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History of World Population and Settlement

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Classical geography regarded settlement as the fundamental expression of the humanization of natural environments by successive civilizations, shaped by their needs, capacities and aspirations, each contingent on the achievements of those that preceded it. It placed significant emphasis on founding acts, natural conditions and phenomena evolving over an extended period. In contrast, contemporary geography views settlement as a cumulative process and a stratification of occupations and developments. However, it shifts its focus towards the dialectic between the inertia of legacies and the current forces of change, encompassing various facets and contradictions (economic, demographic, social, political, etc.). This involves the alteration of population densities and the redefinition of territories based on emerging lifestyles and organizational structures. In all cases, the concept of settlement reflects the intricate relationship between space and time, geography and history.

The study of population and settlement requires substantial statistical, cartographic and methodological apparatus, making the exercise increasingly uncertain as we delve into the past. How can we refer to it for periods when the concepts of settlement, and even more so of population, did not exist and when the counting of individuals was considered taboo, and the representation and appropriation of space held meanings vastly different

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from contemporary understandings? Depending on the continent, modern censuses, allowing the counting of all individuals (or almost all) and linking them to places of residence, are available only from the end of the 18th century at best, and at worst from the second half of the 20th century. For the preceding one hundred thousand years or more, only fragmentary data is accessible: initially, the identification of sporadic traces of individuals or small human groups dispersed in a dominant natural environment during the oldest periods; then, the delimitation of unevenly and irregularly occupied territories, with extrapolations on the number of occupants, as soon as societies organized their living space into fields, villages and cities; finally, the counting of men, carried out discontinuously and implemented in varying ways according to countries and periods, emerged with the birth of states, driven by the need to account for their resources and populations.

1.1. From the primitive African cradle to world "conquest"

1.1.1. *The approximately one hundred or two hundred thousand years before sedentarization*

The refinement of techniques (such as absolute dating and genetic profiling of human fossils) cannot compensate for the scarcity of evidence left by the most ancient prehistory. The sporadic discoveries of skeletal fragments, contingent on the uncertainties of exploration and the preservation of remains, indicate the presence of distant ancestors in specific locations. However, they do not offer insight into the real occupation of geographical space, let alone the density of this occupation and its variations.

The extensive *Homo erectus* family – which has left traces of its existence for a million or more years across much of the Old World – likely evolved into several species almost simultaneously. These species were sufficiently close to allow for hybridization, as seen in instances like *Homo neandertalensis* and *Homo denisova* in Eurasia, and *Homo sapiens* in Africa. Until the discovery of fossils of *Homo sapiens antecessor* (archaic) in other African locations, East Africa was believed to be the sole cradle of the latter approximately 150,000 years ago (for a detailed modeling, refer to Coupé et al. (2018)).

The often-cited figure is approximately half a million *Homo sapiens* in Africa at the time when, during the interglacial periods, they initiated the colonization of the rest of the world. However, this colonization was

carried out by only a few thousand individuals, as indicated by the remarkably low genetic variability observed in European and Asian populations. The mechanisms of their migrations remain a topic of ongoing discussion. The presence of *Homo sapiens* is conclusively established approximately –70,000 in the Middle East, –60,000 in Central and South Asia, –50,000 years in Indonesia, Australia and the Far East, –40,000 years in Europe and –15,000 years in America (with a potentially ephemeral presence 35,000 years ago in the northwest of this continent). The more remote islands and the harshest environments were occupied much later: between –2,000 and +1,000 for the islands of Oceania or the West Indies, and approximately –500 for Tibet or Scandinavia.

Beyond Africa, *Homo sapiens* had to coexist with other more ancient human species. All lived in small groups of opportunistic and nomadic predators, whose geographical expansion was influenced by the fluctuations of glaciation. Contrary to the long-held belief from a Darwinian perspective that *Homo sapiens* eliminated the supposedly competing species, it is now thought that these species were decimated by diseases introduced by the new arrivals (similar to the impact on Native Americans with the arrival of conquistadors) or disappeared due to the effects of climate change. Undernourished due to the scarcity of large food fauna, these groups, weakened, dispersed and insufficient in number, could no longer ensure their reproduction. *Homo sapiens*, being much more prolific, thus became the sole representative of the human species even before the peak of the last glaciation.

1.1.2. *Hypothetical Upper Paleolithic settlement*

Throughout the Ice Age, the expanse of the ecumene was marked by the fairly abrupt alternation of cold and dry periods and milder intervals. In Europe and Asia, hunting territories expanded during temperate interglacial episodes or contracted during glacial advances that significantly enlarged polar ice sheets and mountain glaciers. In Africa and South Asia, these changes rendered the same areas alternately dry or desert-like, and then wet, grassy or forested. Additionally, variations in sea levels withdrew waters or submerged vast coastal areas.

The natural environment supplied both the sustenance and the materials essential for crafting tools and various objects used in daily life. However, it could only cater to the needs of small, highly mobile communities within

expansive territories. This mode of organization was necessitated by the depletion of resources around regularly reoccupied habitats (such as rock shelters on the valley's edge) or temporary camps, the requirement for the procurement of flint, wood, woody stems, etc., and, most importantly, the seasonal migrations of their game. The distribution of humans closely correlated with the vast grassy cold steppes and subtropical savannahs where the large mammals, comprising the mainstay of their diet, roamed.

To estimate the population during the Late Glacial period, we generally turn to the scientifically observed hunter-gatherer populations in various environments at the time of their initial encounters with modern civilization, such as the Indians of Newfoundland, the Aborigines of Tasmania, the Papuans of New Guinea, etc. Their densities seldom exceeded one inhabitant per 100 km^2 (approximately 5,000 times less than the current Earth's average population density: 50 in/km^2 in 2016). Densities may have been slightly higher in Africa and South Asia (it is probable that one in 10 people lived in the intertropical zone and its margins). Conversely, Europe and the remaining parts of Asia, partially covered by ice, could support only a few thousand people. The population of America was likely equally minimal.

1.1.3. *Agriculture, sedentarization and the first demographic revolution*

The warming, initiated approximately –12,000, and the accompanying increase in humidity have shaped a new environment. The forest has significantly expanded, encroaching upon previously grassy plateaus, the associated megafauna has become scarce or extinct, and this transformation has disrupted the way of life for populations dependent on these environments. While some nomadic groups followed the northward shift of tundras and savannahs, elsewhere, the nature of the predation economy underwent a transformation. Most Mesolithic hunter-gatherers abandoned the vast plateaus in favor of valleys where small game and, more importantly, edible plant products, which had become the primary food sources, were more abundant. These communities facilitated the regrowth of plant species they heavily consumed (through practices like burning, soil clearance and removal of competing species), improved their tools and developed techniques for conserving harvests, particularly through the use of pottery. The provision of more regular and abundant food quickly had effects on population size. Mortality undoubtedly decreased, and fertility likely increased.

Between –10,000 and –6,000, these practices led to the emergence of true agriculture, fundamentally based on a few selected and improved cereals such as wheat, barley, millet, rice, and the domestication of poultry, goats, sheep, etc. The new economic system required the permanence of agrarian spaces and regular labor, thus necessitating a large and sedentary workforce. The case of Central America, isolated from the Old World, where agriculture based on maize developed, implies spontaneous developments in multiple regions. However, the Middle East holds the oldest traces of cultivated lands, villages and cities, as exemplified by Jericho in Israel. The *Neolithic Revolution* thrived much earlier in areas regularly enriched by the overflows of major rivers, such as the valleys of Mesopotamia, the Nile, the Indus, the Ganges, the Huang He, the Chang Yang, etc., compared to drier lands where agriculture remained itinerant and sparsely practiced, alongside nomadic livestock breeding.

