

# Food Self-Sufficiency in the New England States, 1975–1997

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## OVERVIEW

This paper examines the extent to which the primary food production sectors of New England's agricultural economy have been able to satisfy the demands of an increasing consumer population. The major food categories produced in New England in 1997 were "meat," "dairy," "poultry," "eggs," "vegetables," "fruits," and "seafood and aquaculture." Comparing consumers' expenditures to the value of food produced in each category provides a relative measure of New England's self-sufficiency in that category: that is, the proportion of consumer demand that is met by regional production. Calculations of self-sufficiency are provided for 1975 and 1997. By comparing data for the two years, we can determine which categories demonstrated growth and which categories experienced losses in their ability to meet changing consumer needs. Our study indicates that the levels of self-sufficiency for several of the major food categories grew significantly over the years, although it is important to acknowledge that increasing self-sufficiency in all categories may not have been possible nor even desirable. In any case, regional food production has continued to improve, implying that the outlook for future growth is quite promising.

### ***Historical Background***

For Colonial farmers, quickly attaining an adequate level of food self-sufficiency was an important goal. When the colonists landed in New England, they found cleared farmland cultivated by southern New England Indians, who hunted, fished, and grew crops such as corn, beans, and squash. In time, Colonial farmers secured their food supply by successfully growing indigenous crops to meet their dietary needs for survival, supplemented by hunting and fishing. Later, they prospered by trading their surplus crops to fur traders from other regions so as to have a commodity to trade to European buyers. Through intercontinental trading, the colonists moved beyond subsistence farming on a simple but adequate level to the more complex level of trading for the acquisition of goods they could not readily produce for themselves. In short, the Colonial farmers reached an optimal level of self-sufficiency by having the means to meet their food needs on a modest scale. They also engaged in agricultural export, the first instance of commercial agriculture in New England.

Over the next two and a half centuries, newcomers from Europe continued to settle in New England, clearing the land of stones and rocks so they could cultivate the soil. Numerous surviving stone walls that bordered farm fields testify to the hard work of these New England farmers. In their determination to prosper, they developed the now familiar virtues of Yankee perseverance and ingenuity. When farmers eventually turned to dairy, horticulture, and specialty crops, they were able to satisfy growing markets for the fresh, perishable foods and ornamental plants demanded by a rapidly growing population.

### ***Today's Farmers and Consumers***

Farmers in New England today have inherited an agricultural legacy with roots tracing back to Colonial times. Even as the populations of the New England states burgeoned at the end of the

twentieth century, consumers continued to cherish their agricultural heritage by putting a high value on local agriculture. There appears to have been a resurgence of interest among consumers in local agriculture, which they support with their dollars. Farmers, some of whom are eighth-generation descendants of the original Colonial farmers, have persisted in growing crops and raising livestock to respond to increased demands for local foods and goods. While public interest in New England agriculture has remained strong, some important questions must be considered: Has agricultural production in New England lost ground over time, as many people assume? Has it only stayed constant? Or, has agriculture in New England actually gained ground overall? The results below provide some evidence with which we can address these questions.

### ***Today's Healthy Agricultural Economy***

The myth that New England is gradually, but inevitably, losing its agricultural base has been dispelled in part by findings published in a recent article by Holm, Lass and Rogers. In that article, the authors report that agriculture in New England is certainly not failing. In fact, their analysis reveals that agriculture in Massachusetts is actually a rather healthy industry, growing in many categories and falling behind in only a few. Just as past generations of farmers were motivated by their opportunities for a better life, today's farmers, who look to the soil for a way to make a living in New England, are inspired by the promise of the future.

### **The Quest for Self-Sufficiency**

Establishing and maintaining a high level of food self-sufficiency can enhance ongoing economic viability. On the national level, high levels of food production help ensure the security and safety of the food supply for all citizens of the country. At the state level, high levels of food self-sufficiency provide protection against catastrophic natural disasters, such as earthquakes, floods, or plant diseases, in other regions or disruptions in the interstate transportation system. On the community level, high levels of local food self-sufficiency evoke a spirit of rugged individualism that appeals to many New England consumers. Indicators of this appeal include successful niche markets for specialty products such as free-range eggs, organic turkeys, and locally produced and processed milk.

Even though high levels of food self-sufficiency represent security and independence, a goal of reaching the highest possible levels of self-sufficiency would be too costly if it necessitated the loss of consumer gains provided by open trade. Through inter-regional trade, consumers benefit from lower prices resulting from the application of the principles of absolute advantage and comparative advantage.

