An Economic History of Europe

From expansion to development

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The European demographic revolution

The variable of population dynamics is of prime importance in understanding the economic and social changes of the nineteenth century. Production and consumption are correlated to the increase in the population and the way it is distributed geographically, socially and by age group. Despite the importance of demographic data, and although statistics and social sciences were originally developed during the nineteenth century, the available documentary evidence is fragmentary and sometimes based on conjecture, even for important countries.[1] Though the figures cannot be considered as in any way precise, they help us to make useful approximations for outlining the general picture and understanding the underlying ratios and trends.

According to some estimates, the European population, which between 1600 and 1800 had grown at a modest rate of 0.42 per cent annually, between 1800 and 1914 increased at the rate of 0.93 per cent annually. Over the century, many European countries experienced annual population increases of between 0.5 per cent and 1.5 per cent.[2] This was a true demographic revolution, which led to changes in structures, and different patterns of behaviour and settlement.

Britain anticipated the trends that would subsequently involve all the other countries. A large increase in the population after the 1740s meant there was an increase in the labour force in country areas, as well as for putting-out systems, or for urban activities. By the second half of the seventeenth century demographic pressure had already made wide sections of the population available for employment in new manufacturing sectors, such as the cotton industry. Similar, if not higher, increases to those in Britain also took place in other areas of Europe, for example in the Austro-Germanic area. This was the beginning of the 'demographic transition', or the transition phase from the 'demographic model of the *ancien régime*' to the 'new demography'.

The former model, in line with Malthusian theories, was marked by a combination of a high birth rate and a high death rate, which created self-balancing mechanisms between population and resources. Coming up against a rigid system of agricultural production, any growth in population would lead to a reduction in

the availability of food, and the already meagre diet of the population would be further reduced. This could trigger a rapid increase in mortality through famine and disease and thus bring the population back to previous levels.[3] According to recent studies, the demography of the *ancien régime* was characterized by a combination of practices and behaviour in individuals and families that tended to reduce female fertility, which however affected the birth rate to only a limited extent. These included remaining unmarried, or systematically delaying the age of marriage. It is estimated that the number of unmarried European women remained constant at around 15–20 per cent, and that on average men married around the age of thirty and women around twenty-five or twenty-six, thus 'reducing' female fertility by a decade. Late marriage, and widespread non-marriage, was precisely what mainly differentiated the Western demographic experience from the rest of the world, where hardly any women over the age of twenty-five were still unmarried.[4]

All these generalizations need to be qualified somewhat. Social differences, for example, are a primary determining factor in demographic behaviour patterns. In any case, from the nineteenth century onwards, the 'Malthusian trap' was no longer in operation; the stability model was supplanted by the development model. For the first time in the history of mankind, an increase in the population did not create a crisis in the available resources. Thanks to parallel changes in production systems, the possibility of expanding the overall economic system increased. The change lay not so much in the intensity of the demographic growth as in the fact that for the next two centuries, and until the present day, it was uninterrupted and showed no regression.[5]

Between 1800 and 1900 the world population increased by 70 per cent, rising from 978 million to 1,650 million (Table 6.1). The number of inhabitants in Asia and Africa increased by a third and a quarter respectively. In Asia it increased from 630 million to 925 million and in Africa from 107 million to 133 million, while in Europe, Russia included, it more than doubled, rising from 208 million to 430

Table 6.1 Evolution of the world population, 1750–1900 (million)

	1750		*1800*		*1850*		*1900*	
Area	*No.*	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*
Europe (excluding Russia)	125	15.8	152	15.5	208	16.5	296	18.0
Russia	42	5.3	56	5.7	76	6.0	134	8.1
North America	2	0.3	7	0.8	26	2.1	82	4.9
South and Central America	16	2.0	24	2.5	38	3.0	74	4.4
Africa	106	13.4	107	10.9	111	8.8	133	8.1
Asia	498	62.9	630	64.4	801	63.4	925	56.1
China	200	25.2	323	33.0	430	34.1	436	26.4
India and Pakistan	190	24.0	195	19.9	233	18.5	285	17.3
Australia and Oceania	2	0.3	2	0.2	2	0.2	6	0.4
Total	791	100.0	978	100.0	1,262	100.0	1,650	100.0

Sources: adapted from E.A. Wrigley. *Demografia e storia*, Milan, 1969; P.A. Toninelli (ed.). *Lo sviluppo economico moderno dalla rivoluzione industriale alla crisi energetica, 1750–1973*, Venice, 1997, p. 602.

million inhabitants. Between the nineteenth century and the present day it has more than tripled, reaching 650 million. In the same period, the Asian and African share of the total world population decreased from 64.4 per cent to 56.1 per cent and from 10.9 per cent to 8.1 per cent respectively; the European share increased from 21.2 per cent to 26 per cent. Furthermore, with the mass migrations that marked the century, Europeans contributed heavily to tripling the number of inhabitants of Latin America, Australia and Oceania, and to multiplying that of North America thirteen times. On the eve of the First World War, Europe had 480 million inhabitants, three times the population of 1750. At the start of the nineteenth century, one person in five was European; by the end, it was one in four. If the Europeans and their descendants who settled on other continents are added to those in Europe itself, then it was almost one in three.

A comparison of densities (the number of inhabitants per square kilometre) shows that the greatest population concentration was on the least extensive continent (Table 6.2). In 1800 Europe, with 18.7 inhabitants/km^2 compared with 13.7 in Asia, was already at the top of the table. At the start of the twentieth century it had a density of 40.1 inhabitants/km^2, almost double that of Asia (21.3 inhabitants/km^2) and ten times that of Africa (4.0 inhabitants/km^2).

The population in different European countries increased at different rates, at different times and with different degrees of intensity. In the first half of the century, the areas of north-western Europe grew more rapidly, while in the second half it was the south and east of the continent that showed particularly high rates of population growth (Table 6.3). In Italy, the population grew steadily throughout the century, with different growth patterns for birth and death rates according to the different regions; some regions, especially the south, experienced massive emigration, with important economic consequences in the short and long term between the 1880s and the First World War (Table 6.4).

Table 6.3 shows how, in the second half of the nineteenth century, the growth rate of France slowed down considerably, owing to the birth rate declining more rapidly than in other countries. Elsewhere, a continuing high birth rate, together with an overall decrease in the death rate, brought about marked increases. However, even here national figures can conceal significant local or regional differences. At the end of the nineteenth century, for instance, Italy was characterized

Table 6.2 Population density by continent, 1800–1900 (inhabitants/km^2)

Areas	*1800*	*1850*	*1900*
Europe	18.7	26.6	40.1
Asia	13.7	17.0	21.3
Africa	3.0	3.1	4.0
North America	0.2	1.1	3.4
Central and South America	1.0	1.2	3.4

Source: J. Heffer and W. Serman. *Il XIX secolo, 1815–1914: dalle rivoluzioni agli imperialismi*. Italian edn. ed. by S. Zaninelli, Milan, 1998, p. 19.

