

SMALL FARM PRODUCTION SYSTEMS
IN THE SPACE AGE

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GREENSBORO, NORTH CAROLINA

1982

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ACKNOWLEDGEMENT

The author would like to express his appreciation to the Department of Agricultural Economics and Rural Sociology for providing the facilities and other assistance which contributed to the preparation and completion of this report. Particularly appreciated are the comments and encouragement of Dr. Richard Robbins and Dr. Hari Marhatta, professors of Agricultural Economics and Director and Interim Director (1981-82), respectively, of the 211(d) Grant program.

The comments and suggestions of Dr. Randall White, Assistant Professor of Agricultural Economics and Rural Sociology, Dr. Howard Robinson, Director, Office of Research Administration, and Dr. Dalton McAfee, Assistant Director of Agricultural Extension at North Carolina A&T State University, who reviewed the paper, helped make this a better paper than it would have been.

The assistance of Venetia Fisher and Jody Wiley, who typed the several drafts of the manuscript, and Azell Graves, who facilitated the administrative details involved in this effort, is sincerely appreciated.

The preparation and publication of this paper was supported by the United States Agency for International Development under Contract No. AID/ta-G-1453, authorized under Section 211(d), Title III of the Foreign Assistance Act of 1966. The paper is based on published data and information, but the opinions and conclusions expressed in the paper are this author's exclusively, except those purported by quotation or direct attribution to be those of another. The author is responsible for any errors, and for accuracy of data, quotations, or attributions made in the paper.

FOREWORD

To attempt to review the entire scope or areas, factors, and affairs embarked by the "agriculture establishment" is an ambitious task. To attempt to do it in a short paper approaches fully; the large number of people, institutions, business entities; diversity of geographic areas; accompanying vast complexity of interest, relationships, and interactions are beyond the capacity of any human mind to comprehend in a comprehensive, balanced manner. However, we must enter, as fools, where angels fear to tread. Perhaps others, especially of our mentors, could do it better, but each of us must have some kind of working concept of the environment within which we work and move. Consequently, even though there will undoubtedly be errors, misplaced emphasis, omitted issues, elements, and data, and decided personal bias in the selection of data, judgements and conclusions, we forge ahead. Perhaps the personal bias, which unavoidably permeates the work of an author, is the element of any work which makes it really worth while.

I. Introduction

The Changing Face of Agriculture

Agriculture, and the closely related field and profession of Agricultural Economics and Rural Sociology, have been historically centered on the function of agriculture as a source of food and fiber for the community/economy, and especially the production process. Originally, the family life and livelihood of the farmers were inextricably involved with the production process and activities of the farm. In most developing countries this is still the situation, but in recent decades U.S. agriculture has become increasingly specialized, mechanized and commercialized. Schumacher observes that in the western world, the production process has become impersonal and objective. Man is separated from his land by machinery. The soil (land) is treated largely as a homogenous resource, and money costs and money income are the ultimate criteria and determinants of human action.

(Schumacher, 1973).

This narrow, materialistic view of agriculture, oriented overwhelmingly toward production - output - of food and fiber, is being challenged by increasing numbers of individuals and groups today, Agricultural Economists are being asked - or forced - to look at their field from a wider perspective: in addition to providing the foodstuffs and other materials which are needed for a becoming life, a wider view sees agriculture fulfilling the task of keeping man in touch with living nature of which he is to remain a vital and vulnerable part, and to "humanize and ennoble man's wider habitat." (Schumacher, op. cit.)

Objective and Constraints

The purpose of this paper is to examine the concept of the "small farm" from a viewpoint other than the conventional view of agriculture as a comparatively homogenous group of farm firms which exist and function for the principal purpose of producing food and fiber products for society; and to provide a broader perspective for the orientation, development, and evaluation of research efforts in the field of agricultural economics and rural sociology. The immediate result is not intended to be a proposal for a specific research project, but to present a panorama of the current institutional, economic, and social framework within which the problem area(s) to be studied exist.

II. THE POSTWAR TECHNOLOGICAL AND SOCIOLOGICAL REVOLUTION IN U.S. AGRICULTURE

Public Policy and the Family Farm

Historically, U.S. farm policy has concentrated on the economic well-being of farmers, because it was assumed that if a farmer had an adequate money income, he could afford the goods, services, and other components of well-being that he needed or wanted. Also, it has always been easier to measure the economic, compared to other components of human well-being.

The majority of policies instituted for the control and improvement of the economic system have been predicated on the strong, underlying belief in private property rights, superiority of the capitalist system, and superiority of market-determined prices, production and incomes. In agriculture, the basic production unit known as the family farm, has traditionally been considered to embody the essential elements of this philosophy. The design, implementation, and assessment of public policies and programs for agriculture have implicitly included the family farm as the central, basic unit of production.

U.S. farm policy, shaped by two dominant goals of society - (1) production, or the size of the pie, and (2) welfare, or how the pie is distributed - largely evolved from the situation existing in the 1930's, which included:

- A severely depressed farm sector (low product prices, and low farm incomes)
- Production oriented toward domestic markets, and relatively unimportant foreign trade.

- Chronic excess productive capacity in agriculture.
- Inelastic demand for farm products - the primordial cause of the problems.
- Insufficient demand in the rest of the economy to absorb the excess resources and production from agriculture.

The policies and programs which were developed attempted to correct these conditions by increasing farm income through programs to support (raise) prices of agricultural commodities (acreage controls, marketing quotas, commodity loans etc); develop foreign markets; encourage the shift of resources (land and farmers) out of agriculture; and to stimulate demand in the rest of the economy for consumption of products of agriculture and employment of excess productive agricultural resources (principally people).

Policy means of two different kinds were used to benefit (family) farmers: (1) public programs to provide farmers with resources and farming skills, in order to increase production efficiency and lower costs per unit of farm output:

- A national land policy of dispersed ownership (1789).
- Establishment of farm credit system.
- A cost-sharing soil conservation system.
- The development of a railroad and highway system to ensure distribution of farm products.
- The establishment of land-grant colleges of agriculture with agricultural experiment stations, and later an extension education system.
- Programs to provide irrigation water for agriculture, and grazing on public lands; and

(2) Programs to support farm prices and incomes:

- Commodity price support programs.
- Income payments, acreage and production control programs.
- Farm bargaining legislation.
- Farm cooperative legislation.
- Marketing orders.
- School lunch programs, food distribution, food stamp programs.
- Export demand promotion.

Farm Programs and Technological Development

The development and adoption of new technology particularly has had a vital role in the transformation of U.S. agriculture, especially the trend to larger and more specialized farms. Adoption of new technology, generated by public and private research, resulted in lower costs of production, and facilitated increases in the scale of production and the size of individual farms. Most technologies emphasize increased output per worker, and increased size of equipment and farm operations is often required for investment in the technology to be economical. (A four-wheel tractor, for example).

The focus of public programs in agriculture on production and output (acreage controls, prices of output, marketing quotas, etc.) has given additional incentive for individual farmers to adopt new technology to increase output, and/or reduce costs of production per unit of output. In addition, the competitive nature of farming, increased cost of labor relative to capital goods, the drive of individual farmers to maximize incomes, inflation, and tax rules have all worked to continually stimulate the adoption of new technology. The net result in the postwar period has been an acceleration in the adoption of capital-intensive technologies

and a concomitant increase in the size and degree of specialization of individual farms. (Schertz, 1979).

Some agricultural economists have described this process as the "agricultural treadmill of technological change;" primary benefits of a new technology went to consumers (increased supplies and lower prices) and early-adopting producers as the increased output depressed commodity prices, forcing the adoption of new technologies by other farmers for their own survival. These and other forces worked together to stimulate a rapid migration of people out of agriculture and a mixed welfare problem, with large and/or innovative farmers faring well, and small or more traditional farmers faring poorly. (Harrington, 1979).

