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MP694: Sunrise Agriculture in the Northeast: Foundations of a Sustainable Agriculture for the Twenty-First Century: Proceedings of an International Conference

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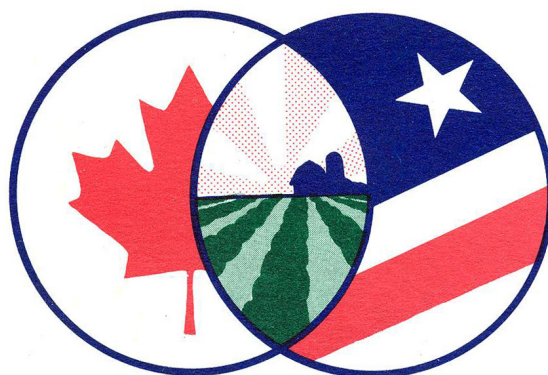
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**SUNRISE AGRICULTURE
IN THE NORTHEAST:
FOUNDATIONS OF A SUSTAINABLE AGRICULTURE
FOR THE TWENTY-FIRST CENTURY**

**PROCEEDINGS OF AN INTERNATIONAL
CONFERENCE**

**DAVID VAIL
EDITOR**



**SUNRISE
AGRICULTURE**

**MAINE AGRICULTURAL EXPERIMENT STATION
UNIVERSITY OF MAINE
ORONO, MAINE
04469**

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INTRODUCTION: A NEW SUNRISE ON THE HORIZON?

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The Sunrise Conference planning group, composed of nine Maine residents, has been motivated by three convictions. First, we share a degree of doubt about the long term sustainability of Northeast agriculture, if it remains heavily dependent upon the commodity systems, production methods and market structures that have predominated in the region since World War II. Second, we perceive that farm policy makers are largely preoccupied with the immediate problems facing dominant commodity systems, like dairy, poultry and potatoes. As a result, a relatively small proportion of public resources is available for research and development directed at new farm commodities, innovative production techniques and marketing strategies that may hold great promise for sustaining the region's agriculture into the Twenty-first Century. Third, each of us is aware of exciting and successful commercial farm experiments with such new (in fact, sometimes very old) commodities, techniques and strategies. The optimists among us believe these are the first rays of a new sunrise for Northeast agriculture.

A central purpose in organizing the conference was to test this "sunrise" hypothesis by tapping into the knowledge and experience of "doers", analysts and policy makers from the New England states and Eastern Canadian provinces. Our not-very-hidden agenda was to bring together people who tend to work in relative isolation from each other - at their farms, experiment stations and government offices - in separate political jurisdictions. The point was to see if we share enough common ground to warrant a greater cooperative effort in the future.

Over one hundred participants attended the late-October conference in Orono, Maine. They represented all the New England States but Connecticut and Rhode Island, plus four additional states and the provinces of Quebec, New Brunswick, Nova Scotia and Prince Edward Island. Two-thirds of the total were from Maine, and the great majority represented government agencies and land grant universities or their Canadian equivalents. Less than one-fifth of the participants indicated that farming is their principal occupation (though it was clear that a large number of others engage in some commercial farm production or have done so in the past).

The first morning of the conference was devoted to plenary presentations on a theme captured by the title of Professor Frederick Buttel's opening address, "The Crisis and Opportunity of Northeast Agriculture". These papers are reproduced in Part I of this volume. Buttel characterizes the current situation of the northeastern states as an "incipient crisis" and provides extensive documentation to show how it differs from the severe financial crisis facing the Midwest farmers. He identifies several potentially major problems for Northeast agriculture, emphasizing external competition for major commodities, the likely evolution and implications of new technologies, and land use and environmental constraints associated with the region's metropolitan character. The region's dairy industry, in particular, appears likely to undergo rather dramatic changes under the twin pressures of chronic overproduction and technological innovations biased toward large scale production units. Buttel's critique of current

state government and land grant university policies leads to a provocative set of recommendations regarding research priorities, extension, land use regulations and general rural economic development. In his response to Buttel's analysis, David Vail presents evidence to argue that Maine's major commodity systems already face a full-fledged crisis. On the other hand, if the long term trends in production of staple foodstuffs are toward overproduction, low and variable returns on investment, and industrialized production methods ("factories in the fields"), then it is important to ask, what is the public interest in supporting such a farm economy? As the Northeast's countryside becomes "suburbanized", the public purpose in supporting agriculture subtly changes from an emphasis upon large production volume of staple foods to issues like preservation of open space, food freshness and quality, and the amenities of living in diversified rural communities with a "working landscape". In such a setting, the growing "niche agriculture" sector, exemplified by farmers' markets, pick-your-owns, ornamentals, and custom-cut freezer lambs may be able to make a much greater contribution than it now does, both to sustainable agriculture and to the overall quality of rural life.

Professor Bruce Gardner employs the classical economic concept of "comparative advantage" to explore prospects for the Northeast to improve its competitive position vis-a-vis other U.S. regions and foreign nations in production of staple farm commodities. In brief, he finds little in either the region's natural resource endowment or its potential to acquire new capabilities that would justify optimism about a major revitalization of Northeast agriculture. Indeed, agricultural support infrastructure is so much stronger in other U.S. farming regions that the Northeast will, in all likelihood, continue to lose market share. In his commentary on Gardner's paper, Professor Stewart Smith contests the adequacy of the comparative advantage concept for understanding the potential for agricultural revitalization in the Northeast. In his view, there is great opportunity to capture what he labels "competitive advantage" by serving local markets more effectively. This is especially true when farmers and food distribution entrepreneurs (who may be one and the same) produce high quality specialty products and add value to them through processing or provision of specialized marketing services. This optimistic conclusion does not exclude new possibilities for the region's existing major farm commodities, but the emphasis is clearly on innovation and diversification of the product mix.

Part II consists of three papers specifically addressing the theme of diversification. (At an evening banquet which featured an all-Maine gourmet menu) Massachusetts Agriculture Commissioner August Schumacher presented a rousing testimonial to the many "sunrise" production and marketing ideas already being pursued by innovative farmers in his state - aided in imaginative ways by the future-directed Massachusetts Department of Agriculture. The second day of the conference was highlighted by Professor Patrick Madden and Anastra Madden's study of economically feasible farm diversification strategies and Professor Stuart Hill's exploration of the psychological dimension of diversification. The Maddens suggested four tactics which, in varying combinations, have enabled many existing farmers to convert their operations to an economically sustainable basis: enterprise diversification, diversification into some off-farm employment, reduced input production techniques (including organic farming), and zero-debt farming. Stuart Hill's emphasis was on the human dimension

of "sunrise agriculture": the sources of self-confidence and courage to "take control of our own destiny". Hill observes that farmers' diversification efforts are as often motivated by personal, social and environmental commitments as by economic objectives.

Two sessions were devoted to workshop discussions which, for convenience, were organized along commodity lines. Although discussions were guided by a common set of questions, the emphasis and flow of dialogue proved to be as diverse as the participants themselves. It is thus impossible to do justice to the richness of the discussions in this brief introduction. Summaries by workshop reporters are presented in part III.

Two workshops focussed on opportunities for profitable diversification by producers of the region's economically most important commodities: dairy products and row crops (essentially potatoes). In a nutshell, most dairy workshop participants believe that dairy farms are already quite diversified operations. Where dairy farming is economically viable, there are not typically other farm enterprises which are compatible with the farms' resources and can contribute significantly to farm profit. In general, as economically marginal dairy farms go out of business, it is unlikely that their land resources will be converted to other types of farming. Rather, they are more likely to be consolidated into larger dairy operations or, as is all too often the case, converted to non-farm uses. Members of the potato workshop were generally more optimistic about the prospect for profitable diversification into enterprises that supplement but do not replace, potato production. Promising examples include leguminous forages (e.g., lupine), brassicas (e.g., broccoli), livestock (e.g., sheep and cattle) and, in the Canadian case, small grains. In each case, the group identified cost-effective forms of public support to stimulate or reinforce farmers' diversification efforts.

Five additional workshops assessed the production and marketing prospects for commodity groups that conference planners had identified as "sunrise" opportunities with special promise: vegetables, small fruits, ornamentals, red meat, and feeds and food grains. Each group worked its way through the following sequence of questions:

°What are the grounds for optimism about the future of this commodity in the region?

°Which parts of the region seem best/worst suited to expanded production?

°What type of existing farm is most/least likely to diversify successfully into this commodity?

°Is this commodity well-suited to start-up farms? Small part-time farms? Larger commercial operations?

°To what extent is production of this commodity complementary or competitive with the resource needs of other farm enterprises and with off-farm employment?

°What are the critical barriers to expanded production?

°What are the necessary preconditions for profitable expansion?

°What would be the most cost-effective government and private sector actions to promote expansion?

°What is the single most critical need to reach the optimistic forecast of the commodity's potential in the year 2000?

The conference concluded with Frederick Buttel's masterful interpretation and synthesis of two days of intense discussions, followed by two views of the policy implications of the conference: one by Sandy Griswold, an agricultural marketing specialist from Prince Edward Island, who reflected on the Canadian perspective; the other by Stewart Smith, former Maine Agriculture Commissioner, representing an American perspective. These comments are presented in part IV.

Readers may be interested to know that a Maine-based working group has been meeting since the conference to develop a proposed agenda of research and action projects suitable for region-wide cooperation. The objective is to encourage the formation of task forces, drawing on expertise and practical experience from across the entire Northeast, for further exploration of five "sunrise" opportunities that conference participants identified as areas of great potential:

- °reduced input production techniques,
- °farm enterprise diversification,
- °on-farm value added opportunities,
- °adjusting product variety and quality to consumer preferences,
- °improving farmers' off-farm employment opportunities in rural areas.

Obviously these types of innovation are mutually reinforcing. They must be brought together in strategic planning for agricultural sustainability, both at the level of the individual farm and that of the province or state. Tentatively, we think it would be most appropriate for a different land grant university to be the institutional base of investigation for each of the five themes, though interested people from the entire region could be involved. The need for synthesis among the five themes might be met by a combination of periodic region-wide conferences, a Northeast "sunrise agriculture" journal, and a publicly supported Regional Agricultural Development Committee, analogous to the Small Farm Sub-committee that formerly existed under the aegis of the New England Governors' and Eastern Canadian Premiers' Conference. Readers who have suggestions about ways to improve regional cooperation and would like to participate in this exciting venture are encouraged to communicate with the staff of the Bureau of Rural Resources, Maine Department of Agriculture (State House Station 28, Augusta, Maine, 04333).

I. CONCEPTS OF SUNRISE AGRICULTURE

THE CRISIS. AND OPPORTUNITY OF NORTHEAST AGRICULTURE*

Frederick H. Buttel
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INTRODUCTION

It is widely said that American agriculture is in a state of crisis. It is estimated that nearly 25 percent of U.S. farm businesses has debt-to-asset ratios in excess of 40 percent. Export volume has declined each year during the Reagan Administration; U.S. grain exports reached a peak of 111 million tons in 1980-81 and will probably be about 75 million tons in 1985-86, causing the U.S. share of the world grain trade to decline from 55 to 40 percent. Declining crop prices since 1983-84, especially for soybeans, wheat, and, more recently, for corn, combined with heavy debt loads and high real interest rates, have led to a decapitalization of U.S. agriculture that has been unprecedented since the Great Depression. In 1984, for example, there was a 13 percent reduction in the value of farm real estate and a six percent decline in farm machinery values. Combined with a one percent decrease in farmer debt, this yielded a decline in the value of farm assets of \$104 billion, or roughly 10 percent. From 1981 to 1985 there was a decline of 19 percent in the average value of farm real estate per acre in the U.S., with particularly severe declines in a half dozen corn belt states (Nebraska, Iowa, Minnesota, Illinois, Indiana, and Ohio) where per acre land values decreased from 39 to 49 percent. Net farm income in 1985 would have been nil had it not been for \$18 billion in federal commodity program outlays. Further statistics on foreclosure and bankruptcy rates, the status of agricultural lending institutions and declines in rural community well-being could also be cited, but they would not change the essential fact that U.S. agriculture faces a troubled situation for which there is no end in sight.

These data, while ominous and discouraging, must be qualified in several respects. First, although current farmer debt loads are historically unprecedented, the status of U.S. agriculture in the 1980s is actually fairly similar to that of the 1950s and 1960s in terms of returns on investment and the exodus of farmers. Realized rates of return to equity have historically been very low in agriculture, ranging between 2-3 percent per annum over the past several decades (Johnson, 1985; Buttel, 1986a). Also, since the end of World War II there has been a net loss of nearly 4 million farms, on average, a net loss of roughly 100,000 farms per year, or about 2,000 per week. Put somewhat differently, the 1980s are, by U.S. historical standards, less abnormal than the 1970s. There are, to be sure, major differences between the 1950s through the 1960s and the 1980s--chiefly in that the current period of agricultural decapitalization coincides with general U.S. economic stagnation and high unemployment, while the 1950s and 1960s were characterized by modest growth in agricultural assets and overall economic expansion. Thus, farmers experiencing economic distress two and three decades ago faced relatively favorable options--to leave agriculture with substantial capital gains and to enter the

*Revised version of a paper presented at the Conference on Sunrise Agriculture in the Northeast. The author would like to thank David Vail for his comments on an earlier draft of this paper.

nonfarm labor market at an attractive wage level. Today such farmers, if they must leave agriculture, do so after suffering capital losses, leaving unsecured loans unpaid, and lacking secure, well-paid employment. The results of a recent survey of farmers in the Midwest, in fact, suggest that the lack of nonfarm jobs has been a major factor causing many highly-leveraged farmers to remain in agriculture (U.S.D.A., 1986a). Indeed, the current crisis in agriculture is in substantial measure a reflection of general macroeconomic (rather than merely agricultural) policies that have adversely affected farm households, both as producers (e.g., high real interest rates and the overvalued dollar in world trade) and as off-farm workers (e.g., high unemployment and declining real wages in blue-and "pink"-collar jobs).

Nonetheless, the 1970s boom decade in agriculture can now be seen in retrospect as having been highly aberrational in several respects. The boom was led by an expansion of exports caused by, among other factors, the low value of the dollar and a surge in demand among several West European, state socialist, and middle-income third-world countries. The U.S. came to dominate the world grain trade to a far greater extent than it had in the three decades after World War II. The export-led boom and low--often negative--real interest rates led to phenomenal increases in farm land values. U.S. farm land values increased by 98 percent in real terms from 1973 to 1981. The low real rates of interest that prevailed in the 1970s had a major unanticipated consequence for U.S. farmers. Most third world countries borrowed massive sums of money during the decade, and many of the major debtor countries now face catastrophic debt crises. To generate the foreign exchange to pay off these loans, Brazil, Argentina, and other major debtor nations have had little choice but to expand production of export crops. Desperately in need of foreign exchange, these countries must now export soybeans, wheat, and other basic grains no matter how low world prices go, making them formidable competitors with U.S. suppliers.

The 1970s were also extraordinary in that, for the first time since the Great Depression, farm numbers stabilized (see below). As will be discussed in more detail later, the attenuation of the long-term trend toward fewer farms in the 1970s was largely accounted for by an increase in the number of relatively small, often part-time farms.

Further, it should be emphasized that many of the discontinuities that characterized U.S. agriculture in the 1970s affected the Northeast to a lesser degree than most other U.S. regions. The vast bulk of agricultural commodities produced in the Northeast is marketed in the region, rather than in interregional or international markets, so that the Northeast was not heavily affected by the 1970s export boom or its demise. Second, with the exception of Pennsylvania, increases in real land prices in the Northeast were 25 percent or less, contrasted to the national figure of 98 percent. Likewise, Northeast farm land prices were relatively stable from 1981-1985 and, in several states increased modestly. Third, farm financial stress in the Northeast is generally less severe than in other regions (U.S.D.A., 1986b).

These observations should cause us to see the crisis of U.S. and Northeast agriculture in the 1980s in somewhat different terms than have normally been portrayed in the popular press and much scholarly writing. The 1980s bear a strong imprint of a return to the conditions that prevailed prior to 1970,

albeit with severe strains--high debt loads and excess production capacity, engendered by low real interest rates and the expansion of export markets in the aberrational 1970s. To the degree that a crisis of Northeast agriculture exists, it is of a substantially different character than that of the corn belt and Upper Great Plains. The problems of Northeast agriculture have far more to do with structural changes, environmental costs, and policy impasses associated with several of its major commodity systems (especially dairy, poultry, and horticultural crops) than with the debt problems that characterize uthey major grain-producing states. In particular, the Northeast will not have to deal with a dramatic decapitalization of agriculture. Instead, given the fact that many of the prime farming areas in the Northeast are in metropolitan counties, the long-term problem here will be to restrain land price increases so that these lands can remain in agriculture (Buttel et al., 1986b). While "crisis" may be too strong a word to depict the current status of Northeast agriculture, it nonetheless faces a number of very difficult long-term problems that will require creative solutions.

The first portion of this paper is devoted to a brief analysis of recent changes in the structure of Northeast agriculture. This discussion includes data on farm structural changes and observations on the nonfarm environment for agriculture in the Northeast. The second section discusses some of the major long-term problems that will face Northeast agriculture. The final section presents some tentative ideas for addressing the long-term problems of agriculture in the region.

For purposes of this paper, the Northeast region includes the states of Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont. This delineation of the region is coterminous with that used for reporting Census of Agriculture data. These nine states have a certain coherence as an agricultural region. Relative to the rest of the U.S., the nine Northeastern states are characterized by farm structures that involve little industrial-type farming, small average farm sizes, a pattern of commodity specialization in which products tend to be destined for major urban markets within the region (rather than for interregional or international markets), and a long trend of loss of land in farms (which was attenuated beginning in the early 1970s). Also, the farm population as a percentage of the nonmetropolitan population in the Northeast has, since the turn of the century, been lower than that of the other agricultural regions of the U.S.

Despite the broad similarities among the states and substate areas in the Northeast, the region is nonetheless quite diverse. There are two major sources of diversity. The first is agroecological in nature. The six New England states (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont) generally have low quality soils and short growing seasons, albeit with certain exceptions such as the Connecticut River Valley. The three Middle Atlantic states (New Jersey, New York, and Pennsylvania) generally have more favorable agricultural conditions. The second source of diversity is socioeconomic in nature and relates to dramatic variations in urban-metropolitan influence. There is a striking contrast between the Boston-Washington megalopolis, with its densely settled 35 or so million inhabitants, and the sparsely settled rural areas of northern New England and the north country of New York State.

THE ANATOMY OF NORTHEAST AGRICULTURE¹

Recent Farm Structure Changes in the Northeast

Virtually all analyses of farm structural change in the Northeast during the first seven decades of the twentieth century emphasize that the decline in farm numbers and farm population accelerated after World War II, and that these declines were most pronounced among small farm households (see, for example, Schertz, 1979; Stanton and Plimpton, 1979). It is now widely recognized, however, that a distinctly new pattern of farm structural change emerged in the Northeast and the U.S. during the 1970s. The trend in the 1970s was toward a dualistic pattern, with increases in the relative numbers of both very large and very small farms and a "disappearing middle" of medium-sized, full-time family farms (Tweeten and Huffman, 1980; Buttel, 1983, 1984). Both small farm numbers and total farms stabilized in the 1970s.

Table 1 reports data on farm numbers by selected characteristics for the Northeast region and the U.S. in 1974 and 1982. These data show that the Northeast generally followed the U.S. trend toward a more dualistic farm structure during this period. In both the Northeast and the U.S., farm numbers and average farm size were relatively little changed over the eight-year period. The Northeast exhibited a 3.5 percent increase in the number of farms from 1974 to 1982, along with a 4.4 percent decrease in the average size of farm, indicating that the gain in farm numbers was concentrated among the smallest farm sizes. U.S. farms decreased by 0.3 percent during the period.

The data on farm numbers by size of farm underscore the dualistic trajectory of structural change; farms with less than 50 acres exhibited significant increases, farms from 50 to 499 acres declined, and farms with 1,000 or more acres increased in numbers. The Northeast Region differed from national trends only in its substantial growth in farms over 500 acres. In the 500 to 999 acre category, the Northeast experienced a 10.1 percent increase, compared to a 1.6 percent decrease for the U.S.

The data in Table 1 suggest that, on balance, the position of Northeast agriculture in the U.S. agricultural structure, stabilized during the 1970s and early 1980s. The value of agricultural products sold in the Northeast increased more rapidly from 1974 to 1982 (67.3 percent) than was the case in the U.S. (61.6 percent), although average sales per farm grew somewhat more slowly in the Northeast than in the U.S. (61.6 and 66.9 percent, respectively). The value of land and buildings, measured on a per farm or per acre basis, increased somewhat more slowly in the Northeast. The average value of land and buildings per acre in the Northeast, however, remained substantially above the U.S. average in 1982 (\$1,236 and \$791, respectively). Increases in the overall inventory of machinery and equipment and in the value of machinery and equipment per farm in the Northeast lagged slightly behind U.S. average. Finally, the Northeast continued its long trend toward declining land in farms (a 1.3 percent decrease from 1974 to 1982, compared to the U.S. figure of -0.3 percent)

¹This section is taken from Buttel, Lancelle, and Lee (1986).

TABLE 1
 Numbers of Farms by Selected Characteristics 1974 and 1982
 and Percent Change, 1974-82, Nine Northeastern States and U.S.

Farm Structure Characteristics	Northeast Region		Percent Change 1974-82	U.S.		Percent Change 1974-82
	1974	1982		1974	1982	
Number of Farms	127,531	131,991	3.5	2,314,013	2,241,124	-0.3
Land in Farms (acres)	23,359,889	23,061,163	-1.3	1,017,030,357	984,755,115	-0.3
Average Size of Farm	183	175	-4.4	440	439	-0.1
Value of Land & Buildings						
Average Per Farm	121,227	214,623	77.0	147,838	347,974	135.2
Average Per Acre	662	1,236	86.7	336	791	135.4
Farms by Size						
Less than 10 Acres	7,689	10,599	37.8	128,254	187,699	46.3
10-49 Acres	19,416	26,421	36.1	379,543	449,301	18.3
50-179 Acres	54,901	51,866	-5.5	827,884	711,701	-14.0
180-499 Acres	37,864	34,533	-8.8	616,098	526,566	-14.5
500-999 Acres	6,421	7,070	10.1	207,297	203,936	-1.6
1,000-1,999 Acres	1,046	1,282	22.5	92,712	97,396	5.1
>2,000 Acres	194	220'	13.4	62,225	64,525	3.7
Land Use						
Total Cropland	13,851,473	13,972,802	0.8	440,039,087	445,527,557	1.2
Woodland	5,809,958	5,899,750	1.5	92,527,627	87,133,026	-5.8
Agricultural Products Sold						
Market Value (\$1,000)	4,291,380	7,179,543	67.3	81,526,124	131,810,903	61.6
Average Per Farm	33,650	54,394	61.6	35,231	58,815	66.9
Crops	1,440,397	2,181,303	51.4	41,790,360	62,274,394	49.0
Livestock	2,216,436	4,998,240	125.5	33,301,560	69,536,509	108.8
Poultry	616,094	844,395	37.1	6,202,291	9,732,222	56.9

TABLE 1 Continued

Farm Structure Characteristics	Northeast Region		Percent Change 1974-82	U. S.		Percent Change 1974-82
	1974	1982		1974	1982	
Farms by Type of Organization						
Individual or Family Corporation	81,142**	115,713	40.9	1,517,573**	1,945,724	28.2
Tenure of Operator	2,615**	4,098	56.7	28,656**	59,788	108.6
Full Owner	83,389	82,043	-1.6	1,423,953	1,325,931	-6.9
Part Owner	36,112	40,005	10.8	628,224	656,219	4.5
Tenant	8,030	9,943	23.8	261,836	258,974	-1.1
Principal Occupation						
Farming	78,144	75,111	-3.8	1,427,368	1,234,858	-13.4
Nonfarming	46,390	56,442	21.5	851,902	1,006,266	18.1
Operators Reporting Any Days of Work Off Farm						
Any	56,670	67,751	19.6	1,011,476	1,187,490	17.4
>100 Days	46,691	56,048	20.0	814,555	963,728	18.3
Selected Production Expenses (\$1,000)						
Commercial Fertilizer	207,433	309,769	49.3	5,137,361	7,689,577	49.7
Other Agr. Chemicals	74,225	140,301	89.0	1,757,776	4,282,795	143.6
Hired Labor						
Workers Working >150 Days:						
Number of Farms	21,775**	29,242	34.3	223,093**	312,621	40.1
Number of workers*	66,149	88,547	33.9	712,715**	950,112	33.3
Machinery and Equipment						
Estimated Value (\$1,000)	2,879,414	5,337,081	85.4	48,402,626	93,686,308	93.6
Average Per Farm	23,470	40,435	72.3	22,303	41,930	88.0

*Computed from the preliminary reports for the nine Northeast states.

**Among farms with sales >\$2,500.

SOURCES: 1974 data: 1978 Census of Agriculture: Preliminary Report (Northeast Region and United States) (Washington, D.C., Bureau of the Census, U.S. Department of Commerce, 1980); 1982 data: 1982 Census of Agriculture: Preliminary Report (Nine Northeastern states and United States) (Washington, D.C.: Bureau of the Census, U.S. Department of Commerce, 1983).

and exhibited a slower rate of growth in cropland than did the U.S. (0.8 and 1.2 percent, respectively).

The farm structure of the Northeast during the 1970s and early 1980s showed increased strength in its small-farm, part-time farming component. The number of farm operators whose principal occupation was non farming (those who worked any days off the farm as well as those who worked 100 or more days off the farm) increased more rapidly in the Northeast than in the U.S. The Northeast also exhibited a larger increase in the number of individual and family farms than did the U.S. The fact that small, part-time farms tend to be family- or individual-type farms underscores the growing importance of the small-scale, part-time farming sector in Northeast agriculture (Buttel, 1982; Buttel and Gertler, 1982).

It was noted earlier that the Northeast registered larger increases in the number of farms with 500 or more acres than did the U.S. as a whole. This relatively rapid growth of farms with large acreages did not, however, tend to take the form of industrial-type farming. While the Northeast exhibited a 56.7 percent increase in the number of legally-incorporated farms, this increase was substantially lower than the 108.6 percent increase for the U.S. Expenditure on hired labor also increased less rapidly in the Northeast than it did for the U.S. as a whole (77.3 and 81.3 percent, respectively), as was true for the proportion of farms with hired workers working 150 or more days per year (see Table 1).

The Northeast has long had a low rate of tenancy relative to other regions. During the 1974 to 1982 period, however, the number of tenant farms in the Northeast increased considerably (23.8 percent, versus the U.S. average of -1.1 percent). This may be because many persons entering agriculture in the Northeast as small farm operators rented their land. Nevertheless, the proportion of tenants in Northeast agriculture remains substantially lower than the U.S. average (7.5 and 11.6 percent, respectively; see Table 2).

Table 2 reports comparable farm structure data for the Northeast and the U.S. for 1982; it shows percent distributions and other standardized measures of farm structure for the Northeast and U.S. from the most recent (1982) Census of Agriculture. The dominant feature of Table 2 is the similarity between the farm structure of the Northeast and the U.S. Although Northeast farms tend to be considerably smaller in average acreage and value of land and buildings, their average gross sales per farm and distribution of farms by value of gross sales are quite similar to the U.S. pattern. Likewise there is considerable similarity in the distributions of farms by type of organization, tenure of operator, principal occupation of the farm operator, and prevalence of off-farm employment. It should be noted, however, that these gross indicators of farm structure may conceal important differences. For example, legally incorporated farms in the Northeast average only about 400 acres per farm, whereas legally incorporated farms in the U.S. (both family and nonfamily) average approximately 2,000 acres each. Thus, legal incorporation of farms has a substantially different character in the Northeast than in much of the rest of the U.S., where many corporation farms are industrial-type units characterized by absentee ownership, hired management, and wage labor (Rodefeld, 1980).

TABLE 2

Farm Structure Indicators: Northeast Region
and United States, 1982

Farm Structure Indicators	Northeast	U.S.
Average Size of Farm (Acres)	175	439
Average Value of Land and Buildings Per Farm	\$214,623	\$347,970
Average Value of Land and Buildings Per Acre	1,236	791
Percent Distribution of Farms by Acreage		
<10	8.0	8.4
10-49	20.0	20.0
50-179	39.3	31.8
180-499	26.2	23.5
500-999	5.4	9.1
1,000-1,999	1.0	4.3
>2,000	0.2	2.9
Percent Distribution of Farms by Type of:		
Organization		
Individual or Family	87.7	86.8
Corporation		
Family Held	2.7	2.3
Other Than Family Held	0.4	0.3
Percent Distribution of Farms by Tenure of Operator		
Full Owner	62.2	59.2
Part Owner	30.3	29.3
Tenant	7.5	11.6
Percent Distribution of Farms by Principal Occupation of Operator		
Farming	56.9	55.1
Nonfarming	42.8	44.9
Percent of Farm Operators Reporting Any Days of Work		
Off Farm	51.3	53.0
Percent of Farm Operators Reporting >10 Days of work		
Off Farm	42.5	43.0
Average Market Value of Agricultural Products Sold Per Farm	\$54,394	\$58,815

TABLE 2 CONTINUED

Farm Structure Indicators	Northeast	U.S.
Percent Distribution of Farms by Value of Sales		
>\$250,000	3.6	3.9
\$100,000-249,999	11.2	9.6
\$ 40,000- 99,999	16.9	14.9
\$ 20,000- 39,999	8.9	11.1
\$ 10,000- 19,999	9.1	11.6
\$ 5,000-9,999	11.2	12.6
<\$5,000	39.1	36.4
Commercial Fertilizer/Acre of Cropland	\$22.2	\$17.3
Other Agricultural Chemicals/Acre of Cropland	\$10.0	\$9.6
Hired Labor as Percent of Agricultural Products Sold (%)	9.9	6.4
Percent of Farms with Workers Working >150 Days (%)	22.2	139
Workers Per Farm	3.0	3.0
Estimated Value of Machinery and Equipment Per Farm	\$40,435	\$41,930
Sales of Crops as Percent of Market Value of Agricultural Products Sold (%)	30.4	47.2
Sales of Livestock as Percent of Market Value of Agricultural Products Sold (%)	69.6	52.8
Sales of Dairy Products as Percent of Market Value of Agricultural Products Sold (%)	44.0	12.4
Sales of Poultry as Percent of Market Value of Agricultural Products Sold (%)	11.8	7.4

SOURCES: 1974 data: 1978 Census of Agriculture: Preliminary Report (Northeast Region and United States) (Washington, D.C., Bureau of the Census, U.S. Department of Commerce, 1980); 1982 data: 1982 Census of Agriculture: Preliminary Report (nine Northeastern states and United States) (Washington, D.C.: Bureau of the Census, U.S. Department of Commerce, 1983).

Table 2 indicates that farms in the Northeast, while typically small in acreage relative to national standards, tend to be farmed relatively intensively. Northeast farmers tend to use more commercial fertilizers and other agricultural chemicals per acre than do U.S. farmers. In 1982 Northeast farmers derived 44.0 percent of their gross farm sales from dairy products, a relatively labor- and capital-intensive commodity, compared to 12.4 percent for

U.S. farmers as a whole (Forste and Frick, 1979). While U.S. farmers derived a larger proportion of gross sales from crops than those in the Northeast, Northeast farmers tended to devote a high proportion of cropland to labor- and capital-intensive fruit and vegetable commodities (Schertz, 1979). Finally, despite the relatively low incidence of industrial-type farming in the Northeast, the region is characterized by a high level of hired labor use. Table 2 shows that in 1982, labor expenses as a percent of agricultural products sold were higher in the Northeast than in the U.S., and a substantially larger proportion of Northeast farmers hired full-time agricultural labor (150 or more days of work) than did U.S. farmers (22.2 and 13.9 percent, respectively.)

These data on farm structure in the Northeast and the U.S. suggest that the Northeast region has achieved a rough parity with the rest of the U.S. by continuing and deepening its longstanding pattern of specialization in dairy products and horticultural commodities. The position of Northeast agriculture in U.S. agricultural structure has become stabilized, now that thousands of marginal acres have been shifted out of agricultural production. This is not to say that the farm structures in the Northeast and the U.S. are identical; the Northeast has somewhat more very small, "subfamily" farms, lower levels of large-scale industrial farming, and a greater prevalence of small commercial-sized farms (i.e., with sales of \$40,000-99,999). Nevertheless, Northeast farm structure has converged with the national pattern over the past several decades, and both exhibited comparable trends toward a more dualistic pattern of farm structure in the 1970s and early 1980s.

Farm and Nonfarm Factors Affecting the Structure of Agriculture and Rural Community Well-Being in the Northeast

Schertz's chapter on "The Northeast" in Another Revolution in U.S. Farming (Schertz and others, 1979) identified several forces--most of them nonfarm in nature--that have affected recent structural change in Northeast agriculture. Among the factors emphasized by Schertz were: (1) urbanization and industrialization in the region, (2) nonfarm employment opportunities, (3) dairy commodity programs, (4) the character of the region's natural resources, and (5) changes in the costs of transporting farm inputs and products.

In 1977, 12.9 percent of the land in the Northeast region was devoted to "urban" uses (including transportation), which was significantly higher than the U.S. average of 5.7 percent (Schertz, 1979:270). One-third of the region's acres in urban uses in 1977 had been so converted in the previous 10 years. Schertz argues that growing urbanization of the region has resulted in upward pressure on farmland prices and in property tax burdens that are often high relative to the land's capacity to generate income streams in farm production. He suggests that further urban-induced inflation in farmland values in the Northeast may result in additional loss of land in farms and further decline in the competitive position of Northeast agriculture. Schertz, however, notes that while urban pressures may adversely affect aggregate production in the Northeast in the future, urbanization also presents greater opportunities for farmers to find off-farm employment. This is particularly the case because of industrial deconcentration--the movement of industrial jobs from large cities to small cities and rural areas--that has occurred in the region for over

two decades (Hastings and White, 1984; Young, 1986). Part-time farming made possible by expanded rural nonfarm employment has historically enabled the Northeast to retain agricultural resources in small production units, rather than their being consolidated into larger farm businesses (Schertz, 1979:271). The concentration of large urban centers has also enabled the region's fruit, vegetable, nursey, and poultry producers to take advantage of large nearby markets.

