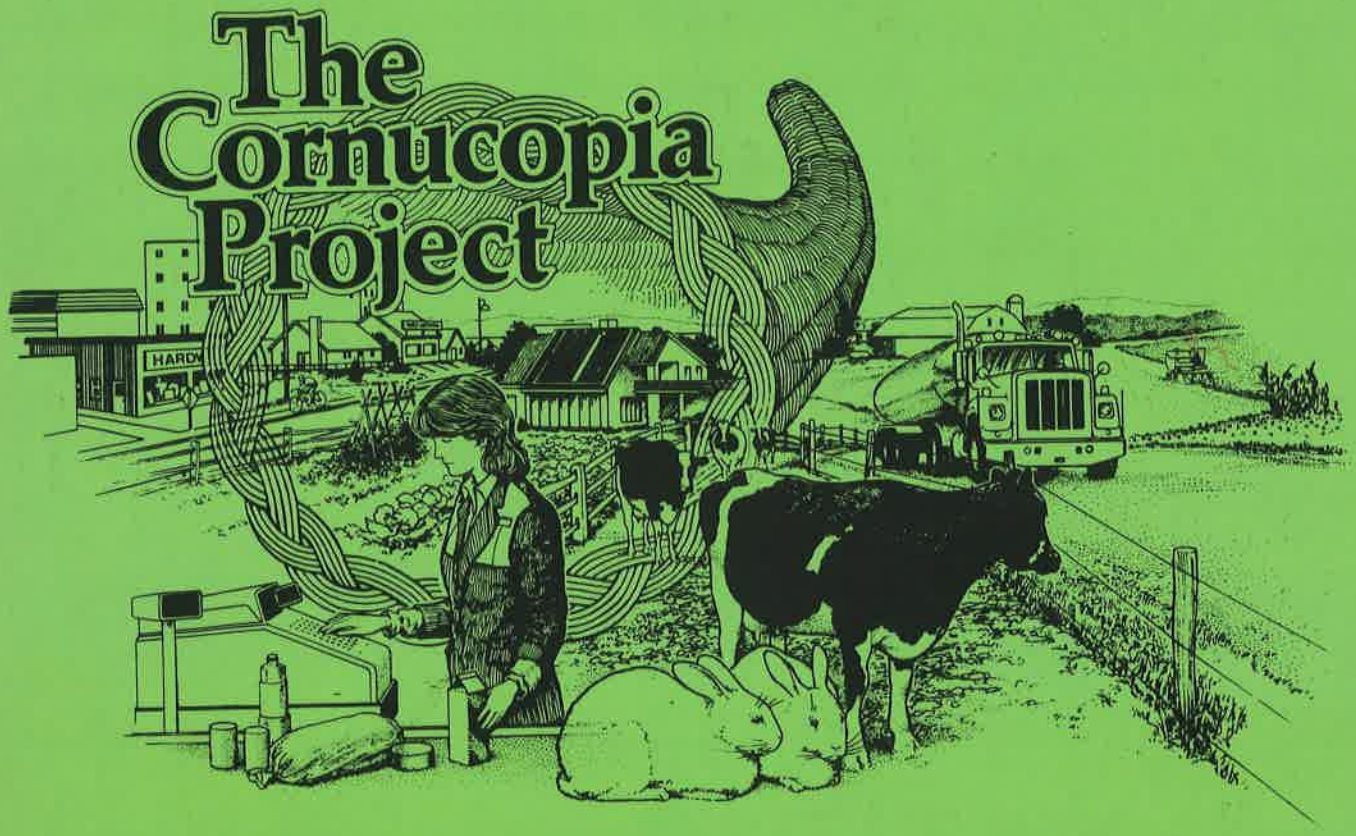

The Wisconsin Cornucopia Project: Toward a Sustainable Food and Agriculture System

Prepared by the
Rural Wisconsin Cornucopia Task Force
September 1982

THE WISCONSIN CORNUCOPIA PROJECT: TOWARD A SUSTAINABLE FOOD AND AGRICULTURE SYSTEM

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I. Introduction: Wisconsin's Agriculture in Crisis

Wisconsin agriculture is in crisis. It is a crisis of farm size, reflected in the common sentiment, "get bigger or get out." It is a crisis of prices and markets. Farmers cannot get the prices they need to survive. Parity prices are as low as they were in the Great Depression. Markets are controlled by only a few farm machinery, chemical, and food processing companies. It is a crisis of energy; high dependency on a high cost, imported commodity. It is an ecological crisis. Soil erosion and toxic chemical use are creating known and unknown adverse consequences for future food and fiber production. It is a crisis in land values and farm indebtedness. Constant or even declining land values combined with high interest rates and low commodity prices are resulting in depression level farm loan delinquency rates, foreclosures, and bankruptcies. The seventy-two Catholic Bishops of the 12 mid-continent states, including Wisconsin, recognize the crisis:

> We are witnessing profound and disturbing changes in rural America. Land ownership is being restructured, agricultural production is becoming more heavily industrialized and concentrated in fewer hands and the earth is all too frequently being subjected to harmful farming, mining and development practices. Such changes are adversely affecting our rural people, their way of life, their land and the wider national and international communities which depend on them to satisfy their hunger (Heartland Project 1980).

Fundamentally, Wisconsin's agricultural crisis is about ordinary people. People want to farm but instead are forced off the land. The interests of common people are in conflict with agribusiness. The food processing and distribution sectors of agribusiness are already highly concentrated. Such concentration may be good for U.S. business and their profits, but is harmful to production efficiency, food quality, and rural life.

Yet agricultural production is still largely decentralized, although since 1925 the average Wisconsin farm size has almost doubled and farm numbers have declined by more than half. Nevertheless, in 1981 Wisconsin had 92,000 farms. In contrast, five major companies control most of the grain sales in the world. We have lost a far greater percentage of our creameries, canneries and cheese factories than we have our farms and farmers.

The large number of remaining farm families provides the basis for a resolution to the agricultural crisis. Hope lies in the many. The outcome of this crisis will determine whether or not the $900 billion in assets held by U.S. family farmers will end up in the hands of a few.

An immediate response to the farm crisis requires a change in public policy toward agriculture. We cannot allow the current crisis to force any more of our farmers off the land. A moratorium on farm foreclosures and bankruptcies is crucial, until adequate farm programs are in place and prices are strengthened. Farmers and consumers must work together to persuade the Congress and the U.S. Department of Agriculture to enact a comprehensive farm program with the goal of full parity. This program must be based on definite price, production, and conservation goals; and encourage the entry of beginning farmers and broaden our agricultural base. These actions are the beginning steps to keeping farmers on the land.

We also need to go beyond these short-term suggestions to further strengthen our farm economy. Because smaller farms are more efficient users of land, labor and capital, research and development in moderate scale production and marketing must be stressed by land grant colleges and the extension service. In addition, we need to conserve the soil, reduce chemical inputs, develop on-farm energy and fertilizer sources, as well as to create local and regional direct marketing options.

In the spirit of helping to solve the farm crisis for Wisconsin family farmers and food consumers, Rural Wisconsin conducted a study of the state's food and agricultural system, using Rodale Press' Cornucopia Project as a starting point. Members of the Rural Wisconsin Cornucopia Task Force gathered the views of farm group members, agricultural specialists, environmentalists, and food groups, and surveyed the published data on Wisconsin food supply and agricultural production.

In our work we have become aware that farm problems are symptomatic of wider societal problems. As Wendell Berry says, "Our agricultural dilemma is characteristic not of our agriculture, but of our time" (Berry 1981). A large part of this dilemma is the confusion of means with ends. Therefore, the starting point of this report is to set forth ten food system goals which are the basis for judging the current state of food and agriculture in Wisconsin.

1. ABUNDANCE: The food system should give every person access to adequate food in quantity, quality and degree of choice.

2. DEPENDABILITY: The food system should provide every person with a reliable food supply--free from social, political, economic, or environmental disruption.

3. SUSTAINABILITY: The food system should be culturally, environmentally, economically and technologically sustainable in respect to production and all other aspects of the food system, including resource inputs, cultivation techniques, processing and distribution.

4. SAFETY: The food system should not endanger workers, consumers, or the environment.

5. EFFICIENCY: The food system should incure minimal energy or other resource costs.

6. APPROPRIATENESS: The food system should be matched to both the limits and needs of its region and locality.

7. EQUITABILITY: The food system's benefits should be available for use by all in a fair manner.

8. WEALTH: The food system should generate sufficient income to rural people to provide a standard of living equivalent to that of other sectors of the economy, to maintain vigorous rural communities and to enable farmers to fulfill their land stewardship responsibilities.

9. FLEXIBILITY: The food system should be open to change, growth, evolution, creativity and experimentation.

10. OPENNESS: The food system's organization, patterns of control and course toward the future should be within public view.

Ultimately, the crisis in the U.S. food system is similar in scope to the crisis in the nuclear power industry and arms race. As with nuclear power, we must bring the food system back under the close and continuous scrutiny and authority of the citizenry. This report represents a small contribution on the part of Rural Wisconsin to empower the people of Wisconsin to achieve a sustainable, equitable food system for all the people of Wisconsin.

