

CHAPTER 1

INTRODUCTION

The aim of this book is to describe the chief characteristics of the major agricultural regions of the world and to attempt some explanation of how they came into being. Although there is some description of contemporary features, the emphasis is upon the historical geography of the major farming systems; first, because the author believes that a proper understanding of present geographies cannot be reached without some knowledge of past development; and second, because whilst there is no shortage of contemporary descriptions of the world's major agricultural regions, there have been few attempts to describe their evolution.¹

But how is the distribution of the major types of agriculture to be explained? There have been many approaches to this problem; some have argued that the distribution is largely a response to variations in the physical environment; others have seen the growth of population and the consequent intensification of farming methods as a major factor differentiating one part of the world from the other, whilst yet others have laid great stress upon the distance that farmers are from their markets. Those who believe that farmers respond readily to changes in prices for products and inputs prefer to see the growth of regional specialisation in starkly economic terms. Nor does this exhaust the list of explanations. But – with a few exceptions – most analyses of the distribution of types of agriculture have been couched largely in contemporary terms, with little reference to the past.

Yet there have been farmers on earth for ten, perhaps twelve thousand years. And farmers as a whole have been – until the last half century – remarkably slow to respond to technical and economic change. The imprint of the past is still clearly to be seen in the world pattern of agriculture. To understand the present, it is essential to know something of the evolution of the modern types of agriculture.

Typologies of agriculture

The origins of some of the modern systems of agriculture can be traced back at least 10 000 years. Further, until a century ago some four-fifths of the world's population were living outside towns and thus directly or indirectly dependent upon agriculture. Even today, after a century of industrialisation and urbanisation, half the world's working population are still employed in agriculture. Clearly the factual evidence available is enormous. Thus some classification of

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modern agriculture must be attempted in order to provide a framework for discussion.

It would seem at first sight self-evident that although farms are different from each other, yet many show a fair family-likeness and can thus be grouped together as a 'type of agriculture', or an 'agricultural system'. Furthermore in much of the world similar types predominate in one area, and that area can then be described as an agricultural region. Unfortunately there are many practical and methodological difficulties in establishing a world typology of agriculture, just as there are, for that matter, in devising typologies of soils, vegetation, climate, race, economies or terrain.² Although this book does not purport to make any original contribution to the methodology of agricultural typology, some of the problems which arise in constructing a world typology must be noted.

The first of these is simply the lack of information. Most agricultural geographers would agree that the best way to construct an agricultural typology, be it for the world or simply for a part of a country, is to try to group the fundamental units of agricultural production – that is, farms – on the basis of similarity; that these similarities should be inherent properties of the farm, rather than external forces which influence the type of farming. Thus there should be used as criteria of similarity elements such as the crops grown, the animals reared, the implements used and the size of the farm, rather than the type of climate or soil or the distance from the market. Further, these criteria should be measurable, but this is rarely possible.

Agricultural statistics are collected annually in many countries of the western world, and cover most of the criteria which are thought suitable for use in classifying farms. But they are rarely publicly available for individual farms; more commonly the published data for individual farms are aggregated into parishes, communes or counties. Clearly a county or a *département* may include within it many different types of farms whose characteristics are lost in the aggregation of the data. But at least such data allow some attempt at the establishment of agricultural regions, and have been used for such a purpose in many parts of the western world. When dealing with relatively small areas the investigator can use the sample questionnaire method; farmers are asked to complete forms giving information on crops, livestock and income; the great advantage of this approach is that data are available for the *farm* rather than for the aggregation of farms. But it is only practicable for small areas.³

But for much of Latin America and Afro-Asia no such data are available either for the farm or for any administrative level below that of the state, and for a variety of reasons the accuracy of the information is far less reliable than in western countries.

Thus at a severely practical level, the construction of a world agricultural typology is well-nigh impossible. Even where data are available, there are considerable problems. What criteria should be used to assign farms to a given 'type of agriculture'? Derwent Whittlesey, in his classic discussion of the problems of

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agricultural typology, believed that there were five criteria by which characteristic types of agriculture could be recognised.⁴

1. The crop and livestock association
2. The methods used to grow the crops and produce the stock
3. The intensity of application to the land of labour, capital and organisation, and the out-turn of product which results
4. The disposal of the products for consumption (i.e. whether used for subsistence on the farm or sold off for cash or other goods)
5. The *ensemble* of structures used to house and facilitate the farming operations

There would be general agreement amongst geographers that these 'elements' – as Whittlesey called them – are critical, with the exception of the fifth. But there would be equal agreement that there are important omissions, not the least being the type of land tenure and the size and layout of the farm.

