Cambridge University Press
978-1-108-42292-5 — The First Farmers of Europe
Stephen Shennan
Excerpt
More Information

CHAPTER 1

INTRODUCTION: POPULATION, RESOURCES AND LIFE HISTORIES

The origin and spread of farming had enormous implications for human history, and for this reason has long been established as one of two or three 'big questions' about the human past. Farming has been the foundation for the development of cities and civilisations and at the time of writing supports a world population of 7.5 billion people. It has changed human biology as well as human society. It has therefore attracted an enormous amount of archaeological attention. In recent years, as archaeological research on the prehistory of the human exploitation of plants and animals has expanded on a global scale, it has become increasingly clear that there were not just three or four loci of agricultural origins but a much larger number in different parts of the world, based on different crops and with different evolutionary histories, so we can no longer tell a single story of the origins of agriculture, or even two or three. Nevertheless, south-west Asia remains what we might call the 'locus classicus' of agricultural origins research because the crops and animals that were domesticated there were the subsistence foundations of the early civilisations of the western Old World and their successors and thus form part of the 'grand narrative' of the 'western' societies.

My aim in this book is to take an evolutionary perspective on understanding the interactions between population, subsistence and socio-cultural traditions that resulted in the origin of cereal agriculture in south-west Asia and its subsequent spread westwards into Europe. The book's central argument can be summarised in two claims. Farming originated because broadening their diet breadth led people to increasing sedentism through growing dependence on plant resources that were dense and sustainable; as a result they had more children and more of them survived. Farming spread because it enabled people to be reproductively successful by colonising new territories that had low-density forager populations, so long as they kept passing on the knowledge, practices, and the crops and animals themselves, to their children. The object of this introductory chapter is to present the theoretical foundations for this argument. It is based on ideas from the rapidly developing fields of evolutionary demography, human behavioural ecology and cultural evolution, but has its origin in the debates started by Malthus over 200 years ago on the relation between population, resources and technology. Accordingly, the chapter begins with a review of these debates and then outlines the basic ideas of evolutionary demography and their implications, together with some of the ethnographic and historical evidence for their significance. It goes on to examine the relevance of these ideas to understanding the processes involved in becoming a farmer, first as presented in the concept of the 'Neolithic Demographic Transition' proposed by the French demographer Jean-Pierre Bocquet-Appel, then by looking at some recent historical and ethnographic studies which have thrown light on the demographic dimension of being or becoming a farmer. After a brief initial consideration of the role of cultural transmission, the chapter closes with an outline of the structure of the book.

MALTHUS AND BOSERUP

Since the 1960s debates in anthropology about the role of population have mainly been framed as a conflict between Malthus's view, that increasing population would always come up against limits imposed by technology, and that of the agricultural economist Ester Boserup (1965, 1981), who emphasised what she saw as the positive role of population growth in leading to economic change, though the conflict between the two has been greatly exaggerated (Lee, 1986; Wood, 1998). Central to Malthus's theory, and of course fundamental for Darwin, who took up his idea as the basis for his theory of evolution by natural selection, was that populations have the potential to grow much more rapidly than the food supply and are subject to density-dependent limits based on food availability. Bringing new individuals into the world increases the future labour supply but also increases the demand for food. Other things being equal, the law of diminishing returns will eventually set in and the average amount of food per person will decrease, until the food produced by an additional individual is no more than the amount they need for survival. Thus, population increase starts to slow down and eventually population levels out, or can even go down, for example if over-exploitation of the soil or of the animals available for hunting sets in, as the Malthusian checks of decreasing fertility and increasing mortality begin to operate. If technical or economic innovation to improve outputs per capita or per unit area of land has some sort of costs, then members of a population that has reached a demographic equilibrium may be more prepared to pay them than people who are not in this situation; hence 'population pressure', as in Boserup's model, can be a stimulus to innovation. Nevertheless, it is important to point out that such conditions do not automatically call into being the innovations that could overcome them. Their incidence will be determined among other things by chance and by patterns of contact, not to mention the possibility of technological 'lock-in' making it very difficult to switch from one subsistence strategy to another (Wood, 1998: 109).