Movement of Resources out of Agriculture

Perhaps the most dramatic change in U.S. agriculture in recent decades has been the drastic decrease in the number of farms and the people living on farms, and the concomitant increase in size of farms. At the close of the 1930's U.S. claimed more than 6 million farms (175 acres each) and 30 million people, one out of every four Americans, living on them. By 1979, U.S. population had increased to 225 million (a 70 percent increase over the 132 million in 1940), but there were less than half the number of farms (2.4 million), 429 acres, and one-third the number of people (6.5 million) living on farms, as there were in 1940.

An even more dramatic change has occurred in the concentration of production of agricultural commodities; in the 1930's each farmer was considered a significant element in the production of nation's food and fiber. By 1979, 38 percent of those farms which might be considered full-time farms (annual sales over \$20,000) accounted for 93 percent of all

agricultural production, and the other 62 percent of the farms accounted for only 7 percent of total output. Thus, less than one million farms now account for practically all of the food and fiber produced in the United States.

The increasing commercialization and technification of farming together with the constant struggle to maintain and/or increase family income, and other factors during the postwar period led to the appearance of another phenomenon; a substantial part of farm family incomes coming from non-farm sources. In 1979 farm income accounted for only about 49 percent of total income of farmers; the major part (51 percent) came from off-farm sources. Off-farm incomes ranged from 97 percent of total family income for farms with under \$5,000 annual sales, to 11 percent for farms with over \$200,000 sales. Farm operators with farm sales of less than \$20,000 (62 percent of all farms) realized three-fourths or more of their total family income from off-farm sources. (Table 1).

Cropland

Although the number of farms and farm people dropped drastically, the acreage of land in agricultural cropland, and the total acreage in farms at the end of the 1940's was nearly the same as that at the end of the 1930's. This demonstrates that, although numbers of 'farms' and 'farmers' have apparently been eliminated, the land used for grazing and crop production still exists, and about the same quantity is used to produce nearly double the output of food and fiber. Thus, in summary of the technological revolution in U.S. farming over the past 40 years, it appears that capital and technology were substituted for labor to maintain and increase U.S. agricultural production on about the same acreage of land. (Table 2).

Table 1. Number of Farms, Aggregate Farm Cash Receipts, and Farm Operator Family Income, by Value of Sales Class, United States, 1979.

Value of Sales dollars/farm	Number of Farms		Aggregate Farm Cash Receipts		Farm Operator Family Income					
	1,000	%	million	%	Total		From Farm		Off Farm	
					dollars	%	dollars	%	dollars	%
Under \$5,000	882	36.3%	\$2,583	1.8%	\$19,074	100%	\$ 489	2.6%	\$18,585	94.4%
\$5,000 - 9,999	330	13.6	2,847	2.0	17,294	100	1,933	11.2	15,361	88.8
10,000 - 19,999	289	11.9	4,606	3.3	16,318	100	4,474	27.4	11,844	72.6
20,000 - 39,999	284	11.7	8,852	6.3	18,384	100	9,761	53.1	8,623	46.9
40,000 - 99,999	377	15.5	27,327	19.3	29,090	100	21,799	74.9	7,292	25.1
100,000 - 199,999	169	7.0	26,883	19.0	53,964	100	43,988	81.5	9,976	18.5
Over 200,000	99	4.1	68,536	48.4	129,202	100	114,626	88.7	14,576	11.3
All Farms	2,430	100%	\$141,581	100%	\$26,870	100%	\$13,202	49.1%	\$13,667	50.9%

Source: U.S.D.A. Economic Indicators of the Farm Sector: Income and Balance Sheet Statistics, 1980. E.S.S. Stat. Bul. No. 674. September, 1981.

An Urban Society in Rural America

By the mid-1970's it was apparent that agriculture was becoming an increasingly urban business, even when far away from the city. Thirty six percent of agricultural employment was in metropolitan areas, and only 12 percent of the nonmetropolitan employment was in agriculture. Consequently, it was no longer necessarily appropriate to equate the needs of agriculture with those of rural areas. However, the traditional image of farms and farmers still persisted in the minds of many people, both in and out of agriculture, and the language of legislation and statements of public figures still was couched in terms of the family farm of 50 years earlier. (Rainey, 1976).

A Transformed Agriculture

At the end of the decade of the 1970's U.S. agriculture was characterized by the following conditions and concerns:

- Shrinking numbers of farm and farmers - less than 2.7 million farms and 8 million farm population. (2.4 million farms and 6.5 million population by the new definition).
- Increasing size of farms and dependence on high-cost large scale technology.
- Growing uncertainty of input availability, especially energy and petroleum-based products.
- Important and increasing world market orientation for U.S. agricultural products, especially grains and oil needs.
- Continued operation of the 'agricultural treadmill'--high demand (from WWII and following years), rapid technological change in agriculture, increasing productivity and production, pressure on prices and incomes of traditional farmers, migration out of agriculture.
- Increasing coordination between agricultural production and marketing.
- Excess capacity in agriculture was disappearing--appeared to be concentrated on internationally traded products.

Table 2. Total & Farm Population, Number of Farms, Land in Farms, and Land Used for Cropland.
United States, Selected Years, 1910 - 1980.

Year	Population	Farm Population		Number of Farms	Land in Farms	Used for Cropland	Average Farm Size
	U.S. Total ^{1/}	Number	% of Total ^{1/}				
	(1,000)	(1,000)	(percent)	(1,000)	(million acres)		(acres)
1910	92,407	32,077	34.7%	6,362	879	330	138
1920	106,461	31,974	30.0	6,448	956	368	148
1930	122,775	30,529	24.9	6,295	990	382	157
1940	132,122	30,547	23.1	6,102	1,056	368	175
1950	151,684	23,048	15.2	5,388	1,161	377	215
1959	177,888	16,592	9.3	3,711	1,124	359	303
1969	202,736	10,307	5.1	3,000	1,103	333	369
1974	213,898	9,264	4.4	2,795	1,084	361	388
1978	222,629	8,005	3.6	2,672	1,072	376	401
<u>New Definition</u>							
1978	222,629	6,501	2.9	2,436	1,045	369	429
1979	225,106	6,241	2.8	2,430	1,043	379	429
1980	227,654	6,051	2.7	2,428	1,042	n.a. ^{2/}	429

^{1/} Farm population as of April 1, and Total Population as of July 1, revised data.

^{2/} n.a. = not available.

Sources: U.S.D.A. Agricultural Statistics. 1972. N. Carolina, Agric. Statistics, 1973 - '81
U.S.D.A. Economic Indicators of the Farm Sector: Income and Balance Sheet Statistics 1980. E.R.S. Stat. Bul. 674, September, 1981.

Frey, H. Thomas. Major Uses of Land in the United States, 1974. U.S.D.A., E.S.C.S. Agric. Econ. Report No. 440. November, 1979.

- Increasing adverse environmental impacts of agricultural production.
- Welfare problems in agriculture were becoming localized to specific groups, areas, and/or commodities. (Generally concentrated among small farmers with few alternative opportunities for their resources, labor, and skills.) (Harrington, 1979)

Conditions of farmers in 1980 which have been attributed to several decades of public farm programs implemented to alleviate the former problem of low farm income included:

- Increased farm prices and net farm incomes in the short run, and stabilized prices and incomes at the higher level.
- Increased quantity of farm capital assets, capital expenditures, and prices of farmland. (Use of capital - machinery and chemicals - increased to 43 percent of all resources used, from 25 percent in 1950).
- Reduced use of land and labor inputs relative to other inputs. (Labor use decreased to 14 percent of all resources used, from 40 percent in 1950; Fertilizer use increased five times, the amount of cropland used about the same).
- Increased productivity of both crops and livestock per unit of input (out-put-input ratio); especially crops.
- An accelerated rate of decline in farm numbers and agricultural employment, and increase in the size of farms.
- Farm operators owned about 60 percent of all farm land, but part owners and full tenants have larger farms than full owners.