This agricultural practice did not extend to the Mediterranean World before the sixth millennium BCE, inner Europe before the fourth, and Northern Europe before the beginning of our era. It appears to have been introduced by new populations rather than through cultural diffusion. Genetic analyses of skeletons recovered from Neolithic burials have revealed that in Europe and South Asia, agriculture was gradually propagated by immigrants originating from the Middle East. These newcomers likely displaced or assimilated existing hunter-gatherer populations. The analyses identified three migration waves. One, associated with the megaliths, would have colonized the shores of the Mediterranean and then spread to the Atlantic and the North Sea. Another would have influenced Central Europe through the Danubian route. A third wave would have emanated from Iran, reaching Afghanistan, India and East Asia.

The disparities in population density rapidly and irreversibly widened between the vast territories that remained the domain of hunter-gatherers (later reoccupied by nomads leading migrations of domesticated herds) and the territories that transitioned into agricultural landscapes. The clearings expanded through deforestation, becoming increasingly populated. Fields, plantations, meadows and constructions altered the landscape, creating new ecological, artificial niches for both the human species and domesticated animals. The concentration of populations quickly gave rise to entirely new forms of territorial appropriation and societal organization. Archaeological evidence supports the specialization of activities, an early social hierarchy, warlike conflicts for territorial acquisition, and the emergence of cities,

originally serving as places of worship and power rather than centers of commercial exchange.

Year	Hyde (2010)	Biraben (1980)	McEvedy and Jones (1978)	Durand (1974)
−8000	5		4	5–10
−4000	28		7	
−2000	72		27	
−1000	115		50	
−200			150	
1	188	255	170	270–330
200	202	256	190	
400	209	206	190	
600	213	206	200	
800	240	224	220	
1000	295	254	265	275–345
1200	393	400	360	
1400	390	374	350	
1600	554	579	545	
1700	603	679	610	
1800	989	954	900	
1850	1,263	1,241	1,200	
1900	1,654	1,633	1,625	1,650

Table 1.1. *World population estimation (in millions of inhabitants) from the most conventional sources*

Because the *Neolithic Revolution* was not merely the shift from primitive, multi-millennial lifestyles to those of the first agrarian societies, it gave rise to such an effective population growth that it led to an inexorable humanization of the environment. The global population, generally stable during the 20,000 years of the Late Glacial period, began to increase, rising from approximately 5 or 6 million inhabitants around –10,000 to approximately 15 million around –6,000, when Neolithization began

spreading beyond the birthplaces of agriculture. Around –4,000, the Earth's population was estimated to be approximately 30 million, reaching a hundred million by –2,000, after agriculture had widely disseminated, and approximately 250 million at the beginning of our era (Figure 1.1). However, it is crucial to consider the demographic evolution as continuous and irreversible when measured over millennia. At the scale of years and large territorial entities, it unfolded in a highly chaotic manner, punctuated by prolonged contractions.

1.2. The era of agrarian civilizations

1.2.1. *The demographic foundation of settlement and its limits*

Excess births over deaths, which were highly irregular, often went unnoticed by generations of ancient times, as so few newborns reached adulthood and few adults lived to old age. This demographic pattern, indifferent to changes in civilization, prevailed from the last millennia before our era until the end of the 18th century, when another demographic revolution began, one that was explosive this time and still unfinished. Birth and mortality rates were close to natural levels, with a small and cyclical gap. While a few individuals could reach advanced ages, the average lifespan remained low, fluctuating, and likely did not change much between the Bronze Age and the 18th century. Living conditions, hygiene practices, medical knowledge and traditional pharmacopoeias were insufficient to control infectious diseases and epidemics. Birth control was scarcely more effective than death control, as few couples defied religious prohibitions to practice contraception, even occasionally, using generally ineffective methods. The only constraints were maternal mortality during childbirth, the prolonged duration of breastfeeding, the decline in fertility during periods of scarcity, or social constraints such as celibacy frequency or late marriage. In such a context, populations heavily experienced the fluctuations of the natural and human environment. Recurring food insecurity and endemic diseases, now considered commonplace but significant in the past, were occasionally compounded by calamities leading to depopulation. The causes were akin to contemporary demographic catastrophes: droughts or floods, major regional and global pandemics, and lethal human behaviors (including inequalities in satisfying vital needs, wars, raids, massacres or genocides, and forced displacements). These calamities tended to overlap and magnify their effects, resulting in lasting population declines.

The splendor of the most brilliant pre-industrial civilizations should not be deceptive. All societies in the past relied on an extensive peasantry (85–95% of the workforce) and were closely tied to the resources of the land. However, yields remained very low until the 19th century, despite advancements such as the invention of the ard and animal traction, followed by the plough with moldboard and the hitching collar, improvements in succession planting, irrigation, liming or tillage of soils, and the use of human fertilizer for gardens and market gardens near cities. For a long time, fields were sustainable only in alluvial areas enriched by river silts. In other regions, agricultural practices requiring long soil fallows meant that fallow lands were regularly moved to vast fallow areas, along with wooded lands left for material, fuel and game needs, covering the majority of territories. The expansion of cultivated areas followed any increase in the population (systematic colonization of wild lands by clearing heaths and forests, drainage of inland or coastal marshes, clearing of heaths or forests extending from the territories, etc.). It appears that, as soon as all cultivable lands in a given territory were put into cultivation, insurmountable ecological limits were reached, which are referred to by historians as the Malthusian limits. The reduction of fallow periods due to the absence of new lands to clear and soil depletion made productions highly susceptible to even minor climatic uncertainties. Undernutrition led to a lasting weakening of populations, further sustained by subsequent neglect of land maintenance.

1.2.2. *The evolution of human population from Antiquity to the end of the early modern period*

Over the past 10 millennia, fluctuations in average temperatures, coupled with changes in rainfall, have only deviated by 1 or 2 degrees from the present, yet they have had significant consequences on harvests. Among the oldest multi-secular cycles, we cite, for example:

– the climatic optimum which, approximately –5,000, with an average of 2° higher in summer, 1° in winter and 10% more precipitation than today, allowed the vegetation of the temperate Atlantic zones to extend up to Norway and agriculture to spread in Europe;

– the progression of cold and aridity in the Mediterranean Basin and its southern margins which, from –3,000 onwards, caused movements of peoples and has been felt as far as the heart of Africa;

– dramatic droughts such as the one that, giving rise to famines, political and social unrest, and political anarchy, definitively eradicated the grassy savannah on which the pyramids had been built in Egypt at the end of the Old Kingdom (approximately –2,200);

– a few centuries of mild weather between approximately –200 and 300 which, following a long cold and humid period, benefited Greco-Roman Antiquity (allowing, for example, the widespread cultivation of vines).