It was noted earlier that dairy is by far the most important commodity sector in the Northeast, representing 44.0 percent of gross farm sales in 1982. Accordingly, federal and state dairy commodity programs have played a major role in shaping farm structure. The essence of dairy commodity programs has been the federal government's purchase of sufficient products (cheese, butter), when necessary to maintain milk prices at mandated support levels. Federal and state milk marketing orders and pooling procedures have had the following impacts: (1) the price of fluid milk has been higher than that of milk used to produce butter and cheese, (2) producers receive a "pool" price reflecting the combination of fluid and "manufactured" milk, and (3) the pool price does not vary with the farmer's volume of milk sales (Forste and Frick, 1979:143). The Northeast has generally benefited from these provisions of federal and state dairy programs. Dairy programs have historically increased the overall profitability and the level of milk production in all regions, but this has been of particular benefit to the Northeast because of the region's suitable agricultural resources for dairying and its longstanding specialization in dairy production. The Northeast has also benefited from provisions of the dairy commodity programs that have insulated its producers from competition with farmers in the North Central Region and have equalized milk prices for producers of varying quantities of milk. Schertz (1979:272) argues that "[t]hese price effects, in combination with government support of dairy prices, have encouraged more milk production, led to higher farm incomes, and slowed the decline of farm numbers in the Northeast".² Schertz notes as well that policy changes which reduced or eliminated government pricing and pooling would reduce milk production, farm income, and farm numbers in the Northeast. Similar impacts on Northeast dairy producers would result from elimination of current restrictions on cheese and butter imports and termination of the prohibition on sales of reconstituted milk at lower prices than for fresh milk.

The character of Northeast farmland resources has long affected the structure of agriculture. While there are areas of high-quality soils over tracts suitable for large-scale mechanization, the bulk of the region consists of low- or variable-quality soils with rough topography. These are barriers to mechanization and consolidation of farmland into large units. Schertz (1979:273-14) notes that the Northeast in 1977 had only 35 million acres of land suitable for regular cultivation (land capability classes I, II, and III), representing 37 percent of the total nonfederal rural land in the Region. By

²Dairy farm numbers in the U.S. and the region have, nonetheless, continued to decline rapidly in recent years. In New York State, for example, the number of dairy farms decreased from 23,085 in 1970 to 15,316 in 1983 even though total farm numbers in the state were relatively stable during this period (Boynton et al., 1984; Blandford and Lee, 1984).

comparison, 44 percent of total nonfederal rural land in the U.S. is suitable for regular cultivation. The proportion is 64 percent in the North Central states, the Northeast's major dairy competitor. The nature of the Northeast's land resources, plus the availability of the part-time farming option for many small ("subfamily") and medium-sized family farmers, makes it unlikely that the region will experience rapid consolidation of farmland into industrial-scale farming units, such as the 10,000-cow dairies now prevalent across much of the Sunbelt.

A final factor that has affected and will continue to affect agriculture in the Northeast is transport costs. With nearly one-quarter of the U.S. population but only 3 percent of its farmland, the region is inevitably a major food importer. Low-cost interregional rail and truck transport reinforces competitive pressure from other states. Because of the region's soils and topography, crop production per acre has lagged behind the U.S. average for more than two decades, and total farm productivity in the Northeast has been lower than the national average since the mid-1970s (Schertz, 1979:267-8). Thus, most of the region's farmers are vulnerable to interregional competition. The cheap energy prices that prevailed until the early 1970s contributed to low transport costs and the decline of the Northeast's share of U.S. farm receipts. If, as many energy analysts predict, energy prices increase substantially over the next one to two decades, the cost of interregional transport will rise and there may be increased opportunities for Northeast farmers to compete in many vegetable, fruit, and nursery products that are presently imported into the region (How, 1980).

THE "CRISIS" OF NORTHEAST AGRICULTURE

Northeast agriculture faces a number of formidable challenges, which in total can be said to represent an incipient crisis. It should be stressed again, however, that the nature of the crisis of Northeast agriculture is far different from the highly-visible farm crisis in the Midwest and Upper Great Plains. Farmers in the major grain-growing states are suffering from a combination of immense debt loads (largely due to 1970s and early 1980s investments in rapidly-inflating farm land at high nominal rates of interest) and declining commodity prices (largely due to the global recession, adverse world market price trends, and contraction of the U.S. share of the world grain trade). The farm crisis in the Midwest and Great Plains thus can be seen to represent a set of crunching dislocations caused by the aberrational character of American agriculture in the 1970s (rapid expansion of U.S. export sales, very low real interest rates, and rapid inflation in land and other asset values) and rapid, adverse changes in macroeconomic policies in the 1980s. The nature of the "crisis" in Northeast agriculture is substantially different. Its most important feature is long-term adverse changes in many of the major commodity systems (especially dairy, poultry, horticultural crops) that dominate in the region's agriculture. These adverse changes have been exacerbated by two other regional conditions: relatively expensive land and environmental problems (especially contamination of groundwater by agricultural chemicals). Further, prospective technological changes, especially the application of bovine growth hormone (bGH) and ultrafiltration and reverse osmosis technologies in dairy production, portend difficult adjustments well into the future. Finally,

land-grant research and extension programs in the region are in transition, and several forces affecting these systems may limit their ability to contribute to innovative solutions to problems of Northeast agriculture.

Structural Change in Major Northeast Commodity Sectors: Dairy, Poultry, and Horticultural Crops

The Northeast is a dairying region. As noted earlier, about 44 percent of the value of agricultural products sold in the region is accounted for by this single commodity. The Northeast has become increasingly specialized in dairy production due to a combination of factors: the abundance of land suitable for forage production but few alternative crops, the proximity to major urban markets, and federal commodity programs that have supported prices at relatively favorable levels.

The current situation and future outlook for dairy production in the Northeast, however, are not entirely optimistic. Historically, the stimulus of favorable product prices, combined with increased production per cow, has led to excess capacity and overproduction. (In 1985, net government removals under the price support program were nearly 10 percent of national milk volume.) The traditional federal dairy program (basically a price support system) has recently been unable to deal with excess capacity and overproduction. Support prices have been lowered, leading to a nominal decline in the average U.S. milk price from \$13.76 per cwt. in 1981 to \$12.75 per cwt. in 1985. These price decreases have been even steeper in the Northeast. An expensive "whole-herd buyout" program is just being implemented, but it seems unlikely that the program can substantially reduce milk production longer than a few years. The current situation, while discouraging, would have been far worse were it not for the fact that direct and indirect consumption of milk unexpectedly increased by over 10 percent in the past eight years. Prospects for continued increases in milk and milk product consumption are not bright, however, since dairy products will likely be subjected to more scrutiny on health grounds.

Poultry, while still a major sector of Northeast agriculture, has generally been a declining industry for several decades. Over the past 25 years the broiler industry has shifted to the Southeast states and has become dominated by a handful of large vertically-integrated broiler firms that contract with farmers for the production of finished birds (Hefferman, 1984). Nationally, broiler production has skyrocketed over the past decade, but farmers have benefited little from growing demand because of intense competition and the processors' control over the terms of contracts (virtually making farmers workers on their own farms).

Egg production, while similar to broilers in terms of meager profitability and longterm decline in the Northeast, has been characterized by a different type of regional shift; from the Southeast to the Midwest. As a result, major competitors are now more proximate to the Northeast. Also, per capita egg consumption has continued its longterm decline. Given the scale economies and low profitability of egg production, there has been a rapid disappearance of family-sized egg operations. Those that remain are increasingly vertically-integrated production-marketing firms that survive by engaging in

direct sales to retail outlets, restaurants, and institutions. Profitability in the industry now comes more from providing marketing services than from egg production per se.

The agroecological diversity of the Northeast region and the presence of several major urban centers have historically enabled it to be a major producer of more than a dozen vegetable and fruit crops. Decades ago much fresh vegetable and, to a lesser degree, processing vegetable and fruit production was undertaken on truck farms on the urban fringe. Now vegetables and fruits are produced across the region, including areas quite distant from cities, and increasingly on large, highly-mechanized farms. The Northeast is a major producer of vegetables, fruits, and potatoes, but remains a net importer, indicating some potential for future expansion. The key asset of Northeast producers is their proximity to large population centers and the many opportunities this presents for developing alternative marketing channels. The prospects for expanded opportunities in fruit and vegetable production thus are probably greater than for dairying and poultry, yet there are a number of major problems facing current and prospective producers in the region.

The major trend adversely affecting Northeast horticultural crop producers has been the increased competition with producers in other regions and in other countries (chiefly Central America and Canada). Out-of-region producers have had two major advantages over Northeast farmers. First, western U.S. vegetable and fruit producers, many of whom are integrated grower-shippers, have improved their marketing methods, quality standards and ability to provide products over much or all of the calendar year more rapidly than Northeast producers. While it was widely expected that rising energy prices in the 1970s would cause out-of-region producers to be less competitive in the Northeast, this generally did not occur. Marketing and packaging practices and increased consumer preference for fresh vegetables more than compensated for the effects of rising energy prices. Today, real energy prices are scarcely higher than before the Arab Oil Embargo in 1973-74. Second, Central American producers of fruits and vegetables benefit from far cheaper land and labor than are available to Northeast producers.

A further factor constraining fruit, vegetable, and potato production in the Northeast region is the environmental impact of agricultural chemicals (and, in some instances, the lack of suitable chemicals for use on minor crops). For several decades Northeast farmers have used higher levels of fertilizers and pesticides per acre of cropland than U.S. farmers as a whole (Schertz, 1979). In several parts of the region, widespread use of agricultural chemicals has led to major environmental problems, especially groundwater contamination. At present there is a glaring lack of alternative systems for Northeast farmers to be able to control pests and provide plant nutrients without recourse to agricultural chemicals that cause water contamination problems.

Land Prices

While the corn belt and Great Plains are currently suffering through the catastrophic dislocations caused by falling land prices, the situation in the Northeast is generally quite different. Land price increases in the Northeast

during the 1970s were moderate, and, in general, land values have continued to increase modestly since that time. Average farmland prices in Rhode Island and New Jersey in 1984 exceeded \$3,000 per acre: in Pennsylvania, Connecticut, and Massachusetts the average exceeded \$1,500 per acre. These figures can be compared to \$1,692 per acre in Illinois and \$1,925 per acre in California--states with far more productive land than generally exists in the Northeast.

In the Northeast region farm land prices tend to be heavily driven by demand for nonfarm purposes (especially residences and commercial uses) and, correspondingly, by the incentive (on the part of farmers as well as nonfarmers) to invest in land for speculative purposes. Many Northeast states have attempted to retain prime farm land by establishing preferential taxation schemes such as agricultural districts. Unfortunately, preferential taxation has probably had very little beneficial impact in retaining prime farm land (Roberts and Brown, 1980). It has, to be sure, been a welcome windfall for established farmers, but it has created severe revenue-generation problems for some rural communities. Most importantly, tax preferences merely make it somewhat more difficult to achieve large capital gains from speculative investment. Such programs thus fail to deal with the farm and nonfarm forces that lead to land inflation. They may have even led to the capitalization of tax benefits into land prices, thereby exacerbating further the problem of high land prices in the region.

Environmental Consequences of Agricultural Chemicals and Production Practices

The Northeast has long been characterized by intensification of crop production through the heavy use of agricultural chemicals. In large part this can be accounted for by the fact that land prices in the region have historically been high, and agricultural chemicals are essentially land-augmenting inputs. Chemical use has long been high in production of the region's horticultural crops. More recently, the major expansion in production of corn for grain and silage has involved extensive chemical usage. Some observers have argued that the incidence of yield-reducing plant pests in New York has increased in recent years in the absence of viable alternative systems for controlling pests (e.g., How, 1984). Agricultural chemical use thus is likely to continue to increase further, and along with it problems of run-off and contamination of surface and subsurface water supplies.

In recent years there has been growing recognition of the seriousness; of groundwater contamination and its implication for human health when polluted groundwater is used for drinking supplies. Most instances of death and disease caused by contaminated drinking water in the U.S. are accounted for by rural water systems which draw on groundwater sources (Clark et al., 1985). One of the most dramatic instances of pesticide contamination occurred in the Northeast. Long Island potato growers had for a number of years used aldrin to control the Colorado potato beetle until it was found that aldrin had infiltrated Long Island's sandy soils and wound up in groundwater. Aldrin contamination on Long Island led to increased scrutiny of pesticides in other parts of the Northeast and elsewhere, and it is becoming increasingly apparent that continued pesticide usage threatens the region's groundwater resource.

Another major environmental problem in Northeast agriculture is sheet and rill erosion on cropland. Erosion rates in the region as a whole are relatively low by U.S. standards, mainly because of the dominance of dairying (and hence of "sod crops"). Three states in the region (New Jersey, Pennsylvania, and New York) have sheet and rill erosion rates above the national average of 4.8 tons per acre per year (Batie, 1983:32). Erosion rates are relatively low in the six New England states. There are, however, a number of localized instances, such as steeply-sloped potato fields in Maine, where erosion rates are very high. Moreover, many current proposals for diversification of Northeast agriculture would entail reduction of environmentally-benign dairying and expansion of less benign enterprises, such as intensive horticulture. Soil erosion is of concern for two major reasons: (1) loss of productivity of prime farm land in the region, an increasing proportion of which has been allocated to corn and other highly-erosive crops in recent decades, and (2) the off-farm impacts of sediment and chemical run-off that deteriorate water and water-related resources (Clark et al., 1985). Historically, the on-farm (productivity) impacts of erosion have received far more attention than the off-farm impacts. But with relatively stringent control of industrial and municipal sources of water pollution now in effect, there is growing awareness that farmers, who have remained virtually exempt from federal water pollution regulations, are now the major polluter of the nation's water resources. At some point farmers may well find themselves subject to mandatory water pollution control regulations, which would dictate major changes in production practices.

Socioeconomic Impacts of New Agricultural Technologies.

The retention of large numbers of dairy farms of diverse sizes has represented the backbone of the region's agricultural structure. On the horizon in dairy production, however, are two technologies that may well lead to dramatic shifts in the structure of the nation's and region's dairy sector, portending major declines in farm numbers and shifts in farm enterprises. The new technologies are bGH and ultrafiltration/reverse osmosis. BGH, a naturally-occurring hormone in the bovine species that plays a major role in the regulation of lactation, can now be produced in a factory through the use of genetically-modified bacteria. Experimental results from injection of bGH into lactating cows indicate that bGH can increase milk production per cow by 10-40 percent with modest increases in feed requirements. Ex ante research has projected that bGH will be very rapidly adopted--perhaps as much as 90 percent adoption within four years of commercial introduction, which is expected in 1988 following FDA approval. If, for example, increased production per cow approaches 25 percent, one can anticipate that cow numbers, and hence the number of dairy farmers, would decline proportionately if not more.

There has been considerable controversy over how bGH would affect the size distribution of dairy farms, the regional distribution of dairy production, and the extent of catastrophic dislocations in the dairy sector. BGH is a divisible input, which has led many (especially corporate and university defenders of the technology) to argue that it will be "scale-neutral" -- equally available to farmers regardless of scale. Others have emphasized that the use of bGH will place a premium on farmers' management skills and ability to use technical information effectively. Hence, superior managers and farmers highly

specialized in dairy production, who generally are large operators, will be in the best position to benefit from bGH. The latter argument would appear the more persuasive given current evidence.

The two major studies exploring the impacts of bGH on an ex ante basis (OTA, 1986; Kalter et al., 1985) have differed considerably in their projections of the regional impacts of bGH. OTA has projected that because industrial-scale dairy farms in the Sunbelt and Northwest regions have more favorable rates of return than dairy farms in the Great Lakes states and the Northeast, they will be in the best position to adapt to the severe price declines likely to result from supply increases due to introduction of this technology. Kalter et al. (1984, 1985), on the other hand argue that since effective use of bGH requires increased feed quality, farmers who produce all or most of their feed and have land suitable for producing high-quality grain and forage (i.e., farmers in the Great Lakes and Northeastern states) will be in the best position to survive the adoption of bGH. It is not clear which argument is more persuasive, though even the relatively optimistic view of Kalter et al. with regard to the Northeast is tempered by the fact that even if the Northeast share of national dairy production remains stable, there will still be substantial dislocation if 15, 25, or 35 percent of the region's dairy farmers must leave the sector.

Just how much dislocation there will be and whether it will be due more to technological change than to ineffective federal dairy commodity policy are also major points of contention. Clearly, given 10 percent overproduction in 1985 and the likely ineffectiveness of whole-herd buyouts in reducing milk production for more than a couple of years, a rapid increase in milk production due to bGH would overwhelm the ability of the current milk program to stabilize price. In the absence of an effective program of supply control, milk prices would likely plummet causing nonadopters (and ineffective adopters) of bGH, and high-cost producers generally, to go out of business. To the extent that such a scenario proves to be the case, many have argued that the fault will be with federal intervention in milk markets, which has kept marginal producers in the dairy sector too long and will delay the time when remaining dairy farmers can profit from the increased productivity due to bGH. Others see the preservation of dairy commodity programs as essential to mitigate the dislocating impacts of bGH and other technological changes. Each argument probably has some element of truth. Nonetheless, it does not seem likely that there will be a shift toward a "free-market" dairy sector in the foreseeable future. Thus, a more constructive posture on bGH is to develop alternatives to the current dairy program to deal with the primacy of the overproduction problem.

A largely neglected dimension of the bGH issue is whether dairy farmers will have viable alternative uses of land, machinery, and buildings. The exit of 15 to 35 percent of U.S. and Northeast farmers from dairy may not be so dramatic as often assumed if they can convert to alternative enterprises. It appears that the land-grant universities and state departments of agriculture in the Northeast have done too little to develop technical and marketing alternatives to dairy production for low- and variable-quality land resources that have been devoted to dairying in the past. Nonetheless, given the fact that the land, buildings, and machinery currently used in dairying are relatively well suited to cash grain, cattle, and sheep production, it is likely that many farmers who leave the dairy sector in the next decade will pursue some

combination of these enterprises. The absolute number of farmers displaced from agriculture will probably depend as much on the viability of alternative enterprises as on dairy commodity policy or the production increase made possible by bGH and other technological changes.

If bGH is not enough to cast a pall on the future of Northeast dairy farmers, another prospective set of technologies--reverse osmosis and ultrafiltration--suggests yet another round of socioeconomic dislocations in dairying. These technologies, which have already begun to be used in the processing sector and which are now being developed for on-farm use, reduce the water content of milk by about two-thirds. This permits a significant reduction in transport costs. Farmers who are able to use the equipment will be able to receive higher prices from processors because of this cost reduction. The key for dairy farmers is that reverse osmosis and ultrafiltration equipment is extremely expensive and has major scale economies. Use of the equipment will probably be impractical for herds smaller than 200-300 cows. Reverse osmosis and ultrafiltration technology, which will probably be commercially available in less than a decade, promises to intensify financial pressure on small and high-cost producers and to bring about a significant increase in the scale of dairy farms.

While technological change in Northeast agriculture over the next two decades will be most dramatic in the dairy sector, this period will also probably witness the commercialization of a significant number of biotechnologies applied to crop production. Since these new plant biotechnologies will likely be very diverse, it is difficult to project how they will affect the structure of field and horticultural crop production. Nonetheless, OTA (1986) has projected that crop biotechnologies (new varieties, plant growth regulators, and microbial agents) will tend to be somewhat more capital-intensive than current seed and petrochemical inputs. OTA has thus predicted that future biotechnologies will reinforce the longstanding pattern of structural changes toward concentration in fewer and larger farmers. These impacts, however, are anticipated to be far less dramatic than in dairying.

Land-Grant Research and Extension Programs in Flux

Northeast agriculture faces an incipient crisis, combining adverse national and international structural changes in its major commodity systems, urban pressure on land prices, environmental problems, and technological innovations that will cause socioeconomic dislocations. In addition to federal and state departments of agriculture, the land-grant research and extension institutions will bear much of the responsibility for developing solutions to these problems. Unfortunately, however, research and extension systems in the Northeast states and elsewhere are in the midst of major changes that will constrain their effectiveness in dealing with these problems.

The key change affecting research programs of the land-grant universities (LGUs) over the past five years has been the rapid shift of resources into biotechnology. The LGUs had for a decade been severely criticized for their excessively-applied, commodity-oriented research and their lack of research in the basic biology of agriculture (National Academy of Sciences, 1972; see

the overview in Buttel, 1986b). Galvanized by growing concern about U . S . competitiveness in high technology, by the explosion of private sector interest in biotechnology, and by joint industry and federal government criticism of the LGUs' lack of basic biological research (Rockefeller Foundation, 1982), they have initiated a dramatic shift in their research agendas toward a more basic inquiry in molecular and cell biology. This shift has largely occurred at the expense of applied research--particularly plant breeding in general and the breeding of minor crops in particular (Hansen et al., 1986). Accordingly, LGU research programs have become more oriented to an industry clientele and to generic applications of biotechnology to agriculture and less oriented to problem-solving research geared to the needs of state-level commodity groups.

The movement of LGU research toward biotechnology has, not surprisingly, been highly uneven. It has been most pronounced in the larger experiment stations. In the Northeast the emphasis on biotechnology has been greatest at Cornell, Penn State, and Rutgers, while the smaller stations in the six New England LGUs have lacked the resources to move aggressively into these expensive areas of basic inquiry. The increased orientation of LGU research toward biotechnology thus appears to be exacerbating an already large disparity in research capacity among state universities in the region. This would not be so serious if there were an effective plan to coordinate and establish a division of labor among the Northeastern LGUs. Unfortunately, previous attempts at coordination have been largely unsuccessful. The result is a dualistic research system in which three large LGUs in the region are becoming more oriented toward basic research, the results of which will tend to be transferred to industry for use across the country, while the six New England LGUs have research budgets too meager to meet the needs of their diverse producer clienteles.

Historically, the pivotal component of the LGU system has been the federal-state partnership, which has led state-level farm groups to favor state government appropriations for research.³ New York State dairy farmers, for example, find it appropriate to encourage the state government to appropriate funds to Cornell University to help New York dairy farmers compete with counterparts in other states. Thus, the backbone of financial support for LGU research has increasingly become state government funding, and the LGUs have come to play a major role in creating technology adapted to the agroecological conditions of their states. The LGU shift into biotechnology may, however,

³The significance of the LGUs' ability to receive the bulk of their public funding from state governments lies in long-recognized tendencies: for research to be of greater benefit to consumers than farmers (Schultz, 1978) and for farm groups to be ambivalent about supporting federal research appropriations (Hadwiger, 1982). This is largely accounted for by two factors: (1) farm groups' federal policy priorities tend to lie in commodity policy, and (2) research that increases productivity through output enhancement tends to result in lower prices and lower revenues for farmers, because of low price and income inelasticities of demand for most agricultural commodities (Schultz, 1978). The federal-state partnership in the LGU system, which transforms farmer's general ambivalence about research into support for state-specific, locally-adapted research, has been a crucial and often unrecognized parameter of the LGU system.

portend severe strains in this state funding base. Pharmaceutical, chemical, and small biotechnology startup companies will become increasingly important as a clientele of LGU biotechnology researchers. These firms, at least in their early product-development efforts, will be primarily interested in developing large national and international markets.⁴ They are thus unlikely to be interested in minor commodities or the technical problems of producers in minor agricultural regions such as the Northeast. The corresponding (though largely de facto) deemphasis on state-level producer groups as the key clientele of the LGUs may diminish the extent to which these groups support appropriations for their LGU.

Recent controversies surrounding the LGU role in developing bGH may be a harbinger of a new politics of agricultural research that will result from the increased emphasis on biotechnology in the LGUs. As farmer groups have become aware of the possibility that bGH will lead to major dislocations in the dairy sector, some have openly criticized LGUs (principally the University of Wisconsin, but also Cornell University) for conducting research that will result in the demise of so many farmers. This response is unprecedented: For the first time in history, state-level farmer groups have been critical of or apprehensive about an LGU-developed technology more than two years before its commercial introduction. An extremely difficult public relations problem for the LGUs has ensued. Whether the bGH situation will prove to be an isolated instance or will represent a new wave of farmer scrutiny of LGU research priorities is difficult to forecast.

The institutional changes currently occurring in the LGUs in the region have several possible implications. First, it is likely that a shrinking proportion of research efforts will be devoted to applied research on the region's agricultural problems. Second, given state government fiscal austerity and the increased orientation of land-grant research away from locally-adapted, applied research, the future of state political support and public funding for the LGUs may be problematic. Finally, increased disparity among the region's LGU research programs suggests the need for greater regional coordination and a division of labor to more effectively utilize limited research resources. Whether such coordination can be achieved is difficult to predict.

LGU extension programs are also in the midst of crucial challenges that cast doubt on their ability to address the growing problems of Northeast agriculture effectively. One challenge is financial. Extension has for several years been considered low priority by the Federal Office of Management and Budget. It has only been with great difficulty that massive federal budget cuts in extension have been averted. Since most LGU extension programs tend to be heavily dependent on federal funding, major federal budget cuts would cripple

⁴Since most major agricultural biotechnology firms are integrated chemical-pharmaceutical-seed suppliers, it can also be predicted that these firms will tend to emphasize biotechnologies that complement rather than supplant the use of agrochemicals. This tendency is illustrated, for example, by the fact that development of herbicide-tolerant crop varieties, which permit farmers to use larger doses of herbicides, is the single-most-common research goal in the private plant biotechnology industry.

extension programs in most states in the region. The second challenge facing extension is that it must begin to adapt rapidly to major shifts in the nature of its clientele. The traditional clientele--large, technologically-innovative farmers--is increasingly tending to bypass county-level extension staff in gaining access to new technical information. These farmers increasingly contact university extension staff directly or bypass extension entirely, obtaining information from private management consulting services or industry representatives. At the same time, the numerical predominance of farmers has shifted decisively from full-time commercial-scale farmers to part-time, low-sales-volume farmers. Extension programs have been slow to reflect this reality and have yet to cultivate this and related constituencies (e.g., the growing nonfarm population of nonmetropolitan counties).

TURNING CRISIS INTO OPPORTUNITY: A FIVE-POINT PROGRAM FOR REVITALIZING AGRICULTURE IN THE NORTHEAST

I have argued that the incipient crisis of Northeast agriculture has multiple causes: structural changes in major commodity systems; the prospect of high and rising land prices; environmental degradation caused by prevailing agricultural practices; ominous implications of prospective technological changes in dairying for small to moderate-sized farms; and constraints on public agricultural research and extension systems. In this section I would like to set forth a multi-point agenda to address the current and prospective problems of Northeast agriculture. None of the strategies identified below is novel. All have been set forth repeatedly by scholars and policymakers in the region. The contribution I hope to make, however, is to show how each strategy can contribute to solving several of the problems that threaten the future of Northeast agriculture.

Research in the Development of Alternative Agricultural Enterprises

As the Northeast has become increasingly specialized in dairy production, there have been repeated calls to develop strategies for reducing dependence on this single commodity. The evidence available at this point, on the economic future of the dairy industry and the likely impacts of new dairy technologies, underscore the need for bold new programs across the region to develop production alternatives for dairy farmers. Much the same could be said for poultry and some types of horticultural operations, such as potatoes.

Research on alternative agricultural enterprises will obviously be a crucial component of the effort. But as the evolution of the poultry and major horticultural crop systems over the past two decades clearly shows, a conversion strategy must involve market development as well. Agricultural research will be largely the responsibility of land-grant institutions, while market development should ideally be the joint responsibility of the LGUs and state departments of agriculture. The importance of socioeconomic and institutional research aid development can be gauged, for example, by the recent success of broccoli production in Maine. This growing sector was made possible in large part because of a state marketing order which established quality standards and made Maine broccoli more attractive to wholesale and retail purchasers. In

addition to state marketing orders, research and development efforts should focus on mechanisms, such as marketing cooperatives, that do not require state government intervention (but which may benefit from state technical assistance and subsidies during their establishment phase).

Programs for commodity diversification and market development should take several factors into consideration. First, such programs should have formal recognition in the LGUs, be allocated research and extension resources, and be given attention in outlook conferences and extension agent training meetings (just as much as the major commodities currently do). Second, such programs must be broad-based and consider not only "traditional" alternatives, like livestock and horticultural commodities, but also nontraditional commodities such as forest products, aquatic products, ornamentals, tourism, and so on. Third, such programs must recognize that farmers in their states are extremely diverse in scale, resources, labor availability, and so on. Thus, diversification and market development efforts must be targeted to the needs of specific types of producers. Particular emphasis should be placed on the needs of the many small and medium-sized dairy producers who are likely to be displaced over the next 15 years.

Reduced-Input Agricultural Systems

A second cornerstone of an integrated effort to revitalize Northeast agriculture should be research on reduced-input agricultural systems. Reduced-input systems, which can be defined as those which minimize the use of purchased petrochemical inputs, have several rationales (see Buttel et al., 1986a). First, given growing environmental problems, a reduction in petrochemical inputs, increased use of crop rotations, and closer integration of crop and livestock enterprises would reduce erosion and the contamination of surface and subsurface water by chemicals. Given the growing concern about groundwater contamination, it is not unlikely that there will be more stringent regulation of agricultural practices in the future. Intensified development of agronomic and pest management practices that reduce the use of chemicals would provide Northeast farmers with alternatives if such regulations become necessary.

Second, reduced-input agricultural systems would be of particular benefit to farmers who have limited access to capital. Such systems would enable smaller producers to improve their efficiency and provide them with alternatives to the capital-intensive systems that are being emphasized in private-sector biotechnology research. Third, the availability of efficient methods of producing crops and livestock with fewer chemical inputs would facilitate the development of broader specialty markets for "organic" produce. Fourth, reduction of agricultural input usage could provide a clear theme for the orientation of biotechnology programs at the region's LGUs. Biotechnology has much to offer in reducing the use of purchased chemical inputs (e.g., via bacterial pesticides, allelopathic mechanisms of weed control, and nitrogen fixation). Biotechnology programs in U.S. LGUs, however, have generally pursued institutional goals--greater LGU access to funds from industry and government, retention of highly-qualified scientists, revenues from licensing of patented technologies. With few exceptions there has been little explicit focus on

solving specific, locally important agronomic problems. Reduced use of chemical inputs would provide such a focus--one with broad relevance to the problems of the region and with specific relevance to the technical and economic problems of the smaller farmers who vastly predominate in numerical terms. Establishing a reduced-input focus for biotechnology research would also be an effective counter to the adverse publicity that has been generated by the LGU role in developing the first major agricultural biotechnology: bGH.

Implicit in the foregoing discussion of biotechnology's potential contribution to reduced-input agricultural systems is the notion that research on reducing chemical inputs should not be confined to highly-applied research. Indeed, for reduced-input research to bear long-term fruit it must be undergirded by a sustained program of basic research in agroecology. In the LGU's rush into basic research in the 1980s, biotechnology has often been taken to be synonymous with molecular and cellular research. This assumption should be strongly challenged, since ecology is a basic science with clear relevance to agricultural production problems. It is, moreover, a basic science in which LGUs have underinvested for a long time. The promise of basic agroecology research is to be able to mimic ecosystemic processes of nutrient cycling, energy flow, and pest control so as to achieve sustainable high yields with a minimum of energy inputs. Thus, a program of reduced-input agricultural research will require a diverse approach--both basic and applied research, with basic research inputs from agroecology as well as biotechnology; multiple-species research within an agroecological and applied "farming systems" framework. It also requires an institutional commitment to ensure that these diverse elements are properly integrated and targeted to the need of producers.

Extension and Research Programs Geared to Small and Part-Time Farmers and to Rural Development and the Cultivation of New Constituencies

The LGU system has been subjected to criticism on social justice grounds for over a decade. The most common social-justice position is that the LGU system should devote more of its research to the technical needs of small and medium-sized farmers. My arguments for reorienting the LGU system are somewhat different from those of past social-justice critics (e.g., Hightower, 1973) in three respects. First, I would argue that there are few ways in which research alone can decisively advantage small producers over larger ones; research is a weak instrument for achieving social changes, such as restoring the position of small and medium-sized farms to the prominence they enjoyed several decades ago (see Buttel et al., 1986a). Consequently, second, reorientation of the Northeast LGUs toward the needs of small, part-time and medium-sized farmers should be based more on extension than on research, though, as has been increasingly recognized in recent years, an integral part of extension is a daptive research. The rationale for extension over research to address the needs of small and medium-sized farmers is not merely that research alone can do little to help smaller operators outcompete their larger counterparts. Equally important is the fact that extension is the LGU's constituency--and political-support-building arm, as well as their technology transfer arm (McDowell, 1985). This function will become increasingly important in assuring the funding base of the LGUs in the future, since full-time, commercial-scale farmers are becoming a smaller component of the farming community. Thus, third,

the LGUs can be urged to adopt such an agenda not simply based on social justice premises (though these could arguably be said to be at least implicit in the Hatch Act) but out of institutional self interest.

Effective cultivation of a constituency of low-sales-volume, part-time farmers has more than a political rationale. First and most important, these farmers have needs that should be addressed by the LGUs. There is also evidence that the prevalence of part-time farms and the proportion of farm persons in the total population are positively associated with per capita income and retail sales in nonmetropolitan counties of the Northeast (Buttel et al., 1986b). Thus, LOU institutions can make a broader contribution to the welfare of rural residents by giving greater support to low-sales, part-time farmers.

It is my perception that in recent years there has been a declining commitment by the Northeast LGUs to research and extension in rural development. As the financial pressures on LGUs (e.g., investments in expensive biotechnology research, stagnant federal funding of research and extension) have increased, rural development activities have tended to be sacrificed. This may be unwise from a long-term perspective, for both political and programmatic reasons. The Northeast's nonmetropolitan nonfarm constituency is potentially vast, since it is about twenty-fold that of the farm population. Programmatically, rural development and employment-promotion activities can help to maintain the viability of part-time farming, which is now the numerical backbone of the region's farm structure.

While I believe there is a sound rationale for greater extension and research efforts devoted to the problems of part-time, low-sales farmers in the region, I do not wish to imply that the effect of such a shift should be to eliminate LGU' attention to the .problems of large farmers. It is a clear fact of life in the U.S. and most other countries that public research systems must be prepared to assist larger farmers if they are to sustain their funding base. Instead, my argument would be that extension (and, to a lesser extent, research) resources should be reallocated so that different size groups of farmers receive the quality and quantity of assistance commensurate with their numbers and shares of agricultural output.

Research and Extension Programs to Ensure the Availability of New Agricultural Technologies to Farmers of All Sizes

The U.S. and Northeast dairy sectors are in a state of incipient crisis because of overproduction, inadequate commodity programs, the likelihood of vast productivity increases, and the tendency for new technologies to be biased toward the management skills and resources of large operators. Several of these factors are beyond the influence of institutions and policy in the Northeast region. However, one area in which state institutions do have responsibility is in attempting to make new technologies as broadly available as possible.

Two major new technologies that will affect Northeast agriculture are bGH and reverse osmosis/ultrafiltration. The former is already controversial, and the latter will likely become controversial because of the role of LGU institutions in its development. There are legitimate differences of opinion

about whether LGUs should participate in developing such technologies. However, it should be clear that a legitimate and necessary role of the LGU system is to assist farmers of all sizes to utilize new technologies. In particular, where new technologies, because of their capital-intensity, management requirements, or scale economies, make it likely that larger farmers will adopt them more effectively, special efforts are warranted to redress these biases.