Table 6.3 European population in the nineteenth century (million)

Country	*1800*	*1820*	*1830*	*1840*	*1850*	*1860*	*1870*	*1880*	*1890*	*1900*	*1910*
Austria	–	13.5	15.5	16.6	17.5	18.2	20.2	22.1	23.7	25.9	28.6
France	27.3	30.5	32.6	34.2	35.8	37.4	36.1	37.4	38.1	38.4	39.2
Germany	–	25.0	28.2	31.4	33.4	35.6	41.0	45.2	49.4	56.4	64.9
Ireland	4.8	6.8	7.8	8.2	6.6	5.8	5.4	5.2	4.7	4.5	4.4
Italy	17.2	19.7	201.2	22.9	24.3	25.0	26.8	28.8	28.4	30.1	32.4
Norway	0.9	1.0	1.1	1.2	1.3	1.5	1.7	1.8	2.0	2.2	2.3
Portugal	2.9	–	–	3.7	3.5	3.6	–	4.2	4.7	5.0	5.5
Russia[a]	40.0	48.6	56.1	62.4	68.5	74.1	84.5	97.7	117.8	132.9	160.7
Spain	10.5	–	–	–	–	15.6	–	16.6	17.5	18.6	19.9
Sweden	2.3	2.6	2.9	3.1	3.5	3.9	4.2	4.6	4.8	5.1	5.5
Great Britain	14.1	16.3	18.5	20.8	23.1	26.1	26.1	29.7	33.1	37.0	40.8
Europe Total	205.0				275.0		320.0			414.0	450.0

Sources: adapted from: B.R. Mitchell, 'Statistical appendix', in C.M. Cipolla (ed.), *The Fontana Economic History of Europe. The Emergence of Industrial Societies*, *Part 2*, London, 1973, pp. 747–8; B.R. Mitchell, *International Historical Statistics. Europe*, *1750–1988*, Basingstoke, 1992. pp. 1–5; S. Pollard. *La conquista pacifica. L'industrializzazione in Europa dal 1760 al 1970*, Bologna, 1981, p. 148.

Note:
[a] Estimated figures for Russia.

Table 6.4 Evolution of the Italian population, 1791–1911 (1914 borders)

Year	*Population (in 000)*	*Annual increase per 1,000 inhabitants over previous decade*
1791	17,479	–
1801	17,860	2.2
1811	18,257	2.2
1821	19,000	4.0
1831	21,088	10.5
1841	22,355	5.9
1851	24,162	7.8
1861	25,017	3.5
1871	26,801	6.9
1881	28,460	6.0
1901	32,475	6.6
1911	34,671	6.6

Source: J. Heffer and W. Serman, *Il XIX secolo, 1815–1914*: *dalle rivoluzioni agli imperialismi*, ed. S. Zaninelli, Milan, 1998, p. 29.

by a relatively homogeneous growth in population over the whole country. Yet socio-economic differences in different parts of the country were matched by fundamentally different demographic mechanisms. The north of Italy had both a low death rate and low birth rate, while the south of Italy showed a high mortality rate and a high birth rate (Figure 6.1 and Table 6.5).

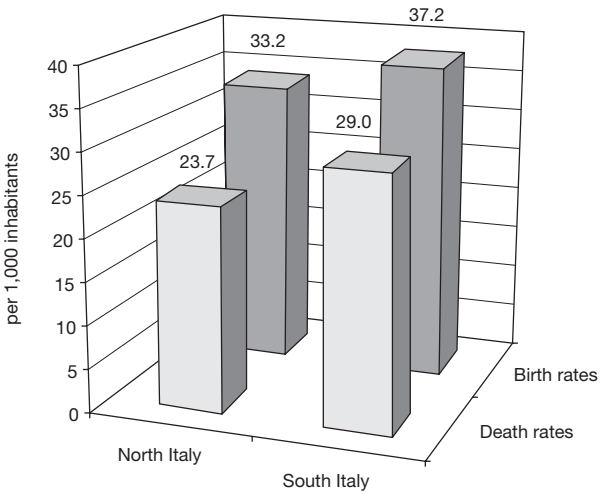

Figure 6.1 Mortality and birth rates in Italy in 1895.

Source: adapted from C. Trebilcock, *The Industrialization of the Continental Powers, 1780–1914*, Harlow, 1981.

Table 6.5 Trends in the Italian population from 1862 to 1911 (annual average per thousand inhabitants)

Period	*Birth rate*	*Mortality*	*Natural increase*	*Net migration*
1862–1871	37.4	30.3	7.1	–0.3
1872–1881	36.9	29.6	7.3	–1.3
1882–1891	37.2	26.9	10.3	–2.8
1892–1901	34.2	23.7	10.5	–4.2
1902–1911	32.2	21.3	10.9	–4.1

Source: J. Heffer and W. Serman. *Il XIX secolo. 1815–1914: dalle rivoluzioni agli imperialismi*, ed. S. Zaninelli, Milan, 1998, p. 30.

The 'new demographic model'

The new European demography that developed with the industrial revolution hinged on a fall in the death rate, and a decline in the birth rate.

> The average fertility and high mortality that had marked the demographic development of pre-industrial Europe – a variation of the high fertility and high mortality that would be the model for the evolution of the whole world population until the 1940s – was thus replaced by the drastic reduction of both parameters. In any case, there was rapid growth in the short term, due to the fall in the death rate rather than to any increase in fertility. In the next phase, there was a marked decline in fertility, and the subsequent increase in

> population did not depend on the increased number of births, but mainly on longer life expectancy.[6]

Thus demographic variables, economic indicators and social circumstances were brought into relation with each other.

Death and birth rates, which are the components of population balance, underwent a structural change. In the first place, the great mortality crises that had been a feature of the pre-industrial period were becoming scarcer, thanks to the combined effect of two factors: the disappearance of the great epidemics, and the decrease in the cycles of famine that had previously been a feature of agricultural production patterns. People became more resistant to disease, thanks to the combined effect of improvements in both diet and hygiene. Considerable progress was made in public hygiene as a result of sanitation measures and the modernization of towns. The new industrial technologies that were beginning to be applied reduced the number of harmful risk factors for health in the cities; sewer systems were being laid down and modernized, open sewers eliminated, streets widened, water piped, and urban amenities generally being developed. The overall decline in epidemics, bacterial infections and infectious diseases was made possible by the extraordinary progress in medical science, from the smallpox vaccination of Jenner (1796) to the 'microbe revolution' carried out by Pasteur (1822–1895) and Koch (1843–1910). During the course of the century, disinfection led to aseptic hospitals, and aspirin to anaesthetics. Epidemics claimed fewer victims and became less frequent, though they did not disappear completely, or immediately, as the European cholera epidemic of the 1930s demonstrated.