At the beginning of the first century CE, the Earth was inhabited by 200–250 million individuals. Half of them resided in East or South Asia, with approximately 70 million in China and 40, possibly 50 million, in India. Plain agriculture, based on millet and green vegetables, had proliferated throughout northern China over the preceding millennia, while wet valley agriculture in southern China, featuring the world's most extensive agricultural concentration centers, particularly those relying on high-yield rice cultivation – highly demanding in labor but providing two to three harvests annually. The capacity to extract more resources from the same environments (clearing, major hydraulic projects, extensive canal networks) enabled populations to grow to a magnitude that, since Antiquity, facilitated the establishment of a shared civilization across almost the entirety of the Far East, setting the stage for centuries in the distribution of people. The network of villages and towns was already so intricately woven that it underwent less alteration than in Europe due to subsequent densification. Europe, characterized by more rudimentary agriculture and significant forest coverage, likely housed approximately 40 million inhabitants. The Middle East and North Africa supported approximately 50 million inhabitants. For the rest of Africa, an estimate of approximately 20 million, and for America, perhaps 10 million, although no quantifiable data is available for these regions.

An aggressive resurgence of cold and drought, from the 4th to the 8th century, triggered a general demographic decline and significant migrations of peoples, particularly Hunnic and Germanic groups, towards the south and west of Eurasia. Subsequently, the warming trend resumed and, coupled with technological advancements, facilitated a substantial expansion of cultivated lands and agricultural production. This expansion constituted the primary driver behind the significant population growth during the mid-medieval period. Overall, the global population doubled between the 9th and 13th centuries. China's population reached

approximately 120 million inhabitants, the Indian subcontinent had approximately 100 million and Europe had about 80 million.

In the collective memory of France, the few years following the reign of Saint Louis (13th century) have often been regarded as the pinnacle of an era: France, already densely populated during the Gallic era (6–8 million inhabitants) in comparison to neighboring countries, including Italy, is believed to have had approximately 20 million inhabitants, which is a threshold that was not surpassed until the 18th century. This population accounted for a quarter of the European population at that time, including Russia. The vast border forests had disappeared, and all potential agricultural areas had been exploited. The "great clearings" had extended too far into the mountains or at the expense of the woods, leading to a descent in the upper altitude of cultivated lands. The areas that remained forested were protected and expanded in the following century. The framework of the current rural settlement was already established, contributing to the rise of the countryside, which, in turn, facilitated the growth of cities living in close symbiosis with rural areas. A medieval fabric superimposed itself on the older and denser Gallic or Gallo-Roman cities. Although the hierarchy, size and morphology of cities have changed since then, their mesh has barely evolved. Very few French cities with more than 100,000 inhabitants today born after the Middle Ages.

At the end of the 13th century, a new climate deterioration commenced, exacerbated between the 16th century and the early 19th century (*Little Ice Age*), resulting in summer and winter temperatures 1–2° lower than today. However, its impact on the population was less pronounced than the occurrence of the *Black Death* in the 14th century – an exceptionally devastating pandemic that became the first to be adequately documented, allowing for the tracking of its progression and consequences. Ancient authors had reported other epidemics, similarly lethal but more confined, such as the *Plague of Justinian*, which in the 6th century induced a lasting demographic decline in the Mediterranean world and facilitated Arab conquests. Although this disease persisted as more or less endemic in Asia, its resurgence gained momentum in China during the Mongol conquest and the associated upheavals and scarcities. The plague devastated Hubei in 1334 and subsequently spread to neighboring provinces. Carried by the Mongols of the Golden Horde to Crimea and then to all ports of the Mediterranean and the Atlantic, it reached the Middle East, India, North Africa (and most likely sub-Saharan Africa) and Europe by 1347. Europe's population had already been severely weakened by recurrent famines, caused by the

aforementioned climate change and exacerbated locally by war-related devastations, such as those during the Hundred Years' War.

In the 14th and 15th centuries, the plague directly and indirectly claimed the lives of 100–150 million victims (leading to a reduction of approximately half the populations of both China and Europe). Plague outbreaks persisted throughout the following century (occurring nine times in Constantinople, for instance) and much more sporadically until the present day, with less catastrophic consequences. The ongoing trend of climate cooling and the reversion of numerous cultivated lands to wasteland did not facilitate demographic recovery. By approximately 1400, the global population had only reached 300–370 million, with approximately 450 million inhabitants (half of them in South and East Asia) by 1500. Consequently, the population had barely returned to the levels of the 13th century when Europeans arrived in America.

1.2.3. *Migration and colonization of the past*

The colonization of the Americas marked a previously unparalleled continuity and scale in migrations, because migrations in the past had consistently yielded an ambiguous demographic impact. While they played a pivotal role in populating each segment of the ecumene, their contribution to subsequent densification appears rather modest beyond their foundational role. Densification primarily relied on the natural growth of established populations, a slow but effective process when sustained over centuries. Historians often depict the pre-modern world as a collection of closed systems. The mobility of the vast majority of peasants rarely extended beyond the boundaries of their village or the surrounding areas. The expansion of humanized spaces was mainly driven by organized clearing or cultivation, gradually encroaching upon the natural landscapes adjacent to settlements. Only a small subset of the population (comprising adventurers, pioneers, merchants, sailors, missionaries, crusaders, soldiers or officials, etc.) engaged in longer-distance or even transcontinental movements.

Invasions and exoduses may have wielded significant political, economic, religious or societal impacts, but the influx of newcomers often inadequately offsets the depopulation resulting from their passage. Climate change and temporary overpopulation, for example, repeatedly prompted nomadic tribes in the heart of Eurasia to seek new territories, setting entire peoples in motion through a snowball effect. While invaders and refugees could instill

terror, achieve military dominance, disrupt agricultural spaces and devastate cities, their numbers were often relatively small. In most instances, they assimilated within a few generations among indigenous populations far more numerous than themselves. However, in some cases, communities of peasants, refugees or those displaced by large empires multiplied and endured without assimilating to the surrounding peoples. This phenomenon paved the way for the entanglement of nationalities and recurrent conflicts, as observed in regions like the Balkans, the Caucasus, the Middle East, etc. The demographic impact of ancient and medieval colonizers was also relatively minor compared to the existing peasant populations in the territories they settled. Their enduring influence stemmed from political dominance rather than sheer numbers, enabling the dissemination of their culture, religion and language among the *barbarians*.

In the mid-15th century, when the Ottoman Turks had gained control over all the crucial endpoints in the connections between Europe, India and China – the leading economic powers of the Late Middle Ages – they significantly reduced and increased the cost of deliveries of spices, silk and other precious products. The Portuguese embarked on a quest for unrestricted access to South Asia, circumventing Africa. They achieved this in 1498, establishing a series of outposts along the coasts and islands of Africa. Meanwhile, the Spanish sought a quicker maritime route via the Atlantic. In 1492, Christopher Columbus unknowingly landed in a world that had, until then, been entirely isolated from the Afro-Eurasian bloc. Starting in 1519, the *conquistadors* initiated the conquest of the continent. The formidable Aztec empire collapsed abruptly, as initial encounters with Europeans proved deadly for the Native Americans. Smallpox and measles, diseases entirely unknown to the pre-Columbian population, decimated tens of millions of Mexicans and Caribbean natives (in Andean America, where the population was more dispersed, resistance to contagion was higher), clearing the way for the establishment of settlers.

