# Migrations and Intensification: Crash Course Big History #7

Crash Course: Big History
https://youtube.com/watch?v=Oy2XJMczUNc
https://nerdfighteria.info/v/Oy2XJMczUNc

John Green: Hi, I'm John Green, welcome to CrashCourse Big History, today, we're gonna be talking about the spread of human foragers across the world and the start of the agrarian era.

John from the Past: Mr. Green, Mr. Green! Didn't we study all that agrarian stuff in World History, because I'm a very busy person, I don't wanna do it again.

John: Yeah, a couple things, Me from the Past, first off, playing Zelda alone in your basement does not constitute being busy. Also, in CrashCourse World History, we zoomed through a lot of this stuff, because we wanted to get to, like, the real history-ish parts of history, you know, the parts with the funny hats and the Mongols.

(Mongol Montage plays)

But if it weren't for agriculture and the surpluses that came with it, we never would have had funny hats. That's why we study big history.

(CrashCourse Big History Intro plays)

John: So as mentioned last week, humans anatomically similar to us have been around for about 200 or 250,000 years, like, here's a picture of one of the oldest known fossil remains of our species from Ethiopia, dated to approximately 195,000 years ago. For the vast, vast majority of our existence, *homo sapiens* were hunter-gatherers, like farming, civilization, modernity, all of that happened in the last 10-15,000 years. And you'll remember that the eruption of Mount Toba about 74,000 years ago reduced the human population to a few thousand, and that scrappy group of survivors held on, and for the next 60,000 years, human populations migrated over the world, separating into their own little petri dishes. And that was interesting, because the human experiment could proceed in isolation in several different zones in the world: the Afro-Eurasian, the Americas, Australasia, and the Pacific. And this was really useful, because it allowed each of those world-zones to develop their own distinct brand of football, which makes for such a beautiful game today, apparently there was no football back then. Really? What did they do all day? Apparently they were hunting and gathering.
Okay, so by 11,000 years ago, the human population had recovered from the Mount Toba disaster and grown to about 6 to 8 million people. Now, because foraging requires humans to constantly move on to new ecosystems to find food while the old ones regrow and replenish themselves, 6 to 8 million is about the largest population of foragers that the entire surface of the earth could support.

Now you may remember that in the very first episode of Crash Course World History we talked about the mystery of why humans developed agriculture even though foraging is easier. One theory involves so-called Gardens of Eden, where the warming climate of the earth created some lush ecosystems with enough food for foragers to quit migrating and settle down for several generations. The Natufians of what later became the Fertile Crescent in the middle east hunted gazelles and fished and harvested wild grains, but they weren't really farmers. But then after a few generations of vigorous population growth, food started to grow scarce in these Gardens of Eden. Given their relatively sedentary lifestyle, those humans may have forgotten how to forage effectively. Also, surrounding areas may have already been overpopulated with other foragers. So humans had to choose between starving to death and getting more out of the land that they were currently on - a choice that historically we make by trying not to die. These humans already had a deep knowledge of plants and animals, and if you've got organisms nearby that might be useful to domesticate like wheat or goats or wild pigs - bingo, agriculture!

Now of course there are many other theories about why agriculture emerged around the world but regardless, agriculture represents a massive shift in human activity. Hunter-gatherers adapted themselves to the resources provided by the environment, right? But agriculturalists increasingly adapted the environment to suit their needs. Forcing the environment to adapt to humans became an increasingly big deal until, you know, like today when it is arguably the biggest deal of all.

But all that being said, the advent of agriculture didn't, like, immediately lead to wars and cities and kings and funny hats. In fact another 5000 years would pass before the first states emerged. So for the first half of the agrarian era, humans lived in a world of villages with transient herders and foragers in the gaps between.

Hank Green: Giving up foraging and settling down did have some downsides in the form of backbreaking labor and diseases moving easily among denser and more numerous populations, but farming allowed humans to support a much larger number of people with a much smaller land area than foraging. This was very good for collective learning, which relies on both the number of potential innovators and the close connectivity between them. The world population had grown from roughly 6 million people at the beginning of agriculture to 50 million by the emergence of states 5000 years ago - roughly 5000 times the size of the population that had survived the Mount Toba disaster 70,000 years prior.

And because early farmers didn't really understand or have the technology to solve the problem of pooping near the drinking water, another upside was that we invented alcohol which was safer to drink instead. So the next time you see a person looking fancy with a glass of champagne, just remember, it's a tradition that started from there being too much poop in the water, and ever since has fueled millions of bad decisions.

States eventually did appear but not all states emerged at once, any more than all agriculture emerged at once. Agriculture first emerged in the Fertile Crescent in Egypt about 11,000 years ago and then in east Asia and Papua New Guinea around 9,000 years ago. Agriculture emerged in west Africa and the Americas around 5,000 years ago, though estimates definitely vary for the Americas. Accordingly, the first states to arise were in the middle East where agriculture first emerged, followed shortly by the Chinese and Indus Valley Civilizations. Papua New Guinea may have invented agriculture around the same time but they never developed enough agricultural surplus to support states. So yeah, in every world zone the invention of agriculture was a precursor for the rise of states.

The key to having a state is agrarian surplus. If you produce enough food, you can have a class of people who don't need to farm. They can then fulfill other duties in this increasingly numerous and complex society whether they be leaders or judges who settle disputes, bureaucrats who deal with administration, infrastructure doctors who heal the sick, priests who make sacrifices to vengeful gods or soldiers who provide security or at least extract a portion of the agricultural surplus for the leadership through some kind of taxation. And with more people filling new jobs and generating new ideas about them, this is also good news for collective learning. Diversification of labor is also the first step of early stage toward hierarchies and classes - aristocrats and popular and despotic kings and pharaohs insulting the shahs and emperors. It also meant the first divisions into unequal, unfair, and undemocratic hierarchies dividing man for man, man from woman, and a high from the low.

