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Agriculture in transition: Can we bridge the widening gap between family farming and market demands?

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Introduction

Compared with other industries, agriculture is rather unstable due to factors such as highly complex biological systems and dependence on climate (Cochrane, 2000). However, the increasing uncertainties for the independent farming community originates mainly from the rapid and accelerating structural change in agriculture, which is creating a more industrialized model of production (Boehlje et al., 1999a). The resulting increase of instability raises the volatility of the economic environment for almost every agricultural enterprise. Unfortunately, there are significant differences in the capability of responding to these changes in vertically integrated agricultural corporations with command-and-control structures, compared with family farms which have little, if any, coordination.

Finding a way of directing agricultural development that the majority of the society can agree upon is extremely difficult, since the general public has developed a uniquely complicated attitude toward agriculture. Most controversial issues such as nuclear power, global warming, and biotechnology divide populations into opponents and proponents. Affluence coupled with nostalgia for the idyllic "Old McDonald's farm" have produced a somewhat "schizophrenic" attitude about how society expects their food to be produced. This attitude is characterized by simultaneously demanding the preservation of the idealized family farm *and* strict compliance with the latest knowledge about food safety and food quality, for which traceability and coordination are major enablers. The public does not realize that, in contrast to the socially stigmatized "factory farming" systems, the traditional agricultural system of independent farms is not only rather inefficient but also not able to implement on its own standardized food safety and quality assurance procedures which decrease food-borne health risks and increase food quality. The "tug-of-war" between expecting inexpensive, safe, and high-quality food versus the nostalgic sympathy for the family farm has led to a mixture of misperceptions, unrealistic expectations, and loss of respect for those who produce our food.

The public, overwhelmed with confusing and contradicting opinions about and signals from agriculture, seems to expect from agricultural leaders and policy makers a fam-

ily farm structure that preserves the values of family-based rural communities *and* can compete without subsidies in a global economy with growing vertically integrated corporations.

The purpose of this paper is to investigate if and how this seemingly impossible ideal can be achieved.

The drivers of change in agriculture

There are several drivers of the changes that agriculture is undergoing at present. The major drivers are:

- World peace and the end of the Cold War have allowed countries, which until recently had a secure internal food production system, to rely on foreign food supply. National agricultural programs that had been designed for self-sufficiency contribute now to overproduction (Howie, 2000).
- Globalization and liberalization of trade, including agricultural products and food, accelerate the pace of the increase of the societal disagreement over subsidies for non-competitive agricultural production procedures (Taylor, 1997).
- Consumers in industrialized countries with fading memories of hunger ask for a growing variety of quality criteria before they buy food, including intangible quality criteria such as how the food-producing animals were raised. Environmental stewardship, the use of antimicrobials, and animal well being are becoming more and more determinants of quality (Blaha, 1999).
- The distrust in mandatory single point inspections as guarantors of food safety is growing due to incidents such as the BSE crisis, the dioxin scandal, and emerging food safety risks such as *E. coli* O157:H7 and increasing bacterial resistance to antimicrobials (Roberts et al., 1997).

The consequences of these changes

These changes have had remarkable impacts on the entire food industry; however, the most drastic implications apply to the agricultural primary production area, especially to small and medium-sized producers that are inde-

pendent and not part of any coordinated marketing organization. The major consequences are:

- The dependence of nations on self-sufficient, domestic food production systems is shrinking, which results in a quite steep decline of the acceptance of continuously subsidizing inefficient farming methods (Taylor, 1997; Howie, 2000).
- The traditional commodity price cycles lost their “stability” (low-price phases were relatively reliably followed by compensatory high-price phases). The increasing specialization of growing farms and the diminishing sector of diversified small- and medium-sized farms results in less flexibility to reduce production in response to low prices in one commodity (Plain, 1999; Ritchie, 2000). Consequently, low-price phases grow longer and high-price phases shorter, unless there are other regulators of price besides quantity. As a result of this development, many farmers have tried to become part of value-added production chains (Boehlje et al., 1999b).
- Food production chains try to extend transparency and traceability back to their farm supply, and they ask for on-farm measures for environmental stewardship, animal well being, and food safety, which creates new tasks and responsibilities for livestock producers and their veterinarians (Blaha, 1999).

