

# Why Do People Farm?

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What led us to practice agriculture? The answer is not as simple as “We need food to survive.”

A rapidly growing body of findings from anthropology, archaeology and paleontology, suggests that agriculture extends back only about 13,000-15,000 years. Jared Diamond, the noted UCLA (University of California at Los Angeles) professor of geography and physiology, and author of *Guns, Germs, and Steel*, contends that earliest agriculture traces to the Fertile Crescent of southwest Asia, where strains of barley, wheat and protein-rich pulse legumes were domesticated. Receding ice across Europe and Asia, followed by numerous cycles of healthy grasses and manure from grazing animals, contributed to rich loam soils available for tilling and growing selected crops.

In an article in the April-June 2010 issue of *Journal of Agromedicine*, I suggested a concept, the *agrarian imperative*, as the best explanation for why people engage in agriculture. The agrarian imperative is a basic human instinct to acquire sufficient territory to produce the food and shelter required by families and communities. The agrarian imperative instills farmers to work incredibly hard, to endure unusual pain and hardship, and to take uncommon risks. There are several lines of recently uncovered evidence that validate the agrarian imperative: historical, anthropological genetics, and psychological.

**Historical** evidence suggests that domesticating animals and cultivating land to produce food, clothing and shelter allowed modern man to survive lean times and to proliferate faster than our hunter-gatherer ancestors during preceding eras. But agriculture was a long time in coming.

Our ancestors, *Homo erectus*, developed in Africa about two million years ago, and were preceded by *Australopithecus afarensis* for a couple million years and *Ardipithecus ramidus* for a couple million years more before that. The earliest *Homo erectus* humans were scavengers who lived off plants and their seeds or fruits, tubers, insects, eggs and whatever sources of flesh they could find--such as the carcasses of animals slain by more powerful predators, or capture--such as small animals, birds, and fish. When our ancestors banded together as groups, mainly by kinship, they could hunt larger prey and protect themselves better. They established territories, which they marked by cairns or announced by shouting and loudly banging rocks and sticks. The most powerful clans occupied the most desirable terrains and waters with the greatest opportunities to obtain food, shelter and other essential resources.

Gradually, the clans outgrew the carrying capacity of the territories they inhabited. Many had no choice but to seek new favorable territories. Life remained uncertain for these aboriginals, as the plants and animals on which they subsisted varied in their availability. In all likelihood, some observant hunter-gatherers noticed that seeds they had collected and inadvertently dropped around their living quarters sprang up into the species they were exploiting. Learning how to tuck seeds into moist ground, to scrape away competing plants and to select the most nutritious seeds from among those they grew, increased their available food supply. Storing the food they produced for winter and other times of shortage gave agrarian clans a powerful advantage over hunter-gatherers. This was the beginning of farming.

Several early subspecies of humans, such as Neanderthals, were hunter-gatherers who became extinct as agricultural clans replaced them. Nomadic farmers migrated out of Africa along the Nile valley northward and eventually crossed into Asia Minor. They brought with them knowledge of how to refine

metals, including adding carbon to iron to make steel, and they may have already had domesticated cats and dogs. They flourished as agriculturalists, and several centuries later as herders, taming sheep and goats first, and later cattle, horses and fowls such as chickens. It is thought their successors spread from Mesopotamia westward, northward and eastward throughout Europe and Asia. Mostly within the past fifteen thousand or so years, these human bands, equipped with their expanding knowledge of farming, also mastered fishing and the building of water craft that enabled them to cross seas to Australia and many islands around the world. Others crossed ice or land bridges to North America and traversed down the Isthmus of Panama to South America. A more recent explanation of the settlement of humans in the Americas is that Pacific Islanders skilled in travel by sea craft landed on the coast of Chile and gradually spread throughout both continents in the western hemisphere. On some continents, such as Europe, Asia and possibly Australia, farmers displaced earlier hunter-gatherers, whose predecessors had also originated in Africa. Some agricultural techniques developed independently. For instance, in the Americas, teosinte seeds were first cultivated about 7,000 years ago and carefully selected to result in maize, and its successor, corn. Agriculture clearly gave survival advantages to agrarian humans over other types of *Homo erectus* and over all other species.

