

# 3.1 The Development of U.S. Agriculture

Introduction	3
Instructor's and Students' Lecture Outlines	
Lecture 1 Outline: History of U.S. Agricultural Development	5
Lecture 2 Outline: Capital, Politics, and Overproduction	9
Resources	13



# Introduction: The Development of U.S. Agriculture

## UNIT OVERVIEW

*This unit provides students with an historical context for current issues in the U.S. agrofood system. It chronicles the comparatively rapid development of American agriculture and food systems from subsistence farming to globalization. It takes a political economy approach to the analysis of American agriculture's development in order to illuminate the intersection of political, economic, social, ecological, and technological factors, innovations, and failures that have shaped this remarkable and complex system.*

The first lecture begins with an overview of general trends in the development of the United States agrofood system, including a quantitative analysis of structural and demographic changes in U.S. agriculture from approximately 1900–2000, drawing from the U.S. Census of Agriculture. This profile of the U.S. food system will serve as a reference point in Units 3.2–3.4 for discussion of the social and environmental consequences of this complex. The ways in which historical land use practices, settlement policies, and labor management schemes have influenced agricultural development in the U.S. are then covered, followed by a discussion of the increasing emphasis on science and technology that characterizes U.S. agriculture. This includes an overview of the federal policies responsible for the development of the U.S. agricultural research complex. This complex has generated the innovations in agricultural technologies that have shaped both the production and processing of food and fiber in America.

The second lecture begins with a discussion of the ways in which large-scale capital investment, enabled by advances in agricultural science and technology, has entered U.S. agriculture, and the structural changes that have resulted. Corn is examined as a case study of how science, capital, and policy interact in the context of agricultural development. The lecture outline concludes by identifying and discussing the effects of the confluence of policy, technology, and capital on agricultural development in terms of certain key characteristics and concepts such as overproduction and surplus, the cheap food policy, and the technology treadmill.

## MODES OF INSTRUCTION

> (2 LECTURES, 50 MINUTES EACH)

Two lectures cover the historical circumstances that have been largely responsible for the direction of development in the U.S. food and agricultural system from 1900–2000. References given in the outlines are described in the Resources section.

## LEARNING OBJECTIVES

### CONCEPTS

- The broad demographic changes in U.S. agriculture from approximately 1900–2000
- The changes in control over the means of production in the U.S. food system from approximately 1900–2000
- How historical land use practices, land settlement policies, and labor management schemes have influenced U.S. agricultural development
- U.S. federal policies that have been responsible for the development of the U.S. agriculture research complex and the innovations in technologies that have shaped the direction of development of U.S. agriculture
- The influence of investment capital on the adoption of capital-intensive agricultural technologies and the concentration of ownership in agricultural

# Lecture 1 Outline: The Development of U.S. Agriculture

*for the instructor and student*

## A. Overview of General Trends in U.S. Agricultural Development

(statistics and graphs from U.S. Census of Agriculture and other sources; see also U.S. Census of Agriculture, [www.nass.usda.gov/census/](http://www.nass.usda.gov/census/))

1. Number of farms and farm size (see Gardner 2002, 51, 58-59)
2. Farm population (see Gardner 2002, 93, 99)
3. Market share of large vs. small farms (see Gardner 2002, 69)
4. Increase in part-time farmers and off-farm employment
  - a) 57% of all persons employed on U.S. farms in 1987 also did non-farm work for cash wages or salary
5. Increasing use of labor-saving technologies (see Gardner 2002, 13-17)
6. Increase in yields and productivity (see Gardner 2002, 20-22, 44)
7. Increase in purchased off-farm inputs (see Gardner 2002, 63; Cochrane 1993, 130-131)
8. Stagnation of net farm income (see Gardner 2002, 75)
9. Share of food dollar to farmers (see Gardner 2002, 129, 155; Cochrane 1993, 135)
10. Concentration in agricultural input firms (see [www.foodcircles.missouri.edu/consol.htm](http://www.foodcircles.missouri.edu/consol.htm))
11. Concentration in food processing firms (see [www.foodcircles.missouri.edu/consol.htm](http://www.foodcircles.missouri.edu/consol.htm))
12. Concentration in food retail firms (see [www.foodcircles.missouri.edu/consol.htm](http://www.foodcircles.missouri.edu/consol.htm))
13. Concentration of agricultural production units (farms): Decrease in number, increase in size