- There is a move away from single-point inspections of products to sorting out products that carry risks to human health or products of low-quality. There is a movement toward quality management procedures for preventing errors and mistakes during production procedures, as well as to a constructive combination of industry self-controls and governmental oversight (Caswell and Henson, 1997; Fearn, 1999).

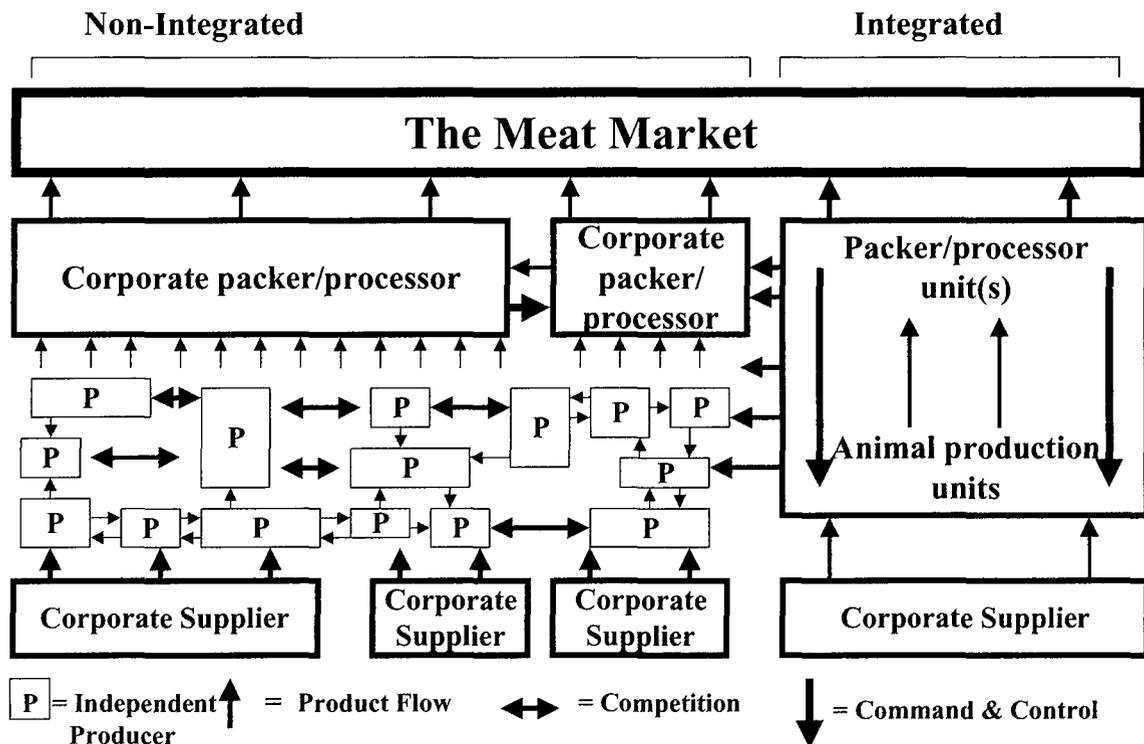
The changes in the pork industry

The recent slaughter-hog price crisis that affected almost every national swine industry has clearly shown that, under the conditions of the current pork commodity market, the quantity- and cost-reduction-oriented independent pork producers face the risk of becoming a cost center of the pork industry they supply.

Figure 1 shows the current “commodity production structure” of the pork industry. The thickness of the boxes symbolizes the economic power of the industry sectors. The meat market (retailers, purveyors, exporters) clearly dictates the conditions for the “down-stream” partners of the production chain. Additionally, the independent producers (P) are “trapped” between the corporate suppliers and the corporate packers/processors. The natural reaction to this pressure is to reduce costs. However, the corporate, vertically integrated farming systems, such as the

Figure 1:

The Current Commodity Production



Smithfields and the Seaboards, can lower their costs even more due to their built-in “command and control” system. Consequently, maintaining the commodity model means nothing less than gradually extinguishing the independent farmer.

The so-called “hog-cycle” has turned into a downward spiral for the non-integrated pork producer. The major reason for this is that the traditional tools of pork producers to react to lower prices, such as reducing the number of sows and lowering costs of production, do not work any longer, since the small- and medium-sized producers, which served as “buffer” by quickly reducing production, are disappearing. This has created a volatile business environment for those who sell pigs for a living.

