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## **Exploring Agriculture's New Frontier**

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Agriculture is on the threshold of an exciting frontier of opportunities. These include growing pharmaceuticals in fields along with delivering fresh food products straight to grocers' shelves. Bright as these prospects may be, however, they must be seized by farmers accustomed to growing commodities and responding to public policy overwhelmingly directed at commodities. Thus, entering agriculture's new frontier requires big changes by farmers and policymakers alike. Farmers must go beyond a tradition of independence to a new business model founded on partnering. And policymakers must shift from subsidizing commodity production to supporting new ventures in product agriculture.

These are the conclusions reached by a national task force commissioned by the National Corn Growers Association to



peer into U.S. agriculture's future. The task force included farmers, industry and technology experts, university economists, and myself.

### Agriculture's commodity dilemma

U.S. agriculture has long been a commodity powerhouse. But that very success creates a dilemma for the future. Twin forces point to much bigger farms in the future, offering the opportunity of growing commodities profitably to a relative handful of elite commercial farmers. One force driving this trend is technology, which continues to advance and reduce the need for farm labor. The adoption of no-till cultivation practices alone is estimated to have liberated about 500 man-hours a year on a typical 1,000-acre Corn Belt farm, or about 11 weeks of time for the farmer. Put simply, growers can now farm more land with the same amount of labor. This increase in productivity also means that full-time crop farmers who elect not to expand are effectively underemployed parts of the year.

The other force behind the trend is intense global competition in commodity production. The farmers on the task force were especially aware of the competitive threat of low-cost production in South America. Corn and soybeans are being grown at very low cost in Brazil and Argentina, and there is great capacity to expand production in both countries. This competition promises to keep profit margins for U.S. grain farmers razor thin for the foreseeable future.

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As a result of these twin forces, corn producers envision a future in which 10,000-acre farms (about 16 square miles) may be needed to generate satisfactory returns. This scale of operation holds little

appeal to many within the current industry, leaving the vast majority of grain producers wondering what the future holds for them. The trend also carries profound impacts on rural communities if left to evolve on its own. Quite simply, farming units of this grand scale will sustain significantly fewer rural communities.

Commodities also pose a huge dilemma for public policy. They remain the overwhelming focus of farm policy, with most government payments flowing to commodity growers. Yet producers are increasingly aware that commodity payments have failed to revitalize their communities or even stem economic erosion. Despite the \$104 billion spent on farm payments in the 1990s, three of every four farm-dependent rural counties had economic growth below the average for all rural counties, and one of every two lost population. An even bigger dilemma arises from the growing recognition that seizing new opportunities in agriculture will be much more difficult if policymakers continue to emphasize income subsidies instead of focusing on new strategic investments. That is, regular subsidy payments for growing commodities stifle entrepreneurial shifts to new opportunities.

### The New Frontier

Even as pressures mount on commodity production and commodity policy, agriculture stands on the edge of an exciting frontier. This frontier, which many now call *product agriculture*, presents a panoply of opportunities that range far beyond commodities. Two features are particularly striking. One is the exceptional range of opportunities—from growing pharmaceuticals in cornfields to selling fresh foods directly on grocery shelves. The other is the common thread that weaves throughout the various opportunities—a business model founded on *interdependence* instead of *independence*.

While some leading corn growers might easily assemble 10,000-acre farms, few seem to aspire to it. Instead, they and many other large crop producers are

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turning to opportunities in product agriculture. These opportunities appear to hold more promise and more excitement than simply growing more bushels on a bigger farm. Importantly, these opportunities seem available to small and large farms alike, but in most cases farmers must forgo their traditional independence and become part of a "product alliance" to tap such markets.

None is more exciting than growing pharmaceuticals in fields. This past fall, the first field of "farmaceutical" corn in North America was harvested in Iowa. The corn was genetically engineered to produce a protein used to manufacture a drug to combat symptoms of cystic fibrosis. There was a compelling reason to grow the protein in a field instead of a factory—farm costs were 7 percent of factory costs. This squares with more general estimates of cost savings of growing drug materials in plants and animals (Chart 1).

