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EDITORIAL

Continuing Evolution of U.S. Agriculture

Changes in consumer preferences and scientific and technological developments are leading toward a significant shift in the structure of U.S. agriculture and the food system. For most of this century, a key objective of agricultural scientists and farmers was to increase yields of food and fiber. Only moderate attention was addressed to the chemical composition of food. But in recent years many consumers have become highly conscious of the role of nutrition in health. They seek to buy products with low contents of saturated fats and cholesterol. To avoid the presence of tiny amounts of industrial herbicides or pesticides some are willing to pay substantial premiums for organically grown food.

Evolution of consumer preferences has come at a time when advances in molecular biology and plant and animal genetics make it possible to influence markedly the composition of food grains and meats. In addition, improvement of information technology is enabling participants in the complex food-processing and distribution system to cater to emerging niche markets. Changes in agriculture will most quickly be effected in large areas of prime farmland in the Midwest devoted to field crops.

To assist in meeting consumer demands, Pioneer Hi-Bred International and other seed companies have been altering the composition of corn grain and soybeans to furnish special qualities of feed for swine, cattle, and poultry. Pork products delivered to consumers are being changed by two methods. Swine that have been genetically developed to be naturally lean are fed grain low in saturated fats. Farmers producing these swine obtain premium prices for them.

Increasingly, corn grain will be used as a starting material for special products. Thomas N. Urban, president of Pioneer Hi-Bred, has estimated that by the year 2000, 25% of all corn grain will be processed to yield consumer products—energy, sweeteners, starch, proteins, oils, and others. Much of that grain will be the result of genetic manipulations. For example, food and paper industries use various forms of starch. These are prepared by treating ordinary cornstarch with chemicals. Genetic modification of corn leading to starches not requiring special treatment probably will be feasible. Food processors preparing name-brand products will be able to choose especially suitable starting materials. To ensure availability and dependable qualities some are already contracting with farmers to grow the crops. Increasingly, the special seeds employed will be furnished on a contract basis by seed companies.

Donald A. Holt, director of the Agricultural Experiment Station at the University of Illinois, and a colleague, S. T. Sonka, have extrapolated present trends and predict a further industrialization of major parts of the food system. They foresee "a future in which a greater proportion of agricultural products is produced by value-added partnerships organized and coordinated through contracts and other mechanisms..." They predict that some organizations will seek to coordinate entire value chains. "They will contract with seed companies to produce special inbreds and varieties; with farmers to produce hybrid seed, special grain, and unique feedstuffs; and with animal breeders to produce special breeds of animals." Furthermore, "they will need to contract with commercial livestock producers and feeders to produce special types of livestock, packers to produce special meats, and processors to convert those special meats into unique food products." Holt and Sonka have also pointed out that companies creating special inbred lines of corn might wish to capture maximum values from their developments. Through the contract approach, the firm can extend its intellectual property rights so as to maintain control not only of the special inbred lines of corn but also of intermediate and final products derived from them.

Circumstances are leading to a major evolution in the food system. Some observers have predicted a tendency toward larger but fewer farms and toward large-scale production of genetically improved swine and other meat animals. Other observers view as likely a reduction in federal agricultural subsidy payments. Deep concern has been expressed about the future of part-time farmers and of rural America. However, it is probable that part-time farming will continue. Those who till the soil are rewarded by seeing things grow and by nature's bounty. They will be motivated to develop means of surviving. But that may require additional determination, ingenuity, and cooperation among them.

Philip H. Abelson