Many producers and their veterinarians recognize the need for changing the pork industry from a “push-through” (producing as much as possible) to a “pull-through” (producing what the market asks for) system. This change can also be described as a transition from “commodity production” to “demand-driven production.”

Figure 2 shows the ideal alternative to the commodity production structure, the “demand-driven production chain” structure (p=interdependant producer). Suppliers,

pork producers, and packers/processors have partnered up with the market segments that exist or are emerging in a way that the agricultural primary production “mirrors” the various segments of the meat market *and* is treated as a partner that is essential to produce the quality the market requires, and not as a potential cost center.

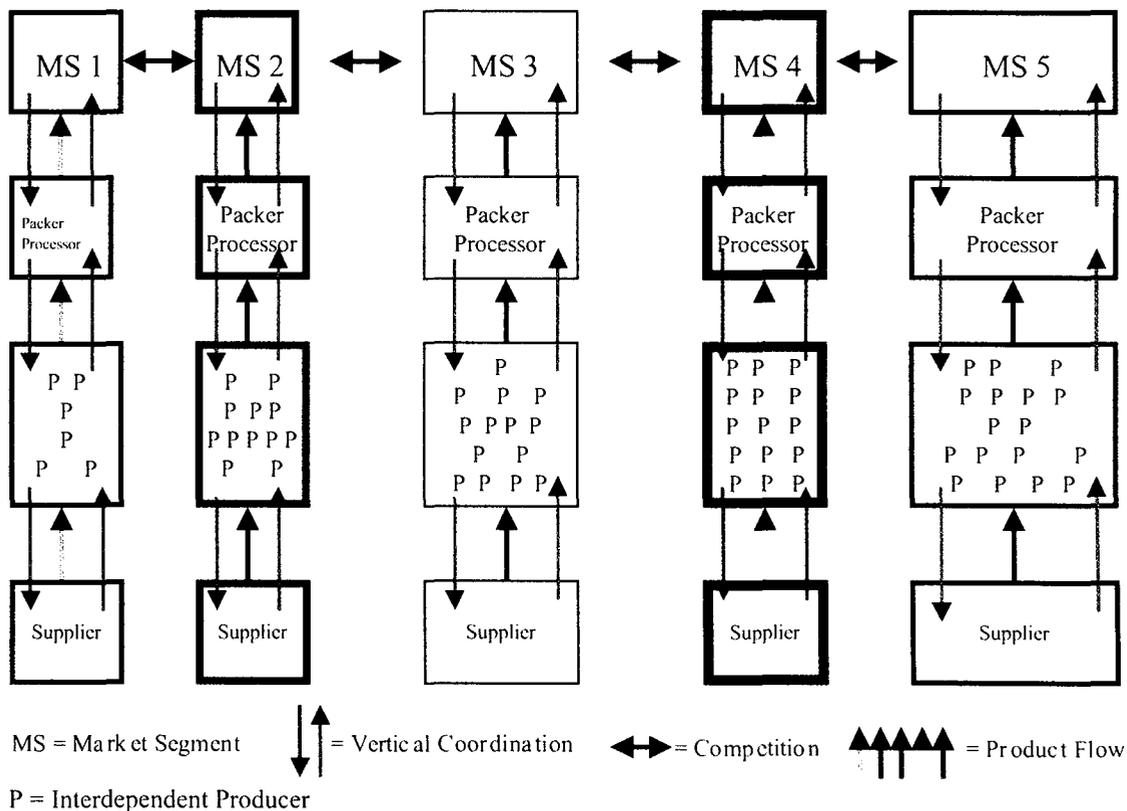
Creation of “Minnesota Certified Pork” (MNCEP)

MNCEP is a pork producer network that is developing a demand-driven supply chain. It is a new generation cooperative; the members buy shares (per number of produced pigs), pay yearly fees, and agree on standardized, market-oriented production procedures. MNCEP is based on the principles of implementing and certifying high food quality and safety standards on all member farms to produce a pork product for the market that is differentiable from the currently anonymous commodity pork.