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II. Food Production and Consumption in Wisconsin

We began our study of Wisconsin's food system with an analysis of food production and consumption in the state. The objectives of this analysis were to:

A. Create a concise overview of food production and consumption characteristics in the state.

B. Identify weaknesses and gaps in the production system where new products could be produced in-state.

C. Identify segments of the production sector vulnerable to changing consumption trends, changing priced support systems, and fluctuating world markets.

Results of this analysis are presented in the large chart inserted at the end of this section.

This analysis follows the methodology developed by Rodale Press' Cornucopia Project. Data specific to Wisconsin were used to the fullest extent possible in generating the information displayed in the chart. Wisconsin has excellent data on food production. Monthly retail prices on most items are available for different regions of the country and seem quite adequate. Consumption data, however, are more difficult to obtain. State or even regional data are not available. National per capita consumption data were used to generate the consumption figures shown in the chart.

In fact, an assumption of this methodology is that regional and state consumption habits are uniform. While we believe these national consumption figures are adequate for the current analysis, we recommend that regional (and possibly state) consumption data should be collected for more refined analysis of the food system.

Summary of Findings

Wisconsin's food production statistics look relatively good compared to many other states. Wisconsin is a net producer, exporting foods valued at roughly seven times the value of foods imported to the state. In fact, Wisconsin sells 85 percent of its food production outside the state (Wisconsin Agriculture Reporting Service 1981).

Wisconsin truly deserves the title, America's Dairyland. In 1980, Wisconsin led the nation in total milk production; its total pounds of production (22,298 million pounds) was nearly equal to the combined total of the second and third ranked states. The dairy industry in Wisconsin not only commands a strong national status, but clearly dominates the agricultural system within the state itself. "Sales of milk during 1980 returned nearly $2.8 billion to producers, 58.9 percent of the total cash receipts to all Wisconsin farmers during the year" (Wisconsin Agriculture Reporting Service 1981 B). The production of dairy products in the state outweigh the state's level of dairy products consumption by a ratio of 94 to 1. Although Wisconsin is also a significant net producer in meat and some processed vegetables, dairy products remain the dominant factor in the state's agricultural economy. Seventy-eight percent of the state's total exports are from the sale of dairy products.

A closer examination of Wisconsin's food production in 1980 reveals that milk, corn, soybean, and cranberry production were particularly high (Wisconsin Agriculture Report Service 1981 A). In terms of national production figures, in 1980, Wisconsin produced about one fourth or more of the national output of cheese, butter, cranberries, sweet corn, peas, snap beans, beets and cabbage for sauerkraut. Production figures for these vegetables applies to processed (canned and frozen) vegetables as opposed to fresh vegetables in 1980 for peas, green and wax beans, beets and cabbage for kraut.

Red meat production in Wisconsin's commercial slaughtering plants amounted to almost 1.2 billion pounds during 1980, an increase of 10 percent from 1979. The state's meat production was enough to supply 6.3 million persons, based on a per capita consumption rate of 184 pounds of meat in 1980 (Wisconsin Agriculture Reporting Service 1981 A). A comparison of the total red meat production with consumption in the state shows that the production exceeds consumption needs by approximately one-third.

Whereas an aggregate analysis of the state's food production and consumption indicates that total food production is much greater than the total food consumption, the state must still import a variety of commodities including wheat, most fresh vegetables, most fresh fruits (especially citrus fruits) chicken, eggs, fish, and sugar. The total amount of food imported amounts to over $2 billion for 1980. The predominant dependency on the dairy industry makes short-term diversification difficult.

The eminent status of the dairy industry in Wisconsin, however, does not exempt it from potential vulnerabilities. Excess milk production, the political volatility of dairy price supports, the national trend of declining dairy products consumption, and the emergence of foreign competition--all are serious challenges to the dairy industry. Any threats to the industry are critical to the state's economy and its balance between food production and consumption. The national and international policy matters related to the dairy industry go beyond the controls of the individual milk producers and the state's own policies.

The processed vegetable industry is another example of a vulnerable sector within Wisconsin's food industry. USDA consumption figures indicate that the per consumption of canned tomatoes and other vegetables in 1980 was 49.8 pounds, which was 2.5 pounds less than in 1979 (USDA Economic Research Service 1980). The 1980 consumption of canned vegetables is the lowest since 1966. Total per capita consumption of frozen vegetables in 1980 also showed a decline from 1979 (10.37 pounds down from 11.23 pounds). In contrast to processed vegetables, the retail per capita consumption of fresh vegetables reached an all-time high in 1980 at 99.9 pounds. There has been a fairly steady increase in fresh vegetable consumption since 1971, when the per capita amount was 88.1 pounds.

Because most of Wisconsin's processed vegetables are marketed outside of the state, the national consumption trends are critical to the health of the state's farm sector. If the state produced more fresh vegetables for local consumption and fewer vegetables for processing, a better balance between the state's production and consumption could be maintained, and dependence on declining national markets could be reduced. Energy costs are also important in this discussion. The energy costs for canning and shipping significantly increase the shelf price of the product. The decreased nutritional value of processed vegetables in comparison to fresh vegetables is another factor that diminishes their overall value.

The productivity of the Wisconsin food system is in part misleading because the large imports of energy, pesticides, fertilizer and capital necessary to operate this system in its present form are not included in the definition of productivity. These issues are dealt with in greater detail in the following sections.

Finally, we should consider the land. Wisconsin has abundant, fertile land: Less than one-third of the land in farms in 1980 would be required to produce 100 percent of the food consumed by Wisconsin's 1980 population! However, with one-third of the state's farm soils eroding faster than they can be replenished, food production takes on more of an aspect of mining than farming. The increase of Wisconsin corn acreage from 2.8 million acres in 1970 to 4.2 million acres in 1980 is a particularly disturbing contributor to the degradation of the soil base Future food production programs must take into account resource conservation goals. Our responsibility is to produce as much as possible forever without depleting our soil and water resource base.