As Wood shows mathematically, whatever the subsistence system, at least in pre-industrial societies, population will increase past the point of maximum well-being, where the gap between surplus production and population is at its greatest, and come to an equilibrium (or oscillate around an equilibrium) at the point where births balance deaths, or 'a state in which the average individual is in just good enough condition to replace himself or herself demographically' (Wood, 1998: 110). In most hunter-gatherer societies the population density at that equilibrium point will be much lower than in a complex agrarian civilisation based on intensive agriculture, but the situation will be the same, though in the latter case it may well be impacted by elite 'surplus' extraction. The speed at which populations grow when the potential exists for them to do so is easily underestimated (cf. Richerson et al., 2001); for example a population of 100 would reach more than 2,000,000 after 1000 years at the modest growth rate of 1% per year. Thus, it is clear that for most of the time over the long run, unless there are frequent crashes arising from external factors (cf. Boone and Kessler, 1999), populations will be at the equilibrium limit, or fluctuating around it, so that further increases will only occur when some shift in technology, economy or a relevant external force like climate makes it possible (Richerson et al., 2009). When such changes do occur they will have a 'pull' effect on population until it reaches a new equilibrium.

Thus, Wiessner and colleagues (1998) showed that after the introduction of the sweet potato to the Enga of Highland New Guinea around 1700 AD population increased from an estimated 10–20,000 to 100,000 within around 220 years, an annual growth rate of 0.7%. Population shifts and migrations set off by the new opportunities resulting from the sweet potato were the most prominent catalyst for change mentioned in local historical traditions. By the time of European contact population pressure on land was beginning to act as a constraint. Similarly, a recent global-scale historical analysis (Ashraf and Galor, 2011) found that, 'technological superiority and higher land productivity had significant positive effects on population density but insignificant effects on the standard of living'. Essentially, the fruits of economic growth, at least until modern times, were always turned into people if not confiscated by elites, so the population growth rate associated with a given economic strategy at a specific point in time is a measure of its success.

LIFE HISTORY THEORY

Of course, the Malthus–Boserup models represent large-scale abstractions, while the processes from which they are built go on at a local level in the day-to-day lives of individuals, in particular women, and households. Over the last 30 years, studies of the cost-benefit factors influencing local reproductive decision-making have been revolutionised by the emerging discipline of evolutionary demography, based on the framework of life history theory, in parallel with, and influenced by, the economic work of Becker and others on human capital (see J.H. Jones, 2015; Sear et al., 2016 for recent reviews). Life history theory is a set of ideas from evolutionary biology concerned with the effect of natural selection on how organisms allocate their limited resources through the course of their lifetime. It is concerned with such questions as: how much effort should be allocated to growth at a particular stage of the life cycle? How much to reproduction? As far as reproduction is concerned, to be successful is it best to devote most effort to mating or to parenting at a particular stage in life? Will it be more successful to produce a large number of offspring without caring for them much, or a smaller number in whose care a great deal is invested? Those individuals that come up with the optimal allocations in the light of the specific constraints they face will be most successful in natural selection terms, so, over time, selection should lead to evolved life histories that produce higher fitness. The point of life history theory is to explain how and why life history allocations within and between species vary over the lifespan. This theory provides micro-scale foundations for understanding population processes that are entirely consistent with the more abstract Malthus–Boserup view outlined above. Evolutionary demography is less familiar to archaeologists than another domain of human behavioural ecology: optimal foraging theory, a set of evolutionary principles concerning the costs and benefits of resource choices on a day-to-day and year-to-year basis that will figure prominently in later chapters, but it is arguably even more important, and the processes and outcomes at the two scales are obviously interrelated.

The starting point for its application to humans, of course, is that they are the same as the rest of the living world, in the sense that, as the outcome of millions of years of natural selection, they should have a propensity to maximise their reproductive success and a sensitivity to environmental factors that affect this; strategies that lead to higher reproductive success in a given set of conditions are likely to spread at the expense of less successful ones. It is important to be clear that this does not necessarily involve conscious motivation, although elements of it might do – in general, for example, people consciously want to take care of their children – but some of the mechanisms related to the goal of achieving reproductive success are entirely physiological.