A comparison with other parts of the world shows more clearly what changes took place in Europe. After 1848 there were no further outbreaks of famine in Europe, although it seriously affected Ireland, where the potato crisis (1845–1850) caused the death of over half a million people and acted as a strong stimulus to migration. In India, famine claimed 30 million victims between 1860 and 1900; in China droughts and floods continued to produce real demographic catastrophes. The same contrasts were seen in sanitation. Cholera, which in India claimed 6 per cent of the population between 1882 and 1890, remained endemic for the whole century, spreading to the Turkish and Russian empires in 1817 and to the whole of Europe between 1831 and 1834, where in France there were 100,000 victims. It reappeared in 1847–1849, with 23,000 deaths in Belgium and 600,000 in Russia, and later in 1855 in the western Mediterranean and the Crimea, before disappearing in the second part of the century, except for an outbreak in Spain.[7] Typhoid fever also decreased during the second half of the century in north-western Europe. Smallpox, plague and leprosy, common in Asia and Africa, decreased all over the European continent: the plague disappeared in the eighteenth century and smallpox declined during the nineteenth. Two great endemic diseases remained – tuberculosis, and malaria in the Mediterranean area – yet they would no longer be the cause of a mortality crisis.[8] Mortality due to war also decreased, in comparison with the high number of deaths caused in other parts of the world, especially in civil wars, like the Civil War in the United States or the Taiping Rebellion in China. Thus, the great losses in population no longer had to be offset by the birth rate.

The nineteenth century marked a fundamental change. Neither the fertility nor the mortality of the European population depended any longer on the availability of food, and there was a positive balance between resources and population. In England in the eighteenth and nineteenth centuries, the increase in population speeded up the modernization of agricultural production methods, which would enable the additional demand for resources to be met. Population increase and technological innovation went hand in hand. The 'agricultural revolution', already under way with more efficient crop rotation, stock farming, manuring and the first agricultural machines, brought about a sharp rise in the productivity of the land, making it possible to produce more with fewer workers. Given the increased productivity, it now became possible to meet the new requirements and at the same time 'free' a certain number of agricultural workers for industrial and commercial activities in the towns. 'The outcome of the process was therefore the opposite of what took place in the *ancien régime*: demographic growth stimulated productive growth and this caused further demographic growth.'[9] The revolution in agriculture and industry made it possible to improve the quantity and quality of food. The revolution in transport and the progressive expansion of markets broke the isolation of many areas, alleviating the effects of any subsistence crises; falls in production could be offset by imports.

As a consequence of improvements in diet, hygiene, health and medical care, life was prolonged and life expectancy at birth increased. The average life span of Western people, which for countless centuries had remained steady at around thirty years, rapidly rose to forty during the course of the nineteenth century and reached fifty in the early twentieth century; in Sweden it would reach seventy by 1965, and eighty at the present day. The increase in average life expectation occurred mainly in the countries and social classes that benefited most from material and scientific progress. The natural mortality rate decreased, especially the infant mortality rate. In England, between 1780 and 1820 the rate fell from 16 per cent to 12 per cent. Infant mortality decreased slowly, because of limited progress in paediatrics and child care. In France, it went down from 187 per thousand in 1810 to 126 per thousand in 1906. In Russia in the same period the rate was still 250 per thousand.

Generally speaking, throughout the nineteenth century there was no marked change in mortality during the first year of life, or in older age groups, but there was a considerable increase in the life expectancy of the young and middle sections of the population. The increased number in the middle section, which included those with reproductive potential, were reflected in the general fertility rate, causing a further increase.[10]

Another important factor concerned the social distribution of mortality. In a comparison of social classes and professional categories, there was a clear disparity as regards death. Life expectancy varied considerably depending on occupation or social status. It was precisely in the cities of the more advanced industrial regions where this phenomenon was most evident. In the mid-nineteenth century, the life expectancy of the English had reached an average of around forty years, but in some of the poor areas of Manchester it remained steady at twenty.[11] At the end of the nineteenth century, infant mortality in the working class areas of York was three times that of affluent families. Around 1885 the mortality rate in the

prosperous quarters of Paris was fourteen per thousand, compared with thirty per thousand in working class areas.[12] Malnutrition, poor hygiene in the home or workplace and lack of medical care weakened the physical resistance of the lower classes, especially of the town workers, but also of the agricultural workers, leaving them more vulnerable to the calamities which continued to strike during part of the nineteenth century, though they were less devastating than previously.

In France and England, countries for which we possess statistics covering centuries, mortality decreased rapidly in the first two decades of the nineteenth century, then remained stable for some time, before falling again towards the end of the period. Unlike mortality, in the new European model the birth rate decreased very slowly, before showing an upward trend starting in the 1880s; but it was not very marked or linear. At the start of the demographic change, economic development boosted the birth rate. Results of the historical reconstruction of the English population between the sixteenth and the nineteenth centuries, by the Cambridge Group of Historical Demography, have shown how only a third of the growth in the population of England and Wales in the eighteenth and nineteenth centuries could be explained by a decrease in the death rate. A marked increase in the birth rate seemed to be more significant. The younger age groups, which were more numerous, had the ultimate effect of increasing the number of births, especially in the areas most affected by industrialization. Opportunities for work were increasing, child labour meant that having children became more remunerative, and the greater availability of food was an incentive to marry and procreate. The lower age of marriage has been seen as the stimulus to a marked increase in female fertility. Some scholars have even suggested that there was a decrease in contraceptive measures within the new family and social structures; it did not last long, however. Apart from some quite marked regional variations, it seems that the break with the pre-industrial demographic model did not bring about a substantial change in the European model as regards the age of marriage.[13]

In the medium term, the trend was towards a gradual and overall decline in birth rates. The phenomenon, recorded in France from the early nineteenth century, was soon seen in the United States as well. Towards the end of the century this same tendency affected the whole of western and north-western Europe, ultimately extending to eastern and southern Europe in the course of the twentieth century. In short, the case of Europe shows different demographic mechanisms at work, even in areas adjacent to each other geographically. In the second half of the nineteenth century, the advanced countries witnessed the spread of family planning and birth control – overcoming cultural and religious resistance – which gradually weakened the traditional close correlation between marriage and fertility. The number of children became increasingly related to questions of consumption and social status. The great diversity between social classes, due to socio-economic differences and the influence of mental attitudes to the family and sexual behaviour, needs to be constantly kept in mind. In England in the 1880s, the fertility rate was inversely proportional to social level. In general, the decline in births reflected the desire of families to maintain or improve their standard of living. In nineteenth century bourgeois society, the new social levels were no longer based on birth, but on income and consumption. Fewer children meant a better chance

of fulfilling their needs, achieving a better education and a more agreeable and better-paid occupation. Religious convictions could not change a trend that saw the more affluent, and better-educated, classes being the first to practise birth control. Meanwhile, in 1900, birth rates remained high among the lower classes, as well as in the countries on the fringes of the industrial revolution, or that were only partly affected by it. Familiarity with birth control later extended to the lower classes generally; but this did not occur until the First World War, when peasants and workers were given instruction in the use of contraceptives, in this case to prevent the spread of venereal diseases.

In conclusion, despite some religious resistance, the Western demographic model showed that the ratio of economic development to population growth could be gradually improved through non-traumatic birth control methods and the free choice of individuals and families.