Henceforth, Europe gained direct access to the agricultural opportunities in the tropical zone. Colonists introduced spice and sugar plantations to the Caribbean islands, sparking immediate disputes among Spain, Portugal, England, France and the United Provinces. As the indigenous workforce proved inadequate, it was replaced by another constrained workforce, captured in West Africa. Between the early 16th and mid-19th centuries, 10–15 million slaves were transported to American shores, half to the Caribbean and North America, and half to Brazil and the rest of South America. The slave trade enriched Portuguese and French Atlantic ports, but

it profoundly devastated the countries of origin in virtually every aspect. The dire consequences of slave raids (exoduses, agricultural disorganization, elevated mortality, gender imbalances, low birth rates, etc.) and mortality during transportation directly and indirectly resulted in the extermination of even more people.

According to most authors, colonial America in 1800 had not yet reached a population equivalent to that of pre-Columbian America at Columbus' arrival: 25 million inhabitants compared to perhaps 40 million (the most commonly accepted estimate, though as highly speculative as lower or higher estimates). The role of immigration, whether voluntary or forced, in this challenging recovery is ambiguous. It laid the foundation for the ethnic and cultural amalgamation in most American countries, but it only marked the beginning of a new settlement. The demographic conditions in Europe during the 16th and 17th centuries did not permit a substantial transfer of population to the colonies. Even during the mass migrations of the 19th and 20th centuries, population densification almost always relied fundamentally on the fertility of the descendants of the initial immigrants, exemplified by the Francophones of Canada. Presently numbering approximately 8 million, nearly all are descended from the small number of French immigrants who settled in the mid-18th century, benefiting significantly from the remarkable growth potential facilitated by the continuous decline in mortality since that time.

1.3. Demographic transition and repopulation

1.3.1. *The European demographic revolution of the 19th century*

In the mid-18th century, indeed, decisive demographic changes were set in motion. Precursors to global warming that ended the Little Ice Age, the diffusion of vegetables from the Americas (potatoes, tomatoes, maize, beans, etc.) and the adoption of new farming practices (three-year succession planting) have collectively ensured a better diet – the sine qua non of the resurgence of population growth, leading to a decline in mortality and an increase in birth rates. Population growth appears to have intensified nearly everywhere, though with significant disparities. The most substantial growth likely occurred in China: approximately 160 million inhabitants circa 1700, approximately 320 circa 1800, and approximately 440 circa 1850. This growth was then impeded by a new threshold, partly because of a Malthusian nature (indicating a limited capacity to increase food resources) and partly

due to political and social unrest that paralyzed the country. This threshold was only truly surpassed nearly a century later. Growth was later and, consequently, less robust in India and the rest of South Asia, where approximately 150 million more inhabitants were recorded between 1750 and 1900. Conversely, it remained insignificant throughout the vast Ottoman Empire, which gradually lost its status as a major power, as well as in Africa.

About two centuries ago, a decisive change for humanity commenced in Europe. The general decline in mortality, particularly infant mortality, was intensified by a rapid process of modernization: the industrial revolution, agricultural revolution, scientific development, increased literacy, medical advancements and more. The primary natural constraints on population growth were dismantled through the intensification of agricultural production and improvements in health conditions. Intra- and interannual variations, characteristic of traditional demography, gradually disappeared, and, barring "accidents of history" (wars, famines, deportations, genocides, etc.), the gap between births and deaths consistently widened. Population growth rates reached values that were previously unsuspected over extended periods.

European population growth, therefore, reached significant levels: +70 million inhabitants between 1700 and 1800, and +230 million between 1800 and 1900. Not only did the continent's population nearly double in the 19th century, but it also played a substantial role in the densification of the American population. However, from the second half of the 19th century, this growth, driven by decreased mortality, was gradually regulated by a constant decline in the birth rate. Couples, realizing that in the new context of lower mortality, it was no longer necessary to have as many children as before to ensure a family and offspring, increasingly and effectively began to control births, well before modern contraception methods were available. Thus, in one or two centuries, depending on the country, there has been a shift from an old demographic regime, with high "natural" mortality and birth rates, to a new regime where both are "controlled" and low. This transition is commonly referred to as *demographic transition*.

France has played a pioneering role in this transition. Births were limited early and drastically. The almost simultaneous decline in the birth and mortality rate has resulted in only insignificant population growth compared to neighboring countries. Thus, the population of France, the demographic giant of Europe during the wars of the Revolution and the Empire, increased within its current territorial limits from 30 million inhabitants in 1800 to

40 million in 1900 and 41 million in 1911 (a unique phenomenon in Europe during peacetime, as the number of deaths in France exceeded the number of births at the beginning of the 20th century; the country's population would have decreased without the extension of life and immigration). In comparison, the population of the United Kingdom grew from 12 to 43 million during the same period, and that of the countries forming present-day Germany increased from about 15 to 60 million. This abrupt population densification was absorbed by intense urbanization, albeit with significant variations across territories.

1.3.2. *Transfer of the European model to new countries*

A significant portion of European growth was transferred to America and, secondarily, to Australia, New Zealand and South Africa. The transformation of transportation conditions (steamships) and the reception environment in the United States (industrialization) fundamentally altered the intensity of these population movements. This shift facilitated over 50 million Europeans, including 18 million Britons, to immigrate to the United States between 1830 and 1930. In 1795, over half of the American population was born in Europe, and by 1900, this figure remained at 15%. The vitality of both newcomers and native populations played a crucial role in the substantial population growth of North America. During the first half of the 19th century, the birth rate exceeded 50‰, decreasing to 30‰ in the early 20th century, with mortality rates as low as or even lower than in Europe. Consequently, the population of the United States surged from 5 million in 1800 to 126 million in 1920. Migration waves that brought Iberians to Latin America were comparatively more modest. The population growth in these regions fundamentally relied on the vitality of populations, originating from Native American, African and European backgrounds. Nonetheless, the population of Central and South America roughly quadrupled within a century. Colonial settlement in Africa or Asia was considerably less significant and often unsustainable, frequently erased by repatriations during the subsequent decolonization in the century that followed.

The foundational events of settlement played an equally potent role in the New Worlds as in the old countries. However, while in the latter, subsequent densification depended on an ancient, fundamentally subsistence economy

that occupied all available agricultural space, in the former, a colonial economy entirely focused on exporting products coveted by the metropolises provided a decisive advantage to ports and their nearby hinterlands. This advantage persisted even in Central America, where Native American civilizations had previously shaped interior spaces. In North America, literature and cinema romanticized the *Conquest of the West*, but history at that time no longer favored agrarian civilizations; the average densities of regions cleared later were destined to remain extremely sparse. The majority of internal migrants, in addition to transatlantic immigrants, contributed to the remarkable growth of cities and industrial or mining regions in the northeast and other urban areas along the Atlantic coast.