## B. Land Use and Settlement (see Cochrane 1993, chapters 4 and 5; Hurt 1994)

1. Agriculture was the dominant land use and economic activity of early U.S.
  - a) >90% of U.S. populace was involved in agriculture pre-1900
2. Early U.S.'s most abundant commodity was land
  - a) Encouraged extensive agricultural development
    - i. Since land was superabundant, few incentives for soil conservation or fertility management
      - Effect: Use hard, exhaust, move on
      - Example: Pre-Dust Bowl agricultural land-use practices
    - b) Early land settlement policies: Had effect of quickly populating landscape with small-scale agriculture, displacing native Americans and making it claimable by U.S.
      - i. Homestead Acts: Free land for those who "improved" it; tracts circumscribed by Township and Range settlement patterns
      - ii. Conscription acts: Trading land for military service, paying soldiers in land was common
      - iii. Railroad land grants establish infrastructure for distribution of food, fiber

- iv. Reclamation acts: Irrigation projects open up vast tracts of the Southwest and California for agriculture
- v. Exceptions: California, Southern U.S.—characterized by large landholdings from the start

### 3. Labor supplies and flows

- a) Slavery: Enabled exception to small-scale, family-scale agriculture that characterized early U.S. Allowed for large increases in the scale of production.
- b) New immigrants typically made up bulk of agricultural labor force
  - i. Waves of immigration in California (ethnic succession: first Chinese, then Japanese, then Dust-Bowl Okies and Arkies, then Filipinos, and currently Mexicans) resulting in a continuous supply of low-wage workers with little status or political power
  - ii. Immigration status and abundance of workers made exploitation the norm and organization difficult

## C. The Scientization and Rationalization of Agriculture (see Cochrane 1993, chapter 7; Hightower 1973, chapters 1–2; Gardner 2002, p. 183)

### 1. Pre-1860s

- a) Agricultural innovation and knowledge exchange was hands-on, in-situ, farmer-to-farmer, and the primary mechanism for knowledge exchange
- b) Locus of control of agricultural knowledge and innovation was on-farm
- c) Basic agricultural techniques and yields per acre had reached a plateau

### 2. Federal policies established the scientific agricultural enterprise

- a) U.S. Department of Agriculture (USDA, established in 1860): Devoted to improvement of agriculture based on scientific inquiry
- b) Morrill Act (1862, amended 1890): Established Land Grant Colleges of Agriculture to conduct research and development
- c) Hatch Act (1887): Established agricultural experiment stations to work on practical agricultural problems
- d) Smith-Lever Act (1914): Established cooperative extension service to diffuse innovations to farmers
- e) Reclamation Act (1902): Authorized the Secretary of the Interior to develop irrigation and hydropower projects in 17 Western States
- f) Adams Act (1920s): Provided a basis for the inclusion of agricultural economics within the research agenda of land grant universities
- g) Budgetary allocations to the U.S. agricultural research complex 1860–2000 (see Garner 2002, pp. 183–184)

### 3. The subsequent furious pace of technological developments

- a) Mechanization spurred early increases in productivity
  - i. Trends: see Gardner 2002, pp. 13–17
- b) Chemical crop protection and fertilizer
  - i. War technology: Peacetime by-products of weapons research
- c) Reclamation and irrigation increased productive capacity enormously
- d) Improved plant and livestock varieties, hybridization
- e) Continued pressure for extension of seasons to allow for year-round availability of commodities
  - i. Varietal research
  - ii. Shift in production localities

- f) Effects
  - i. Vast reduction in labor requirements on farms, which facilitated huge rural-urban migrations and provided labor for industrialization. More workers for the factories and greater financial security for workers.
  - ii. Enabled huge expansion of scale of agricultural production
  - iii. Encouraged specialization and monoculture; separated crop from livestock production
  - iv. Moved input production and processing off-farm
- 4. Summary: Federal policy and resources created the funding and infrastructure for research in the direction of developing agricultural technologies. These technologies encouraged increases in the scale of production, with social and environmental consequences (see Unit 3.2, Social Issues in Modern Agriculture, and Unit 3.3, Environmental Issues in Modern Agriculture).