Victor Davis Hanson described how agrarianism shaped early human civilizations. He suggested that farming parcels of land and the struggle for control/ownership of these territories necessitated the formation of governments. Laws were formulated to manage territories; wars, courts and imperial edicts settled disputes. Numerical systems and writing were invented, along with educational and scientific systems. It can be argued that agriculture was the foundation for much of life as we know it today.

**Anthropological genetics** evidence indicates the drive to acquire and use territories for agricultural purposes has an inherited basis. Underpinnings for the concept of the agrarian imperative can be traced to Konrad Lorenz, Niko Tinbergen and Karl von Frisch, who won the Nobel Prize in 1973 for their observations of animals and other species in their natural environments. They described how most species establish territories with sufficient resources to enable the maintenance and reproduction of additional members. They establish a dominance hierarchy, or pecking order, with the best territories usually going to the fittest individuals within a group of competitors. Contemporary farmers are well aware of the dominance hierarchy within a pen of cattle, pigs or chickens.

Animals mark the boundaries of their territories in prominent ways. Cats and dogs spray urine on tree trunks, plants, fire hydrants and even furniture. Birds fly from tree to tree singing loudly to proclaim "this area belongs to me." The boss cow usually shoves others away from her favorite position at the feed bunk. Personal objects that signify ownership are the modern human pheromones. We mark our territories with fences, signs, sidewalks, and legal descriptions. We even decorate our office cubicles--if we work in such confining spaces--with carefully chosen artifacts and photographs that advertise "this space is mine." Territoriality and dominance behaviors have become encoded into the genetic make-up of most species, including humans.

Humans are carrying around in our DNA the remnants of genetic codes that influenced our earlier ancestors. *Ardipithecus ramidus* provided us with modifications in the pelvic attachment of hip bones which allowed for upright walking and freed our hands for grasping and other functions besides climbing. *Australopithecus afarensis* gave us larger skulls to accommodate more brain matter to store an ever-greater fund of information and increasingly complex language. *Homo erectus* developed sophisticated social, artistic, religious and occupational behaviors necessary to make tools and organize groups of humans to function together efficiently. The inherited capacities and acquired mutations that afforded

our earlier predecessors with survival advantages are included in our gene pool. Those that lacked these adaptations succumbed in the competition for life.

All species carry the history of successful adaptations of their ancestors in their genetic material; the stored information is available when needed. When pigs become feral, their hair becomes thicker, longer and coarser; their tusks elongate and their behavior becomes wary. They know instinctively which plants are harmful to consume. Dogs that are left to fend for themselves form packs and pool their resources to capture food and protect their puppies.

It is interesting how the human body changes and the behaviors associated with farming wash out of people after just a few successive generations have been removed from the land. But they rekindle in just a few years of working the land. City folks who marry farm people or who move to rural areas to begin their own farming operations usually acquire closeness to their land in just a few years. They pass along to their children their hardy work ethic and the psychological commitment to make the land produce. This rapid reversion taps into strands of genetic memory that lie dormant until agricultural activities stimulate the emergence of a wealth of survival capacities that are included in our DNA. How quickly our bodies harden and toughen when we leave an urban lifestyle and become immersed in nature. Our fingers thicken and our hands enlarge; our behavior becomes practical and our manners become brusque, geared toward accomplishing tasks with a minimum of energy and physical wear and tear. We become competitive about acquiring suitable farmland and develop an emotional--and often spiritual--attachment to the land we work. We take great pride in our crops and livestock. Bonds of mutual dependency develop between humans and farm animals. Farmers experience fulfillment in producing essentials for life—food, fiber and fuel for families, neighborhoods and the larger human community. We are exhibiting the agrarian imperative as a way of life.