1980 WISCONSIN FOOD PRODUCTION AND CONSUMPTION

COMMODITY	PRODUCTION (Total Fresh and for Processed)			CONSUMPTION						
	Retail Weight (1,000 lbs)	Retail Value[e] ($1,000) (1980 $)	Direct Market ($1,000)	Consumption[c] in WI (1,000 lbs)	Retail Value ($1,000) (1980 $)	Percent Imported	Retail Value of Imported ($1000)	Percent Exported	Retail Value of Exported ($1000)	Amount of Land Required to Produce 100% of WI Consumption (Acres)
Meats										
Beef	594,494.8[a]	1,355,448.1		359,932.5	820,646.1			39.4	534,802.0	3,685,867.8
Veal	39,330.0[a]	119,169.9		7,057.5	21,384.2			82.0	97,787.2	- - -
Lamb & Mutton	291,270.0[a]	830,119.5		6,116.5	17,432.0			97.8	812,687.5	2,031.4
Pork	351,780.0[a]	548,776.8		321,374.4	501,344.0			8.6	47,432.7	351,589.1
Poultry										
Chicken	43,729.9[a]	47,665.6		235,266.8	256,440.8	81.4	208,775.1			175,049.7
Turkey	77,531.2[a]	74,429.9		49,406.0	47,429.8			36.3	27,000.2	33,084.5
Eggs	113,610.0	153,373.5		162,804.6	219,786.2	30.2	66,412.7			78,915.9
Fish	3,071.1[f]	7,831.3		59,757.8	152,382.4	94.9	144,550.9			3,494.6
Dairy Products										
Cheese	1,484,251.0[a]	3,250,509.7		82,813.9	181,362.4			94.4	3,069,147.2	138,023.0
Butter	289,178.0[a]	563,897.1		20,703.5	40,371.8			92.8	523,525.3	72,807.2
Condensed & Evap. Dairy Products	247,344.0[a]	230,029.9		33,407.9	31,069.4			86.5	198,960.6	12,360.9
Fluid Milk	15,531,000.0[a]	8,076,120.0		1,070,000.0	556,400.0	1.3	267.4			48,862.5
Ice Cream & Milk	114,660.0[a]	204,094.8		114,810.2	204,362.2					
Cottage Cheese	119,157.0[a]	123,923.3		21,174.0	22,020.9			82.2	101,902.3	35,290.0
Dried Dairy Products	141,091.0[a]	270,894.7		31,996.3	61,432.9			77.3	209,461.8	49,593.8
Vegetables			2,091.9[h]							
Potatoes	1,564,900.0[a]	422,523.0		344,901.1	93,123.3			78.0	329,399.7	13,066.2
Lettuce (field)	12,600.0[a]	5,796.0		117,162.8	53,894.9	70.7	38,098.9			5,579.2
Lettuce (greenhouse)	21,739.1[g]	10,000.0								
Cabbage	175,900.0[a]	51,011.1		45,171.2	13,099.7				37,911.4	1,539.1
Tomatoes	1,949.2[g]	1,150.0		158,099.3	93,278.6	98.8	92,120.6			6,358.8
Sweet Corn	1,027,040.0[a]	400,545.6		67,286.3	26,241.7					
Snap Beans	422,360.0[a]	295,652.0		39,995.4	27,996.8			90.5	267,655.2	6,186.6
Onions	34,800.0[a]	13,224.0		51,288.2	19,489.5	32.1	6,265.5			1,791.2
Celery	681.8[g]	300.0		34,349.0	15,113.6	98.0	14,813.5			798.9
Carrots	112,500.0[a]	45,000.0		35,290.0	14,116.0			68.6	30,844.0	1,314.0
Sweet Potatoes	- - -	- - -		20,703.5	10,144.7	99.9	10,144.7			1,863.5
Cucumbers	107,360.0[a]	52,606.4		51,288.2	25,131.2			52.2	27,475.2	3,803.2
Peas	307,340.0[a]	282,752.8		23,056.1	21,211.6			92.5	261,541.5	6,452.9
Squash	12,322.0[g]	7,270.0		1,882.1	1,110.4			84.7	6,159.5	N.A.
Peppers	825.7[g]	900.0		15,527.6	16,925.0	94.7	16,025.0			1,687.8
Mushrooms	359.7[g]	500.0		- - -	- - -					N.A.
Asparagus	8.4[g]	20.0		3,293.7	7,871.9	99.7	7,851.9			2,941.1
Artichokes	- - -	- - -		1,411.6	1,806.8	99.9	1,806.8			N.A.
Broccoli	316.4[g]	250.0		14,586.5	11,523.3	97.8	11,273.3			1,988.1
Cauliflower	217.4[g]	250.0		8,469.6	9,740.0	97.4	9,490.0			993.7
Spinach	- - -	- - -		9,410.7	10,445.8	99.9	10,445.8			970.7
Garlic	- - -	- - -		3,764.2	15,809.8	99.9	15,809.8			313.7
Eggplant	- - -	- - -		2,352.6	1,858.6	99.9	1,858.6			151.8
Beets	155,600.0[a]	85,580.0		7,528.5	4,140.7			95.2	81,439.3	321.2
Lima Beans	9,800.0[a]	8,820.0		5,175.9	4,658.3			47.2	4,161.7	2,458.8
Brussel Sprouts	- - -	- - -		1,411.6	1,820.9	99.9	1,820.9			102.8
Fats and Oils										
Butter (see under Dairy above)										
Lard	107,441.9[a]	74,134.9		11,763.3	8,116.7			89.0	66,018.2	i
Margarine	- - -	- - -		52,699.4	41,632.5	99.9	41,632.5			j
Shortening	- - -	- - -		73,297.0	43,978.2	99.9	43,978.2			
Oil	- - -	- - -		90,920.3	51,824.6	99.9	51,824.6			
Grains										
Wheat	48,940.4[a]	32,790.1		479,834.9	321,489.4	89.8	288,699.3			342,525.5
Rye	3,028.7[a]	2,453.2		2,803.7	2,270.9			7.4	182.2	2,086.1
Oats	117,226.9[a]	82,058.8		12,416.4	8,691.5			89.4	73,367.4	7,054.8
Barley	11,163.9[a]	8,372.9		4,806.4	3,604.8			56.9	4,768.2	3,283.1
Soybeans (oil)	119,768.2[b]	165,280.1		- - -	- - -					N.A.
Rice	- - -	- - -		43,759.6	55,574.7	99.9	55,574.7			N.A.
Corn Meal	- - -	- - -		30,039.8	24,031.8	99.9	24,031.8			9,492.6
Corn Cereal	- - -	- - -		9,212.2	7,461.9	99.9	7,461.9			
Corn, Syrup, Sugar, Starch	- - -	- - -		24,031.8	22,349.6	99.9	22,349.6			
Fruits, Fresh										
Apples	65,000.0[a]	39,000.0	3,766.1[k]	111,045.9	66,627.5	47.1	31,393.7			7,958.1
Peaches/Nectarines	- - -	- - -		52,699.8	31,092.8	99.9	31,092.8			6,616.8
Pears	- - -	- - -	21.3[k]	19,762.4	10,848.0	99.9	10,826.7			2,841.4
Sweet Cherries	- - -	- - -	224.2[k]			98.1	11,350.9			9,829.2
Strawberries	5,700.0[a]	5,643.0	1,618.7[k]			49.8	7,179.0			4,420.3

Berries	- - -	- - -				100.0	357,435.6			N.A.
Oranges/Citrus	- - -	- - -				100.0	378,563.0			N.A.
Grapes	- - -	- - -				99.9	31,210.5			6,928.3
Melons	- - -	- - -	950.0[k]			97.1	31,653.3			6,571.9
Plums, Prunes	- - -	- - -				99.9	22,938.5			4,505.8
Tart Cherries	12,100.0[a]			- - -						
Cranberries	259,200.0	194,400.0		3,764.3	2,823.2			98.5	191,576.8	10.4
Black & Raspberries			91.2[k]	1,882.1	1,863.3	95.1	1,772.1			N.A.
Other Fruits	- - -	- - -		47,680.4	35,760.3	99.9	35,760.3			N.A.
Dried Fruits	- - -	- - -		6,822.8	13,645.5	99.9	6,822.8			N.A.
Miscellaneous										
Sugar	- - -	- - -		334,843.1	167,421.5	99.9	167,421.5			67,337.3
Coffee, Tea, Cocoa	- - -	- - -		44,859.4	118,428.7	99.9	118,428.7			N.A.
Maple Syrup	110,000.0 (gal.)	1,320.0		400.5	36.4			97.2	1,283.6	
TOTAL	24,128,597.0	17,852,651.5	8,763.5	5,719,130.4	5,200,556.6		2,115,039.4		14,900,553.0	5,415,139.5

Notes: Wisconsin Food Production/Consumption Chart

a. 1981 Wisconsin Agricultural Statistics, Wisconsin Agriculture Reporting Service, Department of Agriculture, Trade and Consumer Protection, USDA, Economics and Statistics Service

b. Potential oil production from soybeans produced in state (18.33% x Total production)

c. Food Consumption, Prices and Expenditures, USDA, ERS, Statistical Bulletin No. 672.

d. Based on 1980 Census. Wisconsin Population = 4,705,335.

e. Retail prices were obtained in part from the U.S. Dept. of Labor, Bureau of Labor Statistics, Consumer Prices: Energy and Food. Monthly data for the period July, 1980 - June, 1981 were average for the North Central region. Jan.-June, 1980 data are not available. Other prices were obtained directly from local super markets.

f. Unpublished report from Wisconsin Department of Natural Resources, Fish and Wildlife Division

g. Minor crops in Wisconsin not reported in Agricultural Statistics. Estimates were obtained from Al Jindra, Department of Agriculture, Madison, Wisconsin.

h. Direct market sales figures are not available by individual vegetable categories. Source: Direct Marketing - 1979, Wisconsin Agricultural Reporting Service, Wisconsin Department of Agriculture, Trade and Consumer Protection, Madison, Wisconsin.

i. Lard is a by-product of hog slaughter.

j. Oil consumption in Wisconsin could potentially be provided from the processing of soybeans. See under grains.

k. Direct Marketing - 1979, Wisconsin Agricultural Reporting Service, Wisconsin Department of Agriculture, Trade and Consumer Protection, Madison, Wisconsin.

l. Where available, acreage calculations are based on Wisconsin, 1980 yields. Pennsylvania yields were used for other calculations

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III. Wisconsin Food and Agriculture Issues

Food and agriculture is a system of interrelated parts operating in a context of ecological and cultural relationships, resource competition, and approaching limits. Task force members believe that the following seven food and agriculture issues are highly interrelated and must be considered together before meaningful solutions can be considered.

Farm Size and Numbers

During 1980, the number of farms in Wisconsin stabilized for the first time since 1947 at 93,000 farms. A farm is defined as a place with an annual sale of agricultural products of $1,000 or more. This stability was attributed to a solid dairy economy, a good crop production year, a weaker non-farm economy, and the farmland preservation program (Wisconsin Agricultural Reporting Service 1981).

In 1981, however, Wisconsin farm numbers assumed their downward slide, despite an increase in farm numbers nationally. 1981 saw the loss of 1,000 farms in Wisconsin, leaving the state with 92,000. When consulted about this change, Rod Kriesel, a statitition with the Wisconsin Department of Agriculture, attributed it to the move toward larger-scale intensive farm operations similar to those found in the adjacent states of Illinois and Iowa (Seely 1982).

Farm numbers in Wisconsin declined at a slower rate during the 1970s than in the 1960s when the annual reduction was usually 3,000 farms. The current number of farms is less than half the peak of 200,000 farms reached in 1935. Farm numbers are now the lowest since the 1860s. As farm numbers have declined in Wisconsin, average farm size increased from a low of 113 acres in 1925 to a high of 201 in 1981 (Wisconsin Agricultural Reporting Services 1977).

