promar International

FROM SUB-CULTURE TO SUPERMARKET:

Organic foods grow up

Volume I: Meeting supply side realities

Management Summary

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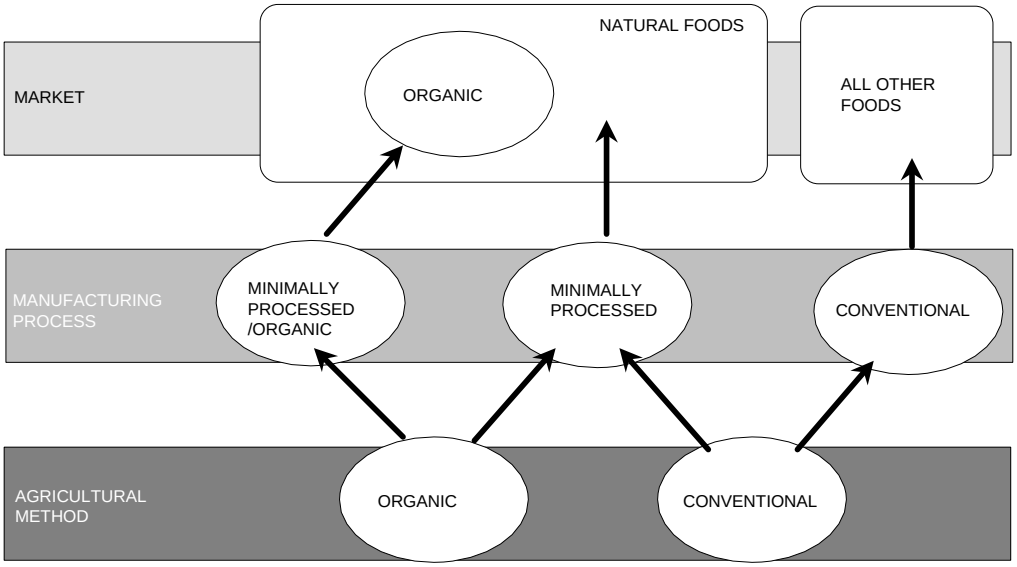
MANAGEMENT SUMMARY

1. THE ORGANIC AGRICULTURAL SEGMENT TODAY

What are organic foods?

Organic foods are distinguished from other types of foods and beverages by the way they are grown and manufactured, not by features that are physically detectable in the product itself. Organic crops are grown in a way that "promotes and enhances bio-diversity, biological cycles and soil biological activity," and are processed in a way that maintains the organic integrity of the product. Organic foods differ from natural foods in that the only requirement for a natural product is that it is minimally altered at the manufacturing stage, as illustrated below.

Categorizing organic, natural and conventional foods based on production practices

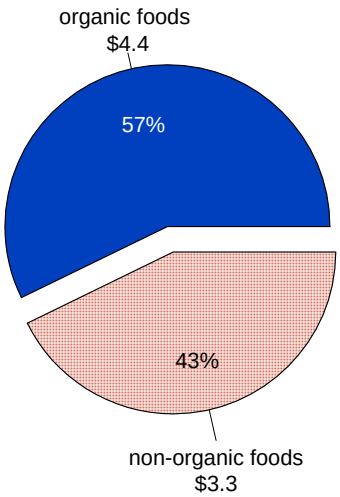


The organic food market in the United States

On the basis of retail sales by product category information, PROMAR *International* estimates that the size of the organic food and beverage market was $4.4 billion dollars in 1997. The organic food and beverage segment has been growing far in excess of the natural food category

and the total food industry, at rates of over 20 percent since the early nineties. Given these growth rates, organic foods and beverages have been making up a growing proportion of the natural food segment over the years. Today, the organic food market constitutes the majority of the natural food and beverage market, making up 57 percent of that segment.

The natural food and beverage market -1997



Source: Nutrition Business Journal; PROMAR *International* estimates

Organic agriculture

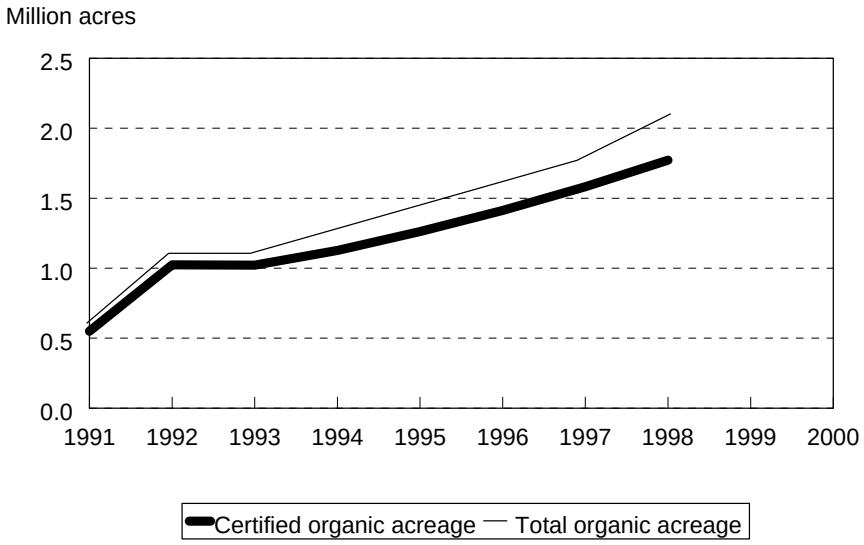
From certification organization data collected by the Organic Farming Research Foundation (OFRF), PROMAR *International* estimates that there were approximately 5,860 certified organic growers operating in the United States in 1998. In addition to this figure, OFRF speculates that there are over 6,000 farms marketing organic foods which are not formally certified, taking the number of farms marketing organic commodities in 1998 to approximately 12,000. According to the later figure, organic growers make up less than 0.7 percent of the 1.9 million farms operating in the United States.

In the mid-1990's, approximately 73 percent of organic farmers grew fruit, vegetable, and nut crops. At the other end of the spectrum, less than 5 percent of certified farmers raised organic livestock, and of these producers, most were also organic crop farmers. These farming demographics differ significantly from overall US agriculture, where less than 10 percent of farms

grow produce (fruits and vegetables) and well over 50 percent are involved in livestock and/or dairy production.

In relation to acreage, we estimate about 2 million acres of US farmland was under organic management at the end of 1998. This represents about one quarter of one percent of total United States land involved in agricultural production in that year.

Estimated acreage in organic production



Source: USDA; PROMAR *International* estimates

Organic agricultural land use in 1994 is presented in the table below. Grains accounted for about 40 percent of certified organic acreage in that year, or 800,000 acres. This share has probably risen in response to increased demand from General Mills with the introduction of their organic cereal line.