# Lecture 2 Outline: Capital, Politics, and Overproduction

*for the instructor and student*

- A. The Commodification and Capitalization of Agriculture**  
(see Goodman et al. 1987; Goodman 1991; Kloppenburg 1987; Heffernan 1998)
1. The historical barriers to capitalist development in agriculture (see FitzSimmons 1990)
    - a) The presence of “nature” in agriculture: The vagaries of season and the absence of control of environmental conditions influencing yield
    - b) The inherent riskiness of farming: Environmental conditions in agriculture, return on investment is unsure, high risk
    - c) The fixed amount and variable quality of land
  2. The increasing role of private capital in U.S. agriculture
    - a) Private capital has difficulty directly controlling the act of farming/crop production
    - b) As technological developments move input production and food processing off-farm, investment capital moves into these areas (see Heffernan 1998; Goodman 1991; [www.foodcircles.missouri.edu/consol.htm](http://www.foodcircles.missouri.edu/consol.htm))
      - i. Seed companies
      - ii. Machinery manufacturers
      - iii. Chemical fertilizer and pesticide suppliers
      - iv. Post-harvest transportation and storage
      - v. Processing and value-adding
      - vi. Wholesale and retail
  3. Cost/price squeeze
    - a) Farmers become “price-takers”; must take market price for products
    - b) Competitive advantage is gained by the economy of scale enabled by the adoption of capital-intensive technologies
    - c) Increasing private and corporate ownership of the agricultural inputs, food processing and retail sales sector of the economy begins to appropriate increasing proportion of food dollar, and thus power over the food system
    - d) Farmers are “sandwiched between a monopoly-controlled input sector and a monopoly-controlled output sector” (Lobao 1990, p. 27)
    - e) Dwindling share of food dollar to farmer
    - f) Farmers gradually lose power, autonomy, economic self-determination
  4. As sector matures, concentration of input suppliers/processors/retailers into monopolies and oligopolies (see Heffernan 1998)

**B. Modern Corn: At the Nexus of Research, Capital, and Politics in Agriculture**  
(see Kloppenburg 1987)

1. The corn seed as a symbol
  - a) In it lies both productive and reproductive capacities
  - b) It is the beginning and end of the cycle of reproduction
  - c) Strategic point of control: Control of seed = control of the self-sufficiency (or market dependency) of farmers and farming
  - d) The story of modern corn is a story of a struggle for that control; and the use of agricultural research and science as a tool of private capital, facilitated by public policy
2. Pre-1920s: Farmers saved a portion of crop as seed to plant the next year
  - a) Maintained a degree of autonomy from purchased inputs
  - b) High degree of genetic diversity and regional variation
3. Hybridization
  - a) Developed in 1920s by Pioneer Hi-Bred, with help from USDA and U.S. patent protection laws
  - b) Doubled and tripled yields resulted from hybrid seed strains
  - c) Facilitated mechanization of production: Uniform height and maturation time
  - d) Consequence: Would not “reproduce true”—forced farmers to buy seed every year
  - e) Almost universally adopted by early 1930s
4. Contemporary developments in agricultural technology: Genetic engineering
  - a) Further application of agricultural science in the service of private capital
  - b) Created and sold as “technology packages,” e.g., Roundup Ready™ seed and Roundup™
  - c) Novel methods of intellectual property protection
    - i. Technology use agreements
    - ii. “Terminator” technology