An important phenomenon to note related to the stabilization of farm numbers is that the numbers of large and small farms are increasing while the numbers of middle-sized farms is decreasing, according to Lyle Schertz, a Department of Agriculture economist. This indicates a greater proportion of land is being shifted to large-scale intensive agriculture than is indicated by the overall figures.

Increasing farm size and declining numbers of farms should be a major farm policy issue. "We are creating a wealthy, hereditary landowning class that is contrary to our traditions and our history," states Donald Pearlberg, former assistant secretary of agriculture and professor emeritus at Purdue University. Public policy feeds this trend, according to Marvin Duncan, an agricultural economist at the Federal Reserve Bank of Kansas City, "Government policies are now force-feeding the evolution of a landed class." In 1978 Federal Reserve Bank economists found the largest seven percent of farms owned more than 36 percent of all farm assets and received more than 25 percent of all government farm payments (Bartel 1982).

These trends were addressed in a candid USDA study entitled, A Time to Choose: Summary Report on the Structure of Agriculture, prepared during the administration of USDA Secretary Bob Bergland. The report found tax policies, marketing systems, and commodity and credit policies that favored larger farms. Development of a "size-biased technology" emphasized supposed economics of scale that encouraged larger monoculture operations. Says the report, "Research and extension programs have generally targeted toward those larger-scale innovative producers, reasoning that the demonstrated benefits would trickle down to the smaller farmers." (USDA 1981). A 1982 Government Accounting Office report titled Food, Agriculture, and Nutrition Issues for Planning took the USDA assessment a step further by detailing how the traditional farm policy orientation is contributing to the vertical and horizontal integration of the farm sector (GAO 1982).

One of the primary arguments of "get bigger or get out" advocates has been that small farms are inefficient. Recent studies are pointing to the contrary, and are showing that most farm efficiencies can be achieved at levels well below today's average farm size. For example, a 1981 USDA study found that in the corn belt, while the most "efficient" farms were about 640 acres, 90 percent of those efficiencies could be achieved on farms of about 300 acres (Critenden 1982).

In addition to the inefficiency, inflexibility and undemocratic nature of the farm consolidation trend, farm groups should be very concerned because fewer farmers translates into even less political power than they now have. Some observers saw evidence of this decline in political power last year as farm subsidies came under attack in Congress.

Without strong public intervention, farm consolidation is forecasted to continue, according to a recent study on the future of the state's economy. The study forecasts that farming will draft toward an occupation dominated by the big and the rich. According to the study, "the projections for 1990 show pronounced reductions in the number of smaller and medium-sized farms," with a resultant negative impact on the economics of small towns and rural businesses (Strang 1982).

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The Overall Food Production System

The U.S. food production system is no longer highly diverse with large numbers of small operators. Instead, there is a high degree of concentration and integration, both vertically and horizontally.

Concentration is occurring at all levels of production - in farming, processing, and retailing. Farmers are consolidating and total number of farms is decreasing rapidly; oligopolistic food processors are driving out competition; and supermarkets and convenience stores are replacing neighborhood grocers.

Technological changes in agriculture have substituted capital--in the form of fertilizer, pesticides, hybrid seed, and machinery--for land and labor. This has encouraged the transformation and consolidation of farms into large mechanized units, reduced the number of people required for farming enterprises, and made the remaining farmers extremely dependent on off-farm resources.

Vertical integration occurs when individual corporations control as much as possible--everything between producers (farmers) and consumers. General Foods, for example, not only owns food procesing plants (coffee, cereal, meat, and frozen foods) but also a fast food chain and a seed company. Many food processors/retailers actually contract with farmers to produce the food marketed under their label. In 1972, vertical integration had control over 97 percent of broiler production, 95 percent of vegetable processing, 85 percent of citrus fruits, 80 percent of seed crops, and 51 percent of fresh vegetables (Shover, 1976).* In addition, marketing costs account for two-thirds of every dollar spent on food. Thus, even though farm prices may drop, food prices are often not affected.

Horizontal integration results when large corporations gain control over a variety of consumer goods. An example is ITT, which dominates communication facilities and produces bread and bakery products.

The U.S. food system can be described as both wasteful and profitable. It is wasteful because large amounts of high protein grain are fed to animals, one-crop agriculture is destroying the soil resource base, excessive energy is consumed, and foodstuffs are overprocessed. Profitability is determined by dollar value, and American agricultural exports in 1975 accounted for $913 million out of a total trade balance of $910 million (the nonagricultural sector operated at a loss of $3 million) (Shover, 1976). However, concern for health and nutrition often received lower priority than new research and technology concentrating on higher yields, longer shelf life, and new methods for processing food:

*Wisconsin experiences vertical integration in its vegetable processing industry.

> . . . Americans are perhaps the only people on earth privileged to buy unbreakable, perfectly calibrated, dehydrated, rehydrated parabolic potato chips packed in vacuum-sealed tennis ball cans - at dozens of times the cost of the original, long-forgotten potato. The US food system is geared, in its entirely, to getting people to eat money (George).

The food system in this country has reached a critical juncture. Fewer and fewer individuals have the opportunity, supposedly inherent in our free enterprise system, to enter the marketplace. Land prices have skyrocketed; production costs are prohibitively high; mortgage rates are unaffordable; small retail grocery stores can no longer compete with chains--the list goes on. What is needed is greater diversity in all aspects of food production and more concern for the nutritional value of food. A mixture of large, medium, and small producers, processors, and retailers would allow more competition and the opportunity for more people to participate in food system enterprises.

As these centralizing tendencies have developed, a small but growing trend toward more diverse, decentralized food systems has also emerged. Some groups, such as the National Farmer Organization, have a long record of getting the highest available prices for users of their marketing system. Newer groups, such as the Madison-based Intra-Community Co-operative, one of the nation's largest cooperative wholesale food distributors, are providing alternative distribution systems for small independent food stores.

Two other areas, direct marketing and gardening can make important contributions to a decentralized food system.

Direct Marketing

Direct marketing is one alternative food-marketing method that possesses the attributes of a simple but healthy solution to several problems, while potentially benefiting both producers and consumers. For farmers, direct marketing offers additional opportunities for selling their products with the possibility of a higher return than they may obtain through traditional methods. In some cases, direct marketing is a significant source of income for part-time farmers. Consumers also benefit from the direct marketing method because prices are usually lower than retail and foods are fresher. Other benefits for consumers, as well as producers, include the social, educational and recreational values of participating in direct sales markets (GAO 1980).

Although direct marketing is not a panacea for the various threats to our current food marketing system, it does provide a healthy means of addressing some broader concerns. Increasing energy costs, land use issues, and increasing reliance on distant sources of food are serious factors that direct marketing can positively influence. Direct marketing can bring fresh products to consumers in a timely fashion, while

reducing labor costs, energy output, transportation expenses, and spoilage. Direct marketing is not without limitations, but its advantages for many producers and consumers clearly suggest that it should be an expanded method of food marketing.

In 1979, direct marketing sales of agricultural products totaled $61,092,919 in Wisconsin. Of the direct marketing sales, 10.8 percent were from fruits and nuts, 3.4 percent from vegetables, 54.6 percent from floral and nursery products, and 32.2 percent from other products (livestock and poultry products, Christmas trees, honey, etc.). Of those farmers selling direct in 1979, 25.3 percent expected to increase marketings in the next 5 years, 39.7 percent expected no change from current volume, 11 percent expected to decrease volume, and 24 percent were undecided (Wisconsin Agricultural Reporting Service 1979).

The conclusions stated in a 1980 GAO report on direct marketing clearly express the potential for direct marketing as a viable food marketing method--one that truly solves problems instead of creating problems.

> It is now viewed not only as providing fresher, cheaper food to consumers and increased income to farmers but also as encouraging revitalization of regional and local agriculture, aiding in survival of the family farm, and possibly contributing to energy conservation (GAO 1980).

Professor Philip Raup, an agricultural economist from the University of Minnesota, sees the emergence of two agricultures in this country. One is the currently dominant form of agriculture geared for commodity production to be distributed to a national or international market. The second is a "metropolitan agriculture" of smaller farm units close to urban areas. Metropolitan agriculture would serve many of the food needs of the people in the nearby urban area. Direct marketing has an important role to play in this type of agriculture.

Home and Community Gardens

Home and community gardening provide an important avenue for people to get control of part of the food production system. Home gardening is increasingly popular in the U.S. In a survey of American gardening trends conducted in 1981, vegetable gardens were part of approximately 38 million households. In 1981, home garden production was valued at $16 billion. In addition to economics, many people listed recreation as a reason for gardening. It gives them a chance to relax, spend time outside and take their minds off pressures while nurturing their flowers and vegetables. Another important reason given for gardening is that the food from gardens is tastier and more nutritious than most commercial produce.

Since 1970, organized city residents have established community gardens on vacant lots from New York City to Eugene, Oregon. There are currently more than on million community gardens across the U.S. The gardens are most often divided into individual plots and used to grow annual vegetables. Besides providing economic relief, recreation and high quality food, the gardens serve important social functions.