MNCEP’s mission statement reads as follows: To provide the market with superior quality pork products, traceable back to the farm(s) of origin, produced by independent farmers, guaranteeing a minimized risk of food-borne

Figure 2:

The Evolving Demand -Driven Production



threats to human health through standardized, audited, and certified production procedures.

The quality standards of MNCEP are outlined in the *MNCEP Quality Handbook*, mandating every MNCEP member to meet these standards. The *MNCEP Quality Handbook* includes the following topics:

- MNCEP's quality policy
- Best production procedures, such as:
 - biosecurity
 - daily procedures throughout production cycles
 - cleaning and sanitation, etc.,
- Pre-harvest food safety procedures, such as:
 - prudent use of antimicrobials
 - salmonella control
 - trichinella- and toxoplasma-free production
 - residue and foreign body avoidance procedures
- Environmental stewardship practices, such as:
 - rules for proper manure storage and spreading
 - odor reduction measures
 - contingency plans for environmental accidents
- Animal welfare practices, such as:
 - herd health program
 - rules for humane handling and animal care
 - opportunities for animals to move and be active
 - rules for transport and pre-slaughter handling
 - humane euthanasia
- Recording and documentation protocols

Apart from the detailed description of every daily production procedure as a Standard Operating Procedure (SOP) to provide the basis for the intended standardization within MNCEP, new standards for improving food safety such as prudent use of antibiotics (WHO, 1997), on-farm salmonella control (Carlson and Blaha, 1999), and standards for protecting the environment and improving the animals' well being (Anonymous, 1999) on the farm that exceed the current mandatory requirements are also described. The implementation of the standards outlined in the *MNCEP Quality Handbook* is done in close cooperation with the veterinarians who conduct the monthly audits on each member farm to assure compliance with the standards.

During the market studies for MNCEP, where we explored the demand and the willingness of certain market segments to pay more for defined and traceable products pro-

duced under certified production procedures, we were asked several times whether we could implement high quality and food safety production standards similar to MNCEP's standards in the production procedures of the pork producers that are currently supplying the markets we interviewed. These requests led to the development of a program for implementing high quality standards into audited and certified production procedures for networks of independent farmers producing agricultural products. We call this program "Minnesota Certified" or "MnCERT." This program will create new areas of activity for food animal veterinarians (Blaha, 2000).

"Minnesota Certified" (MnCERT)

The concept of an independent organization for agricultural quality assurance procedures (an ISO 9000-equivalent for agriculture) was developed at the College of Veterinary Medicine together with the College of Agriculture at the University of Minnesota. The goal of the MnCERT organization is to provide networks of independent producers with market analyses, with support in implementing quality and food safety standards that meet the demands of certain market segments, and, most of all, with the necessary third-party certification of the specified quality criteria.

This certifying agency is being developed as a non-profit organization. MnCERT is a joint venture of the Minnesota Department of Agriculture, the University of Minnesota, and the private sector, through which the objectivity and credibility of the government and a Land Grant university can be combined with the flexibility of a privately run business. MnCERT's mission is as follows: To help any network of independent farmers that wants to become part of a value-added supply chain to find a market; to implement market-tailored quality standards; and to facilitate the certification of their high-quality production procedures.

MnCERT will help any agricultural producer group to:

- Find appropriate market segments for their type of production
- Define specific quality standards
- Develop a customized quality handbook
- Implement these specific standards on their farms
- Facilitate the auditing and certification procedure that verifies the proclaimed quality standards

In contrast to the countless efforts of governments and commodity associations to increase the general quality and safety standards of agricultural production procedures, the quality and food safety features developed and implemented by MnCERT are not meant to be general production standards for entire national industries, i.e. they are

not the same for every network, but they will be specifically “designed” and customized for the market segments the network in question wants to supply. Once the standards are developed, they will also be subject to change with rising demands of the market and/or of public/governmental requirements. The standards MnCERT will deal with can reach from special eating characteristics of food products to food safety guarantees (e.g., the reduction of food-borne pathogens, antibiotic- and/or GMO-free pork, etc.), environmentally protective production procedures, animal welfare aspects, and even guarantee organic production procedures.