Urbanization, migration and colonization

The combination of population explosion and economic transformations brought about a redistribution of the population, on geographical and occupational lines. Industrialization and urbanization proceeded at the same rate. Demographic stagnation in the cities meant that the growing demand for labour from industry could be met only if the rural population became urbanized. At first, the move to the towns was gradual and only temporary; but because of the changes taking place in the country areas with the declining work force, and because of the crisis in the rural cottage industries due to competition from factories, it gradually gathered strength. Weavers, agricultural, domestic, seasonal and migrant workers were all attracted to the towns, and converged on the factories. The railway boosted a mass movement towards the urban conglomerations, which swelled with hundreds of thousands of migrants. The urbanization of wide areas of the continent was the clearest evidence of the transformation taking place in ways of life.

In Great Britain, the proportion of town dwellers to the total population rose from 48 per cent to 73 per cent between 1851 and 1910–1914; in France it went from 25.5 per cent to 44.2 per cent, and in Russia from 7.8 per cent to 19.6 per cent. In 1800, Europe had twenty-three cities with more than 100,000 inhabitants, but a century later there were 135; altogether this was 46 million people, compared with the 5.5 million of a century earlier, that is, 11 per cent of the total population as against 3 per cent previously.

In Renaissance Italy, towns and urban centres had flourished, and many of these still had a considerable number of inhabitants. With the industrial revolution, other European areas similarly flourished, and took on new features. What happened in England after the second half of the eighteenth century was without precedent, particularly with regard to its intensity. In the half-century between the first census of 1801 and the Great Exhibition of 1851 alone, the number of inhabitants in Liverpool multiplied four times, and in Manchester no less than five. But it did not only affect the new industrial towns. The number of inhabitants in Brighton, for example, rose from 7,000 to over 65,000; in Oxford from 12,000 to 27,000, and in a county town like Hereford from 7,000 to 12,000.

As industrialization proceeded, other European countries experienced the same trend. In Germany and Austria in 1800 there were only three cities with more than 100,000 inhabitants: Berlin, Vienna and Hamburg, to which were added Munich and Breslau, fifty years later. The fourteen cities with over 50,000 inhabitants had fewer than 2 million inhabitants altogether. Yet, following rapid industrial growth in the second half of the century, by the beginning of the twentieth there were already seventy-six centres with more than 50,000 inhabitants, containing 13,650,000 people altogether. Berlin and Vienna had over 2 million; Hamburg had 1.1 million inhabitants, and Leipzig, Dresden, Cologne and Munich over half a million. In the small centres of the Ruhr basin, growth was even more spectacular: Essen grew from 9,000 to 295,000 inhabitants; Düsseldorf from 27,000 to 359,000; Dortmund, which in the mid-nineteenth century was still a small village, grew to 214,000 inhabitants in the space of a few decades.[14]

Economies of conurbation, and heavy dependence on local mineral resources, led to the development of urban areas with a high industrial concentration. As Table 6.6 shows, between 1800 and 1910 the number of cities with over half a

Table 6.6 Population of the principal European cities in the nineteenth century (000)[a]

City	*1800*	*1850*	*1880*	*1910*
Hamburg	130	132	290	931
Amsterdam	217	224	326	574
Barcelona	115	175	346	587
Berlin	172	419	1,122	2,071
Birmingham	74	233	437	840
Brussels	66	251	421	720
Budapest	54	178	371	880
Constantinople	600	–	–	1,200
Dresden	60	97	221	548
Glasgow	77	357	587	1,000
Leipzig	30	63	149	590
Liverpool	80	376	553	753
London	1,117	2,685	4,770	7,256
Madrid	160	281	398	600
Manchester	90	303	462	714
Marseilles	111	194	360	551
Milan	135	242	322	579
Munich	40	110	230	596
Moscow	250	365	748	1,533
Naples	327	449	494	723
Paris	587	1,053	2,269	2,888
Rome	163	175	300	542
St. Petersburg	336	485	877	1,962
Warsaw	100	160	339	872
Vienna	247	444	1,104	2,030

Source: B.R. Mitchell, *International Historical Statistics, Europe, 1750–1988*, Basingstoke, 1992, pp. 73–4.

Note:
[a] With at least 500,000 inhabitants in 1910.

million inhabitants rose from three to twenty-five. Driven by industrialization and the revolution in transport, there was a rapid development of both small centres and of important cities, but above all, there was a growth of great metropolises that had long been at the centre of their respective national economies. London grew from 1,117,000 inhabitants in 1800 to 2,685,000 in 1850, from 4,770,00 in 1880 to 7,256,000 in 1910; Paris from 587,000 in 1800 to 1,053,000 in 1850, to 2,269,000 in 1880, and to 2,888,000 in 1910. Industrialization meant new prospects for the management and organization of huge population masses. One needs only to think of the improvements in water supply systems, or gas pipelines for urban lighting. Large cities sprawled into suburban areas; in their centres multi-storey buildings were constructed, with building techniques and materials being adopted in order to optimize the available space.

Thus huge numbers of workers found employment in new production sectors; but they also had to physically move to the cities. The social implications of these astonishing events have been the subject of a great deal of debate among historiographers. During the 1960s there were at least two opposing viewpoints. One Marxist line of interpretation, headed by Eric Hobsbawm, pointed to a worsening standard of living in the transition from the pre-industrial to the industrial period. On the other hand, a neo-liberalist line of thinking, headed by Max Hartwell, emphasized the positive effects on living standards of industrialization and urbanization. There is no doubt that industrialization led to the development of dormitory areas without water, street lighting or sanitation systems, and also imposed extremely harsh working conditions and hours on men, women and children, mostly in promiscuous and unhealthy environments. But, on the other hand, it also brought freedom from hunger and poverty, and new opportunities for social and cultural improvement.

The transition from a rural and agricultural society to an industrial and urban one involved profound changes in the occupational structure of the population. Disregarding the different statistical classifications adopted by each country, and differences between one census and another, a definite evolutionary trend could be distinguished: regression in the primary sector of agriculture, fishing and forestry; expansion in the secondary sector of industry, and also in the tertiary sector of transport, commerce, public and private services, and professional jobs. In some countries the trend was more marked; in Germany, the number of people engaged in the primary sector fell from 42.5 per cent to 28.6 per cent between 1882 and 1907, while those engaged in the secondary sector increased from 35.5 per cent to 42.8 per cent. In other countries it was less so; in France, between 1866 and 1906, those engaged in the primary sector decreased only from 49.8 per cent to 42.7 per cent, while the proportions of those engaged in industry rose only very slightly, from 29.0 per cent to 30.6 per cent.

Despite this, for a good part of the nineteenth century, societies remained largely rural, with the exception of Great Britain. The population of hamlets and villages immediately before the First World War was still more numerous than that of the towns in France, Russia, Italy and even in the United States. However, the relative decline in the rural population did not prevent an absolute increase in countries with a mainly agricultural economy, such as those of eastern Europe.

Various forms of contact with the urban world were regularly kept up by sections of the rural population. Ever since the Middle Ages, relations between town and country had been much closer than is normally thought. They were related to the mobility that affected whole professional categories, or geographical areas, in different ways. One illustration is the Alpine macro-region, where groups of people, or even whole villages, would seasonally move to the plains and the towns, even covering enormous distances, for different reasons. They travelled in order to peddle their trade and crafts, to work on the construction of the railways and other infrastructure, to take on domestic work or other business in the towns, and were continental and temporary migrants. Another reason for emigration was to escape religious persecution, which was often the case; many Russian Jews emigrated for this reason, first to England and France in western Europe, and later to the United States. Important political conflicts might also bring about forced migration, as in the case of the 'deportation' of rebels to Algeria in June 1848, or the settlement after 1871 of German-speaking people in Alsace-Lorraine, which was striving to remain French.