Thus, at any given age humans, like other animals, face the optimisation problem of allocating their lifetime 'income' in terms of energy among investments in survival, improving the possibilities for future 'income', and in reproduction (including parental investment), to give the solution that maximises the energy for reproduction at that age (Kaplan, 1996: 95). Female nutritional status, for example, has a considerable impact on fertility (e.g. Ellison et al., 1993). The closing down of the female reproductive system under conditions of nutritional stress is often seen as a pathological phenomenon, but from the life history perspective it is better seen as an adaptation. It makes much more sense under these circumstances to devote current resources to survival rather than to reproduction, which will probably fail anyway, and to wait for the possibility that resources will improve in the future and make successful reproduction more likely. Similarly, it is no good producing children every year if they die in infancy because it is impossible to provide care and other resources for several of them at the same time. That is to say, there are quantity-quality trade-offs; one must not only produce children but also invest in their upbringing, so that they do not die in childhood but instead become successful reproducing adults themselves. Accordingly, the processes of fertility regulation observed ethnographically and historically should be seen as responses in the individual's interests to the current prospects for reproductive success, which may require, for example, much longer inter-birth intervals than those that are theoretically feasible. Indeed, it has been shown that the most important life history factor affecting fitness is the survival of children, especially over the first four years of life, which makes a massively bigger difference than allocating the same quantity of effort to increased fertility (J.H. Jones, 2009; Jones and Tuljapurkar, 2015). In keeping with this, there is clear evidence of diminishing returns to recruitment (successfully bringing the children to adulthood) with increasing numbers of births (Jones and Bliege Bird, 2014): as women get older it makes more sense to look after the children they already have.

An example that illustrates some of these points well is Gibson's (2014) study of the consequences of a 1990s development project in Ethiopia that involved installing clean water taps in a number of villages. Prior to this development, women in the region had had to walk for hours daily, carrying water on their backs. After the taps had been installed time spent carrying water was dramatically reduced, by over ten times on average in the dry season. This was rapidly reflected in a three-fold increase in the probability of giving birth on the part of women who had access to the taps over those who did not, an outcome that had not been anticipated by those who designed the project. There were also major reductions in child mortality, with a decrease in the relative risk of death of 50% per month of life. In fact, the importance of women's energy levels for their fertility (among many other factors (Vitzthum, 2009)) means that it should have been no surprise that the introduction of local water taps led to an immediate increase in the number of births in the absence of education or incentives for birth control, a pattern also seen in other similar studies (Kramer and McMillan, 2006). However, studies some years after the taps had been installed revealed that children from villages with taps were more likely to be under-nourished than those from villages without them, while the mothers' bodily condition had also deteriorated as a result of the shorter birth intervals. The result has been 'increases in family sizes in a population close to environmental limits under current technology' (Gibson, 2014: 75), so the outcome over the medium to long term remains unclear at this point. Evolution is nothing if not opportunistic and short-sighted.

But it is important to emphasise that a given situation will not necessarily affect everyone in the same way, since the availability of resources obviously has a major impact on any trade-offs required. Thus, Gillespie et al.'s (2008) analysis of historical demographic data from 18th-century Finland demonstrated that there were diminishing returns in maternal fitness with increasing maternal fecundity for women from landless but not from landowning families because the limited resources of the landless women resulted in severe quantity-quality trade-offs. Similarly, Voland (1995), in his study of the 18th-century agricultural community of Krummhörn in Friesland, Germany, found that rich landowner male farmers had much greater reproductive success than the general male population, especially over the long term.

In summary, life history theory provides us with a framework that enables us to understand the processes going on at the individual level that affect population patterns at the larger scale. People have been selected by their evolutionary history to maximise their reproductive success. External conditions have a bearing on the best way of doing this and individuals are sensitive, including physiologically, to these conditions. Birth rate is only one of the requirements and has to be traded off against a whole series of other considerations which are relevant to the production of grandchildren. It is impossible to have both maximum birth rate and maximum offspring fitness, and it is the successful raising and social placement of offspring that decides lifetime reproductive success. Changes in external conditions can shift the costs and benefits of an existing set of trade-offs making it advantageous to have more or less children and fertility can respond on a very rapid timescale even if this has deleterious consequences not very far down the road.