1.3.3. *Transformation of the European population*

In the new countries, the proliferation of new cities along the coasts, major inland waterways and subsequently railways was instrumental in claiming vast empty spaces. In Europe, however, the urban development of the 19th century had to contend with a significant historical legacy. Similar to Asia and North Africa, rural spaces in Europe were dotted with numerous towns and small cities, sometimes scarcely more populated than the villages in their "flat countryside". These settlements had long existed in close symbiosis with their rural surroundings, and their demographic trajectories ran in parallel. Up to a fifth or even a quarter of the inhabitants in most cities were still engaged in urban agriculture in the 17th century. Until the 19th century, the larger cities that emerged could boast populations numbering only in the tens of thousands at best. Around 1300, Europe had a mere 6 cities with populations exceeding 100,000 inhabitants; by 1700, this number had only increased to 12, and by 1800, it reached 23. During this period, urban population growth lagged only slightly behind that of rural areas. The rate of urbanization in Europe (excluding the scarcely urbanized Russia at that time) would have increased from approximately 8 to 10% (depending on whether urban agglomerations of more than 2,000 or more than 5,000 inhabitants were considered) around 1300 to 12 or 13% by 1700 and 13 or 14% by 1800. A few regions that had early based their economy on the production and trade of manufactured goods, such as Lombardy and much of Italy, or Flanders and the entire former Netherlands, experienced higher levels of urbanization. These regions also witnessed early intensification of agriculture. Before the transportation revolution, the

question of food supply acted as a constraint on the development of cities. However, larger hinterlands, major ports (Naples, Venice, Genoa, Amsterdam), some inland cities served by major internal trade routes (Cologne, Milan, etc.) and major political centers managed to overcome this constraint. Yet, by the end of the 18th century, only the capitals of vast empires, such as Hangzhou and later Beijing, Rome and later Constantinople-Istanbul, and Baghdad, could, at certain moments in their history, be temporarily populated by more than a million inhabitants.

Paris, the capital of a densely populated state for its time and an early hub of centralization, held the distinction of being the most populous city in Europe from the 13th to the 17th centuries. However, by 1800, London, the capital of a global commercial and maritime empire, had surpassed it, boasting over a million inhabitants and claiming the title of the largest city in Europe, outpacing Paris (which had 550,000 inhabitants) and surpassing Beijing and Istanbul to become the largest city in the world. In England, spurred by the combined effects of the demographic transition and the industrial revolution, the relentless process of urbanization, which fundamentally transformed the settlement patterns of Europe in the 19th century, commenced as early as the 18th century (with 34% of the population residing in urban areas in 1801). This urbanization reached an unparalleled scale in the 20th century (with 50% of the population living in urban areas as early as 1845, escalating to 80% by 1911). However, England's experience is not unique, and a similar evolution unfolded in almost every European country, each following its own timeline. Belgium led the way (with 25% urban dwellers in 1800, rising to 61% in 1900), followed by the Netherlands (40% in 1800, 54% in 1900), and Germany (12% in 1800, 52% in 1900). Subsequently, the rest of the continent, which remained predominantly rural for a longer period, especially in the south and east, witnessed a similar trend (with more than 40% urban dwellers in Italy or Spain in 1900, but still less than 20% in Serbia, Romania, Russia, etc.).

In England, propelled by a formidable natural growth – and despite the departure of millions of emigrants to the New Worlds – the population surged from 8.9 million inhabitants in 1801 to 36.1 million in 1911. By the early 20th century, England boasted five of the 20 largest agglomerations of the time: Liverpool, Glasgow, Birmingham, Leeds and London, the capital of an immensely populated empire and still the foremost city in the world, with 6.4 million residents in 1900. From the mid-century onward, urban

growth had been predominantly driven by the natural increase of urban populations rather than rural emigration, contributing less than 20%. The countryside of the United Kingdom did not witness a depletion of its inhabitants, even though the preference for free trade and colonial imperialism favored the import of inexpensive food at the expense of intensifying national agriculture, facilitated by the export of manufactured products. The rural population continued to rise until 1861, trailing behind France (1846). At that point, it reached 8.3 million inhabitants compared to 5.9 sixty years earlier, while the urban population had surged from 2.8 to 11.8 million individuals. Subsequently, a gradual decline in the population of the English countryside commenced, primarily through the elevation of rural parishes to city status, leaving 7.6 million rural inhabitants (compared to 28.5 million urban dwellers) on the eve of World War I.

The urban development of the 19th century in other European countries undergoing industrialization was even less impactful than in England, leading to the depopulation of rural areas. It merely curbed their overpopulation by absorbing a significant, if not entire, portion of their demographic surplus. For instance, between 1867 and 1900, only the province of Pomerania in Prussia experienced a slight decline in its rural population. In contrast, other regions witnessed an increase, reaching up to 60% in Westphalia and 35% in Rhineland, areas where the urban population had surged dramatically (by +250% and +220% in about 30 years). Population density shifts resulted from the concentration of people in mining regions, industrial hubs and major cities rather than from rural depopulation, except in local instances; this phenomenon would only occur later. France, on the other hand, faced significant challenges due to its demographic vitality lagging behind that of its neighbors. Urban development in France relied on drawing more migrants from rural areas than the natural population growth could provide. This is why the depopulating emigration has been labeled as a *rural exodus*, transforming the once fairly uniform distribution of the population across the territory into a highly contrasting pattern. However, it is essential to contextualize this phenomenon. In 1911, the rural population density was still 20% higher than in 1800, and the urbanization rate was below 45% (it only surpassed 50% a couple of decades later). Internal migration flows were insufficient for a general urban growth. The Parisian metropolitan area emerged as the major beneficiary, followed by a few secondary cities and peripheral industrial regions (such as Nord-Pas-de-Calais, Marseille, the Lyon area, etc.).

1.4. Contemporary demographic and urban explosion and the new settlement map

1.4.1. *Liquidation of 19th century demography and the baby boom*

The evolution of the population at the beginning of the 20th century and during the interwar period can be considered both as a final extension of the trends observed in the previous century and as a transitional period signaling the shift of the epicenter of population growth towards Asia and subsequently Africa. In France, more so than in other regions, the impact of aging (and its consequences on the number of potential reproducers) and Malthusianism (in the 1930s, the total fertility rate fell below the replacement threshold for a generation, and in 60 departments, deaths exceeded births) had rigidified demographic and spatial structures. A continuous decline in the birth rate, surpassing the rate of mortality, gradually brought other European countries closer to the demographic situation in France. Nevertheless, Germany experienced a brief resurgence in fertility under the Nazi regime, and the USSR, severely affected demographically by the Communist Revolution, resumed natural growth by the end of the 1930s. In contrast, the 1929–1930 crisis led to a decline in the natural surplus in the United States, despite still exceeding 1% per year during the 1920s.

While signs of the end of the demographic transition were multiplying in Europe, the rest of the world began to perceive, albeit unevenly, the benefits of the decline in mortality, particularly infant mortality, which typically precedes a reduction in mortality at older ages. This was particularly evident in parts of Latin America, North Africa, and South and East Asia. For instance, the population of Japan, which had remained stagnant for two centuries, more than doubled between 1870 and 1940. China, frozen in population from the mid-19th century until the early 20th century, started growing again despite revolutionary crises and the Japanese invasion. In the first census of the People's Republic of China in 1953, the country had 518 million inhabitants, equal to the population of Europe and 100 million more than 50 years earlier. Epidemics and famines did little to allow the Indian population to grow between the late 19th century and the 1920s. However, between 1921 and 1951, the population increased by 100 million inhabitants, representing an average annual growth rate of 1–1.5%, a rate that doubled in the subsequent years. Yet, these early signs of the diffusion of the demographic transition received little attention at the time.

Following World War II, a genuine demographic upswing reversed the declining birth rate in Europe and North America. The causes of this *baby boom* and why it persisted until the mid-1960s, and even the 1970s in some countries, remain poorly understood, possibly due to the inertia of age structure (the arrival of full generations at the age of reproduction). This surge had the most significant impact on populations with low fertility rates before the war, primarily in the northwest quarter of Europe. France, more than any other country, abruptly deviated from a century and a half of particularly Malthusian behavior. In the 1930s, the TFR (Total Fertility Rate) had dropped below 2.1 children per woman (the replacement threshold for generations). By the early 1950s, it exceeded three children per woman. Although this renewed vitality, with a birth rate of 18–22‰, was noteworthy, it paled in comparison to the United States, where the birth rate (less than 19‰ in 1930) surged to 26‰ until the mid-1960s, or Canada (27–28.5‰). States in Southern and Eastern Europe merely extended their pre-war birth rates for a time, which were still relatively high.