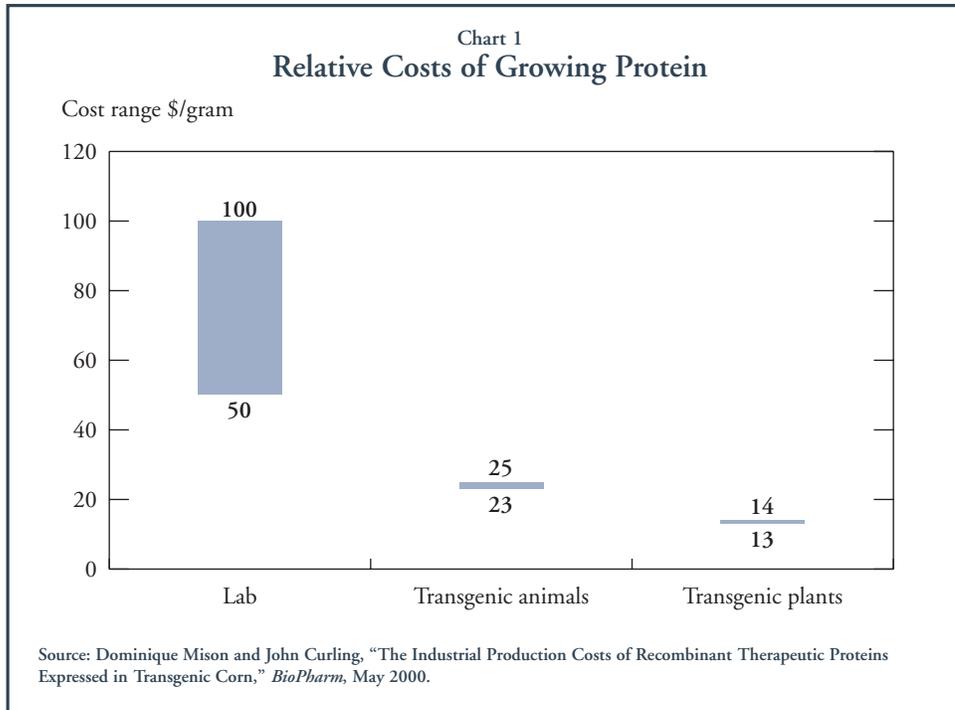
The rural economic impact of more widespread plantings of farmaceutical crops is potentially great. To the producer, these fields represent what are in all likelihood the highest value crops ever. In the case of the

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cystic fibrosis corn, it is estimated that several thousand acres might be needed to meet market demand, and this is a small-market drug. Worldwide, an estimated 400 plant-based drugs are currently being developed, with another 1,000 under considera-



tion. If such drugs reach the market, plantings of pharmaceutical crops could swell significantly. While no one knows how many acres could ultimately switch to these high-value crops, islands of specialized productions could one day be scattered throughout the Farm Belt.

The biggest economic impact of these islands comes from locating processing facilities near where the crops are grown. The National Corn Growers Association estimates that such plants could require investments of \$80 million. And the plants would

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provide high-skill, high-wage jobs.

Another opportunity in the new frontier is to sell farm fresh products directly to grocers through new alliances. While some

organic foods are beginning to show up on grocery shelves in the nation, perhaps the best example of farmer-grocer alliances can be found in the United Kingdom. Waitrose became a top-ranked UK grocer in the 1990s due to its huge selection of organic, farm-fresh products. Many of these products are grown in the UK and supplied to Waitrose through direct alliances with farmers. This has given new markets to farmers that used to grow traditional commodities while at the same time lifting the number of organic products on today's Waitrose shelves to more than 1,500. These products range from "deep-strawed eggs" to certified farm-fresh leg of lamb.

Farmer to grocer alliances are much less developed in the United States, especially in the Midwest where commodity production remains dominant. However, crop producers within an easy drive to major cities have a clear-cut opportunity to help grocers widen their product offerings. The success of this strategy, as Waitrose demonstrates, depends on having enough growers to keep products consistently stocked, even for seasonal products.

The need for partnering is, in fact, the other striking feature of the new frontier.

Traditionally, farmers have been the very embodiment of a highly independent business model. Looking ahead, however, the task force agreed that farmers must be willing to challenge their traditional comfort

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zone, exchanging independence for *interdependence*. While some in agriculture lament this shift, task force members also agreed that some loss in independence is far preferable to a growing farmer dependence on government subsidies.