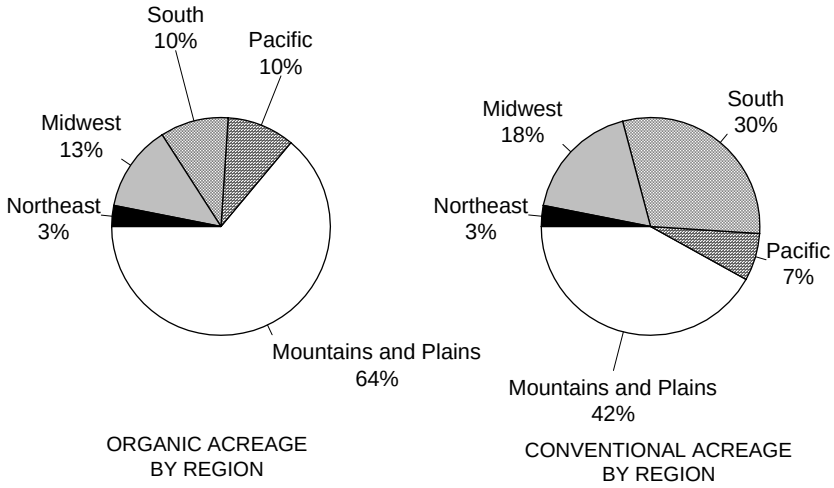
Organic land usage

Land usage	***Percent of total organic acreage***
Produce (fruits, vegetables, herbs, nuts)	8.0
Grains	21.5
Dry beans and soybeans	4.5
Livestock feed	15.0
Cotton and other row crops (tobacco)	2.0
Pastureland/rangeland	40.0
Woodland	1.0
Fallow cropland	8.0

Source: USDA; Organic Farming Research and PROMAR *International* estimates.

According to the Organic Farming Research Foundation, certified organic farms are concentrated in the Pacific states (California, Washington, Oregon) and in the North East (in particular, New York and Maine). However, while these areas represented over half of the growers, they made up only a third of the acreage in 1995. The majority of land under certified organic management is found in the mountain and Northern Plain regions, with states such as Colorado, North Dakota, South Dakota and Montana making up over fifty percent of organic acreage. While these states hold most of the organic acreage, they are home to less than 15 percent of organic farms. In other words, a few large organic farms can be found in the Mountain and Northern Plains regions, and many small organic farms are located in the Pacific and Northwestern regions. Interestingly, the OFRF suggests that there are no commercial organic farms in the states of Nevada, Mississippi, Delaware, Alaska and Alabama.

Organic and conventional acreage by region

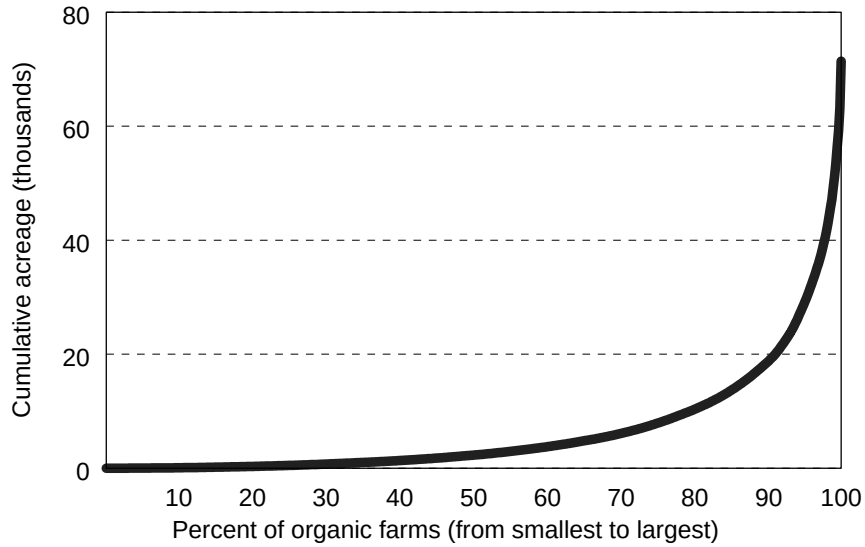


Source: USDA; PROMAR *International* estimates

The average organic farm is considerably smaller than the average conventional farm. According to our estimates, the average US organic farm was only 173 acres in 1998. These calculations stand in stark contrast to the size of the average US farm which, according to the USDA Census of Agriculture, was about 485 acres in 1997. While averages provide a useful illustration, a clearer picture of the relative size of organic farms may be drawn by analysis of medians. According to available data on CCOF-certified growers, the median farm size was about 20 acres. This is considerably smaller than the median size for all US farms, which was between 150 and 200 acres in 1997.

While organic farms are smaller, there actually exists a pronounced dichotomy between small and comparatively large organic farming operations. Of the 249 farms certified by the California Certified Organic Farmers (CCOF) in 1999, 50 percent of the organic acreage was owned by 3 percent of the certified farms, whereas the smallest 50 percent of farms held only 3 percent of the certified organic land. Interestingly, this pattern is not specifically a function of the types of commodities grown by the largest farms, as larger growers produced the same types of commodities as the smaller farms, but on an exponentially larger scale.

A minority of organic farms own most of the organic acreage



Source: PROMAR *International*

Organic agricultural supply chain - farm inputs

Organic growers obtain crop production information from a wide variety of sources. For information on organic farming practices, one of the most important sources is neighboring farmers. Nearly a quarter of the organic vegetable growers in one survey obtained pest management assistance from other local organic growers. This study also found that trade magazines/newspapers (23%) and extension advisors (16%) were prominent sources of information for organic growers. Interestingly, large organic farmers receive information from very different institutions than smaller growers. The larger organic farms get a greater proportion of information from input supply companies and professional pest control advisors and rely less on newsletters and other organic farmers than do smaller growers.

Apart from information, organic growers also source pest, weed, disease and nutrient inputs from external sources. Bacillus thuringiensis (Bt) is probably the most prominent off-farm input utilized by organic growers. Bt is a naturally occurring bio-insecticide which attacks different types of pests. Industry specialists suggest that over 50 percent of organic growers use Bt. Organic farmers also purchase and use fungicide substitutes such as sulfur, copper products and hydrogen peroxide to control crop diseases. Bio-pesticide use differs considerably between small and large organic producers. For example, 15 percent of large organic vegetable farms used pyrellin EC, compared to only 2 percent of small farms.

The organic pesticide and fertilizer input supply segment is growing and developing. A few large manufacturers of bio-pesticides have entered the market. Verdant Brands, Inc., which is a NASDAQ-listed company, produces organic farm supply products under the Safer Brand label. The Fortune 500 company Abbott Laboratories has research and developed a number of "biological" pest control products, such as Novodor and ProGibb. The company has actually patented a number of these products, such as Biobit, which is a Bt strain active against lepidopterous insects. There are also a number of natural and organic farm input retailers and distributors. Major input distribution players include Harmony Farm Supply, Peaceful Valley Farm Supply and the Bloomington Wholesale Garden Supply Company.

The majority of organic growers purchase and consume primarily non-genetically modified (GMO) conventional seed. This is because there is a distinct lack of organic seeds available for purchase. There are only two main producers of organic seeds operating in the Unites States, Seeds of Change and Northland Organic Corp. While these companies have developed non-GMO identity preserved, organic seeds especially for sustainable agriculture, the high cost and reported low reliability of these products has meant limited market penetration. Organic producers also use conventional seed simply because they can. Difficulties surrounding the cultivation of organic seeds has meant that certification and regulatory bodies have had to permit the use of conventional seeds on organic farms.

Organic agricultural value chain - commodity marketing

The most important marketing channel used by small organic fruit and vegetable growers is direct-to-consumer sales. More than 50 percent of small organic fruit and vegetable growers market their produce through roadside stands, farmers markets and consumer supported agriculture. This compares with only 12 percent of the large producers and 2 percent of conventional produce growers. Alternatively, the most important marketing channel used by large organic fruit and vegetable growers is grocery wholesalers followed by brokers and processors. These buyers were insignificant for small producers.

The marketing channels used by grain and oilseed growers are substantially different from those for fruit and vegetable producers. Grower cooperatives are important buyers of organic grain and oilseed commodities. A number of very large organic grower cooperatives have emerged in the United States, such as the Organic Growers of Michigan (OGM) which comprises over 200 farmers and the Organic Farmers of Michigan, LLC, which covers over 10,000 acres.