In the case of bGH, with its tendency to place a premium on management skills, extension and applied research are needed to enhance the management capacity of small and medium-sized dairy farmers, enabling them to utilize bGH effectively. Reverse osmosis and ultrafiltration technology, while it is several years away from commercial availability, seems likely to confer major scale benefits on large dairy operations. Research avenues should be explored with regard to smaller-scale applications of the technology and organizational innovations, such as cooperative use by smaller operators.

Public Policies to Restrain Land Prices

High land prices, relative to comparable land in other regions, have long been a major problem for Northeast agriculture. Driven by the nonfarm demand in a densely-populated region, Northeast farmers will continue to suffer from high relative land prices. Preferential taxation, the region's principal policy response to farmers' real-estate costs, has little leverage on the problem and may well exacerbate it, if the tax reductions are capitalized in farm asset values. New thrusts are needed to deal more directly with the land cost to farmers. As Brake et al., (1984) of Cornell University have argued, consideration should be given to a purchase of development rights policy by state and local governments. This would eliminate market-driven pressure to convert farm land to nonfarm uses and prevent escalating land prices at the rural-urban fringe.

A further policy option, applicable in both metropolitan and nonmetropolitan settings, is that of states levying penalty taxes on capital gains from the sale of farm (and rural forest) land, with the added tax revenues targeted to agricultural research and market development of the LGUs, state departments of agriculture, and private groups. Such a policy in a relatively mild form (a capital gains penalty tax on large profits from land held for a short time) has already been implemented in Vermont. Capital gains penalty taxation schemes would discourage nonfarm investors from buying agricultural assets and diminish the incentive of farmers and bankers to premise investments on expected asset appreciation. Moreover, to the degree that these programs are effective in restraining land price increases, they would complement efforts to reduce the use of land-augmenting agricultural chemicals and thus the environmental consequences of agriculture.

One feature of each of the four previously-discussed strategies for revitalizing Northeast agriculture (as well as of preferential taxation) is that most farmers can be expected to favor these policies. Purchase of development rights and, in particular, heavy taxation of capital gains from sale of farm and rural forest lands would be opposed by many farmers and other rural land owners. Farmers would likely not be swayed by the argument that

the collective effect of their individual ability to profit from farm asset appreciation is a price structure that severely hampers the ability of Northeast farmers to compete with producers in other regions. Thus, successful enactment of capital gains legislation will likely need to be packaged with concessions to farmers. One, mentioned earlier, would be to target the tax revenues to research and market development activities that improve the state's agricultural competitiveness. A second might be to combine the capital gains tax with legislation to ease intergenerational transfer of farm property.

CONCLUDING REMARKS

Northeast agriculture has been relatively fortunate in that it has not been subjected to roller-coaster forces during the 1970s and 1980s that culminated in a virtual farm depression in the corn belt and Great Plains. Nonetheless, there is an incipient crisis of Northeast agriculture that demands far-reaching policy changes on the part of the region's land-grant universities, state departments of agriculture, and state governments.

I am realistic enough to recognize that few of my recommendations are likely to be implemented; and even if they all were, major problems would remain for many of the region's farmers. Moreover, many of these problems cannot be dealt with through LGU or state government policy changes. For example, the massive productivity increases in dairying would render current dairy commodity policy ineffective. Perhaps an analogue of the Canadian system of marketable dairy production quotas may be the only means by which the federal government can deal with over-production while reducing milk price instability. Nonetheless I hope, these remarks will lead to recognition that the region's farm problem goes beyond the financial stress and will stimulate discussion of policy alternatives.

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THE FARM CRISIS AS A TIME TO CHOOSE: NECESSITY AND OPPORTUNITY

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Frederick Buttel's "The Crisis and Opportunity of Northeast Agriculture" is a lucid, comprehensive and on the whole persuasive account of the major forces shaping the future of agriculture in the northeastern U.S. He makes clear that the search for sustainable agriculture in this region will take place in a setting of intense interregional, even international, competition facing our current dominant commodities. Rapid, but highly selective technological innovation and an overhaul of Federal farm credit and milk pricing policy will also have substantial effects.

Buttel is the bearer of mostly bad news for the Northeast. In fact, I am convinced that certain ominous trends have progressed even further than he suggests. However, it seems to me that we can glimpse some rays of hope for a "sunrise agriculture" if we understand the trends and respond to them creatively. One such trend is "suburbanization" of the Northeastern countryside. Another is a tendency toward chronic overproduction of several staple food commodities. A third is the evolution toward large scale "industrialized" production of many staples. The good news is that these symptoms of crisis create the opportunity -- indeed, the necessity -- for strategic choices to re- shape the long term future of farming.

My analysis diverges from Buttel's only on two points of real importance. The first is his interpretation of the current Midwest farm financial crisis; the second is his characterization of the current situation in the Northeast as an "incipient crisis".

1980s Farm Crisis: "Made in Washin ton"

This is not the place for a treatise on causes of the Midwest farm debacle. However, one difference of interpretation with Buttel is relevant to the Northeast. He observes (p. 19) that the 1980s show considerable continuity with patterns of the 1950s and 1960s, concluding that conditions in the halcyon 1970s -- booming farm exports, high incomes and rising land values -- were not sustainable over the long run. This contention is probably correct. But what Buttel does not discuss is the gross inadequacy of the Reagan Administration's farm policy to deal with the symptoms of the crisis, much less with its deeper causes. It was not inevitable that a return to the trend lines of earlier decades had to occur so abruptly or with so much economic chaos, inequity, and human agony.

Even more important than inept farm policy has been the perverse impact of general economic conditions and macroeconomic policies. (This is nothing new. General economic policies and trends have had a great impact upon the fortunes of American farmers and the evolution of farm structure at least since the Civil War.) "Reagonics" from 1980 to 1983 was a concoction of tight monetary

policy, massive tax cuts and increased Federal expenditures (largely defense and automatic anti-recession spending). It was designed with virtually no thought about its impact on farming. (Most economists would contend that the components of policy were inconsistent and were implemented without a clear grasp of their probable combined impacts upon the economy.) Several results of Reaganomics -- a deep recession, an overvalued dollar and punitively high real interest rates -- were devastating for export agriculture in general and for younger, highly leveraged grain farmers in particular.

Two implications are important for Northeast agriculture: first, it would be naive to think that state and Federal farm policies can fully counteract adverse effects of macroeconomic policy. Second, it would be naive to count on much support for our regional farm strategies from the present administration in Washington.

Incipient Crisis in the Northeast?

A second difference of opinion with Buttel is at whether we face an incipient of full fledged farm crisis. If the crisis is at an early, formative stage, that seems to imply that crisis conditions can be averted -- and that we can avoid major changes in the existing production and marketing system -- by appropriate policies. Since I know Maine's farm situation better than that of other New England states and Eastern Canadian provinces, I will focus on evidence of crisis in Maine. Conference participants from other states and provinces can determine whether Maine's recent experience parallels their own. A strong case can be made that the crisis in Maine has passed the point of incipency. Specifically, it is quite unlikely that any new policy initiatives could sustain a prosperous farming system at its current size and socio-economic importance so long as over ninety percent of production continued to come from the handful of commodities that have dominated since World War II (i.e., poultry, potatoes, dairy, apples and blueberries).

Before discussing Maine's current farm crisis, we should note that "crisis" does not simply mean "bad times." Webster's definition is more useful: "crisis is a stage in the sequence of events at which the trend of all future events is determined ... a turning point ... a decisive stage ... a condition of instability." In all these senses Maine agriculture is in crisis. In the sweep of history, crises are not marked by one but by numerous indicators. And major turning points are frequently not recognized clearly until well after the fact. Thus, I cannot claim to know that the 1980s are a turning point for Maine Agriculture

Certainly much of what we observe today is a continuation of long standing trends, for example the decline in dairy farm numbers and Maine's falling share of the U.S. potato market. In some cases important turning points came well before the 1980s, for example net farm income in real terms has tended downward for 10 years (in 1980 it was negative) and per acre potato yields peaked in the 1960s. However, a quick and dirty assessment of the "big six" commodities (accounting for over 90% of 1980 farm sales) indicates that since 1980, all have faced or now face serious problems.

Eggs: Maine retains a prominent place in the New England brown egg "niche", but long term trends in demand and Maine production are downward. Real sales revenue fell 49 percent between 1979 and 1985; 1984 volume was the lowest since 1971. It is debatable whether this is a full-fledged "crisis". The few remaining egg operations are industrial "factories in the field" whose central function is to pump "imported" midwest grain and various chemicals through caged layers. As Buttel argues, profitability stems from their distribution networks, not from egg production. They have little to do with sustainable agriculture as I understand it.

Broilers: With the collapse of Maine's processing industry in the early 1980s, broiler production plummeted from a \$100 million a year business to a quarter of that volume. Hundreds of broiler house operators were shut out of the market and few had viable alternative uses for their fixed capital. This was a crisis par excellence. Based on what I have heard, current moves to re-open one or more processing plants are not likely to mean significant revitalization for an industry which has lost its comparative advantage to regions with more modern facilities and better access to feed.

Potatoes: Although production, acreage and market share have been declining for some time, the past two years appear to have been a major shake-out. 1984 and 1986 production levels were the lowest since the 1930s depression and acreage is the smallest since the turn of the century. For the second time in five years, net income was probably negative for the 1985 crop. In 1986 it appears that another 10 percent of growers went out of production. The potato-dependent economy of Aroostook County is in a severe depression.

Dairy: After holding fairly steady at 1050-1100 farms since the late 1970s, the number has declined by about 15 percent since 1984 (including 86 farms participating in the whole herd buy-out). Real milk sales peaked in 1983. Uncertainties stemming from Federal milk price policy and new production and handling technologies are well analyzed in Buttel's paper. I share his "best guess" that many small and medium size dairy operations will go out of business in coming years. With chronic oversupply, and yet more new technology coming on line, it is hard to see how any but the most efficient operators will be able to earn a tolerable return on investment. In some parts of the state, declining farm numbers will probably lead to a vicious circle of deterioration in farm supply networks and milk pick-up routes. Growing demand based on higher regional population and per capita dairy consumption may partially offset these

negative forces. However, the majority opinion in the Dairy Diversification workshop at this conference is that by 2000AD Maine will probably lose 300 to 500 more dairy farms, while milk volume holds constant or declines moderately.

Apples and Blueberries: Production, but not sales revenue, has increased substantially in recent years. In the case of apples, new plantings were prompted by expected demand growth. In the case of berries, innovative cultural methods have dramatically increased yields from a relatively fixed acreage. In different circumstances these two crops might have great growth prospects. The catch is that producers outside Maine have also increased production. And it appears that the most lucrative growth is not in Maine's apple and blueberry varieties. The paradox of rising productivity in American farming has long been that consumers, rather than producers, capture most of the benefit. In markets characterized by inelastic demand, rapid supply shifts mean falling prices and often declining total revenue. This seems to be the case with apples and blueberries. Private and public efforts are being made to stimulate demand for fresh, stored and processed fruit products. But, the sources I read do not lead to great optimism. (An aside: the state agriculture department in Texas, of all places, is promoting a local blueberry industry to compete with imports from the, North!) (Sources: Allen, Clark, CRAS, Libby, MDA, Smith, Wood)

To my mind, the present period is a turning point for Maine agriculture. However, I am not a Cassandra, predicting imminent collapse of any of these specialized commodity systems. It is possible that one or more will be revitalized and even experience growth. Certainly important goals of farm policy must be to encourage increased efficiency and to stabilize production at profitable levels. But no persuasive case has been made that Maine agriculture can continue to depend 90 percent on these commodities and regain anything like the scope and economic vitality it had as recently as the 1970s. Thus, it is logical that we give priority to a search for profitable diversification opportunities for farmers who have specialized in commodities with doubtful future prospects. For some operators diversification may mean adding a supplementary enterprise, like brocolli on potato farms. For others it may mean wholesale conversion to new commodities. A central goal of this conference is to learn more about successful diversification experiments around the region.

Crisis as an Opportunity to Choose

In Buttel's analysis, two important trends for the coming 10-15 years stand out. The first trend combines a tendency toward chronic overproduction and a continued shift toward industrialized agriculture. This trend is national, even global, in scope. The second trend is rapid economic and demographic growth on the Northeast's urban fringe -- what I call "suburbanization of the countryside". It is worthwhile to contemplate the implications of these two

patterns for what is possible and what is desirable in New England agriculture.

Over the remainder of this century we are likely to witness rapid development and diffusion of new farm technologies, contributing both to abundant food supplies and increasing concentration of production on large farms. International competition is also likely to be intense in many markets. The almost certain implication of these trends is that most producers of staple foods face the prospect of low and unstable returns to investment.

Economies of large size -- combining technological, managerial, marketing and tax advantages -- will reinforce the current trend toward fewer, larger production units. In all likelihood, a growing proportion of staples will be produced by farm businesses with more resemblance to industrial enterprises than to traditional family farms. Finally, it appears that an increasing proportion of U.S. farm production will be done by contract producers, bound to large, vertically integrated agribusiness corporations (OTA).

My point: if this is the more-or-less inevitable future for most staple farm commodities -- from corn to potatoes -- who needs them? To put it less glibly, if these long term trends in farm economics and farm structure for most staples are unavoidable, then why should the 98 percent of New Englanders who are not farmers foot the bill for continued public support of agriculture? What are the public interest and equity arguments for subsidizing large industrial farms? Indeed, there are several reasons not to promote industrial agriculture. It does not appear that food supplies will be at risk if we do not produce staples locally. Low and precarious farm profitability makes for an unstable local economy. Industrial agriculture contributes relatively little to the economic and social vitality of rural communities, compared to family farming. Evidence from Maine and elsewhere suggests that hired laborers on very large farms are often exploited; their typically high rates of job turnover and their low incomes do not enhance community vitality (Goldschmidt). Contract production for "monopsonistic" agribusiness corporations erodes farmers' entrepreneurial independence (Harris). Undoubtedly we could find a few large scale egg factories, orchards, dairies and potato farms that do not have these negative side-effects. However, the burden of proof is on those who believe that the side-effects could be avoided if the farm system as a whole shifted toward industrial agriculture.

I doubt that this is the future New England's legislators and tax payers have in mind when they design and pay for farm programs. New Englanders have been remarkably supportive of local farming, considering its relatively small and shrinking economic significance. I suspect that non-economic values largely motivate popular support. They have much to do with preserving a rural, pre-industrial heritage, with real or imagined virtues of independent family farms, and with enlightened self-interest in maintaining open space and diverse rural communities. To the extent that farm production per se motivates citizen support, I suspect that concern about product quality, like freshness and variety, is more important than concern about basic subsistence needs (Lockeretz). Finally, I suspect that most farmers too prefer family farming and the type of rural community it fosters, over "factories in the fields" and the communities they breed.

In New England a distinctly non-industrial type of farming -- call it "niche agriculture" in contrast to "staples agriculture" -- has grown in recent years. "Niche farmers" produce differentiated products for local markets, rather than homogeneous products that enter national and international channels. The term "local market" is deliberately vague: it can mean a single town or all of New England, depending on the commodity and the marketing strategy. Without elaborate supporting arguments, I will assert that promoting a further shift toward niche farming is socially desirable, even if it contributes little to subsistence and fails to generate megabucks in gross sales. Its products do contribute significantly to consumer well-being. It is conducive to family farming and entrepreneurial independence. And it enhances social and economic vitality in rural communities. In sum, New England is not geographically well suited to compete in producing many staple foods, but our declining competitiveness presents an opportunity -- as well as the necessity -- for a transition toward a new commodity mix and farm structure that promise to be more stable and beneficial.

The second trend I want to explore is "suburbanization of the countryside". Expansion of shopping malls, housing developments and recreational complexes into farm country is usually identified as a major problem facing New England agriculture. The problem is typically analyzed in terms of fast rising land values and property taxes. It also takes the form of environmental regulations, nuisance laws, and vandalism -- changes which raise farmers' production costs and restrict their freedom of action. However, my recent' research suggests that suburbanization can be "part of the solution" not just a set of obstacles, if it is limited and channeled by appropriate policies. A study of three southern Maine towns revealed five different ways in which an affluent and growing non-farm population contributes to the vitality of small family farms:

- °It generates local employment opportunities, many meshing well with part-time farming.

- °It creates profitable local market niches for specialty farm products, ranging from fresh vegetables to landscape shrubs; and value added products, like home-baked goods and hand knit woolens.

- °Many of the "commuter gentry" are anxious to preserve their open fields (and save on property taxes), so they lease prime land to farmers at subsidized rents.

- °Numerous farmers supplement their incomes, and utilize their equipment more fully, by doing custom work (rototilling, car repairs, snow plowing) for non-farm neighbors.

- °Some local farm suppliers, like veterinarians and feed dealers, are able to stay in business because of their affluent suburbanite clientele (Vail 1985, 1987).

Suburbanization tends to benefit primarily small, part-time "niche farmers", while eroding the economic viability of larger "staples farmers". Given the nature of capitalist economic growth, suburbanization seems to be unstoppable in southern and coastal New England. Thus, there is both a need and an opportunity to shift the balance of farm policies toward a niche agriculture which is "symbiotic" with suburbanization. But even for niche farming, long term survival is no sure thing. Given the predatory power of speculative real estate development, an unplanned suburbanization can sweep away virtually all

farming very rapidly. As a result, sustainable agriculture in fast growing parts of the region requires more than a shift in farm policy. It also hinges critically on systematic land use planning to contain development pressures and on much closer integration between farm policy and other components of state and local economic development strategy.

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PRECONDITIONS FOR A NORTHEASTERN AGRICULTURAL SUNRISE

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The situation of a region in a country is similar to the situation of a country in the world. The conditions under which a region can prosper in a country's economy are therefore similar to the conditions under which a country can prosper in the world economy. But differences exist, too. My purpose is to use both the similarities and the differences to throw light on the prospects for agriculture in the Northeast and on what can be done through public policy to improve those prospects. ("The Northeast" in this paper means New England, New York, Pennsylvania, New Jersey, Delaware, Maryland, and West Virginia, although some statistics quoted omit the last three states.)

COMPARATIVE ADVANTAGE IN AGRICULTURE?

The term "preconditions for change" is taken in this paper to mean elements of the situation which promote change. But they certainly do not cause change (as a sufficient condition would), nor are they absolutely required for change (as a necessary condition is). Necessary and sufficient conditions in economics occur only-in models, in formal representations of economies. Thus, in certain models of free trade, comparative advantage in agriculture is a necessary and sufficient condition for a country to export agricultural products. But actually a comparative cost advantage isn't sufficient, for example because high transportation costs might preclude profitable trade; nor is it necessary, for example, because a country might subsidize agricultural production or exports. To keep from being bogged down too much in models, this paper sticks to the less formal term "preconditions".

The key preconditions for sunrise in (parts of) Northeast agricultural turn on comparative cost advantages. This is even more true than for a nation, say the U.S., in world agricultural trade. One reason is that transportation, communication, and other business linkages between regions are better developed than between nations. A second and more important reason is that political trade barriers are almost entirely ruled out. If it becomes cheaper for the Northeast to import food from other regions, then it will import more food.

There are three main factors internal to the Northeast that could cause changes to occur in the comparative advantage of Northeast agriculture: (1) changes in the resource mix, (2) changes in technology, and (3) changes in demand. There are additional factors external to the Northeast (that could be important: (1) changes in exogenously given (to the Northeast) energy prices, and (2) changes in national policy, e.g., farm programs.

Resource Mix

We often think of a region's resources as fixed, but in at least three important respects they can change in ways that could make a big difference

for agriculture. The first is human resources, particularly the skills and information of farmers. There is good evidence that schooling, even higher education, makes a big difference in agricultural productivity in modern farming. This is not so much because of particular skills or information imparted at school, but because education appears to contribute to farmers' ability to process new information about production technology, appropriate decisions in production and marketing, and generally cope better with uncertainty (See papers by Griliches, Welch, Schultz, and Huffman). During the 1970s midwestern land grant universities graduated many well trained farmers who have become leading farmers in their states: It would have been necessary for the Northeast to invest a lot just to stay even -- it isn't enough to create a slight improvement in skills, since it is comparative advantage relative to other regions that matters. But it might be that an important precondition for sunrise agriculture in the Northeast is better training and skills for operating in commodity niches that the Midwest has neglected.

The second element of resource mix is environmental, including water quality, soil loss, and other externalities. Potential change in the quality of such resources is a big issue in Maryland; it is notable more as a factor that could put a thick cloud in front of any incipient sunrise than as a potential promoter of northeast agriculture. [Of course, environmental problems elsewhere could give a boost to Northeast agriculture. Perhaps the nuclear power plant at Morris, Illinois could be the next Chernobyl. But it hardly seems sporting to look to such a source for help.]

The third aspect of changeable resources is infrastructure: for serving the modern input and capital needs of farmers; for storage and first-stage processing of products; and for transportation, within the region, to other regions and to international markets. I think it is likely that this, more than any other factor, will prevent any real revitalization of Northeast production of the major commodities now produced in the Midwest. What makes the Corn Belt so formidable in agriculture is not just the productivity of its land, but that there is so much contiguous productive land, uninterrupted by mountains or cities, and well suited to the economies of scale that efficient marketing requires today. As with education, perhaps the best route for the Northeast to follow is to search for those specific forms of infrastructure investment that will promote the economic development of agricultural activities that are not so dominated by midwestern production. Unfortunately, I do not have a good notion of what these investments might be.

Changes in Technology

Agricultural productivity, measured as a ratio of output to inputs used, has been growing more slowly in the Northeast than in the U.S. as a whole. Figure 1 shows the trend for crop production per acre, and a similar story is told by the U.S. Department of Agriculture's statistics on total factor productivity (aggregate agricultural output divided by an index of aggregate inputs). This trend may in part be due to more rapidly growing farm size outside the Northeast (Figure 2).

Changes in technology are most likely to cause the sun to continue setting on Northeast producers of the major commodities. The reason lies in

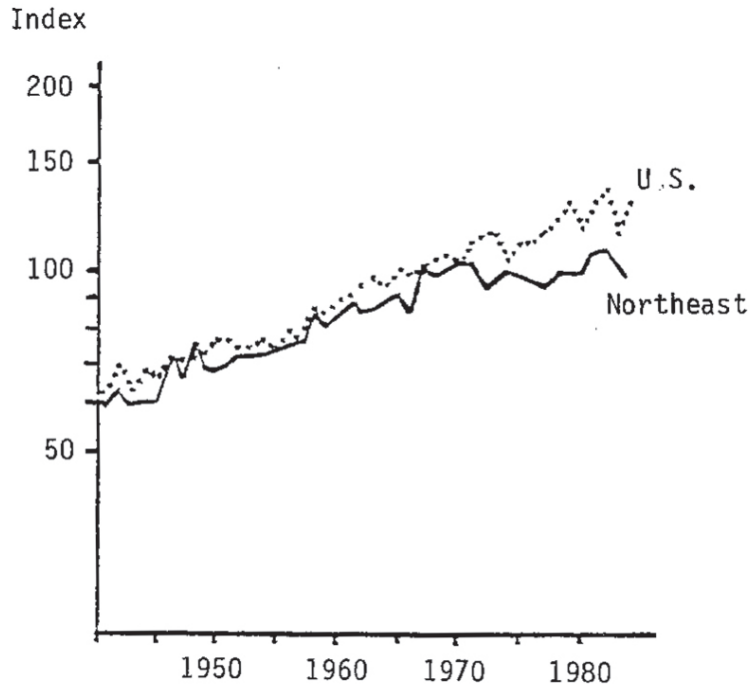


Figure 1. Index of Crop Output Per Acre (1967 = 100)

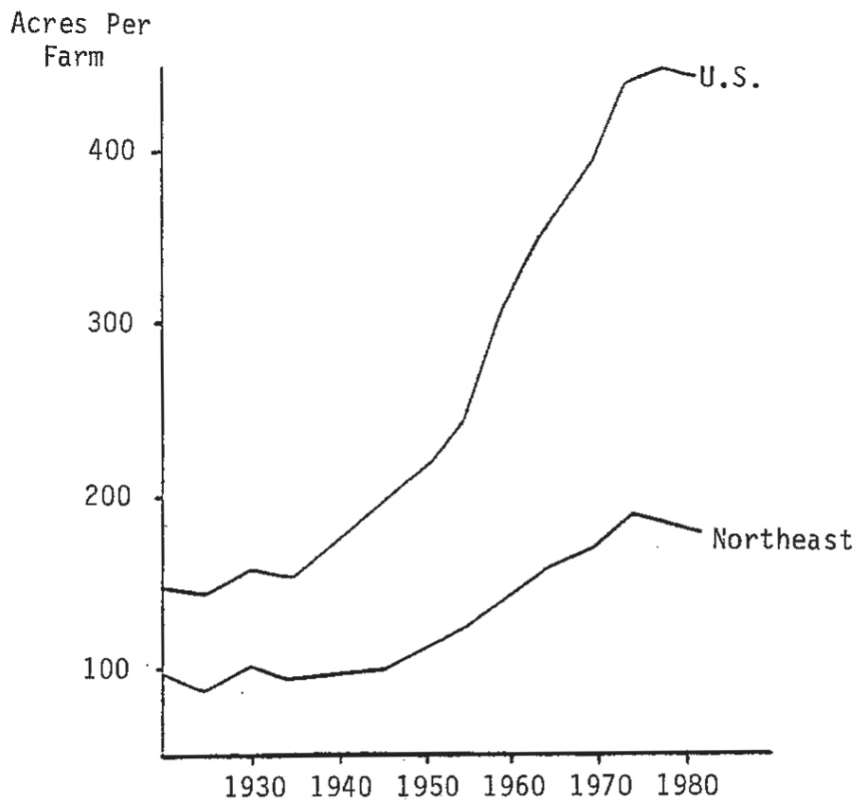


Figure 2. Average Size of Farms

the economics of investment in agricultural research, which seems to be the main source of growth in total factor productivity. This investment is likely subject to economies of size, in that the larger agricultural producing states have a greater potential internal gain for each dollar invested in improving productivity. Of course, if technological improvements were perfectly transferable across state lines, it would not make any difference which state did the research. But, as recent experience with improved grain varieties makes clear, this is often not the case (Evensen and Kislev). The threat here is that the Northeast may find itself further losing out in the "technology race" for nationally important commodities.

Changes in Demand

Two kinds of possibilities are important here. One is a general increase in demand for U.S. farm commodities, for example due to a strengthening of world markets. This is not a matter of comparative advantage but a boost of the rising-tide-lifts-all-boats variety. Unfortunately, worldwide strengthening of demand is not in sight, and it would be foolhardy to base expectations and plans on such a prospect.

Moreover, even if world agricultural commodity markets were to strengthen and U.S. exports were to rise back to 1975-80 levels, it is not clear that this would improve the relative position of the Northeast. The issue here is not regional comparative advantage in a static or "snapshot" sense, but the ability of different regions to respond to a general increase in demand for farm products. The only evidence that we have is what happened during the 1970s and it is tainted because U.S. production increases between the late 1960s and 1970s were a response to a major policy change (the phasing out of acreage set-asides) as well as a market response to higher world prices. Nonetheless, it is worth recalling that the share of U.S. production and inputs accounted for by the Northeast shrank rather than expanded in the export-boom period. The USDA's Northeast (list of states from p. 45 less West Virginia) accounted for 4.3 percent of U.S. cropland harvested in 1969-1970 but only 3.9 percent in 1980-81. Even though the Northeast's cropland acreage expanded by 7 percent during the 1970s, acreage in the rest of the U.S. expanded by 20 percent. Similar trends occurred for aggregate inputs and for farm output.¹

The second possible shift in demand is toward particular commodities in which the Northeast has a competitive advantage. Because the Northeast has always specialized in particular commodities, real sunrise possibilities exist for such shifts to make a difference. As of 1978, USDA's product categories of milk, poultry, fruits, vegetables, and specialty items accounted for 74 percent of the value of farm products in the Northeast, but only 29 percent for the U.S. as a whole. Thus, the idea of regional comparative advantage in agriculture is too broad -- we have to consider comparative advantage for particular agricultural commodities. Unfortunately, the Northeast has been losing mar-

¹Editor's note Frederick Buttel's paper in this volume indicates that the Northeast's share of total farm production increased slightly in this period (see page 11).

ket share in some of its traditional commodities, notably potatoes, milk, and vegetables. Nonetheless, close study of specific commodities is warranted to assess the demand prospects for agricultural sunrises.

Changes in Exogenous Factors

During the 1970s rising energy costs were projected to have the continuing effect of increasing transportation costs. This would increase the cost of interregional trade and hence induce greater self-sufficiency in importing areas. Since the Northeast, according to my estimate, consumes about three times the value of agricultural commodities that it produces -- making the region a food importer on the scale of Japan, with half of Japan's population -- increasing transportation costs would provide a real boost to Northeast agriculture (Gardner 1982). Swackhamer (1981) cites this as a reason why the Northeast's role is "likely to become increasingly important" (p. 16). However, transportation costs have not increased significantly relative to other prices in the 1980s, so no aid from this source has been forthcoming. The future of transport costs, as an Influence on regional comparative advantage, is impossible to predict.

Another price-related factor is farm wage rates in the Northeast relative to elsewhere. High wages have been cited as one factor in the decline of the region's fruit and vegetable industry. As recently as 1970, Northeast farm wage rates were 19 percent above the South (U.S. Bureau of the Census). However, in recent years Northeastern farm wages have fallen so that New England now has the lowest farm wage rates of any region, lower even than the South (\$20.13 per day in the Northeast compared to \$20.76 in the South in 1981).

Federal farm policy could also play a role, especially if supply-controls were intensified under continuing commodity surpluses. Whether the Northeast would be assigned a bigger or smaller share of production under a political acreage allocation, as compared to the present unconstrained market allocation, is not clear.

NON-TRADED AGRICULTURAL GOODS

Although many of the most interesting and problematical issues in the agricultural economy of the Northeast are related to regional trade, some other possibilities should be considered also. These involve non-traded agricultural goods, those both produced and consumed in the Northeast. It could well be that demand for these goods both produced and consumed in the Northeast will increase relative to demand for other agricultural commodities. Even if demand does not increase, it might be more productive to focus research and market development efforts on these goods rather than the ones for which other regions now have a comparative advantage.

Which specific goods are traded or non-traded varies with economic conditions. One reason for focusing efforts toward particular specialty items grown in the Northeast is that they might become exportable. The overall boundary between traded and non-traded goods, as was discussed earlier with

reference to the volume of trade, is influenced by transportation costs. If those costs became high enough, the Northeast could become self-sufficient in everything it can produce that is costly to transport.

POLICY ISSUES

The notion of self-sufficiency leads us to consider it as a policy goal. In international trade, this goal is pursued by means of protectionist policies, e.g., import tariffs or quotas. The U.S. Constitution prohibits such impediments to interstate commerce, but similar results could be achieved by legal means, such as subsidies to state's consumers on purchases of domestically produced goods. So far as I know such a policy is not being advocated for Northeast agriculture, but the goal of moving toward food self-sufficiency for the Northeast apparently does have some political support (see discussion in Bahn and Christensen, 1979).

An important source of tension exists in the promotion of food self-sufficiency for the Northeast. Consider the possibility that higher transportation costs increase the supply price of imports into the Northeast. This improves the competitive position of Northeast agriculture and so would be a welcome development for producers. But it raises the cost of food to Northeastern consumers. For them, a move toward self-sufficiency is a cost, not a benefit. Moreover, since the Northeast consumes far more food products than it produces, consumers' losses would be greater than the producers' gains. In this sense the Northeast as a region is made worse off by the move toward self-sufficiency.

This argument is illustrated in simple supply-demand terms by Figure 3. Initially commodities are available for import into the region at price P_0 . Domestic supply is less than demand at P_0 , but with the effective supply curve to the region being the hatched curve SS_0 , imports are $Q_c - Q$. Now when transport costs increase, supply shifts to SS_1 . Price rises to P_1 . This makes domestic producers better off by area A , and stimulates increased domestic production. But consumers are worse off by $A + B + C + D$. Thus, there is a net loss to the region of $B + C + D$.

Policies intended to boost self-sufficiency artificially would have similar results.

It is sometimes objected that this type of argument is oversimplified and leaves out important elements of the situation. Even an abbreviated discussion of these issues would require a whole paper. My own view is that the argument just given does capture the most important element of the situation and that policies to promote self-sufficiency are typically welfare-reducing for the community that adopts them.

CONCLUSION

The preconditions for a northeastern agricultural sunrise have been discussed as essentially those which would generate new comparative advantag-

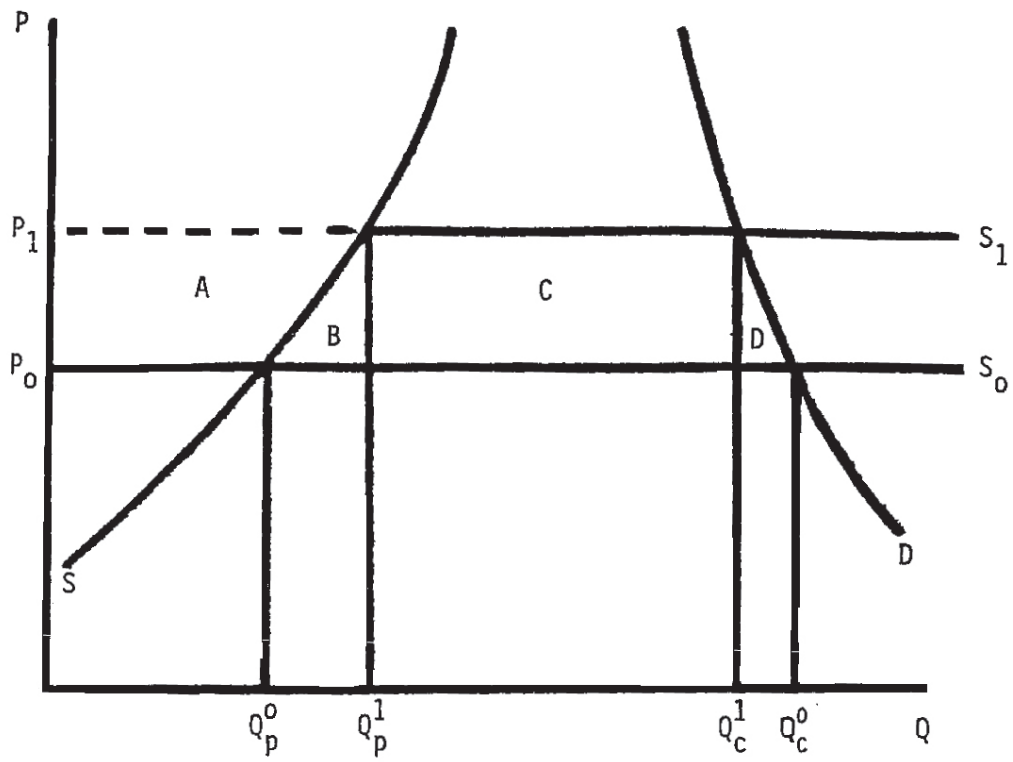


Figure 3. Gains From a Move Toward Self Sufficiency

es for a country in trade. For the region's agricultural sector as a whole there does not seem to be evidence that these preconditions are emerging. However, for particular commodities the picture is brighter. These can only be identified on a detailed, case-by-case basis, which is in fact the approach that this conference takes.