Since Whittlesey's essay was published in 1936 there has been much discussion of the problems of agricultural typology and the allied problems of regionalisation. In 1964 the International Geographical Union set up a Commission on Agricultural Typology, which has tried to establish uniform criteria by which farms should be classified, and to persuade individual geographers to use these criteria in their work on different parts of the world.⁵ Thus in the long-run such work could be collated, and a hierarchy of agricultural types established for the world as a whole. This is an entirely praiseworthy aim; but one is constantly reminded of Lord Keynes' definition of the long-run.

A different approach has been pursued by many writers of textbooks on economic geography. They have taken Whittlesey's original classification and modified it in the light of changes in agricultural practice since the 1930s.⁶ A number of writers have also criticised the individual 'types' that Whittlesey suggested: the plantation system and shifting agriculture have received particular attention.⁷

We are left, however, without an entirely satisfactory solution to our problem. Pragmatism must – sadly – take precedence over principle, and the basis of the discussion in this book is Whittlesey's map of the agricultural regions of the world, as modified by subsequent writers (Fig. 1). The major types of farming which are considered are:

1. Shifting agriculture
2. Wet-rice cultivation in Asia
3. Pastoral nomadism
4. Mediterranean agriculture
5. Mixed farming in western Europe and North America
6. Dairying
7. The plantation system
8. Ranching
9. Large-scale grain production

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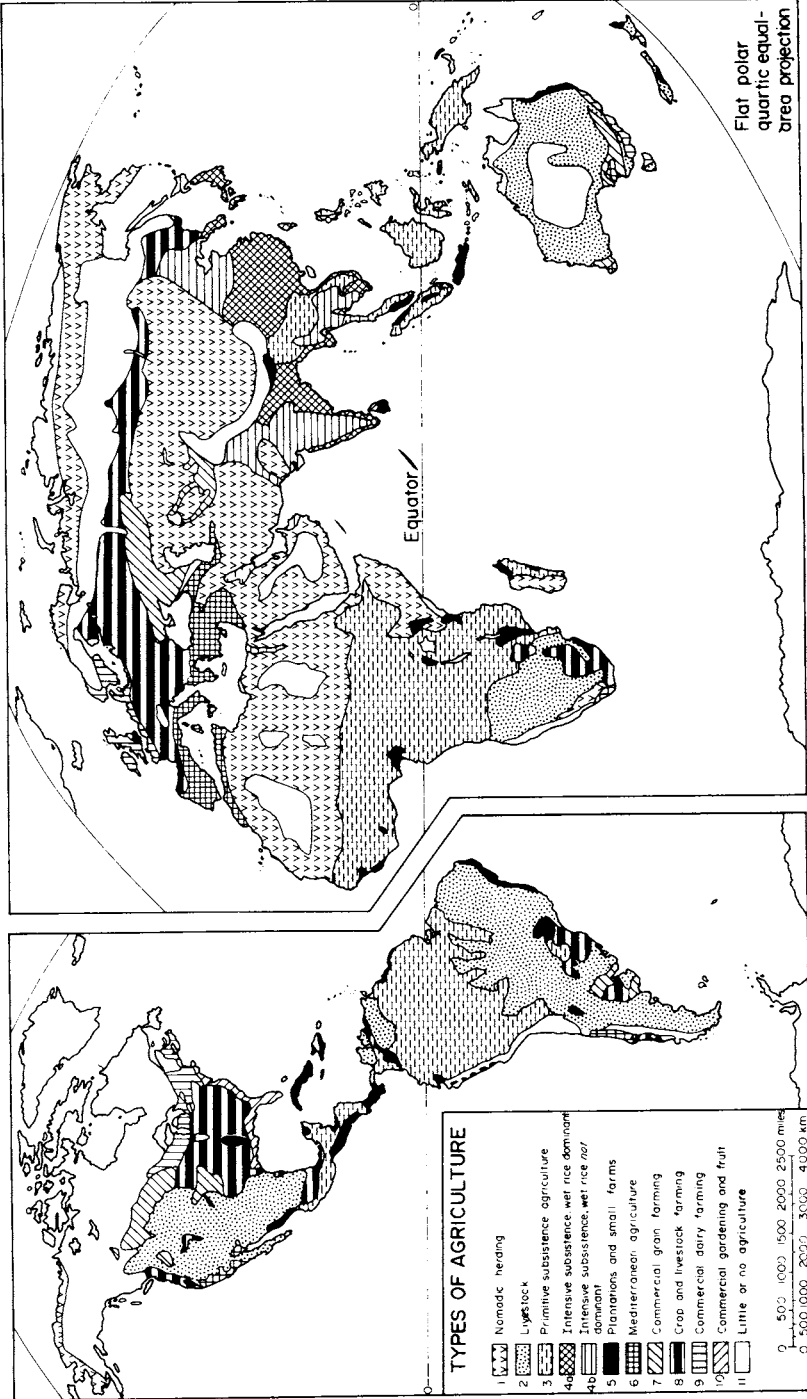