1.4.2. *Years of exponential demographics*

The population growth of countries later categorized as developing nations seemed to align with a similar trend. However, its origin was markedly different: the initiation of the first phase of demographic transition in countries where it had not yet occurred, irrespective of whether they had been colonized or not. Global conflicts accelerated their integration into the world, and modernization yielded effects on life expectancy akin to those in Europe a century and a half earlier. However, this occurred so swiftly that a significant disparity emerged between rapidly declining mortality rates and birth rates that remained at very high levels. Improved healthcare and hygiene, if anything, contributed to their elevation. In sub-Saharan Africa – a region that had largely remained detached from contemporary demographic changes – between 1950 and 1970, as the mortality rate decreased from 27 to 19‰, the birth rate increased from 40 to 46‰. Consequently, the natural surplus rose from 1.4 to 2.8% per year, maintaining a level almost unchanged since then (although it was 1.1% in southern Africa in 2018, it was 3% in the rest of sub-Saharan Africa). In North Africa, an even higher birth rate (55‰) and lower mortality (22‰) enabled the recording of a natural growth rate of 3% as early as 1950. This rate only began to reduce significantly after 1980. In absolute terms, during the 1950s, China's population, with a TFR of over six children per woman, increased on

average by 15 million inhabitants per year, and India's by more than 8 million per year.

The global population surpassed the milestone of the first billion individuals in approximately 1820 and just over a century later (around 1930), it reached the threshold of two billion. Subsequently, it took only 30 years to achieve the three billion mark (1960), and barely 15 years to surpass four billion (1975) (Figure 1.1). It was during this period that western public opinion became cognizant of the exponential nature of population growth, previously regarded as a sign of progress and prosperity, and the threat it posed to the equitable distribution of natural or food resources. This concern was heightened, particularly since almost all developed countries had experienced a decline in vitality in the post-war era. In reality, the completion of the demographic transition had only been delayed by about 20 years due to the baby boom.

With their distinct rhythms, all countries entered what would later be termed the *post-transitional stage*, characterized by a prolonged life expectancy and low fertility rates below the replacement threshold for generations. Birth rates declined, while mortality rates tended to rise due to aging and a concentration of deaths at older ages, following the near elimination of infant mortality. From the early 1980s onward, there was little to no natural population increase in Germany, Belgium, Italy and others. In the early 21st century, the natural movement balance was negative (ranging from 0 to –0.6%) in most European countries, particularly in those of the former communist bloc (Russia, Ukraine, Hungary, Romania, etc.), and modest in the few countries where it remained positive (0–0.2% in France and the United Kingdom). The United States (+0.3%) is not a significant exception. Despite societal, identity or political considerations, international immigration – originating from the colonial Old World and subsequently from the least developed countries – had some impact on Europe's demographic landscape in the aftermath of World War II. However, since the end of the 20th century, it has struggled to compensate for the birth deficit.

The decline in demographic vitality in most developed countries and the continued exponential growth in others have significantly widened the growth disparities. However, opposing the behaviors of developed countries and those of other countries en bloc no longer makes sense since the 1980s, if it ever did. By that time, the second phase of the *demographic transition*

was already well underway in *emerging countries* and several developing nations. In many others, it was just beginning.

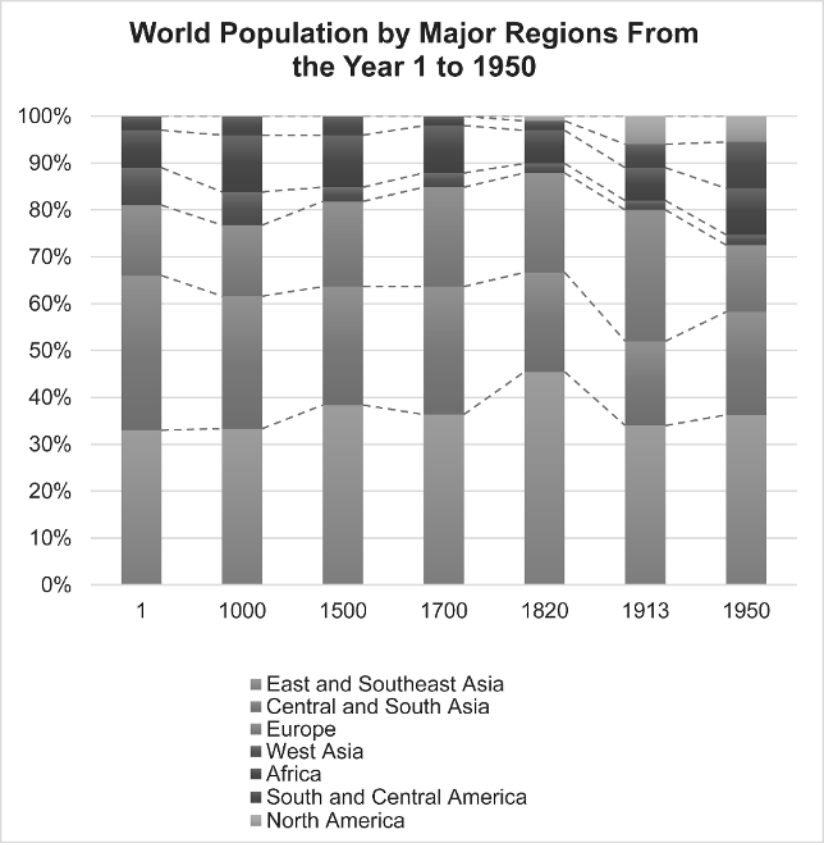

Figure 1.1. *World population by major regions from year 1 to 1950. For a color version of this figure, see www.iste.co.uk/doignon/settlement.zip*

1.4.3. *A fractured global demographic dynamic*

The earliest and most striking changes occurred in the city-states of Asia and Japan. Singapore's birth rate (6 million inhabitants with a density of 8,000 inhabitants per km^2 in 2019) was still at 47‰ in 1952, by 1976 it had dropped to 20‰, in 2000 to 14‰, and in 2019 to 9‰. This outcome resulted from a stringent birth control policy, accompanied by a rapid increase in life expectancy (over 83 years in 2019), education levels and income. Since

the mid-1970s, generational replacement has not been assured, and since the early 2000s, the TFR has fallen below 1.2 children per woman. Hong Kong experienced a similar trend. Japan, still an agricultural and rural country in the aftermath of World War II (with less than 40% urban dwellers), maintained an almost unchanged birth rate (34%) since the early 20th century. Under the pressure of occupation authorities, the reception of 8 million returnees from former colonies, and food shortages, Japan enacted *eugenic laws* encouraging contraception and making all available means accessible to couples. Urbanization, accelerated industrialization and a significant leap in life expectancy undoubtedly had a more profound impact. Nevertheless, the birth rate collapsed: 20‰ in 1960 and dropped below 10‰ as early as 1994. South Korea and Taiwan followed a similar trajectory with a delay of about a decade.