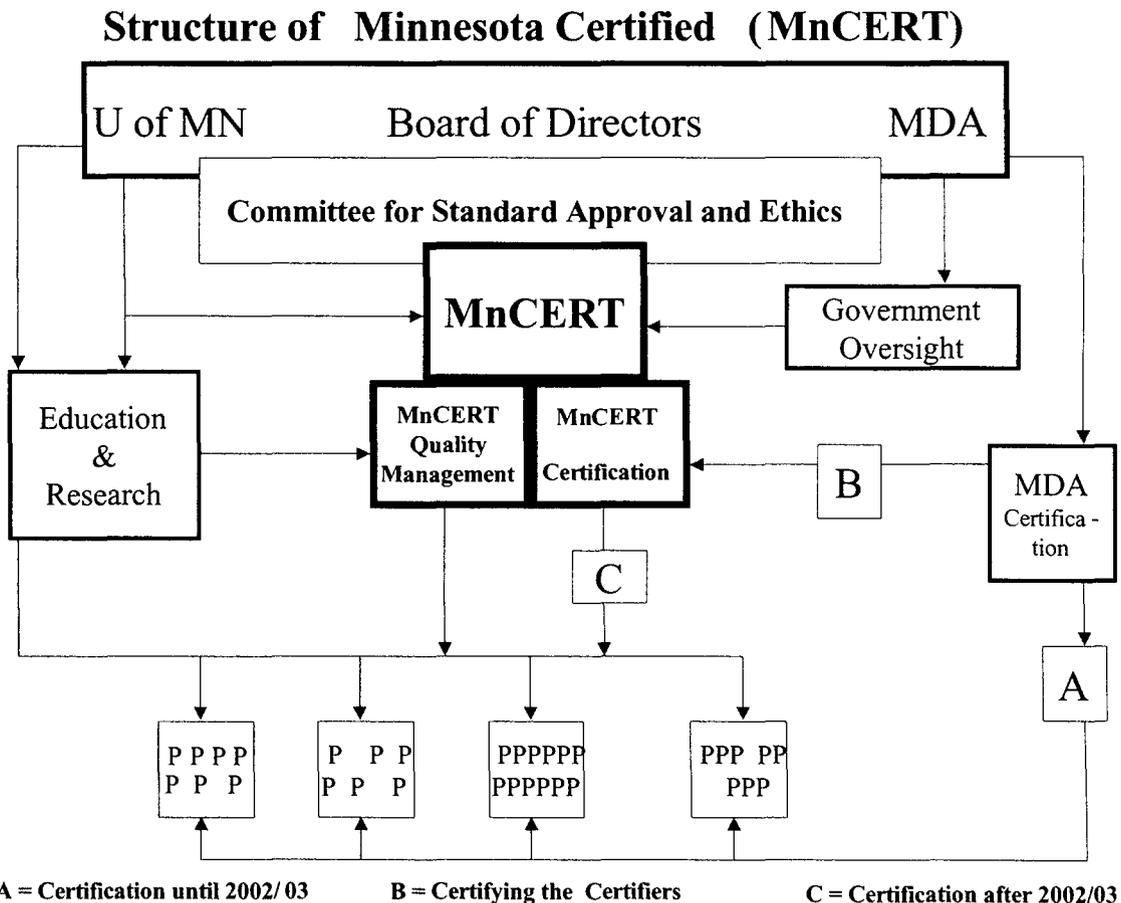
Figure 3 shows the current plan for the MnCERT structure. MnCERT is governed by a Board of Directors, operates on fees charged for services provided to agricultural businesses (p=interdependant producer). These businesses are any agricultural enterprises aimed at producing high quality, identity preserved primary products for vertically coordinated production chains that value third-party certified quality claims. MnCERT is officially recognized by the Minnesota Department of Agriculture (MDA) and the University of Minnesota (U of MN), which both are permanently represented in MnCERT’s Board

of Directors. The legally mandated cooperation of MnCERT with the MDA and the U of MN implies that MnCERT’s services are available to any agricultural business.

The Board of Directors governs the activities of MnCERT and appoints a “Committee for Standard Approval and Ethics,” which develops procedures to guarantee that MnCERT implements and certifies only standards that are at least at or above any governmentally mandated standard.