THE EVOLUTIONARY DEMOGRAPHY OF BECOMING A FARMER

In keeping with these ideas from evolutionary demography, since 2000 the French demographer Jean-Pierre Bocquet-Appel (2002, 2008, 2011) has developed the hypothesis that the beginning of farming marked a 'Neolithic Demographic Transition'. The modern 'demographic transition' in developed countries marked a shift from a long-standing high-fertility and high-mortality life history pattern to one of low fertility and low mortality. In Western Europe, in particular England and France, death rates began to fall in the late 18th century. After a period of time fertility rates also began to decrease but not nearly as fast as mortality rates, so the result was massive population increase. In England the process of transition lasted over 150 years, until the mid-20th century, before birth rates and death rates came more or less into balance, and in the interim population underwent a seven to eight-fold increase (Dyson, 2010: 88–89, 217).

But the population increases were not merely local. One huge consequence was the mass migration of European populations, to the New World in particular, where the existing low intensity of exploitation and corresponding low density of indigenous populations made it possible for them to expand still further, disastrously aided by the diseases they introduced (Crosby, 1986). Bocquet-Appel proposed that the high-fertility high-mortality pattern characteristic of agrarian societies had begun with the transition from foraging to farming.

Just as the modern demographic transition was started by a fall in mortality, the argument runs, so the agricultural demographic transition began with a rise in fertility, detectable in the high proportion of young individuals in Neolithic cemeteries, an indicator of population growth (Sattenspiel and Harpending, 1983). In this case it was mortality that subsequently caught up, not least because of the increased incidence of infectious disease; again there was major population increase in the interim. The basis of the fertility increase, Bocquet-Appel proposed, was a major positive shift in female energy balances, resulting from the increased availability of calories from cultivated crops, on the one hand, and decreased mobility on the other, that also fed through into child care.

In fact, we can throw more light on these processes because people in different parts of the world have continued to become sedentary and become farmers up to the present. Consequently, ethnographic and recent historical studies have provided direct evidence of the demographic implications of adopting sedentism and farming. These studies provide strong support for the relevance of life history theory in this context and thus for making the inferences from the archaeological record with its evidential shortcomings that we will see later in this book.

The earliest such study was published by Binford and Chasko (1976). They collected data on the birth and death rates of an Inuit group, the Nunamiut, in Alaska, from the 1930s to the 1960s and found that the crude birth rate doubled during the 1950s, when they were changing from a mobile to a sedentary way of life, levelling out when they became fully sedentary and then decreasing after contraceptives were introduced. Their analysis of the factors leading to the increased birth rate concluded that it was overwhelmingly the result of a reduction in the seasonal variation in food intake and a higher proportion of carbohydrates in the diet because they were able to acquire store-bought non-native foods, especially cereals. Indeed, in their conclusion to the study they anticipated the Neolithic Demographic Transition hypothesis, speculating that

> The first major demographic 'transition' occurring near the close of the Pleistocene was caused by changes in fertility, rather than by the 'normal' condition of changes in mortality that has led to transition in modern times. Dramatic demographic changes can be related in a provocative manner to changes in fertility as conditioned by shifts in labour organisation and diet. (Binford and Chasko, 1976: 142–143)

Other studies have emphasised the effect of sedentism on child mortality, which decreased by 75% among sedentary !Kung in southern Africa, for example, probably because settling at Herero cattle posts gave them access to milk and other weaning foods (Pennington, 1996). Kramer and Greaves's (2007) ethnographic study of demographic parameters of separate groups of Pumé foragers and horticulturalists in Venezuela found both effects at work: women in the horticultural group had an average completed fertility of 7.27 surviving children, compared with 4.25 for the hunting and gathering group; the increase resulted from both higher infant survival rates (contributing 79% of the increase) and higher birth rates (21%). Both are the result of higher food availability among the horticulturalists: young children are very susceptible to food shortfalls, which also affect female reproductive function. As in Gibson's Ethiopian study, the increased energy availability is turned into increased fertility, which compounds with the increased child survival to produce a very rapidly growing population.