(Nelson, J., and Chochrane, 1976).

An indirect impact of these farm programs, resulting from the increasing concentration of production on larger, specialized and technified farms, has been the concomitant concentration of benefits of public programs to help farmers; in 1978 about ten percent of U.S. farm producers received about 50 percent of the total commodity program payments made by U.S.D.A. A related impact, growing out of the higher income levels realized by farmers, is that income tax rules applicable to farming have become more important to farm net income than price support programs.

Social Changes in Rural America

The postwar technological re-evaluation in U.S. agriculture also sparked numerous complex sociological changes. One of the most publicized has been the issue of rural poverty i.e., those people (farmers) still living on the land, but left behind in the technology marathon, and lacking rural employment or other income-earning opportunities comparable to their more successful farmer neighbors and their urban-oriented neighbors and cousins.

The most direct and widespread sociological impact of the technological revolution in agriculture was the movement of farm and rural population to urban areas and non-agricultural employment. Secondary impact was seen in the decline of small towns in rural areas. Concomitant, not unrelated developments were the growth of suburban residential areas around major population centers, and inndr city decay of many of the larger cities.

The farm family and life style also experienced substantial changes. In the mid-1970's some of the changes that were noted as occuring in rural communities included the following:

- People, especially youth, are leaving, in increasing numbers.
- The village population is being dominated more and more by the older people, many retired from farming.
- The village-centered church is replacing the open-country church, and is displaying renewed leadership and interest in community affairs.
- Young people, looking for more vital recreational program, are travelling to nearby towns and cities for commerical recreation programs.
- The closely-knit, homogenous rural neighborhood group is disappearing.

- Informal methods of organization are being supplemented by more formal organizations.
- Social contacts and interests of rural people have expanded: farm and town people are participating jointly in activities for community betterment. Farm people are increasingly recognized as leaders, both in and outside the community.
- Greater involvement of county, state, and federal government in schools, hospitals, roads, services, etc.
- Family participation in organized groups is giving way to greater individual participation; interests are becoming more heterogenous. (Ensminger, 1978).

III. SCENARIO FOR THE 1980's

Turnaround: World Food Shortages

In 1972 a shortfall in world agricultural production, particularly in Russia and China, prompted an unprecedented Soviet purchase of 28 million tons of cereals; 18 million tons from the United States. U. S. farm prices and incomes increased in response, and by 1974, farm prices were 70 percent above 1971 levels, and net farm incomes reached \$30 billion in 1973, compared with \$13 billion in 1971. Prices of feed grains more than doubled, and prices of food grains, wheat and rice tripled. (Schertz, December 1979).

These events marked a dramatic shift from a long period of excess agricultural production with chronic low prices and incomes, to the prospect of a period of tight supplies and high prices. Lauren Soth commented, "For half a century the principal public policy question concerning food and agriculture was who to deal with production over capacity; in the next half century the central problem could well be scarcity. High food costs and instability of prices will be public policy targets." (Soth, December 1976).

The apparent change in farm policy ends also was reflected in the preface to the Agricultural and Consumer Protection Act of 1973 as reported out of the U.S. Senate Committee on Agriculture and Forestry: "The country appears to be moving toward a period of shorter supplies of food and fiber with consequent higher prices to consumers. The purpose of this bill is to assure the production of adequate supplies at reasonable prices to consumers by insuring producers against losses if their expanded production results in prices below the target prices." (U.S. Congress:1973).

Turnaround: Return to the Land

Also in the 1970's a distinct net movement of the U.S. population from urban to rural areas occurred, reversing the rural-urban trend of previous decades. The 1980 Census of Population data show that the population of nonmetropolitan counties (rural and small towns) increased by 15.4 percent since 1970, outstripping the 9.1 percent growth of metropolitan counties.

The 1980 nonmetropolitan population of 62.8 million includes a net movement since 1970 of at least 4 million people who moved in from metropolitan areas or abroad. By contrast, in the 1960's around 2.8 million more people moved out of rural areas than into them.

Many factors may be contributing to the post-1970 growth of nonmetropolitan counties. Among the explanations for which some evidence has been provided are: (a) continued growth of metropolitan centers and their spillover into adjacent nonmetro counties; (b) decentralization of manufacturing in pursuit of lower land and wage costs; (c) increased pursuit of leisure activities and the resultant development of retirement centers outside of the sunbelt areas of the United States; (h) increased enrollments in nonmetro colleges and universities; (i) growth of state governments; (j) levelling off or loss of farm population; (k) youth revolution with anti-materialistic movement, anti-urbanism and an increase in alternative lifestyle agriculturalists; (l) narrowing of traditional gaps in urban and rural lifestyles; (m) longer and more long distance job commuting; (n) increased energy and mineral exploitation in rural areas; (o) completion of interstate highway system; (p) a strong preference for rural/small towns living, coupled with the lower cost of

living in rural areas; (q) increased fear of crime, and concern with other urban disamenities such as congestion and pollution (Dillman, 1979).

A New Structure of U.S. Agriculture

The forces acting in the agricultural establishment, as well as in other sectors of the economy over the recent decades have brought about a changed structure of U.S. agriculture. Production of agricultural products has become increasingly concentrated. In 1979 only 268,000 largest producers, those with \$100,000 or more annual sales, produced 67 percent of total agricultural output measured by sales value; about 900,000 farms, those with \$20,000 or more sales, accounted for 93 percent of total farm output. (Table 1).

Although owner-operated farms are still the dominant form of tenure, increasingly, ownership of the land is becoming separated from operation of farms; i.e., farm operators do not necessarily own the land they farm. The most obvious example is the large-scale corporate averaging around 3,400 acres and \$500,000 annual sales; in 1974, 28,000 such corporate farms produced 18 percent of the nation's agricultural output.

The use of capital goods, especially machinery, fertilizers, chemicals, irrigation and other technology, is now the dominant characteristic of commercial farming, and labor and land are of secondary importance. Productivity per unit of labor and land has increased to a high level, and there have been significant changes in income and wealth of farmers and those who own land. Total farm income has increased substantially, resulting in large increases in the wealth among the larger, more successful farmers. (Schertz, 1979).

At the other end of the size scale, the remaining 1.5 million units recognized officially as farms , (annual product sales between \$1,000 and \$20,000) account for only seven percent of aggregate U.S. commercial agricultural production. These generally are considered to fall in the category of small or 'limited resource' farms. Although there has been such discussion of those terms in recent years, there has been a notable lack of agreement or consensus on just what a 'small' or 'limited resource' farm means. Viewed from the context of the new structure of agriculture, particularly the growing importance of off-farm income for nearly all groups of farmers, the reason for confusion becomes somewhat more understandable. A 'small farm' (for example, with \$10,000 annual sales) operated as a part-time activity by a farmer who earns \$15,000 in off-farm employment, is considerably different than one with the same sales volume, but in which the farmer has no income except what he earns from farming.