The Committee for Standard Approval and Ethics should consist of permanent members (ideally members of the Board of Directors) and of temporarily appointed members that cover the expertise needed for the evaluation of applications from the various areas of agriculture. Its major responsibility is to prevent the certification of high-quality procedures that violate the rules of EPA, USDA, and FDA. It also has to assure that the standards are in compliance with generally recognized ethical standards, e.g., no approval for high quality but illegally employed workers, for causing pain in animals, or for unacceptably high occupational health risks.

Figure 3:



The MDA contributes to Minnesota's agricultural certification program the governmental oversight, and, for a certain period of time, the certification of standards that have been:

- Approved by the Committee for Standard Approval and Ethics
- Implemented on all farms of the agricultural enterprise that has applied for certification
- Audited repeatedly by internal auditors of the applying agricultural enterprise

The governmental oversight of the MDA guarantees MnCERT the credibility that any certification procedure needs, especially if it starts from the very beginning and has not yet gained general recognition. For the initial phase of MnCERT's activities, the MDA oversight is the equivalent of the accreditation of privately run registrars in the framework of ISO 9000.

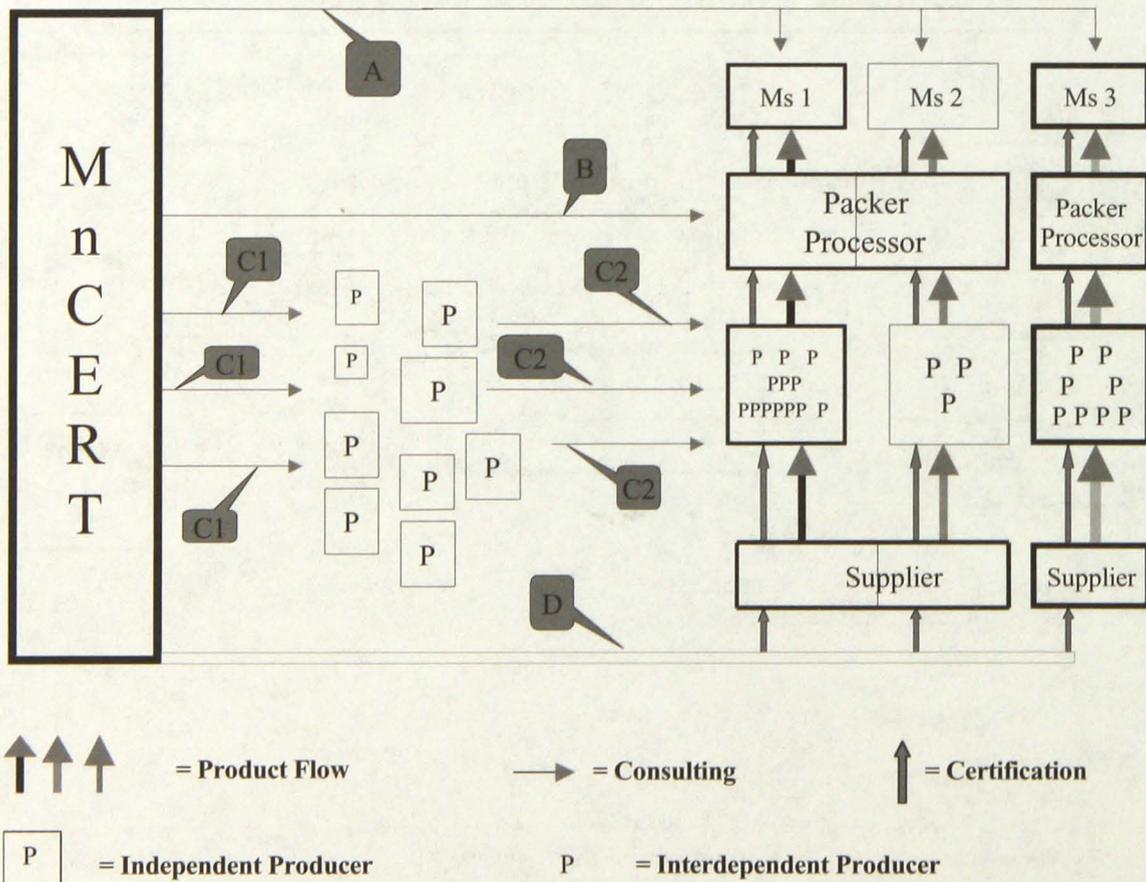
The third-party certification provided by the MDA may be limited to an initial phase of the development of MnCERT. The long-term vision for the certification procedure provided by MnCERT is that the MDA, instead of conducting every certification itself, will certify the certifiers for the MnCERT certification procedure.