The outstanding historical demographic data from local parish records in Finland has provided the basis for a similar study (Helle et al., 2014), in which vital rates from Saami hunting-fishing-gathering groups were compared with those of Finnish farmers who had moved into northern Finland and lived alongside them; these were sedentary agriculturalists who raised cattle and sheep and grew some barley and potatoes in what were marginal conditions for crop growing. After their initial arrival there was very little further immigration during the 19th century so the population growth that occurred was almost entirely the result of local increase. Both populations were growing during the period studied but analysis of life history parameters constructed from the historical records showed that the growth rate for the Finnish farmers was 6.2% higher than that of the Saami hunter-gatherers. Projected over 100 years this would lead to a farmer population nearly double that of the foragers. Importantly, the study was able to show that the differential was due to fertility not mortality differences, and in particular to a higher birth rate for women between the ages of 21 and 30, while the percentage of children brought to adulthood was essentially the same for both foragers and farmers (c.80%).

Another recent ethnographic study (Page et al., 2016) tested the hypothesis that the transition to farming involved a shift in the nature of parental investment trade-offs from a strategy based on investing large amounts of resources in a small number of offspring to investing less in a larger number, a change that is postulated to have resulted in greater reproductive success for those that adopted it, despite the deleterious effects that were also incurred. The study was based on a group of Agta foragers in the Philippines who varied in the extent to which they were mobile and practised foraging, thus providing a basis for relevant comparisons. Settled mothers had an estimated successful completed fertility of 7.7 compared with 6.6 for mobile mothers. The argument we have seen already that the difference is related to nutrition was supported by the fact that there was a positive correlation between fertility and maternal body mass index (BMI) and a negative one between BMI and greater mobility. In addition to sedentism, increased involvement in cultivating as opposed to foraging also positively affected fertility. On the other hand, evidence indicated that individuals in sedentary settlements suffered worse health conditions resulting from a variety of infections; for example, they had a far higher incidence of lymphocytosis, a response to viral infection, and higher rates of helminth infestation in the gut. The poorer health conditions in sedentarised camps were also reflected in increased child mortality, with an increase of over 60% for the children of settled mothers in sedentary camps compared with those of mobile mothers in temporary camps. Nevertheless, despite this, the number of children surviving to age 16 was greater for sedentary than nomadic women because their high fertility more than compensated for the increased mortality. The result was an increase in reproductive fitness of over 15% compared with the nomadic women. The effect of sedentism was compounded by the effect of involvement in cultivation, which resulted in increased fertility compared with foraging but did not have an effect on child mortality.

In this case then the results support the hypothesis that a new trade-off of offspring quality in favour of offspring quantity could account for the combination of increased ill health with more successful recruitment. In fact, the trade-off is in keeping with other studies that point to decreasing parental effort in the face of increased extrinsic mortality, that is to say mortality that is not affected by parental care; for example, Quinlan's (2007) cross-cultural analysis found that maternal care increased with increasing pathogen stress then declined. Since pathogen stress is a factor in child survival that care can do little to mitigate beyond a certain point, it is safer to spread a given amount of care across more children. This may be particularly relevant in the tropical environment of the Agta.

SYNTHESIS

The examples described above show that different combinations of static/increasing fertility and increasing/decreasing child survival can result in increased reproductive success and population growth for sedentary ways of life, including cultivation, compared with mobile foraging, because of reduced metabolic loads and/or decreased risk and improved weaning possibilities. Moreover, improved infant survival and greater reproductive success can still be consistent with poorer health and lower life expectancies for the population as a whole (Pennington 1996). It is important to note though that population growth depends on the sedentary adaptations and cultivation having a higher sustainable carrying capacity – supporting more people per unit area – than mobile alternatives, which is not the case everywhere. Even then, however, high fertility will eventually be matched by high mortality, sooner rather than later given the implications of even low rates of increase, as we have seen. This situation can be mitigated if promising dispersal opportunities are available, as with the European colonisation of North America: growth can continue but it is now spatially expansive rather than locally intensive. Moreover, promising dispersal opportunities also introduce a further consideration, not immediately obvious, that tends to favour life histories that increase fertility: demographic competition for expansion. In terms of the competition for reproductive success, a strategy that postpones reproduction when an expansion opportunity exists will be less fit than one that takes immediate advantage (Voland, 1998).