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CREATING A COMPETITIVE ADVANTAGE

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Bruce Gardner's paper is useful as an introductory presentation at this conference because it reminds us that we function in a market economy and that it is critical to understand the economic forces which influence the markets our farmers compete in. We are reminded that the comparative advantages of a region can be shifted by endogenous as well as exogeneous forces, thus giving us clues to proper public policy. Since Gardner focuses primarily on general principles, additional insights can be gained by developing his concepts more specifically to the Northeast region, including the New England states and Eastern Canadian provinces. This paper focuses on the application of some basic economic concepts to Northeast agriculture.

THE CONCEPT OF COMPETITIVE ADVANTAGE

We first need to rearrange the concept of comparative advantage for our situation. Comparative advantage, as used in economic literature, refers to the relative cost of producing two products in one region compared to their selective costs in another region. Thus, although one region may have an absolute advantage in both commodities, society benefits if each region specializes in what it does relatively best and trades for some of the output of other goods. Two aspects of that concept need to be modified for our particular use.

First, production according to comparative advantage results in maximizing the total value of product available to consumers without consideration of external effects or objectives not reflected in the marketplace. The concept is more useful to us in a modified form, where farmers in this region produce for a market at a cost equal to or less than farmers in other regions. Thus, economic development policy would support production if it were as efficient as that of competitors, even though that might not result in maximum global production.

The second modification to the notion of comparative advantage is to include both production and marketing in the calculation of comparative costs. Thus, although Northeast farmers may not be able to produce certain commodities at a lower cost than other farmers, they may be able to produce, distribute, and market at a cost that is less than competitive producers, distributors, and marketers.

I will refer to the concept of comparative advantage modified by these conditions as competitive advantage. The notion of competitive advantage is more useful for our needs. Competitive advantage exists when production, distribution, and sales of a product in a specific market can be done at a cost less than or equal to that of any competitive producer. Competitive advantages may be achieved by providing a particular service with the sale of a product, by offering a product with particular quality aspects, or by adding value to a product through processing or packaging. This implies that Northeast

farmers should consider themselves to be competing with other processes, assemblers, transporters, distributors, and retailers, and not only with other farmers. Since many Northeast farmers are near very large consumer markets, advantages of these non-production activities offer regional farmers additional opportunities. Considering that the non-farm share of total food expenditure is about 70 percent, the potential competitive advantage for certain Northeast farm commodities becomes even more interesting. It may be advantageous for some Northeast farmers to compete more with the post-production than the production aspects of their business.

Post-production competition is not entirely new in the Northeast. About thirty miles west of this location (Orono) is an apple farmer who has developed a retail outlet on his farm. Initially he sold only his own apples at a roadside stand, but now he offers a variety of food products which are an integral part of his operation and the key to his economic success. The business of farm marketing has been taken another step by a Portland-area vegetable farmer, who sells not only at his farm, but also at an in-town retail food store where his produce is supplemented by purchased products, which are clearly differentiated and labelled for consumers. A Connecticut farm, owned and managed by several family members, has developed a large retail market selling a wide variety of food products as well as a golf course complex with a restaurant. They produce a substantial amount of fruit and have recently modernized their apple packing shed. These are examples of New England farmers who have gained a competitive advantage through marketing and service functions. Very successful financially, they would probably fail a strict production-cost test of comparative advantages. It should be noted that in every case they are part-time farmers in the statistical sense; that is, only part of their income is generated from the production of farm products. Most of their income comes from processing and marketing their products, as well as providing customers with other goods and services.

It also means they have increased or maintained the returns to their own labor and management without expanding their scale of farm production. Their per unit production cost is probably comparable to that of larger farmers, and they rely on returns from non-farm production activities to achieve a desirable level of income.

ACHIEVING COMPETITIVE ADVANTAGE

If we accept the notion of competitive advantage, rather than comparative advantage, we are not then limited to the forces of change suggested by Gardner, although several of the forces he discusses can be useful. I will examine five factors, influenced by public policy, which can help farmers gain a competitive advantage.

The first element on almost everyone's list is upgrading marketing and management skills. Before deciding what to produce, farmers need to determine the market demands for their alternative commodities and identify production methods to meet those demands competitively. Those farmers who get involved in the marketing system need marketing skills as much or more than

production skills. They need to be as knowledgeable of focus group interview results as of fertilizer trial results. They need to know how to identify and service market niches as well as how to produce a specialty crop. Providing the opportunity for farmers to acquire both marketing and management skills requires a shift in public programs that currently focus primarily on production.

A second requirement is market information, including perishable information as well as that with a longer horizon. Market surveys to determine trends and project the impact of changes in tastes and preferences are critical if farmers are to respond to current and future market demands. Market analysis needs to be supplemented by analysis of likely production levels in competing regions. How are other farmers responding to changing demands? Are they incorporating technologies which will shift their competitive position? "Perishable" information, gathered daily and concerning immediate supply and demand conditions, is also a vital element in marketing decisions. In most cases, individual farmers do not have sufficiently large volume to justify paying for acquisition of the needed information individually. Some sort of public or joint public-private activity is necessary to establish an adequate information system.

Third, credit needs to be available to help finance farmers through transition periods. In some cases, public capital may be required. Private creditors can usually provide adequate credit to ongoing businesses, but often private creditors are not willing to take the risk of financing transitions, even though it may be necessary for the region's farmers to remain competitive.

Fourth, agglomeration economies, achieved by creating or maintaining a certain critical mass of similar economic activity, helps sustain the region's competitiveness. Most farms are not by themselves large enough to attract supply and service firms or public programs directed to their needs. Thus, we observe the decline of supply and service infrastructures as the number of farms in a particular region declines. Focusing on certain types of farm activity in specific regions can maintain the infrastructure and reduce the costs of input to firms in that industry.

Finally, the transportation infrastructure, and increasingly the telecommunication infrastructure as well, can significantly affect competitive advantage. Although the interstate transport system is quite adequate in the Northeast, poor secondary roads increase the cost of distribution for local farmers. It may be more costly to move product short distances over secondary roads than to move it a greater distance over the interstate system. Rail transportation and intermodal transport systems, as well as export facilities, are public infrastructures that affect competitive advantage of regional farmers in certain markets. Public policy can work for or against the position of regional farmers; it is seldom neutral.

Entrepreneurship: A Necessary Condition

By using the term "preconditions for change," Gardner moves away from the notion of necessary and sufficient conditions, that is, those that cause change or those that are required for change. Although it is admittedly difficult to

identify sufficient conditions, using the concept of "preconditions" loses some analytical power. A necessary condition for change that seems to be overlooked in Gardner's paper is the existence of an entrepreneurial force. Economic change is the result of human behavior: it seldom occurs automatically, with only a change in external conditions. Most changes are implemented by an active change agent, an entrepreneurial factor, which can be public as well as private.

For example, prior to 1982, no commercial broccoli was produced in Aroostook County, Maine. That year 300 acres were grown. 3,000 acres were planted in 1986. It is unlikely that external forces made broccoli unprofitable in 1981 and earlier, somewhat profitable in 1982 and ten times as profitable four years later. More likely, over a period of years prior to 1982 broccoli production in Aroostook County gradually regained its potential competitiveness, but it required a combination of public resources (Maine Cooperative Extension Service personnel) and a small number of innovative farmers to initiate its recent production growth. Early successes encouraged less venturesome farmers to get into the action.

In some cases, the entrepreneurial forces are even more completely public. For many years Maine potato farmers fell steadily further behind potato farmers in other areas in the use of state-of-the-art environmentally-controlled potato storage. Consequently, product quality suffered relative to other areas, market share declined, and certain markets were simply unattainable. For a number of years business analyses indicated that state-of-the-art storages, although costly, were profitable. Yet few farmers built them. Commercial lenders discouraged them, and suppliers and builders were not interested in promoting them. In 1982, Maine citizens, by referendum, created a \$5 million revolving loan fund to encourage state-of-the-art potato storage and packing systems. Only then did suppliers become interested, builders learn the standards, creditors change their guidelines, and research and extension personnel focus on current technology. Although the economics of adopting the technology had not changed, apart from scale economies linked to a large volume of activity, the State had performed an entrepreneurial function which caused substantial change. As suggested by these examples, entrepreneurial force is a necessary condition for change.

Environmental Quality as a Positive Factor

Gardner notes that potential negative impacts of current agricultural production systems on soils and water quality can stifle incipient sunrise agriculture. There is another side to the environmental issue, however, that Northeast farmers might use to their advantage. Alternative production systems can mitigate a number of negative environmental impacts while producing products with a distinct preference by some consumers.

Systems that do not use pesticides are much less likely to have adverse impacts on water quality than pesticide systems. At the same time they eliminate pesticide residue on food products. Such alternative systems are desired by many residents who depend on local water supplies, as well as by consumers who will pay a premium for pesticide-free food. Political support from these constituencies may generate the funds needed for research development

and other public support for alternative production systems. This would further consolidate Northeast farmers' competitive advantage in certain markets. This confluence of interests among farmers, consumers and rural residents might enhance the economic feasibility of rotation systems that produce better quality product and are more benign to the environment. They might also increase support for land use programs that keep local land available for agriculture.

Size of Farm and Competitive Advantage

Gardner correctly notes that the average size of farm in the Northeast is substantially smaller than the national average. However, there is some question whether or not this is a substantial disadvantage. Several studies have indicated that technical economies of scale are achieved in farming at a rather modest size; some suggest that farms requiring less than two full-time employees can achieve maximum technical efficiencies. In such cases, incentive to expand the scale of operation is not to achieve technical efficiencies, but to expand output in order to increase the return to management and to achieve pecuniary economies (lower input prices because of large volume purchases). This expansion force has been supported by tax policy, an effect which will be somewhat dampened by the 1986 Tax Reform legislation.

If the studies suggesting few, if any, technical economies beyond a modest farm size are correct, then an alternative to expanding scale is to utilize operators' excess management capacities for activities other than farm production. Noting that competitive advantage incorporates marketing as well as production, and that the former has twice the potential rate of return of the latter, smaller farms in the Northeast may not be such a disadvantage if their operators became actively involved in marketing. Because of the proximity to markets, many Northeast farmers have good opportunities to earn a return to management from marketing or other non-farm activities.

It should also be noted that small farms can achieve most pecuniary economies by collective action, either privately or in conjunction with the public sector. In sum, the smaller-sized farm units of the Northeast may turn out to have some distinctive advantages, providing their managers are astute enough to earn supplementary returns to their skills in activities other than farm production.

Regional vs. National Policy: A Paramount Difference

Although Gardner correctly notes that the U.S. Constitution prohibits the imposition of trade barriers between states, his paper begins with the suggestion that regional trade situations are similar to national trade situations. The concept of free interstate commerce, unfettered by state law, is so clear in our legal framework it probably should be emphasized and the similarities between regional and national trade policies should be subordinated. Any state or regional attempt to support internal economic activity by border protection will probably be rendered useless in federal court.

Even subsidizing a particular industry, say by supporting the price of a particular commodity above the free market equilibrium, can achieve only a

marginal change, given the free flow of products and inputs across state lines. On the other hand, targeted subsidy programs to affect economic behavior for a short period of time or to promote a transition can be quite appropriate. Long-term subsidies, especially if they need border protection to succeed, will fail as regional or state policy (although they may, in certain circumstances, be proper national policy). The distinction between state and national actions is so significant it would be well to keep it foremost, even at the expense of blurring some of the similarities between the state and national trade situations.

Self Sufficiency and Consumer Affairs

Finally, it should be noted that not all policies supporting self sufficiency necessarily reduce consumer welfare; some such policies may in fact increase it. Gardner correctly notes that any increase in the cost of supplying commodities from outside a region will benefit the local producer by increasing market prices and expanding his potential market share, but will also decrease consumer welfare for the region. It is then suggested that self sufficiency policies result in similar impacts.

However, some policies that are likely to be feasible and beneficial to local producers do not have this negative effect. The policy variable described in the Gardner paper is an increase in the cost of transportation. It is unlikely, given the above discussion of interstate trade, that one region can impose higher transportation costs on another region. Such cost increases are more likely to come from increases in input prices or regulatory change at the federal level. Market-oriented self sufficiency policies usually are directed at helping local farmers serve a market niche, provide a market service, or offer a differentiated product that was not previously available. In all these cases consumer welfare is increased, since consumers can acquire a product or service that simply was not available to them before or was available at a higher price.

Another type of self sufficiency policy is directed at reducing the cost of production for local producers, usually by exploiting a resource or other situation specific to the location. In this case, market price is unaffected. The supply curve of the region's producers is shifted to the right, resulting in the displacement of imported products by local products. There is no loss of consumer welfare in the local region, and to the extent that local products have more desirable characteristics (e.g., freshness) but are offered at the same price as "imports", there is actually some consumer welfare gain. In addition, the reduction of imports into the region releases more of the total supply for consumers in other regions, resulting in lower prices and consumer welfare gains in those regions. Consequently, although certain economic changes do benefit local producers at the expense of local consumers, any practical sufficiency policy benefits both local producers and local consumers.

In summary, it seems possible to view a sunrise on Northeast agriculture's horizon. Such a view stresses the concept of competitive advantage, involving both production and marketing activities, rather than just production as suggested by the classical concept of comparative advantage. It recognizes the

proximity of Northeast farmers to substantial markets and concentrations of economic activity and builds on the fact that two-thirds of the food dollar is allocated to distribution activities beyond the farm gate. A public policy that taps these advantages and provides adequate market and management support, adequate infrastructures, especially in transportation and telecommunication, and adequate capital to facilitate transitions can help promote sunrise activity. Necessary conditions for the transition also include adequate entrepreneurial forces, whether they be private, public, or a combination. The smaller size of farms in the Northeast may be an advantage, releasing underutilized managerial resources for related activities. Public policy cannot rely on regional border protection due to the interstate trade assurances in our legal framework, but there are feasible policies that can benefit both local producers and local consumers. With proper public policy support and adequate skills on the part of farmers, Northeast agriculture can enjoy a sunrise status although it may look different from the region's current agriculture structure and from that in other regions.

II. AGRICULTURAL DIVERSIFICATION
AND
SUSTAINABILITY

THE SUN ALSO RISES: A NEW ERA OF AGRICULTURE IN THE NORTHEAST

August Schumacher Jr., Commissioner
Massachusetts Department of Food and Agriculture

The Bible and Ernest Hemingway were right. Just as sure as it sets, the sun also rises. And it is rising here in the Northeast as we look toward the horizon of a new century. We see a whole new era of challenge and opportunity for agriculture in New England and Eastern Canada. The title of this conference, "Sunrise Agriculture in the Northeast," is very appropriate. It expresses exactly the sort of positive, look-ahead attitude that is needed if we are going to build a sustainable agriculture for the twenty-first century. We need an agriculture that embraces and inspires new innovations in production technology, wi-marketing and creative management.

We are already off to a pretty good start. While farmers in the midwest continue their struggle to stay afloat, some of the farmers **in** the Northeast are experiencing a modest comeback. And I stress the modest. There is a lot more work that needs to be done before we can breathe easily. But we have made progress because our farmers have been able to adapt readily to the consumer-driven trends which are changing the business of agriculture as we have known it. The way farmers farm, the way they package and market their goods is being determined more than even by changing consumer tastes.

Today's consumers want food that is closer, fresher and safer. They are demanding an unprecedented diversity of local, high-quality, low-chemical food. The farmers, grower cooperatives and food processors who recognize those demands -- and who respond quickly to them -- will lead the way into the next century. So it is that we see all these little explosions throughout the region:

°The broccoli boom in Maine.

°The great success of Stoneyfield Yogurt in New Hampshire.

°The rapidly-growing fruit-juice Massachusetts.

°Vermont's Cabot Cheese is being sold **in** more markets and in greater quantities than ever before.

°Connecticut has become something of a mushroom capital of the Northeast.

°And Rhode Island is making big waves with its seafood and aquaculture industries.

°Our good neighbors in Eastern Canada also are making their mark, helping us construct a sustainable regional agriculture for the years beyond 2000.

I have mentioned only a handful of the hundreds of specialized products which reflect a new diversity in Northeast agriculture. It is an exciting time.

We are developing whole new agricultural systems. These systems evolve from the knowledge that there is much strength in diversity. The more adaptable we are to changes in the marketplace, the more successful we will be. What is happening, then, is that our farmers are changing their definition. Fewer farmers consider themselves commodity-specific -- the dairy farmer, the potato farmer, the corn-and-tomato farmer. Instead, they see themselves as farmers in a broader sense. They are far more versatile than before. If broccoli is 'out' and bok-choy is 'in,' then it is up to today's farmer to decide whether it might be a good idea to change crops.

This sort of stay-with-the-trends farming takes a lot of common sense, careful analysis and managerial know-how. As one of my colleagues pointed out, you can not go from broccoli to bok-choy without carefully weighing the risks and the benefits of such a move. You have to be able to tell the difference between overnight fads and sound investments. For this reason, Northeast farming in the 21st century will be very management-intensive. The good managers -- the ones who stay abreast of market trends and adapt themselves and their production accordingly -- are the ones who will survive.

It will be people like Peter Field in Brimfield, Massachusetts. Here is a man, an accountant-turned-farmer, who grew his first tomato just two years ago. Today, he is producing 200,000 pounds of vine-ripened tomatoes a year... nine months a year...under 40,000 square feet of greenhouse. He grows them in sterilized soil inside plastic bags. With his out-of-the-ordinary technology, Peter Field has tapped into a market that is starving. for a decent-tasting tomato in the middle of winter. Not surprisingly, he can not keep up with demand. Right after picking, his carefully-graded tomatoes are labeled with the "Tower Hill Farm" seal, packed neatly in boxes and shipped off to Boston... where they have already been spoken for. Without being too specific, I think it is fair to say that Peter gets a pretty decent price for his tomatoes. In fact, he gets more per pound wholesale than many tomatoes sold retail. His are not just ordinary tomatoes, after all. They are part of the new breed of New England specialty foods.

Again, success in agriculture over the next fifty-plus years is going to require constant innovations in both technology and marketing. It is a lesson that has already been learned by the people at Ocean Spray, Veryfine and the New England Country Dairy in Massachusetts. They are all enjoying the enormous boom in the fruit-beverage business. Today's health-conscious consumers do not want those sugar-filled, artificially-flavored soft drinks anymore. They want to pour a glass of something like 'Cider Berry.' That's the new, lightly-pasteurized beverage combining fresh-pressed cider and puree of fresh cranberry, raspberry and strawberry. The makers of Cider Berry, New England Country Dairy of Greenfield, have successfully penetrated the New York market. They also sell to the Bread & Circus Markets in Massachusetts. It is another case where a little creativity and initiative -- and a willingness to diversify into something a bit different -- can prove its benefits. Businesses like this can be very appealing to venture capitalists. They are cash cows; once they get going, the cash starts rolling in. There is no great mystery here. Peoples' eating habits are changing. Women are not home all day cooking big roast-beef dinners. Instead, we are eating smaller amounts of high-quality food that is

much safer. And we are willing to pay a premium for that food. People also want to know where their food is coming from. They do not like knowing that their food was flown in Federal Express via Memphis. It is for that reason that the Northeast is seeing such a great resurgence in roadside stands, farmers' markets and other direct-marketing outlets.

As we consider the future of Northeast agriculture, one thing is clear: now more than ever, farmers need to look at all available systems for producing and marketing their commodities. The day is gone when we could rely on the federal government to help pick up the slack. We must rely on our own sweat and wits.

Our future also hinges on a number of environmental imperatives, not the least of which is farmland preservation. If the Northeast does not guard its precious farmland from development pressures, there will be no need to worry about all this marketing wizardry and newfangled technology. There will not be any farms left to farm. We also must continue our efforts in pesticide reduction. With integrated pest management and the development of non-chemical pest controls, Massachusetts is well on its way to reducing the use of pesticides fifty percent by 1995. Our fellow Northeast states also recognize the importance of tightening the cap on pesticides. It makes sense not only environmentally, but from a marketing perspective. If it is low-chemical or no-chemical food that the public wants, then it is the smart farmer who supplies it.

What is heartening to me is that so many farmers in the Northeast already know these things. They know that they must keep in step with all the fast-breaking innovations in production technology. They know that they must continue to be creative and aggressive in their marketing. They know that they must master the management skills it will take to survive in the 21st century marketplace. They know this, by and large, because they are doing it already. The sun is rising on a new era of agriculture in the Northeast. And it is rising because our farmers have the common sense, the ingenuity and the wherewithal to make it rise. They say there is nothing more beautiful than a New England Sunrise...and they are right.

NEW ENGLAND FARM STRATEGIES FOR SURVIVAL AND PROSPERITY

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The financial situation of farmers in the U.S. is a classic good-news, bad-news story. The good news is that more than 80 percent of the Nation's farmers have moderate to low levels of debt relative to the earning capacity of their farms. These farmers are not in immediate jeopardy. The bad news, however, is that 10 to 12 percent of all farms face severe debt repayment problems that probably will persist. During the fiscal year 1985, and ending June 30, 1986, the Farmers Home Administration reported that 4,695 of its borrowers discontinued farming due to financial difficulties. Lenders are also taking a beating. The Farm Credit System, which includes Production Credit Associations and Federal Land Banks, reported a net operating loss of \$487 million. Commercial banks that have 17 percent or more of their loan portfolio in agricultural loans are known as "agricultural banks." The number of agricultural bank failures has been increasing sharply in recent years, from seven bank failures in 1983, to thirty-one in 1984, to fifty-three last year. Fortunately, none of these agricultural bank failures has occurred in New England (Agricultural Finance, March, 1986).

The financial crisis in U.S. agriculture clearly is afflicting those farmers who are deeply in debt, especially those whose debts are high relative to the current market value of their assets. A debt-to-asset ratio greater than 40 percent is considered "highly leveraged." A ratio of more than 100 percent implies that a farm is technically insolvent. That is, if all of the farm's assets were liquidated, the receipts would not be enough to repay the debts. About three percent of the Nation's farms were found to be technically insolvent as of January 1985 according to a survey conducted by USDA. Roughly three-fourths of these unfortunate farmers also had a negative cash flow, meaning that the farm family income (from both farm and off-farm sources) was not enough to pay for cash operating expenses, interest and principal payments on debts, and family living expenses. The prospects of these farms, about 2.2 percent of total, are indeed grim. Another 15.9 percent of the Nation's farms had debt-to-asset ratios between 40 and 100 percent, which meant they were highly leveraged. Reports from recent USDA surveys indicate farms in the Northeast region, including New England, are generally under less financial stress than those in the Nation as a whole, and especially the Corn Belt and Great Plains states. Whereas 37 percent of commercial-scale farmers in the Corn Belt, with gross sales over \$40,000, were highly leveraged at the end of 1984, only 21 percent of similar farmers in the Northeast were in this vulnerable position (Economic Indicators of the Farm Sector, Farm Sector Review, December 1985, page 54).

Four farm management strategies that farmers may use to avoid financial difficulties are diversification of farm enterprises, off-farm earnings, reduced-input or regenerative technologies, and minimizing indebtedness. A diversified farm is more likely to withstand adverse conditions, such as sudden declines in the price of farm commodities and unfavorable growing conditions. Farm diversification is also a valuable strategy for leveling out labor

requirements, to avoid a bottleneck at peak labor times of the need to purchase high-capacity machinery as a substitute for peak labor. All good farm managers are fully aware of these advantages of diversification. In some instances, a potential disadvantage of diversification is the added complexity of management and especially of marketing. It takes a better manager to operate a diversified farm than a highly specialized farm.

Perhaps the most widely used diversification strategy employed by farmers is working off their farms, usually in wage-earning jobs but also in off-farm businesses, including custom work for neighbors. Off-farm income is extremely important to farmers; it has exceeded net farm income in all but 2 of the past 20 years. The importance of off-farm income continues to increase. It now accounts for 61 percent of total farm income or an average of \$16,200 non-farm income out of \$26,600 total household income in 1984 (Ahern, Mary, Financial Well-Being of Farm Operators and Their Households_, U.S.D.A. Agri, Econ. Report 563. September 1986).

In addition to various diversification strategies, farmers may also use reduced input practices. One example is crop rotations with legumes. This practice not only reduces dependence upon purchased chemical fertilizer; it also reduces the need for pesticides. It is well known that farmers who grow corn continuously on the same ground face the risk that the corn root worm as well as other pests and diseases will become a severe problem, reducing yields and increasing pesticide costs. Many other regenerative farming practices, including integrated pest management and substitution of mechanical cultivation and crop rotations for herbicide application, are being used by a growing number of farmers, often with very positive effects on farm income (Madden, Patrick, "Sustainable Agriculture Must be Profitable." Paper presented before the Global Tomorrow Coalition, Washington, D.C., October 15, 1986).

Another management strategy, which we consider a part of the larger category of regenerative or sustainable farming methods, is the avoidance of indebtedness. Just as deficit spending at the federal level is a continuing threat to the financial stability of the Nation, rapidly expanding indebtedness among farmers, particularly in the late 1970s, has been largely responsible for many of the bankruptcies and agricultural bank failures in recent years. That is the bad news. The good news is that the vast majority of farmers have debt loads that are moderate to negligible in relation to the value of their assets and their earnings. Farm debt was much less severe in New England than in the U.S. as a whole. For example, the "factor share" of gross sales required to pay interest expense was 8.8 percent for the U.S. compared with 4 percent in New England (Table 1). In fact, data from the latest Census of Agriculture indicate that roughly half the farmers in the U.S. were debt-free in 1982. While the financial position of many farmers has worsened since 1982, it is interesting to examine the extent of debt-free farming in that base-line year. Obviously, the vast majority of farms cannot expect to become debt free in the near future. Indeed, many farmers consider a moderate level of indebtedness in relation to their total assets and potential earnings to be a viable financial management strategy for farm expansion. However, when carried to extremes, and especially when asset values and farm income are declining, indebtedness can become a curse. As a practical matter, then, debt-free farming can be viewed as a goal toward which farmers may wish to strive. More than a million farmers have

demonstrated this is not a fantasy. Throughout the United States, 50.5 percent of the farms reported in the 1982 census that they paid no interest, which would imply they were debt-free. A significantly higher share of farms in New England were debt-free -- 59 percent.

Among the New England states, Rhode Island had the highest percent of debt free farms -- 69 percent -- and Vermont had the lowest -- 49 percent (Table 2). Maine exhibited a wider variation among its counties in regard to percent of debt-free farms than any other New England state, ranging from a high of 83.5 percent debt-free in Hancock County to a low of 36.1 percent in Aroostook County (Table 3). These debt-free ratios tend to be highly correlated with other measures of financial stress, including "interest burden," or the ratio of interest expense to gross sales. For example, in the same two Maine counties, the interest burden was only 1.2 percent in Hancock County, compared with 8 percent in Aroostook County. In all of New England, Orleans County, Vermont and Coos County, New Hampshire tied for the highest interest burden relative to gross sales, 8.8 percent -- which happens to equal national average (Tables 4 and 5).

For a number of obvious reasons, smaller farms are more likely than large farms to be debt-free. One major reason is that farm expansion is usually financed by borrowing. It is not surprising, then, to see an inverse relationship between farm size and percent of farms that are debt-free, as indicated in Table 6. The majority of New England farms having less than 220 acres were also found to be debt-free. More surprising, however, is that even in the largest acreage category, farms over 2,000 acres, 23 percent of U.S. farms were debt-free in 1982. New England has very few farms in this size category (they are found only in Maine, Massachusetts, and Vermont) but 41 percent of them were debt-free.

When farm size is measured in terms of gross sales rather than acreage, the same picture emerges: as sales volume increases, the percent of debt-free farms decreases, again for many obvious reasons. The majority of New England farms having gross sales under \$40,000 were debt-free. While this general relationship is not at all surprising, the number of debt-free farms in the largest size category is amazing. In the U.S. as a whole, one in ten farms with gross sales in excess of half a million dollars was debt-free in 1982; in New England, nearly one in five (18 percent) was debt-free (Table 7).

Among the various types of farms, dairy farms are least likely to be debt-free -- 28 percent in New England, 26 percent for the U.S. (Table 8). Only 22 percent of dairy farmers were debt-free in Vermont, while more than 75 percent of the general crop farms in all six New England States were debt-free. Because of the high labor requirement of milking and other chores, dairy farmers have less off-farm income than any other type of farm -- \$6,000, compared with \$21,000 for general livestock and \$22,000 for nursery and greenhouse operations (Ahern, *ibid.*, page 16). Off-farm income is a safety net for most farmers, an excellent financial diversification strategy. It appears that many debt-free farms pay off their liabilities with savings from non-farm income. (Findeis, Jill, "The Growing Importance of Off-Farm Income." Penn State University, Farm Economics, May/June 1985.) The option of working off the farm is most practical for farms that have relatively low labor requirements, and particularly in

regions with an abundance of off-farm employment or self-employment opportunities, such as the more heavily populated areas of New England.

Farms organized as an individual or family farm are more likely to be debt-free than other forms of business organization, such as partnerships and corporations. In New England, 61 percent of the individual or family farms was debt-free in 1982, compared with 43 percent of family-held corporate farms (Table 9).

Demographic factors are also related to farm indebtedness. The percentage of farms that was debt free in 1982 tended to increase with the age of the farmer. Farms operated by a person whose principal occupation is other than farming were much more likely to be debt-free, regardless of the operator's age (Tables 10 and 11). Only 242 farmers under age 25 whose principal occupation was farmer were counted in New England in 1982. Only 19 percent of these young farmers was debt-free; most of them got started in farming on borrowed capital. Conversely, 71.5 percent of young farmers with non-farm occupations was debt-free.

In summary, various diversification strategies have been found to be very useful to farmers, both in New England and elsewhere, as a way of reducing risk of loss and increasing average farm income. The diversification strategies farmers have adopted include the rather obvious approach of producing a number of different commodities. Preferably, this involves a combination of crop and livestock enterprises whose prices tend not to swing together, and crops that are not vulnerable to the same hazards of nature, including adverse weather and various pests. Other more subtle diversification strategies include value-added enterprises, such as processing milk into cheese, selling fresh produce at farmers markets, or doing custom work for other farmers, such as harvesting grain.

Perhaps the most widely used and most successful diversification strategy of farmers is off-farm employment. It is a serious mistake to view today's farm as a producer of just standard commodities such as milk and corn. Farms produce a wide array of both goods and services. Smart farmers use an almost infinite range of diversification strategies, limited only by their imagination, market conditions, and other resources.

The use of regenerative or reduced-input farming practices often requires diversification, as in the case of complex multi-year rotations featuring both legumes and cash crops. Many regenerative farming practices also hold considerable promise for making the various diversification strategies more profitable, more sustainable, and less ecologically damaging.

This essay has focused primarily on one particular financial management goal, debt-free farming. Obviously, a debt-free farmer is not threatened by foreclosure. Money that would otherwise go toward paying principal and interest payments may be used for family living, savings, or investment. Diversification strategies discussed here are often highly compatible with the goal of becoming debt-free, especially where diversification reduces the risk of financial loss, reduces capital requirements, and promotes long-term productivity and prosperity.

TABLE 1

Selected Farm Expenses with Ratio to Gross Sales,
New England and U.S. Comparison, 1982

Item	Expenses (\$ Millions)		Ratio of Expense to Gross Sales	
	New England	United States	New England	United States
Interest	73	11,700	4.0	8.8
Livestock and Poultry Purchased	78	17,174	5.0	13.0
Feed for Livestock and Poultry	350	18,600	23.0	14.1
Seeds, Bulbs, Plants and Trees	25	3,171	1.0	2.4
Commercial Fertilizer	46	7,700	3.0	5.8
Other Agricultural Chemicals	22	4,282	1.0	3.2
Hired Farm Labor	180	8,441	12.0	6.3
Energy and Petroleum Products	107	10,000	7.0	7.5

SOURCE: Bureau of the Census, 1982 Census of Agriculture, Vol. 1, Part 51, United States Summary and State Data, Table 6.

TABLE 2

Percent of Debt-Free Farms in New England by State, 1982

State	Number of Farms Reporting		Percent Reporting No Farm Interest Expense
	Any Interest	No Interest	
Connecticut	1,205	2,327	65.9
Maine	2,826	3,863	64.6
Massachusetts	1,803	3,297	57.9
New Hampshire	974	1,672	63.2
Rhode Island	210	468	69.0
Vermont	3,135	2,993	48.8

New England	10,153	14,620	59.0
United States	1,050,104	1,070,356	50.5

SOURCE: Bureau of the Census, 1982 Census of Agriculture, Vol. 1, Part 51:184-190.

Calculated from Census Table 6 data, number of farms reporting "no" interest expense as a percent of the sum of those reporting interest expense and "no" interest expense.