The biggest hurdles for community gardening projects are finding and holding suitable sites. The Trust for Public Land provides a good model for securing land for community gardens. They remove land from the commercial market and place it in public trust with a non-profit organization. However, in most cases community garden projects are low-budget operations without access to money for purchasing expensive lots slated for development. Most urban gardens are held by short-term agreements or by no agreement at all, leaving them in a very insecure position. Without government support for stability, the community garden movement's future may be undermined.

Government support for community gardens is nothing new. In the U.S. it began at the turn of the century when community gardens were used to help immigrants assimilate into American society. The federal government actively encouraged gardening through both world wars. At peak production in 1944, 20 million Victory Gardens yielded 40 percent of the fresh vegetables consumed in the U.S. that year. These various gardening movements tended to die out as soon as the government withdrew support. Many city governments in England, the Netherlands, Germany and other European countries have an ongoing gardening program which is enthusiastically supported by citizens and officials alike.

In Wisconsin there are 19 groups maintaining community gardens in Fond du Lac, Green Bay, Chippewa Falls, Neenah, Appleton, Superior, Eau Claire, Oshkosh, Madison and Milwaukee. Currently, about 1/3 of these projects are federally funded, 1/3 funded through municipal or county money and 1/3 are funded privately.

The federally-funded Madison gardening project is one of those facing an uncertain economic future. In two years of operation, participation has expanded from 6 acres and 150 people to 20 acres and more than 400 gardeners. Most of the gardens are located in low and middle income suburban neighborhoods. In spite of this success, however, project director Jim LeBue indicated that the city is somewhat reluctant to cooperate in the endeavor.

The Milwaukee Shoots 'n Roots program, coordinated by UW-Extension, began in 1978 as one of 16 federally-funded projects. In 1981, under this project 1,700 adults raised more than $500,000 of produce on approximately 17 acres in the metropolitan area. Results of a survey indicate that gardeners share their produce with an average of 4.6 people so that more than 6,000 people benefited from Shots 'n Roots in 1981. However, Steve Brachman, project coordinator, expressed concern over the future of this program and others like it due to funding cuts and difficulty in holding onto garden sites.

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Farmland Preservation

The loss of Wisconsin's farmland base presents a serious long-term threat to our food system. Over 5 million acres of farmland have been removed from agriculture since 1942, when a maximum of 24-million acres of land were in use. In January 1982 about 18.5 million acres of land were in agricultural use.

Wisconsin Farmland Loss Since 1940

Year	Land in Farms - Million Acres
1940	22.9
1950	23.6
1960	22.2
1970	20.1
1980	18.5
Percent Change: 1940-1980	-19%

(Wisconsin Statistical Reporting Service 1981)

During the 1960s, farmland losses averaged over 200,000 acres per year. Since then the state continues to lose 100,000 acres every year to urban uses, highways, and other land use changes.

In recognition of this problem the Wisconsin Farmland Preservation Law was enacted in 1977 to assist local people who want to preserve farmland, and to provide tax relief to farmers who participate in local programs. As of the end of 1981, about 15,400 farms, covering 3.2 million acres of agricultural land have been protected by the farmland preservation program through farmland preservation agreements and local exclusive agricultural zoning ordinances. At that time, 32 of Wisconsin's 72 counties had adopted farmland preservation plans. An additional 28 plans are scheduled to be adopted and certified in 1982. For the 1980 tax year, more than $10 million in tax credits were received by some 6,300 farms. The average credit received was $1,600 (Wisconsin Farmland Preservation Program 1982).

Wisconsin's approach is currently recognized as one of the nation's most effective and innovative state-level farmland preservation programs. Continued support for this program is an important part of a state farmland preservation strategy. Local people should also monitor the status of their county's farmland preservation plans and work to see them implemented.

The farmland preservation program is only one element of an overall strategy needed to preserve Wisconsin's irreplaceable cropland base. Another equally important, and largely unrealized, element is the need to reshape the urban development process. The basis for our current loss of farmland lies in inefficient urban development. On a nationwide basis, the per capita use of land for urban purposes doubled from 0.2 to 0.4 acres between 1950 and 1970 (Williams 1980). The depopulation of central cities, over-building of road systems, large lot residential development, and an overall condition of unplanned urban sprawl have all contributed to this condition.

Today, the objectives of both farmland preservation and economically-viable urban development need to be met by encouraging new approaches to urban development. These activities need to occur at both state and local levels of government.

In 1980, the Council on Development Choices for the '80's, a bi-partisan body initated by the U.S. Department of Housing and Urban Development, identified 6 priority approaches for efficient urban development. These approaches together provide a useful guide because they respond positively to current market forces while at the same time fulfilling farmland preservation objectives. These approaches are:

A. accelerating infill and redevelopment in existing communities;

B. increasing compactness of new metropolitan development;

C. increasing the mix of land uses in neighborhoods to increase pedestrian movement and neighborhood diversity and convenience;

D. increasing transportation options in order to reduce dependence on the automobile;

E. provide affordable housing to meet the requirements of changing households and diverse incomes;

F. promoting the concept of the "urban village," an organizing principle that offers attractive, efficient, and marketable development forms that incorporate all of the above approaches.

City, village, town and county governments have the statutory authority to bring about these approaches. Local planning commissions are often overburdened with near-term land use decisions and are unable to deal with long range needs. Citizen groups can provide an important role in encouraging local governments to undertake long range master planning programs. Also, land use planning at the state level has been abolished in recent years. Because of the need to take a statewide view of urban development and resource use, this type of planning should be re-initiated.

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Food System Energy Use

The U.S. food system uses 16.5 percent of the total fossil energy consumed each year. This includes on-farm production, processing, wholesale marketing, retail marketing and food preparation (commercial and home). The ratio of output/input is greater than one for the production of most grains, legumes and vegetables. The following table shows the energy inputs per hectare for U.S. corn production in 1975.

Energy and Corn Production - 1975

Inputs	kcal/ha
Labor	5580
Machinery	558000
Diesel	1278368
Nitrogen	1881600
Phosphorous	216000
Potassium	128000
Limestone	31500
Seeds	525000
Irrigation	780000
Insecticides	86910
Herbicides	199820
Drying	426341
Electricity	380000
Transportation	34952
Total	6,532,071
Outputs	
Corn yield	19,148,700
kcal output/kcal input (Pimentel and Pimental 1980)	2.93

However, for meat, poultry, dairy and fish, energy inputs far exceed outputs. For example, it requires nine times more energy to produce one kcal of milk protein, then it does to produce one kcal of corn protein. There are 34 million tons of plant protein produced annually in the U.S., with 26 million tons fed to livestock and 8 million tons available to humans. The 26 million tons of plant protein fed to livestock produces 6 million tons of animal protein (Pimental and Pimental 1979).

The processing, packaging and preparation of food require many inputs. For illustration, Pimentel and Pimental (1979) analyze energy inputs for one 455 gram can of sweet corn:

Item	Input
Production	450 kcal
Processing	262 kcal
Packaging	1006 kcal
Transportation	158 kcal
Distribution	340 kcal
Shopping	311 kcal
Home preparation	457 kcal
	3011 kcal
Food value	375 kcal

This produces a net loss of over 2600 kcal per can of corn. The most significant input was the packaging (16 oz. steel can) which required one-third of the total energy. The following table shows the enormous amount of energy required for all types of food packages.

Energy Required to Produce Various Food Packages

Package	kcal
Wooden berry basket	69
Styrofoam tray (size 6)	215
Moulded paper tray (size 6)	384
Polyethylene pouch (16 oz) or 455 g)	559
Steel can, aluminum top (12 oz)	568
Small paper set-up box	722
Steel can, steel top (16 oz)	1006
Glass jar (16 oz)	1023
Coca Cola bottle, non-returnable (16 oz)	1471
Aluminum TV dinner container	1496
Aluminum can, pop-top (12 oz)	1643
Plastic milk container, disposable ($\frac{1}{2}$ gal)	2159
Coca Cola bottle, returnable (16 oz)	2451
Polyethylene bottle (1 qt)	2494
Polypropylene bottle (1 qt)	2752
Glass milk container returnable ($\frac{1}{2}$ gal)	4455

(Pimentel and Pimental 1979)

Wisconsin imports 96 percent of its energy supplies (DSE 1979). Consequently, we have no control over energy prices or availability. To increase self sufficiency and produce more energy locally, it is necessary to look towards renewable energy sources (solar - passive and active, wind generation, and biomass) and conservation. To increase economic viability and play its part in helping the state become more energy self-sufficient, Wisconsin's food system will need to adopt more energy-efficient production processing and distribution systems.

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Soil Abuse

Soil loss in Wisconsin is a quietly growing catastophe. One-third of Wisconsin's 4.75 million acres of corn and soybean cropland is losing in excess of 5 tons of soil per acre per year, which is a higher rate than soil replenishes itself.