Finally, the 'variance compensation hypothesis' proposed by Winterhalder and Leslie (2002) is also likely to be relevant to the transition (Bandy and Fox, 2010), in that the costs of having extra children may be higher for non-sedentary hunter-gatherers given the requirement for mobility, so they may err towards the low side of a notional ideal number of children in the face of environmental unpredictability. Agriculturalists on the other hand, may tend to err on the high side, not just because of the increased unpredictability of child survival as a result of increased disease risk but also because children become useful in farming at a young age (Kramer and Boone, 2002). Kaplan et al. (2000) showed that males in hunter-gatherer societies do not start producing more than they consume until the age of 20. In agricultural societies older children actually subsidise the investment in younger ones.

As we will see, traditional archaeological accounts of the link between the origin and spread of farming and population emphasised the idea of population pressure and were puzzled by the evidence that adopting farming seemed to be associated with a decline in human health, as well as increasing amounts of labour: it was seen effectively as expulsion from the Garden of Eden of the 'original affluent society' (Sahlins, 1972). It should be clear now from what has been said that to think in terms of human well-being as a *goal* in this context is mistaken. While levels of well-being at population equilibrium may vary in different populations depending on local circumstances, what matters is the short-sighted evolutionary process of achieving reproductive success in the circumstances prevailing. This is reflected in the long-term global analysis by Ashraf and Gaylor (2011) described above, which showed that technology and land productivity had a positive impact on population density but not standard of living. The ethnographic and historical evidence indicates that the large-scale adoption of sedentism and farming created a Malthusian population *pull* as a result of the increased reproductive success associated with the increased energy availability and improved recruitment that ensued, while high population growth is by no means incompatible with poor nutrition and health (see also Lambert, 2009).

As Page et al. (2016) point out, however, while ethnographic studies like theirs make possible an analysis of variation within the population studied and allow us to distinguish the demographic mechanisms in action in the uptake of farming as a result, they do not allow the exploration of long-term trends or the reasons for them. Why did some Agta become sedentary and start farming given that the reproductive advantages only appear after the changes have occurred? Even studies based on the evidence of historical demography only take us so far in this respect, important though they are. Bocquet-Appel's proposed Neolithic Demographic Transition, on the other hand, gives us a very broad-brush picture of the long term, but again, given that the change is a *consequence* of farming, does not address how it began, and others would place more emphasis on infant survival than increased female energy availability. The chapters that follow will provide a much more detailed long-term picture both of the demographic patterns associated with the origins of agriculture in south-west Asia and its spread westwards, and their causes as well as their consequences. In order to understand these we need to take into account not just the relationships between population, subsistence and environment that have long been the object of discussion but the cultural evolution of subsistence practices.

As we saw with Gibson's Ethiopia example, the circumstances favouring increased reproduction can rapidly dissipate. The long-term consequences of farming depended on the long-term transmission of farming practices from generation to generation and on this continuing to provide a survival and reproductive advantage compared with alternatives. Under standard natural selection, specific versions of genes that provide a selective advantage over others will be passed on from generation to generation and will spread through a population because they improve survival and reproductive success in some way. On the basis of the ethnographic and historical evidence we have seen we can suggest that agriculture represented a cultural strategy that was under natural selection. It was transmitted from generation to generation and spread because it improved survival and reproductive success in comparison with other possibilities, but it depended on the continued transmission of agricultural knowledge and domesticated plant and animal resources. That knowledge could be transmitted from farmers to non-farmers but it could only continue to provide a selective advantage if it was passed on by parents to their children. On average, the grandchildren of anyone who failed to pass on the knowledge and resources would be fewer in number than those of individuals who did. It follows from this that, as well as providing a measure of economic growth at a given point, the population growth rate associated with farming as a culturally transmitted subsistence strategy is also a measure of its fitness, and one that we can get from the archaeological record.