### ***Absolute and Comparative Advantage***

As in Colonial times, today's farmers continue to strive for the highest possible levels of food production in a diverse number of categories to meet consumer demands. However, state and regional economies also rely on the export and import of certain foods and goods to make up the difference between high levels of production in some food categories and low, or nonexistent, levels in others. Absolute advantage means that a particular region can produce

certain foods and goods at a lower cost than can another region. This cost advantage is due to factors such as regional climate, indigenous natural resources, or the existence of an established specialized labor force. Comparative advantage comes about because of differing opportunity costs—the amounts of goods or services that could be produced instead of current products. A region has a comparative advantage in producing foods and goods for which it has to give up little (in terms of other foods and goods that it could otherwise be producing) compared to the price that it receives from exporting the products. For example, the Northeast has the advantage of soil and weather favorable to the production of both wheat and vegetables. If the potential economic value of vegetables is greater than that of wheat, the farmer will produce vegetables. To produce vegetables, the farmer forgoes the value that could have been received by producing wheat. It makes better economic sense for the Northeast to import wheat from outside regions, for which the opportunity cost of growing wheat is lower, than to grow wheat at a higher opportunity cost in New England. Otherwise, subsidies financed by tax dollars would have to be implemented as a financial incentive for farmers to overcome the higher opportunity cost of growing crops for which the Northeast does not have a comparative advantage. In this case, due to its comparative disadvantage, such a subsidy would result in losses for both farmers and consumers.

### ***The Advantages of Trade***

In addition to the benefits of absolute advantage and comparative advantage, economists also look to the gains offered by specialization and trade. If farmers in New England realize they are better off specializing in those foods and products offering a comparative advantage, they will produce a surplus of those foods and products, which can be traded for the many other goods and services that consumers demand. Cranberries, for example, provide a comparative advantage in Massachusetts. A surplus of cranberries is produced and exported to other regions. Falling prices for these exports in the competitive open market have inspired the creation of new products, such as dried cranberries for snacking and baking. Ultimately, fresh cranberries and cranberry products are traded for imported foods and goods such as oranges, bananas, and tea.

Today's consumers expect to be able to choose among the vast variety of foods and products available through inter-regional and global trade. For instance, because so many consumers now want fresh strawberries all year round, not just in season, fresh strawberries are flown in from Chile in January. A foreign country in the Southern Hemisphere such as Chile has absolute and comparative advantage for fresh strawberries during the New England winter. However, in the summer, consumers in New England are enticed by locally grown, deep red, ripe, fragrant strawberries, prefer them to imported, half-white, comparatively tasteless strawberries, and are willing to pay a premium for the higher-quality product. Specialization and trade guarantee today's consumers a wide selection of both local and imported foods and products throughout the year. In this way, consumers have the satisfaction of choosing those foods and products they deem to be the most desirable at the time of purchase.

### ***The Purpose of a New Self-Sufficiency Study***

Having recognized that specialization and trade are essential for consumer satisfaction, let us consider the value provided by an accurate assessment of New England's current levels of self-sufficiency. With accurate, quantified information, agricultural advocates and policymakers can gain insights into how well the agricultural sector is performing in New England today. By contrasting data describing the state of the agricultural sector in 1997 and in 1975, they can clearly comprehend how much the agricultural economy has changed over the last two decades. Data on the present, the past, and changes from past to present provide evidence that can guide advocates and policymakers in public policy debates concerning future land use and development.

### ***The Purpose of the 1975 Self-Sufficiency Study***

Concerns over regional food self-sufficiency in the New England states inspired Henry Bahn, Extension Specialist in Farm Management, and Robert Christensen, Professor, Department of Food and Resource Economics, University of Massachusetts, Amherst, to conduct their analytical study of regional food production and consumption in 1975, utilizing aggregate analysis of the major food categories. Their results revealed the quantity of food consumed in each of the major commodity groups in the New England states, the total cash receipts of farmers from each group in each state, the retail value of farm production in each group, and the percentage of consumption within each commodity group supplied by the farmers of each state. The study determined how much of the total consumer demand for each food category was met by New England agricultural production. It indicated that New England's major food assets in 1975 were "seafood," "dairy," "poultry and eggs," and selected fruits and vegetables. The region's minor assets were "meat" and "all other products."