Furthermore, it may no longer be appropriate to assume that most U.S. farms are "full-time" occupations. Even farms with \$40,000 to \$100,000 annual farm product sales, which logically should be considered adequate for a full-time occupation, realized 25 percent of their family income from off-farm sources. Smaller farms, received a larger share of their family income from off-farm sources; ranging from 47 percent to farms with 20,000 to 40,000 sales to 97 percent for those under \$5,000 sales. Total dollar family income, from both farm and off-farm sources, for these smallest farms, however, approximated that for farms with \$20,000 to \$40,000 sales, illustrating the importance of off-farm employment for all these 'smaller farms.' (Table 1).

Consequently, we see U.S. production of agricultural commodities concentrated on a relatively few, large, commercial 'farms,' while increasing numbers of people are moving onto parcels of land which inherently include potential for agricultural production. The nearly ubiquitous current concern with inflation, particularly rising food costs, and the concomitant increased interest in home gardens, and home canning and freezing of meat, fruits and vegetables, provide substantial reason to believe that this increasing rural population is in fact engaging in agricultural production, at least for family consumption.

A New Look at the Family Farm

Today's farm is substantially different from the traditional concept of a 'family farm,' for which the sale of farm products was the only source of income for the farmer and his family who lived and worked on the farm. The agricultural extension establishment, whose principal function is working directly with farmers and has had to deal pragmatically with the changing characteristics of farmers, has found it useful to classify farmers according to the types of extension information they need: small or limited resource farmers, those with less than \$20,000 from sales of agricultural products annually (need "how to" information); 'commercial' farmers with sales between \$20,000 and \$99,999, (general information); and 'large commercial farmers,' with sales over \$100,000 (highly technical information). (Seastrank, 1978).

The definition of 'small' or 'limited resource' farmers was formalized by Congress in the Food and Agricultural Act of 1977 as: "Any person who depends on farming as his primary source of income, whose gross annual sales from farming operations are less than \$20,000, and

whose income from nonfarm sources is less than \$5,000."

Within this definition, however, there are several fairly well-defined subgroups:

- (1) Full-time farmers under 65 years of age working less than 100 days a year in nonfarm employment.
- (2) Part-time farmers under 65 years of age working more than 100 days a year in nonfarm employment, with annual farm sales less than \$2,000.
- (3) Part-time farmers under 65 years of age working more than 100 days a year in nonfarm employment, with annual farm sales between \$3,500 and \$20,000.
- (4) Farmers over 65 years of age, with retirement or pension income and annual farm sales of \$1,000 or more. (Helik, 1978).

In addition to these persons which fall within the Census definition of 'farmers,' there appear to be an additional 4.8 million landowners with 10 or more acres of land indicated by data on land ownership; who are at least potentially farmers, and probably live in rural areas. (Table 3).

Thus, where 50 years ago there were 6.3 million farmers in the United States, and most lived on the land they farmed, as owners or tenants, and could usually be recognized as a 'family farm; today we have less than one million essentially full-time farmers producing the great majority of food and fiber for the nation's needs and exports; and an additional 1.5 million farmers living on their land and receiving part of their income from farming, but most from off-farm sources; and 4.8 million more people owning and possibly living on ten acres or more, who presumably gain most of their income from non-farm sources, but are at least potentially producers of farm products.

This survey indicates that there were about 2.5 million owners of parcels of land of 100 acres or more in 1978, and 905,000 owners of

Table 3. Number of Landowners and Acreage Owned, by Size of Holding and Net Farm Incomes.
United States, 1978.

Size of Holding	Land Ownership			Net Farm Income			
	Number of Owners	Total Acres	Acres per Holding	Income	Number of Holdings	Total Acres	Acres per Holding
(acres)	(1,000)	(1,000)	(acres)	(dollars)	(1,000)	(1,000)	(acres)
1-9	26,485	46,199	2	No Farm Income	19,851	176,849	9
10-49	3,300	77,704	24	0-2,999	2,263	156,502	69
50-99	1,405	100,776	72	3,000-2,999	1,211	167,227	138
100-259	1,653	262,231	159	10,000-24,999	692	120,353	174
260-999	757	343,696	454	25,000-49,999	111	38,949	351
Over 1,000	148	516,591	3,490	Over 50,000	106	32,120	303
				Loss	1,215	176,333	145
				No Answer	6,469	236,350	37
All Farms	33,749	1,347,197	40	All Farms	31,918	1,104,667	35

Source: Lewis, James A. Landownership in the United States, 1978. U.S.D.A., E.S.C.S. Agric. Inf. Bul. No. 435. April, 1980.

parcels larger than 260 acres, which closely correspond to the 2.4 million total farms and 929,000 farms with over \$20,000 sales (full-time farms) reported in Census data. The 1.12 billion acres in all land holdings over 100 acres also corresponds closely with the Census figure of 1.10 billion acres in farms.

However, landownership data show an additional 4.7 million owners of parcels from 10 to 99 acres each (a total of 178 million acres) which apparently are not engaged in farming within the Census definition of a 'farm.' These parcels are undoubtedly mostly located in rural areas, and possibly could be used for agricultural production on either an owner-operated or a rental basis.

Another 26.5 landowners own from 1 to 9 acres each (46 million acres), but these are less likely to be engaged in agricultural production except possibly home gardening. (Lewis, 1979).

The "family" farmer of 1980 is considerably different from the American Gothic stereotype of the American farmer which still apparently persists in the minds of many people. Although located in rural setting, his home is similar in appearance, with the same appliances and furnishings, as one located in the suburbs of a large city. The family social activities, schools, churches, and shopping facilities also are similar to those of a family living in an urban area suburb. Furthermore, as indicated above, a substantial part of the family income of a farm family now commonly comes from off-farm employment or business activities, and in increasing instances, notably corporations engaged in agricultural production, the farmer does not live on the land he farms. In spite of these trends, however, the historic relationship between farming and ownership of land appears to be relatively unchanged, as indicated by a U.S.D.A. survey on patterns of

landownership in 1978 (Lewis, 1979).

What appears to have happened during the past several decades is that, to a significant degree, rural living has become divorced from commercial agricultural production, while most of our public policies, programs, legislation, and common attitudes are still phrased in traditional terms, and predicated on the concept of the family farm in which agricultural production and rural residence are inextricably linked. Consequently, the social, economics, and political issues, problems, structures, etc. involved with rural areas in 1980 differ substantially from those traditionally associated with agriculture.

Urban Living in A Rural Setting

The recent 'return to the farm' movement apparently involves people and issues other than those included in the present official definition of 'farms,' or 'agriculture,' although it is evident that increasing numbers of people are living in rural areas, or parcels of land which potentially could have an impact on aggregate production of agricultural products. Data from the 1980 Census indicate that 63 million people live in nonmetropolitan counties. Thus, nearly 30 percent of the U.S. population is identified as living in 'rural' areas, and this percentage could exceed one-third when rural residents of urban counties are included.

Although less than one-tenth of this rural population is presently identified officially with agricultural production as farms, it appears likely that a substantially larger part of rural population could engage in agricultural production, at least to the extent of producing most if not all of their own food requirements. If this occurs, the impact on

the food marketing system could be substantial, as well as the impact on public policy relevant to agricultural production and food consumption.

The current trend of nonmetropolitan population growth involves renewed rural communities--open country and small village. There is an undeniable trend of entry into farming of people with nonfarm backgrounds. Allied with this aspect of the overall trend is the increase occupancy of former farm homes. Such homes are now commonly rented or bought with five or ten acres by people who work in towns. (Beale, 1976).

One immediate potential concern noted in connection with this movement is the matter of motor fuel costs and supply. However, the unprecedented renewed residential growth of villages and open country is also cause for concern in the longer run, with respect to the impact on local institutions, community values, and individual lifestyles.