Interdependence is a critical part of product agriculture. Whether producing pharmaceutical corn or farm-fresh foods, the key is delivering products exactly suited to the needs of the end consumer. Value chains are increasingly the means for ensuring quality assurance throughout all steps in the process. In the case of pharmaceuticals, growers will likely need to take two steps. First, they will need to certify their farms to quality production protocols, such as ISO 9000, a step the Iowa farmer took before growing the cystic fibrosis corn. And second, growers will need to foster close business and contractual relationships with firms that process the crops. Farmers will benefit from this shift in business model if they are able to help other partners manage risk while delivering high-quality products. Similarly, farm-to-grocer food products likely will be delivered under exacting standards, and farmers will have to partner with other farmers to deliver sufficient quantity to keep products stocked in stores.

### New policies for product agriculture

Just as product agriculture requires big shifts in farm business practices, so it points

to the need for big shifts in public policy. Seizing opportunities in agriculture's most promising product ventures will be much more difficult if policy continues to emphasize income subsidies instead of focusing on strategic investments in the new opportunities.

With new policies, the grain industry can have a bright future where there are new opportunities for quality conscious growers of all sizes. But this future requires

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a change in mindset. Government and private industry must enhance the climate for producers to participate in value-added ventures. Two shifts in public policy will be especially important to improving outcomes for producers and rural communities. The first is a new emphasis on strategic investments in rural development. The second is new strategic investments in product agriculture.

Rural policy, as such, is a new frontier for U.S. policymakers. While much remains unknown, three key principles might guide formulation of a new rural policy. First, policy might focus on rural places instead of one sector—agriculture. A “one-size-fits-all” policy no longer fits the diverse economic landscape that is 21<sup>st</sup> century rural America.

Second, it might focus on encouraging clusters and networks among farmers and rural businesses. Being small is a liability in the new economy, and more and more evidence supports policy that encourages partnering among firms. This policy orientation also happens to align with the needs of the interdependent business model emerging in product agriculture. But it represents a

sharp departure from the farm focus of agricultural policy.

And third, it might focus on investing in new competitive advantage for rural regions. A good example is New York's “dairies to wineries” program that is now bringing substantial tourist dollars to the Finger Lakes Region.

A handful of specific policy thrusts might support these three policy principles. Spurring more rural entrepreneurs will be important to product agriculture and rural economic growth more generally. After chasing smokestacks throughout much of the past half century, rural policymakers increasingly recognize the benefits of growing their own businesses. An essential ingredient in helping new entrepreneurs is equity capital, which is sorely lacking in rural areas. Thus, building new equity-fund institutions is a vital policy issue. Helping rural businesses tap advanced technology will be another important program thrust. New institutions like Minnesota Technology Inc., a technology assistance group created by the state of Minnesota, may be important model institutions for helping rural companies move up the technology ladder. And, of course, lifting rural quality life will be important to helping rural businesses attract and retain talented workers.

Another key policy thrust is new strategic investments in product agriculture. Such investments are crucial in fostering a healthy agricultural structure and are necessary for thriving rural communities. Four areas will be especially important. First, new research investments are needed to address environmental concerns in the livestock industry. If animal agriculture continues to move to other countries because of social and environmental concerns, U.S. grain producers will be hurt. A “Manhattan style” research project to solve animal odor problems could help keep in rural America the single most important source of farm income.

Second, public policy might focus on programs that help farmers—big and small alike—and rural communities leverage specialty product markets. Public investments that help underwrite the costs of forming

producer alliances would be helpful.

Initiatives that help develop farm-to-grocer markets will help many farmers, especially those near cities.

Third, encouraging new research and business alliances between the medical industry and the agricultural sector will be important. Pharmaceuticals represent a new intersection of farming and medicine, and public policy might consider research investments that aim to exploit the new synergies between industries that have rarely intersected in the past. As second- and third-generation biotech products provide consumer benefits, such as low-cost vaccines and life-saving pharmaceuticals, the nation could position itself to take advantage of these lucrative niche markets.

Finally, policy might update cooperative legislation. Existing coop law was passed for commodity agriculture. New provisions may be needed to promote value chains where all participants benefit. For example, the current patchwork of state laws makes it difficult for new generation coops to raise capital across state lines.

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