### ***Updates Since 1975***

Since 1975, population levels have risen in all New England states (Table 1). This paper considers whether farm production has been able to keep pace with the increased demands of New England's greater population or whether the New England states have become greater net importers of food. The release of the 1997 Census of Agriculture made it possible to update the 1975 report to determine how well the New England states have fared since that time. This study uses the same approach as Bahn and Christensen's 1975 study to ensure that the two are comparable. Data from government sources are used to calculate levels of food production self-sufficiency for each state and the region. In addition to having aggregated national food consumption data, today's researchers have access to detailed consumption expenditures on a per household basis, along with the number of households for each state. Consumption expenditure data are now also available on a regional basis, allowing for an accounting of regional variations. It is now possible to report some information in a less aggregated format; for example, the values of "poultry and eggs" and the values of "fruits and vegetables" are no longer reported as two aggregated food groups, but instead as four separate food groups. Finally, the value of sales by farms directly to consumers is available, thereby allowing this amount to be excluded from the farm-to-retail adjustments.

In this study, total consumer retail food expenditures for each state were estimated based on the number of households and expenditures per household for each of ten different food groups. Farm gate receipts for agricultural products and dock prices for commercial landings of seafood were adjusted to retail value using farm–retail price spreads. Comparing the total retail value of receipts to the estimated consumer expenditures for a food category provides an informative estimate of overall food production self-sufficiency for that food category in New England. Aggregating individual food category results provides a general summary of New England food self-sufficiency.

### ***Retail Food Expenditures***

Household food expenditures in the Northeast, along with the number of households in each state, were used to estimate each New England state's total food expenditures.<sup>1</sup> Data are available for food consumed at home and away from home (Table 2). Total food consumption expenditure per household includes both categories, but only food consumed at home is broken down into food categories. The relative shares of expenditures for different food categories were assumed to be the same for consumption at home and away from home, and the relative shares of at-home household expenditures were used to allocate the value of food consumed away from home to the different food categories (Table 2).

The food categories considered relevant to New England producers include “meat,” “dairy,” “poultry,” “eggs,” “vegetables,” “fruit,” and “fish and seafood.” Consumers spent a smaller portion of their overall food expenditures on these categories in 1997 (56 percent – see Table 3) than they did in 1975, when they spent 73 percent on these items. A much greater proportion of the consumer's dollar is now being spent on “bakery and cereal products” and “miscellaneous food items” than was spent in 1975. Multiplying individual household consumption by the number of households results in an estimate of overall consumption in each New England state (Table 3).

### ***Food Production***

The U.S. Department of Agriculture collects information on the value of farm products sold and on the retail value of final food sales to the consumer, and calculates a farm–retail price spread. The farm–retail price spread is an estimate of the difference between the farm gate price and the final cost to the consumer. It is expressed as the farm value percentage of the final consumer expenditure. A similar measure can be estimated for “fish and seafood” using U.S. Department of Commerce data on commercial landings of fish and seafood and their final retail sales. A price spread for fish and seafood can be calculated by dividing the dockside value by the final retail value.

Cash receipts for primary marketing of each food category relevant to New England producers are given in Table 4. Massachusetts producers (farmers and fishermen) account for \$541

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**1. Data on food expenditure per household are survey results. These surveys are conducted in several regions across the country including the Northeast. They are not available for New England.**

million of New England's total food production, about 26 percent. This is second only to Maine's \$656 million, about 32 percent of New England's total production. Table 5 presents estimates of farm-retail price spreads, or the portions of consumer dollars that producers receive. These national data are used to estimate the retail values for each of the food categories important to New England producers. Multiplying producers' cash receipts (Table 4) by the U.S. ratio of retail value to farm value (Table 5) results in estimates of final consumer retail values for the food produced in New England states (Table 6).

The percentage of consumer dollars going to farmers is now lower than it was in 1975. This finding is consistent with data from the Economic Research Service, which show that the overall farm value component of consumer expenditure has declined from 33 percent for all foods in 1975 to 21 percent in 1997. This means that a smaller portion of the consumer's dollar goes to the farmer and a larger portion goes to cover costs within the food processing, transportation, and retailing sectors.

### Today's Assessment of Self-Sufficiency

Consumer expenditure data from Table 3 and estimated retail values of production from Table 6 are presented in Table 7, along with the resulting net surplus or deficit. This is an indication of agricultural self-sufficiency in only a narrow accounting sense because each state has its own area of specialization and seasonality, with trade providing the diversity of agricultural products demanded by consumers. New England produces a surplus of "seafood and aquaculture" products. New England produces less than it consumes for all other food groups, although 92.5 percent of the eggs consumed in New England are produced there. With the exception of New Hampshire, each state produces at least one product in surplus. Individual states are discussed in more detail below.

