Maintaining the Cutting Edge

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Editors: Cara L. Mitchell
Kim B. Anderson

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Measuring the Interdependencies of Agriculture and Rural Communities

Gerald Doeksen and Mike Woods

The farm crisis is well publicized and most everyone is aware of the severe problems faced by many farmers. The impacts of hard times on farmers are also affecting rural communities and businesses. The fiscal problems created by declining agriculture on rural communities and businesses have been slower to surface but are beginning to receive public attention. For instance, a recent U.S. Senate subcommittee (Senate Subcommittee, 1986, pp. 1-2) report on intergovernmental relations states that:

> "The human face of the farm crisis has also been the subject of much attention, including dark stories of personal losses and family tragedy. That these dimensions of the farm crisis command center stage is not surprising. But, they are only the first tier of effect from a declining agricultural economy. The farm crisis threatens rural America in other less immediate ways, ways which are far less obvious but potentially as serious. Many rural communities are now questioning whether they will survive the financial stress brought on by declining farm incomes."

The study concludes that:

> "small town officials are being faced with a choice between higher local tax rates, or lower quality schools and other local services." (Senate Subcommittee, 1986, p. 2)

Another illustration is an article in the September 8, 1986 issue of Time. It states:

> "Teachers, merchants, veterinarians, and mechanics from the small towns link the farmers and help orchestrate community life. For the moment, some of the small towns are in more distress than the farmers. The government provides no subsidy for grocers and dry good merchants. Publisher Alan Smith of Mount Ayr, Iowa (pop. 1,900) used to run two-thirds of a page of delinquent taxes in his Record-News every year. Now he runs six or eight pages. How long before his Ringgold County must yield on the quality of its schools and public services?"

The Subcommittee report and the article in Time illustrate the severe problems in rural communities as a result of the farm crisis. This paper shows how the decline in the number of farmers will affect, or is affecting, rural communities. In addition, comments will be made about how extension and research must link together to address the crisis in rural communities.

The Linkage Between Agriculture and Rural Communities

To illustrate the linkages between agriculture and rural communities, a community simulation model was applied to a typical rural county and community. Pawhuska, Oklahoma was selected and it is located in North Central Oklahoma and is the county seat of Osage County. This community, 56 miles north of Tulsa, is the main business and service center for most county residents. The population of Pawhuska in 1980 was 4,771 with a total county population of 39,327. From 1980 to 1985, Pawhuska's population increased by 4.8 percent and Osage County's population grew by 5.5 percent. In 1984, there were 1,269 farm proprietors and 1,653 wage and salary farm workers in Osage County. Beef cattle from cow-calf operations were the predominant agricultural enterprise and livestock sales accounted for 93 percent of all agricultural sales in 1984. The primary crops in 1984 were wheat and hay.

The simulation model used to link agriculture and rural communities is a recursive system of equations with an input-output model as its basic component. Location quotients and a gravity model are used to make the model community-specific. The driving forces behind the model are the final demand equations. As changes occur within a community, they cause changes in output and employment.[1]

Community Simulation Model Results[2]

The Pawhuska simulation analysis used to link agriculture and rural communities was run under two scenarios. One to develop a baseline, while the other assumed that about 20 percent or 200 farmers would go out of business in 1986. This percentage was chosen because agricultural economists working with depressed farmers in Oklahoma have projected that 20 percent of the farmers are in financial trouble and will go out of business in the near future. The reduction in number of ranch or farm proprietors is treated differently than an industrial plant going out of business. The main difference is that when a farmer or rancher is forced out of business, a new farmer or renter works the land and agricultural production continues. New owners' agricultural input purchases may differ slightly, but total impact will change little. Agricultural production may even increase if the new operators are more efficient. Thus, the linkages with the agricultural input sectors will not change much. The major impact is that 200 fewer families will be purchasing goods and services in Pawhuska. Since the community has a very limited industrial base, jobs for displaced farmers will be difficult to find in the area. It was assumed that unemployment would increase to 10 percent and that out-migration would begin to occur at that point. Based on these assumptions, employment, population, and selected community service data are presented for each scenario.

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[1] For an overview of the model, see Appendix A. For a complete, detailed description of the model, see Drs. Woods and Doeksen.

[2] This section of paper is taken from Doeksen (1987).

