

# **FARMING IN THE 21<sup>ST</sup> CENTURY**

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## Preface

The U.S. agricultural industry is in the midst of major structural change — changes in product characteristics, in worldwide production and consumption, in technology, in size of operation, in geographic location. And the pace of change seems to be increasing. Production is changing from an industry dominated by family-based, small-scale, relatively independent firms to one of larger firms that are more tightly aligned across the production and distribution chain. And the input supply and product processing sectors are becoming more consolidated, more concentrated, more integrated.

Agriculture in the 21<sup>st</sup> century is likely to be characterized by: 1) adoption of manufacturing processes in production as well as processing, 2) a systems or food supply chain approach to production and distribution, 3) negotiated coordination replacing market coordination of the system, 4) a more important role for information, knowledge and other soft assets (in contrast to hard assets of machinery, equipment, facilities) in reducing cost and increasing responsiveness, and 5) increasing consolidation at all levels raising issues of market power and control.

These profound changes in the agricultural industry present new challenges and new opportunities that require new ideas and concepts to analyze and implement. They require new learning and thinking. Some of those new ideas and concepts are presented here, not as empirically verified truths, but as “thoughts” to stimulate different and better thinking. They have been developed based on observations, analysis and discussions with numerous managers and colleagues in agribusinesses in North America and Europe. This series focuses on Farming in the 21<sup>st</sup> Century; companion series are also available on Financing and Supplying Inputs to the 21<sup>st</sup> Century Producer (Staff Paper 99-11), and Value Chains in the Food Production and Distribution Industries (Staff Paper 99-10).

Our purpose in sharing these “thoughts” is to invite discussion, dialogue, disagreement — in general to encourage others to develop better “thoughts”.

Keywords: qualified supplier, biological manufacturing, strategic risk, process control, economies of size, franchise grower

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## **The Agriculture of 2020: Biological Manufacturing**

The agricultural industry, particularly the livestock sectors, is in a period of major change and transition. This transition is commonly referred to as the industrialization of agriculture — the application of modern industrial manufacturing, production, procurement, distribution, and coordination concepts to the food and industrial product chain. What will this industrialized sector characterized by biological manufacturing look like in the year 2020?

Production agriculture today consists of a very diverse set of types and sizes of farm businesses including part-time and full-time farmers. Part-time farming will still persist in the future and some farms for local markets and specialty crops will be only of modest size. But most of the agricultural output will be produced by larger scale businesses producing as qualified suppliers to food processors and manufacturers. Many farms will be multi-plant operations that are geographically dispersed, networked alliances of individual farm units, or systems of franchise production tied to a processor not unlike franchised operations in other industries. Some farmers will remain as independent producers (particularly in commodity production); others will be plant managers or contractors in a tightly vertically aligned or owned system.

Biological manufacturing will be characterized by:

1. Industrialization production which uses modern business principles and manufacturing approaches including procurement, inventory management and process control techniques. This will transform farming from a rural lifestyle to a business in many situations.
2. Precision production which uses science and technology to “real time monitor” the production processes and exercise control over those processes through biotechnology and nutritional technology. Farmers will adopt technology and management practices to standardize, routinize, and generally manipulate and control the biological processes of crop and livestock production.
3. Differentiated products which have transformed farming from an industry that produces commodities (i.e., #2 yellow corn) to one that manufactures raw materials with specific attributes (high oil corn or specific amino acid composition soybeans). This will also require segregation and identify preservation in the marketing and distribution systems.
4. Supply chains which are tight alliances and linkages in the value chain from input suppliers through producers to processors and retailers. This movement to tightly aligned value or supply chains will result in better quality control, improved product flow scheduling, and stronger qualified supplier arrangements throughout the chain.

This type of production agriculture will develop under a policy environment of limited government intervention and relatively open markets domestically and globally. Farmers generally will not receive significant amounts of government assistance. Because production agriculture looks much like other industries, the regulations that farmers face in terms of the environment, worker safety, etc. will be similar to that of other industries. Policy with respect to market access, anti-trust and commercial transactions will also be similar for the farm and manufacturing sectors; the result will be more consolidation and concentration in the food and other industries.