Table 8 presents the self-sufficiency values from Table 7 grouped in the same categories used by Bahn and Christensen in 1975 so that comparisons can be made. In New England, improvements in self-sufficiency have occurred in all food categories except poultry and eggs.

Tables 9 and 10 allow two additional comparisons of self-sufficiency. Table 9 presents self-sufficiency results for an aggregation of the seven food categories that are important to New England producers: "meat," "dairy," "poultry," "eggs," "vegetables," "fruits," and "seafood and aquaculture." In Table 10, we also include the two additional food groups that are not commonly produced in New England: "bakery and cereals" and "miscellaneous food products." Because New England states have very little grain production, the aggregate measures of self-sufficiency decline significantly when this is done, as can be seen by comparing Tables 9 and 10.

### **Massachusetts**

Massachusetts produces a surplus only in "seafood and aquaculture." Massachusetts producers provide only about 1 percent of meat and poultry purchases in the state. Levels of self-sufficiency in egg (11.2 percent) and dairy (14.6 percent) production are also quite low. Massachusetts producers provide about 33 percent of the vegetables and 65 percent of the fruit

consumed in the state. Comparing 1997 to 1975 shows that moderate declines in self-sufficiency have occurred in meat and dairy. The most significant decrease occurred in “poultry and eggs.” The greatest improvement in self-sufficiency occurred in “vegetables and fruit.” Massachusetts’s self-sufficiency in “seafood and aquaculture” improved just slightly. These findings suggest that food production has been preserved and even enhanced in some sectors in Massachusetts. These findings are even more impressive when one considers that agriculture has expanded greatly in the greenhouse and nursery industries. These crops, and tobacco as well, are not included in the food self-sufficiency figures presented here. Overall, in products important to Massachusetts producers, the level of self-sufficiency improved from about 19 percent in 1975 to nearly 32 percent in 1997. When “bakery and cereals” and “miscellaneous food products” are included, Massachusetts’s overall levels of self-sufficiency increased from about 14 percent in 1975 to nearly 18 percent in 1997.

### ***Maine and Vermont***

Maine produces surpluses of “seafood and aquaculture,” “vegetables,” “eggs,” and “dairy.” As in 1975, Maine and Vermont had sizable net surpluses in 1997 in the food groups considered important to New England producers. While Bahn and Christensen found surpluses in “dairy,” “poultry and eggs,” “vegetables and fruits,” and “seafood” for Maine in 1975, the current study, with its separate “poultry,” “eggs,” “vegetables,” and “fruits” categories, found that “poultry” and “fruit” are no longer in surplus. In fact, Maine is only 8 percent self-sufficient in raising poultry. Conversely, it is faring well in fruit production, with 91 percent self-sufficiency. Maine’s high ranking in this analysis, with 174 percent overall self-sufficiency for food groups important to the state’s producers (Table 9), is consistent with Bahn and Christensen’s estimate of 166 percent, and, as they mentioned, is due not only to Maine’s low population but also to its specialized surplus production in potatoes, eggs, and seafood. The excess is high enough to cover nearly the entire value of Maine’s food needs (Table 10)—reaching 98 percent of need, although down somewhat from the 1975 level of 121 percent.

Vermont’s surplus is due to its excess production of dairy products in relation to its relatively small population. The value of Vermont food production is high enough to provide for a surplus above its total food consumption needs (Table 10). Vermont was the only New England state in 1997 that was a net exporter of food products. This 111 percent of food self-sufficiency measure is down slightly from the 1975 level of 122 percent.

### ***New Hampshire, Rhode Island and Connecticut***

Aggregate self-sufficiency for the food groups important to New England producers has improved since 1975 for all states except New Hampshire. New Hampshire has experienced continued rapid population growth, with a 42 percent increase between 1975 through 1997. This increased consumer demand has resulted in a loss of self-sufficiency in New Hampshire. On the other hand, Rhode Island has experienced improvements in self-sufficiency, having been bolstered by increased production of fish and seafood products from both commercial landings and expanded aquaculture. Connecticut has had a relatively small increase in self-sufficiency for the aggregated food groups considered (21 percent in 1997 versus 18 percent in



1975), but no increase in overall food self-sufficiency (12 percent in 1997 versus 13 percent in 1975).