TABLE 3

Percent of Debt-Free Farms in New England
by State and County, 1982

Count	Number of Farms		Percent Reporting No Farm Interest Expense
	Total	Reporting No Farm Interest Expense	
Connecticut			
Fairfield	272	197	72.4
Hartford	659	518	78.6
Litchfield	610	352	57.7
Middlesex	265	181	68.3
New Haven	403	302	74.9
New London	536	327	61.0
Tolland	285	171	60.0
Windham	502	279	55.6
State Total	3,532	2,327	65.9
Maine			
Androscoggin	336	183	54.5
Aroostook	1,185	428	36.1
Cumberland	480	334	69.6
Franklin	272	150	55.1
Hancock	267	223	83.5
Kennebec	553	283	51.2
Knox	200	120	60.0
Lincoln	233	138	59.2
Oxford	382	244	63.9
Penobscot	629	348	55.3
Piscataquis	152	90	59.2
Sagadahoc	120	66	55.0
Somerset	509	313	61.5
Waldo	438	272	62.1
Washington	378	298	78.8
York	555	373	67.2
State Total	6,689	3,863	57.8

Table 3 (Continued)

Count	Number of Farms		Percent Reporting No Farm Interest Expense
	Total	Reporting No Farm Interest Expense	
Massachusetts			
Barnstable	116	68	58.6
Berkshire	347	204	58.8
Bristol	548	380	69.3
Dukes	37	30	81.1
Essex	348	281	80.7
Franklin	512	314	61.3
Hampden	371	258	69.5
Hampshire	541	327	60.4
Middlesex	525	336	64.0
Nantucket	5	3	60.0
Norfolk	191	128	67.0
Plymouth	606	401	66.2
Suffolk	3	2	66.7
Worcester	950	565	59.5
State Total	5,100	3,297	64.6
New Hampshire			
Belknap	144	91	63.2
Carroll	122	86	70.5
Cheshire	250	152	60.8
Coos	176	79	44.9
Grafton	386	243	63.0
Hillsborough	365	241	66.0
Merrimack	373	247	66.2
Rockingham	412	261	66.3
Strafford	212	137	64.6
Sullivan	206	135	65.5
State Total	2,646	1,672	63.2

Table 3 (Continued)

Count	Number of Farms		
	Total	Reporting No Farm Interest Expense	Percent Reporting No Farm Interest Expense
	Rhode Island		
Bristol	37	27	73.0
Kent	64	51	79.7
Newport	134	93	69.4
Providence	243	164	67.5
Washington	200	133	66.5
State Total	678	468	69.0
	Vermont		
Addison	724	269	37.2
Bennington	185	110	59.5
Caledonia	462	245	53.0
Chittenden	488	248	50.8
Essex	84	50	59.5
Franklin	774	203	26.2
Grand Isle	127	60	47.2
Lamoille	248	127	51.2
Orange	596	358	60.1
Orleans	644	243	37.7
Rutland	545	305	56.0
Washington	387	210	54.3
Windham	296	214	72.3
Windsor	568	351	61.8
State Total	6,128	2,993	48.8

SOURCE: Bureau of the Census, 1982 Census of Agriculture, Vol. 1. Part 7, Connecticut: 134-135. Part 19, Maine: 142-144. Part 21, Massachusetts: 134-135. Part 29, New Hampshire: 132-133. Part 39, Rhode Island: 128. Part 45, Vermont: 132-133.

TABLE 4

Ratio of Interest Expense to Gross Sales on New England
Farms by State and County, 1982

County	Value of Gross Sales	Interest Paid	Ratio of Interest Expense to Gross Sales
Connecticut			
Fairfield	\$ 8,949,000	\$ 497,000	5.6
Hartford	64,174,000	1,735,000	2.7
Litchfield	29,398,000	1,748,000	5.9
Middlesex	15,857,000	660,000	4.2
New Haven	26,632,000	417,000	1.6
New London	68,295,000	2,011,000	2.9
Tolland	22,839,000	902,000	3.9
Windham	49,180,000	2,753,000	5.6
State Total	\$285,324,000	\$10,724,000	3.8
Maine			
Androscoggin	\$ 79,955,000	\$ 2,169,000	2.7
Aroostook	87,412,000	7,035,000	8.0
Cumberland	14,879,000	471,000	3.2
Franklin	7,041,000	301,000	4.3
Hancock	12,260,000	141,000	1.2
Kennebec	34,145,000	1,218,000	3.6
Knox	8,934,000	178,000	2.0
Lincoln	4,505,000	88,000	2.0
Oxford	14,728,000	628,000	4.3
Penobscot	25,337,000	1,010,000	3.9
Piscataquis	4,223,000	242,000	5.7
Sagadahoc	4,995,000	156,000	3.1
Somerset	22,939,000	1,076,000	4.7
Waldo	36,531,000	845,000	2.3
Washington	16,539,000	606,000	3.7
York	24,991,000	671,000	2.7
State Total	\$399,412,000	\$16,835,000	4.2

Table 4 (Continued)

County	Value of Gross Sales	Interest Paid	Ratio of Interest Expense to Gross Sales
Massachusetts			
Barnstable	\$ 3,989,000	\$ 238,000	6.0
Berkshire	16,542,000	707,000	4.3
Bristol	28,260,000	517,000	1.8
Dukes	688,000	*	0.0
Essex	13,920,000	373,000	2.7
Franklin	21,555,000	815,000	3.8
Hampden	15,572,000'	534,000	3.4
Hampshire	25,483,000	1,084,000	4.3
Middlesex	45,543,000	1,142,000	2.5
Nantucket	327,000	*	0.0
Norfolk	9,121,000	165,000	1.8
Plymouth	52,964,000	1,357,000	2.6
Suffolk	152,000	*	0.0
Worcester	47,319,000	1,976,000	4.2
State Total	\$281,436,000	\$9,009,000	3.2
New Hampshire			
Belknap	\$ 2,130,000	\$ 95,000	4.5
Carroll	2,880,000	164,000	5.7
Cheshire	13,475,000	370,000	2.7
Coos	8,702,000	763,000	8.8
Grafton	16,320,000	807,000	4.9
Hillsborough	15,858,000	677,000	4.3
Merrimack	13,714,000	607,000	4.4
Rockingham	12,877,000	541,000	4.2
Strafford	8,673,000	224,000	2.6
Sullivan	7,891,000	443,000	5.6
State Total	\$102,520,000	\$4,690,000	4.6
Rhode Island			
Bristol	\$ 1,077,000	\$ 21,000	1.9
Kent	1,077,000	60,000	3.2
Newport	9,159,000	270,000	2.9
Providence	7,402,000	294,000	4.0
Washington	10,862,000	629,000	5.8
State Total	\$ 30,376,000	\$1,273,000	4.2

Table 4 (Continued)

County	Value of Gross Sales	Interest Paid	Ratio of Interest Expense to Gross Sales
	Vermont		
Addison	\$ 72,835,000	\$ 5,180,000	7.1
Bennington	7,380,000	314,000	4.3
Caledonia	22,570,000	1,448,000	6.4
Chittenden	25,158,000	1,694,000	6.7
Essex	4,779,000	322,000	6.7
Franklin	71,084,000	4,554,000	6.4
Grand Isle	7,528,000	496,000	6.6
Lamoille	15,261,000	912,000	6.0
Orange	25,179,000	1,461,000	5.8
Orleans	46,612,000	4,088,000	8.8
Rutland	27,909,000	1,350,000	4.8
Washington	13,727,000	752,000	5.5
Windham	13,838,000	686,000	5.0
Windsor	15,542,000	784,000	5.0
State Total	\$396,402,000	\$24,042,000	6.5

*Information withheld to avoid disclosing data for individual farms.

SOURCE: Bureau of the Census, 1982 Census of Agriculture, Vol. 1. Part 7, 19, 21, 29, 39, 45: Table 3 and 16.

TABLE 5

New England Counties with More than 70 Percent of Farms Debt-Free,
with Ratio of Interest Expense to Gross Sales, 1982

County	Percent of Farms Debt-Free	Ratio of Interest Expense to Gross Sales
Hancock, ME	83.5	1.2
Dukes, MA	81.1	*
Essex, MA	80.7	2.7
Kent, RI	79.7	3.2
Washington, ME	78.8	3.7
Hartford, CT	78.6	2.7
New Haven, CT	74.9	1.6
Bristol, RI	73.0	1.9
Fairfield, CT	72.4	5.6
Windham, VT	72.4	5.0
Carroll, NH	70.5	5.7

TABLE 6

Percent of Debt-Free Farms by Acreage Size Class in New England States, (New England and U.S. Comparison), 1982

Acreage of Farm Size	CT	ME	MA	NH	RI	VT
2,000 or More	--	44.4	42.9	--	--	50.0
1,000 to 1,900	38.5	26.0	50.0	52.2	66.7	26.0
500 to 999	30.7	34.6	34.0	35.5	--	24.4
260 to 499	45.2	42.3	52.2	44.9	51.6	30.0
220 to 259	44.5	46.3	51.1	48.1	50.0	38.7
180 to 219	60.2	52.1	57.7	70.4	60.0	40.2
140 to 179	63.9	62.7	67.8	59.7	63.9	57.3
100 to 139	70.3	66.2	63.1	70.4	65.2	63.9
70 to 99	65.9	69.2	73.2	67.2	62.3	72.9
50 to 69	73.6	61.2	61.7	74.1	57.1	67.1
10 to 49	73.8	72.0	66.2	69.3	78.0	73.6
1 to 9	68.8	70.4	70.7	74.8	79.6	70.9

Acreage of Farm Size	New England	United States
2,000 or More	41.3	23.2
1,000 to 1,900	31.8	21.5
500-to 999	30.1	24.2
260 to 499	38.5	33.4
220 to 259	44.2	41.8
180 to 219	51.7	46.5
140 to 179	61.7	51.3
100 to 139	66.1	57.2
70 to 99	69.8	61.0
50 to 69	65.3	63.9
10 to 49	70.7	67.3
1 to 9	71.0	70.4

SOURCE: Bureau of the Census, 1982 Census of Agriculture, Vol 1. Part 51:88-89. Part 7:80-81. Part 19:80-81. Part 21:80-81. Part 29:78-79. Part 39:80-81. Part 45:78-79.

TABLE 7

Percent of Debt-Free Farms in New England States by Value of Agricultural Products Sold (New England and U.S. Comparison), 1982

Value of Agricultural Products Sold	New England					
	CT	ME	MA	NH	RI	VT
\$10,000 or More	47.3	33.3	48.4	36.3	47.3	25.4
Less than \$10,000	79.1	74.3	77.6	76.4	80.9	78.6
\$500,000 or More	16.3	11.3	35.4	17.4	21.4	4.0
\$250,000-\$499,000	18.3	16.9	29.9	22.0	12.5	10.8
\$100,000-\$249,999	28.1	16.6	32.8	24.1	27.3	13.0
\$40,000-\$99,999	46.4	23.5	49.4	28.2	47.5	22.9
\$20,000-\$39,999	65.2	43.0	57.6	36.5	66.7	42.3
\$10,000-\$19,999	72.0	71.3	56.3	66.1	55.6	62.8
\$5,000-\$9,999	73.9	69.7	65.1	56.7	78.8	67.0
\$2,500-\$4,999	80.7	68.9	76.9	74.7	79.6	75.7
Less than \$2,500	80.4	77.3	82.7	82.4	82.0	82.8

Value of Agricultural Products Sold	New England	United States
\$ 10,000 or More	36.3	30.9
Less than \$10,000	77.0	30.9
\$500,000 or More	18.4	10.4
\$250,000-\$499,999	18.7	12.4
\$100,000-\$249,999	19.5	15.5
\$40,000-\$99,999	31.0	24.7
\$20,000-\$39,999	50.6	38.4
\$10,000-\$19,999	64.9	51.3
\$5,000-\$9,999	67.5	62.6
\$2,500-\$4,900	74.6	70.3
Less than \$2,500	80.7	76.0

SOURCE: Bureau of the Census, 1982 Census of Agriculture, Vol. 1. Part 51:107-107. Part 7: 96-97. Part 19:96-97. Part 21:96-97. Part 29:94-95. Part 39:96-97. Part 45:94-95.

TABLE 8

Percent Debt-Free in England by Principal Type of
Produced (New England and U.S. Comparison), 1982

Standard Industrial Classification of Farm	New England					
	CT	ME	MA	NH	RI	VT
Cash Grains	48.3	72.9	58.3	33.3		22.2
Field Crops:						
Tobacco	64.8	--	86.1	--	--	--
Other Field Crops*	81.8	45.0	78.8	79.9	63.2	71.0
Vegetables and Melons	77.1	60.9	61.5	53.9	82.6	69.5
Fruits and Tree Nuts	77.2	76.6	62.1	66.8	61.9	67.5
Horticultural Specialties	64.0	66.7	55.6	53.6	53.1	63.8
General Crop Farms	88.7	77.7	76.5	89.2	87.5	86.7
Beef Cattle	75.9	72.9	82.5	73.3	82.7	77.3
Dairy Farms	30.9	28.2	43.2	28.7	50.7	22.3
Poultry and Eggs	52.8	38.0	57.2	49.2	66.7	74.7
Animal Specialties	65.6	68.8	71.4	72.4	67.5	73.5
	73.7	81.6	55.6	80.3	45.5	73.0

Standard Industrial Classification of Farm	New England		United States	
Cash Grains		60.4		38.2
Field Crops:		73.3		61.4
Other Field Crops*		63.6		57.3
Vegetables and Melons		65.9		55.6
Fruits and Tree Nuts		69.6		54.8
Horticultural Specialties		59.9		57.2
General Crop Farms		83.0		54.3
Beef Cattle		76.9		65.4
Dairy Farms		27.6		25.9
Poultry and Eggs		50.6		43.3
Animal Specialties		70.3		61.1
General Livestock Farms		72.9		55.6

*Sugar crops, Irish potatoes, hay, peanuts, and other field crops.

SOURCE: Bureau of the Census, 1982 Census of Agriculture, vol. 1. Part 51:124-125. Part 7:112-113. Part 19:112-113. Part 21:112-113. Part 29:112-113. Part 39:112-113. Part 45:110-111.

TABLE 9

Percent of Debt-Free Farms in New England States by Type of Farm Organization (New England and U.S. Comparison), 1982

Type of Organization	New England					
	CT	NE	MA	NH	RI	VT
Individual or Family Partnership	69.0	59.1	66.7	65.4	49.5	71.4
	48.3	52.4	50.9	48.7	39.7	64.7
Family Held Corporation, Total	46.1	32.4	52.7	32.6	41.3	35.0
10 or Fewer Stockholders	46.1	32.4	51.9	31.1	39.8	35.0
Other Than Family Held, Total	63.6	46.9	66.0	83.3	68.4	87.5
10 or Fewer Stockholders	56.3	11.8	61.5	83.3	68.4	83.3

Type of Organization	New England	United States
Individual or Family Partnership	60.6	51.8
	47.5	43.3
Family Held Corporation, Total	43.0	29.2
10 or Fewer Stockholders	42.6	28.8
Other Than Family Held, Total	63.4	37.1

SOURCE: Bureau of the Census, 1982 Census of Agriculture, Vol. 1. Part 51:39. Part 7:36. Part 19:36. Part 21:36. Part 291:34. Part 39:36. Part 45:34.

TABLE 10

Percent Debt-Free New England by Principal Occupation of Farm Operator, 1982

Age and Principal Occupation of Farm Operator	New England					
	CT	ME	MA	NH	RI	VT
Under 25:						
Farming	35.5	15.7	61.5	14.3	0.0	4.7
Other	59.1	45.9	92.3	40.0	87.0	96.7
25 to 34:						
Farming	55.6	35.5	43.3	49.2	55.2	30.4
Other	57.8	60.2	69.7	64.9	51.4	77.0
35 to 44:						
Farming	36.5	26.1	38.6	41.9	40.4	17.6
Other	64.6	65.5	65.6	62.7	70.0	65.1
45 to 54:					50.0	26.8
Farming	41.0	27.5	47.1	38.0		
Other	78.0	73.7	72.5	71.1	77.6	67.6
55 to 64:					58.3	45.3
Farming	55.1	47.0	62.8	50.2		
Other	86.9	83.5	82.2	83.3	89.4	74.0
65 and Over:						
Farming	79.0	77.5	78.8	76.9	76.3	70.6
Other	94.6	93.3	83.8	92.9	88.6	91.0
All Ages:					58.0	36.5
Farming	55.9	42.4	57.1	52.1		
Other	76.7	73.6	73.5	73.2	78.6	73.0

Source: Bureau of the Census, 1982 Census of Agriculture, Vol.1. Part 7, Connecticut: 48-49. Part 19, Maine: 48-49. Part 21, Massachusetts: 48-49. Part 29, New Hampshire: 46-47. Part 39, Rhode Island: 48-49. Vermont: 46-47.

Calculated from census table 46 data, number of farm operators reporting "no" interest expense as a percent of the sum of those reporting interest expense and "no" interest expense.

TABLE 11

Percent Debt-Free Farms by Age and Principal Occupation of Farm
Operator: New England and U.S. Comparison, 1982

Age and Principal Occupation of Farm Operator	New England	United States
Under 25:		
Farming	19.0	32.1
Other	71.5	54.5
25 to 34:		
Farming	38.3	22.0
Other	65.2	48.6
35 to 44:		
Farming	28.7	23.1
Other	65.1	51.1
45 to 54:		
Farming	33.6	29.8
Other	72.7	58.3
55 to 64:		
Farming	51.7	46.2
Other	82.3	71.2
65 and Over:		
Farming	74.0	74.7
Other	90.8	85.7
All	Ages:	
Farming	46.7	41.9
Other	74.0	61.1

SOURCE: Bureau of the Census, 1982 Census of Agriculture, vol. 1. Part 51:52-53.

DIVERSIFICATION AND AGRICULTURAL SUSTAINABILITY

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In December of 1986 the newspaper Successful Farming from Des Moines, Iowa, sponsored and paid transportation for North American farmers to attend a conference with 100 sessions on opportunities for diversification in agriculture (Figure 1). In the words of the organizer and editor, Richard Krumne, "There is not one solution to what ails agriculture, there are 10,000 solutions. They are not in Washington, D.C., your state capital or county seat, but right there on your own farm." He continued, "The Conference (acronym ADAPT for Agriculture Diversification Adds Profit Today) is not only about the economics of diversifying your farm, but also about courage...the courage to change." He noted that "Most people, farmers included, prefer that things either stay the same or that the rest of the world change to suit our needs. It is much easier to hope grain prices would only go up, or that the government would do something, than to take control of our own destiny." What is exciting is that most of the 75 speakers were farmers who have demonstrated that they have the courage to change and whose diversification efforts have already paid off.

This raises a number of important questions: are we at the beginning of a trend towards diversification; what are the driving forces and the benefits; is farm diversification part of a larger trend; if it is widely adopted, will its economic value decrease; how will it affect the structure of the food system, of rural life, of international trade and relations; what are its disadvantages; what are the barriers to diversification and how can they be overcome; what are the variables that determine its benefits; what are reliable indicators of optimal levels of diversification and commodity mixes; what is its relation to farm size, capital, technology, market structures including distance from urban centers, ethnic background of target consumer populations, etc.

These questions cannot be answered here. But, as a framework to answer them, it may help to view diversification in a broader context than is usual. Figure 2 indicates the broad forces which impinge upon diversification. In this paper I will focus particularly on the ecological and psychological aspects of diversification; but first, some historical background.

As long as there have been farm management texts, a degree of diversification has been advocated as a useful strategy to buffer the effects of unpredictable variations (Heady, 1952). Specific conventional objectives usually include reducing variability of income, preventing net income falling below some minimum level, and increasing the ability of the farm enterprise to withstand unfavorable conditions (Harsh et al., 1981; see also Cornman et al., 1982; Pope and Prescott, 1980; Shertz, 197) Such objectives have been likened to the portfolio problem of the investor (Johnson, 1967). Concern for the relatively short-term effects of risk and instability has been the most obvious driving force for diversification. Yet other less tangible forces, such as boredom and the personal need for a change or for more flexibility, a tendency to copy neighbors, or an urge to behave in accordance with nature or some "higher authority," may in certain cases be major factors. More "global"

FIG. 1: Workshops Offered at the Adapt 100 (Ag Diversification Adds Profit Today) Conference in Des Moines, Iowa, Dec. 2-3, 1986

TWISTS ON TRADITIONAL CROPS

- 1 Sweet Corn
- 2 Corn Nuts
- 3 Garbanzo and Navy Beans
- 4 Gourmet Vegetables
- 5 Corn Snack Foods
- 6 Oats for Food
- 7 Edible Soybeans
- 8 Bagging and Selling Birdseed
- 9 Sorghum Molasses
- 10 Grain Alcohol for Lighter Fluid
- 11 Cubing Straw into Fuel Logs
- 12 Premiums for Organic Products
- 13 Alternate Row Crops and Legumes
- 14 Corn for Cereal

VEGETABLES

- 15 Broccoli and Cauliflower
- 16 Pumpkins
- 17 Melons
- 18 Okra
- 19 Asparagus
- 20 Squash and Cucumbers
- 21 Sweet and white potatoes
- 22 Other Vegetables (Onions, Lettuce, Greens, Peas Beans and More)
- 23 Processed Tomatoes
- 24 Beets, Carrots
- 25 Peppers

OTHER SPECIALTY CROPS

- 26 Crambe
- 27 Amaranth
- 28 Gingseng
- 29 Shitake Mushroom
- 30 Specialty Seeds (Flower, Vegetable, Turf and Others)
- 31 Herbs
- 32 Hydroponics
- 33 Flowers
- 34 Bedding Plants
- 35 Landscape and Nursery Plants
- 36 Harvesting Your Woods for Landscape Plants
- 37 Sod
- 38 Greenhouse
- 39 Extending Growing Seasons with Plastics

BERRIES

- 40 Strawberries
- 41 Raspberries
- 42 Blueberries
- 43 Wine Grapes
- 44 Table Grapes
- 45 Selling Flavoring and Jam

TREES

- 46 Apples
- 47 Other Tree Fruits
- 48 Pecans
- 49 Black walnuts

- 50 Forestry
- 51 Firewood
- 52 Maple Syrup
- 53 Christmas Trees

AQUACULTURE

- 54 Catfish
- 55 Trout and Bass
- 56 Fishing Bait
- 57 Crayfish

ANIMALS AND ANIMAL PRODUCTS

- 58 Retailing Specialty Beef
- 59 Selling Livestock Waste
- 60 Embryo Recipients: Cows, Ewes and Sows
- 61 "Natural" Beef
- 62 Llamas
- 63 Rabbits
- 64 Alligators
- 65 Draft Horses
- 66 Angora Goats
- 67 Sheep and Goat Milk Products
- 68 Specialty Milks
- 69 On-Farm Cheese Production
- 70 Raising Deer for Venison
- 71 Bees and Honey
- 72 Stock Dogs
- 73 Hunting Dogs
- 74 Gamebirds for Restaurants
- 75 Trapping Your Farm
- 76 Raising Fur Animals
- 77 Escargot
- 78 Money from Horse Markets
- 79 Producing Laboratory Animals
- 80 Selling Ducks to Restaurants

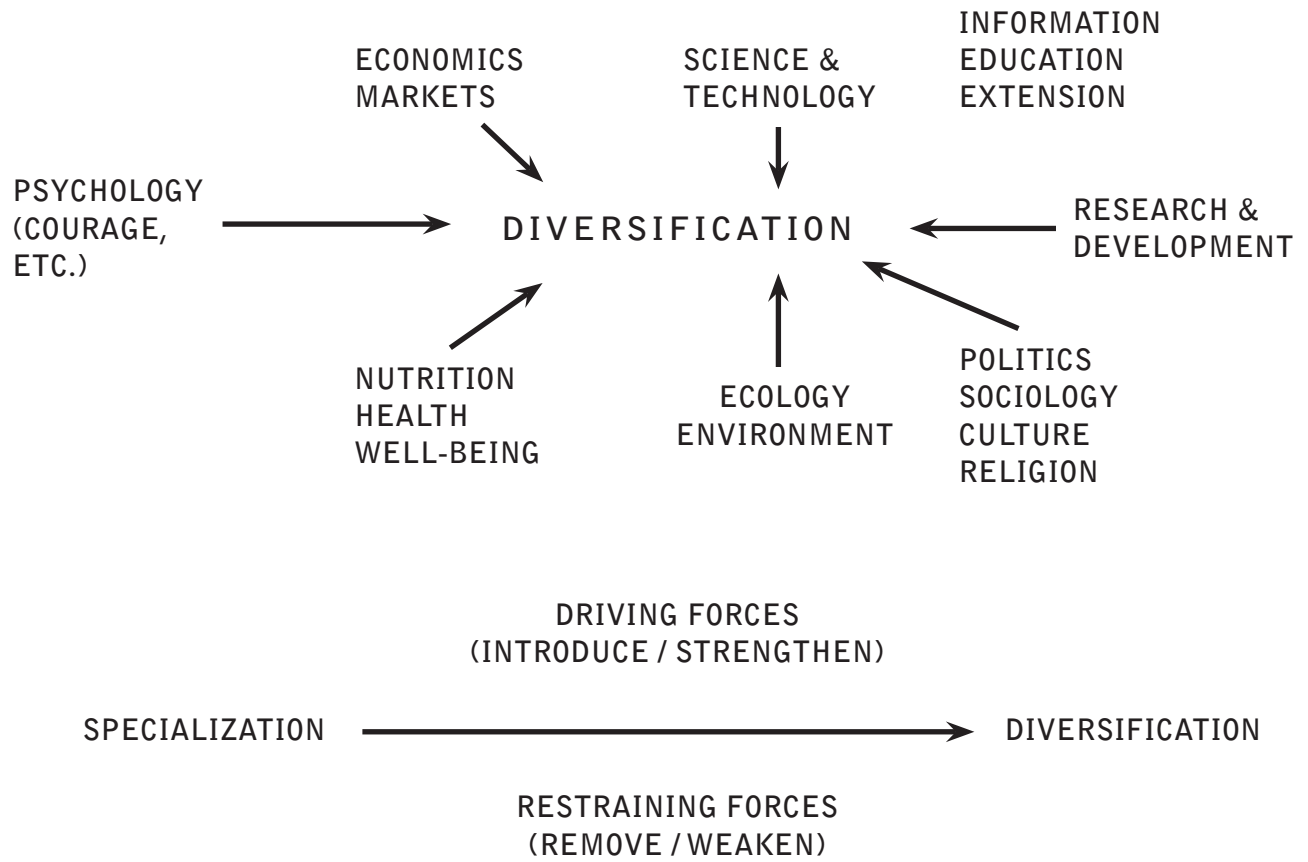
SERVICES

- 81 Leasing Hunting Rights
- 82 Moonlighting with Computers
- 83 Bed and Breakfast
- 84 Farm Vacations
- 85 Selling Your Farm Skills

MARKETING

- 86 Farmer's Markets
- 87 Is Your Farm Pick-Your-Own?
- 88 Roadside Marketing
- 89 Marketing Co-ops
- 90 Mail-Order Sales
- 91 Selling to Restaurants
- 92 Direct Exports
- 93 Selling Your Machinery Ideas
- 94 Advertising
- 95 Pricing
- 96 Using Computers in Marketing
- 97 \$100,000 from 25 Acres
- 98 Customer Clubs
- 99 Markets within 30 Miles
- 100 Inventory Your Farm's Options

FIG. 2 MAJOR INTERACTING FACTORS AFFECTING DIVERSIFICATION



and long-term objectives for diversification might include restoration of the natural capital of the farm (soil health, natural pest controls, etc.; Hill, 1985); reduction of dependence on imported inputs which may then be conserved for higher priorities, increased efficiency in resource use (Cox, 1984); increased resilience (Holling, 1973); reduced environmental impact; prevention of species extinction related to habitat simplification (Miller et al., 1985); and the evolution of more benign systems of food production that can provide meaningful work and nourishment for local communities without compromising the long-term sustainability of the agroecosystem, equity or justice (Hill, 1985; see also Altieri, 1987; Fukuoka, 1985; Mollison, 1979; Reddich, 1982; Todd, 1976; U.S.D.A., 1981). These certain other "advantages" of diversification are listed in Figure 3.

Our best models for diversified cropping systems occur among the traditional tropical cultivation systems, such as those found in parts of Java. Although these have been long neglected by modern agriculturists, there is a growing interest in combining the best of both traditional and modern agriculture to "help stabilize and improve rural life (in developing countries), free capital resources for industrialization and...stem the migration from rural areas" (Conway, 1973). An example more directly relevant to the Northeast is provided by Gavitt (1986).

Although the wisdom of diversification is universal, the following factors have operated against it since World War II and still remain as driving forces for expansion of farm size, mechanization, intensification and specialization (USDA, 1981): the cost-price squeeze, short planning horizon, low relative energy prices, inflationary land market, particular tax and commodity policies, preferential access to credit by large operators, emphasis on research and development, science and technology, and education and extension for large-scale, capital-intensive agriculture (Youngberg & Buttel, 1984). Partly by reducing the farmer's perceived risk, these factors have lessened the imperative for risk reduction through diversification (Todd, 1984). Over the long term, however, most of these factors are likely to become less and less effective means for protecting against risk. Among the many causes of this are the decreasing availability and associated increasing cost of non-renewable resources; increased erosion of the natural capital of agroecosystems; growing public awareness of the connections between environment, food quality and human health; the failure of many agricultural and food policies to achieve their stated objectives; and the empowerment of working people, who are becoming less and less willing for their lives to be dictated by centralized governments and multi-national corporations.

In ecology there is much debate concerning the relationships among diversity, stability and resilience (e.g., May 1972). Unfortunately there is also much confusion, mostly the result of the failure of researchers to distinguish between diversity (the number of different species present) and functional diversity (i.e., taking into account what the organisms do and how they interrelate, particularly their mutualistic relations). It seems obvious to me that there is a clear positive relation between the degree of functional diversity and resilience (see Holling, 1973).

In an effort to generate locally relevant data concerning diversification

FIG. 3: Characteristics of Highly Functional Agricultural Diversity in Time and Space

BIO-ECOLOGICAL

Diversity:

- Is a natural state within mature, open ecosystems in resource-rich environments;
- Bestows resilience on systems (less affected, recover faster);
- Is necessary for long-term sustainability (self-maintaining, self-perpetuating);
- Is associated with high negentropy (e.g., maturation, succession, evolution) and low entropy (e.g., minimal degeneration, decay, erosion);
- Permits cycling of nutrients; uses "wastes";
- Increases resource use efficiency;
- Reduces likelihood of accumulation of inhibitory or disruptive materials (e.g., pesticides);
- Has a higher incidence of cooperation (symbiosis, commensalism, mutualism); ◦ Is characterized by self-regulatory mechanisms.

AGROECOSYSTEM DESIGN & MANAGEMENT

Diversity Means:

- Less acreage & capital required to enter agriculture;
- Greater opportunities for creativity & experimentation;
- Greater opportunities for increasing efficiency, raising total yield, preventing and controlling pests, conserving resources, reducing environmental impact and increasing resilience;
- Greater opportunities for further evolution of the agroecosystem.

MARKETS AND ECONOMICS

Diversity Means:

- Reduced risk in the context of uncertainty;
- Greater opportunities for diverse marketing and value added strategies (e.g., roadside stands, farmers' markets, U-pick, on-farm processing, wholesaling, contracting directly with consumers);
- Being highly compatible with the informal economy;
- Being more responsive to changing demands;
- Spreading workload and labour costs over the years; extends growing season;
- Reduced input costs.

HUMAN NEEDS

Diversity:

- Permits meeting all food and fibre needs locally;
- Is likely to link farmer and consumer;
- Landscape is aesthetically pleasing, stimulating, less boring;
- Provides more rewarding and more diverse work opportunities, e.g., for all ages and skills;
- Free inputs for other uses.

the "Sunrise Conference" audience participated in a brainstorming exercise in which they wrote down their first thoughts under the following headings: key realities for you about agricultural diversification; rational long-term goals that follow from the above; barriers to their achievement and ways to weaken or remove these; policies, plans, actions and initiatives for implementing agricultural diversification; immediate actions (including what you will or would like to do). Respondents, of whom there were about 40, noted their province or state of residence and whether they were answering as a farmer, academic, consumer, etc. The results of this exercise are given in the addendum following. Particularly evident in the responses was the audience's clear understanding of the advantages of diversification, the problems associated with its implementation, and the dependence of change upon both the external provision of support and the internal willingness to take risks.

I will conclude by touching briefly on what I consider to be the major restraining factor for both farm diversification and the broader challenge of establishing a rational sustainable agriculture. Usually such discussions focus, on the one hand, on knowledge, skills, resources and technology and, on the other hand, on institutional policies and supports. Although these are both essential areas for concern, they are dependent on the collective state of mind of those involved, what I have termed our "human beingness" (Figure 4). This is determined largely within the family, primarily during our early childhood (Figure 5). The systematic, although largely unintentional, oppression of children in our society causes them to develop a defensive and adaptive false public image that reacts to cues from outside (Bradshaw, 1986; Jackins, 1965; Miller, 1984; Solter, 1984). This is in contrast to the unoppressed child who acts' spontaneously from within (Pearse and Crocker, 1946). While the former child has been disempowered and seeks compensatory symbols of power from outside, the latter child becomes increasingly powerful (yet benign) and is content even to act anonymously, needing no compensatory external recognition. The implications of this for agriculture and diversification are that, whereas the disempowered individual is more likely to be attracted to highly simplified, and therefore readily controllable, resource and technology intensive farm operations, the powerful individual will be psychologically freer to design and manage agroecosystems to achieve longer-term, less spectacular goals such as nourishment, self-fulfillment, justice, flexibility, evolutionary change, efficiency and sustainability.

This concept has been developed into a hypothetical scheme that links early childhood events to farm design and management (Figure 6). I believe that only when we pay equal attention to this human factor will we be in a position to achieve sustainable and benign change, one aspect of which is the development of diverse farming systems.