Discussions with industry participants also established that brokers are prominent in the organic grain and oilseed value chain. A number of mid-sized brokering institutions, such as Northland Organic Foods Corp. as well as American Health and Nutrition have evolved and grown in the last decade in response to inefficiencies in the organic commodity distribution system. Unlike conventional grain marketing channels, first processors play a minor role in the organic value chain. Only a small percentage of commodities are actually marketed directly to first processors. Instead, cooperatives, brokers and food manufacturers enter tolling arrangements with conventional millers and crushers. Moreover, some major manufacturers and brokers actually own their own mills and perform their own first processing.

A study conducted in 1987 provides evidence that many organic farmers do not always market their commodities through specialty marketing channels. It was found that just under 22 percent of growers marketed at least 50 percent to specialty markets. A more recent analysis by Tourte and Klonsky of California production showed that for the 1992-1995 period, a large percentage of organically produced commodities was sold as conventional.

Contract farming plays a critical role in the organic segment. A recent study of marketing channels employed by specialty grain and oilseed handlers found that over 80 percent of

speciality food soybeans was purchased through farm contracts, while 71 percent of speciality food corn was purchased using long-term marketing agreements. While organic commodities only made up a proportion of these speciality categories, research verifies information from industry specialists that contract farming is prominent in the organic segment. Both buyers and sellers indicate that they source or sell using contracts at least part of the time. Contracts are most often sought by buyers who require large, reliable quantities of raw materials. Farmers and intermediaries most often enter into contracts to gain the security of price cover.

Organic commodity market

The table below illustrates current price premiums for a number of organic commodities. Overall premiums for organic grain and oilseed crops are much higher than for organic fruit and vegetable products.

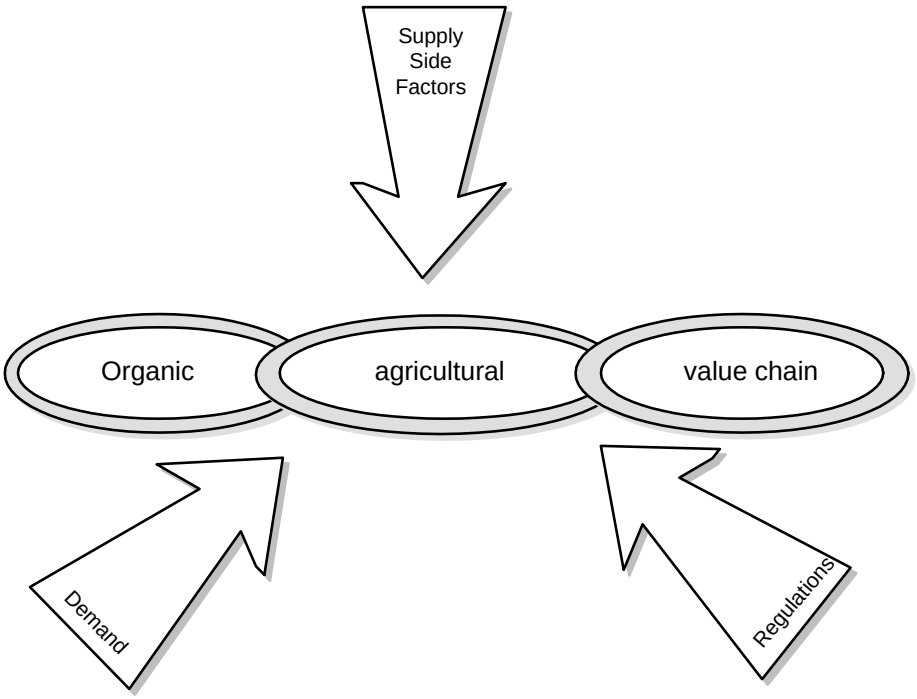
Price premiums for various organic commodities

Commodity	*Organic farm gate price*	*Conventional price*	*Price premium (percent)*
Soybeans (bu)	$13.25	$4.28	209
Corn-yellow (bu)	$3.88	$1.93	101
Wheat (bu)	$6.75	$2.45	175
Green split pea (lb)	$24.50	$7.00	250
Thompson grapes (18lb)	$15.50	$15.00	3
Valencia oranges (35lb)	$22.15	$20.00	11
Baby peeled carrots (25lb)	$21.00	$17.50	20

Source: PROMAR *International*

2. FACTORS SHAPING THE STRUCTURE OF THE ORGANIC AGRICULTURAL VALUE CHAIN

Three broad forces, namely, consumer demand, supply side constraints and regulatory issues have molded and will continue to influence the production of organic commodities, as well as the structure of the segment from input supplier through to first processor.



Consumer demand

Demand for organic foods and beverages has been increasing in the past. However, will this demand be maintained in the future? In order to develop a clearer picture of demand to 2010, we need a better understanding of the forces that are actually influencing the organic consumer. In our consumer model, we distinguish today's organic consumer from the conventional consumer by several indicators of social and individual concern. These "concerned" consumers actively incorporate into their consumption choices considerations well beyond the realm of the conventional points-of-value for food: taste, variety, and convenience. They seek out foods that allow them to extend a particular lifestyle choice to their food consumption habits. Health, food safety and concern for the environment stand out as key issues for organic consumers.

- *Wellness* - Many consumers view organic foods as a health benefit. These consumers specifically seek out organic foods. With consumers taking a more active role in managing their health due to increased medical costs, many people are turning to organic foods to avoid pesticides or post-harvest chemicals. This trend signals continued growth in the organics market.

- *Environmental concern* - According to a poll conducted by the Environmental Research Associates (ERA), 87 percent of American adults are at least "concerned" about the state of the environment and 44 percent are "very concerned" about its condition. An increasing number of Americans are acting on these apprehensions. They have learned about environmental degradation and have chosen to take action by changing their living and buying patterns. As environmental consciousness increases, so can the demand for organic foods grown without application of synthetic chemicals.

- *Food safety* - The primary food safety claim organic foods manufacturers and processors make is that organic foods reduce the level of harmful chemicals found in foods. Organic food consumers are convinced. The absence of pesticides is cited in surveys as the primary factor motivating their decision to consume organics. As the concern over pesticides grows, many more people could turn to organic foods as the answer. Demand for pesticide-free foods is the most important force behind growth in the market for organic foods. However, this single benefit may not be enough to guarantee long-term commitment to organics on the basis of food safety.

- *Secondary drivers* - There are a number of secondary organic drivers such as demand for locally grown fresh produce, vegetarian lifestyles, social responsibility and the desire for gourmet or exotic foods. The consumer base for each of these segments is in many respects similar to the consumer base for today's organic market. Moreover, there is a niche or specialty quality about demand which forces consumers to search for their food choices outside conventional retail environments. The specialty retailers serving these consumers have found that they can expand their customer base by offering organic products.

Given this growing consumer base and increasing interest in organic foods and beverages, we estimate that over the next decade, demand for organic foods will more than double. The share of foods purchased that are organic will expand from 0.7 - 1 percent of the food market to an estimated 2 -2.2 percent; or $12.5 billion to $13.8 billion by 2010. Likewise the share of food

consumers eating organic foods will increase from today's 50-55 percent to over 70 percent in 2010.