The Wisconsin Board of Soil and Water Conservation Districts (1977) evaluated the amount of soil being lost through erosion and found it to vary widely across the state. Grant and Lafayette counties having a soil loss in excess of 10 tons per acre per year because of intensive row cropping, long steep slopes, intensive rain storms, and few erosion control practices. Another ten counties in the southern half of the state have an annual loss of 5 to 10 tons per acre. The push for profit maximization has turned farmers away from soil conservation practices--contour plowing, crop rotation, grassed waterways, and erosion control structures. More intensive cropping methods have increased levels of soil erosion. These cropping methods include a shift from forage and pasture to cash grain crops that yield higher prices, an increase in farm size, and a trend toward large scale mechanization.

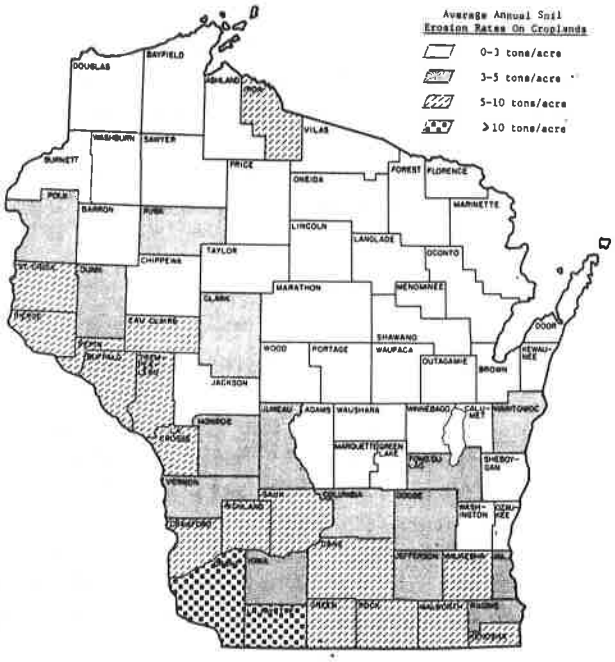
Conservation tillage programs, while necessary, can divert attention from these broader structural issues which cause soil abuse. In addition, conservation tillage practices which place heavy reliance on pesticides may be replacing one form of environmental degradation with another.

Some of the environmental problems associated with soil loss include maintaining and sustainability of the food producing soil base and the quality of surface and groundwater supplies. Every year the equivalent

of 1.5 million acres of cropland is taken out of production in the U.S. because of soil loss. The sediment that is being removed is clogging lakes and streams and causing irreparable harm to aquatic ecosystems. Wildlife habitat is destroyed through increased levels of nutrients and sediments, decreased levels of dissolved oxygen, and accelerated weed growth. In addition, drinking water, both surface and groundwater, is polluted.

In Wisconsin, the Department of Natural Resources (DNR) has been given authority to control water pollution. In a recent report to the Legislature (1982), the agency estimates that it would cost $600 million to control the most significant nonpoint source water pollution problems in the state. Presently, the agency is working with 11 priority watersheds where farmers are eligible for 50 to 70 percent of the cost for soil conservation practices. But, to effectively improve water quality the DNR estimates that it would need to work with 130 watersheds.

LAND USE AND EROSION SURVEY (1976-1977)



SOURCE: JOHNSON AND KINDERMAN (1977)

Several different policy options are being discussed for reducing soil erosion: regulations, a "green ticket" program, cross-compliance, and cost-sharing incentives tied to long-term agreements. Regulation usually takes the form of ordinances that require erosion control plans, permits for land disturbing activities, and limitations on amount of soil loss. The Town of Sterling in Vernon County established a soil erosion ordinance in 1976. It controls farming practices on slopes greater than six percent and land disturbing activities over 10,000 square feet. The program has used local initiative and enforcement and has been quite successful.

The "green ticket" program would integrate the use of soil conservation practices with farm commodity support programs. This voluntary program would reward farmers that conserve soil with increased tax support and compensation for increased production costs. It would also prescribe the types of management practices used, along with the kinds of crops being grown. Cross-compliance requires that any farmer receiving income or production assistance be required to participate in soil erosion control.

Cost-sharing incentives could provide increased funding for soil conservation practices, while requiring long term agreements to maintain

them for a prescribed period of time. This could be accomplished through existing cost-sharing programs like the USDA Agricultural Conservation Program (ACP).

There are probably more federal and state programs that encourage erosion than discourage it. Federal grain export policy is a prime example. The National Agricultural Lands Study found 90 federal programs that adversely affected farming in some way. Resolution of the soil abuse problem must include removal of these public incentives to destroy the soil base if ameliorative conservation programs are to succeed.

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Pesticide Use

Over 4.2 million acres in Wisconsin are treated with herbicides, and over 2.3 million acres are treated with insecticides, according to a 1978 pesticide use survey conducted by the Wisconsin Department of Agriculture, Trade and Consumer Protection. This survey estimated pesticide applications on the 13.4 million Wisconsin acres planted in corn, soybeans, small grains, hay, pasture, and tobacco.

Total amounts of herbicides applied were about 9.7 million pounds, while total amounts of insecticides were about 1.8 million pounds. Of these totals, about 94 percent of the herbicides and 95 percent of the insecticides were applied to corn (Wisconsin Agricultural Reporting Service 1978).

The percentages of some crops treated with pesticides has increased dramatically between 1970 and 1978. Corn treated with herbicide increased a small amount, from 94 to 96 percent; however, the percentage of corn treated by insecticides almost doubled, growing from 28 to 55 percent. Also, the percent of soybeans treated with pesticides has increased from 49 to 93 percent.

In addition to these heavier pesticide application rates, the growth of Wisconsin as a corn belt state in the past decade has brought with it a significant increase in the overall acreage treated with pesticides. In 1970 about 2.8 million acres of corn were planted in the state, while in 1978 3.7 million acres were planted. By 1980 the figure had grown to 4.2 million acres. Between 1970 and 1978 total acres of major crops treated by herbicides increased by 35 percent, from 3.1 to 4.2 million acres. Acres treated by insecticides increased by 190 percent, rising from .8 to 2.3 million acres. In the four years since the pesticide use survey was completed, pesticide use has increased over the 1978 figures due to an increase in corn acreage.

This increased use of pesticides has raised serious questions related to human health, the increased role of private corporations in agriculture, environmental impact, and the long-term viability of a pesticide-based cropping system.

The issue of farmer safety is addressed in the 1978 pesticide use survey. Farmers were asked what type of protective equipment or clothing they used when handling pesticides. Only 19 percent of the respondents reported using a respirator, 14 percent used a spray suit or other protective clothing, and only 26 percent used goggles. The storage and disposal of empty pesticide containers is another safety issue not addressed by the survey.

Long-term health effects on rural residents in areas subject to continuous pesticide applications is another issue of growing concern. Data on pesticide usage and human health is not adequate to make a sound epidemiological (epidemiology is the science that deals with the incidence and control of disease) statement concerning pesticide safety. The prices paid for the widespread use of unproven chemical substances in other areas of contemporary experience should generate greater concern of the potential health affects of pesticide use.

The uncertainty over adverse health effects is illustrated by the presence of aldicarb in private wells in seven Wisconsin potato-growing counties, mainly in the Central Sands. Aldicarb, a highly toxic insecticide/nematicide, was applied with potato seed each spring until its use was partially restricted in 1982. Tests in 1980-1981 by Union Carbide, manufacturer of Temik--the trade name for aldicarb--found the chemical in groundwater at concentrations up to 15 times greater than the EPA-recommended maximum.

The growing role of private corporations in agriculture is also a part of the pesticide use issue. The use of greater amounts of increasingly expensive chemicals increases the capital acquisition needs of farmers and makes them more dependent on business corporations. A related issue is the existence of extremely heavy media advertising during the late winter chemical buying period. This pressure is not balanced in the media or elsewhere by unbiased discussions of viable alternatives to pesticide reliance. Many of these advertisements claim quasi-endorsements from universities by such means as showing actors walking out of university buildings holding research reports confirming the superiority of the advertised products. In order to provide a more balanced picture of the role of pesticides, colleges of agriculture should move to halt this endorsement practice. In addition, a portion of all research funds accepted from pesticide manufacturers should be used to develop public education and discussion programs on the full range of pest control alternatives.

The role of private corporations in pesticide handling is also a health and safety issue of concern. Wisconsin has an estimated 720 pesticide-producing establishments and 721 pesticide manufacturers and labelers licensed to sell an estimated 6,580 pesticide products (GAO 1981). Public enforcement capability to monitor these pesticide users is low. According to a 1981 GAO report, the Wisconsin Department of Agriculture, Trade and Consumer Protection pesticide program staff includes only one plant industry specialist. The notorious PBB disaster in Michigan gives us fair warning of the in-plant dangers of pesticide handling.

The environmental impact of major reliance on pesticides is felt in two major ways. The first is that pesticide use makes possible the continuous cropping of individual plant species, which defies the basic ecological principles of diversity. In the long run, ecology (not economics) is the basic discipline of agriculture, and its principles cannot be overly stretched.