But it was the radical reversal of China's birth position that halted the acceleration of the world's population growth rate. Population growth had exploded after the return to peace (with over 300 million additional individuals during the 20 years following the Revolution) and sharply resumed after the mortality crisis of the *Great Chinese Famine* (famine and the most colossal rural exodus of all time) that followed the *Great Leap Forward* (the ill-prepared collectivization of agriculture). A first attempt at birth control had no effect. It was different after the *Cultural Revolution* when the *one-child policy* was adopted (1972–1974). Authoritatively applied and increasingly drastically extended to all provinces, it brought the TFR down in 10 years from 4.8 to 2.5 children per woman and then below the threshold of replacement of generations in the early 1990s. The fall in mortality rates and the youthful age structure, nevertheless, maintained high growth until the beginning of the 21st century. China's population exceeded one billion as early as 1982. It is expected to stabilize around 1.4 billion over the next two decades. The fear of an unprecedented aging of the age structure induced by the forced crossing of the second phase of the demographic transition led to a relaxation and, in 2015, the abandonment of the one-child policy. However, it is unlikely that these measures will lead to significant changes in the fertility of the younger generations who have largely adopted the post-transitional behaviors of developed countries.

In India, the low TFR level, 2.2 children per woman in 2018, signals the imminent completion of the demographic transition. In the 1970s, the Indian government was tempted by an authoritarian policy of birth control. However, following a scandal involving forced sterilizations, the government reverted to a more traditional population policy, encouraging

but not mandating contraception. Mortality rates, sharply contrasting between castes and states, have only gradually declined (in 2019, life expectancy at birth was still less than 70 years). Fertility has been slow to decrease. The demographic transition unfolded at the pace of the country's gradual embrace of modernity, with birth and death rates of 40‰ and 18‰ in 1971 and 32‰ and 10‰ in 1991 respectively. The one billion inhabitants milestone was reached in 1998. India will soon surpass China in population size.

The growth of other countries in the developing world depends on their position in the stages of the demographic transition. The transition can be considered to be complete in Latin America and the Caribbean (with a TFR of two children per woman in 2019), with fertility remaining high only in Haiti. The TFR for the whole of East Asia has dropped to 1.5 children per woman, while that of South and South-East Asia is at 2.2 or 2.3. The replacement threshold for generations is no longer exceeded in Bangladesh, Sri Lanka, the Philippines, Vietnam, Malaysia, etc. However, this is not yet the case in Pakistan, Afghanistan and much of Central Asia, where the TFR still often exceeds three children per woman. Contrasts are also sharp in the Middle East and North Africa, with countries where the TFR sometimes approaches the threshold of replacement of generations, such as in Iran, Turkey, Saudi Arabia, Tunisia, Morocco, Lebanon, etc., and sometimes continues to approach three children per woman.

The situation is markedly different in sub-Saharan Africa, which still contributes little or nothing to the overall slowdown in world population growth. Only South Africa and a few small islands have completed their demographic transition there. In other regions, the persistence of birth rates ranging from 40 to 50‰ and growth exceeding 4%, despite a clear decline in the infant mortality rate (less than 70‰ in 2019), has defied the predictions of models derived from transition theorization. The TFR has remained nearly stagnant at the highly prolific levels of the first phase of the demographic transition, with an average of more than five children per woman (ranging from 4 for the lowest to over 7 for the highest, as observed in Niger or Uganda). Population growth will continue to be vigorous for several decades, even after the entry, at a still-distant date, into the second phase of the transition, due to the fabulously young age structure of African populations, characterized by significant percentages of potential breeders. The United Nations' median projection anticipates 2.5 billion inhabitants in Africa as early as 2050, equivalent to the global population in 1950

Large geographic regions	1950	1960	1970	1980	1990	2000	2010	2020	Multiplication coefficient 1950–2020	Growth 2000–2020
Africa	227	283	363	476	630	810	1,039	1,340	5.9	65%
Asia	1,404	1,705	2,142	2,649	3,226	3,741	4,209	4,641	3.3	24%
of which South Asia	493	594	742	939	1,189	1,456	1,712	1,940	3.9	33%
of which East Asia	677	805	999	1,198	1,393	1,519	1,604	1,678	2.5	10%
Europe	549	605	656	693	720	725	736	747	1.4	3%
Latin America and the Caribbean	168	220	286	361	442	521	591	653	3.9	25%
North America	172	204	230	254	279	312	343	368	2.1	18%
Oceania	12	16	19	23	27	31	36	42	3.3	36%
World	2,536	3,034	3,700	4,458	5,327	6,143	6,956	7,794	3.1	27%

Table 1.2. *World population evolution since 1950 (in millions of inhabitants). Sources: World Population Prospects 2019, United Nations*

This underscores that, while the slowdown in its growth is widely confirmed in relative terms (+1.1% in 2019 compared to +2.2% per year in the early 1970s), the world's population continues to increase in absolute terms by about 80 million individuals per year since the 1990s. Between 1960 and 2020, an additional five billion people were added, with average annual growth rates ranging from 0.2% per year for Eastern Europe to 3% for Central Africa. These differing paces not only altered the distribution of people among countries and major regions of the world (Table 1.2) – from 1950 to 2020, Europe's share of the total population decreased from 22% to less than 10%, Africa's increased from 9% to 17%, Asia's, which had risen to approximately 60%, has been declining for the past 30 years, and America's (North, Central and South) has remained stable at approximately 13% – but more importantly, they have significantly and unevenly reinforced national and subnational inequalities in human densities and pressures on geographical space, whether natural or built.

1.4.4. *Densification, urbanization and metropolization*

The concentration of populations in cities was the major spatial response to the population explosion: in 1950, 725 million people lived in cities (urbanization rate of 29%), in 2019, 4.2 billion (urbanization rate of 55%). Nevertheless, more than a third (1.8 billion people) of the world's population growth between these dates was absorbed by rural areas of developing countries. In Europe, throughout the Americas (with more than 80% urban dwellers in Argentina, Mexico, Brazil, Chile, the United States, Canada, etc.), in East Asia (with more than 90% urban dwellers in Japan, more than 80% in South Korea and Taiwan, 60% in China), and over much of the Middle East and North Africa (with more than 75% urban dwellers in Algeria, Libya, Lebanon, Israel, Jordan, Saudi Arabia, Iran, etc.), settlement is predominantly urban, sometimes even almost entirely urban, and population growth, slowed down (or zero), depends essentially on the fertility of urban populations and migration. In many countries in South Asia or sub-Saharan Africa, on the contrary, rurality remained overwhelming. In 2018, more than two-thirds of the inhabitants still lived in the countryside in India, Bangladesh, Cambodia, Laos, Afghanistan, Pakistan, Vietnam, etc., and in countries like Burundi, Niger, Malawi, Rwanda, Ethiopia, Uganda, Kenya, Tanzania, Sudan, Guinea, rural populations have maintained such vitality that they have fueled abundant migration to urban agglomerations while continuing to grow.

In sub-Saharan Africa (excluding South Africa), between 1950 and 2020, the number of inhabitants has multiplied by more than five (Niger, Mali, Senegal, Cameroon, etc.), more than six (Uganda, Tanzania, etc.) or even more than seven (Côte d'Ivoire, Kenya, Democratic Republic of Congo, etc.). Comparing their densities would not be meaningful, considering the physical heterogeneity of the territories and their uneven desert coverage. However, the pressing population growth has violently exacerbated the demand for cultivable land everywhere. In Sahelian regions, for instance, the needs of both humans and their herds (which have increased concurrently with the human population) had led to overgrazing and the depletion of water resources even before climate change forced populations into migration. In other areas, forests face threats from the unregulated exploitation by large capitalist companies and the slash-and-burn practices of undernourished peasant families. Additionally, the savannah is condemned to laterization due to the reduction of fallow periods. Throughout, intense tensions over land underpin or exacerbate inter-ethnic, political or religious conflicts.