Fig. 4 Inter-relations between "Human Beingness" and Food System Design & Management

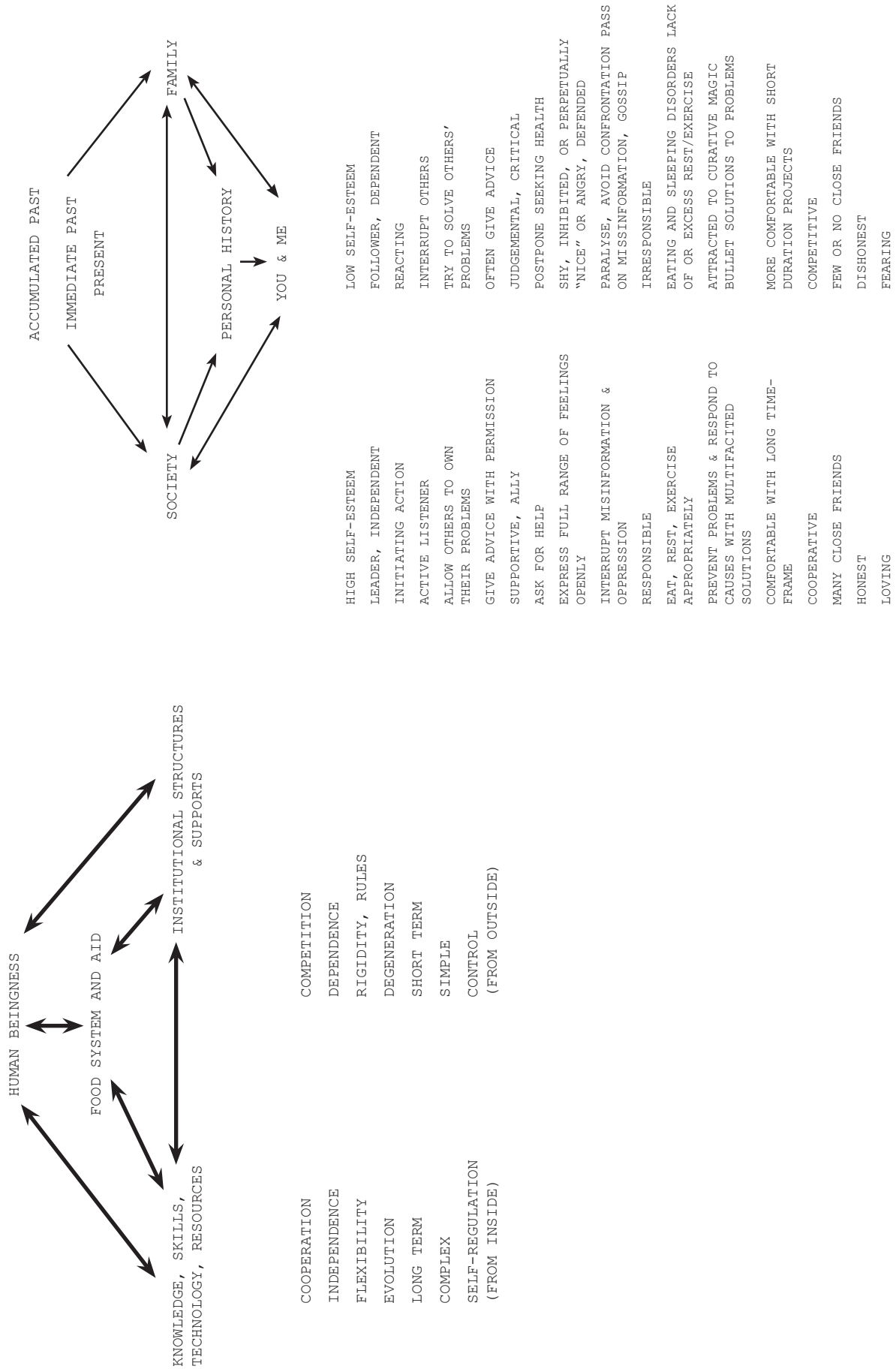


Fig. 5 "Families" - Historical factors that determine one's human beingness

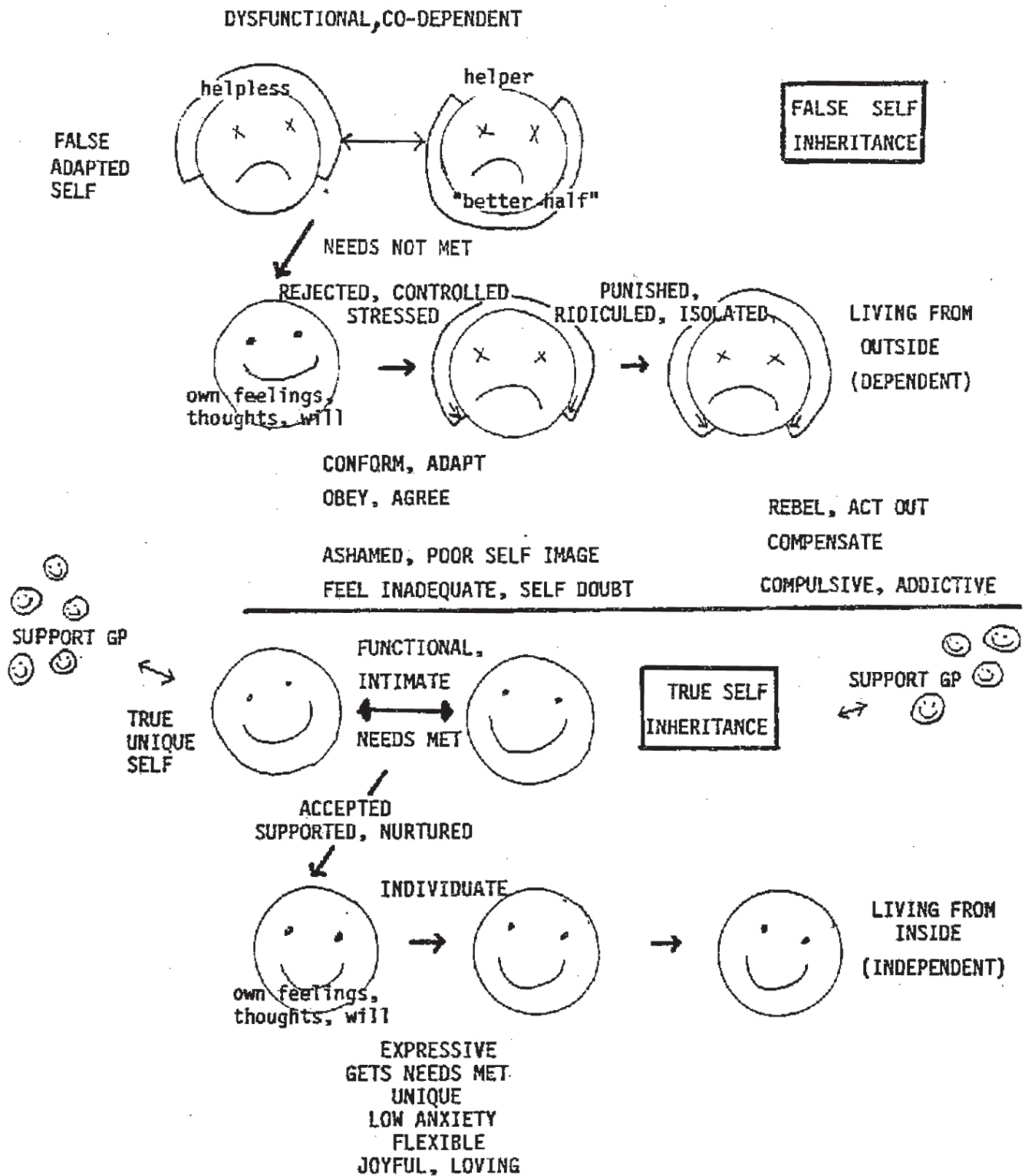


FIG. 6: Negative Influences of Past Experience on Food System Design

PAST EXPERIENCE	HUMAN CONDITION	VALUES	FOOD SYSTEMS
HIGH PHYSICAL AND EMOTIONAL STRESS	INTERNALIZED DISTRESS MALADAPTIVE PATTERNED BEHAVIOURS (Irrational Attempts to get Rational Past Needs Met in Present - Needy)	COMPENSATORY (Individual ME FOR ME) END JUSTIFIES MEANS WANTS - NEEDS MORE IS BETTER LIVE NOW, PAY LATER/NEVER INNOCENT UNTIL CAUGHT	MALFUNCTIONING RESOURCE DEPLETING ENVIRONMENTAL IMPACTING UNJUST SYSTEMS MILK THE SYSTEM EMPHASIS ON ECONOMIC EFFICIENCY (Short Term)
UNHEALED HURTS	UNAWARE DISCONNECTED UNBALANCED CONFUSED INDECISIVE OR DECIDING IRRESPONSIBLY POWERLESS, ATTRACTED TO PSEUDOPOWER DEFENSIVE SECRETIVE, DISTRUSTFUL AFRAID, LONELY DEPENDENT, COMPETITIVE TRAPPED DEPRESSED OR HYPER BAR-GAINING WITH DEATH OPPRESSIVE/OPPRESSED (Hierarchical) PREOCCUPIED WITH CONTROL ISSUES UNCOMMITTED INFLEXIBLE	OWNERSHIP GIVES FREEDOM SIMPLIFY SYMBOLS OF POWER - POWER IT'S THEIR FAULT GET THE ENEMY FAITH IN CURATIVE SOLUTIONS IMPORTANCE DETERMINED BY SURFACE FEELINGS I CAN'T CHANGE TILL THEY CHANGE NATURAL LIMITS ARE TO BE TRANSCENDED	LABOUR REGARDED AS A COST MANIPULATED DEMAND DICTATES PRODUCTION IGNORE OR UNDERVALUE EXTERNALITIES AND LONG-TERM SPECIALIZATION UNIFORMITY (Monocultures) LARGE CAPITAL INTENSIVE OPERATIONS HIGH POWER MACHINERY MAGICAL BULLET SOLUTIONS (N2 in a Bag, Etc.) NUCLEAR SCENARIO GENETIC ENGINEERING SPACE COLONIES OVERKILL OF PESTS (Insecticides, Herbicides, Antibiotics, etc.) UNSUSTAINABLE

FIG. 7: Positive Influences of Past Experience on Food System Design

PAST EXPERIENCE	HUMAN CONDITION	VALUES	FOOD SYSTEMS
LOW PHYSICAL AND EMOTIONAL STRESS	FULLY ALIVE IN PRESENT TIME UNIQUE RESPONSES TO UNIQUE SITUATIONS SPONTANEOUS, JOYFUL	UNIVERSAL, GLOBAL (Species) COMMITTED SELF, SPECIES, LIFE, PLANET CONSIDERATE OF NEEDS OF OTHER INDIVIDUALS AND SPECIES (Long-Term)	MEETING REAL NEEDS (Nourishment, Health, Fulfillment, Justice) SUSTAINABLE, CONSERVING ENVIRONMENTALLY SUPPORTIVE, REGENERATIVE, RENEWABLE, SOLAR RESOURCE BASE
HEALED HURTS	AWARE INTEGRATED BALANCED THINKING CLEARLY DECIDING WISELY CREATIVE LOVING POWERFUL OPEN, HONEST AUTONOMOUS COOPERATING FREE EMBRACING LIFE SUPPORTIVE COMMITTED FLEXIBLE	SUPPORTIVE, GIVING, CATALYTIC ROLE DISTINGUISH NEEDS FROM WANTS ENOUGH IS BEST PAY AS I GO SELF POLICING, HIGH ETHICAL STANDARDS EQUITABLE ACCESS COMFORTABLE WITH COMPLEXITY EVERYONE IS POTENTIALLY POWERFUL RESPONSIBLE, JUST TREAT CAUSES AND PREVENT PROBLEMS IMPORTANCE DETERMINED BY THINKING & GUT FEELINGS PROVIDING LEADERSHIP ACTIONS LIMITED BY NATURAL LAWS AND VALUES	FLEXIBLE, EVOLVING, LONG-TERM PLAN LABOUR, KNOWLEDGE, SKILLS AND NATURAL RESOURCES AS CAPITAL REGIONAL SELF-RELIANCE PARTICIPATORY HIGH AUTONOMY, SELF-MAINTENANCE, SELF-REGULATION, FUNCTIONAL DIVERSITY COMPLEX, e.g., Multistory Polycultures SMALL (Most) TO LARGER SCALE LOW POWER APPROPRIATE TECHNOLOGY PREVENTATIVE SOLUTIONS (Focus on Causes, Early Indicators and Bioecological & Social Approaches) BUILDING ON NATURAL PROCESSES & CYCLES ENERGY, RESOURCE, SKILL

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CHAPTER ADDENDUM

ANALYSIS OF BRAINSTORMING SESSIONS AT SUNRISE AGRICULTURE CONFERENCE

1. Key Realities for You About Agricultural Diversification - Ecological Factors

Care for soil/soil fertility to ensure sustainability
Diversity **in** the foundation of biological and traditional systems Helps to maintain or recreate balanced systems Diversity is required for survival and sustainability Creates closed systems (cycles)
Prevents erosion
Reduces chemical inputs
Is part of organic agriculture
Uses local resources
Without it resources are wasted
Promotes crop/livestock synergy and balance

Economic Factors

Lessens cash flow irregularities
Acts as a buffer from market swings
Is more profitable
Lower costs
Spreads risk
Diversifies farm income
Without it farmers risk loss of money or farm
Practical for domestic needs, less so for exports
May increase value and cost of food
Facilitated by consumer demand for quality food/better food

Human/Demographic Factors

Landscape more interesting, aesthetic and exciting
Promotes survival of family farms
Strengthens local community through self-reliance
Encourages co-operation
Helps people think holistically
Prevents agricultural decline
Allows increased opportunity for integrated lifestyles
Healthier
Based on human interests and needs

Management Considerations

A challenge to planning
Evens out use of labor and equipment
Runs with little or no outside inputs

Management Considerations (Continued)

Permits low resource input operation
Needs to be examined in relation to economies of scale
(management, planning, marketing)
Reduces pest problems by promoting crop rotation
Less susceptibility to weather variation
Opens up new possibilities of new products for a diversity of producers

2. Rational Long-Term Goals that Follow from Above Ecological Realities

A more stable and sustainable overall system
Improved soil conditions and fertility to preserve land
Imitation of natural and traditional agricultural systems
A caring and bountiful countryside
Awareness of symbiotic relationships
A fully integrated system
An improved environment
Resource conservation
Feeding ourselves and helping those in the rest of the world to do the same

Human/Demographic Goals

Better quality of life
More people remaining in rural areas Sounder, healthier agricultural communities
Preserve diverse rural lifestyle
Less pasteurized and homogenous society
A bioregional approach to the "Anywhere, U.S.A." phenomenon
Cultural change toward ecological conscience Education of young people for a "New World" Satisfaction of all human values

Economic Goals

Higher profitability
Year-round stable farm income
Economic viability of rural communities

Management Considerations

Better and more stable use of land and equipment
Improve food supply and other products marketed
Reduce dependency on one crop, one way, one plan
Reduce pest problems

3. Barriers to Their Achievement and Ways to Weaken or Remove TheseA. BarriersManagement Problems

Not enough time to plan, etc.
 Lack of quality land, certain soil elements
 Lack of equipment or suitable equipment
 Specialization/monoculture is easier
 Increased complexity of system is too much to manage
 Immediate need to grow food, produce a commodity
 Agricultural diversity not foolproof against problems
 Not economic to run livestock on good crop land
 Labor and harvest problems
 Reduced yields
 Lack of support infrastructure

Financial/Economic Considerations

Not enough money (to start, hire help, etc.)
 Consumer sensitivity to food prices (cheap food policy)
 Difficulty obtaining investment
 Conventional specialist economic system is "against" self-reliance incentives and rewards of present system
 Competition
 Lack of markets
 Stable agriculture is a low profit industry
 Too risky to diversify in capital intensive agriculture
 Most need short-term economic benefit before changing

Lack of Knowledge

Lack of knowledge, know-how and available information
 Lack of supportive research
 Meetings/workshops only preach to converted

Individual Attitudes

Unwillingness to change
 Human greed
 Lack of willingness to risk
 Human ignorance
 Lack of creativity
 Farmers too crushed by worry
 Arrogance
 Large-scale farmers see it only applicable to small scale

Political Factors

Government hindrance/obstructive and unsupportive policies
Centralization
Politics in general

B. Ways to Weaken or Remove the BarriersEducation/Information

Education in agricultural diversification through courses, examples,
demonstrations
Train farmers, financiers, politicians to new and creative thinking
More research into new crops, harvesting methods, etc.
Access to information

Management Solutions

Work jointly rather than in competition, support each other
Active effort to overcome barriers preventing expansion out of
monoculture
Take risk on one prototype area
Improve marginal land
Lease land and equipment
Guarantee needed labor pool to harvest and store new crops

Financial/Economic Solutions

Develop support for individuals trying new options Establish new markets
Raise prices and cut unnecessary costs
Remove tax incentives favoring extreme concentration
Develop financial institutions that favor mixed farms
Have loans guaranteed by public sector

Individual Attitudes

Keep an open mind and be willing to experiment
Reduce personal needs to those obtainable directly by "hands-on" efforts
Accept failures
Trust others
Change my/others' values and the way I/we think

Political Factors

Major political and social upheaval
Government help

Political Factors (Continued)

Political processes that would raise consciousness
Elect candidates who believe in sustainability

4. Policies, Plans, Actions and Initiatives for Implementing Agricultural DiversificationEducation/Information

Educate re sustainability at all levels
Regional farmer conferences/workshops
Research farm ecosystems, biological cycles
Research transitional agricultural production/marketing systems
Develop public information programs
Improve exchange of information at all levels
Translate needs into terms farmers can understand and respond to
Identify key nutritional elements of a balanced diet
Learn about nutrient cycles (potassium) on local scale
Research alternatives to pesticides
Educate people to respect community, planet, etc.

Government Policies

Government funding for R&D, demonstration models, etc.
Government funding to support farmers trying to diversify
Public sector management assistance
Public sector regional development task forces
Support for sustainable agriculture
Throw out cheap food policy
Limit land owned by one farmer to manageable size
Regulate farming methods
Government should encourage people to buy local produce
Public sector should be more active in promoting recycling
Regions should compete by tax strategies that largely eliminate profiting
from capital gains on farm real estate
Removal of government market intervention
Government should have policies stressing self-reliance as basic to
society

Management Initiatives

Co-operation instead of competition between farmers
Help set up farm-based value added system
Establish small, local market outlets
Create crop/livestock mixes to fit regional needs
Work out a system/schedule for farm production
Use outside labor corps and contract farming
Diversify large-scale agricultural operations according to regional
plans

Management Initiatives (Continued)

Make modest changes that are immediately rewarding
 Price according to economics of getting crop to market
 Create guidelines for crop rotation
 Establish home-scale production system
 Practice time management
 Continue reliance on off-farm income
 Keep planting
 Stop using chemical fertilizers
 Develop and use crops that perform well under a variety of conditions
 Develop low-input systems allowing effective use of labor
 Coalition of producers and consumers Introduce greater variety of crops

Individual Attitudes

Keep patient
 Keep learning
 Will be changed more by stressing immediate benefits than long-term ethics

5. Immediate ActionsIndividual Actions/Management Initiatives

Do it now even if it means a loss - the most important rewards are intangible
 Determine what you can grow and the feasibility of growing it Farm part-time
 Find other growers and work together to support a program
 Continue activity with Maine Organic Farmers and Gardeners
 Find and obtain land
 Finish school and learn how to achieve a better system
 Grow apples, potatoes, horseradish
 Get refinanced and diversify further
 Get politically involved
 Argue for needed changes in my public service work
 Someone has to provide initial investment
 Plan ahead
 Go home and think

Education/Information/Research

Educate farmers, extension workers re need for sustainability
 Have farmers' workshops with specialists/guest speakers
 Don't preach - get practical and profitable
 Integrated research and development to assess viability
 University research centered on sustainable agriculture

Education/Information/Research (Continued)

Educate consumers on need for diet diversification

Get financiers to consult with experts when evaluating farm business proposals

Government Action

Government support of state agriculture, services, etc.

Get diversification "institutionalized" (e.g., at experimental station)

Support local organic food and cottage/regional industries

Review funding and mandates for research and education programs

Tax imported foods

Marketing

Identify, produce and sell for markets to assess returns

Increase efforts in marketing on broader scope

Advertising/marketing, e.g., "fresh" better than rubber

III. WORK SHOP SESSIONS

DIVERSIFICATION FOR DAIRY FARMS

FACILITATOR: Don Stimpson, University of Maine

REPORTER: Richard Wood, Maine Department of Agriculture, Food
and Rural Resources

PARTICIPANTS: Charles Colgan

Arthur Davis

John Fogler

Benjie Grant

Warren Graper

Stuart Hill

Richard Hinners

Donald Hoenig

James Leiby

David Vail

After an introductory interlude, in which the Canadian participants gave a brief sketch of their quota systems, the workshop moved to the question of how serious the "crisis in dairying" really is. Is there a need to turn to diversification to improve dairy profitability?

Several participants kept this question before the group during the session. One mentioned that many farmers he had spoken to acknowledged that, to their surprise, 1986 was the most profitable year they could recall. Who, then, were the dairy farmers in crisis? The participants were in agreement that, as a group, most of those in trouble are young farmers who borrowed heavily to start farming in the late 1970s and very early 1980s when land, cattle and used equipment all carried high price tags, and interest rates were also very high.

Examples were offered from both the U.S. and Canada of heavily capitalized, high debt dairy farmers encouraged to over-extend themselves by experts and loan officers who apparently felt the conditions of the late 70's and early 80's would keep on forever. Both governments were guilty of this, and the Canadian incentive programs only served to dig their farmers in deeper still, as they had to borrow still more to match the incentives. The recent reversal of cattle, land and milk price trends left these farmers (encouraged by experts, the farm press and loan officers to borrow heavily for state-of-the-art facilities and equipment) struggling against the new reality of the mid-1980s. Their equity has been seriously eroded and, even with today's lower grain and fuel prices, they are unable to pay late-1970s debt obligations at mid-1980s milk prices.

There was no unified sense of how to respond to the plight of those farmers. Some participants feared that government programs to save them might do even more lasting damage to the dairy economy. One participant argued that it is unwise to prop up, or keep afloat, farmers who are in rough financial shape even though they are the victims of unfortunate timing and unreliable experts. A Quebec discussant was less sanguine about this, citing the devastating impact on his community. If his farm community loses four more

farms, that would be half of the English speaking community. At that point the Government might not be able to justify, for example, funding an English language library.

There was discussion of the impact of biotechnology, especially Bovine Growth Hormones (like B.S.T.) and Reverse Osmosis. Some feared that the cost of equipping for Reverse Osmosis will be a bigger threat to small farms and rural communities than B.S.T., which may be size-neutral. Dairy operators from Canada disagreed, pointing out that if Reverse Osmosis became a necessary investment, cooperatives could install equipment at collecting points so that small farmers could enjoy the benefit while costs were diffused over a large number of cows on several small farms. If B.S.T. is approved, however, even though each farmer could, in theory, make the same living from a reduced number of cows within the quota system, history suggests that sooner or later the more aggressive would buy the quota of the less aggressive. Either strong pressure for diversification into other farm enterprises would develop or the number of farms in a given rural community would shrink, with unforeseeable, but not likely happy, consequences for the social fabric. This prospect makes Canadian dairymen extremely uneasy.

It was argued that B.S.T. might in fact give dairying in the forage-raising northeast and maritimes an edge over the grain-producing regions of the west, because experimental results suggest that it has a greater effect in enhancing milk production from forage feed than from grain rations. However, one producer countered that his response would be to diversify his operation and produce more of his herd's grain ration. A number of his neighbors are turning to beef, especially cow-calf operations, but without much planning or assurance that it is a viable profit center. Debt burdens are viewed as important in affecting producers' ability to make adjustments like these. It was pointed out, for example, that 50 percent of Pennsylvania farmers are debt free and, thus in a preferred position to try alternative crop and livestock ventures. It was agreed that dairymen already floundering financially are viewed by creditors as unfavorable candidates for new ventures.

On the subject of who is likely to leave dairying, it was agreed that, historically some of the best farmers have always left during rough times, because they had other options and felt they could do better with their accumulated capital in other endeavors. Also, a number of the most productive dairymen quit because they were forced to. Many of the less efficient would soldier on as long as possible, feeling they had no choices. Thus, it is not a case of the inefficient producers constantly being weeded out. A look at the average ages of dairy farmers (just over 50 in Quebec, just under 50 in Maine) suggests that retirement may remove the lion's share of those who will be made redundant by new technology and depressed prices.

A look at consumption figures and recent trends suggests that the demand for milk may well continue to increase. It is currently 480 pounds per capita in Canada and 582 pounds per capita in the U.S., and rising on both sides of the border. The most conservative estimates peg U.S. consumption at about 600 pounds per capita in the year 2005, while various studies done on behalf of the cheese industry suggest that it may go even higher, assuming that the price of dairy products remains favorable to consumers. In view of these projections,

one participant felt that we could use as many dairy farms at the end of the century as we have now, if people could be found who have the capacity to run them efficiently. He went on to remark that our system has over-emphasized production per cow and judged farmers accordingly. However, profitability must be the standard by which farmers are judged by their peers. He has found that it is liberating to stop thinking of cows as individuals and regard them, instead, as machines for converting forage into money.

A brief comparison of milk quality standards in the U.S. and Canada (stemming from an observation concerning the extra profit to be made by lowering the somatic cell count of milk) led to suggestions of a number of ways tighter management could enhance dairy profitability without increasing expenses. It was suggested that, for those who have already accumulated a heavy debt load and specialized equipment getting established in dairying, intensified management probably offers better prospects than adding a new farm enterprise. It was acknowledged that traditional dairying was already quite diversified, involving a milking operation, a replacement raising operation, and production of several forage crops. The awareness of diversification opportunities in dairying might best be heightened by regarding each of these as a separate profit center and bringing intense management to each. The group was reminded that a traditionally acceptable form of diversification for dairy farmers was for Dad to operate a school bus and for Mom to take a job in town.

In summary, the participants seemed to feel that for most dairymen, more hope was to be found in doing better what they are already doing, rather than seeking new ventures. A few participants qualified this conclusion by stressing that there would always be a place for small diversified dairy operations that started with that intention in mind and concentrated on niche marketing of dairy products, especially for customers concerned about health issues and food free from additives.

DIVERSIFICATION FOR ROW CROP FARMS

FACILITATOR: Sandy Griswold, Prince Edward Island Department of Agriculture

REPORTER: Bill Seekins, Maine Department of Agriculture, Food, and Rural Resources

PARTICIPANTS: Terry Bourgoin
Brenda Cook
Edward Johnston
Jim Marchildon
Dale McLaughlin
Peter Mosher
Joe Rideout
Peter Schousboe
Duane Smith
Ruth True

Potato Production Information

The central concerns of most participants were the overall health and future prospects of the potato industry. To give some perspective on potato production sectors in the various jurisdictions, the facilitator presented basic statistics for PEI and asked others to give similar figures for Maine, New Brunswick and Quebec. Tables 1 and 2 contain the basic information outlined. It was noted that about 75 percent of Canadian potato production is in the Eastern Provinces, while two-thirds of U.S. production is in the West.

TABLE 1

Basic Potato Production Information*

State/Province	Acres	Averages for Recent Years		
		Yield/Acre (Cwt.)	Trend in Production (Million Cwt.)	
			1971	1985
New Brunswick	53,000	280	?	14.8
P.E.I.	70,000	257	9.0	19.0
Maine	100,000	265	32.0	20.0
Quebec	48,000	211	7.8	10.0

*Estimates made by workshop participants.

The bulk of Eastern production is concentrated on a relatively small number of farms. In PEI, about 80 percent of the potatoes is grown by 200 of the

TABLE 2

Distribution of Potato Production by Product Type

State/Province	Percent of Crop Produced			
	Seed	Tablestock	Processing	Loss
New Brunswick	15	15	55	15
P.E.I.	15	50-55	15	15-20
Maine	8	43	32	17
Quebec				

Island's 600 potato farms; and in Maine about 250 of the 800 potato farms grow most of the potatoes. Similar concentration is found in New Brunswick, which has 450-500 potato farms. The opinion was expressed that a coordinated marketing effort, even if it only involved these 500-600 largest producers, could have a significant positive impact on potato prices in Northeastern markets, enhancing profitability for everyone.

Grounds for Concern - and Possible Pessimism - About the Future Prospects for Production of Potatoes

Damage to crop land associated with cropping patterns and heavy machinery use. The one potato farmer in the session expressed an overriding concern about the impact management systems for potato production were having on the resource base. He felt that farmers were forced by immediate economic pressures to use practices that would be detrimental in the long run. How could potato farmers diversify and improve rotations and still meet immediate financial needs?

Rapid expansion of potato acreage in PEI and Quebec. New Brunswick officials anticipate that production controls will eventually have to be imposed on the Eastern Canadian potato industry. The recent rapid expansion in potato acreage by producers in PEI and Quebec is seen by them as an attempt to gain larger production quotas relative to New Brunswick producers.

Over-production of round white tablestock depressing market prices. All participants agreed that this was the number 1 problem. The region's growers persist in "riding the sinking ship" of round white tablestock, instead of diversifying into varieties with rising demand. There were several different representations of this basic problem faced by the Eastern U.S. and Canadian potato industries. The region continues to be a heavy producer of round white potatoes despite generally low prices and frequent very poor price years. Continued resistance to changing to new varieties, new markets and new crops is fueled by the unrealistic hope that there will be a return to the conditions of the early and mid-70's when there were comfortable profits to be made in the round white tablestock market.

Different grading standards for U.S. and Canadian potatoes. (Canadian standards for #1 potatoes are more stringent.) U.S. and Canadian farmers each want the other to adopt their grading standards. Consumers evidently prefer the higher Canadian quality, but U.S. standards permit a greater "packout" (i.e. fewer discarded culls). Agreement on a single set of grading standards is not likely in the present political atmosphere.

Farmers have the capability to produce efficiently but not to market effectively. New Brunswick farmers are evenly divided on the role of the Potato Marketing Board: half feel it should be less involved in marketing and half feel it should be more involved. In none of the jurisdictions do government marketing agencies actually buy and sell potatoes (or in any way control marketing). Their only role is promotion.

Domination of New Brunswick's potato industry by a single large processor. Though the existence of large volume processing capacity is seen as having a positive impact on demand for New Brunswick potatoes, the presence of a single large processor puts the farmers in a weak bargaining position. (Maine is seen to be in a much better position, with three large processors and several smaller ones.)

A crash in PEI land values since 1981. The dramatic decline from Can\$1,500 to \$950/Acre in the market price of agricultural land has contributed to the loss of about 125 farms and 10 percent of potato acreage. (Note: This estimate of declining acreage conflicts with the perception of New Brunswick participants that PEI is expanding production.)

Parts of the Region that Face the Greatest Difficulty in Maintaining Profitable Production at Current Levels

If production levels remain high, all parts of the region will have difficulty maintaining profitability due to depressed prices. All parts of the region are being pressured by the Western U.S., especially Idaho.

PEI has two advantages: its rock-free red soils and plenty of land available for quick expansion. Maine and N.B. have the advantage of strong processing industries, but both have rocky soils that cause more bruising of potatoes at harvest.

New Farm Enterprises (Commodities) with the Greatest Promise for Row Crop Farmers

In Maine broccoli has become profitable on an increasing scale. 3,000 acres are now being planted, with the potential of up to 18,000 acres of peas and 5,000 acres of broccoli. Some farmers are now experimenting with lupines as a protein source to replace soybeans in animal feed. It should be emphasized that growers and government agencies in Maine are working on not ONE but SEVERAL crops for diversification.

On PEI some farmers have found a profitable niche for growing quality timothy hay for export to Florida as horse fodder. Soybeans also look

promising. The Province now has about 3,000 acres and a roasting facility. This compliments current efforts to expand the hog industry.

The Canadian Federal government has committed \$35 million to promote the grain industry in eastern provinces. It is not yet clear whether competition with the Western provinces will be feasible, even if transportation subsidies for Western grain are eliminated.

In all parts of the region, livestock could make better use of cull potatoes and grains, but the question of profitability in red meat production is still not completely answered.

Is Diversification into New Commodities Primarily a Supplement to or a Replacement for Potatoes?

There was general agreement that the main thrust of diversification would be to supplement potatoes. There is no way a large part of Maine's 100,000 acres of potato, for example could be replaced a by other crops

Among the viable options is diversification within the potato industry, specifically growing new varieties and developing new markets (e.g. baby potatoes for the restaurant trade).

How Far Could Diversification Go Before "Critical Mass" of Suppliers and

Met Outlets for Potatoes

This did not seem to be a pertinent question since the group did not anticipate diversification out of potatoes, but rather a better mix with potatoes.

Critical Barriers to Profitable Diversification (What new technologies, management systems, access to capital and market infrastructures are needed?)

Barriers in four general areas were discussed: finance, soil management, farmers' resistance to change, and subsidies to competing geographic regions.

Financial barriers result from both lenders' attitudes and farmers' business practices. Lenders will often not consider a loan for a diversified operation. They are more comfortable dealing with a single commodity specialization. Lenders also require a farm business plan that demonstrates the profitability of proposed innovations and contains a solid marketing plan. "Shoebox" accounting systems are not acceptable, yet many farmers are not attuned to maintaining the detailed farm records necessary to prepare the required business plan.

Low soil pH is seen as a barrier to many types of diversification from potatoes. Many farmers are so concerned about keeping pH low to prevent potato scab that they believe they cannot afford to diversify into less to acid-loving cash crops. Although not cited specifically as a barrier to cash crop

diversification, the current short rotations and other land management practices found on many potato farms were seen as critical barriers to sustaining production of potatoes, as continuation of these practices will eventually render many sites unsuitable for almost any crop production.

Farmers' general resistance to change is evidenced in a number of ways. One of these is the slowness of the potato industry to adjust its varieties and packing standards to meet changing consumer preferences. Another is the continued reluctance to include variety information on potato package labels. The continuing focus on physical yield goals, instead of quality, marketing and profit goals, was still another example. It was felt that even the public sector, which has been trying to overcome this resistance by means of research, demonstrations and education, has not been as forward thinking as it could be. Two examples cited are Maine's \$5,000 limitation on technology transfer grants for storage and handling facilities and the disproportionately great emphasis placed on teaching, compared to research, at the land grant University (some research faculty spend 80% of their time teaching and only 20% conducting research).

Finally, there was concern that subsidies provided to competing regions will obstruct diversification in the Northeast, by making it impossible to compete in the marketplace with the subsidized products. An example is the Canadian transport subsidy for grains grown in the western provinces.

Actions to Overcome the Critical Barriers

Although no effort was made to assess the cost-effectiveness of alternative approaches, a number of suggested actions were discussed during the session. These are listed below, grouped roughly according to the specific barrier they address.

A. Financing

No specific suggestions were voiced for dealing with the financial constraints problems but it was implied that if farmers could be trained and persuaded to be better business managers, they would find financing easier to get.

B. Soil Management

An Agriculture Department promotion to encourage better land management practices, including a better livestock/crop mix.

A program to encourage soil liming, including both financial incentives and technical assistance. This is a precondition to profitable diversification.

Greater emphasis in plant breeding programs on developing scab resistant varieties.

C Reluctance of Farmers to Change

A multi-state/province effort to identify profitable new commodities that complement potato growing. More research and extension work focusing on economic profitability of alternative commodities.

Extension programs geared to assist with all aspects of the diversification process.

More effective government marketing assistance for new crops.

A more cooperative approach to potato marketing by all farmers in the region.

A campaign to get potato packers to label bags with the VARIETY.

More effort to tap institutional markets into which 40 percent of U.S. potatoes are currently going.

D. Subsidies to Other Regions

Canadian grain transportation subsidies should be phased out.

VEGETABLES

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Stewart Smith
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Richard Wells

From the participants' introductory remarks, it became clear that the group was split between the "ideologists", who came to the conference primarily in search of allies in working towards self-sufficiency, ecological agriculture and the quality of rural life, and the "analysts", who hoped to identify the critical factors for promotion of "sunrise" commodities. As a result, some questions posed to the participants meant little to the "quality of lifers" and the answers reflected the divergent goals within the group. The critical factors for achieving self-sufficiency, ecological agriculture and the rural quality of life are evidently not the same as those deemed essential for profitable commercial agriculture. (It is a challenge to public policy makers to formulate programs that meet the expectations of both these constituencies.)

