Development and Diffusion of Agriculture

The first section, the development and diffusion of agriculture is quite well covered in most human geography textbooks. Most textbooks follow the presentations of economic land agricultural activity that is based on the notions of the 19th century geographer Edward Hahn that were modified and further articulated in the United States by Carl Sauer. The structure, of the AP course and most textbooks, follows conventional thinking that classifies economic activity into primary, secondary, and tertiary activities. Primary activities are those that are using the resources of the environment directly such as hunting and gathering, farming, and timbering, mining, and fishing.

There are major events in the history of the world that are quite transforming and the invention of agriculture in the Neolithic times, was one of those events. The invention of agriculture enabled the human population to differentiate itself from the higher primates. By applying agricultural technologies in a very simple forms, humans were able to increase the carrying capacity of the earth's surface by many, many times. Every culture on the surface of the earth engages in agriculture in some form. We obviously need food to eat and cultures have developed practices for storing food until times of shortage and moving food from areas of high productivity to areas of high consumption. In addition to the circulation of food, other aspects of food production attract the attention of human geographers. The spatial patterns of the dietary laws that govern consumption and production of crops and animals around the world have fascinated many geographers.

Carl Sauer's seminal work, the Agricultural Origins and Dispersals published by the American Geographical Society in 1952, is the spring board for all contemporary geographical discussions about the origins of agriculture. Sauer believed there were eleven separate centers of plant and animal domestication. This great invention probably occurred first in the areas of the tropical seashores where settled fishermen were able to produce enough surplus so that they could invest some of their wealth and time into the experimentation and nurturing of plants and animals. Sauer and others argue that large herd animals may have been first domesticated for ceremonies and then later used for other purposes. They conclude this because the religious personages in the early agricultural communities had the time to rear young herd animals to the time where they could actually participate in religious ceremonies. But of course no one really knows for sure. The movement of humans around the surface of the earth diffused plants and animals to nearly every possible environment. Some of the movements are well documented others are only vaguely understood.

Evolution of Energy Sources and Technology

The increasing availability of animal energy increased the ability of humans to till the soil. Techniques of the harnessing of animals evolved from the early forms of tying plows to the heavy horns of cattle to the advanced harnessing system for horses. Europeans developed the heavy horse collar which enabled the weight that the animals were pulling to be transferred to their powerful shoulders and away from their windpipe and neck. This made the horse much more effective. Large draft horses enabled the farmers to till heavier, more productive soils which ensured better yields of grain. Better yields meant more food of animals and eventually large and more powerful animals. Although agricultural technology evolved in all parts of the world, the process was slow. Farmers were reluctant to experiment with new, risky ventures for fear of crop failure and famine.

Major Regions of Plant and Animal Domestication

All the popular textbooks and atlases have maps and charts that portray the assumed regions of plant domestication. These maps are important because they illustrate the areas where the wild ancestors of modern crops might be found. The genetic material in the world of our ancestors is considered precious because it is necessary to create new varieties of the domesticated plants.

Agricultural systems associated with major io-climatic zones
There are two things that must be considered when teaching the contemporary regional patterns of agricultural production. One is the relationship between agriculture systems and the climatic zones and the second is the complicated set linkages among the production areas and the consumption areas. All forms of economic activity are involved in the shift of agriculture products to food.

Most atlases and textbooks contain a version of a map based on a map drawn by Derwent Whittlesey and published by the Annals of the Association of American Geographers in1936. Unfortunately no agricultural geographer has attempted to modernize this map, and therefore it must be used with caution. This map attempts to portray the major agricultural regions in the world. One way to deal with this part of the course is to have your students study this map making sure they understand the key. The maps shows a pattern of about thirteen varieties of agriculture that are reflective of environmental zones. For example, the nomadic herders are found in the arid regions of north and south Africa, the eastern horn of Africa, southwest Asia, central Asia and northern Eurasia. Shifting cultivation is focused primarily in tropical forests and on the savanna margins of the forests in South America, Africa, and Southeast Asia, and particularly Indonesia.