Already rural lifestyles have changed so much during the past two decades, that the uniqueness of rural communities has been significantly diminished:

- Per capital personal incomes in rural areas have risen to 80% of urban levels: adjusting for differences in cost of living probably would eliminate much of the remaining discrepancy;
- In march of 1975 manufacturing, wholesale and retail trade, and services, each had roughly 20 percent of rural employment, while agriculture had less than 10 percent;
- Rural residents work at a wide-ranging set of activities similar to those of urban Americans;
- There is no longer any significant difference in infant mortality rates between urban and rural areas;
- Substandard rural housing has declined from 59 percent 25 years ago, to less than 7 percent today (Deavers, 1980).

Although these economic and social changes have resulted in a substantially changed picture of U. S. agriculture, there had not been a

general and complete replacement of the old by the new. Instead, there has been a gradual addition of the new, and a concomitant gradual decrease of the old; although not necessarily in the same geographic location. What has resulted, which we observe at the beginning of the 1980's is a considerably greater diversity between 'agriculture' and 'rural society' and a considerably less clear distinction between what once was clearly 'rural', and what was 'city' or 'urban.'

As mentioned above, the family farm as traditionally viewed, has changed in form and diminished considerably in numbers. However, 'rural' families still retain a distinctiveness which sets them apart from 'big city' families. The rural American in the 1980's is characterized by a wide range of life styles, family structures, patterns of residence and occupations, but a common denominator is the lower concentration, and greater physical dispersity of population. The pervasive urbanization of rural areas has greatly reduced many of the former differences between rural and city life styles, but an analysis of Census data found that rural people marry earlier than their urban counterparts, have more children, and live in larger households. Few rural women work outside the home, and a smaller proportion of marriages end in divorce (Coward, 1980).

A New Kind of Rural Community

Still another related development, is suggested by the appearance and apparent popularity of a number of popular magazines capitalizing on the theme of a simpler, rural life style, including home production and preservation of food, energy-efficient homes and living, and a wide variety of do-it-yourself projects and activities. (Countryside, Rural America, Organic Gardening, Mother Earth News, Dairy Goat Guide, The New Farm, New

Shelter, Small Town, True Seed Exchange, and others). The stated or implied goal of these magazines appears to be self-sufficient living, reminiscent of the traditional image of the family farm. This is sometimes referred to as a revival and nostalgia about life at the turn of the century: 'a mythology engrained in our historical and literary culture which has portrayed, even to this day, country living and family life as unspoiled, pure and wholesome, free from pressures and tensions while set within idyllic gardens and fields.' Completing this romantic version of rural life is frequently the inclusion of the extended family concept as represented by both Grandma and Grandpa who are usually seen as contented sentimentalist, somewhat dull, carefree, and most usually perched on a gently moving swing as they watch their grandchildren frolic and play. (Quotation from Libertoff, K., Helping Networks in Rural Youth and Family Services. Paper presented at the annual meetings of the American Psychological Association. New York, Sep. 1979. Coward, 1980.)

Although we are cautioned against accepting as feasible a return to the mythologized concept of rural living, apparently large numbers of families have purchased homes in rural areas and are engaging in activities and life-style trends which are not inconsistent with the spirit of the romanticized past. If this trend becomes widespread in terms of numbers, it is possible that some of the qualities and characteristics of the former rural lifestyle may again become a part of our culture.

Impact of Rising Energy Costs

Low-cost energy has been an important factor in the shaping of American life styles, as well as in the location of agricultural production, and the technology and resource mixed used in farming and ranching

(Schertz, Another Revolution in Farming, 1979). The critical importance of energy in U. S. agriculture was brought to the attention of U. S. citizens in 1973 by the Arab oil embargo, and subsequent OPEC price increases and natural gas delivery curtailments. The disruption of oil supplies from Iran in 1979 contributed to U. S. shortages of diesel and gasoline supplies. The prospect of further price increases and increased uncertainty of fuel availability have significantly affected U. S. agriculture in recent years and will continue to be an important influence. (Van Dyne, et al. 1979).

Higher energy cost will influence where production will be located, and the mix of resources used in farming. Higher energy costs will inflate transport cost as well as irrigation cost, and will likely encourage a shift of fruits and vegetables from concentrated, irrigated production areas in the West, to producers located nearer to the metropolitan consuming centers of the Northeast. Because farms in Northeast have been smaller than those in the irrigated West, this will probably mean shift in the scale and technology of production of the crops affected as well as in location.

Higher relative energy costs also will stimulate farmers to adjust the mix of resources used in production. In the case of extremely high energy cost, it is possible that present trends toward higher capital use, and larger farms would be reversed, and increased proportions of land and labor be used. (Schertz, Another Revolution in U.S. Farming 1979).

Although there appears to be a unanimous concern with the rising cost and uncertainty about future availability of energy for agriculture,

transportation, family living, etc., relatively little is known about the relative magnitude of the impact on different segments of society. For example, little information is available on the relation between farm size and energy intensiveness; or the relationship between size and energy-related production costs; or about how energy price increases would affect large farms vs. small farms (Humphries, 1980).

The spreading suburban and rural residential lifestyle in recent decades, facilitated by traditionally low motor fuel cost and improved local and interstate roads and highways, also is being affected severely by the sharply-higher and still rising fuel and oil prices. Furthermore, the higher fuel costs sparked by the OPEC petroleum price increases are being felt by all Americans in higher costs of home heating and air conditioning.

Subsequent reaction to increased fuel costs are already seen in the development and proliferation of smaller, more fuel-efficient automobiles, and the phasing out of the large 'gas hogs;' increased popularity of electric fans to reduce use of heavier energy-consuming air conditioning, and wood stoves as an alternative or supplement to oil or electric home heating; and the development of solar heating and cooling technology for residential and commercial buildings, including design of the buildings themselves.

An additional related development, believed to be in part motivated by desire or need to reduce other living costs to be able to cope with increasing energy costs, is the increased interest in home gardens and home preservation of foods, especially fruits and vegetables. The U.S.D.A. Nationwide Food Consumption Survey revealed that 47 percent of American

households reported producing some food for home use; 37 percent reported canning and/or freezing some food for home use. Both percentages reflected a considerable increase from 1965 (34 percent producing some food, and also 35 percent canning or freezing) when a similar survey was made. (Hatfield, 1981).

The New Farm Policy Agenda

After more than a century of concern with low product prices, and farm incomes and related problems of agriculture, phrased in terms of a stereotyped image of a farmer in overalls who earns a living from farming, we are now faced with a different set of problems, and a different farmer. Whereas the concern historically has been for the depressed economic condition of (family) farmers (the production of abundant supplies of food and fiber was assumed), there is now considerable, and growing concern for assuring adequate supplies of food for the nation's population, at reasonable prices. People now talk of 'food policy' instead of 'farm policy.' The farmer today is seen as an educated, technically oriented businessman, and farming as a commercial business enterprise.

Whereas farmers or their representatives (e.g., the Farm Bloc in Congress) in the past have traditionally placed issues involving agriculture on the agenda for public policy consideration, issues on the new 'food policy' agenda are increasingly being placed there for consideration by groups and interests other than farmers. Some of these groups which are pressuring for a voice in national food policy issues are consumers (food costs) environmentalists (population, ecological impact), urban interests (land use, zoning), minority groups (civil rights in

agricultural industries), organized labor (collective bargaining), the 'hunger lobby' (food distribution, food stamp programs), etc. (Paarlberg, Don, in: Ford, Thomas R., 1978).