After the mid-nineteenth century, however, because of population pressure and adverse circumstances, rural populations were involved in wide-scale migrations that had unprecedented and far-reaching implications. It did not happen only in Europe. The mid-century marked the start of the greatest migration of people in history.[15] Mass internal movements took place in India and China, after the imperialist powers had created new administrative and commercial centres. There were other migratory flows, from Asia towards the developed areas, as in the case of the Chinese to the Californian coast at the time of the Gold Rush. But the huge territorial redistribution of world population that took place in the nineteenth and twentieth centuries unquestionably involved mainly Europeans. 'In a certain way, the populating and colonizing of the nineteenth century marked the high point of the economic, political, military and cultural strength of the West.'[16] Europeans, who on their own continent inhabited about 700,000 square miles, in the course of the nineteenth century ended up by colonizing and controlling no less than 8 million square miles, multiplying the surface area in use nine times. In previous centuries, the greatest movements of people to destinations outside Europe had been those of English emigrants to the colonies of North America, or the traffic in slaves to the plantations of Central and North America. Africa experienced French immigration in the west Mediterranean area, after the Dutch colonization of its southernmost regions. In their efforts to prevent overcrowding in prisons in the mother country, the British changed the demography of distant Australia.

The general increase in the European population could be absorbed, without trauma, only by the more advanced countries. However, it should not be forgotten that strong imbalances had been created between different areas within the same country. Europe by now was an arrangement of areas of emigration and areas of population absorption. Areas that were not very dynamic economically, such as southern Germany, Ireland, Scotland, Scandinavia and parts of the Habsburg Empire, created emigration to adjacent areas that were very dynamic, such as Alsace, northern France, Saxony and the Rhine valley. Internal migrations within Europe overlapped with increasing wide-scale migration to the temperate and

sparsely populated areas of North and South America. Driven by increasing population pressure, and the structural changes and crises that periodically affected economic life, the predominant form of emigration was extra-continental and permanent. Furthermore, the new countries held out a great many attractions. There were the prospects, whether real or promoted by propaganda, of enormous expansion; people were motivated by a taste for adventure, and the hope of making a fortune; there were the aspirations of the middle classes with their spirit of conquest, who saw a world waiting to be improved or exploited.

Between 1821 and 1914 a figure estimated at between 46 million and 51 million people left Europe for other continents. The majority emigrated to the United States, which between 1821 and 1880 received two-thirds of the European emigrants. Besides the United States, Australia and New Zealand, Europeans, especially from northern Italy, emigrated to Canada, Brazil and Argentina. Between 1896 and 1914, 3.5 milion Russians emigrated to Siberia. By the mid-nineteenth century the migration had become considerable (Table 6.7), boosted by the revolution in maritime transport and its greater accessibility.[17] Group voyages were organized under the auspices of the navigation companies, as well as voyages encouraged by governments or even by professional organizations, as in the case of British trade unions, in order to help alleviate the national labour market and guarantee wage levels. The English government actively encouraged emigration by providing almost £5 million sterling for the emigration of 39,000 people to Australia in 1869.

At the beginning of the nineteenth century, the majority of emigrants came from England, while from the 1840s onwards the phenomenon also affected other areas. The famine that struck Ireland in 1847 led to a flow of emigrants from the island and caused the population to decline from over 8 million in 1840 to 4.5 million in 1900. The economic crisis of 1848, and revolutions throughout Europe in the same year, led to particularly heavy emigration from Germany and Scandinavia, and from central and southern Europe. Difficulties in the German economy brought about heavy migration between 1880 and 1885. Greater population pressure in

Table 6.7 Transatlantic emigration from Europe, 1851–1920 (000)

Country	*1851–60*	*1861–70*	*1871–80*	*1881–90*	*1891–1900*	*1901–10*	*1911–20*	*Total*
Austria and Hungary	31	40	46	248	440	1,111	418	2,334
France	27	36	66	119	51	53	32	385
Germany	671	779	626	1,342	527	274	91	4,310
Italy	5	27	168	992	1,580	3,615	2,194	8,581
Norway	36	98	85	187	95	191	62	754
Portugal	45	79	131	185	266	324	402	1,432
Russia	–	–	58	288	481	911	420	2,158
Spain	3	7	13	572	791	1,091	1,306	3,783
Sweden	17	122	103	327	205	324	86	1,184
UK and Ireland	1,313	1,572	1,849	3,259	2,149	3,150	2,587	15,879

Source: W. Woodruff, *Impact of Western Men*, London, 1966.

the poorly developed countries of eastern and Mediterranean Europe led to the emigration of Slav and Latin people, which continued to increase until 1914. Through emigration, Spain lost a third of its natural increase in population. The Habsburg Empire lost about a sixth and Italy more than half. Between 1850 and 1910 about 62 per cent of the over 6 million Italian emigrants came from regions of the south, and 32 per cent from the north. To appreciate the extent of these emigrations, it only needs to be remembered that the number of emigrants between 1870 and 1910 was 12.3 per cent of the population of Spain in 1910, 3.7 per cent of that of Austria and 18.3 per cent of that of Italy.

Movements on such a huge scale had far-reaching effects on the sending countries, as well as on the destinations. Migrations of peasants, farm workers, hired labourers and craftsmen profoundly changed the labour market on both sides. Italian emigration, which exploded at the end of the nineteenth century (Table 6.8) with the agrarian crisis, became a way to alleviate overcrowding in the countryside, especially in the south; it also brought in a flow of new financial resources in the form of remittances from the peasants who had emigrated. These remittances contributed significantly to balancing Italy's account with foreign countries, and the drive towards industrialization, in the nineteenth and twentieth centuries, took place in this context. 'One of the characteristic features of Italian dualism – the extreme poverty of the south – thus became an organic component in the development process that took place between 1896 and 1913.'[18]

Conversely, the economies of the New World gained benefits from the exodus from the Old.[19] The social and economic, as well as demographic, make-up of the

Table 6.8 Average annual expatriations from Italian regions per 1,000 inhabitants, 1881–1910

1881–1890		*1891–1900*		*1901–1910*	
Veneto and Friuli	20.31	Veneto and Friuli	33.85	Abruzzi and Molise	33.70
Basilicata	16.52	Basilicata	18.11	Calabria	31.66
Piedmont e Valle d'Aosta	9.94	Calabria	12.12	Basilicata	29.76
		Abruzzi and Molise	10.69	Veneto and Friuli	29.47
Calabria	7.95	Campania	10.61	Campania	21.63
Abruzzi and Molise	6.52	Piedmont and Valle d'Aosta	7.98	Sicily	21.50
Liguria	6.05			Marches	20.57
Lombardy	5.77	Tuscany	5.86	Piedmont and Valle d'Aosta	16.50
Campania	5.50	Emilia Romagna	5.59		
Tuscany	4.79	Sicily	5.05	Umbria	14.96
Emilia Romagna	3.00	Lombardy	5.03	Emilia Romagna	12.94
Marches	2.00	Marches	4.77	Tuscany	11.90
Sicily	1.66	Liguria	3.78	Lombardy	11.33
Apulia	0.80	Apulia	1.85	Apulia	10.71
Sardinia	0.20	Lazio	1.36	Lazio	9.83
Umbria	0.15	Umbria	1.22	Sardinia	6.88
Lazio	0.02	Sardinia	0.86	Liguria	6.10

Source: J. Heffer and W. Serman. *Il XIX secolo. 1815–1914*: *dalle rivoluzioni agli imperialismi*, ed. S. Zaninelli, Milan, 1998, p. 31.