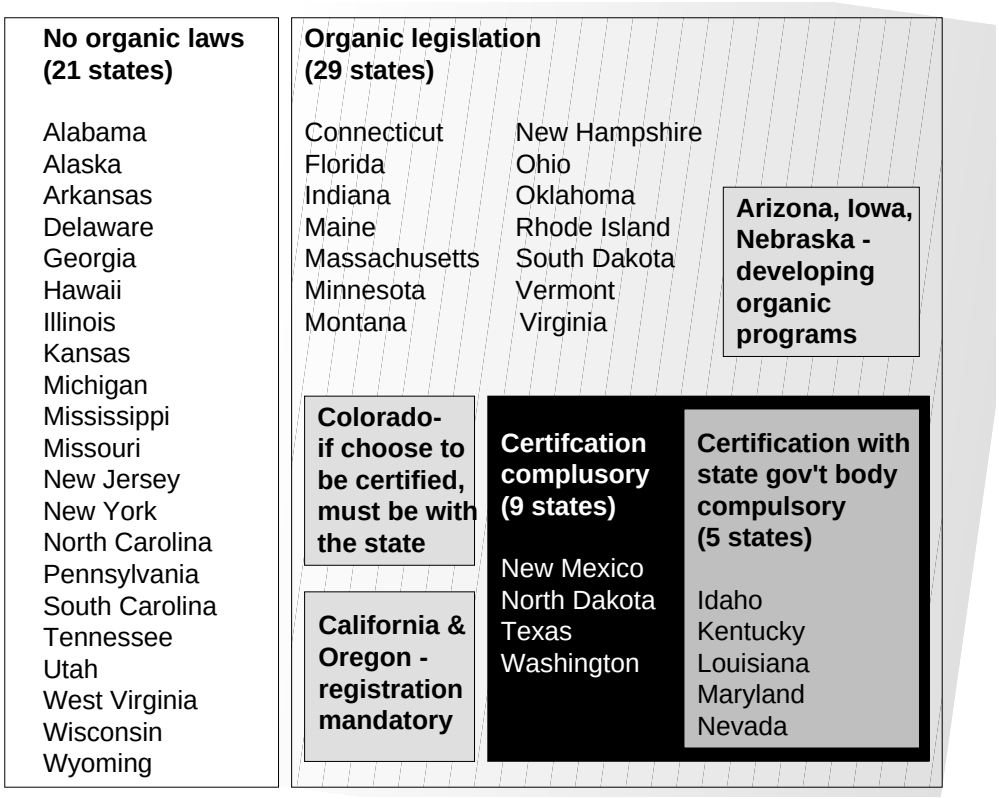
Regulations and policy

Organic certification organizations have evolved in order to help deal with some of the labeling and quality assurance problems associated with organic farming and production. Certifiers are independent third party institutions that assess the practices of organic farmers and handlers in order to verify that they are maintaining certain organic standards. Most certifiers evaluate the integrity of organic producers by undertaking annual inspections of soils, water, facilities and records. In addition to "policing" growers and handlers, certifiers also set the organic standards that they mentor and fix and levy their own fees. Fees charged often include an initiation fee, an income-based administrative fee as well as separate inspection tariff. Further, each certifying agency also determines its own standards for the organic foods that they certify. Consequently, organic standards and regulations vary slightly between individual certification organizations. However, these standards have tended to converge over time so that most certification agencies have similar recommendations on the main materials used by growers.

State legislatures have also implemented laws and regulations. Organic production and handling legislation has been enacted in a total of 29 states throughout the United States, but is only functional in 26 of those states. Although this legislation varies significantly, the laws have a number of common traits. *First*, most state organic legislation sets out the length of the transition period for conversion to organic production. This period varies from 1 to 3 years, with the majority of states adopting the later schedule. *Second*, many state laws mandate record keeping requirements for organic producers. In many jurisdictions, a comprehensive record of all production must be maintained, and in some cases details must be retained for up to 5 years. *Third*, in general, state legislation sets out inspection and enforcement regulations. In many states, government agencies have been given the power to inspect the facilities of organic producers and handlers, and may implement fines upon violation of laws. *Finally*, most state regulations establish production standards for organic foods, or give authority to non-governmental groups to develop and/or change standards over time. As with certification agencies, these standards have tended to converge between jurisdictions over the last decade, with most states adopting regulations similar to those proposed by the federal organic standard setting body, the National Organic Standards Board (NOSB).

Despite the similarities, state legislation does differ considerably, particularly in terms of logistics. The table below groups states in terms of the administrative nature of organic food production legislation.

Breakdown of state organic legislation



Source: PROMAR *International* and Community Alliance with Family Farmers

While state legislatures implemented organic food laws, similar legislation was also passed by the US Congress in 1990. The Organic Food Production Act (OFPA) was developed with the aim of enhancing truth in labeling of organic products, establishing uniform standards across the country and cultivating public trust in the organic label. Although the OFPA was passed in 1990, it is still not operational. The OFPA legislated the creation of a National Organic Program (NOP), which would include organic standards, a national certification process and a system of federal oversight. Apart from a number of minimum requirements set out in the legislation, the OFPA gives the Secretary of Agriculture extensive discretion over the content of the NOP.

Draft rules for the NOP were released by the USDA in December 1997. A number of significant regulations were defined in the draft:

- It suggests that enforcement of the NOP would be conducted by the USDA, not by state government bodies or by certification agencies.
- The draft states that processed products must contain a minimum of 95 percent organic ingredients in order to be labeled "certified organic." Alternatively, products that contain between 50 and 95 percent organic ingredients by weight can only be labeled as "made with certain organic ingredients."
- In line with current certification and state standards, land may not have prohibitive substances applied to it for 3 years prior to the harvesting of organic crops. When applying for certification, growers must demonstrate to inspectors that no prohibited substances have been applied to the land during that period.
- Livestock must be fed organic feed, however, small amounts of non-organic feed may be used if organic inputs are not available. Further, antibiotics may be administered to sick animals, although products from treated animals cannot be labeled organic without a certain (undefined) withdrawal period.

The proposal also addressed, but did not commit to a number of controversial issues. The three main issues the department opened for discussion were the use of genetically modified organisms (GMOs), irradiation and the application of biosolids (sewage sludge) to organic farms. The USDA requested public comment on these issues and any other aspects of the draft by April 30, 1998.

There was an overwhelming response to the proposed NOP. A record reply of over 275,000 comments were received, many of which were encouraged and coordinated by organic lobby groups and trade associations such as Citizens for Health. The majority of responses addressed the three controversial issues presented by USDA for discussion, with most respondents opposing the inclusion of GMOs, sewage sludge and irradiation in organic standards. However, many of the responses also opposed a number of the regulations already defined and specified in the program. The livestock provisions produced many critical comments for being too relaxed. Demands that all feed be 100 percent organic, and that no antibiotics be administered to organic livestock and poultry were among the public responses. The recommendation that USDA handle enforcement also drew fire for being unnecessarily cumbersome.

The large number of comments received forced USDA to make fundamental revisions to the proposed national standards. The inclusion of food grown or processed using biotechnology, irradiation or biosolids was withdrawn. The Department agreed to accept further public comment on the issues of animal confinement, animal medications and termination of certification procedures until December 1998.

It is unclear when the final standards will be announced. Officials with the Agricultural Marketing Service of USDA have indicated that another draft of the national standards will be released by October 1999. After the release of the draft, the OFPA states that a 60-90 day public comment period must be provided, and it will take the AMS at the very minimum 3-6 months to read and integrate comments into the NOP. Once approved by the Secretary of Agriculture, growers and handlers will receive a grace period of at least 18 months before compliance with the NOP is required. This means that the program will not be fully operational at least until October 2001, although it is likely that implementation may take a much longer period of time.