The domestic crops and animals themselves can be regarded as part of a transmitted environment that maintained the selective conditions favouring the farming way of life in a process of 'niche construction' (Odling-Smee et al., 2003), not only by altering physical environments but also by changing the

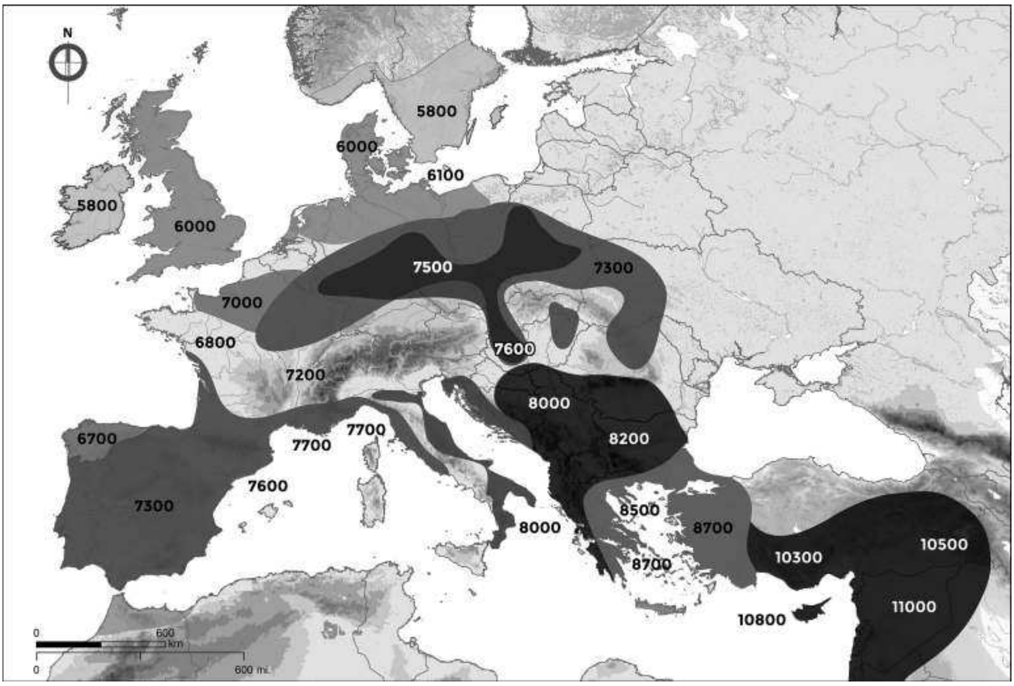

Fig 1.1. Map of the spread of farming from south-west Asia to Europe. Dates shown in years BP. Updated from a map created by Professor J. Burger, with permission.

nature of social institutions such as property rights that would have affected the payoffs of different economic and social strategies (Bowles and Choi, 2013; Gallagher et al., 2015; Shennan, 2011).

On the other hand, if farmers found themselves in a situation where conditions for farming were less favourable, perhaps as a result of climate change, then the selective advantage might disappear, with various possible consequences. People might return to foraging, though this would almost certainly result in a drop in local population and, in many cases, an increase in mobility. However, if the social norms associated with farming practices were very powerful this might not happen and migration to seek more favourable conditions could take place. It certainly cannot be assumed that a technical innovation overcoming the problems created by the new conditions would automatically occur.

STRUCTURE OF THE BOOK

In the light of the theoretical foundations established in this chapter the book provides an account of the processes at work in the origins of agriculture in south-west Asia and the spread of the form of agriculture that developed there westwards into Europe (Fig 1.1). In doing so it makes use of the rapidly growing body of evidence available on population patterns, especially that from the increasing number of analyses of ancient DNA, which give us for the first time direct information on population relationships. Chapter 2 begins by giving an account of the different ideas that have been put forward to account for the origins of agriculture in the region and how these have changed over recent years in the light of new ideas and new discoveries, with a particular focus on the indications of increasing subsistence intensification from the Last Glacial Maximum c.24,000 before present (BP)[1] to the end of the last Ice Age c.11,700 BP and associated demographic patterns. It goes on to describe current evidence and ideas on the emergence of cereal agriculture, accepting the view that this was not something that took place very quickly or in a single location but, on the contrary, that it was a drawn-out process taking 2000–3000 years and going on in many different locations in the so-called Fertile Crescent, from the southern Levant, through south-east Anatolia to the Zagros mountains on the Iran–Iraq border. In a similar vein the evidence for animal domestication is reviewed and it is shown that there is a great deal of variation in the regional trajectories towards increased control and consequent domestication of animals but that it was ongoing across a broad region of the northern Fertile Crescent from south-east Anatolia to the Zagros. Regional population patterns are then discussed before turning to one of the major developments in understandings of the origins of agriculture over the last 20 years, the recognition that it did not just involve subsistence, population and ecology but also major social changes, including new social institutions and property rights, that can usefully be seen from the cultural evolutionary perspective of 'niche construction'.

