

9 Our dominion

And God blessed them, and God said unto them, Be fruitful, and multiply, and replenish the earth, and subdue it: and have dominion over the fish of the sea, and over the fowl of the air, and over every living thing that moveth upon the earth.

Genesis 1:28

Like all other life forms, we have always been a part of nature, negotiating our way through a world shared by other people along with a multitude of other species. As our lineage has evolved, our impacts have increased both in type and intensity. Over the course of the Great Expansion, skilful hunter-gatherers in control of fire multiplied and successfully filled the habitable four corners of the globe by 14 thousand years ago. In their wake, the living landscapes of Australia and the Americas were significantly transformed as they had been, to a lesser degree, in Eurasia and Africa. As big as these impacts were, none would compare with those that were to come with farming. Farming initiated what is arguably our most radical revolution: when we increased food production by domesticating plants and animals, adopted a sedentary lifestyle and developed large, complex societies (civilisations).

Everyone was a Stone Age hunter-gatherer 14 thousand years ago, but some people independently started making the shift to farming around 10 thousand years ago, and by 2 thousand years ago almost everyone was a farmer or was fed by farmers. Civilisations rose and fell repeatedly over the last 6 thousand years, while the population grew along with complex cumulative cultures facilitated by the written word and knowledge of the world and how it works. The rapid acceleration of our cultural

evolution increasingly gives the illusion of our being separate from rather than a part of nature. And even when it didn't seem possible, our numbers continued to soar, with the Industrial Revolution run on the burning of fossil fuels, the Green Revolution run on fertilisers and the development of 'miracle' grains capable of feeding over 7 billion people. How did our dominion propel us to where we find ourselves today?

Before farming

By the end of the Great Expansion, hunter-gatherers in possession of Later Stone Age (LSA) cultures (people) had dispersed into most of the habitable world beyond their ancestral African home. They found themselves in many new settings whose unique plants and animals they quickly became familiar with, particularly the edible ones, as their survival depended upon it. People lived in bands of several tens to several hundreds of individuals, many of whom were blood relatives or in-laws. These groups were mobile, moving to where the rain was falling, where plants were ready for gathering and animals were abundant to hunt. Lingering in any one place was rarely a viable option. As itinerants, group members kept their possessions to the bare essentials and spaced children 4 to 5 years apart to minimise their load. These groups were highly successful, developing unique and ingenious ways of eking out a living depending on the type and amount of edible resources available.

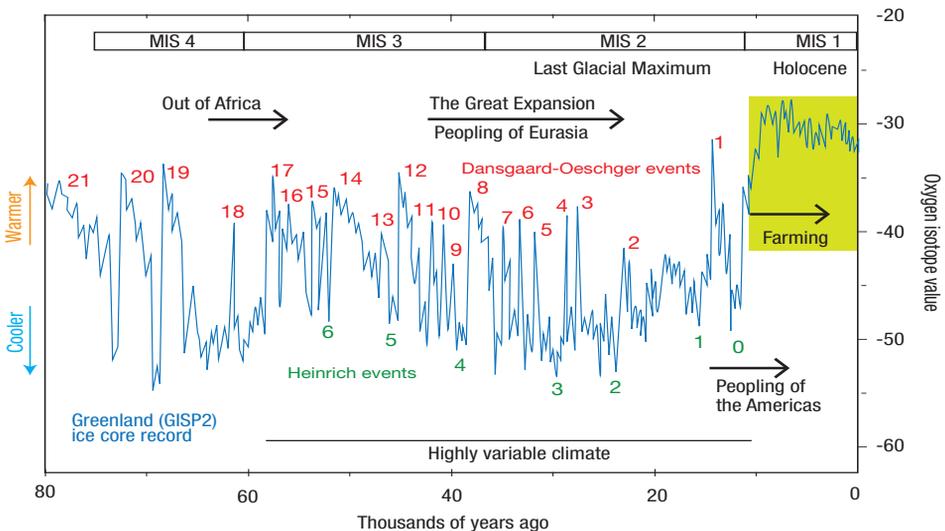
But ultimately the number of people in any region was limited by the amount of food or 'carrying capacity' the habitat could provide. The abundance of natural food sources varied regionally and in relation to fluctuations in climate, and it placed a ceiling on population size. It was only in the transition to farming that significantly larger populations were possible. Although people had dispersed out of Africa into the Eurasian continent 50 to 40 thousand years ago, they would only farm the plants and animals they had soon become familiar with there much later, between 10 and 7 thousand years ago. If farming would prove to be such a beneficial adaptation in growing large populations in Eurasia as well as other parts of the world, why the delay?