3. SUPPLY SIDE FORCES FOR CHANGE

The economics of organic agriculture

The organic philosophy and the standards which have developed to maintain this philosophy mean that organic production methods or "technologies" differ considerably from conventional agricultural practices. The two areas where organic and conventional crop production practices differ extensively are soil and pest management.

Empirical evidence suggests that these farm management differences have a profound impact on traditional measures of farm performance. The table below summarizes farm outcome results from a number of US comparative farm studies. These surveys suggest that in the majority of cases, yields, revenues, costs and profits decline during the conversion period to organic farming. However, during the post-conversion period, yields and profits may return to levels similar or higher than those experienced prior to the adoption of organic agriculture.

Summary of farm outcomes

Outcome	***Conversion***	***Post-conversion***
Yields	Equivalent or lower	Mixed evidence
Primary crop output	Lower	Lower
Costs	Lower	Lower
Profits	Lower	Mixed evidence

Business or transaction costs are also likely to be different on organic farms. Organic growers face a number of additional direct and indirect costs in the establishment of market exchange relationships:

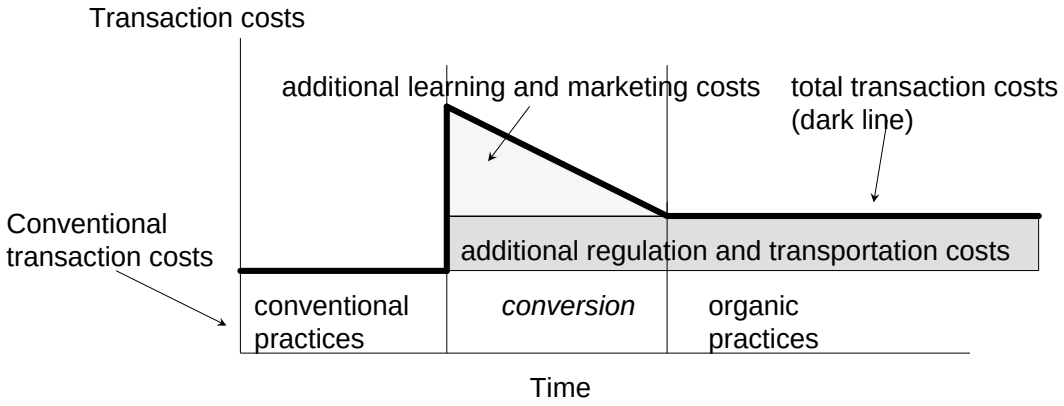
- Organic farmers must contend with the costs associated with certification or compliance with government regulations. In the majority of cases, state organic standards require detailed record keeping on the part of organic growers, which can be time consuming and administratively burdensome. Further, a number of state regulations impose certain compulsory fees on those growers wanting to market their products as organic. Moreover, while not compulsory in most jurisdictions, voluntary certification which is often required for market credibility, can be expensive. For example, California Certified Organic Farmers, one of the higher cost certification organizations, charges growers and processors a non-refundable $175 application fee, an annual administrative fee of about $150 and "member assessments" of half a percent of organic gross sales.

- Organic growers may face additional costs when establishing market relationships. Distribution systems are comparatively unsophisticated and undeveloped in the organic segment, meaning that growers have to employ extensive resources searching for, developing and nurturing input supply and final product marketing channels.

- Those farmers that are involved in the transportation of raw materials to buyers may have to contend with high transport costs because organic farmers may have to move their products to highly dispersed markets in small lots. Distances and quantities notwithstanding, organic growers face additional costs imposed to maintain product identity.

C Organic farmers also incur costs as they learn about organic farming practices. Organic farming is very different from conventional growing and may require many hours of reading and research on the part of the farmer, particularly during conversion.

Transaction costs for a representative organic farm



Productivity growth on organic farms is also likely to differ from that experienced on conventional farms. Improvements or increases in capital are unlikely to have a major impact on output on an organic farm due to the overwhelming importance of rotational cropping, hand weeding and cover crops in organic agriculture. Additions or improvements in farm equipment may have limited impact since these tasks are inherently labor intensive and will take the same amount of time regardless of machinery utilized. Furthermore, by definition organic agriculture involves the outright rejection of other agricultural "capital" such as synthetic pesticides and fertilizers as well as GMOs. Unlike conventional agriculture, organic farms may be unable to benefit substantially from improvements in mainstream crop protection materials and advances in biotechnology in the future.

Economies of scale refers to a situation whereby a firm or industry experiences declining average costs as output increases. That is, the more output that is produced, the less it costs, on average, to produce each unit of output. Economies of scale are likely to be significant in organic agriculture given the prevalence of high fixed costs in the segment, such as high marketing and certification costs.

The supply of organic commodities

The previous discussion assessed how the economics of organic agriculture differs from conventional agriculture. This evaluation provides foundations for an understanding of organic commodity supply. In general, we believe that production changes are a function of three broad factors: farm conversion, farm expansion and farm efficiency.

Farm conversion

What factors influence the grower's conversion decision? The most important considerations influencing a farmer's decision to convert to organic agriculture are financial factors. Profits and returns will be of paramount importance to most if not all farmers. Non-financial factors may also play an important role in the conversion decision. One of the only US studies assessing factors motivating organic growers was conducted in 1987. This study, which consisted of a representative survey of 58 organic growers in the Midwest, found that growers preferred organic farming mainly for non-financial reasons, as illustrated in the table below.

Benefits of organic farming

Most frequently mentioned advantages of organic farming	*Percent of respondents*
Healthier for farmer and family	60
Healthier for livestock	40
Better for environment	37
Better for soil	31
Lower production costs	25
Philosophical - in harmony with nature	19

Source: Lockeretz and Madden, 1987

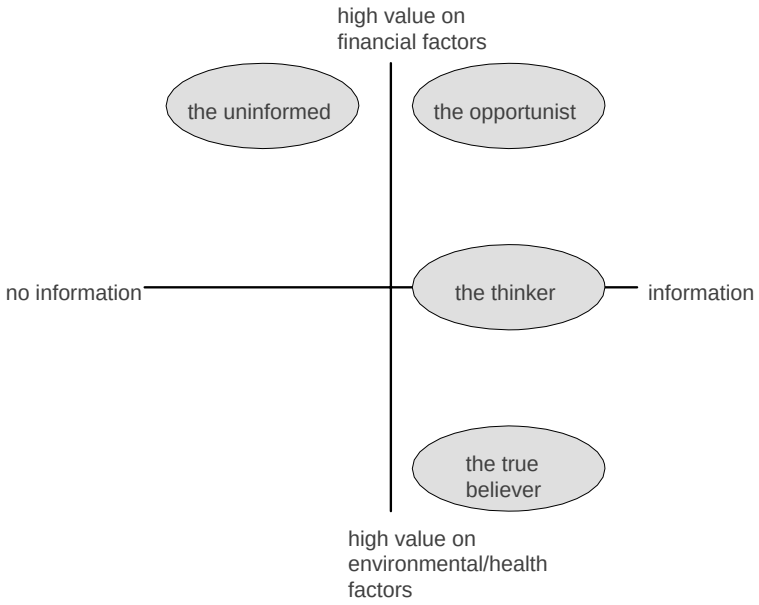
Another important factor which will have a profound effect on the decision to convert to organic agriculture from conventional farming is information. The notion of organic agriculture has to be on the farmer's decision agenda in order to generate some thought on the issue. Those conventional farmers who have only limited information about organic agriculture, possible price premiums, benefits and potential costs are clearly not faced with a decision at all - they cannot convert to something they know little or nothing about. When farmers do have information on organic processes, the quality of that information then becomes an important factor influencing decision making. Research shows that incorrect information has the potential to generate incorrect stereotypes of conservation systems. Finally, the decision making process in organic agriculture is likely to be shaped by different preferences among farmers. The "value" placed on different variables is likely to significantly differ among growers. Some growers will place

greater emphasis on direct financial variables while others may value environmental outcomes.