Unlike many genetic disorders, the agrarian imperative is not encoded into a single gene, but into a host of genes. Henry Cole, a respected professor of Preventive Medicine and Environmental Health at the University of Kentucky and also a farmer like me, offered an alternative explanation why people farm in the same issue of the Journal of Agromedicine. He reasoned that people farm because they choose to do so, and only if they have access to the necessary economic, cultural and social capital resources. I think the agrarian imperative is a better argument in this nature versus nurture debate. As Steven Kirkhorn, the editor of "Agromedicine" has suggested, "the love of the land and the skills and ability to succeed in this endeavor may be expressed in both the genotype and phenotype of those engaged in farming." In other words, genes influence our basic urge to farm. We can detect genetic selection in the personalities of those who farm.

**Psychological evidence**, particularly personality research, suggests behavioral traits that are characteristic of persons who engage in agriculture. Joyce Willock and her colleagues at the University of Edinburgh evaluated the attitudes, objectives, behaviors and personality traits of 242 male and 10 female farmers in Scotland. Personality traits most predictive of success in farming included: conscientiousness, risk-taking and self-reliance. These personality traits have survival value in the competition for farm land and working the land as a way of life.

Marilyn Shrapnel and Jim Davie at the University of Queensland identified five personality factors that motivated the 60 farmers they studied: a capacity for hard work; confidence in making their own decisions; great capacity to cope with adversity; diminished need for companionship and a comfort level with a small circle of friends; and self-reliance. Similar to Willock's findings, these factors seem to be essential characteristics of the agrarian imperative.

The same traits that motivate farmers to be successful also are associated with depression and suicide when the objectives of farming are not met. Fiona Judd and her Australian colleagues conducted a number of studies during the past decade to explore why Australian farmers have a significantly higher rate of suicide than non-farmers. In comparison to non-farming rural Australians, farmers exhibited significantly higher levels of conscientiousness and lower levels of neuroticism, which they described as the ability to acknowledge or express mental health problems and to seek help for these problems. The traits that contributed to their success as farmers, such as perseverance in the face of adversity and tendency to keep problems to themselves, appeared to also work against them.

The rate of suicide among male farmers is much higher than that of their non-farming counterparts in most studies undertaken in agricultural areas around the world. Farm women also have a higher suicide rate than non-farm women but their overall rate of suicide is much lower than for males. The incidence of suicide is tied mainly to episodes of severe economic stress, although exposures to certain classes of insecticides, such as organophosphates, can also be a factor. The suicide rate among farmers is higher in nearly every country, from India, to Japan, the United Kingdom, Australia and the United States. In Great Britain the suicide rate of livestock and dairy producers rose to as much as 10 times the usual rate for several months in 2001 when their sheep and cattle were killed and burned to prevent the spread of foot-and-mouth disease and mad-cow disease (bovine spongiform encephalopathy). These hard pressed farmers could not bear to see their beloved animals--the means to their economic livelihood--slaughtered. The same traits that helped them be good farmers also contributed to their demise in this instance. In the overall course of life, however, great capacity to deal with adversity, conscientiousness, risk-taking and self-reliance contribute more to survival than incapacitation.

Does the agrarian imperative imply that we have little or no control over the behaviors entailed with farming? Clearly not, for instincts encourage patterns of behavior, but don't dictate responses, to individual events and circumstances. Living and working on the land influences what is absorbed into our changeable genetic material, but the genetic imperative is only one influence--the most important, I think--that explains why people farm. The more we advance as a species, the greater our capacity to change what we respond to. We farmers have little control over the weather, agricultural policies, global food production and consumer demand, but we have a great deal of control over how we farm, whether we manage our resources responsibly or not, and how we govern our time and energy. We choose whether we get adequate sleep, recreation and do not compromise our safety. We are in charge of how we deal with our frustrations, whether we share them with people who can help us or let our stresses overwhelm us. If our choices increase our likelihood of surviving and flourishing, they become ingredients in the agrarian imperative.