Grounds for Interest in and Possible Optimism About the Future Prospects of Vegetable Farming in the Northeast Region

Optimism was based on the belief that there is already more diversification in the Northeast than in the Midwest and that historical evidence demonstrates that a diversified agriculture provides a more permanent foundation for a stable and resilient farm economy. Sustainability was also thought to be strengthened

by the fact that most existing and anticipated agricultural enterprises in the Northeast are family owned and managed.

Governments in the region were seen to play a positive role in restoring agriculture by developing the necessary tools and public awareness.

A major advantage of producing in the densely populated sections of the Northeast is the proximity of farms to consumers.

Parts of the Region that Appear to Be Most/Least Suited to Expanded Production

There are wide variations in availability of land, with areas like Northern Maine being an example of ample, low cost, land. It was noted that the Federal Dairy Buy-out Program provided an opportunity to convert some fertile land to vegetable production in areas closer to large urban markets.

The excess plant capacity for freezing and processing vegetables in Maine's Washington and Aroostook Counties was seen as a local advantage.

The cool climate in more northerly summer and fall cole crops. Specialists sweet corn, snap beans, and spinach for England.

The whole region has ample water supply. This may become an important margin of advantage if the Ogalalla aquifer continues to be depleted.

Critical Barriers to Expanded Production

The Market - Northern farmers are strangers and outsiders in terms of their participation in and leverage over the region's marketing system. Growers from other producing areas - Connecticut, Texas, Florida and Mexico -- are regular players in the Northeastern markets and they are not about to give up their places. They often dump produce on the market at very low prices.

Excess Production Capacity - In addition to being newcomers in their own backyard, vegetable and, to a lesser extent, fruit farmers face a market situation in which there is already a national tendency to oversupply, as well as idle productive capacity in other parts of the country.

Technology - On the whole future changes in technology are not likely to be favorable to a restoration of vegetable farming in the Northeast. Technological innovations now in the works are likely to be available to large scale farms outside this region, exacerbating a bimodal farm structure.

Infrastructure - Most Northeast agriculture is below the "critical mass" necessary to maintain effective supplies of equipment, farm inputs and extension services.

Marketing Structure - Another consequence of being below the critical mass

is the difficulty of having impact on the wholesale commercial market. The New Brunswick contingent perceived themselves to be under the monopolistic control of processors.

Financial Mechanisms - There was a sense of lack of adequate commercial or public financing for entry-level and small scale entrepreneurs.

Necessary Preconditions for Profitable Expansion of Production in the Regions

Markets - The availability of local markets and responsiveness to market opportunities were agreed to be the most important preconditions. It was felt that the opportunity exists. The Northeast should be able to respond to the growing public fear of toxic chemicals by supplying organic, or at least IPM-grown, products.

New Technologies - There seems to be a hunger for information on appropriate varieties, season extenders, hydro-coolers, storage facilities, mechanical transplanting and harvesting equipment.

Awakened Public - There was a rather vaguely articulated sense that public support for reviving agriculture is a prerequisite for "sunrise" agriculture.

Rural Development - The group came closest to agreement on a set of priorities for rural development. For example, rural and community development efforts should be directed at stimulating local and regional enterprises, rather than competing with other regions to attract outside investors and industries. As expressed by Sam Smith, "self-sufficiency and prosperity equally shared within a region are more a matter of will and culture than a result of comparative or competitive advantages."

The Most Cost-effective Government and Private Sector Actions to Overcome and Attain Necessary Preconditions for a Sunrise Agriculture

(Many ideas were offered that did not directly address the preceding list of barriers; they nevertheless reflected an optimistic "can do" attitude towards Sunrise Agriculture.)

Cooperation/Cooperatives - Faced with the smallness of farms and the lack of critical mass, cooperation in developing market structures and delivering research and other information more broadly seems to be the panacea of this group.

Marketing - The "analysts" advocated that governments supply up-to-the-minute market information to producers, to reflect consumers' changing tastes. An extension agent familiar with Maine's developing broccoli industry dispelled the myth that the success was due to an individual entrepreneur. It was rather the publicly generated information on production methods and market demands which gave rise to the success.

Centralized grading and storage facilities would help assure uniform quality and provide other efficiencies in wholesale marketing to fresh or processing outlets.

It was suggested that the "local is fresher" promotion efforts could be expanded beyond individual provinces and states to encompass the entire region.

Marketing consultants in the group reminded participants that it is important to distinguish between two distinct markets and to direct efforts accordingly: 1) the regional wholesale markets for fresh or processed crops, where local production exceeds local demand, (e.g. brocolli, blueberry, cranberry, apples) and 2) specialized, high value, quality "niche" markets, which may also be for fresh or processed produce and local or out-of-state buyers.

Infrastructure for Small and Part-time Farms - Participants who perceive the "sunrise" to lie with small, diversified, ecologically sound farms suggested the easiest and most helpful steps would be for land grant institutions to restructure their research priorities to place a primary emphasis on low input systems. One grower articulated the view that public policy must support economic diversity as a prerequisite for region wide ecological diversity. He said that governments need not look outside for concepts or technologies but can learn from the techniques already employed by successful diversified farms in the region.

What Type of Existing Farm is Most Likely to Make a Profitable Conversion to Vegetable and Fruit Farming?

The farms most likely to diversity into vegetables are those already partially involved in other vegetable or fruit growing. Most non-vegetable/fruit farmers are hesitant to convert to enterprises that require a whole new set of management and production skills. Regardless of the economic promise, successful conversion requires a motivated, interested farmer who is personally drawn to and excited about the prospect of a new enterprise.

Possibilities for conversion are also enhanced by farms' proximity to direct market outlets. However, direct/local marketing systems are frequently vulnerable to oversaturation, which limits the number of farms in an area that can profitably move into direct marketing.

Vegetables and Fruits in Diversification Plans

Vegetable farming, especially when the farmer wants to grow a wide variety of vegetables, may present serious management problems if attempted alongside other commodities. However, if the farmer limits himself/herself to a few carefully chosen vegetables or fruits, then conflicts can be minimized and harmonies created within the whole farm system (for example, in terms of energy and nutrient flows, biological balances and use of human resources).

Vegetable and fruit production, done efficiently and limited to a few well chosen enterprises, is compatible with off-farm work. This has been demonstrated by countless models all over the Northeast. (Access to information about some of the best case studies of this type of diversification would be of

great interest and benefit to present and prospective farmers.) Livestock may come to be seen as the principal activity on many such farms, simply because it requires the year-round presence and participation of the farmer.

In evaluating diversification plans, farmers with limited resources will usually realize economic advantages by combining crops and livestock. But diversification has advantages for all farmers, in terms of improving and sustaining ecological balance on their farm.

Is the Commodity Well Suited to Entry-Level Farms? Larger Commercial Farms? Small, Part-time Farms?

Fruits and vegetables are very well suited to entry-level farms. This is particularly true for farms with local, direct marketing opportunities. If the farmer aims at a small but assured market, the start-up costs are low. This allows the farmer to experiment with production methods and test his/her motivation before going to a larger scale or making significant capital outlays.

What is the Single Most Critical Need or Priority to Reach Ones' "Optimistic Forecast" for the Year 2000?

Identifying a "single most" in this diverse group of people proved to be impossible. The following are some of the top priority needs as seen by the two factions of "analysts" and "ideologists".

The more commercially oriented group (analysts) saw the need to create large volume production in order to affect the market through cooperative selling, a diverse product mix, support of processing facilities and bulk transport. Cooperation in marketing across the U.S.-Canada border was seen as far more productive than the present unsystematic and vituperative relationship.

Those whose goal for the year 2000 was self-sufficiency for the region (ideologists) viewed maintenance of the soil base and public education to overcome "cheap food policy" as primary. As expressed by one grower, "it is necessary to convert the faculty and staff of land grant institutions to a vision of and commitment to regionally and globally sustainable agriculture systems. This view derives from the widely held belief that the central concern of the year 2000 will be the preservation and healing of the global ecosystem The purpose of a Sunrise Agriculture is to build regional self-sufficiency, to restore community through the diversification of employment opportunities, and to provide a place to practice our ultimate vocation, which is to be caretakers of the earth."

SMALL FRUITS

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A workshop discussion always follows a path created by the participants, no matter how finely the "key questions" are focused on a topic. For that reason it is worthwhile to point out that the fruit workshop was attended by a few small farmers, economists, and agricultural research and advisory people. There were no representatives of large farms. Nearly half of the participants were strongly committed to ecologically sustainable agricultural methods.

Throughout the discussion there was emphasis on three themes: marketing, the need to reduce chemical use, and the need to increase research and technical support. Responses to the key questions focused on these themes.

Barriers

Barriers to increased small fruit production (especially strawberries and raspberries) center on problems in marketing. There are no large marketing organizations and thus little shipping to distant population centers. There are also no large growers on a scale comparable to apples. These two facts are related: the scale of operations is constrained by the scope of markets. An improvement in the marketing infrastructure, such as development of a large frozen berry industry, would change the picture quickly. At this time, however, local direct marketing is far more profitable for the small grower than any other means of marketing. A major problem that arises with local sales is that such a limited market is vulnerable to oversupply. A typical situation is for a grower to make a good profit for a few years, after which other nearby growers enter the field and shrink profit levels by price cutting and market saturation.

Although more urban areas offer the best opportunity for profitable local sales, such communities are also the most likely to question the use of pesticides. (High land prices also limit the opportunity for profitable production, even of high value fruit crops.) The majority of consumers want blemish-free fruit and do not particularly care about the farm use of pesticides; but community residents do not want spray drift onto their property, residues on their vegetation, or contamination of their water supplies. Each

year there is stronger pressure from the public and the regulating agencies to reduce the use of pesticides in food production.

At this time the greatest pressure from pesticide regulations and restrictions is on the grower. Such pressure is a definite barrier to increased production in our region. IPM in strawberry and raspberry production is very underdeveloped. Furthermore, any grower who takes it upon himself to reduce the use of sprays, in today's market, usually gets no reward for taking the risk. Consumers are generally unaware of the risk and are unwilling to pay higher prices.

Basic and applied research on production of fruit with more effective pest (insect, weed, disease organism) control but reduced use of chemical pesticides was seen by participants as the best approach to overcoming the barriers discussed. In order to develop further the production of small fruit, in locales with substantial local sales potential, a healthful product has to be grown by an ecologically harmless method. Furthermore, if small fruit production is going to be profitable well into the future, new technology will have to be assimilated into a redesigned farming system. For example, biological control can seldom be easily 'added onto existing farming methods in the way chemical pest controls can be. A combination of resistant cultivars and appropriate cultural methods must be the core of a new design.

The major question is how research into reduced pesticide use will be funded. An obvious disincentive to private sector research is the fact that such new technologies will involve reduced inputs, i.e., less sales to the farmer. The greatest returns to such research will accrue to the farmer rather than to agribusiness. Since prospective profits from research are not clear, the majority of funding for such research will probably have to come from public sources. However, additional public sources of funding for agricultural research are already under strain. Additional money might be raised through new taxes on agricultural chemicals or on tourist activities. The rationale for a tourist tax is that farms are part of the landscape which attracts tourists to the region. It is not unreasonable to ask them to support its preservation. A member of the workshop reported just such a tax already in force in Switzerland.

Money should be raised to support region-specific research priorities. Biological controls, as well as new farming systems, are frequently specific to local situations -- much more so than chemical controls. Thus, the Northeast is not likely to benefit much from current research in agroecology in states such as California.

The need for such research becomes daily more obvious, as regulation of pesticides becomes more strict. At present and in the past regulation has outpaced research, so that numerous pesticides have been removed from the market, or their use restricted, before alternatives were developed. This situation puts great economic pressure on the grower. Regulatory agencies play a restrictive role and rarely address solutions. There is little communication between regulatory agencies and agricultural research institutions. Inter-agency coordination must be enhanced so that alternatives are available when new regulations take effect.

A separate but closely related issue was raised at the close of the workshop: environmentalists and farmers in the Northeast should be natural allies. Working together, the two groups could learn much from each other about the most effective means of protecting the region's land and water resources. By joining forces, they could also form a more powerful political coalition.

(On the second day of the conference, the fruit workshop merged with the vegetable workshop.)

ORNAMENTAL HORTICULTURE

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The ornamentals workshop faced a major challenge in trying to provide a realistic assessment of the prospects for growth of and entry into ornamental horticulture as an agricultural enterprise. Generally, those participants who are producers in the sector believe the current business situation is good in most of New England. Much of the positive outlook is based on continued population growth and commercial and residential construction, along with increased interest in landscaping and property improvement. A possible exception is Christmas trees, whose market appears to be nearing saturation. Climate is an important limiting factor for ornamentals in the region, because it slows plant growth and affects the seasonal timing of supply.

Specific industry needs: producers and potential producers need help in learning how to evaluate market options. Government's role in this regard should be as a provider of information and technical assistance. For individual growers who hope to diversify into ornamentals, barriers can include production knowledge, availability of markets, compatibility with existing farm enterprises, specialized equipment and competing labor needs. The overriding concern of growers represented in the session is that the current success of the industry not be undermined by overpromoting the profit opportunities which now exist in small market niches.

A General Assessment of the Ornamentals Sector

The current economic situation in the Northeast, with rapid expansion of both commercial and residential building, is bringing with it a measure of economic success for the ornamentals industry. Recent surveys of the ornamental industry in Maine and Vermont show rapid growth in recent years, with sales exceeding the U.S.D.A.'s census estimates.

Because the ornamental industry is made up of a large number of very different sub-sectors, it makes sense to consider specific parts separately.

Landscaping - There is strong demand for landscaping services, closely tied to increasing population growth and the accompanying demand for services. One

specific area where regional production is not currently available is specimen size trees (15 feet and up), which are often purchased from Long Island and other points south.

Bedding Plants - U.S. markets are extremely competitive. Many small producers use bedding plants as an entry into the industry, which expands supply and depresses prices. Some suppliers find it cost-effective to have plants shipped in from other parts of the country. New Brunswick has a special situation, with prices regulated by a marketing board at both the wholesale and retail level.

Nursery Stock - There is relatively little nursery stock grown in the region, particularly in the most northerly states and easterly provinces. Among the obstacles to profitable production are: climate -- areas to the south get more growth in each season, leading to shorter times to market; soils -- nurseries traditionally have not had access to prime soils and have had to adapt to existing soil conditions; capital costs -- nursery stock take several years to reach marketable size, requiring a substantial cash outlay before any revenue is received; labor requirements -- skilled and diligent field labor is often unavailable.

Christmas Trees - At present, there is a general oversupply of Christmas trees around the country. It is likely that new entrants into the industry would face oversupply problems similar to several other farm enterprises.

Barriers to Expanded Production and Preconditions for Success

The most important factor discussed was the need for analysis and information on potential markets. There was general agreement that production techniques are widely known or can be learned readily, but the market side is the barrier to expansion of existing firms. No single ornamental specialty is likely to be a solution for a large number of new producers since the industry is made up of many small volume markets for specialty products. Thus, for potential entrants, the single most important factor in their future success is the ability to identify and establish a clientele for whatever plants they decide to grow. While public provision of market information would be most useful, individual growers should be responsible for establishing specific market arrangements. The type of market information most needed is forecasts of future demographic and demand patterns throughout the region.

Other Items Which Seemed to be of Major Significance

Climate is a critical limiting factor for perennial crops. Areas to the south may get as much plant growth each year as northern growers get in two or three. This increases our comparative production costs per plant significantly, though lower land costs may help offset the climatic disadvantage.

The marketing season is equally important. By the time our growers are able to lift plants, the peak planting season has already passed in southern areas. This limits the potential "export" market for perennials, or requires expensive cold storage facilities to allow fall digging and over-winter storage.

It is difficult to find skilled laborers willing to work in the plant production end of the ornamental business, as opposed to the design end. In wholesaling businesses, frequent turnover of retailers' employees means loss of contacts and a need to re-establish procedures with retailers annually.

Consumers in the region are not well informed about the appropriate varieties for northern climates.

Appropriate Roles for Government and the Private Sector

There was a general agreement that the entrepreneurial roles (investment decisions, plant production, identifying specific market opportunities and arranging contracts) belong with the private sector. However, the private sector needs assistance from the public sector, including the university system, to establish the information base necessary for private decision-making. The most appropriate way for the public to relay that information to the private sector is through commodity groups and associations. These groups should be encouraged and strengthened to make them effective tools of individual producers. The single most often mentioned need was management assistance, instruction on how to identify and establish markets.

Finally, the group expressed one particular concern which bears repeating. There is a general fear that government overpromotion may ruin profitable niches created by individual growers. Saturation of markets due to overentry of growers would lower income for all producers and be unfair to those innovators who developed the markets first.

Diversification at the Farm Level

There was a lively discussion of the potential for new entrants into production of ornamentals. Because the ornamental industry is made up of a number of smaller specialties and marketing regions, participants felt that there was a real need to look at matches for individual sub-sectors.

Who Might Grow What? - Based on the existing skills and equipment, there are limited opportunities for a transition from current row crop and dairy operations to ornamentals. There may be appropriate matches in the following specific areas: dairy and sod production, due to the farmer's experience in managing grasses; vegetables and bedding plants, because of growers' experience handling transplants and operating greenhouses; conversion from potatoes to Christmas trees, due to row cropping similarities (however, markets may be limited). Generally, new participants in the ornamental industry are likely to be start-up farmers rather than commercial producers seeking profitable diversification opportunities.

How Do Ornamentals Match with Other Resource Needs? - The basic equipment for producing ornamentals in the ground (nursery beds, sod, Christmas trees, perennials) matches well with the basic equipment available on most farms. Tractors, wagons, spreaders and sprayers are all generally useful for ornamentals. However, for each particular commodity, some specialized equip-

ment is needed. Labor can be an obstacle, due to either competing farm tasks (nursery digging and balling may conflict with potato planting dates, for example) or availability of particular skills (greenhouse workers, for example). For some commodities, particularly slow developing plants like nursery stock and Christmas trees, substantial capital must be tied up for a period of years before revenues become substantial. This is likely to be a major conflict for any farmer who currently faces financial problems and is considering diversification.

Who is Likely to Enter Successfully? - Generally there is a feeling that the best opportunities are for small operations which produce quality products that are already widely supplied. Most likely to succeed are operators who successfully establish market outlets early on, possibly by selling bought-in stock until they gain good production skills and can begin substituting their own stock. There are high capital costs associated with the slow maturing species and greenhouse operations, so adequate financing must be arranged.

The Future

The growth of markets is critical to continued prosperity for the industry. Ornamentals are still considered to be a luxury, so during recessions, producers' incomes decline sharply. Strong producer and trade associations are necessary for promotion and marketing. Management training will be important for most new producers.

FORAGES AND FOOD GRAINS

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W. Gardiner Young

Many issues were raised during the course of the forages and food grains workshop, however, one point became clear from the outset: forages and food grains have the potential to play a very substantial role in the future of Northeast agriculture. Agreeing on this point, the participants took full advantage of their diverse backgrounds to discuss the many issues which will affect forage and food grain production in the future.

Opportunities

The Northeast climate and soils are suitable for the production of a wide range of forages and food grains. The question then becomes, how will these commodities fit into the scheme of Northeast agriculture? Participants agreed that forages and food grains could have an immediate positive impact on corn and potato producers. Yields of both these commodities could be strengthened by producing them in rotation with forages and food grains. Several participants mentioned the potential for using lupine in rotation with potatoes. This high protein legume is suitable for use in livestock rations and its requirement for sandy, slightly acidic soils makes it an excellent rotation crop and additional source of income for the region's potato growers.

The livestock industry may also prove to be an excellent market for regionally produced forages and food grains. The participants agreed however that the current livestock industry must grow in order to absorb any dramatic increase in production. It now appears that such an expansion is possible over the next twenty to twenty-five years, due in part to diminishing water supplies in the southern great plains. This area, currently the heart of U.S. beef production, receives much of its water from the Ogallala aquifer. The continued depletion of this water source may in some measure shift the country's beef production to less urbanized parts of the northeastern states. However, there is no question that realization of the Northeast's potential for competitive red meat production hinges on the revitalization of processing, handling and distribution capacity of the region.

Three Strategies

If we are to develop and strengthen our animal industry, we must take full advantage of our ability to produce high quality forages and food grains. With this in mind, the participants developed three approaches to forage and food grain production.

The first approach, labeled the "caretaker approach", targets those individuals who produce the commodity for reasons other than profit. Their ultimate goal is to retain the scenic value of open land and to maintain an agricultural lifestyle. Input costs are negligible and few or no management practices are employed.

The second approach aims at low costs by minimizing the purchase of additional inputs. This approach appears to be the most cost-effective, since it uses existing land, equipment and facilities whenever possible. The key to profitability lies in the operators' forage management practices, minimization of investment costs and ability to use any added resources efficiently.

The final approach involves high cost and high input levels. This situation may result from either an expensive land base or a high cost of capitalization. These operators generally have a great deal invested in equipment and facilities. Nonetheless, management practices similar to those of the low cost, minimum input approach apply. However, field management is often more intensive, particularly, in regards to fertilization, reseeding, crop rotation, and pasture management.

Effective Management Practices

The discussion of these three approaches led to an attempt to identify the one best suited to Northeast agriculture. The workshop participants agreed that the low cost, minimum input approach is most likely the best option in parts of the region where land values have not reached exorbitant levels. Thus, the group brainstormed ideas which would make low cost, minimum input operations successful. All of the ideas generated were closely tied to the belief that the successful operator must look not only at yields, but also at total income per acre of production. This income includes the market value of the forage or grain itself as well as the value added in dairy, meat, or fiber products produced through its consumption.

The use and conservation of fossil energy were addressed. Longer crop rotations, minimum tillage, and efficient pasture management systems were mentioned as ways of conserving fossil energy in a cost-effective way. Participants also linked soil testing, manure management, and the efficient use of fertilizers to fossil energy conservation. Finally, the educated use of pesticides as well as industrial and municipal by-products was thought to be relevant to the management of fossil energy resources in particular forage production situations.

Efficient use of equipment and facilities is yet another aspect of a low cost, minimum input operation. Grazing schemes should be emphasized and

operators should avoid the high costs related to over-mechanization. The concepts of cooperative equipment use and custom services were mentioned as means of reducing overhead costs. Labor requirements are closely linked with equipment and mechanization. Participants felt that longer crop rotations, reduced tillage, and the increased use of grazing schemes would decrease the need for labor on farms where other production tasks or off-farm employment compete for the operators' limited time.

The area receiving the most attention was the imperative of cost-effective carbohydrate and protein production. The point stressed most frequently was the need for timely forage and grain harvesting. Participants underlined the importance of accurate nutrient analysis of forages and grains as well as the need for well developed nutritional management in livestock feeding systems.

Safe and effective use of pesticides is important to any agricultural operation. Participants agreed that there is a need for more research related to integrated pest management and the proper use of pesticides. The group also expressed the need to reduce pesticide use and to help farmers "break the pesticide habit."

The final issue raised in the brainstorming session relates to all agricultural operations regardless of their size or management approach. All farmers must keep accurate financial and production records. Only then will they be able to make informed, intelligent management decisions. As one might expect, the potential contribution of on-farm micro computers and specialized farm management software was raised.

Research Needs

Perhaps the comment made most frequently was the need to intensify, or at least maintain, research related to forages and food grains. Work should continue in areas such as plant genetics, pasture management, forage and grain storage, and the like. It is also crucial that these research results be disseminated to those farmers who will benefit from them.

In addressing research needs, the group devoted a great deal of time to lupine. Research to date indicates that lupine is suited to the northeast climate and has great potential for use in livestock feeds. However, there are several questions which remain to be answered before lupine can gain wide acceptance. Perhaps the crucial question is how animals digest and utilize lupine, and the extent to which it will support sufficient animal growth and production. It is also important for producers to have better estimates of production costs so they can determine its cost-effectiveness as a source of protein in livestock diets.

There is no question that forages and food grains can play a role in the future of Northeast agriculture. The extent of that role however, remains to be seen. It will depend largely on continued research efforts and the extent to which farmers capitalize on their ability to economically produce high quality forages and food grains.

RED MEAT PRODUCTION

FACILITATOR: David Boggs, Management Consultant, Richmond, Maine

REPORTER: W. Gardner Young, Past President, Maine Small Farm Association

PARTICIPANTS: Robert Bowen
Alfred Bushway
Ray Corey
Thomas Duby
Ed Fonda
Forest French
Hugh Maynard
Stanley Musgrave
Jack Redden

Grounds for Optimism About the Future of. Red Meats

While not minimizing the problems, the members were moderately optimistic about the near-term future of farming in general and livestock production in particular. Both in Maine and nearby Canada, there is a good deal of land available for farming and much of this could be made productive with a minimum of effort and 'expense. High quality water is in good supply. Similarly, many existing farm structures are readily available and easily restored for livestock usage. Existing markets are strong and demand is strong for fresh, quality, products. While competition is keen, there is always room for both outstanding quality and well timed marketing. Special niches exist for farmers who see these possibilities and are flexible enough to move rapidly and take advantage of them. Scale economies are not overly critical, so smaller-scale livestock farms are quite feasible.

Technological advances, such as "bGH" (biogenetic growth hormone for a dramatic increase in cows' milk production), "no till" seeding, new electric fencing materials and approaches, and application of bio-ash and other industrial by-products as soil additives pr nutrients, can make farms both more efficient and productive. Meanwhile better understanding of marketing and merchandising have increased growers' awareness and use of value-added processes to increase profitability. Technology has already made possible improved lean-meat characteristics of livestock and reduced cholesterol levels, to meet the demands of nutrition conscious consumers. Acceptance of leaner meats may also allow marketing of less-than-finished animals, at a saving to the farmer.

A basic interest in and enthusiasm toward farming among many men and women would seem to insure a constant supply of new blood into agriculture and stimulate experimentation into new and better ways to farm. This may be affected, of course, by the adverse publicity attending the current farm situation and doubts about the profitability of farming at anything less than huge scale. Nevertheless, as long as a reasonable supply of capital exists

to enable entrance to farming, and as long as new management skills can be learned and applied, there appear to be plenty of people willing to adopt this labor-intensive life-style.

More attention needs to be paid to cost reduction through use of nearby by-products as feeds, improved pasture management techniques, and other cost saving practices. Emphasis upon diversified production can also be a stabilizing factor for farms. All these cost-saving measures and innovative approaches in conjunction with stress on high return, value-added, products, better merchandising techniques, and greater reliance upon direct marketing rather than wholesaling, should ultimately pay off. It appears that the high cost of credit, poor farm planning and other management deficiencies are the major drawbacks. Federal involvement in agriculture has some effect, of course; but it is far more important in the grain and livestock producing areas of the Mid- and Far-West than in New England and the Maritime Provinces. As the value of the American Dollar declines to something like a normal level, the breathing space afforded in domestic markets should allow ingenuity and adaptability to restore agriculture to a more stable and profitable position.

In short, the feeling about agriculture over the near-term was generally favorable and even enthusiastic.

Which Parts of the Region Appear to be Most (or Least) Suited to Expanded Production?

This question provoked considerable discussion. The consensus seemed to be that proximity to markets, processing plants, and feed supplies were the major positive factors (lack of proximity is a very negative factor). Other deterring factors included climate and growing seasons, cost of land, and environmental pressures such as urban areas tend to create, for instance opposition to farm smells and noises. To be more specific, a template was developed that identified the key factors and particular areas within the region:

	Positive	Negative
<u>Suitable Areas</u>		
Aroostook County, ME	Cheap feed Cheap land Plentiful water	Climate Distance to market
Grand Falls, N.B.	Cheap feed Cheap land Plentiful water	Distance to market
St. Hyacinthe, P.Q.	Cheap feed Proximity to Market	Land cost Environmental pressure

	Positive	Negative
<u>Unsuitable Areas</u>		
Urban Areas	Proximity to market Market expansion	Land cost Environmental pressure
Resort Areas	Proximity to market Market expansion	Land cost Scenic pressures

Competition for land with more intensive farm enterprises was also seen as a constraint on expansion in some areas. Proximity to processing facilities and markets was seen as a potential off-set to cost-raising elements, such as land and labor. It was also recognized that, with some creativity, the disadvantages of an area could be made to work for one. For example, a sparsely populated area which possesses a ready supply of low-cost feed, like Nova Scotia, is eminently suited for a feeder operation, but poorly suited for a finishing operation. On the other hand, parts of Quebec lacking ready feed supplies and having high land costs are not suited to feeder operations, though their proximity to urban markets makes them appropriate for finishing operations. These examples reinforce the argument that careful planning is needed to establish a profitable red meat farm sector compatible with local resources and markets.

A parallel condition exists in Maine, where the central region lacks local grain supplies, while Aroostook County has plentiful supplies. Still another element of the problem is farm waste disposal, with its impact on water and air pollution. Apart from these potential problems, there may be a growing opportunity in Central Maine to use readily available industrial wastes both as feed supplements and soil additives.

An ever-present problem is the limited infrastructure to serve local farm systems. Under current trends, farm equipment dealers, seed and feed suppliers, and repair and maintenance facilities are gradually disappearing from most of the region. Without having these services within a reasonable distance, most farms would find their costs rising to prohibitive levels. This is particularly true for small-scale farms whose operators are, of necessity, jacks-of-all-trades who must weigh the cost of being diverted from field operations in order to tend to repairs on tractors or other equipment.

Critical Barriers to Expanded Production

This topic was covered, at least by implication, in the preceding section. Considering the prospects for breeding and feeding operations, however, the group developed the following matrix:

	Breeding	Feeding
Best Suited Areas	Central/Southern Maine e.g., Wolfe's Neck Farm	Aroostook County

	Breeding	Feeding
Best Suited Areas (Continued)	Eastern Canada	Southern Ontario Urban areas Resort areas
Worst Suited Areas	Urban areas, e.g., Portland Resort areas, e.g., Ogunquit	Central/Southern Maine

Other critical barriers are inadequate slaughtering facilities and a shortage of grading and inspection services. The limited educational and training facilities and technical assistance services for producers were also seen as strong negatives, both in connection with management skills and technological developments. Lack of adequate sources of capital, or limited understanding of particular capital needs for specific purposes and at specific times, can be extremely limiting, both as to established operations and expansion. Consumer non-acceptance of "native" products can also be a limiting factor, as was once the case with Maine livestock, which was perceived to be fatter and less tasty than western meat. Although this is certainly no longer true, Maine livestock raisers still find local wholesale marketing difficult, except at large price discounts.

Government policy concerning international borders may well be a deterrent, especially when the U.S. views Canada as unfairly subsidizing its agriculture, or while Canadian growers see U.S. tariff policies as harmful.

International competition from the following nations was perceived as especially strong:

New Zealand	- Sheep
Argentina	- Beef
Poland	- Ham
Denmark	- Ham
European Economic Community	- Processed Meats (beef)
Southwest U.S.	- Beef and Lamb
Canada	- Beef and Hogs

The sheer size of the United States market attracts competition from abroad; while interregional competition also limits the ability of Northeastern farmers to capture local markets. International trade in livestock products takes some puzzling forms, for example the EEC exports beef to Canada which then ships its own surplus to the U.S. This increases the U.S. supply of meat and depresses prices.

In sum, the internal barriers to expansion appear to involve limited capacity ability to grade, slaughter and market livestock in a region where population tends to be either thinly spaced or inconveniently located. At the moment, consumers accept some Maine meat products, but a massive educational and promotional task lies ahead to re-inspire confidence in the quality of "native" Maine products. Meanwhile, Federal government policies frequently hinder more than help the expansion of local production and marketing.

The Necessary Pre-Conditions for Profitable Expansion

Discussion revolved around new technologies, management systems, and market infrastructure. In connection with new technologies, concern was expressed about the need for research into and development of modern processing facilities and marketing techniques. Given the intense competition, it is crucial to stay on the cutting edge of technological developments in production, processing and marketing. Further, it is important that there be educational and training facilities and materials to extend the best of the existing technologies to growers. In terms of "management systems", there should be information, training, and emphasis upon rotational grazing systems, good husbandry practices (such as medical, sanitary, and nutritional practices), sound market assessment techniques, and sufficient financial expertise to guide farmers with investment planning, cash flow analysis, and financial statements.

Vitally needed veterinary services are sparse in some U.S. areas. In Canada, for example, government funding of travel expenses has increased veterinarians' willingness to venture into the "outback".

Finally, as already mentioned, there is a great need to educate the region's consumers about meat grading so that "native" products can be realistically appraised. There is a related need for improved availability of grading services for producers and distributors. More publicly supported promotion is needed to offset the price advantage of equivalent products imported into local markets. Perhaps most important, it would be of great assistance to producers to have timely, accurate, comprehensible supply/demand information. Too often, production plans are mistakenly based on the recent past, when major shifts in demand are in the offing. With better demand forecasting, producers can take advantage of these changes and avoid probable losses.

The Most Cost-Effective Government and Private Sector Actions to Overcome These Barriers and Establish the Pre-Conditions for Profitable Growth

Among the actions which were considered likely to have the greatest positive impact were: 1) cross-licensing of meat inspectors and graders by state and federal authorities, 2) market research emphasizing the quality demanded by various purchasers, the cuts and packaging they favor, and the volumes and timing of shipments to specific markets, 3) more on-farm consulting by

Cooperative Extension Specialists or County Agents as well as cost-sharing for veterinarians' travel, 4) more consistent federal regulations and tax policies, which frequently and illogically skew financing possibilities, and 5) credit programs similar to that of the Finance Authority of Maine (FAME), which guarantees loans made by commercial banks and insurance companies, extending credit directly only as lender of last resort for economically sound investments. As mentioned earlier, more public sponsored promotion of local products is important; as is increased availability of educational programs for farm planning, production management and animal husbandry. Governmental regulations regarding the crossing of jurisdictional borders by feeder steers, wethers and barrows are outdated and should be repealed.

In terms of private sector activity and self-help, there is a great need to re-involve New England's commercial banks in agricultural lending. For several reasons, their staff no longer have the skills to appraise farm operations accurately, particularly diversified operations. The issue is not simply one of re-training bank loan officers, but of persuading the bank's executives that there is still a "market" for quality farm loans. In Maine, in particular, there has been far too much dependence upon Farmers' Home Administration loans. FHA in turn, is too dependent upon political considerations.

There is a great deal of room for improved promotion by commodity groups and individual producers. Although producer cooperation has led to some unfortunate experiences in New England, and conflicts to some degree with farmers' desire for independence, there is still a great potential in cooperative action. A good deal of information sharing is needed and advocacy by state and provincial governments would help. (There was disagreement on these suggestions.)

Research is vital, for example new marketing methods, equipment technology geared to small-scale operations and multiple uses. Private enterprise can do much to encourage and invest in such research. In a situation where it is difficult to re-orient university research priorities to meet changing needs, there is a great potential for on-farm experimentation that could be conducted by producers themselves, with some supervision and controls.