Clearly, preferences and access to information differ considerably among all farmers across the country. Despite these differences, a number of farmer groups or types share common traits and accordingly behavioral similarities. We have identified four broad farmer types: the "True Believer", the "Opportunist", the "Thinker" and the "Uninformed". Members of each group respond in similar ways to the factors that influence conversion to organic production, while the types themselves stand in sharp contrast to one another.

- The "True Believer" is interested and active in ecological, health and animal rights issues. This type of farmer is committed to organic production because of the perceived health and environmental benefits of agriculture, and places less value on financial rewards or losses.
- The "Opportunist" is interested primarily in the bottom-line. He/she is likely to have been adversely affected by the recent bout of low conventional commodity prices and increasing farm fertilizer and pesticide costs, and is looking for ways to improve profits. Accordingly, the "Opportunist" is attracted to organic agriculture primarily because it has the potential to minimize direct expenditures, even though it may be much more time consuming.
- The "Thinker" takes into consideration all of the benefits and costs of organic agriculture in a balanced, well rounded way. This farmer type is aware of the family labor and management costs of organic farming and incorporates these costs into the decision making process. He/she also places some value on the environmental and health benefits/costs of agriculture. This farmer type has little or no exposure to information on organic farming practices.
- The "Uninformed" is not aware of the potential price premiums, lower costs and external benefits of organic and low-input methods, has no familiarity with organic farming methods and its historical background and is generally unconcerned with the environmental issues surrounding conventional farming practices.

Farmer types categorized by information and preferences



Farm expansion

Thus far, we have evaluated possible changes in acreage and production resulting from an increase in the number of farms under organic production. However, organic acreage and production may increase, even if farm numbers remain constant, if existing organic farmers find it profitable to expand the scale of their organic operations. Organic farm expansion may occur through the acquisition of neighboring farmland, by sourcing from farms on a contractual basis, or by converting property currently under conventional production to organic management. A farmer may choose to expand if a larger farm presents long run economies of scale. Expansion may also occur if an increase in price, a reduction in costs or an improvement in yields makes a larger farm more financially attractive to growers.

Farm efficiency

Even if farm numbers and acreage remain constant, it is possible that organic crop and livestock production may increase through improvements in farm efficiency. Output on a given area of farm land may increase if farmers can enhance crop or livestock yields. Further, efficiency may

increase if farmers are capable of reducing rotational cropping requirements, so that primary crops can be harvested on a larger percentage of the fields. Farm output may also improve if farmers improve the marketing of their organic products. As mentioned, poor organic distribution systems force many farmers to market at least some of their organic output through conventional channels. Improvements in farm efficiency may occur in response to a number of factors such as an increase in price or an exogenous improvement in organic distribution systems.

4. THE NEW ORGANIC ENVIRONMENT

In the preceding discussion we outlined in detail possible forces for change that may influence production of organic commodities. However, we did not discuss the *relative* importance of these variables. What were the most important drivers of change in the past, and what are likely to be the most important in the future?

Understanding the past

Three main factors stand out as the most important drivers of organic acreage and production in the past. *First*, one of the main drivers has been the "True Believer" farmer types who have been driven by their environmental and philosophical commitment. These farms were typically small but the sheer number of "True Believers" meant that they had a profound impact on acreage, production and the organic movement overall. A *second* important variable that has generated substantial increases in organic production is information. The distribution of information relating to the benefits and costs of organic agriculture has increased conversion in the past by alerting unaware farmers and adding organic methods to their decision making agenda. Once informed, farmers, particularly "Opportunist" types, have made the transition if the perceived expected benefits of organic farming were higher than the expected benefit of remaining with conventional practice. The *third* fundamental factor behind rising organic acreage and production is price. Falling conventional commodity prices coupled with increasing demand for organic foods and beverages has generated high price premiums for a number of organic crops and livestock products. These premiums, which have often been over 100 percent, have encouraged conversion and expansion given their positive impact on farm profits.

The main drivers that have shaped acreage have also had a profound impact on farm structure and characteristics. The small average size of organic operations may also be explained, in part, by the predominance of the "True Believer" farmer type in organic agriculture. The philosophical, environmental and community-based concerns of the "True Believer" suggest a propensity towards small-scale farming. It is hard to imagine this farmer type operating a large-scale agri-

business pre-or post-conversion. This proclivity towards smaller farming operations also helps explain the disproportionate share of organic farms involved with produce (fruits and vegetables production). A majority of "start-ups" were attracted to fruit and vegetable cultivation because these commodities lend themselves to relatively small-scale production, compared to corn, wheat or soybeans. The geography of organic farming is also a function of the high proportion of "True Believers", and their attraction to fruit and vegetable production. The location of the majority of organic farms in the Pacific Coast states, the Great Lakes area and to a lesser extent Texas and Florida is not surprising given that these regions are the largest fruit and vegetable production locations in the country.

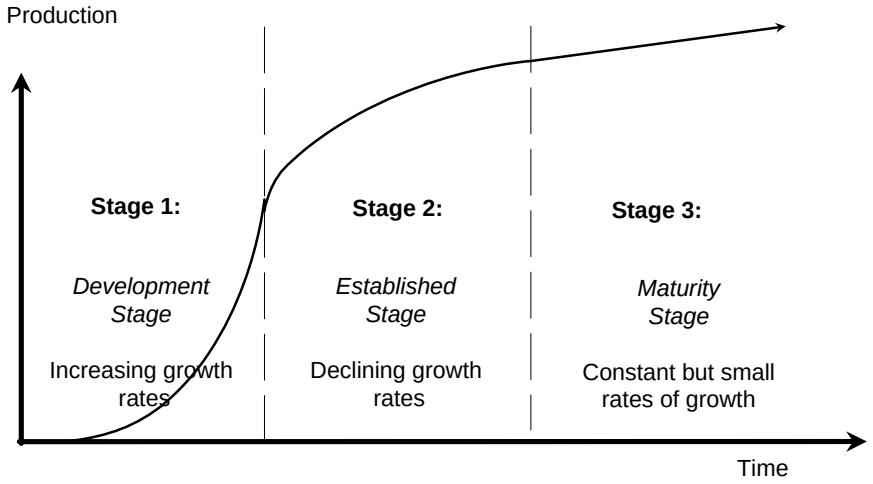
The organic agricultural segment to 2010

What forces are likely to drive organic acreage and production growth in the future? Analysis suggests that three main forces will be influential:

- *Economies of scale* - As existing organic farms mature and obtain access to financial and human resources, the size of operations are likely to expand through acquisition of neighboring land or lease agreements with other farmers. Furthermore, it may be in the interests of large-scale conventional farms to make the transition to organic management especially if they can extend existing scale economies to organic agriculture.
- *National Organic Program* - We believe that the implementation of the Organic Foods Production Act will generate a substantial increase in organic acreage and production. This is because the OFPA will lead to the widespread dispersion of information pertaining to the benefits of organic farming, thereby encouraging conversion among the "Uninformed." Improved consumer confidence, reduced certification costs and greater quality assurance may also have a positive effect on organic supply.
- *Marketing efficiency* - Poor distribution systems have meant that many growers cannot sell all of their organic commodities through specialized channels. We expect that the distribution system will improve, meaning that more organic products will be sold even if acreage remains constant. Improvements in marketing channels should occur as geographical dispersion narrows and intermediary institutions become more established.

