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Agricultural Industrialization: *It's Inevitable*

by Thomas N. Urban

➤The industrialization of agriculture is with us. It's driven by consumer and processor needs, supported by new and useful technology, and augmented by the severe agricultural recession of the 1980s, which changed attitudes towards risk. The consequences for farm policy and rural development are significant, and should be favorable.

Changes in agriculture may be taking place faster than we think. We are on the threshold of a significant shift in the structure of agriculture and the food system. These changes may require the new use of a very old term to describe the total system—"industrialization."

I am partial to the term industrialization. It evokes an old idea—the shift from agriculture to manufacturing. But I suggest that this industrial pattern is, in fact, what is happening to agriculture today. I also suggest that that process will lead to significant shifts in food policy, farm policy and rural development within the next 15 years.

Industrialization

Industrialization was the process by which the production of goods was restructured under the pressure of increasing levels of capital and technology. It was ultimately a process by which consumers' wants and needs were fed back into a production and distribution system to provide desired quality, availability and price. Equally important, industrialization provided for a management system which allowed the integration of each step in the economic process to achieve increasing efficiencies in the use of capital, labor and technology. It was highly successful.

Production agriculture in the Western World is now entering the last phase of industrialization—the integration of each step in the food production system. The production segment is rapidly becoming part of an industrialized food system.

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I do not mean that farming will become "corporate," in the sense that corporations will manage the land. That has been tried and, with the few exceptions of some specialized crops, it has failed. Land cannot be moved. The farmer remains the most efficient manager of land and its best environmental custodian for future generations.

I do suggest, however, that more rapid changes in structure across production agriculture are upon us. This is true not only in poultry, pork and cattle—as a number of writers have noted—but also in the production of grains and oilseeds. It is, in fact, the coming change in grains and oilseeds production patterns which is perhaps the least recognized, yet the most significant in the long run.

Prescription Products

In 1989, Pioneer introduced BETTER-LIFE™ grain products to the market—not a large or earth-shaking concept, but a clear example of a series of changes which will significantly affect the grain industry. BETTER-LIFE™ grains are referred to as being "identity-preserved." In this case, they are certified as having been produced without the use of chemical pesticides.

Identity-preserved products are "production" clones of "brand name" products in marketing parlance and, in fact, may often be the same thing. Such products are "prescription products," produced outside the traditional commodity system. By the year 2000, 25 percent of all corn grain production in the United States will be processed into consumer products, energy, sweeteners, starch, proteins, and oils. A large portion of that production will be identity preserved.

As an example of the forces at work, processors have pointed out that those characteristics which have added to the harvestability and storability of corn grain are contrary to the kernel characteristics that improve the efficiency of processing operations. As breeders, we have moved toward harder textured products. The processor, however, wants softer-textured, thin pericarp kernels. These products will have to be produced on a contract basis since such grain deteriorates passing through the traditional commodity distribution system.

Besides the general characteristics of the grain, there are a whole host of specialized starches required for the food and paper industries which can be produced genetically. These may replace or moderate the chemical processes now used in the processing system. They improve the performance of the final product and reduce cost. They will be contracted on an identity-preserved basis.

In addition, companies such as Pioneer are now working on altering the make-up of No. 2 yellow corn and soybeans for feeding purposes; e.g., specific qualities for hogs, cattle, dairy, and poultry. These grains and oilseeds will be uniform and feature specific processing and feeding characteristics to meet the needs of the end user better than present No. 2 yellow corn and soybeans. These products will also be produced and marketed outside today's commodity system. They will be purchased as "manufactured," or identity-preserved, products. The high lysine corns of the 1970s were an early attempt at this concept. We now see opportunities to affect protein, digestibility and oils genetically, thereby linking meat, milk and egg production to specialized grain and oilseed producers.

The management of such a manufacturing or identity-preserved system requires an industrial structure. Each step must be integrated into a system. Producers at the front end of the system must meet exacting standards. An extreme example would be the production steps of the broiler industry today.