Farming has always been precarious. I have never farmed or even visited a farm while living in the USA – hardly surprising given that only 2% of Americans farm. My first visit to a farm was during a trip to Zimbabwe. It was summer and fields of maize as tall as me grew over the low rolling hills surrounding the farmhouse. Each morning the sky was nothing but blue, but by late afternoon the distant rumblings of thunder became sharp, hard pronouncements of rain. I quickly picked up on the farmer's anxiety as we sat on the veranda and looked out over the fields, watching as

isolated rainstorms passed one day to the south and the next to the north of his farm. Some of his fields were irrigated but most were not. A good yield depended on rain, not too much to flood or too little to stunt the growing crops. There was little the farmer could do other than hope and pray. By the time I left, the rains still had yet to roll across his land, although I later heard that rain had come and the harvest was a decent one.

If farming is a risky undertaking today, it was all the more so in the past. Since the Great Expansion began and right up to the start of farming, Earth's climate was far more variable than today, with short-term fluctuations associated with Heinrich events and Dansgaard-Oeschger (D-O) cycles (p. 127). The abrupt climate transitions associated with these fluctuations often spanned just one 25-year generation. Such rapid and large climate changes impacted on habitats and forced people to move frequently in search of food or to reduce their numbers when habitats contracted and there was less food on offer. These rapid climate fluctuations were not conducive to farming, which was touch-and-go in the best of times, and doomed to failure in times of highly erratic climate.

Climate stable enough for farming only set in at the start of the present-day interglacial period known as the Holocene epoch 11.5 thousand years ago (MIS 1). Like previous interglacial periods, Holocene climates were relatively warm and wet globally and, most importantly, lacked the rapid, large-scale fluctuations of Heinrich events and D-O cycles that had previously wreaked havoc. The stable habitats of the Holocene made it possible for people to stay put in one place for periods of thousands of years, with climate variations mostly related to those we are familiar with today,



Farming had to wait for the stable, warm climates of the Holocene

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such as El Niño (ENSO) cycles (p. 128). While not as intense or as frequent as before, climate variations in the Holocene still managed to have large impacts. Climate-related crop failures were likely a major factor in the collapse of past civilisations and result in shortages and food-price increases today. Considering the modern-day challenges, it is not surprising that people had to wait for the relatively benign climate of the Holocene before they could have a successful go at farming.

The emergence of farming didn't depend solely on a change in climate. It also depended on people being primed in ways that would allow them to take advantage of the change in climate when it finally happened. To understand the emergence of farming, we need to rewind back to a world very different from today: the Last Glacial Maximum (LGM). The LGM was colder, drier, windier and dustier than today, with mean global temperatures 5°C colder between 26 and 18 thousand years ago. Although five degrees may not sound like much, it was in fact huge. The Eurasian ice sheet spread from Scandinavia to 52°N (southern England), while the Laurentide ice sheet in North America covered much of Canada to 42°N (New York and Kansas), so much ice that it effectively forestalled the expansion of people into the Americas (p. 267). South of the Eurasian ice sheet was treeless tundra of moss, lichen and frozen ground, followed further south by treeless Siberian-like steppe. Even prior to the LGM, habitable terrain expanded and contracted in response to Heinrich and D-O climate cycles. Climate during the LGM was perhaps not as variable as those leading up to it, but continually harsh conditions confined people in Europe to the relatively narrow southernmost fringe of open canopy woodland habitat.

Expansion and contraction of the ice sheet leading up to the LGM, as well as the LGM itself, placed people globally under pressure to adapt to changing conditions.