These three main drivers of change stand in contrast to the main forces for change that have operated in the past: price, information and environmental benefits. In the same way that the influence of the past drivers has diminished over time, it is likely that the main drivers of change in the future will also face inherent limitations. That is, at some time or another in the future, the rate of growth of organic acreage and supply is bound to decline. Information dispersion, marketing efficiency and economies of scale are all bound to reach "saturation point." Firms will not expand beyond lowest average cost, and at some point in the future all organically produced commodities will be marketed as organic and all farmers will have organic farming on their decision making agendas. This is illustrated in the graph below.

Organic commodity supply cycle



We believe that the organic segment is currently operating in the *transition period* between Stage 1 and Stage 2. Development stage factors which have previously been driving the market are reaching or have reached their "speed limits." Alternatively, forces associated with the established stage, such as economies of scale and distribution efficiency, are beginning to play a more prominent role. While production growth is likely to remain high in the short term, it is possible that growth rates will begin to decline as the segment moves further into stage 2 sometime next decade. On the basis of this model, PROMAR *International* estimates that between **5.5 and 6.5 million acres** of US land will be dedicated to organic production in the year 2010. Even if the rate of acreage growth does begin to decline in the next decade, organic production should still remain strong and will constitute a much larger proportion of overall US farmland in 2010 than it does today.

These main drivers of change are also likely to have a profound impact on farm structure in the future. The reduction in the growth of the "True Believers" combined with increased economies of scale will generate an increase in the size of organic farming operations. The diminished importance of the "True Believer" will also significantly affect the commodities grown by organic farmers. While fruit and vegetable acreage and production will continue to increase, the relative share of the acreage accounted for by produce crops is likely to decline. Alternatively, a greater proportion of organic acreage will be dedicated to the production of grain and oilseed commodities. High price premiums are likely to persist in this sector as branded food manufacturers introduce new organic grain-based product lines.

At least three broad future trends pertaining to the structure of the agricultural value chain can be outlined. *First*, there will be a dramatic increase in demand for off-farm organic inputs, such as bio-pesticides and fertilizers. This will be fueled by the growth of larger organic farmers, who are less driven by ideology and more driven by profit. *Second*, the relative importance of direct marketing channels, such as roadside stands and farmers markets, is likely to decline in the future. The proportionate decline in the importance of small-scale fruit and vegetable producers, who are the main supporters of this marketing channel, and improvements in produce marketing efficiency should drive this trend. *Third*, the growth of the organic segment should also encourage the development of organic first processors. Low turnover and high costs have discouraged the entry of processing institutions dedicated exclusively to organic commodities. This is likely to reverse in the future when certain commodity volumes are reached.

Meeting organic demand - brand examples

In Volume 2: *New Markets, New Consumers*, we looked at a number of hypothetical organic line extensions of popular conventional food brands and determined the ingredients (in pounds) that would be required if 10 percent of the products current sales were converted to organic. Here we take these pound weights and calculate the amount of organic acreage that will be necessary to meet these ingredient demands. We evaluate line extensions for five popular products, including Kellogg's Corn Flakes and Borden pasta.

Our analysis of a 10 percent organic Corn Flakes line extension found that 2,050 acres of corn and just 36 acres of organic sugarcane would be required. While this corn acreage requirement is small by conventional standards, it actually accounts for about 5 percent of current organic corn acreage and possibly well over 20 percent of organic food corn acreage. Accordingly, finding organic corn producers to develop contracts with may become a problem should other manufacturers be sourcing organic corn simultaneously.

Sourcing ingredients for a national pasta line extension would be even more difficult. In our example, the required volume of semolina, which is processed from durum wheat, would have to be supported by 32,000 acres of organic wheat to produce a line with sales equivalent to 10 percent of Borden sales. Moreover, Borden would have to contract for the output from over 20 percent of current organic wheat farmland, which would be extremely challenging, at least in the short-term. By extension, any company contemplating a large-scale move into organics would have to implement a long-term strategic sourcing plan to be successful.

5. STRATEGIES IMPERATIVES

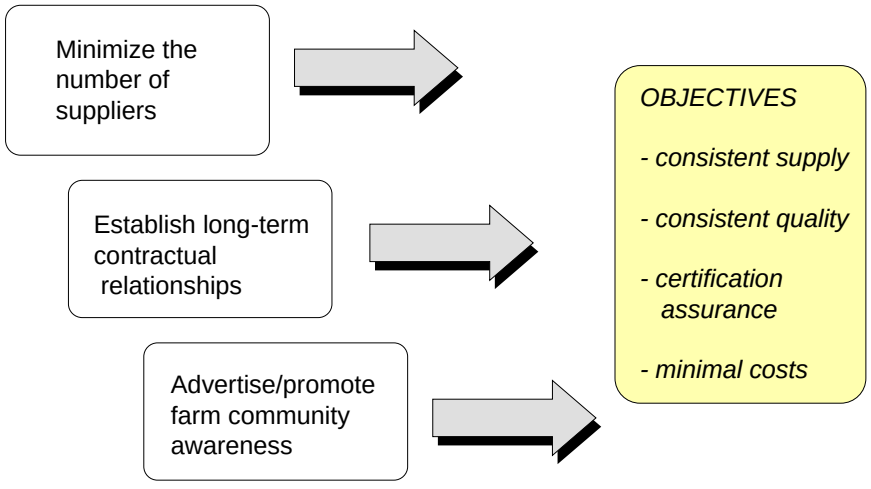
Strategies for organic food and beverage manufacturers, first processors and wholesalers

Buyers have four main objectives when it comes to the purchase of organic farm products:

- consistent supply;
- consistent quality of that supply;
- certification assurance; and
- lowest possible costs.

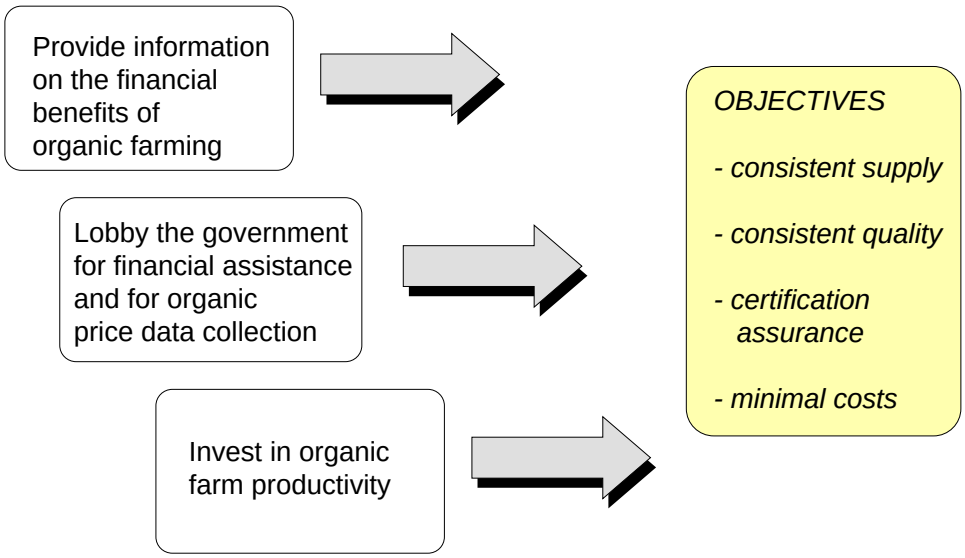
What strategies can organic food manufacturers, processors and brokers implement in order to meet these supply side objectives? We believe that companies should pursue both micro and macro strategies. Micro strategies only assist the individual company in achieving its goals and objectives. Our analysis of the organic food segment has revealed three main micro supply strategies. Buyers should attempt to minimize the number of suppliers; develop and nurture long-term contractual relationships; and actively promote their role as an important buyer of organic commodities within the organic agricultural community.