Chapter 3 looks at the initial expansion of farming in a westerly direction from the broad core zone where it developed, but it begins with an account of the influential model that has framed most accounts of the spread of agriculture as a demographic process, Ammerman and Cavalli-Sforza's (1973) 'wave of advance' model, which raises many of the issues that are considered in this and later chapters. The earliest evidence for the expansion of subsistence practices involving animal and plant management comes from the island of Cyprus, long before a reasonably consistent set of farming practices was developed, and its early date seems surprising given that it involved a presumably risky maritime colonisation. The expansion across Anatolia to western Turkey and across the Aegean Sea to mainland Greece, on the other hand, took place later, when a fairly consistent farming 'package', including dairying, had already been established. This dispersal was extremely fast, but it stopped at the northern edge of the Aegean for 300–400 years before spreading equally rapidly northwards into the Balkans, as far as the river Danube and beyond. New ancient DNA evidence has shown that the Anatolian–Aegean farmers were the starting point for the population expansion that brought farming to the rest of Europe.

Chapters 4 and 5 describe the spread of farming westwards through Central Europe and the Mediterranean respectively. In both cases the ancient DNA evidence now tells us that the mechanism of spread was the population expansion just mentioned and that absorption of local hunter-gatherer populations played a very minor role, at least partly because there were probably very few hunter-gatherers in the areas where farming pioneers settled. Both expansions were rapid: farming communities reached the English Channel by the Central European route and Portugal via the north coast of the Mediterranean within 500 years, but the population growth was not maintained. New data shows that in most places the demographic boom associated with the arrival of farming communities was followed by a crash. In much of Central Europe this seems to have been associated with extensive warfare.

Further expansion into Britain and southern Scandinavia did not occur for another 1000 years. The question is why. Unlike most of the other chapters, which focus on the initial arrival of farming and its consequences, Chapter 6 examines the 7th millennium BP, the period when farming societies were present in most of continental western and Central Europe but the farming frontier in the north and north-west was static. The account given rejects the long-standing view that this was because of ongoing resistance from indigenous hunter-gatherer groups whose societies were only gradually undermined. On the contrary, in much of this broad area farmer populations were declining or static and their distribution restricted to the small areas initially colonised by the first farmers. It was only in the latter part of the 7th millennium that internal expansion out of these small enclaves occurred, so that farmers now occupied much broader areas of the landscape. This led to greater interaction with the local foragers, reflected in the increased forager component in the DNA of the farming groups. However, developments at the western end of the farming zone were distinctive because here communities descended from the Mediterranean expansion met those with a Central European cultural ancestry, a meeting now directly detectable in ancient DNA. The result was new patterns of contact and striking *sui generis* social developments in areas such as Brittany.

Chapters 7 and 8 describe the expansion of farming into southern Scandinavia and Britain and Ireland. Like all the other expansions described it was extremely rapid in both cases. Again the emerging ancient DNA evidence suggests that we are dealing with a population expansion rather than local adoption of farming, effectively a continuation of the expansion that had begun in west-central Europe a couple of hundred years earlier, though there seems to be a greater continuity in subsistence strategies in Scandinavia. In Britain and Ireland and Scandinavia too there was a pattern of population boom and bust, though the timing was rather different. At the height of the boom in both cases large numbers of ditched and banked enclosures of considerable size were constructed, most probably as a result of social competition,

Cambridge University Press
978-1-108-42292-5 — The First Farmers of Europe
Stephen Shennan
Excerpt
More Information

and in Britain at least this time also shows evidence of warfare and violence. Following the population crash distinctive new social and cultural patterns emerged in both the British Isles and southern Scandinavia, although the reasons were different in the two cases.

Finally, Chapter 9 draws together the common threads that have emerged and looks at their implications for the ideas developed in the first chapter, focussing on the action of a number of evolutionary processes operating at different timescales.