Fig. 1. The agricultural regions of the world, after D. Whittlesey.
[Source: Finch *et al.*, 1957, Plate 8]

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This is not a comprehensive typology of world agriculture. But these types occupy much of the earth's agricultural area and employ most of the world's agricultural population. Their discussion should be sufficient to demonstrate the historical approach to agricultural geography which is advocated in this book.

Processes and periods

Before dealing with each of the major types of agriculture, it may be useful to consider some of the major processes which have influenced their development.

The growth of world population, and in particular the regional differences in growth, have been of paramount importance in determining the characteristic features of modern agriculture. Until recently most writers assumed that pre-industrial populations were dependent upon food supply; thus population numbers were a function of the nature and efficiency of the type of agriculture. A number of writers have inverted this thesis, and have suggested that the growth of population has caused the intensification of agriculture, and thus led to changes in the type of farming in a particular area.⁸ This argument begs a number of questions; no satisfactory explanation of the change in population has yet been offered that excludes the role of food supply. There are, however, other aspects of population growth of great importance, in particular, migration. At the end of the Pleistocene man already had a very wide distribution.⁹ But the establishment of relatively dense populations dates only from the rise of village farming communities in the seventh and sixth millennia B.C. From that time there have been repeated migrations of farmers into unoccupied or sparsely occupied land. The 'frontier concept' is one associated primarily with the European occupation of North America, Russia and Australia.¹⁰ It is worth remembering, however, that there have been equally important expansions of the agricultural frontier from much earlier times. Thus the Bantu occupation of Africa south of the tropical forest took most of the first millennium A.D., as did the Chinese settlement of the lands south of the Yangtse, whilst the same period saw the agricultural colonisation of much of Europe north of the Alps.

The growth of the world population has accelerated since the last century. From about 250 000 000 in the early Christian period, it had only grown to about 430 000 000 at the time of Columbus' arrival in the Americas and somewhat less than 1 000 000 000 at the beginning of the nineteenth century.¹¹

Since then, not only has the population continued to increase, but the *rate* of increase has risen (Table 1). The area under cultivation has increased as population has grown. But in the last hundred years there has been relatively little increase in the cultivated areas of the old agricultural civilisations of Europe, the Indian sub-continent and East Asia. Instead, most of the expansion has been in the recently settled areas of Russia, Australia, North America and Latin America (Table 1).

In spite of the great migrations which have been going on for some 10 000 years, remarkably little of the earth's land surface is cultivated. About 11 per

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cent is used for crops and another fifth used for grazing. Further, in spite of the continuing pressure to expand the *ecumene*, the world's population is still remarkably concentrated. In 1960 about four-fifths of the world's population lived on only 16 per cent of the earth's land surface, whilst only 15 per cent of the land surface had densities above 20 per km².¹²

TABLE 1 *Regional increases in population, A.D. 14–1970 (millions)*

Region	14	600	1000	1340	1500	1700	1800	1900	1920	1950	1970
North Africa	11	4	4	5	6	2	5	27	46	51	87
Rest of Africa	12	33	46	65	79	97	95	106	94	166	257
North America	3	7	13	29	1	1	6	82	117	166	228
Latin America					40	12	19	74	91	162	283
East Asia ^a	80	65	80	89	131	201	391	586	597	830	1217
South Asia	70	75	70	75	79	200	190	297	326	481	762
South West Asia	34	26	22	22	15	13	13	43	44	44	77
Europe ^b	39	24	44	90	82	112	179	430	486	572	705
Oceania	1	1	1	2	2	2	2	6	8	12	19
World	256	237	280	378	427	641	890	1651	1810	2486	3632

^a Including South East Asia^b Including Soviet UnionSources: Clark C., 1967, 64; U.N. *Demographic yearbook*, 1958, and 1970, 104–5

There are many reasons for this continuing concentration of population, but one of considerable significance is the physical environment. Although geographers have recently been apt to discount the importance of environment, as a reaction to the period when geographical determinism was used as a basis of all explanations, the great importance of the physical environment in explaining the development of types of agriculture can hardly be gainsaid, and will be apparent throughout this book.