**C. Chronic Surplus, Overproduction, Export Agriculture, and Global Food Trade** (see Cochrane 1993, chapter 8; Friedmann 1993; Lobao 1990, chapter 1; Danbom 1995, chapter 11)

1. Surplus and overproduction: A core problem of the modern food system
  - a) Fueled by development of agricultural technology and labor-saving devices
  - b) Exacerbated by federal farm subsidies, commodity payments, price supports to largest producers
  - c) Keep crop prices paid to farmers chronically low
  - d) Those farmers not receiving subsidies are placed at an economic disadvantage
  - e) Farmers’ status as price-takers and the cost-price squeeze give them little margin for error
  - f) Overproduction has been constant since 1880s (with exception of war-time periods)
  - g) Slim profit margins discourage farmers from adopting conservation farming practices that do not show economic return or that require reinvestment of capital
2. The “cheap food policy:” Good for consumers, bad for farmers
  - a) Chronic overproduction keeps food prices low (for consumers)
  - b) Enables non-farm wages to be kept low; important for industrialization
3. Export agriculture
  - a) Surpluses exported, formed the basis for global food trade
    - i. Major source of revenue and catalyst for U.S. overseas economic development
    - ii. Overseas commodity markets of major strategic importance to U.S.

4. Those surpluses not exported formed basis of U.S. meat industry
5. The “technology treadmill”
  - a) Chronic low commodity prices force farmers to rely on economies of scale
  - b) Farmers must produce more to survive: “Get big or get out”
  - c) Creates a climate in which early adopters of capital-intensive, yield-increasing technologies are rewarded
  - d) Those who do not adopt technologies are driven out; leads to familiar pattern of bankruptcy and consolidation
6. The tyranny of the agricultural economists
  - a) Narrow efficiency criteria: Often food system policies and decisions are made based on exclusively economic logic and do not consider externalized costs of production
  - b) Smaller farms are by definition “less efficient” by economic calculus
  - c) Their disappearance, and their consolidation into larger farms, were logical and even welcome consequences of economic rationalization
  - d) This logic ignores social and ecological issues/consequences (see Units 3.2 and 3.3)



# Resources

## SUGGESTED READINGS FOR STUDENTS (DESCRIBED BELOW)

- Buttel, Frederick H. and Howard Newby, eds. 1980.
- Cochrane, Willard W. 1993.
- Danbom, David B. 1995.
- Friedmann, Harriet. 1993.
- Gardner, Bruce L. 2002.
- Heffernan, William D. 1998.

## PRINT RESOURCES

Buttel, Frederick H. and Howard Newby, eds. 1980. *The Rural Sociology of the Advanced Societies: Critical Perspectives*. Montclair, N.J.: Allanheld Osmun.

*A pivotal collection of essays covering a range of social and environmental issues in modern agriculture. This book and its contributors would help to define and direct a new, richly critical sociology of agriculture. Especially Newby and Buttel, "Toward a critical rural sociology;" and Buttel, "Agriculture, environment, and social change: Some emergent issues."*

Cochrane, Willard W. 1993. *The Development of American Agriculture: A Historical Analysis*. Minneapolis: University of Minnesota Press.

*The definitive critical history of U.S. agricultural development. Full of insightful analysis and commentary as well as exhaustive history. Introduces the concept of the "technology treadmill" as a major problem in U.S. agriculture.*

Danbom, David B. 1995. *Born in the Country: A History of Rural America*. Baltimore: Johns Hopkins University Press.

*An important history of the effects of agricultural policy and development on rural life and rural people. See especially Chapter 11, "The production revolution and its consequences."*

FitzSimmons, Margaret. 1990. The social and environmental relations of US agricultural regions. In *Technological Change and the Rural Environment*. London: Philip Lowe et al. London, David Fuller.

Friedmann, Harriet. 1993. The political economy of food: a global crisis. *New Left Review*: 29.

*A succinct history, overview and contextualization of trends in global food trade. Discusses national agriculture and trade policies in the context of international geopolitical relations; and their effects on agricultural development.*

Gardner, Bruce L. 2002. *American Agriculture in the Twentieth Century: How It Flourished and What It Cost*. Cambridge, MA: Harvard University Press.