Another view states that "the farm policy agenda will be initiated, developed and controlled largely outside the traditional agricultural establishment. Food policy will be initiated by the Department of State and other agencies that are concerned with the use of food as a political tool or for humanitarian purposes. Farm Policy, (as distinguished from food policy) will be determined substantially by such agencies as the Environmental Protection Agency, which can have a much more effective way of making supply management a reality in agricultural production." (Wood, in Ford, 1978).

From the traditional agricultural economics perspective, some of the specific issues which might well be on the food and agricultural policy agenda during that 1980's are:

- (a) How can we reduce price and income variability in a more interdependent world market?
- (b) How can we reconcile the private and social costs and benefits of conservation and environmental concern?
- (c) To what extent will government protect returns to land and other fixed assets?
- (d) To what extent will agricultural output be devoted to ethanol production?
- (e) What level of financial support will be given to agricultural research?
- (f) How will public policy be used to shape the structure of agriculture? (Martin, 1981).

In addition to the complexities involved in the diversity of conflicting interests working in the public and legislative arena in forging a hopefully consistent program of activities to resolve these issues,

another group of issues dealing with small farmers and other rural residents, involving the associated fields of rural sociology and community development, will also have to be considered. These issues have much less legislative history and are not nearly as well defined; one of the major tasks will be to identify and define specific issues in terms appropriate for working out practical programs and activities which will resolve or ameliorate the problems, and/or aid in coordinated development.

Such issues will need to focus on questions of social stability, employment, equity, and rural community development. At the center of this focus will be the 'small farmer' and the conditions and needs encountered by this group of the population. (Humphries, 1980).

With the increase in crime and environment pollution, and decline in moral customs among the economically affluent in the U.S. and other 'developed' countries, it is becoming apparent that other than economic values will have to be considered in the development, implementation, and evaluation of public policy, programs, and research involving agriculture and rural areas. Subjective, human values and concepts, such as the psychological and social needs of a community, will have to be considered. As the rural nonfarm sector becomes more important, there will be a further blending/conflict of rural vs. urban, and farm vs. nonfarm values. We may have already reached the point where it is necessary to make a distinction between rural development policy and agricultural policy. (Redman, 1980).

IV. AGRICULTURAL ECONOMICS RESEARCH: WHAT ARE THE PRIORITIES NOW?

During the past century, U.S. research efforts in agriculture have focused on improving production technology, farm firm and institutional structure, and operating efficiency, and public policies and programs, all working toward the objectives of obtaining desired (usually reduced) production, supporting production, supporting product prices, and ultimately to improve net farm income. Billions of dollars have been spent on the development and dispersal of improved agricultural technology through the complex network of the agricultural establishment: the U.S. Department of Agriculture, and the land-grant complex universities, Agricultural Experiment Stations, and the Agricultural Extension Programs.

Although the widespread adoption of the new technology has had social and other impacts far beyond the direct physical and economic results, the corollary socioeconomic effects have been studied accidentally rather than systematically. It has been claimed that:

- (1) Research has been geared overwhelmingly to technology, overlooking and ignoring social consequences;
- (2) The social consequences of this technological research has been to exacerbate and accelerate the shift of population from rural to urban, and to produce an anti-social pattern of income distribution;
- (3) When social research has taken place and threatened powerful interests in agriculture, such tendencies have been cut off;
- (4) California's support for research in agriculture has been even more disproportionately loaded toward the technological aspects than have been the efforts of other states; and
- (5) It is no accident that social researchers on rural society know far more about land reform and related issues of political and social control of rural society outside the United States than they do inside. (Friedland, 1978).

A review of program data for fiscal year 1969 confirms the contention that research activities of the land-grant institutions have focused predominantly on production technology, efficiency of production and marketing systems, integrated food processes, etc. Of nearly 6,000 scientific man-years (smy) dedicated to agricultural research on all projects at all state agricultural experiment stations in 1969 only 289, less than five percent, were specifically for 'people oriented' research (see Table 4).

Table 4. Scientific Man-Years (smy) Dedicated to Specified Areas of Research by Land-Grant Institutions. U.S. FY 1969.

Production and Efficiency-Oriented	People-Oriented
- Improving biological efficiency of crops.....1,125 smy	-Improving rural income.....18 smy
- Control of insects, diseases and weeds in crops..... 842 smy	-Toxic residues in food products from agricultural sources..95 smy
- Ornamentals, turf, and trees for natural beauty..... 200 smy	-Rural housing..... 7 smy
- Improving management systems for livestock and poultry production..... 88 smy	- Improving rural institutions..... 45 smy
- Marketing firms and systems efficiency 68 smy	-Causes and remedies of poverty among rural people..... 17 smy
- Other production and efficiency oriented..... 3,693 smy	-Other people-oriented....106 smy
Total production/efficiency 6,000 smy	Total people 289 smy

Source: Hightower, Jim, and Susan Demarco, "The Land-Grant College Complex," in Rodefeld, R.D., Change in Rural America: Causes, Consequences, and Alternatives. Mosby, 1978.

Those research projects identified as 'Rural Development' involve a much higher 'people-oriented' component, as would be expected, but even for those projects so identified, in Fiscal Year 1976 one-third of the projects and nearly 40 percent of the funds devoted to 'rural development' research by the Land-Grant colleges and experiment stations were for "Economic Development" projects. (See Table 5).

Table 5. Number and Value of Rural Development Research Projects by Types. Land-Grant Institutions, United States, Fiscal Year 1976.

Type of Project	Number	Percent	Dollar Value Per Project	% of Total Dollar Value
Community Services	176	20.5%	\$ 28,343	18.4%
People Building	283	33.0	27,275	28.4
Economic Development	295	34.4	35,831	38.9
Natural Environment	103	12.0	37,903	14.4
Total	857	100	31,717	100

Source: Otto, Daniel, and Joseph Havlick, Jr., Analysis of Rural Development Research Programs in the United States and Southern Region. Virginia PI and State University, Department of Agricultural Economics. SP-79-3. Feb 6, 1979.

In the United States, we have been notably successful in increasing agricultural production and marketing efficiency, as measured in traditional economic concepts such as yield per acre output per worker, per capital income, rate of economic growth, technical efficiency of operation, etc. Although the traditional goal of rural development--to improve rural well-being and quality of life-- may still appropriately be linked with agricultural production, it is becoming apparent that it will be necessary to define these terms in other than the usual economic

concepts. Politicians and the public in general have come to accept the economist's argument that human well-being and quality of life are adequately defined and measured in economic terms; the common response to the statement that "money isn't everything," is: "maybe not, but it's way ahead of whatever is in second place." This attitude should no longer tacitly or explicitly be accepted without challenge in our thinking.

Research Priorities for Commercial Agriculture

Numerous concerns about the changes occurring in commercial agriculture have been aired, and more are being added as more information regarding the changes come to light. Generally, there is increasing concern about the economic, political, sociological, and ecological ramifications of the trend toward fewer but larger farms, and the more intensive use of drugs and chemicals in production, processing, storing, and packaging food products. This area of concern, characterized by striving to understand the interrelationships between and among production practices, marketing systems, the structure of agriculture, and their impacts on ecological and human well-being, is demanding priority for research.

Within this general area, some of the more specific concerns are:

- (1) The impact of the decreasing number of farms on the social, ecological, and economic vitality and viability of rural and urban communities, which is directly related to patterns of ownership, control, use, and distribution of agricultural resources. (Already there have been aggravated social and economic problems, such as unemployment, alienation, inadequate housing and health care, and deterioration of the economic base of both rural and urban communities).

(2) The increased vulnerability and reduced adaptability of commercial agriculture to natural disasters, large-scale insect and disease attacks, disruptions of energy supplies, soil erosion and soil depletion, depletion and pollution of water, and contamination of food by agricultural chemicals; resulting from the specialization and technification of agriculture.