The second major area of potential environmental impact is generic to the proliferation of chemical substances introduced into the environment in recent decades. Because most of the chemical substances used in pesticides are relatively new, we know little of their individual or synergistic long-term effect of their large-scale use on the environment. For example, the Leopard frog population in Wisconsin has decreased dramatically in Wisconsin in recent years. Autopsies of dead frogs revealed degenerative liver changes, some of them suggestive of ingestion or absorption of a toxic substance. Toxicity tests showed that the herbicide Atrazine retarded growth and lowered tadpole survival. A recent DNR report on Leopard frog research concluded by saying:

> The drama of the Leopard frog decline that has been unfolding over the past decade may provide a vital insight into ecosystem health - it must not go on unnoticed or unattended. (DNR 1981)

The final pesticide use issue that bears noting is the long term viability of a pesticide-based cropping system. The growing resistance of insects to pesticides is a well-established phenomenon. This phenomenon is also showing up with herbicides. For example, central Wisconsin farmer Don Thompson recently became one of the first mid-western farmers to discover Atrazine-resistant weeds in his corn. Growing numbers of resistant weeds have been found in the northwest, Canada, the eastern seaboard, and most recently in Wisconsin--always where Triazine herbicides--such as Atrazine, simazine (Princep) and cyanazine (Bladex)--had been used every year in the same field, often in a no-till program (Locker, 1981).

Specialists are recommending such remedies to herbicide resistance as switching chemicals, more frequent cultivation and rotating crops. Some specialists feel that switching chemicals will only keep the problem of resistance at bay for a limited number of years, and propose integrated weed management programs, similar in concept to integrated pest management programs currently being developed.

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Fertilizer Use

Wisconsin's agricultural system has become increasingly reliant on non-renewable sources of fertilizer. Over the last 30 years, fertilizer usage in Wisconsin has increased annually, peaking in 1978. Rapidly accelerating fertilizer costs, particularly for nitrogen, forced the rate of consumption to stabilize in 1979-80.

Nitrogen fertilizer is the mainstay of monocultural corn-based cropping systems. Wisconsin farmers used 231,000 tons of the nutrient in 1980, twice the amount used in 1970. Fertilizer nitrogen is derived from combining gaseous nitrogen present in air with hydrogen, to form ammonia. Natural gas has always been the cheapest and most abundant source of hydrogen. However, the increasing scarcity of petroleum reserves, along with rapidly accelerating prices has made nitrogen production expensive. In 1978 the U.S. imported 19 percent of its ammonia supply.

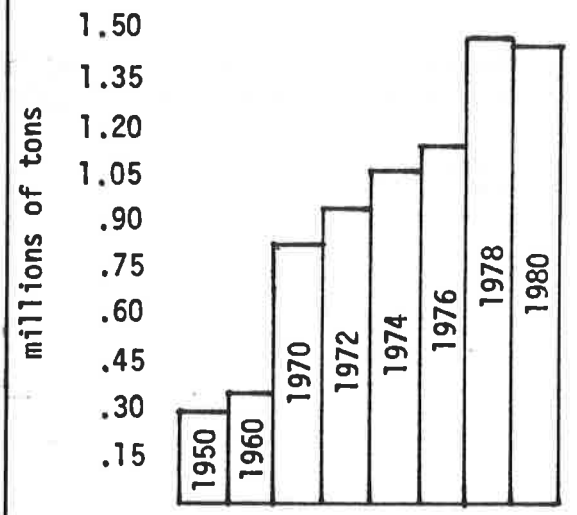
Phosphorus and potassium are the other two major plant nutrients. Wisconsin used 156,000 tons of phospate and 342,000 tons of potash fertilizer in 1980. This represents a respective 34 percent and 75 percent increase over 1970 levels. The U.S. produces only 25 percent of these nutrients from domestic supplies of phosphate rock and potassium oxide. Supply depletion problems are expected to be encountered by the year 2000.

Nitrates are one of the principal pollutants associated with agricultural operations. They are derived fro excessive nitrogen applied to cropland and runoff from livestock confinement areas. Only a portion of the fertilizer is absorbed by plants. Nitrates are very mobile in the soil and much of the unabsorbed portion either leaches into groundwater or becomes incorporated with runoff and moves downslope into lakes and streams.

Drinking water polluted with nitrates is a major health concern. Amounts in excess of 10 ppm cause methemoglobinemia in infants. Mortality rates have been shown to increase in areas with high nitrate levels (Commoner 1971).

Sustainable cropping systems involve a balance of inputs and outputs. The continued reliance on vast quantities of imported fertilizer that consumes both energy and irreplaceable resources needs to be questioned. As an alternative, some farmers in the U.S. have experimented with organic farming and obtained high yields using naturally occuring sources of nitrogen, phosphorus, and potassium. These nutrients are derived from nitrogen-fixing legumes, increased amounts of organic matter, and the addition of lower levels of outside sources of fertilizer materials (USDA 1980).

Fertilizer Consumption in Wisconsin 1950 - 1980*



*Total fertilizer material used. Includes nitrogen, phosphates & potash.

Source: Wisconsin Dept. of Agriculture, Trade & Consumer Protection (1980)

Alternative sources of nitrogen require minimum tillage systems that conserve plant residues, crop rotations using grasses and nitrogen producing legumes, and applications of animal wastes that recycle nutrients taken from the soil. Dairy farming in Wisconsin is especially well suited to utilize cropping systems that conserve organic matter. Crops grown in rotation can be plowed in as fertilizer, pastured, and used as feed, while manure is available for recycling nutrients back to the cropland.

The other two major plant nutrients, phosphorus and potassium, also require agricultural practices that produce organic matter. In addition, some outside sources of nutrients may be needed. Some farmers apply nutrient-source materials in their natural or unprocessed state, including organic wastes (such as sewage sludge), phosphate rock, and glauconite (greensand). The rate at which these materials break down and become available to plants depends on a proper balance and maintenance of the soil. Soil in a healthy condition needs lower levels of input and provides a more dependable source of nutrients. Research on plant strains that use nutrients more efficiently can also lower fertilizer inputs.

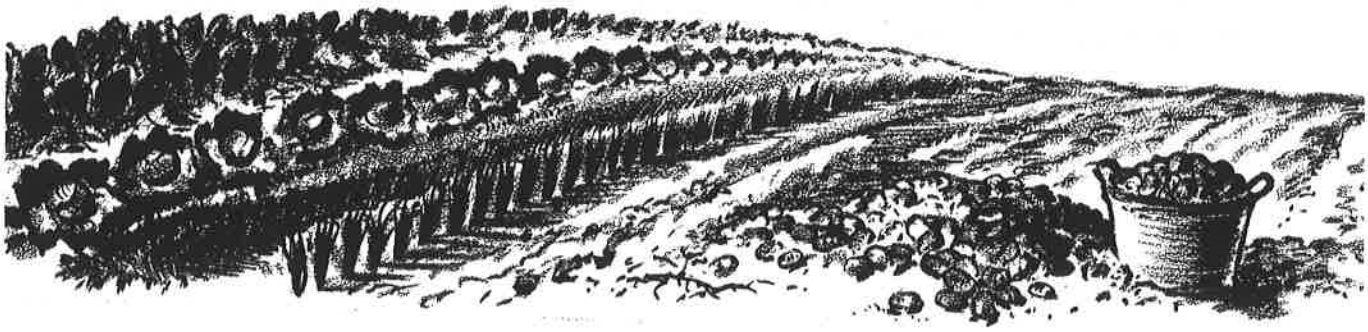
REFERENCES

Wisconsin Agricultural Reporting Service, "Wisconsin Fertilizer Summary," Department of Agriculture, Trade and Consumer Protection, 1980.

Report and Recommendations on Organic Farming, United States Department of Agriculture (USDA), 1980.

Commoner, Barry. The Closing Circle, Alfred A. Knopf: New York, 1971.

IV. Conclusions and Agenda for Action



This report identifies and documents several trends that warrant serious consideration by producers and consumers of food. We have undertaken the Wisconsin Cornucopia Project because the trends in these areas indicate that our food supply may be becoming more vulnerable to interruptions of supply and inflationary pressures. We recognize the potential for a food crisis that equals or exceeds the impact of the energy crisis, and a future which threatens the quality of rural life, the existence of rural institutions, and the continuation of rural culture.

The industrialization of agriculture consists of contradictions: people advocate an economic system which is also at the root of many of the problems they face. The contradictions become more apparent when we look at the treadmill philosophy of "bigger is better." Family farm operators have expanded in size and capitalization in order to survive. In order to support the expansion and the retirement of debt, more land and machinery is required to keep productively high. Investment in new machinery and more expensive inputs such as fertilizer and pesticides require further capitalization and expansion. All the while the prices of farm products do not keep pace with the farmers' inflated costs because of supposed oversupplies. This economic treadmill encourages monoculture--specialization in a single crop--and decreases agricultural diversity. Monoculture and economic pressures have made soil conservation practices a luxury that many farmers cannot afford in the short term.