A third important process has been the diffusion of crops, livestock and farming techniques. The wild plants from which crop plants have been domesticated were found in relatively few parts of the world, but the crop plants are now widely distributed. Similarly, farming techniques have been carried from their areas of origin and practised in new environments.

Fourth is the complex series of changes which have accompanied economic development in the last 200 years: industrialisation, urbanisation, commercialisation and transport improvements, combined with radical changes in agricultural technology, have revolutionised farming since 1850.

Although agriculture has a history of at least 10000 years, technical change was remarkably slow until the middle of the nineteenth century. Most of the major crop plants and livestock were domesticated by the second millennium B.C., if not before; and by the middle of the first millennium B.C. the techniques and implements which prevailed in the major agricultural civilisations until the nineteenth century had already been devised, if not widely adopted. Thus the ox-drawn plough, the hoe, the digging stick, the sickle, harrow, axe and machete

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were used; fallowing, the use of cattle manure, the growth of legumes to maintain soil fertility, irrigation, water-lifting techniques and a variety of other fundamental techniques were all known to farmers.

The early history of agriculture is so important in understanding the present distribution of peasant farming systems that it is given special attention in Chapter 2, whilst the diffusions of crops and livestock, particularly those that took place after the discovery of the New World, are treated in Chapter 3. In Chapter 4 an outline of the major economic changes of the last 100 years is given, and the change in the pace of agricultural innovation is discussed. This completes the systematic discussion of factors influencing the evolution of agricultural systems. Part Two is devoted to a discussion of the evolution of individual types of agriculture.

PART ONE

CHAPTER 2

THE EARLY HISTORY OF AGRICULTURE

There are few subjects in which there have been such great changes in recent years as the prehistory of agriculture; and probably few in which there will be greater changes in the near future. Fortunately our only purpose here is to describe those features of the early history of agriculture which are relevant to an understanding of the development of modern types of agriculture.

Agriculture is generally understood to mean both the cultivation of crops and the rearing of livestock, and thus the beginnings of agriculture go back to the first domestication of plants and animals. It is helpful to make a distinction between 'seed' agriculture and 'vegeculture'. The latter refers to plants reproduced by vegetative propagation, mainly tropical roots such as taro, manioc, yams, sweet potatoes and arrowroot. In tropical vegeculture rhizomes have to be cut from the growing plant and individually planted. There is less need to completely clear the natural vegetation; if a mixture of roots is grown, crops may be harvested, by digging up each root individually, over a long period, rather than at one specific time; there is thus less need for storage. Most tuber-growing communities also collected the fruits of trees such as bananas or coconuts, and little more than protection, rather than domestication, was necessary to provide a food supply.¹

In seed agriculture, which includes of course the cereals which are now the staple food crops in all but a few parts of the world, more initial clearance of vegetation is necessary, seed is sown *en masse* and harvested in one short period. The crops are predominantly annuals, and have a marked growing season, necessitating some form of storage during the winter or dry season. Seed agriculture has formed the basis of the major agricultural civilisations and was associated early on with the plough and draught animals. The importance of vegeculture in early agricultural history has been neglected. It now seems likely however that primitive vegeculture developed in the tropics, on the boundary between forest and grassland, in the Americas, Africa and South East Asia. The area in which these systems predominated has been reduced by the expansion of seed agriculture.

The best-known tropical vegeculture is that of South East Asia which may be taken to include not only the mainland and the Malaysian archipelago, but also Assam and South China. A number of important root and tree crops are indigenous to this region, including taro, the greater yam, the breadfruit, the sago palm, the bamboo, coconuts and bananas. Poultry and pigs were also independently domesticated in this region. Little is known of the methods of far-

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ming, but it is likely to have been primitive, relying upon stone axes, fire and the digging stick. The earliest archaeological evidence of vegiculture is in Thailand where legumes – possibly domesticated – have been dated at about 9000 B.C.;² plant domestication was certainly achieved on the mainland of South East Asia by 7000 B.C. This farming system was found above the valley bottoms and deltas, and expanded into – or developed independently in – eastern India, southern China, Taiwan and possibly Japan.³ It also spread eastwards from western Malaysia into Melanesia and the Polynesian islands. The chronology of this movement is in doubt; but the earliest evidence of migrants in the Marianas was about 1500 B.C., in New Caledonia 847 B.C., the Marquesas 120 B.C., Fiji 46 B.C., Hawaii A.D. 124 and New Zealand in the tenth century A.D.⁴ What is significant is that rice, presumably domesticated in the mainland after the domestication of the tuber and tree crops, was not taken to Melanesia or Polynesia, although it later penetrated the western part of the Malaysian archipelago.⁵ Thus when Europeans first arrived in Polynesia the crops and methods in use were still those of the original vegiculture of the mainland.