John: All of this brings us back to the Hobbes verses Rousseau debate. Hobbes viewed life without state control as nasty, brutish, and short, while Rousseau viewed humanity as largely egalitarian before claims to land and wealth and property corrupted them. Now certainly the idea of an Age of Innocence or a

Golden Age has been popular with many philosophers and political idealists throughout history. I mean, if humanity had once been perfect and was simply corrupted by societal structures or political systems, then it would take only a few tweaks or reforms to get us back to perfection. Unfortunately, it now seems clear that a lot of humanity's evils are created simply by the bad wiring of our evolutionary biology, and the solution to that problem is somewhat complicated. It's very difficult for me to imagine a world in which humans will say, "You know what? If the Earth can only support 6-8 million foragers, then there should only be 6-8 million of us." So where you stand on this Hobbes v. Rousseau question affects your view of the entire 250,000 years of human history, and also your view about much of human morality, character, and potential.

Hank: Another big history take on agriculture is this. Consider the sun. We are made up of the leftovers of its formation and the debris of stars that came before it, but its role in our history doesn't stop there. Fusion reactions happen in the sun's core. This generates energy, which is released into space and takes approximately eight minutes to get to us. Here on Earth, plants capture that energy and store it via photosynthesis. Agriculture lets one species, us, harness more of that energy, we either eat it or use it to feed animals that we eat, or we use it to feed animals like horses and oxen that pull carts and carry burdens, providing 500-750 watts of power, about 10 times more than what a human being could do.

So essentially, agriculture is the act of harnessing more energy from the sun, way more than we could as foragers. All of this leads to an interesting perspective: human history has frequently been viewed as too chaotic or complex to allow us to find an underlying trend, a bottom line or overarching theme. And this to some people makes conventional history differ greatly from the natural sciences. However, given what we know of energy and complexity, consider the following: If we want to prevent our bodily complexity, as well as the complexity that we have created, from descending into chaos, we must keep harvesting matter and energy flows on a regular basis. This is the bottom line of human history. I will therefore argue that during most, if not all, of human history, the quest for sufficient matter and energy to survive and reproduce has been the overriding theme.

That doesn't mean that the bottom line is all there is to human history. You've got political history and the history of warfare and gender history, class history, art history, environmental history, oral traditions, creation myths, and much, much more, but none of those would matter if we were all dead. If you don't eat, if you don't drink, you die. Much of the collective learning, invention, shifts in social structure, have been geared toward coping with the problem of energy flows as the population continued to expand by leaps and bounds, from a tiny 10,000 people 74,000 years ago to over 7 billion people today.

John: So the beautiful thing about being able to remember and accumulate the ideas of your ancestors is that some of their ideas are great for agriculture, also other things, but mostly food. Whether it's new forms of irrigation invented in ancient Mesopotamia or the four-crop rotation that gradually proliferated across Europe in the 17th and 18th centuries, these innovations increased the number of potential innovators who could exist in a social order without starving.

And there were also great innovative leaps in connectivity. For instance, the invention of writing in ancient states about 5,000 years ago. Like, starting from a bureaucratic form of accounting, mostly to count livestock, to an art, largely enjoyed by the elite, writing gradually communicated more abstract and complex ideas. And those ideas became available to more and more people as more people could read, until eventually writing became so popular that these days, everyone writes books, even some of your CrashCourse Big History hosts. We also liked writing because it made it less likely that things we'd learned would be forgotten, like when people started to write down what they knew, that knowledge became set in stone. Sometimes literally! And then with the invention of printing in China and later Korea and the printing press in Europe, more writing could be produced and circulated more quickly, and often more cheaply than books copied out by hand. All of this turned into a beneficial feedback cycle, potential innovators raise the carrying capacity of the population, more people go on to produce more ideas, which raises the carrying capacity of the population, which in turn produces more potential innovators. And we can do it all without anything bad happening to the environment. What's that? Oh. Oh my.

So, throughout the agrarian period, collective learning continued to raise the carrying capacity of the world. Populations grew from 6 million 10,000 years ago to 50 million by the dawn of states to 120 million by 1000 BCE in the midst of classical civilization. By the end of the agrarian era and the beginning of the industrial revolution, 954 million people lived on the Earth.

But while collective learning gradually raised the carrying capacity in the agrarian era, it did not keep pace with population growth, and this is a significant problem with humanity. Just like any other animals in nature, we breed until we strain the resources of our environment, so we are prone toward unsustainable levels of overpopulation. So every two or three centuries, humans would hit the carrying capacity and then the population would recoil, resulting in famine, disease, periods of in-fighting and population decline, in every agrarian civilization, from civil wars between Caesar and Pompey, the English War of the Roses, to the revolt of the Janissaries in the Ottoman Empire, and similar events all across the world, the cycles of prosperity, strain, crisis, and civil in-fighting repeated themselves. And I do worry a little bit that when we talk about traditional history, we don't do it enough in the context of carrying capacity. We are, after all, organisms, and we behave a lot like other animals on this planet. We want there to be more of us, and we want more resources for that more of us to enjoy.

So that broad, big history take on the agrarian era takes us to the Age of Exploration. Explorers, including Christopher Columbus, but also many others, united the previously isolated world-zones of Afro-Eurasia, the Americas, Australasia, and the Pacific. Eventually, this combination of world-zones into one unified global network, although not that unified, would produce an even more astounding rise in complexity: the Modern Revolution--we'll talk about that next time.

(CrashCourse Big History End Screen/Credits)