The concentration of farmland into fewer and fewer hands along with the industrialization of agricultural production has implications beyond the economic health of individual producers. These trends will also effect the economic and social health of rural communities. Communities surrounded by family farms are likely to benefit from the diversity that accompanies an indpendent enterpreneurial base. Studies conducted in California as early as 1946, and replicated years later, conclude that such communities can support more people at a higher standard of living

than can communities that are surrounded by large-scale farms. The communities that were surrounded by family farms had better community facilities: more schools, more parks, more newspapers, more civic organizations, and more churches.

Rural Wisconsin believes that the threats to the food system and the threats to rural communities that result from the current trends in food production can be dealt with by adherence to a few broad principles:

—Agricultural prices should be high enough to ensure an adequate standard of living and return on investment for agricultural production.

—Individuals should strive to become more self-relient in providing for some portion of their own needs.

—Tax policies, farm price support programs, and the research priorities of land grant universities should directly promote moderate-size, owner-operated farms.

—The capacity of the land to regenerate itself determines the long-term economic health of farms, and the economic health of farms is linked to the prosperity of adjacent communities. By implementing policies and practices that maintain the health of the land, we are ensuring the health of individuals and communities.

This report is intended to be an expression of grass-roots concern for Wisconsin's food system. We hope that it helps focus people's attention and encourages them to organize around their food system concerns. Following is a list of recommended actions that have bearing on the problems discussed in this report. Solutions to the problems we have talked about require a combination of federal, state, local and individual action. Using these recommendations as a starting point, persons can alter their lifestyle and consumption patterns, work with neighbors, or join organizations that influence state or national policy.

FEDERAL ACTIONS

At the federal level of government, citizens can work toward the enactment of the following programs and policies:

A. A comprehensive farm program which includes:

1. Adequate price supports and support loan rates with an eventual goal of full parity.

2. Commodity management controls which will reduce over-production.

3. Programs to encourage the entry of beginning farmers to broaden the agricultural base.

4. A moratorium on family farm foreclosures and forced bankruptcies until adequate farm programs are in place and working.

B. Expansions and development of USDA research and extension programs which work toward diversified production, soil conservation, reduced chemical inputs, on-farm energy and fertilizer sources, and more direct, diversified marketing options.

C. Adoption of HR 5618, the Organic Farming Bill, introduced by U.S. Representative Weaver (D-Oregon). This bill, introduced on February 24, 1982, would estabish a volunteer advisor program modeled after the successful Extension Master Garden Program. People with expertise in organic farming would be formed to advise farmers who wish to make the transition to organic farming. The bill would also establish six regional pilot programs in land grant colleges to research and develop techniques for organic farming in those regions.

D. Enactment of effective soil conservation measures such as cross-compliance requirements. Cross-compliance would require that any farmer receiving income or production assistance be required to participate in erosion control programs.

E. Elimination of anti-conservation and preservation programs. The National Agricultural Lands Study identified 90 programs that adversely affect farming and farmland preservation.

F. Elimination of federal tax incentives for absentee farmland ownership and overcapitalization of farm operations.

G. Initiation of a national food systems planning program.

STATE ACTIONS

At the state level, citizens can work through farm and food groups, state legislators, and other avenues for:

A. An effective Farm Entry Program to increase the number of farms and stabilize average farm size in Wisconsin. Three bills designed to help beginning farmers were introduced into the Wisconsin Legislature last year. All three failed to proceed out of committee.

B. Continued state support for the Wisconsin Farmland Preservation Program, one of the most effective in the nation.

C. Continued support and expansion of the UW-Extension Limited Resource Farmer Program. This eight-year-old program currently operates in three areas of the state. Targeted toward lower income farm families, this program offers individualized educational programs related to crop and livestock and management; financial management; and community involvement training. This type of program could be expanded to include smaller scale farms geared toward direct marketing in urban areas.

D. Expanded focus on integrated pest and weed management research, and research which works toward diversifying Wisconsin's agricultural products. Opportunities for research include tree crops, fresh vegetables, new forage crops (now under study by the new Dairy Forage Research Center), livestock with low grain feed requirements, aquaculture, and others.

E. A full-scale inter-agency study of the impacts of pesticide use in Wisconsin, followed by the enactment of effective controls and guidelines.

F. Enactment of a three-pronged soil erosion abatement program involving technical assistance, cost-sharing and regulation of worst offenders. The names of major soil abusers should be identified and made public.

G. Continued and expanded support for successful UW-Extension programs that encourage community gardens and urban food production, such as:

1. The Madison Urban Experiment Station, now facing an uncertain future.

2. The Master Gardener Program. Modeled after a successful program developed by the University of Washington, this program offers people 46 hours of course work in exchange for their promise of 46 hours of volunteer work with gardeners.

3. The Milwaukee Shoots 'n Roots Urban Gardening Program.

LOCAL ACTIONS

At the city, village, town and county level, people have a wide range of opportunities to promote a sustainable food system. They can work to:

A. Initiate community food plans, implemented by:

1. The establishment of direct marketing programs.

2. The development of urban gardening programs which use vacant and public land for food production.

3. The utilization of work relief programs to establish urban food production sites.

4. The use of composting in leaf collection and recycling programs.

5. The amendment of urban street tree programs to allow food producing trees and to preserve solar access for front yard food production.

6. The requirement in public food procurement contracts that food be produced in the region of use where possible.

7. The amendment of local ordinances to allow the keeping of appropriate small livestock.

8. The requirement of garden areas in multiple unit housing projects.

B. Adopt agricultural preservation zoning ordinances in rural areas and strictly regulate livestock confinement and other industrial agriculture operations.

C. Preserve farmland by encouraging higher urban density through urban infill, narrower streets, revitalized downtowns, smaller residential lots, and control of leapfrog development.

D. Establish agricultural revitalization programs in urban fringe townships, similar to downtown revitalization programs now becoming popular in many Wisconsin communities.

E. Form citizen groups that would initiate and encourage the above activites.

INDIVIDUAL ACTIONS

The beauty of food system reform is that the arena of action starts in the kitchen, the yard, the neighborhood and the local grocery store. Here, individuals can:

A. Grow and process food at home, and share food production knowledge with others.

B. Compost organic matter.

C. Purchase locally-produced food and patronize direct marketing operations.

V. Wisconsin Food and Agriculture Organizations

The following is a list of Wisconsin organizations through which people can express their concern over the future of Wisconsin's food system.

Alternatives in Agriculture
Terry Schettini
Horticulture - Room 16
University of Wisconsin
Madison, WI 53706

Wisconsin Natural Food Associates, Inc.
6616 CTH I
R. R. 2
Waunakee, WI 53597

Intra-Community Cooperative
Lynn Haanen
1335 Gilson
Madison, WI 53715

Wisconsin Nutrition Project
1045 E. Dayton Street
Madison, WI 53703

Rural Wisconsin
P. O. Box 7202
Madison, WI 53707

High Wind Association, Inc.
2602 E. Newberry Road
Milwaukee, WI 53211

Wisconsin Federation of Cooperatives
David H. Erickson
122 W. Washington Avenue
Madison, WI 53703

Wisconsin Canners and Freezers Association
Mr. Alvin H. Randall
110 E. Main St. - Room 1003
Madison, WI 53703

Wisconsin Grange
Lester Wallace
Rt. 1, Woodtrail
Beloit, WI 53511

Wisconsin Cheese Makers' Assoc.
115 West Main Street
Madison, WI 53703

Wisconsin Dairy Products Assoc.
2805 E. Washington Avenue
Madison, WI 53704

Wis. Environmental Decade, Inc.
302 E. Washington Avenue
Madison, WI 53703

Citizens' Pesticide Control Comm.
Mary Ann Krueger
3216 Welsby Avenue
Stevens Point, WI 54481

Common Health Warehouse
Cooperative
810 Clough Avenue
Superior, WI 54880

Milwaukee Organic Gardening Club
Ann Kadlee, Correspondence Sec.
4122 South 84th
Greenfield, WI 53228

Rural Network
Arlene Caldwell
Rt. 1, Box 49 B
Avalon, WI 53505

Waukesha Organic Gardeners
John Greenwood
S94 W13876 Ryan Drive
Hales Corners, WI 53130

Wis. Organic Growers Association
Ken Patnode
3650 E. Becker Road
Oak Creek, WI 53154

Associated Milk Producers, Inc.
1707 South Park Street
Madison, WI 53713

Citizens' Environmental Council
110 East Main Street - Room 415
Madison, WI 53702

Wisconsin Farm Bureau Fed.
7010 Mineral Point Road
P.O. Box 5550
Madison, WI 53705

Wis. Farm Equipment Assoc.,
13 Odana Court
P. O. Box 4364
Madison, WI 53711

Wisconsin Farmers Union
117 West Spring Street
Chippewa Falls, WI 54729

Wis. Assoc. of Food Dealers
802 West Broadway
Suite 203
Madison, WI 53713

Wis. Assoc. of Meat Producers
2600 East Main Street
Merrill, WI 54452

National Farmers Organization
825 Water Street
Sauk City, WI 53583

Wisconsin Muck Farmers Assoc.
121 Circle Drive
Randolph, WI 53956

Wis. Conference of Churches
1955 West Broadway
Madison, WI 53713