### **Summary**

All states, except New Hampshire, showed gains in overall self-sufficiency for their important agricultural crops. When measures of overall self-sufficiency included the final two food categories, "bakery and cereals" and "miscellaneous foods," some states actually showed a decline in overall food self-sufficiency. This phenomenon is reflected in the New England regional self-sufficiency measure of 50 percent in 1997 versus 38 percent in 1975 for food categories important to New England producers as contrasted with 28 percent in both 1997 and 1975 for overall self-sufficiency when the final two food groups are included. While the value of New England farm production has increased since 1975, a larger percentage of consumer expenditure is going to "bakery and cereal products" and "miscellaneous food products."

### **Discussion**

The need to increase levels of food self-sufficiency has been used as an argument in various public policy contexts: as a justification for farmland preservation, farm market expansion and development, and assistance to specific agricultural industries or commodity groups. Although Christensen believes, rightly so, that complete, or nearly complete, self-sufficiency is not feasible for practical reasons, New England farmers have a comparative advantage in producing certain commodity groups. <sup>2</sup> OK? is this what's meant?!. By focusing analysis and policy on the specific production areas where their states have a comparative advantage, policymakers can ensure that local agriculture is sustained.<sup>2</sup>

An argument can be made that open space should be preserved because an aesthetically pleasing pastoral landscape attracts tourists, and their dollars, to the region. This point of view makes the claim that tourists from metropolitan areas want to experience the diverse landscapes of beautiful rural areas. They are therefore willing to have tax dollars designated for the preservation of open areas. These expenditures ensure that tourists will continue to have desirable vacation destinations in which to spend their money. In short, the preservation of open land, and particularly farmland, in rural areas may return benefits to the regional economy by providing a satisfying experience to visitors.

Policymakers should envision economic development as a goal with increased food self-sufficiency as an outcome rather than focusing on only food self-sufficiency as a primary goal. Judy Green, Director of the Farming Alternatives Project at Cornell University, has described agricultural development goals as economic (creating an increase in economic security), environmental (protecting and enhancing ecological systems), and social (strengthening community capacity). She suggests the following contrasts between the old agricultural production model and a new agricultural development model:

- Global competition versus regional connections

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2. Personal communication with Robert Christensen, May 26, 1999.

- Increased yield and volume of production versus added value and increase of market share
- Production at lowest cost versus market agriculture's multiple benefits
- Adoption of technical and scientific solutions to problems versus relying on institutional and individual problem solving

There are many valid reasons to support local economic development. In general, the arguments for local production for local consumption include the economic multiplier effect and spin-off of economic activity; increased tax receipts for the public sector, resulting in increased money for community development, schools, and preservation of the environment; less vulnerability to outside events inasmuch as a diversified local economy is not as negatively affected by catastrophes such as the collapse of the economy elsewhere; and the fact that local ownership removes the corporate threat of an industry's relocation, thereby resulting in an acceptance of improved environmental and labor standards.

By definition, self-sufficiency connotes a trade-off of more local production and less trade with other areas, resulting in an overall reduction in total goods and services consumed. Economists should provide direction so that development policies will balance the benefits of specialization and trade with the costs of preserving the natural environment and having a limited diversity of economic activity. Fortunately, Massachusetts has done reasonably well as it retains a link to its agrarian past without sacrificing gains from trade. Since complete, or nearly complete, self-sufficiency is not practical or even feasible without sacrificing the variety of foods and products consumers now enjoy, policymakers should continue to promote trade, assist New England farmers in finding the most profitable operations, and engage in the public policy debate by promoting the value of open space and other amenities that are difficult for farmers to capture in the price of their products.

## Conclusion

While it is true that New England still depends on outside regions for most of its food supplies, the fact that New England food producers have consistently met consumer demand for regional foods and products is very encouraging. The notable success of a number of food commodities bodes well for the future in the quest to improve farm financial situations and increase food self-sufficiency in New England. By estimating self-sufficiency measures, economic analysts can continue to assess growth in the agricultural economy. Having the benefit of periodic assessments of how our agricultural sectors are doing, agricultural policymakers will be better able to recommend policies that will enhance producers' economic competitiveness in the marketplace

Effective policies that support farming are vitally important. Agriculture has made important contributions to the quality of life in New England since Colonial times. As in the past, a healthy agricultural economy over the coming decades will contribute significantly to the vitality of the overall economy in New England.

The data provided by an analysis of aggregate self-sufficiency measures indicate that the agricultural economy is healthy. Regional food production has consistently kept pace with increased consumer demand for the New England region as a whole, with an overall self-sufficiency in 1997 matching that of 1975 at 28 percent. But the region has made improvements in those food products important to New England producers. The news that New England producers continue to be economically viable is gratifying for the general public as well as for advocates of agricultural development and reform.

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