(3) The impact on the nation's economic and political institutions of the increasing concentration of ownership and control of land and other agricultural resources in the hands of few and fewer individuals and/or corporations. (Madden and Fischbein, 1979).

In addition to concerns related to these structural and technological changes, these are concerns regarding the relevance of some of the concepts and tools traditionally used in the description, analysis and assessment of agricultural related issues.

In his Presidential Address at the annual meetings of the AAEA in 1975, James Bonnen called attention to the growing obsolescence in the concepts which the agricultural data system attempted to measure. Although the "family farm" with all its value and organizational assumptions constitutes the central concept around which three-fourths of our agricultural statistics are designed and collected, the structure of the food and fiber industry today only vaguely resembles the structure that prevailed when the concept was created more than fifty years ago (Bonnen 1975).

Sehah (1976) speaks of the "new macroeconomics of agriculture," involving basic and substantial changes in former trends, such as the out migration from agriculture, a more open U.S./world economy, and

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the emergence of a new structure of agriculture and rural/urban society in the U.S. (Schuh, 1976).

Although concerns regarding small, family farms have been expressed frequently and insistently, it has been generally assumed that research is 'scale neutral,' and that technology developed for larger farms is equally beneficial to small farmers. (Caldwell, 1978). However, data now coming to public view indicates that large-scale commercial farms have received the major share of the benefits from new technology developed by research. Because of more limited land, capital and labor and lack of access to input and product markets oriented to serve large-scale agriculture, together with lack of information, inability to deal with price and yield risks, and other conditions associated with small-scale agriculture, small farmers have realized few of the benefits from new, labor-saving technology. (Schuh, 1976; Humphries, 1980).

A major thrust of agricultural research probably should continue to focus on the technological, biological, and economic efficiency of agricultural production, marketing, and processing, recognizing agriculture's essential role in providing food and fiber for the world's people. The focus of research might be enlarged somewhat, however, to include some of these current corollary areas of concern, which in the long run may have a significant impact on the fulfilment of agriculture's basic function. An appropriate perspective for the overall agricultural research program 'mix' is suggested by CARET (Committee for Agricultural Research, Extension, and Teaching.) In its recommendations in support of an increase in the federal budget (FY 1981); for agricultural research, extensions, and teaching, CARET emphasized three priority areas for

research:

(1) Biological mechanisms of animals, crops, and forests photosynthesis, nitrogen-fixation, genetic modification, reproductive efficiency, and insect and disease control;

(2) Food safety and quality;

(3) Assisting rural families to adjust to changing economic and social conditions, (CARET, 1980).

The first two of these areas would apply principally to large-scale commercial agriculture, while the third would apply mainly to the 'small' or 'limited resource' farmers.

This recommendation reflects the current emphasis on research interests of the land-grant colleges and experiment stations, which CARET represents, and indicates that the principal emphasis of agricultural research is still on technology and economic efficiency, while recognizing the importance of, but implicitly assigning lesser priority to, the socioeconomic conditions of rural families. The principal emphasis on technology/economic performance was underlined by the U. S. President's statement in his budget message for FY 1981 that "long-run economic growth depends critically on technological development." (CARET, 1980).

Research for Small Farm Agriculture

Ever since the days of Thomas Jefferson, the expressed intent of the nation's agricultural policy has been to support family farms, particularly small farms. Despite expressions of concern and support by both agriculturalists and statesmen, the design and implementation of public programs has gradually undermined the economic and political support structure of a system of agriculture and rural communities based on

land-owning family farmers. Recently a widening array of interested groups of citizens have begun to express alarm over the discrepancy between the avowed intent and the ultimate effect of public policy to achieve the goal of supporting family-owned and operated farms. This increased awareness has created a climate in which the value of small-scale family farms is being reassessed and reaffirmed.

The increasing emphasis being given to small farm agriculture, augmented or accompanied by the recent new phenomenon of population movement to rural areas, makes it imperative that agricultural economics research include more of what has been perfunctorily left to the sociologist. In addition to the question of the impact of changes in commercial farm size on the rural community, and vice versa; they are faced with other questions regarding the characteristics of the new rural residents and their lifestyle, and associated economic and social impacts on the rural social and business community.

This means more emphasis on rural development, as distinguished from technological, biological, and economic efficiency, in agricultural economics research involving these small farms. Rural development research should not replace, but should supplement present research activities; to focus attention on the interaction of the information obtained from technological, biological, and economic research with the economic and social environment in which this information is put to use. Although the current political administration has thus far been silent about rural development policy, it seems inevitable that this kind of research will again become high priority. It would seem to be prudent strategy to seriously consider this kind of research activity in

developing new research projects, in order to be ready with some results when rural developments moves into a high priority position. (Day, 1981).

The principal general area of concern regarding small farm agriculture involves questions related to the characteristics and viability of small, family-type farms, framed in the context of the overall structure of agriculture and the complex set of interconnected casual factors.

Within this general area, there are a number of more specific areas of concern:

- (1) The impact and meaning of the changing structure of agriculture on rural communities; including the disappearing "middle sector";
- (2) Quality of life issues, including evolving new lifestyles, energy use and costs, off-farm incomes opportunities, nutrition, health and rural community services;
- (3) Ecology/environmental issues: soil and water conservation, pollution, etc.
- (4) The economic viability of small, family-type farms; appropriate social and economic goals, objective function(s), and technology; optimum resource or product mixes; means of dealing with yield and price risks; and the impact of government policies and programs on small farms;
- (5) The problems of markets and marketing faced by small farmers; alternative marketing channels, approaches, techniques, market information on market conditions, prices, and consumer preferences; market development methods, techniques, restrictions, and requirements; production/harvesting/marketing requirements, practices, and methods; market power, competition, monopoly, etc.

A large number of more specific questions or issues, concerning small farm agriculture and associated rural community life have been suggested or mentioned as concerns and/or need for research, some of which fall clearly within one of the general areas mentioned above, and some which cut across two or more of them. A number of these questions are included in the appendix.

Rural Development Research: U.S. and Developing Countries

Many of the conditions of small farms in the United States are similar to those found in developing countries; the principal differences are in technologies commonly employed by farmers, the physical environment (especially resource constraints), and priorities. Research goals of developing countries, which receive major research input from the U.S. agricultural establishment, have been focused on the usual pressing need to increase agricultural production to meet domestic food and fiber needs. Through a wide variety of foreign assistance efforts over recent decades, the emphasis of research in developing countries has been on transferring technology developed and used in the U. S. to the LDC's, hoping to reproduce the techniques and benefits of the "Great American Agricultural Success Story" in these countries.

Experience in some developing countries, however, indicates that new improved technology, training of personnel, and improvement of institutional, educational and research capabilities are not necessarily sufficient to increase agricultural production. After 18 years of technical assistance to Peru, average potato yields increased only 6 percent, even though the results in terms of technology introduced and developed, the educational and research facilities and capabilities established, and number of persons trained were impressive. (Eastman, 1976).

In the case of Peru, it was indicated that the political element (and implicit social customs and institutions) was not adequately involved in the development process; development (in this case, indicated by increased production) is dependent on a number of distinct but inter-related elements, all of which must be in place for development to occur.

(Eastman, 1976).

