Emergence of Civilizations / Anthro 341: Notes 5

Agriculture and sedentism in theory

© Copyright Bruce Owen 2009

- Archaeologists think agriculture is a big deal. Why?
  - It is a recent change in the way humans have lived for most of their existence
    - As we saw before, even if you include only anatomically modern *Homo sapiens*, 98% of our duration as a species has been as foragers.
  - so: farming and civilization are both very recent aberrations for humans
    - That can't be a coincidence: they must be connected somehow
  - All the known "pristine civilizations" depended at least in part on agriculture
    - So again, agriculture and civilization must be connected
    - Agriculture seems to be a necessary prerequisite for civilization

- **Agriculture** = Activities to artificially increase plant food yields (sowing seeds, clearing forest, weeding, diverting water, fertilizing, etc.)
  - Agriculture provides more food per unit area of land than does foraging
  - That is, you get more food per acre by farming it than by collecting the wild foods on it
    - This allows more people to live in a given area
    - That is, it allows a higher density of people
  - Of course, it takes more labor to farm an acre of land than to collect the wild foods that grow there naturally, without any help
  - This process of putting more labor per acre *in* to get more product per acre *out* is called **intensification**
    - agriculture is more "intensive" than foraging
      - in that it produces more food per acre, but requires more labor per acre to do so
    - agricultural practices themselves can be more or less "intensive"
      - a "low intensity" form of agriculture might involve just scattering seeds or diverting floodwaters to wet some land
      - fertilizing, irrigating with canals, etc. are "more intensive" forms of agriculture
        - because they produce more crops per acre
        - at the cost of collecting, hauling, and applying the fertilizer, building and cleaning the canals, etc.
  - Is farming a good deal, compared to foraging?
    - that is, if you double the labor input, do you at least double the food output?
    - the surprising, empirical answer is, in most cases: no!
    - In fact, agriculture usually requires more labor per unit of food produced than does foraging
      - That is, a farming family has to work more hours per year to provide its own food than a foraging family does
    - The !Kung recognize this as a matter of common sense
      - That is why when Lee (author of the reading on the !Kung) asked the !Kung why they don't farm, one famous reply was "Why should we farm when there are so many mongongo nuts?"
      - They know that they can get the food they need with less work by foraging

- The tradeoff of agriculture is clear if we consider the difference between the yield of food *per acre* and the yield of food *per hour worked*
  - agriculture produces more food per acre
  - but agriculture produces *less* food per hour worked
  - In a given area, agriculture can produce more food than foraging can, so agriculture can feed more people
    - But each one has to work harder than before to survive
- Foraging is a good deal if there is a lot of land per person, that is, a very low density of people
  - But if there are too many people for the available land, foraging just can't provide enough food
  - so if population gets too high, or the land's natural productivity becomes too low, farming or herding become the only alternatives to hunger
- You often hear the idea that when people switched from foraging to farming, they escaped the pressures of a precarious existence and suddenly had the time to develop "civilized" practices like art, literature, science, and technology
  - but in fact it was the reverse
  - farmers have *less* free time than foragers
  - so we need some more sophisticated explanation for the development of civilization
  - instead of looking at the total or average amount of "free time", maybe we should think about how the free time is distributed in the society
    - *who* has to spend more time on subsistence tasks
    - and who gets to spend less time on subsistence tasks

- **Sedentism** = living more or less permanently in one place
  - in some particularly good environments, foragers can settle in one place (become sedentary)
    - or have just a few semi-permanent settlements (be semi-sedentary)
      - sometimes seasonal settlements, as in shifting between winter village and summer camp
    - sedentism requires either enough wild food available year-round, or some kind of food that can be collected in large quantities and stored for the off-season
      - not all kinds of food can be stored effectively or efficiently
      - some that can be stored must be specially treated, like drying, which may require lots of fuel, labor, and time in one place
    - sedentary foragers are usually highly specialized on one or a few very productive wild resources in specially favored places
      - fish and shellfish along parts of the US west coast, producing shell mounds
        - marine resources tend to be available year-round. so storage is not necessary
      - acorns in parts of inland California
        - seasonal but easily stored for long periods in dry silos
      - salmon on the Pacific northwest coast
        - seasonal but can be smoked or packed in oil for long-term storage
  - in less-ideal environments, agriculture allows people to become sedentary, and creates reasons for them to do so
    - farmers *can* settle because

- agriculture can provide enough food in a limited area that the food is not exhausted before the next season replenishes it
  - so people don't have to move in order to get food
- farmers are *encouraged* to settle because
  - fields must be tilled, weeded, irrigated, harvested, etc., which requires people to be there at many different times during the year
  - harvests produce a lot of food at once, which has to be stored for eating later
    - staying near the stored food is easier than carrying it around
  - stored food, fields, canals, etc. may need to be defended