American continent came to develop original features.[20] The departure of younger and more enterprising people left demographic gaps in the homeland that would only later be filled. In the recipient countries, the prevalence of a younger, more fertile age group in the population led to an increase in the birth rate, which had already been boosted by the lower age of marriage. A comparison of the 1900 and 1940 age tables for the United States[21] shows that the 1900 table resembles the typical age composition of pre-industrial societies; there is an overwhelming majority of inhabitants under the age of forty. The 1940 population, on the other hand shows a general rebalancing of the age groups, most likely due to the effects of family planning and the population living to a greater age. Between 1861 and 1920, which was immediately before immigration was restricted, over 28 million Europeans emigrated to the United States. They helped decisively in urbanizing and industrializing the country; and at the same time they changed its social and cultural character, founding communities based on ethnic and national groups, such as 'little Italy' and 'little Ireland', that would play an important role in the history of North America. Germans and Scandinavians formed communities in the Mid West, while Italians, Russians, Poles and Austro-Hungarians settled on the north Atlantic coast. These communities gradually melted into the mass. The inflow of Slavs and Mediterranean people, Catholics, Orthodox Greeks and Russians, and Jews at the end of the century, caused concern to the supporters of a White Anglo-Saxon and Protestant (WASP) America; measures taken against Chinese immigration in 1882, and in 1907 against the Japanese, prefigured the 1921 and 1924 quota laws against eastern and southern Europeans.

For tens of millions of European peasants the difficult and painful decision to emigrate meant contact with other cultures, and learning about other systems of values and behaviour, and adopting new codes of life and work. The 'melting pot' proved to be one of the keys in the development of the United States. The concentration of large numbers of immigrants in sectors with specialized activities led to forms of 'ethnic enterprise'; a typical case is Italian enterprise, which in its development and interaction with economic expansion in the mother country in the second half of the twentieth century would gradually build up the Italian business community throughout the world. In short, the most important and dramatic demographic events in the history of the European population became a fundamental component of modernization.

Changes in the agricultural sector

The progressive cutback of employment in the agricultural sector is one of the most conspicuous aspects of the economic development of Europe. Although the economies of different countries have been affected at different rates and to different degrees by the cutback, agriculture has continued to play a fundamental role in the process of modern economic growth. The changes in the agricultural sector that preceded and accompanied the advent of industrial societies made it possible for an increasingly urbanized population to be fed; it also provided capital and labour for other sectors of the economy, and created export flows and market demand for industrial products and services. All this was possible thanks to increased

agricultural production, productivity of labour and productivity of the agents of production.[22]

Contrary to Malthusian forecasts, the increase in European agricultural production in the relatively long term enabled the population of the continent to grow without its living standards becoming significantly lowered, and without imports of food products from countries outside Europe being significantly increased. Estimates of that increase, however, are still uncertain; until the mid-nineteenth century they fluctuated widely. More abundant data are available for the second half of the nineteenth century, though they are not always reliable. Table 6.9 gives the growth rates of agricultural production for the four most important countries of western Europe compared with those for the United States and Japan.

Regardless of the fact that they are clearly lower than for the economy as a whole, it will be seen that the growth rates are always positive, except for Great Britain in the period 1870–1912, and are definitely higher in the United States. The table also shows a steady decline in growth rates in all the countries. A correct assessment of these figures needs to take into account that the growth of demand for agricultural products is structurally lower than that for manufactured products and services. Since the end of the nineteenth century the demand for industrial raw materials, such as wool and cotton, had grown less than relative consumption, because of the use of synthetic substitutes. The consumption of foodstuffs was affected by the slowing down of population growth, since the *per capita* increase in consumption is subject to natural limits. Ever since the initial phases of economic growth, changes in food consumption had been taking place; for example, there was a transition from a diet based on cereals and vegetables to one based on meat and animal products.[23]

Since the decline in demand made it superfluous to greatly increase overall production, it seems more appropriate to assess the performance of agriculture in relation to the growth rate of labour productivity or, preferably, of all the factors. Once again calculations are affected by the limited availability and reliability of data, especially up to the mid-nineteenth century. In any case, the productivity of labour apparently grew almost as much as overall production.[24] Agricultural production increased considerably; growth was both extensive[25] and intensive.[26]

Table 6.9 Growth rates of agricultural production, 1800–1912

Periods	*Great Britain*	*France*	*Germany*	*Italy*	*United States*	*Japan*
1800–1850					3.00	
1816–1850		1.42				
1850–1870		0.78	1.50		2.84	
1856–1870	0.59					
1870–1912	–0.13	0.49	1.49	0.84	2.34	
1886–1912						1.38

Source: P.A. Toninelli (ed.), *Lo sviluppo economico moderno dalla rivoluzione industriale alla crisi energetica, 1750–1973*, Venice, 1997, p. 624.

Note: Moving three-yearly averages (excepting the United States in 1850–1870).

Extensive growth, with land, labour and capital growing simultaneously, came about where land was available at a low or negligible cost. In the nineteenth century, in the countries where land had been exploited for a long time, the cultivated areas were not very extensive. But in countries on the margins of continental Europe, such as northern Scandinavia, the Hungarian plains, Prussia east of the Elbe, and Russia, where the cultivated surface area doubled between 1860 and 1880, they were more extensive. However, in the immense spaces of American virgin land, in Canada, Brazil, Uruguay and Argentina, Australia and New Zealand, and even Siberia, they were particularly extensive; in the United States the cultivated land area tripled between 1850 and 1910. The revolution in maritime and land transport brought these land areas into the circuit of international exchanges. They could benefit from low production costs, because of the low relative land value and extensive cultivation; in the overall context of the international division of labour they could take on the role of providing food products and raw materials for the urban and industrial regions. Reduced transport costs boosted the flow of European emigrants to these regions.

On the other hand, in a great many European countries, a significant increase in agricultural land area was possible only with complex land reclamation schemes; Italy distinguished itself in this field, not to mention the immense operations carried out by the Dutch to reclaim land from the sea. However, the difficult and onerous reclamation of land for agriculture was offset by the loss of land to urbanization. Reclamation of land was an example of extensive growth in Europe; it differed from the extensive growth in the American or Australian areas, since it was based on an increase in the quantity of capital and/or labour per unit of land. Productivity was also increased through projects for the irrigation of arid land and the alkalization of acid land.