One of the essential elements often mentioned as lacking in LDC's is the effective institutional and physical infrastructure for marketing agricultural products and production inputs. In his comments on priorities for research and training in agricultural marketing in developing countries, H.J. Mittendorf emphasizes "the important role played by the marketing system as a stimulating and dynamic force in agriculture, particularly for small farmer development." Mittendorf also suggests that, "Since the problems (connected with the planning or marketing organization and management at micro-level under different socio/cultural situations) are of a complex nature and are related to technical, economic and other aspects of behavior, a multi-disciplinary approach is needed which requires....a common conceptual reference framework for development of the participating disciplines such as economics, anthropology, sociology, and geography, which is still lacking." (Mittendorf, 1981).

Although agricultural production and marketing conditions found in developing countries may be at an earlier stage of development compared to those found in rural USA, the basic problems and issues appear to be very similar, and the same approach to analysis might well be appropriate in both.

The "farming systems" concept may provide an appropriate conceptual framework for such a multi-disciplinary approach to research on small farm agriculture in the U.S. (Norman, 1980). This approach was implemented by ICTA in Guatemala under a Rockefeller Foundation sponsorship, and is currently in the pioneering stage in Florida. (Hildebrand, 1978, 1981).

V. SUMMARY AND CONCLUSIONS

The paper examines the concept of the small farm from other than the conventional production/efficiency viewpoint, in order to present a clear, up-to-date perspective for research efforts. This is done by means of a review of literature and census data on the socioeconomic, policy, and environmental issues confronting farm and rural families today.

Historically, U.S. public farm policy has focused on the issues of assuring adequate supplies of food and fiber for the national population and improving the economic well-being of the producers of these products, (farmers and their families), who chronically realized substantially lower incomes than urban families. Public farm education, research, and extension programs have concentrated on solving these problems, and have succeeded in remarkable degree ("The Great American Agricultural Success Story"). "Excess" labor has moved out of agriculture into other occupations, farm productivity has increased so that there are abundant supplies of farm products for the U.S. population and for export, and farm family incomes are now at par with those at non-farm families.

A new group of issues concerning small, family farms, and rural communities are demanding public attention, however, and some of these are suggested as potential areas for agricultural economics research:

- (1) Less than one million commercial farms now account for 93 percent of all farm product sales; another 1.5 million "small", or "limited resource" farms produce the remaining seven percent.

- (2) There are an additional five million owners of ten or more

acres, and 26.5 million owners of one to nine acres, with unknown agricultural potential; in total, about one-third of the U.S. population apparently lives on a parcel of land of an acre or more.

(3) A net movement of U.S. population from urban to rural areas is occurring, suggesting development of new rural communities.

(4) More than one-half of farm family income comes from off-farm sources; a much larger share of small farm income comes from off-farm.

Conclusion: There is substantial need and opportunity for research in the areas of small farms and rural development. Although it is important that a major thrust of research continue to focus on the technological, biological, and economic efficiency of production, marketing, and processing of agricultural products, increased emphasis and higher priority is needed for research dealing with issues involving conditions and changes of small farms and associated rural communities.

Major areas of concern, and need for research include:

- Questions on the viability of small, family-type farms in the context of the changing structure of agriculture and the complex set of interrelated casual factors and impacts.

- Appropriate technology for small farm agriculture, including optimum resource and enterprise mixes for small farms; appropriate objective functions; social and economic goals; and means of dealing with yield and price risks.

- Problems of markets and marketing infrastructure faced by small farmers; alternative marketing channels and techniques; and information of market potential, conditions, and prices; and information

on consumer preferences.

- The impact of the changing structure of agriculture and the urban-rural trend on rural communities, including employment issues, community, social, and health services needed, etc.

- Quality of life issues, including the evolving new lifestyles, nutrition and health issues; energy use, sources, and costs; environmental pollution issues, etc.

New concepts and methodologies need to be developed and clarified. The wide spectrum of causative factors and impacts involved in studying and developing programs or activities dealing with today's issues suggest the need for the participation of a number of different professional disciplines in the analysis of problems; and in the development of relevant policies, programs, and activities to improve conditions or to guide economic and social developments. The farming systems approach described by David Norman and Peter Hildebrand may provide an appropriate conceptual framework for a multi-disciplinary approach to research on small farm agriculture, both in domestic and developing country settings.

This appears to be a fertile field for the 1890 schools to cultivate, given their historic orientation toward small farm problems, in developing and implementing research projects and programs which are focused on issues with high priority for a large proportion of the country's population--and which have an appeal to research funding agencies.

APPENDIX

Questions and issues concerning small farm agriculture and rural community life suggested for research. (This is not intended to be an exhaustive list, but an indication of the number, nature, and scope of the issues and needs which have been made public).

- (1) The declining quality of rural life.
- (2) The impoverishment of limited resource farmers.
- (3) The human, social and ecological impacts of economic and technological efficiency.
- (4) The disappearing 'middle sector' of family farms, and aspect of the new structure appearing in U.S. agriculture. (Madden and Tischbein, 1979, issues 1-4).
- (5) How small farmers are affected by government policies on pollution, energy, taxation, and income supports.
- (6) How limited resource farmers can enter and compete for markets developed for volume movements, government and commercial contracts which require strict adherence to quantity and quality standards, standardized containers and weights, and other government regulations.
- (7) What is (are) appropriate objective function(s) for small farm agriculture? What is an optimum resource use or product mix for small farmers?
- (8) How can small farmers deal with yield and price risks?
- (9) Information is needed on how to market products of small farms; methods and practices of picking, packing, displaying, and pricing products for local sales.

(10) Information on consumer preferences, local market conditions, means and methods of promotion and publicity.

(11) Information on potential reaction by established retailers to competition from small farmers.

(12) Sources and methods of supplementing farm income by off-farm employment, aggregation (cooperatives, processing, storage, etc.) (Mathis and Proctor, 1979; issues 5-12).

(13) Research to predict the impacts on various types of small farms, of policy alternatives for price, income, taxation, farm credit programs, etc.

(14) Research on how conventional and alternative marketing channels can hinder and/or enhance small farms.

(15) Evaluation of alternative approaches for providing technical and marketing information to small farms.

(16) Determination of descriptive and casual aspects of the structure of the small farm sector of American agriculture, including resources, opportunities, constraints, and aspirations of small farms, and the impacts on rural communities.

(17) Interdisciplinary studies on the processes underlying the nature and scope of agricultural research and extension, including policy decision-making, systems of professional rewards and incentives, funding levels, and the impact of research on the small farms.

(18) Research on economics of farm size, taking into account the full array of appropriate technology available (including used equipment, custom hiring, cooperative arrangements for use of machinery), organic farming, and other alternative approaches. Research should recognize that many small farms depend heavily on off-farm income for their

livelihood, and for farm growth and operating capital. The need for actual farm data is imperative, to learn what small farms are actually doing. (Madden & Tischbein, 1979; issues 13-13).

(19) Information about the state of the arts and research findings about marketing alternatives for small farmers.

(20) Information on developing markets for small fruit and vegetable producers.

(21) Identification of factors restricting market access, evaluate methodology for finding ways to alleviate market restrictions.

(22) Market power has been concentrated among a few buyers, e.g., over 70% of all food is sold through 15% of the retail stores; over half of the canned fruit and vegetables and two-thirds of the frozen products are processed by 20 firms--mostly contracted, leaving the small grower without a market.

(23) Increasing energy costs coupled with an increasing concern (among consumers) about food prices and nutrition have generated a renewed consumer's interest in locally produced fresh fruits and vegetables. Volume is still small--about 2 percent of total fresh fruit and vegetable marketed via direct farm-to-consumer channels. In 1976 there were an estimated 3,000 pick-your-own operations, 9,000 roadside markets, and over 550 farmers' markets.

(24) Recent interest among consumers to keep food bills as low as possible and a renewed interest in freshness and nutrition have stimulated direct marketing. (Free, 1979; issues 19-24).

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