- Effects of agriculture and sedentism
  - Agriculture and sedentism tend to lead to population growth
    - Both tend to increase fertility for biological reasons
      - Increased carbohydrate consumption from agricultural crops may keep women's body fat levels high enough year-round that they do not go through periods of infertility
        - foragers often get very lean during the season of scarcity (it varies in different regions), which reduces female fertility
        - this is an effect familiar to female runners and dancers
      - Less mobile mothers don't have to carry their small children constantly, encouraging them to stop breast feeding sooner
        - Fertility is reduced while nursing
        - So shortening the period of breast feeding shortens the period of reduced fertility
        - Making the mother more likely to get pregnant again sooner and have more children over the course of her lifetime
      - Since the mother does not have to carry her infant around while foraging, farming allows a woman to care for more than one infant at a time, leading to larger families
        - mothers are not forced to take measures to prevent having another infant while a previous one is still small
        - such as abstinence rules, contraceptive measures, induced abortions, or infanticide, all of which were practiced by at least some foragers
    - Agriculture also provides economic incentives to want more children
      - Farming creates a greater demand for labor, that is, kids to help with the work
      - So farmers generally want to have large families, and the population tends to grow
  - The population growth caused by sedentism among foragers may
    - push sedentary foragers into agriculture
    - the population may outgrow what the wild resources can support
      - in order to avoid shortages, they may start encouraging the wild plants they specialize in to grow, through burning, planting, diverting water, weeding, etc.
  - The population growth caused by sedentism together with agriculture may
    - push people who are only partially dependent on farming to commit to it more fully
    - population growth may push them into more intensive farming
      - in order to produce enough for the rising population, they focus more and more on farming, less and less on foraging
    - Eventually they are locked in

- population rises above what wild resources can support
- people can't give up farming without causing hardship
- So the shift to farming may becomes a one-way change
- there is no going back without unacceptable disaster

- Agriculture and sedentism have surprising effects on nutrition and health
  - early agriculture often focuses on one or a few of the most productive crops
    - so most early farmers had less varied diets than foragers
    - and often poorer nutrition overall
  - most early crops are rich in carbohydrates (grains, tubers, etc.)
    - more carbohydrates lead to more dental caries (cavities), abscesses, etc.
    - these were serious matters before modern dentistry
  - more labor leads to more arthritis, back and knee problems, etc.
  - living in permanent villages creates new problems of sanitation (waste disposal, insect infestation, etc.) that encourage disease
  - living in larger, denser groups aids the spread of epidemic diseases
  - overall, settled agricultural lifestyles typically increased biological stress on people
    - and often decreased lifespan
    - more children were produced, but they had more ailments and tended to die younger
    - in theory, these two trends could cancel each other out
      - but the observed pattern is that in most cases, the increased birth rate outweighed the reduced survivorship, and the net effect was a population increase

- Agriculture and sedentism have cultural effects, too:
  - Sedentism allows accumulation of material goods: storage of goods and food
    - thus the origins of rich and poor people and classes
    - so sedentism makes economic stratification possible
    - accumulation is not limited to a single generation, either; land and goods can be inherited
      - mobile foragers also inherit, but their mobility limits accumulation
      - in settled societies, more fortunate families may accumulate wealth over generations
        - allowing greater economic stratification
        - and the formation of economic classes and aristocratic families
  - Agriculture and sedentism allow the production and storage of **surplus**: food or other goods beyond the needs of the producer
    - mobile foragers could produce surplus, too, but since they could not store or transport much surplus, they don't generally produce it
    - surplus production makes it possible to support craftspeople and other specialists who do not produce all (or any) of their own food
      - Harvey Weiss (an archaeologists at Yale) called this "the beginning of the big rip-off"
    - the existence of surplus and people who don't produce all their own food creates a whole new arena for social arrangements that may become very complex. Consider:
      - Successful farmers might use their surplus to support servants
      - Farming families might want to pool some of their surplus as insurance for bad times or to support work on community projects, defense, etc.
        - There will have to be ways to keep track, distribute, decide who gets what, etc.

        - If some people trade surplus for goods or services, how will the inevitable disagreements, debts, etc. be handled?
        - Some people might try to encourage or coerce others to produce surplus to support them, like chiefs, priests, warriors…
    - Agriculture allows larger groups to live together
        - because farming produces more food in a given area, more people can live there
            - so people have to interact with a larger number of others
        - the kinship system becomes inadequate to structure interactions
            - since you can't keep track of so many relationships
        - so people start using other criteria to determine how to interact with people they encounter
            - such as social status, class, rank
            - this is the beginning of more complex social organization
        - greater likelihood of conflicts
            - because more people are interacting with each other
            - and because people can't defuse problems by simply moving away
            - encourages the development of institutions for conflict resolution (chiefs, religious authorities, courts, etc.)
    - Settled people with goods are easier to raid, threaten, conquer, control, tax
        - unlike mobile foragers, settled people have stored food, goods, and improved fields that people may want to take by force
            - so raids or warfare become possible
            - so sedentary people may need to defend themselves
                - meaning that they may have to develop hierarchies to organize their defense
                - they may have to pool surplus in order to build defensive walls, etc.
        - because they are stuck in one place, settled farmers are easier to coerce and tax
        - this vulnerability, surplus, and accumulation of wealth help make power hierarchies possible

- We used to think that agriculture and sedentism were tightly linked
    - it has become clear that the relationship between agriculture and sedentism is not so simple
    - some early sedentary societies practiced little or no agriculture
    - but larger, more complex societies do seem to have required both sedentism and agriculture

- Agriculture and sedentism made these changes, many of which are steps towards "civilization", possible.
    - But they did not necessarily *cause* civilization to arise
        - they just made civilization possible, while among mobile foragers it was not.
    - Some foragers specializing in unusually rich resources (like salmon on the northwest coast of the US, or acorns in California) were sedentary and lived in relatively large villages, even without agriculture
        - Yet they did not develope the social complexity of "civilizations"
    - even settled farmers were around for thousands of years before "civilizations" emerged
    - So sedentism, and even agriculture, are apparently necessary steps, but not sufficient ones, for the appearance of civilization
    - Something else must be needed, too