What Whittlesey calls rudimentary sedentary cultivation really should be thought of as subsistence agriculture. He also categorizes what he calls intensive subsistence tillage, one form making heavy use of rice and one form really using wheat rather than rice. These circulation systems are essentially the same but just have a little different crop mixture due to the climatic differences. Livestock ranching, like nomadic herding and shifting cultivation does seem to follow major climatic zones.

If students look at the map with some fundamental understanding of environmental zones will see very clear patterns. However this map is only the beginning because farmers have greatly modified the environment even destroyed major components of it to bring this pattern into reality. The forests that once covered Europe have long been cleared, as have the forests that once covered part of North America east of the Mississippi. The tilling of the soil breaks up and eradicates the indigenous or natural vegetation. The crops that grow in particular places are dramatically modified from their original ancestors and in many cases bear little resemblance to the native plants that were in the area before agriculture. Wheat, for example, the dominant plant on the northern plains of the United States has its origins in southwest Asia. The corn that blankets the Midwest of the United States and the Danubian basin had its origin in Mesoamerica.

Production and Food Supply: linkages and flows
Commodity maps in an atlas such as Goode's illustrates the concentration of a crop such as wheat . It is produced in the central plains and northern plains of North America and the area around the Rio Plata Pampas of Argentina. In Europe it is found all the way from the British Isles through to Syria. Other concentrations are found in the Ukraine and out to the Far East along the Trans-Siberian Railroad. Wheat is also grown in the Indus and Ganges Valleys, and in northern China. Further concentrations exist in southeastern and southwestern Australia. This grain, the staff of life, is traded in a world wide pattern from these very successful production areas to area of population concentration where the wheat is converted to flour. The map of wheat movements in Goode's Atlas is critical to an understanding of the manifold connections. North America and South America and Australia are major exporters of wheat. Most of the exported wheat goes to Europe, the Middle East and China.

Maize or corn, another major crop that is exported is heavily concentrated in North America, the largest production region. A secondary regions are in the Danubian basin and in China and Java. Corn is also grown in southern Brazil and in Argentina and in parts of Africa. The African corn, however, does not

enter world trade. Most corn flows out from the American Midwest, down the Mississippi, out the major port of New Orleans, and through the Panama Canal to major consumption regions in China. Another flow from North America moves to the Middle East and western Europe. Unlike wheat which is consumed directly by humans through the form of bread, corn is usually fed to animals and consumed indirectly by humans.

The third major grain that moves in world trade is rice. Terrific concentrations of rice production occur in south China and Indochina. Surpluses from these areas flows to Africa, Europe and to the Middle East. Rice is also produced to a lesser extent in the Mississippi Valley where it enters world trade, again, flowing largely to Africa and Europe.

Other commodity flows of interest are the movement of coffee and tea from the tropics to the mid latitudes. Likewise a flow of sugar from the coastal regions of South America and Islands of the Caribbean and southeast Asia, the northeast coast of Australia.

In the contemporary times there is controversy about the flow of food around the world. Many governments think of food as a strategic material and want to ensure that their local production is adequate should warfare interrupt the flow of international trade.

In addition farmers using their political clout have raised barriers to prevent food being imported from areas where farmers can produce food more efficiently. One of the significant developments in international trade and food in the 1990s has been the growing resistance in Europe to the importation of American crops that have been produced using the technologies known collectively as genetic engineering. While selective breeding of crops and livestock has been going on consistently for thousands of years, the breakthrough of genetics in the last 25 years has enabled more sophisticated manipulations of the characteristics of the crop through gene splicing and actually introducing genetic material from other plants into the seed corn. This has alarmed many people around the world, both in the production and consumption areas. If this opposition to genetically modified crops increases tremendous problems will develop because of the growing reliance of American farmers on the superior productivity of the new crops.