The U of MN contributes to Minnesota's agricultural certification program the necessary education (extension service) for producers, veterinarians, and consultants who want to adopt or contribute to quality assurance principles, and research (faculty and graduate programs) filling knowledge gaps identified during the development and implementation of specific quality standards (e.g., alternatives to sub-therapeutic use of antibiotics, or identification procedures of animals and products through entire production chains for identity-preserved production chains).

Figure 4 shows random examples of the various activities that MnCERT needs to develop to "trigger" the tran-

Figure 4:

MnCERT as Facilitator of the Transition to Demand-Driven Production Structures



sition of the current commodity production to a demand-driven structure that is based on identity-preserved product flows and quality assurance principles. The A arrow represents identifying markets and communication with the various market segments. The B arrow symbolizes negotiating with existing packer/processor enterprises to partner up with potential producer groups that are to be organized for adopting specified standard operating procedures to meet identified market demands. The C1 arrows are the various activities of MnCERT to bring together independent producers to establish groups of deliberately interdependent producers who are willing and capable of adopting the identified SOPs for a certain demand-driven supply chain. The C2 arrows represent a variety of MnCERT activities from developing supply chain specific quality handbooks, support in implementing the chain-specific SOPs, and the internal auditing procedure. The D arrow demonstrates the MnCERT-facilitated third-party certification that parallels the product flow from farm supply to the final market segments.

MnCERT will use the progressive pork producer cooperative "Minnesota Certified Pork" (MNCEP) as pilot project. This pilot project, which is a close cooperation between the College of Veterinary Medicine and the College of Agriculture, Food and Environmental Sciences of the University of Minnesota, the Minnesota Department of Agriculture, and the Swine Health Center at Morris, Minnesota, will clearly define the role of the consulting veterinarian in developing and implementing specific standards, developing quality handbooks, the checklists for auditing, as well as the auditing procedures themselves as basis for any third-party certification.

Conclusion

Although MNCEP and MnCERT are under development and in their infancy, they have the potential to serve as a model of how to restructure the traditional, quantity-oriented agricultural commodity production into a quality-oriented, demand-driven production system. In the latter, the mutually destructive competition between producers will be replaced by the competition between vertically coordinated supply chains that provide the various market segments with differentiated, identity preserved (traceable back to the farms of origin) products. The MnCERT concept embraces agricultural enterprises of any size. It offers even the smallest independent farmers the opportunity to join interdependent production network systems that enables the implementation of standard operating procedures (varying between market segments) for linking the family farming community with the markets.

We believe this concept is an alternative to subsidizing family farms, which only postpones their disappearance from the economic scene of food and fiber production. Of course, at start-up, considerable funds from tax money

are needed to initiate, promote, and enhance the gradual development of a demand-driven agriculture that eventually will be self-sufficient and is able to embrace small-scale producers, if they are willing to agree upon interdependent arrangements. The funding of the planned restructuring, however, is, in contrast to on-going subsidizing inefficiency, an investment in future generations of self-supporting farmers that are highly respected as an indispensable part of national and international economies.

The vision and description of the evolving demand-driven supply chains for food production is not new (e.g., den Ouden et al., 1996; Urban, 1998; Caswell, 1998; Boehlje et al., 1999b, Windhorst, 2000; Ritchie, 2000 and many others). However, the new approach is the creation of regional or national agencies for facilitating the process of bringing independent farmers together enabling them to adopt ISO 9000-like quality management, standardization, and certification procedures. Under this structure, any independent farmer, regardless of farm size, can become a valuable part of distinguished supply chains. Through the support of such agencies, the interdependence, which they cannot develop on their own, will help them to be competitive in a changing agricultural world.

If such agencies can be developed and policy makers endorse and support the concept, our answer to our interrogative title is: *Yes, we can bridge the widening gap between family farming and the market demands.*

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