Micro strategies for organic commodity buyers



Macro strategies are those that improve the position of both the individual company and the other players in the segment. We believe that three main macro strategies should also be pursued. First, buyers interested in increasing the supply and quality of organic raw materials may find it in their long-term interests to fund awareness campaigns, either individually or in collaboration with organic lobby groups or environmental bodies. Second, manufacturers and processors may find it beneficial to lobby government for organic farm subsidies and improvements in pricing transparency. Third, companies investing in organic foods should promote research on organic techniques so that yields on farms may be enhanced, or simply help in the education of organic farmers so that they are producing at optimal productivity levels.

Macro strategies for organic food manufacturers, first processors and commodity brokers

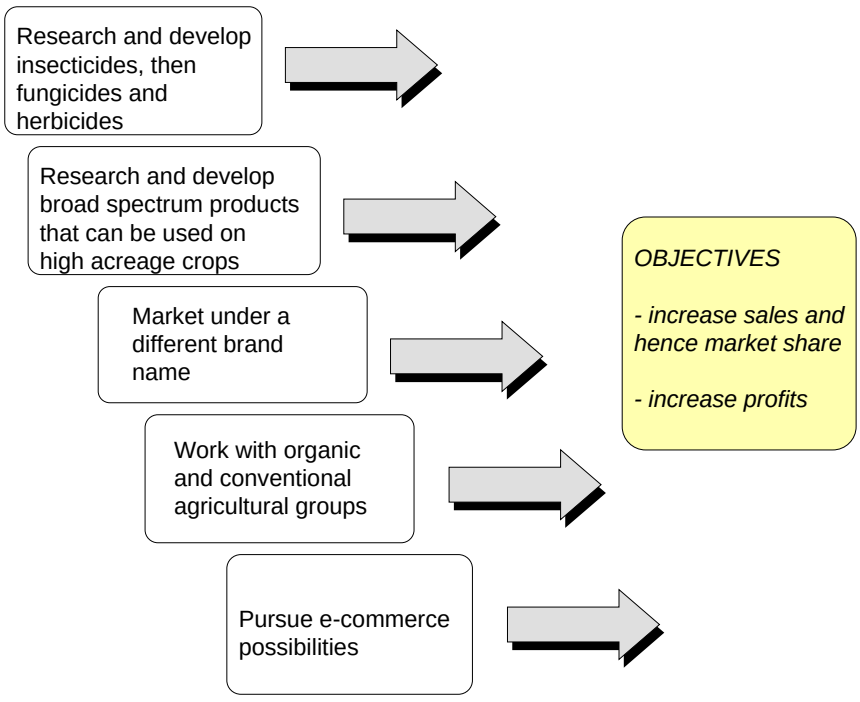


Strategies for crop protection manufacturers

The US crop protection market is currently facing a number of challenges. Players must meet competition from generic producers as products come off patent. Companies are having to contend with the effects of current and possible EPA pesticide prohibitions under the Food Quality Protection Act. Further, biotechnology is having a profound impact on the market. Genetic engineering of crops has produced pest resistant varieties that are reducing the need for traditional pesticides. Does the organic agriculture market offer a viable opportunity for crop protection companies? Organic agriculture may be an important niche market opportunity given that acreage will continue to grow over the next decade, and because organic agriculture offers unique and comparatively untapped patent opportunities.

If crop protection companies decide to enter the organic and natural input supply market a number of strategies can be pursued. These companies should focus on the research and development of broad spectrum insecticides and fungicides, should market their products under a different brand name and should pursue e-commerce opportunities.

Strategies for crop protection manufacturers

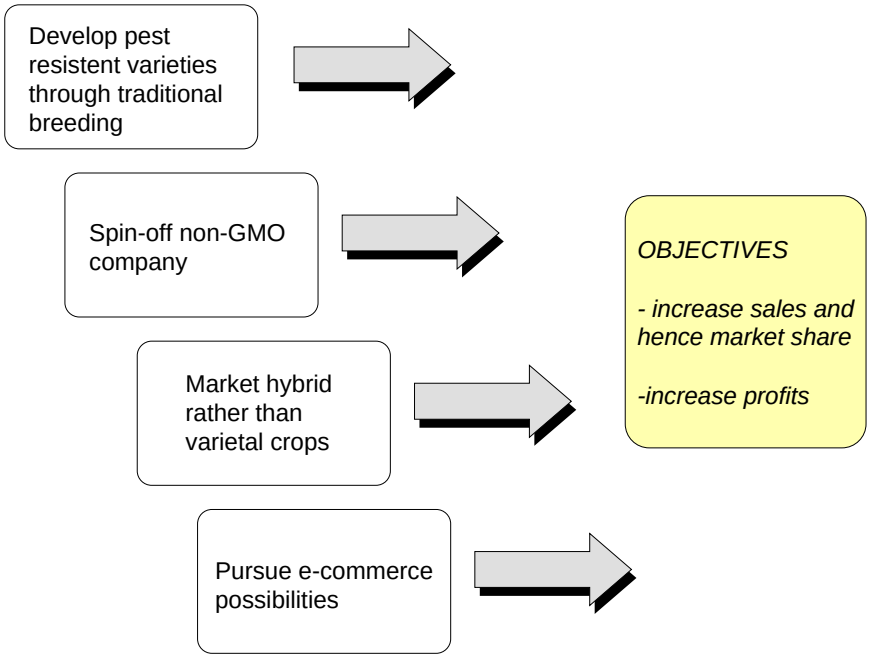


Strategies for seed producers

The opportunities for traditional seed manufacturers in the organic segment are not as clear cut as they are for pesticide and fertilizer input producers. This is primarily because the market is not particularly well defined. Organic legislation and regulations do not require the use of organically grown seed. Growers may use untreated non-GMO seed if organic seed is not available, and may even plant treated non-GMO seed in some jurisdictions. Accordingly, even if seed manufacturers develop and manufacture certified organic seed products, there is no guarantee that farmers will purchase, let alone pay a premium.

Nevertheless, a number of organic market strategies may be pursued which have the potential to increase sales. Seed companies should research and develop non-GMO varieties that can withstand common organic farm pests, market hybrid varieties in order to ensure repeat sales and should also pursue Internet retailing and the development of a spin-off company or brand name.

Strategies for seed producers



Strategies for retailers

The limited regulation and low risk associated with bio-pesticides, fertilizers and seeds means that there exists great potential for direct distribution by manufacturers and producers of organic farm inputs. However, despite this e-commerce potential, we believe that retailers have much to gain from the organic farm industry. Conventional agricultural retailers and cooperatives such as United Agri Products (UAP) and Farmland Industries, to our knowledge, should move into the distribution and retailing of organic and environmentally friendly materials. Retailers still have opportunities to increase sales and enhance market share in this segment, even if direct distribution channels do eventually play an important role.

Should retailers decide to move into this area, they should concentrate on attracting business through the provision of important services to organic growers. Retailers should become a one-stop shop for organic inputs and equipment, should offer consulting, crop scouting and educational services and should offer tie-in input application and precision agriculture services.

Strategies for retailers