In South Asia, India, boasting the largest agrarian population globally, had 350 million rural inhabitants in 1960 (82% of the total population) and now has nearly 500 million more (66%), distributed across over 600,000 villages where modernization progresses slowly and unevenly. In Bengal and the Ganges plain, despite being one of the most densely populated areas globally, rural district densities, often exceeding 1,000 inhabitants/km^2, continue to rise. In Bangladesh (42 million inhabitants in 1950, 164 million in 2018; 1,320 in/km^2, the highest human density in the world outside of city-states and a few small islands), the population, rural at over 95% in 1950, is still 64% in 2018, and rural densities have increased from 300 to 760 in/km^2. It is not surprising that efforts are made to expand cultivated areas at the expense of the wooded slopes of the Himalayas, accelerating their erosion and leading to the formation of transient patches of floating mud in the Brahmaputra delta, where landless peasants settle; 9 million Bangladeshis live perilously, subject to the whims of the river.

China, now predominantly urban but home to the world's largest peasantry after India, attempted to retain the natural surplus on-site and stem internal migrations (+242 million rural dwellers vs. +85 million urban dwellers between 1960 and 1976) by controlling them and fostering rural industrial enterprises. However, the modernization policy and its impact on employment (reduction in agricultural jobs and a surge in industrial job opportunities in urban centers of the inland provinces) reversed the situation,

leading to waves of *migrant workers* moving to cities (+160 million inhabitants in cities and +74 in the countryside between 1976 and 1982). The coexistence in cities of authorized and unauthorized rural immigration (i.e. lacking a *hukou*, the internal passport), more or less tolerated (approximately 300 million people at the end of the 20th century), facilitated some control over the most massive rural exodus in history, spreading it across all layers of the urban hierarchy, a phenomenon relatively uncommon in emerging countries.

Because it is internal migrations – movements from rural areas to urban centers and among territories and regions – that reshape the demographic landscape based on variations in dynamism and give rise to the ascent of giant metropolises in the 21st century, as well as the desertification of certain rural territories. While highly populated regions tend to maintain their status over time due to the actions of the present populations, nothing is ever predetermined. Attraction criteria and adaptive capabilities evolve over time. The effects of internal migrations are compounded by those of international migrations. However, aside from the geographical origin of migrants, they do not fundamentally differ strictly in terms of settlement. Most of the time, they play only a secondary role because, on a global scale, international migrants are relatively few, despite their increasing numbers: an estimated 220–250 million people lived in a country other than their birthplace[1] in 2018, comprising 3% of the world population compared to 2.2% in 1980. Their impact is significant only if they persist. Since they are occasional, forced displacements, such as those of national groups in the Stalinist USSR, the movements from east to west in Europe after World War II, or the transfers between India and Pakistan after the *partition* of these countries in 1947, have left enduring political and cultural imprints but have only superficially affected settlement patterns.

Often, emigration has minimal impact on the population of departure areas (Ireland stands out as one of the few countries where emigration has visibly constrained population growth), but it can influence that of destination areas, since the increasing dispersion of origins contrasts with a concentration on a few favored destinations: 64% of international immigrants settle in developed countries, particularly North America (with over 50 million in 2018, including a growing number of Mexicans), the European Union (22 million) and the Gulf oil countries (25 million). For

1 The UN defines international migrants as all persons born abroad, regardless of their nationality of origin or acquired in the host country.

instance, France, Germany, Benelux and Great Britain have shifted from migrants from Southern Europe, which has itself transformed into a destination for immigrants, to migrants from former colonial empires, contributing to the globalization of migratory patterns. The concentration of foreign immigrants and their descendants in large urban areas, their cosmopolitanism, and the trends towards ethnicized communalism in neighborhoods have heightened their visibility and integration challenges.

Today, asylum seekers are often the primary victims of border closures. However, few refugees follow the same routes as traditional immigrants. The majority remain confined in or near conflict zones. Over 80% of them constitute a transient population, with half being children, housed in refugee camps established near borders, within their own country (more than 40 million), or in the neighboring countries they fled to (26 million). Most return to their homelands when security is restored, but global instability increases their numbers and delays their return. The persistence of camps (as seen in Palestine for over 70 years, for example) remains a rare phenomenon.

It is at the regional level and across generations that we should analyze the losses or gains of territories in the context of all migrations. In the absence of population growth in countries in the post-transitional stage, the reconfiguration of the hierarchy and size of cities is slow, primarily driven by the dynamics between centrality and peri-urban sprawl, as well as territorial economic inequalities. This pattern is observed in Europe, Japan and, to a lesser extent, in North America. It is just beginning in Latin America and the Caribbean, which are continually marked by the wave of explosive urbanization that once propelled cities like Mexico City or Sao Paulo to the forefront globally, as well as in the Middle East. In contrast, particularly in most of the least-developed countries, the combination of continued strong natural urban population growth and significant rural immigration flows contributes to the swelling populations across all urban strata. However, it is noteworthy that in countries with a preexisting urban infrastructure, urban growth has been more dispersed among intermediate levels of the urban hierarchy compared to countries, especially in Africa, where urbanization is a relatively recent phenomenon. In these regions, the bulk of the growth is concentrated in a few cities or even just the capital. But, it is the magnitude of population growth, particularly in the most populous developing countries, that has determined a new hierarchy of global megacities based on the size of their countries. New Delhi (30 million inhabitants in 2018), which is expected to become the world's largest

agglomeration in about 20 years before Tokyo (37 millions in 2018), concentrates only approximately 2% of the Indian population. Similarly, Shanghai (27 million) represents a little less than 2% of the Chinese population. They are followed by Sao Paulo, Mexico City, Dhaka, Cairo, etc., ranked by size. However, considering criteria beyond population, such as economic integration or global influence, hierarchical distinctions become more complex, necessitating the consideration of powerful regional urban corridors or *megalopolises*, such as those in the northeastern United States (from New York to Philadelphia), the Hondo region (between Tokyo and Osaka), the northwestern European corridor (between London and Stuttgart) and others.

1.5. Conclusion

The current population represents 7–10% of the total number of individuals who live or have lived on Earth since the emergence of *Homo sapiens*. The enormity of this proportion, regardless of the exact figure, symbolizes the unprecedented accumulation of individuals in less than two centuries of *Revolution* or *demographic transition*. Although temporally displaced, this transition has endured only a very brief period on the scale of human history, leading to a new distribution of individuals between countries and within countries and a novel way of inhabiting the Earth. Paradoxically, population growth is not the primary cause of the shift in humanity's relationship with the environment; rather, it is a consequence of the global modernization of our societies, scientific and technological progress, and the continuously intensified exploitation of resources of all kinds. While changes in behavior could potentially mitigate global warming and the deterioration of natural environments, nothing, barring a global catastrophe, can hinder the ongoing increase in population in the coming decades, likely persisting until the end of the century. The milestone of 10 billion inhabitants is projected to be surpassed before 2050, according to the median projection of UN estimates.

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