Consumer Demands, Too

The move to identity-preserved products is also being driven by the perceived health needs of consumers. We are all aware of the willingness of consumers to pay premiums or reject purchases in order to meet perceived health needs. Both the cost and uniformity of production and the value of the genetic make up of the products are enhanced by identity preservation using production and genetic controls. Uniformity and predictability are keys to efficient operations. The industrialization process lends itself to maximizing both. Health and cost reduction needs, matched to developments in biological and management technologies, are acting in tandem to drive the industrialization of the entire food system.

We can see further examples of consumer preferences for unique products. Those preferences are driving change. Brand-name fruits having distinctive forms and colors are examples of this trend, as well as branded and unique products for meat, eggs and poultry. Branding and identity preservation, then, are keys to the industrialization process.

The consequences of identity-preserved grains and branded products for the structure of agriculture are significant. Capital, labor and technology are much more efficiently utilized by an industrial management system than by a cottage industry or the agricultural efforts of individual, financially autonomous units.

Resource Mix

Capital is critical to the industrialization process. Capital tends to be risk averse. The agricultural depression of the 1980s radically changed the application of capital to production agriculture in the U.S., setting the stage for a more rapid development of industrialization. Capital will follow manufacturing operations that link production to marketing, decreasing the volatility of each step of the system. Capital will prefer the manufacturing enterprise to the autonomous producers.

In addition to capital, an industrialized system will—and is—adopting at a much more rapid rate than the individual producer. Molecular biology now allows industrial enterprises to plan and develop identity-preserved grains and oilseeds. Tradi-

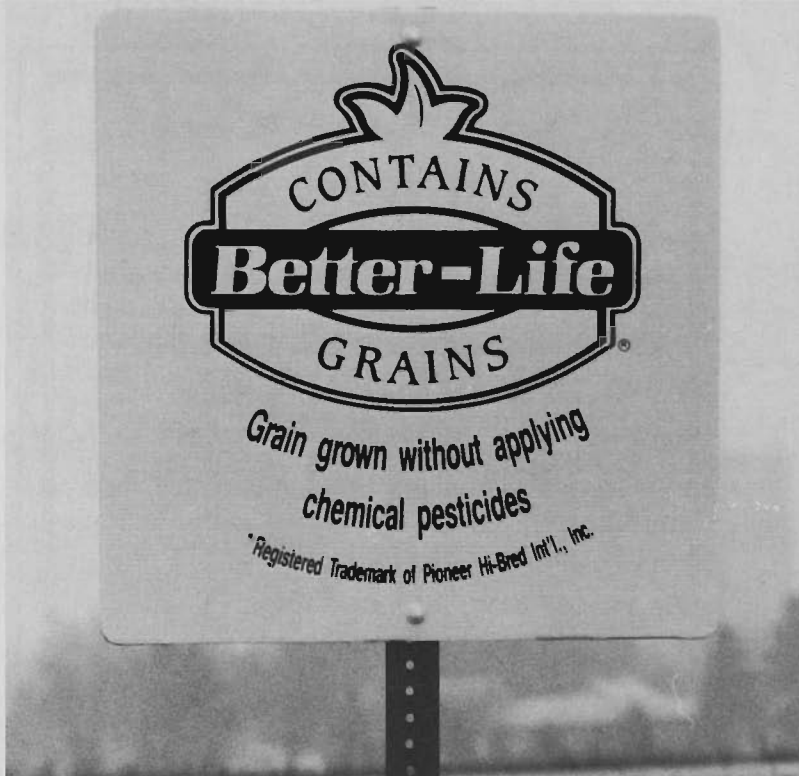
We are on the threshold of a significant shift in the structure of agriculture and the food system.

tional technology transfer processes between researchers and farmers cannot compete with an industrialized system. The autonomous farmer has neither access to all the elements of the system nor the management skills to organize all elements. Ongoing changes in hog production today illustrate the case; grains and oilseeds are following.

In the fall of 1990, ground was broken for a new center at Iowa State University. The center will concentrate on the interaction between feedstuffs, meat quality, and human nutrition. It's the first of its kind in the nation. Such research is, in reality, a precondition to the ultimate satisfaction of consumer desires, as well as a recognition that the industrialization of the food system is upon us.