The increase in overall productivity of the factors was the result of innovations that were both land-saving and labour-saving; the former were aimed at increasing yields from the land, while the latter aimed at increasing labour productivity. Since land was the scarcest factor, the first innovations were in land saving. During the English agrarian revolution of the eighteenth century, the continuous rotation system was perfected, and became more widespread; it became known as 'high farming', and had been carried out in the Po valley since the late Middle Ages, and in Holland in the modern era. During the agrarian revolution, new fodder plants were introduced so that the practice could be extended to all types of land.[27] Continuous rotation increased the cultivated surface area by a third, or even half, thanks to the elimination of the period of fallow, when the land was left to rest in order to restore its fertility. Fallow land areas were planted with nitrogen-fixing leguminous vegetables, which were subsequently used as cattle feed. The increased numbers of cattle also increased the quantity of fertilizing manure.

Further changes took place in the varieties of plants that were cultivated and the breeds of livestock that were raised. Species were introduced that were more suited to the different types of weather and soil conditions. Among the species already introduced, maize was increasingly used to feed livestock; the potato, which supplied two or even three times more calories per unit of land than wheat, became the staple diet of the population of north-western Europe. Over the nineteenth

century, the quality of cultivated crops steadily improved. Beet was cultivated more extensively; it was used for producing sugar and feeding to livestock, and like the leguminous plants, aerated and replenished the soil, making it possible at the same time to feed greater numbers of stabled animals. There were increased yields per unit of product; this objective was also achieved by selecting varieties that were less susceptible to parasites, and/or were more suitable for specific environmental conditions. In order to restock the vineyards which were destroyed by phylloxera between 1870 and 1880, grafts from American plants were used. There were also significant changes in stockbreeding, and dairy cows and beef cattle were being raised in order to adapt to new demands. Another great land-saving innovation was the introduction of chemical products for use as fertilizers and insecticides. Fertilizers of animal origin, such as manure, and Peruvian guano, and of artificial origin, such as phosphates, Chilean nitrates, potassium salts and superphosphates, were used in combination with fertilizers of vegetable origin. The production of perphosphates started around the middle of the nineteenth century. The massive use of fertilizers, and increased mixed cultivation, led to the fallow land being rapidly eliminated and the land being cultivated continuously, with increasingly complex rotations.

The labour-saving innovations mainly consisted in perfecting equipment such as sickles, ploughs and harrows made of iron; this continued throughout the nineteenth century, and contributed considerably to an increase in productivity. At the end of the eighteenth century and in the first decades of the nineteenth, machines started to replace human labour; these included wheat threshers, cotton pickers, and wheat harvesters, and the end of the nineteenth century saw the appearance of the combine harvester. In some situations, there were serious technical problems to overcome before machines could be used; such was the case with the milking machine, which was introduced only in 1895. The increase in the size of farms led to greater mechanization; farms were now increasing in size as a result of a policy being carried out to reduce excessive parcelling of the land. In numerous areas of the continent, it also came about as a response to labour strikes. The invention of the tractor, the first of which were built in the 1890s, meant that the mechanization of farming could be speeded up and extended.

Technical progress increased yields and productivity per worker. On the plains of Hungary, for example, the number of days required for harvesting and threshing wheat was reduced from 130 working days in 1872 to only thirty-three in 1914. In 1914 a 'map' showing the modernization of European farming could be superimposed on to one showing the geographical distribution of yields. In north-western Europe, yields of wheat per hectare ranged from 33 cwt in Denmark to 21 cwt in Germany and Great Britain; this differed greatly from southern Europe, where the figures were 13.2 cwt for France, 10.5 cwt for Italy and 12.6 cwt for the Danube area of Hungary.

The spread of progress in farming depended on the willingness, and possibility, of farmers or landowners to adopt new techniques. Where farm labour was scarce, and therefore costly, there was an incentive for farmers to cultivate the land by increasing the working capital; but where rural population pressure was strong and farm wages were low, farmers had far less interest in increasing their capital. Moreover, appropriate investment skills were needed, a consideration which was

related to the technical and organizational environment in which the landowner lived; modernization took place more rapidly where the class of large landowners was open to technical progress. It did not matter whether they exploited the land directly, as in the Prussia of the Junkers, or divided their property into large farms and entrusted the management to tenants with sufficient capital, as in the case of English landlords.

In contrast, the small peasant properties were where innovations were adopted more slowly; neither the resources for investment nor adequate technical training were available. There was a tendency to freeze savings unproductively in the purchase of very costly land, rather than invest it in modernizing equipment; this was the case in numerous regions of France, in the south-west, the east, and in Brittany. The medium-size farm was a more favourable environment for technical change; this was especially the case if it was well integrated in a network of co-operatives for buying and selling, or if it benefited from state aid in the field of agricultural training, as in Denmark or Holland.[28] Co-operatives made it possible to overcome the disadvantages of small farms. The development of the co-operative movement is considered the decisive element in the great success of Danish agriculture, which reached maximum levels of land and labour productivity.

Adopting innovations was, however, a complex process and conditioned by environmental considerations. In Mediterranean regions high farming was not possible, since fodder plants could not withstand the long summer droughts.[29] Soil characteristics determined the different types of equipment and machinery. Research and agricultural experimentation had low 'appropriability',[30] and state intervention was required, the first public experimental station being created in Germany in 1852. The system was later imitated in many countries, so much so that if state commitment had been different it 'would have affected the capacity for developing techniques suited for each specific environment, and thus in the final analysis the rate of technical progress'.[31] The state created research institutions and specialized organizations; in Italy, for example, it promoted agrarian meetings, and formed a network of travelling schools of agriculture, which saw their greatest expansion under the Giolitti government.

Journals on agronomy experienced a real boom throughout the nineteenth century, and played an important role in promoting innovations; this was especially the case in areas where the majority of people were able to read, and income was sufficiently high to allow the purchase of a journal.[32] Innovations often spread by being imitated, or through the direct exchange of information; it was therefore a slow process. There was also the subjective perception of risk and its acceptance; this depended on factors such as information about the new techniques, or the availability of credit.[33] It was one thing to face it by relying only on the resources of an individual farm, as in Italy; it was quite another to face it with the technical and financial support of a co-operative, as in Denmark.

The greatest agricultural development was in north-western Europe, in England and in the area between the Paris basin and east Prussia, where both types of improvement complemented each other. In any case, the extension of farmland, technical progress and intensification of cultivation considerably increased overall agricultural production. Its growth rate was higher than that of the population;

the revolution in transport made it possible to avoid subsistence crises and improve the diet of the masses in industrialized countries. It also led to changes in the agricultural geography of the world and the system of prices.