The Type of Existing Farm Most and Least Likely to Make a Profitable Conversion to Red Meat Production

First of all, it was agreed that it would not be profitable for existing full time commercial farms to convert entirely to livestock. Rather, diversification is likely to be most successful, since livestock production meshes nicely with several other types of production. For instance, row crop farmers, with their prime land and specialized equipment, are not likely to convert totally to livestock. On the other hand, many already have the needed buildings and some useful items of equipment. Their soil fertility would be improved by the convenient supply of animal wastes. Row crops and livestock finishing operations have rotational complementarities, for example, when feed grain is followed by forage or pasture. Row-crop farmers could move readily into either finishing beef or breeding and finishing sheep. Breeding cattle, however requires facilities and labor inputs that might not be economical.

Another potentially successful combination is dairy production with beef cattle or sheep. Virtually all of the necessary facilities and equipment are present, as is experience with handling and feeding. On the other hand, a dairy farm with a major silage operation may just be too demanding, time-wise, to add further enterprises. A dairy/hog operation might work in the U.S., although the two animals require quite different facilities and handling. It seems that there are legal barriers to this combination in Canada. Livestock do not appear to combine well with operations involving ornamentals or fruits; and a dairy-row crop combination does not seem logical, due to the land requirements and the labor and time requirements. It was suggested that low volume production (say, 20-30 head of livestock) could produce a high return per animal; while high volume (say, 100-300 head) might well result in low returns. The appropriate scale of operation is largely determined by the existing resources of the farm, including labor supply.

Compatibility of Livestock Operations with the Demands of Off-Farm Work

Small scale livestock operations are not incompatible with off-farm occupations since much of the farm work has some flexibility in scheduling. If the demands of one's job are also somewhat flexible, it should work out. It might well be advisable to use custom work to fill in during labor bottlenecks and it may make sense to buy hay rather than attempt to grow it.

Production of Red Meat Better as a Farm's Principal Enterprise or Supplementary Activity

The three determining factors appear to be the amount and timing of labor demanded by various enterprise combinations, the preferences and goals of the operators, and the nature of the farm's current resources. If too much additional equipment or other facilities must be acquired, livestock might well not be profitable as a primary focus. There are too many variables to make a definitive statement covering all situations.

Suitability to Entry-Level Farms, Larger Commercial Farms and Small, Part-Time Farms

For entrants and small, part-time farms, the primary advantages seem to be lower capital costs and a lower labor factor compared to other farm enterprises (assuming sufficient experience to farm efficiently). The other determinant is the size and location of markets.

For larger, commercial, farms more capital is required, as is a reliable supply of low-cost feed. Proximity to both markets and processors is more critical for the large producer than for the entrant or small-scale farm.

The Single Most Critical Need to Fulfill Optimistic Forecasts by the Year 2000

The most emphasis was placed upon entrepreneurship: having a positive attitude and being ingenious in finding solutions to one's farm problems,

whatever they might be. In other words, success and failure are still seen as primarily the individual's problem. Second priority was assigned to higher profits, which involves both effective individual actions and more supportive public policy. Third priority was given to education for both production and financial management. Again, the primary responsibility lies with the individual to make the correct decisions in a timely manner. The public enters only in terms of making available training programs.

Conclusion

Several broad conclusions appear to stand out from these deliberations:

1. It is a widespread view that the greatest reliance should continue to be placed upon the ability of the individual to solve his/her own problems. The only place for public institutions is in identifying the farmer's needs and providing the needed education and skill training to enable the individual to cope by himself or herself.
2. This attitude, while expected from independent spirited farmers, overlooks the seeming advantages of collective thought and action. Organizing farmers to exchange ideas and develop common approaches to common problems does not appear to be acceptable. Due to the negative experience with cooperatives in Maine's recent past, and possibly due to ignorance about the responsibilities and conditions for membership in such undertakings, the mere mention of cooperatives evokes a negative reaction. Nonetheless, the logic of the situation indicates a very real place for them.
3. Perhaps due to the feeling that past governmental involvement has not been very helpful and that policy makers are so distant from farmers, there was little or no credence in the ability of government, at any level, to understand or deal helpfully with the major problems farmers experience. Indeed, some of these problems are felt to be produced by government policy.
4. There were few innovative or original responses to the questions raised. In that sense, this workshop could be described as a disappointment. Nevertheless, the opinions registered here confirm the nature of many problems that have previously been identified.

IV. Concluding Session

SAYING NORTHEAST AGRICULTURE: FROM. WHOM? FOR WHAT? HOW?

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At this conference many provocative arguments have been made and interesting insights offered on a variety of topics by a diversity of participants. I cannot pretend to adequately synthesize all these in the space available. I do so as best I can, with the proviso that these comments are probably best characterized as a statement of my own opinions and biases after they have been pierced and reinforced, pushed and pulled, through interaction with others at this conference.

These comments are entitled "Saving Northeast Agriculture" because I have a strong feeling that this has been the underlying premise of most participants in the Sunrise Agriculture Conference. I believe the conference should not close without scrutinizing the notion of saving Northeast agriculture. In doing so we must ask three questions: saving it from whom? for what? and how? The "how?" of saving Northeast agriculture has received the lion's share of attention here, and accordingly the bulk of these comments will be devoted to this issue. But I would argue that prior to "how?" are the of "from whom?" and "for what?", since we must be clear on what we wish to save and why it is being lost.

Saving Northeast Agriculture: From Whom?

The major focus of my paper presented earlier in the conference was the incipient crisis in which Northeast agriculture currently finds itself. I attempted to identify the major forces that are leading toward this crisis. The discussions I have heard here and the rethinking they have led me to undertake prompt me to emphasize that the problems the region is experiencing have a wide range of causes, from global forces over which people in the region have little control, to very localized factors, such as the operation of land markets and the character of agricultural resources. Let me discuss several of these important forces, proceeding from the most macro to the more micro.

At the most macro level, we should remember that agriculture, like most major economic sectors, is in a state of crisis--actual or incipient--virtually around the globe. We are in the midst of a period of protracted global economic contraction that began in 1974, continues to this day on most continents, and may persist for another decade. It is wise to bear in mind that we, as residents of a particular region shared by two particular countries, often tend to see our problems as being more region-specific than is warranted. In particular, one consequence of all long periods of economic contraction is a disproportionate decline in raw materials prices. Agricultural commodities (and some of the inputs used to produce these commodities) are, of course, raw materials. They have experienced long-term relative declines in world market price along with petroleum, bauxite, and so on. At present, there is global overproduction in most such raw materials sectors. We should thus recognize that, in part, the problems of Northeast agriculture have quite distant origins. We must be modest about what we can hope to achieve in such an unfavorable world economic milieu.

Closer to home, it is evident that what we commonly call "farming" has changed dramatically in the U.S. and the Northeast over the past half century. Many of the functions formerly performed by farmers (e.g., providing certain inputs, marketing, processing) have been "differentiated away" from agriculturists (Freidland et al., 1981). The activities that are most profitable and have the greatest scale economies are the ones that tend to be removed from the sphere of "farming." The less profitable areas with the fewest scale economies have tended to be relegated to farmers. This process has led to centralized agribusiness systems in which a region's farmers are increasingly subject to economic decisions made outside the region. This pattern suggests that we can not realistically hope to achieve a renaissance of Northeast agriculture in which farming is highly profitable and stable.

Closer to home, we must begin to grapple with the fact that securing the long-term viability and livelihood of farmers in the nation and region may involve undertaking policies that will be unpopular with farmers. Farmers' self-interested individual actions have frequently undermined their collective interest. For example, the free market for land, which allows farmers to profit from asset appreciation, has led to land inflation which ultimately raises production costs and barriers to entry. Likewise, preferential federal tax provisions (e.g., cash accounting, heavy tax subsidies to capital investment) that ostensibly benefit farmers as a whole may ultimately be detrimental to their interests by inducing overinvestment and overcapacity. To be sure, farming is not novel in this regard. One could argue, for example, that it is in the immediate interest of every employer in the country to pay workers low wages, but the aggregate consequence of this narrow self-interest is a lack of purchasing power' to consume the products and services that are produced. Nonetheless, one lesson we learned during the 1970s is that when farming becomes profitable, farmers become quite skillful at taking advantage of the economic opportunities available to them--in this case, by leveraging unrealized capital gains into new loans and by availing themselves of tax subsidies on new investments. The result has been a heavy debt load and land prices that have been unsustainable in the post-1981 agricultural recession (albeit less so in the Northeast than in the Midwest and Upper Great Plains). To be sure, these problems have been exacerbated by changes in fiscal, monetary, and other macroeconomic policies in the 1980s that have been disastrous for farmers (and into-varying degrees for other sectors as well). But it is likely that within five to ten years the global and U.S. economies will have moved into a new expansionary phase. Thus, our strategies for "saving Northeast agriculture" must not only take into consideration the adjustments required in the present contractionary era, but they should also consider broader policies to reduce the amplitude of land market and investment distortions that result from rational behavior on the part of farmers.

In sum, we can see that there is a bit of "good news" and "bad news" on the horizon for Northeast agriculture. The good news is that barriers to centralization in Northeast agriculture (discussed in my earlier paper) have led to a farm structure with little industrial agriculture. Family farms are predominant, and small-scale and part-time agriculture is viable, leading to significant rural community development benefits (Buttel et al., 1986). It is also probably healthy over the long term that the farmers and public policy institutions in the region take steps toward diversification (especially

vis-a-vis dairying, which, in the absence of unforeseeable expansion of demand, seems to be a sector that will be unable to sustain anywhere near the number of farming operations that currently exist). The bad news is that the Northeast has not yet come to grips with the strong forces for increased farm land prices (chiefly urban-based demand for first and second homes, recreational resources, commercial sites) in this region of generally low and variable productivity of farm land resources. These forces, unless unchecked, will over the long term lead to a continued ratcheting-up of land prices, which will threaten the future viability of Northeast agriculture during both favorable and unfavorable cycles in the agricultural economy.

Saving Northeast Agriculture: For What?

Agriculture is not a major component of the Northeast economy as a whole (Buttel et al., 1986). Given that it is a relatively minor industry, why should so many people be devoting so much time and energy to "save" it? While many people at this conference have tended to sidestep this question by implicitly assuming that saving the region's agriculture is a priori important, it is essential for us and for the region's policymakers to address this question squarely, since the answers we give will have major implications for how we go about achieving this goal.

At this conference there have been four major reasons raised why it is important to preserve the region's agriculture. First, many see preserving agriculture as an important means for preserving the rural way of life as a lifestyle option for both rural and urban people. Second, many have expressed the notion that saving Northeast agriculture will help us achieve food self-sufficiency for the region, which is said to be important on economic and ethical grounds. While a good many people are quite legitimately personally tend motivated by these two reasons for saving Northeast agriculture, I them as minor. Lifestyle preservation is unlikely to have a compelling appeal when it comes to allocating scarce governmental funds to a sector such as agriculture. Also, it seems unlikely that any set of imaginable changes in the commodities produced and the amount of land under cultivation in the region can move the Northeast anywhere close to food self-sufficiency, since the region now imports about 80 percent of its food needs.

I find a stronger rationale in two other justifications for saving Northeast agriculture that have been advanced at this conference.) One is that preserving agriculture helps to maintain an open-farm countryside which is

¹Another possible rationale for revitalizing Northeast agriculture is to contribute to development of depressed rural regions. There is modest empirical support that retention of farms, especially smaller, part-time farms, will have beneficial impacts on levels of living in rural areas (Buttel et al., 1986). But, as I will argue below, the more important relation between agriculture and rural development probably has the reverse direction of causality: rural development should be seen as crucial for sustaining agriculture as more and more farm operators and their household members rely on off-farm income.

highly conducive to sustaining the region's aesthetic appeal and its tourism and recreation industry. The second is that it is a reasonable goal to maintain an "idling agriculture" -- that is, to maintain productive capacity for a possible future time when there is national need (e.g., for biomass energy cellulosic feedstocks for microbiological-based industries) or a regional need (for production of bulky agricultural commodities which may become expensive to import if energy and transport costs escalate sharply). While I would argue that each of these latter two reasons for preserving Northeast agriculture is worthy, even those who agree must have some discomfort in the fact that these rationales seem a bit "soft" or ephemeral. This is especially true in agricultural circles, where there has long been pride in taking a no-nonsense approach to increased productivity, feeding the world, and other lofty goals. Nonetheless, I suggest that we must move beyond this "hard nosed" orientation and recognize, for example, that an agriculture based heavily on part-time farming is becoming quite normal world wide. I often recall a provocative article by Gene Logsdon on "Feeding the World as a Part-Time Business" published in one of the first issues of *The New Farm*. Logsdon pointed out that around the world, the growing majority of agriculturalists is farming on a part-time basis. The nature of agriculture is such that it tends not to be highly profitable, and thus it is often an inadequate basis for a household's livelihood. Thus, we must get accustomed to the notion that part-time farming is a widespread trend -- that it is, in a sense, natural, and that encouraging and assisting people to farm part-time is wise use of public resources.

Saving Northeast Agriculture: How?

The "how?" of preserving agriculture in the region has, of course, occupied the attention of most persons at this conference. I think it is best to begin this summary with some preliminary observations about the range of agricultural systems in the region that we must consider. First, there are two broad sectors in the region's agriculture: (1) subcommercial, largely part-time farms (roughly those with annual gross sales of less than \$40,000), and (2) commercial-scale, typically full-time farms (with annual gross sales of \$40,000 or more). There are various shades and combinations in between -- for example, the increased prevalence of part-time commercial-scale farms, which have emerged as part of longstanding national and regional trends toward greater off-farm labor market participation by operators of all sizes of farms; and a small number of very large commercial farms that utilize so much hired labor that they can hardly be described as family farms. Alongside this diversity of farm organizational arrangements are major differences in farm operator and household goals and decision-making criteria. These range from essentially portfolio management, much like that of any large business, to an attraction to farm work as a leisure activity or lifestyle choice in which the farmer's only economic constraint is to avoid large losses. Thus, one cannot talk meaningfully about commodities and their potentials in the region in the abstract. We must be specific about types

²See Busch and Lacy (1986) for an excellent discussion of how food production over the next two decades may increasingly shift from the field to the factory as industrial microbiology and plant tissue culture are adopted in the food industry.

of producers and their motivations for being farmers when we deal with commodities and strategies.

The commodities and strategies that have been discussed at this conference tend to fall into four major categories. First, there has been a great deal of discussion about commercial horticulture (e.g., broccoli). These commodities tend to involve high value-added in production and, to some extent, in marketing, especially when marketing services provided to institutions, chain stores, restaurants, and brokers are crucial in establishing such a commodity system. Second, there is a group of specialty/niche commodities (e.g., maple syrup, ornamentals) which have as their major characteristic the fact that they involve high value-added in marketing. Such commodities are typically merchandised through boutique-like retail outlets at upscale prices. There is some overlap between the first two categories (e.g., in the case of high-value horticultural commodities sold through upscale roadside stands in suburban regions). Nonetheless, the basic distinction between the two categories is in whether the source of high value-added is production or marketing.

The third major category of new opportunities for Northeast agriculture is that of commercial (nondairy, ruminant) livestock production. Unlike the first two categories, commercial livestock production would not tend to involve high value-added in either production or marketing (though it is quite conceivable that a substantial volume of some animal products could be marketed as "organic" or "very lean" meat through upscale commercial outlets and thus be a part of the "specialty/niche" category). The chief rationale for expanded production of nondairy ruminant livestock products in the Northeast is that such enterprises are most compatible with the capital resources and management skills of dairy farmers. They thus represent a likely route for diversification from dairying. It can probably also be said that efficient nondairy ruminant production will rely on low-cost, low-input utilization of relatively low-quality pasture and forage lands. These are abundant in the region and likely to be released from dairy production over the next decade.

The final category of "commodity" opportunities for Northeast agriculture is a set of "less-than-commercial" commodities or "noncommodities." A good example of this category is that of small-scale beef or hay production on a "hobby" farm, where the principal motivation for "production" is to keep land clear cheaply and easily or to engage in farm work as a form of recreation. This type of production generally does, and should, employ low-cost, low-management methods, with minimal risk of large losses (but also little likelihood of making money). In conventional agricultural circles there is a strong tendency to look down on this type of production because of its low efficiency and minimal contribution to the nation's food supply. Yet it must be emphasized that such production systems already use a major share of the region's agricultural lands and that these "producers" have a good many technical needs. Most importantly, the prevalence of these small, "hobby" operations can be very important to the viability of small rural places distant from metropolitan areas.

With this background in mind, let me comment on several issues relating to strategy for "saving" Northeast agriculture. I begin with the role of research

and feel compelled to make an initial observation. While the conference, in the main, has not primarily been attended by the region's "agricultural establishment," such people are represented here. Even so, there appears to be a surprising consensus that land-grant university research should give far more attention to low- or reduced-input agricultural systems. I might also mention in this regard that under the leadership of Brian Chabot, Associate Director of the Cornell University Agricultural Experiment Station, a proposal is just now being developed to initiate a Northeast regional project on low-input agricultural systems. Thus, the issue now is increasingly not so much whether we should give emphasis to reducing the use of purchased (especially petrochemical) inputs in Northeast agriculture, but rather how this can be best accomplished. This is a very encouraging development. But I would argue that, while the impetus or pressure for low-input systems tends to come from people who want applied, practical research results now, there are equal or greater long-term needs, first, for basic agroecological, microbial-ecological, and biotechnological research and, second, for this basic research to be effectively linked with applied, problem-solving research. One point in particular has been brought up several times at this conference and bears repeating: biotechnology research methods are applicable to developing stress-tolerant cultivars, which is especially relevant in this cold region with its low-quality soils.

One of my principal concerns with regard to research is that the land-grant system in general (the Northeast region somewhat less so) has lost about a quarter of its plant breeding faculty since 1980 and may lose another quarter by the end of the decade (Hansen et al., 1986). This is largely because the rapid rush into biotechnology by the land-grant system has largely taken place by replacing plant breeders with molecular biologists, cytogeneticists, biochemists, and so on. This may present a major long-term problem for the Northeast, given the prevalence of minor crops, the importance of forages (which have, with the exception of alfalfa, received too little attention for a long time), and the agroecological specificity of the region's major crops. The lack of land-grant plant breeding staff, and the fact that the Northeast is a minor region in the eyes of most private sector plant-breeding firms, suggest that the region's plant agriculture will suffer in the future because of a lack of varietal development. The decline of the region's applied plant breeding programs is merely one of many reasons, discussed at greater length in my earlier paper, why there is a need for a purposive -- rather than an ad hoc -- division of labor among the region's land-grant universities.

Discussion of diversification strategy and agricultural market development in the region at this conference, and elsewhere has had a strong tendency to revolve around what Commissioner Schumacher described to us in his address: namely niche and niche-like strategies (my second category above) to produce highly-differentiated commodities for sale at upscale prices to affluent urban consumers. This strategy is satisfactory as a partial piece of the puzzle. But I would argue that we must go beyond what Stuart Hill, tongue-in-cheek, referred to earlier as "rip-off broccoli." That is, we must concern ourselves with providing moderately-priced staple foods relevant to the interests of low- and moderate-income consumers in the region and avoid a de facto assumption that the principal role of agriculture in the region should be to service the consumption needs of affluent urbanites. There are major limits to a strategy heavily dependent on value-added in marketing -- in particular, because supermarket

chains are very agile in copying upscale marketing techniques and thus in capturing the value-added component in marketing.

The issue of desirable state and federal government intervention has arisen in most conference sessions. I would offer the following opinions. First, state governments must maintain, if not increase, their funding of land-grant university research and extension (and land-grant universities should do a better job of broadening their constituencies in order to justify these funding

levels). Second, state departments of agriculture, in conjunction with land-grant universities and private groups, must play a major role in developing institutional arrangements for a revitalized Northeast agriculture, particularly in the area of market development. Third, a more controversial -- but, in my view, essential -- role of state and other governments is in land use policy. This role should include: (1) transferable development rights programs at the urban fringe, (2) capital gains penalty taxes to reduce the incentive for speculative investment (and hence inflation) in farm land, and (3) land use planning to direct human settlement into areas where little productive farm land will be wasted and services can be provided efficiently.

A final issue I would like to raise has received little attention at this conference or elsewhere because of its political invisibility and a lack of social science scholarship. This is the issue of rural development, particularly with regard to the essential role that it can play in sustaining agriculture in the Northeast's nonmetropolitan areas. Intellectually, social scientists have been preoccupied with the mechanisms through which agricultural change affects rural communities and livelihoods. We have, in the process, ignored the opposite line of causality -- how rural development can affect agricultural transformation. Politically, we have failed to recognize some very important master trends affecting the viability of rural regions and, in particular, the adverse nature of recent trends which can be attributed to the Reagan Administration's transfer of government revenues from rural socioeconomic development into the military. Perhaps the biggest success story in the history of rural America has been the reduction of rural-urban disparities in incomes, living standards, and access to services since the mid-1960s. This accomplishment (see, for example, Buttel et al., 1986) was accounted for largely by a substantial increase in federal rural development funding during Lyndon Johnson's "Great Society" initiative, a pattern that was continued by both Republican and Democratic Administrations until 1980. The origins of this rural-urban convergence were largely in an ensemble of federal programs which did not fall under the "rural development" heading and were generally administered outside the U.S. Department of Agriculture. Major examples of such non-USDA programs were area development programs, the Small Business Administration, the regional commissions, federal grants to rural places for pollution abatement and water supply facilities, federal planning grants, and support for health care and other services.

This invisible and bipartisan rural development program has now been largely dismantled in favor of missiles, laser defense systems, and so on. Preliminary data suggest that the consequences of dismantling these programs have been a rapid increase in unemployment rates in nonmetro areas and a divergence of rural and urban incomes (see the sources in Butte] et al., 1986). The ultimate significance of all of this for present purposes may well be that

the relative economic decline of nonmetropolitan America greatly constrains our ability to stabilize agriculture, since farm household members will find it increasingly difficult to obtain secure, well-paying off-farm jobs. Thus, in developing strategies to revitalize and "save" Northeast agriculture, we should not fall into the trap of "agricultural fundamentalism" -- that is, assuming that the only important parameters affecting agriculture are internal to agricultural commodity systems. The agricultural and rural-nonfarm economies are interdependent. The relative decline of nonmetro areas remote from major population concentrations, reinforced by federal policy shifts, will make our task that much more difficult. We must also lend our voices to a call for restoring the vital federal programs that have been lost in the 1980s, especially since they were, in aggregate, cheaper than agricultural commodity programs and have many more direct and indirect beneficiaries.

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SUMMARY: POLICY PERSPECTIVES FROM A CANADIAN VIEWPOINT

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Most present policy issues in North East Agriculture are associated with the immediate crisis in farm financing and farm debt. Within this context the issues are deflation of asset values, the cost-price squeeze, and surplus production of basic commodities world wide. The present problems in agricultural trade between the two countries are seen as basically a function of U.S. monetary and fiscal policy (i.e. values of the respective currencies).

The Conference participants seem to have agreed that the above problems, serious as they are, are only symptomatic of more basic long term problems. The root problem is still the future of a sustainable agriculture in the region. The problem concerns both the land itself and the people using it to make a living.

Major areas for future policy direction efforts within the region include:

Farm Numbers - Over 75 percent of our farmers are small scale and part-time, they produce 25 percent of the output. The needs of this group and those of the commercial sized group may require significantly different programming supports, particularly at the marketing end of the business.

Land Management - Erosion and soil loss are major problems. Most is associated with the commercial sized, row crop growers (i.e. potatoes). We are guessing that, for example, P.E.I. grows 70,000 acres of potatoes on 200,000 acres of land, N.B. produces 50,000 acres on 150,000 acres and Maine produces 85,000 to 100,000 acres on 200,000 acres of land. It is agreed that none of these is a sustainable rotation in the long run. This is a universal issue regarding the region's agriculture and therefore should be worked on collectively.

Education Process - This is required as part of the development of a more sustainable agriculture. It needs to be aimed at producers, consumers, the service sector and legislators.

Research - The present priorities are geared to production efficiencies (large scale). If research is to be reoriented, at least in some degree, to support overall sustainability in agriculture, there will have to be a major shift in "mindset" by our research institutes.

Farm Financing - The financing of a more sustainable agriculture will require amendments to the existing policies of private and public lenders (i.e., the longer term "pay off" of more sustainable agricultural practices will require medium rather than short term lending practices).

Off-Farm Job Opportunities - It was agreed that State and Provincial job creation strategies should reflect the need for such opportunities in rural areas.

New Marketing Structures - There is a need to cooperate within the region in developing marketing structures and systems that will help our small scale/part-time agricultural producers.

Public policy reacts to existing circumstances. If the emphasis on a more sustainable agriculture continues to grow in the consciousness of the agricultural sector and the food consuming public, then eventually legislators' views and ultimately public policy will come to reflect and support that consciousness.

SUMMARY: POLICY PERSPECTIVES FROM AN AMERICAN VIEWPOINT

Stewart N. Smith
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This conference has traversed a considerable spectrum, from the opening presentation of Bruce Gardner, who viewed regional opportunities in terms of traditional ideas about comparative advantage, to Stewart Hill's final plenary address, advocating an ecologically diverse system with relatively little consideration of economic relationships. Not surprisingly, the progression of the conference reflects the situation facing Northeast agriculture at this time. Agricultural production systems can be viewed as being on a continuum, with monoculture specialization at one extreme and ecological diversity at the other. In a market economy such as ours in the Northeast, it is unlikely that the systems can move along the continuum beyond the point allowed by economic relationships and constraints. Nonetheless, it may be wise for those who promote ecological diversity to support incremental movements toward their end, even if they fall quite short at this time.

More economic diversity, as distinguished from ecological diversity, is attainable at this time and will have beneficial results. Introducing an emphasis on more, rather than less, diversity is a significant departure from current policy. Several forces discussed at this conference support economic diversification. First, there is substantial interest in income stability in this period of farm income erosion. Judicious increases in commodity diversity on the farm can improve that stability. Second, stress on complementary marketing activities is a theme that ran through several conference papers and workshop discussions. Breaking out of the purely production mode into more creative marketing is desirable in itself and can also facilitate the move toward greater diversity. Third, there is obviously a great deal of interest at this conference in complementary production of various commodities. At this time, the extent of most growers' interests is probably limited to those compatible enterprise combinations that are economically profitable, with relatively little concern for ecological goals. Even this limited notion of compatibility, however, is a major step in the right direction. Fourth, I heard a great deal of discussion about reduced input production methods. Again, it was considered at this conference primarily in terms of its economic advantage. Reducing production inputs can reduce cost of production and result in greater economic stability in a situation where output expansion would tend to depress prices. Regardless of the motive, it also moves the system toward the diversity end of the continuum.

Reaching an extreme point on the diversity continuum would probably necessitate basic changes in the economic system that are unlikely to occur in the near future. Indeed, ecological diversity may never prove to be the optimal economic choice in a short or even intermediate time horizon, the planning frame generally used in the competitive market economy. On the other hand, the market economy often fails to allocate properly along the continuum because it understates benefits and costs that accrue to offsite residents and future generations. Public actions that properly internalize these costs and benefits into the marketplace will likely move the system towards a greater diversity.

However, an all out effort to move to the extreme immediately is likely to fail and it may well inhibit even gradual movement in that direction. From what I heard here, the lesson for those supporting ecological diversity is to show patience, since they are likely to fail if they push too far ahead of economic realities. The good news is that the economics are moving toward greater diversification and public policy can speed up the process.

Beyond this general observation about moving toward a system of diversity, I heard five specific issues discussed, all implying the need for a mix of public policy and private initiative. First, I heard that marketing is an issue of paramount concern. Almost every group discussed how to access certain markets and delineated clearly between national, regional, and local markets. For many farmers, cooperatives or other organizational techniques are necessary to offer a sufficient volume over an adequate time period to gain access to regional markets. Establishing and assuring product standards is also essential. Both of these objectives can be achieved with a public/private partnership. There was also considerable discussion about local direct marketing and specialty products. In both cases there appears to be a need of assistance in demand estimation, new product feasibility assessments, technical assistance in packaging and presentation, and well-targeted promotion. It seemed to me there was a keen awareness that marketing requires the determination of a demand and coordination of production to meet that demand, rather than simply trying to sell farm products already produced. The latter has too often been the perception of marketing held by farmers in the past.

Second, there was general recognition of the need for management assistance. This was articulated clearly in discussions concerning the development and production of new commodities, especially in light of the managerial complexity of diversified production. One reason farmers have moved to monoculture is that the production system is simplified. After learning how to do a few steps routinely, the management challenge is then to do those steps in a way that minimizes costs. The discussions here pointed out that diversified farms are more complex and require a greater knowledge of production technologies.

Third, there was a recognition of the need for appropriate credit mechanisms. This was most often expressed in terms of financing risky new ventures, product and production innovations, and transitions from one production system to another. I believe the discussions conveyed the message that credit to finance these changes was more important than credit to finance established and ongoing activity. Since the capital needed to finance most innovations is substantially less than that needed to finance ongoing activity, states and provinces can help meet that need. Educating existing lenders in the basics of agriculture was also identified as a need. This is probably true for both operating and transitional finance.

Fourth, I heard several needs expressed relative to the production side of the farm enterprise, but it was my impression these were subordinated to the marketing and management needs. Research and development in systems of reduced pesticides, low input technologies, and diversified farming were called for. There seemed to be a general belief that these systems could be much more competitive if they had received the level of R and O support enjoyed by the cur-

rent methods of intensive chemical use, high inputs and specialization. I heard a related call for carefully chosen subsidies for certain production practices. For example, some Canadian provinces underwrite veterinarians' travel costs in order to equalize those fees to all farmers in a province. In potato growing areas, subsidizing the application of lime would encourage the building of soils that offer more production alternatives.

It was also suggested that labor allocation could be made more efficient by better use of available data management techniques. As farmers diversify, the organization and scheduling of labor becomes more complex. Improved techniques for managing that complexity are possible. Finally, with respect to production, there was considerable concern about the land resource and how best to protect its future productivity. From what I heard, the issue needs to be addressed cautiously because of the strong sense of private property rights both in Canada and the U.S. We are not yet to the point where we can prevent the destruction of land resources, so long as government intervention requires a heavy infringement on the right of a land owner to do what he wants with his land. However, I also heard that we should be actively seeking solutions to protect the land base given that sense of private ownership rights.

Fifth, I heard that rural development will play a major role in the sunrise of Northeast agriculture. Farming systems in the region will be enhanced by good off-farm job opportunities in rural areas. Competent small scale farmers can increase the return to their human resources by off-farm opportunities. It was noted that these need not be limited to natural resource-based industries. Increasing job opportunities as part of an economic development strategy for rural areas requires enlightened public policies and programs. Development finance, technical assistance, and appropriate infrastructure support are all important ingredients.

Despite the negative trends in some of the traditional measures of agricultural activity in the Northeast, I leave this conference convinced that there is increasing opportunity for a sunrise agriculture in the region. Participants articulated a clear desire for a system of more diversity, which if properly pursued can enhance the competitiveness and stability of Northeast agriculture. The needs expressed, in terms of marketing, management, transition capital, production technologies, and rural development, are for the most part the proper ones in turning agriculture toward the sunrise horizon. The transition will not be easy or fast; indeed, there is no guarantee it will succeed. However, it appears to me that the seeds of success were nurtured here, and if we possess enough intelligence, desire, energy, and persistence, we should be able to succeed.

APPENDICES

APPENDIX 1

CONFERENCE PLANNING GROUP

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APPENDIX 2

THE AUTHORS

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ORINDA FOGLER is trained in animal and veterinary sciences and is currently completing work for an advanced degree in education. She is coordinator of the Maine Department of Agriculture's "Agriculture Viability Project" for Penobscot, Piscataquis and Somerset Counties.

BRUCE GARDNER is professor of agricultural economics at the University of Maryland. His economic analyses of farm production systems and structural change have been influential in the shaping of U.S. farm policy in the 1980s.

SANDY GRISWOLD's training is in the ecology of agriculture. He is an agricultural planner with the Prince Edward Island Department of Agriculture.

ESTHER LACOGNATA is Director of the Maine Department of Agriculture's Bureau of Rural Resources. There she has been instrumental in the design and implementation of a pathbreaking state-local partnership, the Agriculture Viability Program. Under her leadership a wide range of other innovative projects, including small farm management training, farm energy audits, and reduced agricultural chemical dependence, have been instituted.

RUSSELL LIBBY is Director of Research at the Maine Department of Agriculture and author of a recent study on the ornamental horticulture industry. He is a part-time fruit and vegetable farmer.

PATRICK MADDEN is professor of agricultural economics at the Pennsylvania State University. He is currently completing a book which, through its case studies, will provide the most thorough available documentation of the microeconomics of organic farming. ANASTRA MADDEN collaborates with Patrick.

AUGUST SCHUMACHER, as Massachusetts Commissioner of Agriculture since 1985, has fostered the creation or expansion of a wide range of innovative state programs to support farm diversification, marketing of indigenous farm products, value added industries, improved nutrition for low income citizens, and farmland preservation. He comes from a family background of Massachusetts truck farmers and was formerly an executive of the World Bank.

BILL SEEKINS is a researcher for the Maine Department of Agriculture. A Ph.D. agricultural economist, he has provided the analysis and statistical support that underlie the Division of Rural Development's many innovative projects. Most recently, he has completed a study of the Maine potato industry.

ERIC SIDEMAN, a PhD biologist, is Technical Advisor to the Maine Organic Farmers' and Gardeners' Association. In this position he is responsible both for assisting individual MOFGA members with their information needs and for developing widely applicable guidelines for chemical-free agriculture.

SAMUEL SMITH and his wife Elizabeth operate Caretaker Farm in Williamstown, Massachusetts. In addition to his pioneering work on methods for intensive organic vegetable production, Smith has written a monograph on appropriate small farm equipment technology and he spends a part of each year doing advisory work in India.

STEWART SMITH is Luce Professor of Food and Agricultural Policy at Tufts University. As Maine Agriculture Commissioner from 1980 to 1986, he oversaw the Department's transformation from a largely regulatory agency into a nationally renowned agricultural development agency.

DAVID VAIL is Professor of Economics at Bowdoin College and the author of articles and monographs about farm and forestry production and marketing in the Northeast. He was a member of the Maine Food and Farmland Commission that proposed the overhaul of the Maine Department of Agriculture which occurred in the early 1980s and has served as advisor to the Department under the past three Commissioners.

RICHARD WOOD is a former dairy farmer from Durham, Maine, who now serves as the state-wide coordinator for the Agriculture Viability Program.

W. GARDINER YOUNG, a livestock farmer from Kingfield, Maine, was a founding member, president and executive director of the Maine Small Farm Association. He also serves as a director of the Maine Extension Association and a member of the Agricultural Advisory Committee to the Director of the Maine Agricultural Experiment Station.