Future Farmers

What might we look forward to as the industrialization of agriculture proceeds? It's possible that a new family farm could



BETTER-LIFE™ grain products are examples of a series of changes which will significantly affect the grain industry.

develop, tied to a more stable system of production. A farm family dependent as much on financial management skills and contract marketing as on production and agronomy know-how will be critical to increasing rural income and to keeping U.S. farmers competitive worldwide. In fact, all of our market research indicates that is what is happening today. The so-called "super farmer" will respond quickly to new opportunities to increase income and reduce risk. That person will be part of the industrialization of agriculture. The "sun-downer," or part-time farmer, will continue to exist and might even expand in numbers. Sun-downers garner most of their income off-farm, but desire to live on the farm. The industrialization process should not disturb these custodians of the land."

Conclusions

If we accept this analysis, what conclusions may we draw about farming, farmers and rural America? Frankly, I am optimistic. That optimism runs counter to much pessimism generated by the ongoing demise of our Jeffersonian heritage, but I believe my optimism is well placed.

Farmers are interested in finding special market niches, alternative products, and off-farm income because they recognize that autonomous producers selling commodities will have a difficult time surviving the cyclical nature of commodities and attracting added capital and technology. Yet, tomorrow's farmers may be more stable, able to employ new technologies more rapidly and be less capital-limited. They will be a critical part of a system or systems. And their ability to perform within the systems will depend on access to information which will allow them to meet standards of quality, uniformity, and cost—all quite normal in any industrial structure.

We may even see farmers organize with like members of a system, or systems, as labor did at the turn of the century, to protect their interests in the face of contracts perceived to be unfair. They will certainly ask for, and receive, legislative protection at state and federal levels as labor has done in the past.

Unlike the laborer of today, however, the farmer of the future

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will also have significant net worth in land and buildings, combined with an income stream linked to the final market for consumer goods. Not a bad combination.

Implications for rural development are quite intriguing. A recent study by USDA's Economic Research Service found that rural workers continue to earn at 75 percent of urban employees. They tend to be out of work after layoffs for 24 weeks, versus 16 weeks for urban workers. We also know that since 1944, the number of farmers under the age of 35 has declined 77 percent and represents only 13 percent of farm operators today. The average age of farmers is now 52 versus 48.7 in 1940. I suggest that industrialization may stabilize farm income and provide competitive employment for rural workers, ultimately raising rural wages to urban standards.

The industrialization process should allow rural America to remain populated, allowing those who prefer a "farm" or rural existence to enjoy those things. In fact, industrialization may

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attract young people back into agriculture as they see the cost of entry come down and increased opportunities for personal advancement beyond the farm within a system and across systems.

Industrialization will have a significant long-term effect on farm policy. The farmers' safety net, or risk sharing, will come to depend as much on their link to an industrialized system as on federal farm programs. The rationalization for a public system to protect the independent commodity producer—the family farmer—will begin to erode. Such a turn of events will require significant rethinking of our farm policy agenda and a further rationalization for its continuance.

One can only guess at the political implications of the industrialization process.

There will be strong, emotional opposition to these changes. There may be political and social pain associated with the changes. But the change appears to be irreversible and inevitable. And let me be clear that I am not advocating these changes; I am simply attempting to share my current understanding of them with you, the readers of *CHOICES*.

Study Needed

We have generally measured changes in agriculture by following the demographics of the farmer—farm size, farm purchases, farm production, off-farm income, farmer ages, etc. A number of studies have also been done outlining such things as cooperatives, specific industries and backward integration.

I have not, however, seen a comprehensive study of the industrialization of agriculture. We need an in depth study and debate of these processes. Such a study would require an analysis of these changes and an attempt to relate them to rural development, the function of the farm as a producing unit and consequences for farm policy. The study must also encompass the appropriate scope of public research and development efforts to support the industrialized food system.

Such a comprehensive review would do much to allow the present stakeholders in production agriculture and the food system to prepare for the future.

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