*A straightforward, uncritical, but data-intensive and encyclopedic overview of trends in American agricultural development during the 20th century. Full of valuable charts and graphs. An excellent reference.*

Goldschmidt, Walter R. 1978. *As You Sow: Three Studies in the Social Consequences of Agribusiness*. Montclair, N.J.: Allanheld Osmun.

*A groundbreaking and often-cited study of two agricultural communities in California with different structures of farm ownership. Goldschmidt found that concentration in ownership and corporate control of farms had negative impacts on such indicators of social welfare as income distribution, civic participation, and quality of education.*

Goodman, David, Bernard Sorj, and John Wilkinson. 1987. *From Farming To Biotechnology: A Theory of Agro-Industrial Development*. Oxford, New York: Basil Blackwell.

*An integrated theory of the nexus of research, policy, technological development, and capitalist penetration in agricultural development. Considered a seminal work in modern political economy of agriculture.*

Goodman, David. 1991. Some recent tendencies in the industrial reorganization of the agro-food system. In *Towards a New Political Economy of Agriculture*. William Friedland, ed. Boulder, CO, Westview.

*A distillation and update of the concepts developed in From farming to biotechnology (Goodman et al. 1987); and an overview of the encroachment of industrial capital into the agrofood system.*

Heffernan, William D. 1998. Agriculture and monopoly capital. *Monthly Review* 50: 46 (July/August).

*An analysis of who controls the agro-food system. A discussion of the historical and modern trends toward oligopoly and monopoly that characterize firms operating in the agro-food sector, and the consequences for the structure and development of agriculture. Heffernan's specialty.*

Hightower, Jim, and Agribusiness Accountability Project. Task Force on the Land Grant College Complex. 1973. *Hard Tomatoes, Hard Times; A Report of the Agribusiness Accountability Project on the Failure of America's Land Grant College Complex*. Cambridge, MA: Schenkman Pub. Co.

*A high-profile critique of the research and education agenda of the land-grant university complex in the U.S. Hightower argues that the Land Grant Universities serve and promote large-scale, corporate agriculture at the expense of small-scale, family farmers, and have actively contributed to the decline in family-scale agriculture.*

Hurt, R. Douglas. 1994. *American Agriculture: A Brief History*. Ames, Iowa State University Press.

*A good, but uncritical, survey of American agricultural development with an emphasis on pre-World War II history.*

Kloppenburg, Jack R. 1988. *First the Seed: The Political Economy of Plant Biotechnology, 1492-2000*. Cambridge; New York: Cambridge University Press.

*A gripping and well-documented analysis of the "commodification of the seed." Kloppenburg starts from the thesis that the seed is an important locus of power and autonomy in agriculture, and goes on to show how control over the seed has been transferred from the public domain—farmers and peasants—to a handful of large private corporations; and this transferral's effects on the structure of the agrifood system.*

Lobao, L. M. 1990. *Locality and Inequality: Farm and Industry Structure and Socioeconomic Conditions*. Albany: State University of New York Press.

*A Marxian analysis of the structural economic conditions governing agricultural development.*

McConnell, Grant and American Farm Bureau Federation. 1969. *The Decline Of Agrarian Democracy*. New York: Atheneum.

*A history and analysis of agrarian populist movements in the U.S. Good discussion of farmers' resistance strategies in the face of increasingly powerful corporate control over the food system.*

Schafer, Joseph. 1936. *The Social History of American Agriculture*. New York: The Macmillan Company.

*A dated but entertaining history of pre-chemical American agriculture, with an emphasis on social organization.*

Worster, Donald. 1990. Transformations of the Earth: Toward an agroecological perspective in history. *Journal of American History* 76(4): 1087.

*A preeminent environmental historian's discussion of agriculture as the fundamental way in which humans relate to, transform, and are themselves transformed by their environments. A call for the reorientation of agriculture towards a more ecologically informed approach.*