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# Beyond Industrialization: The Prescription Food System

Over the next twenty-five years a food system will develop that will make the present system appear primitive, unorganized, and unregulated. For many of us in the system today this is hard to believe, but both science and consumer demands are pushing the system in that direction.

Capital and technology will continue to transform agriculture into an industrial process. An earlier article ("The Industrialization of Agriculture," *Choices* Fourth Quarter 1991), discussed how the application of these two change engines is reforming the production and distribution of food. The present article reflects on a significant shift in consumer attitudes, buttressed by research discoveries, which will dramatically alter the world's food system well beyond industrialization.

## Prescription system

The traditional commodity-based system is moving rapidly to a prescription system. Consumer expectations for food are beginning to include standards which reflect safety, health, and the environment. Cost, taste, and availability, the traditional elements of food preferences, are still important and will continue to be, but the future structure of the world's food system will primarily be patterned after pharmaceutical standards for research, production, distribution, and pricing.

The operating and structural consequences of this significant shift will be extraordinary for each step in the development, production, distribution, and purchase of food.

The key elements in this prescription system will be transparency and traceability. The consumer will expect to be able to trace each food item back

to its earliest production step. This is a revolutionary change in the world's food system. It is only by demonstrating traceability that the consumer will be convinced that the safety, health, and environmental demands of the food are met.

The purchaser of a sirloin steak will know which animal it came from, with what and how the animal was fed, the



range or confinement growing conditions of the animal, and how the animal was killed and packaged. This process is essentially a prescription for a sirloin steak. In this sense, the steak will resemble a drug and it will be handled in the same manner. Similar prescriptions will be required for all foods; meat, grains, vegetables, and fruits—fresh and processed.

## Drivers

What is driving the food system from

commodity to prescription? Our heightened sensitivity to diseases found in food is a critical driver. Because of scientific advances, we now know how to look for food-borne illnesses and we are coming to understand the consequences of what we find. Our concern for health, the perceived relationship between diet and disease, and production practices and diseases (pesticides and herbicides) have heightened consumer sensitivity. Our increasing concern for the environment—the recognition that the "how" of food production has significant consequences for soil, water, and air quality, as well as for wetlands and forests—is now top-of-mind in many consumer buying decisions. These shifts reflect the wide distribution of accumulated research findings over the past twenty-five years and our increasingly sophisticated understanding of the linkages between food, health, safety, and the environment.

## Diet and genetics

As we have developed recommended diets, we have traditionally treated humans as a homogeneous class with some exceptions, such as pregnant women and newborns. We have developed a food system for all humans in which we recommend a "balanced diet."

We are learning, however, that each individual's nutritional needs vary based on genetic diversity, and that these needs shift as we age. As our understanding of human genetics progresses, we will reach a point where we can prescribe diets based on the genetic profile and age of an individual, a "diet prescription," if you will.

We do that, in fact, with animals today. We have made it much easier with animals by selective breeding



which narrows the diversity in any specific line of hogs, cattle, and chickens. That line breeding allows us to prescribe a diet which we can test on a specific line of animals in order to improve productivity.

That process is, of course, neither desirable nor possible with humans, but I predict that as we begin to develop specific genetic profiles for individuals, we will relate those profiles to nutritional needs.

Current developments in information technology will underpin the transparency and traceability required of the new food system. Scanning identification codes as well as the descending costs of data storage and retrieval capacity will inform a prescription system.

The ability, then, to "prescribe food" (we do that today for obesity, high blood pressure, allergens, and diabetes) will be dramatically enhanced. That enhancement will help drive the dramatic changes in our food system which are already finding ready acceptance among consumers.

### Consequences of the new system

What are the consequences of these changes for the players in tomorrow's food system? All will be dramatically impacted. A farm may well come to resemble a drug manufacturing site, albeit still open to the weather, requiring detailed record keeping and restrictions on the choice of inputs and practices. Precision agriculture will take on new dimensions. Each farm or factory will be required to provide transparency and traceability to all of its outputs (salables, crops, and animals), as well as its waste (water, manure, and unused roughage). The government will require that waste be chemically analyzed and its further use follow prescribed procedures.

Food processors will be required to look very much like a pharmaceutical manufacturer, taking the product from the farm along with the accumulated

records and continuing to document the process, thereby sustaining traceability and transparency. These same control and identification procedures will be required in each step until the product reaches the consumer. The consumer will be able then to trace all foods back to their origins.

The HRI (hotel, restaurant, institution) trade will be faced with even more stringent requirements. Consumers will depend on the HRI to deliver what they require, just as they expect an airline pilot to take off and land safely. The "trust factor" for the HRI trade will dramatically increase.

These changes in our food system, which reflect a movement of food from commodity to prescription, will require significant upgrading of the professionalism, talents, and expertise at all levels of the food system. Farmers, however, will be the most dramatically affected. They will be required to become sophisticated producers of food products for which they can be held responsible all the way to the consumer. The need for traceability and control will be reinforced by liability issues that expectations of consumers will generate. One can imagine farmers having the same liability as the HRI trade for food which does not meet these new consumer standards.

Information management and quality control features will speed the industrialization and integration of farming. Traceability and transparency will require close cooperation between each step in food manufacturing. Liability will flow up and down the food system. Retailers in England have already moved in this direction, specifying exactly how they want food produced on the farm and handled in manufacturing plants before they will allow it in their supermarkets.

It is now not a question of welcoming or avoiding the changes in practices required to meet the demands of the new food system. Those who do not meet them will be rapidly removed from the

system. Those who adapt will remain.

There may indeed be early premiums available to the farmer, processor, and retailer who will meet these new requirements. Those premiums, probably tied to brands, will swiftly dissipate, however, as the new standards become the norm. The brands may remain.

### Globalization

These changes will be global in nature. As food is produced worldwide, these new standards will quickly be required in the developing world which aspires to be part of the world food system. The unease present in consumers' minds over problems with imported foods is pushing the system toward traceability. Each location will be required to adopt what will look like the industry's present ISO9000 standards (global, policed manufacturing standards of process and quality which qualify goods for world trade), although food standards will be much more rigid. "ISO9000" type farms will become common in all production areas including the developing world.

The world's food system will indeed become further industrialized and integrated because consumers will define food as an input or a prescription for their physical condition, mental health, and safety, as well as a template for beneficial environmental practices in food production—a good definition of a prescription food system.

Industrialization has come rapidly, but the change will pale in significance to the changes driven by the changing consumers' definition of food from commodity to prescription. ■

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