In South East Asia vegiculture almost certainly preceded seed agriculture. This is less sure in Africa or South America. But it is possible that a vegiculture developed in West Africa on the margins of the tropical forest and savanna, based upon the yam indigenous to West Africa (*Dioscorea cayenensis*), and the oil-palm tree.⁶ West Africa remains one of the few areas where root crops form a major part of the agricultural economy, although the indigenous crops have been supplemented by roots from America and South East Asia.

There was a third centre of tropical vegiculture in South America, where the major root crops were manioc (*Manihot utilissima*), the sweet potato (*Xanthosoma*) and arrowroot. These crops, together with the peanut, were probably domesticated in the tropical lowlands east of the Andes at some time between 7000 B.C. and 3000 B.C. in an area stretching both north and south of the Amazon. By 3000 B.C. the crops had been combined into a system, which was subsequently taken into the islands of the Caribbean, and the southern part of Central America.⁷

A quite different selection of root crops characterised the plateau areas of the Andes around Lake Titicaca. Most important was the potato, but oca (*Oxalis tuberosa*), ulluco (*Ullucus tuberosus*) and anu (*Tropaeolum tuberosum*) were probably domesticated there together with the grain crop, quinoa (*Chenopodium quinoa*). This highland tuber culture was possibly a derivative of the tropical lowland root culture.⁸

Little is known of the methods of farming practised by these early groups. They probably used the digging stick, stone axes and fire to clear the vegetation, and practised shifting cultivation, whilst continuing to rely upon hunting, gathering and fishing for much of their food supply. Domesticated animals were unimportant, and quite absent in South America. Pigs and poultry, both scavengers, were early domesticates in South East Asia, and were taken to the Polynesian islands.

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Vegeticulture based on roots was essentially tropical in location, and has contracted as the farming systems based upon cereals have expanded from their heartlands. There were three major centres of cereal domestication in the Old World: South West Asia, North China and South East Asia, and possibly two in the New World, southern Mexico and Peru.

South West Asia and the eastern Mediterranean

The first archaeological evidence for the domestication of cereals, and some of the earliest evidence for the domestication of animals, comes from a broad region stretching from Greece and Crete in the west to the foothills of the Hindu Kush south of the Caspian in the east.⁹ Here are found the wild plants from which wheat and barley were domesticated¹⁰ (Fig. 2), whilst it is only in this zone that the wild progenitors of sheep, goats, cattle and pigs were found together, for the latter two had a much broader distribution than wild sheep and goats (Fig. 3). By the tenth millennium B.C. peoples who relied upon hunting and gathering were reaping wild barley and wild wheat with knives, grinding the grain and using storage pits.¹¹ By the sixth millennium there is evidence of village communities growing wheat and barley, and keeping sheep and goats, in Greece and Crete in the west, in southern Turkey, the Galilean uplands of the eastern littoral of the Mediterranean, in the Zagros mountains of Iran and Iraq, the interior plateaux of Iran, and in the foothills south east of the Caspian.¹² Subsequently the number of domesticated plants grown was increased, including flax, for its oil rather than for fibre, peas, lentils and vetch. By the fourth millennium the olive, vine and fig, the crops which give traditional Mediterranean agriculture much of its distinctiveness, had been domesticated in the eastern Mediterranean.¹³ Cattle and pigs are thought to have been domesticated after sheep and goats. Cattle were used as draught animals, and for meat; not until the late fourth millennium is there evidence of milking in South West Asia.¹⁴

In the sixth and fifth millennia there was a significant change in the location of farming communities; they appear for the first time on the flood plains of the Tigris and Euphrates.¹⁵ In Egypt, agriculture was derived from South West Asia; the first farming communities appear in the fifth millennium B.C., but above the flood plains of the river. It was not until the middle of the fourth millennium that farmers occupied the Nile flood plains and began to use the annual floods to irrigate crops.¹⁶ By the late fifth millennium B.C. the farms and villages of the Ubaid culture were widely scattered in southern Mesopotamia, whilst Dynastic Egypt had emerged by the late fourth millennium. The rise of these literate urban civilisations was the result of a long period of development of food production methods, and the changes which took place on the flood plains may have been a critical prerequisite for urban growth.

Farming methods in South West Asia and the eastern Mediterranean

The earliest farmers had reaping knives, sickles and simple methods of grinding