Because of the effects of weather conditions on farming production, agricultural prices fluctuated more markedly than prices for industrial products; moreover, producers were too numerous to have any control over the market. Despite this, even agricultural prices, like industrial prices, showed long-term trends; between 1815 and 1845 prices fell, and were at the centre of measures such as the Corn Laws and quasi-prohibitionist systems. During this period of depression, the well drained limestone areas adapted better to the complex practice of mixed or high farming with corn, barley, rape and livestock, while in the heavy clay areas investment was needed to improve the land, which reduced the farmer's net revenue.[34]

From the 1840s to the end of the 1860s, agriculture benefited from a number of positive circumstances. The price of corn rose; there was little competition from the new countries, or from Russia, since the transport revolution still had only limited effects; internal demand, especially for animal products, increased, and prices remained high until 1883. In addition, in the system of mixed farming greater prominence was given to stock farming, which was more profitable; it developed as an activity in its own right, and was no longer merely a supplement to cereal farming. Transformations in land use intensified, with the canalization and drainage of wetland; but the agricultural system still hinged on wheat farming, for technical as well as psychological reasons. Farming traditions, insufficient knowledge and unwise investment worsened the impact of the 'great depression' of 1877–1896 on European agriculture; the effects of the transport revolution were now being felt, with competition from the animal and vegetable produce arriving from the virgin lands. The agricultural crisis of the last quarter of the nineteenth century was, above all, a cereals crisis, and of wheat in particular. The immediate response was to implement protectionist policies, and a series of tariffs were imposed in Germany, France, Italy, Austria-Hungary and Spain during the 1880s; England did not follow suit and remained committed to free trade, but considerably reduced the area devoted to cereals. The west and north of England, which had long since turned to stock farming, were not affected by the crisis, which hit arable farming particularly badly. The development of stock farming in various European countries was one of the more positive consequences of the great agricultural crisis (Table 6.10).

Table 6.10 Composition of agricultural production around 1910 (%)

Produce	*Britain*	*France*	*Germany*	*Italy*	*Spain*
Cereals	11.0	22.2	18.6	20.9	31.4
Seed produce	10.3	9.0	13.1	14.3	18.5
Tree produce	5.7	24.4	2.7	36.0	19.8
Animal produce	73.0	44.1	65.6	28.8	30.3
Total	100.0	100.0	100.0	100.0	100.0

Source: adapted from: P.K. O'Brien and L. Prados de la Escosura, 'Agriculture and European Industrializaton, 1890–1980', *Economic History Review*, 44, 1992, pp. 514–36.

The responses and effects differed widely, in view of the variety of agricultural systems, which in themselves reflected the great variety of terrain and climate.

Notes

1 The lack of systematic surveys for a part, or the whole, of the period for many countries explains the discrepancies in the tables drawn up by different authors.
2 With an annual growth rate of 1.5 per cent a population doubles in fifty years and increases four times in a century.
3 M.W. Flinn, *Il sistema demografico europeo*, Bologna, 1983.
4 J. Hajnal, *Modelli europei di matrimonio in prospettiva*, in M. Barbagli (ed.), *Famiglia e mutamento sociale*, Bologna, 1977, pp. 267 and 274.
5 P. Macry, *La società contemporanea*, Bologna, 1992, pp. 99–105.
6 'Il regime a fecondità media e ad alta mortalità, che aveva caratterizzato lo sviluppo demografico dell'Europa preindustriale – una variante di quello ad alta fecondità e alta mortalità che guiderà l'evoluzione dell'intera popolazione mondiale fino agli anni Quaranta del Novecento – fu dunque sostituito da un regime caratterizzato dalla drastica riduzione di entrambi i parametri. Sul breve periodo si produsse comunque una crescita impetuosa, dovuta al calo della mortalità più che all'aumento della fecondità. In una seconda fase. la fertilità declinò in misura vistosa e il successivo aumento della popolazione non dipese dal maggior numero di nascite, ma essenzialmente dal crescente allungamento della vita'. L. Allegra, 'La dinamica demografica', in P.A. Toninelli (ed.), *Lo sviluppo economico moderno dalla rivoluzione industriale alla crisi energetica, 1750–1973*, Venice, 1997, p. 87.
7 J. Heffer and W. Serman, *Il XIX secolo, 1815–1914. Dalle rivoluzioni agli imperialismi*, Milan, 1998, p. 22.
8 M.W. Flinn, *Il sistema demografico europeo*, p. 143.
9 'L'esito del processo è dunque l'opposto di quanto si verifica in Antico Regime: la crescita demografica stimola la crescita produttiva e questa provoca ulteriore crescita demografica.' P. Macry, *La società contemporanea*, p. 100.
10 E.A. Wrigley, *Demografia e storia*, Milan, 1969.
11 A. Briggs, *L'Inghilterra vittoriana*, Rome, 1978, p. 391.
12 J. Heffer and W. Serman, *Il XIX secolo*, p. 21.
13 L. Allegra, *La dinamica demografica*, p. 85.
14 M. Reinhard, A. Armengaud and J. Dupaquier, *Storia della popolazione mondiale*, Rome and Bari, 1971.
15 E.J. Hobsbawm, *Il trionfo della borghesia, 1848–1875*, Rome and Bari, 1976, p. 237.
16 'Popolamenti e colonizzazioni ottocentesche segnarono, in qualche modo, il punto più alto della forza economica, politico-militare e culturale dell'Occidente.' P. Macry, *La società contemporanea*, p. 106.
17 S. Collison, *Le migrazioni internazionali e l'Europa. Un profilo storico comparato*, Bologna, 1994.
18 'Uno dei tratti caratteristici del dualismo italiano – la estrema povertà del Mezzogiorno – entrò così come componente organico nella struttura del processo di sviluppo che si manifestò tra il 1896 e il 1913.' L. Cafagna, *Dualismo e sviluppo*, Venice, 1989, p. 322.
19 E.J. Hobsbawm, *Il trionfo della borghesia*, p. 245.
20 L. Allegra, *La dinamica demografica*, p. 99.
21 M. Reinhard, A. Armengaud and J. Dupaquier, *Storia della popolazione mondiale*, p. 780.
22 Cf. G. Federico, 'Agricoltura e crescita moderna', in P.A. Toninelli (ed.), *Lo sviluppo economico moderno*, pp. 380–1. The productivity of a factor is given by the ratio between total production and the quantity of the factor. Overall productivity is the average productivity of each factor in relation to its share in the overall product.
23 *Ibid.*, pp. 390–1.
24 For further specifications, *ibid.*, pp. 392–3
25 Because of the increased number of the factors of land, labour and capital.

26 Because of increased productivity of the factors
27 *Ibid.*, p. 396.
28 J. Heffer and W. Serman, *Il XIX secolo*, p. 101.
29 F. Galassi, 'Stasi e sviluppo nell'agricoltura Toscana. Primi risultati di uno studio aziendale', *Rivista di storia economica*, 3, 1986, pp. 304–57.
30 The possibility of the inventor enjoying the fruits of his own invention. G. Federico, *Agricoltura e crescita economica*, p. 399.
31 'avrebbe influenzato la capacità di sviluppare tecniche adatte a ciascun ambiente specifico, e quindi in ultima analisi il ritmo del progresso tecnico'. *Ibid.*, p. 400.
32 This was the case of England. Cf. D. Grigg, *La dinamica del mutamento in agricoltura*, Bologna, 1994.
33 G. Federico, *Agricoltura e crescita economica*, p. 400.
34 J. Heffer and W. Serman, *Il XIX secolo*, p. 105.