Employment

Employment projections for the baseline, or Scenario 1, are presented in Table 1. Under baseline conditions, which place a large emphasis on what has occurred over the past 10 years, employment is projected to be very stable from 1986 through 1990. In general, agricultural and mining employment are projected to decrease slightly, while the government sector is projected to increase slightly. The employment projections under Scenario 2, or the assumption that 200 farm families will exit agriculture, are presented in Table 2. Total area employment is forecast to drop by 346 jobs in 1986 and 478 jobs by 1990. This drop is shown in Figure 1. The model predicts that it will take time for the main street businesses to feel the impact, with marginal firms going out of business during the early years. After these fail and economic activity further declines, other less marginal firms will see the impact in later years.

Population

The impact of the reduction in population for Pawhuska and the service area is presented in Figure 2. The population of the service area is projected to remain stable in Scenario 1, with 21,857 in 1985 and 21,807 in 1990. With the reduction of 200 farm proprietors in 1986, service area population in Scenario 2 is expected to decrease from 21,807 in 1985 to 20,306 in 1990 and Pawhuska population from 4,683 in 1985 to 4,303 in 1990. Some residents will lose their employment due to fewer farmers and closing main street businesses and will be forced to move to jobs in urban areas.

Selected Community Services

The reduced number of farm proprietors will affect the employment and population of Pawhuska. In addition, the community will have to adjust to the projected decline in revenue and services. Illustrations of decreased usage for selected community services are presented in Table 3. Water usage is projected to decrease from baseline usage (Scenario 1) by 1,987,200 gallons in 1986 and 9,108,000 gallons in 1990. Fire and ambulance calls are also expected to decrease.

Estimates of water and solid waste revenue reductions are presented in Table 3. The impact is over $5,000 in 1986 and over $28,000 in 1990. These numbers do not seem large, but if the reductions in sales tax and other taxes are added to these declines, community decision makers will face a host of difficult decisions as they reduce services to stay within their budget.

Summary Comments

The above example illustrates vividly the relationship between the economy of the farmers and ranchers and the impact on the rural community. Another important point is to realize that this is not an isolated case. The USDA, in a study that classified counties identified 720 counties in the U.S. as farming-dependent (Bender et. al.). Counties dependent on farming account for 29

TABLE 1

BASELINE EMPLOYMENT FIGURES FOR PAWHUSKA SERVICE AREA, 1972-1990

Type of Employment	Year							
	1972	1980	1985	1986	1987	1988	1989	1990
Proprietor Employment								
Farm	1,138	1,092	972	968	963	959	955	951
Non-Farm	686	866	889	892	896	897	898	899
Wage and Salary Employment								
Agriculture and Mining	496	1,228	1,510	1,503	1,494	1,490	1,483	1,477
Construction	256	450	541	551	563	574	586	598
Manufacturing								
Nondurables	429	348	288	277	267	257	248	239
Durables	86	277	307	315	324	332	340	349
Transportation and Public Utilities	205	317	390	407	425	443	462	482
Wholesale and Retail	1,625	1,440	1,328	1,307	1,287	1,266	1,247	1,227
Finance, Real Estate and Insurance	401	303	231	219	207	197	186	177
Services	1,470	1,284	1,156	1,134	1,112	1,091	1,071	1,052
Government	926	1,243	1,406	1,441	1,477	1,514	1,552	1,591
TOTAL	7,718	8,848	9,018	9,014	9,015	9,020	9,028	9,042

TABLE 2

PROJECTED EMPLOYMENT FOR PAWHUSKA SERVICE AREA 1986-1990 GIVEN LOSS OF 200 FARM FAMILIES

Type of Employment	Year				
	1986	1987	1988	1989	1990
Proprietor Employment					
Farm	763	757	751	745	736
Non-Farm	870	870	875	870	858
Wage and Salary Employment					
Agriculture and Mining	1,489	1,487	1,477	1,467	1,455
Construction	549	521	569	569	575
Manufacturing					
Nondurables	269	263	251	240	228
Durables	314	295	317	334	336
Transportation and Public Utilities	398	416	423	449	464
Wholesale and Retail	1,301	1,283	1,251	1,240	1,218
Finance, Real Estate and Insurance	212	201	191	180	168
Services	1,107	1,098	1,069	1,042	1,012
Government	1,396	1,455	1,463	1,497	1,514
TOTAL	8,668	8,646	8,637	8,633	8,564

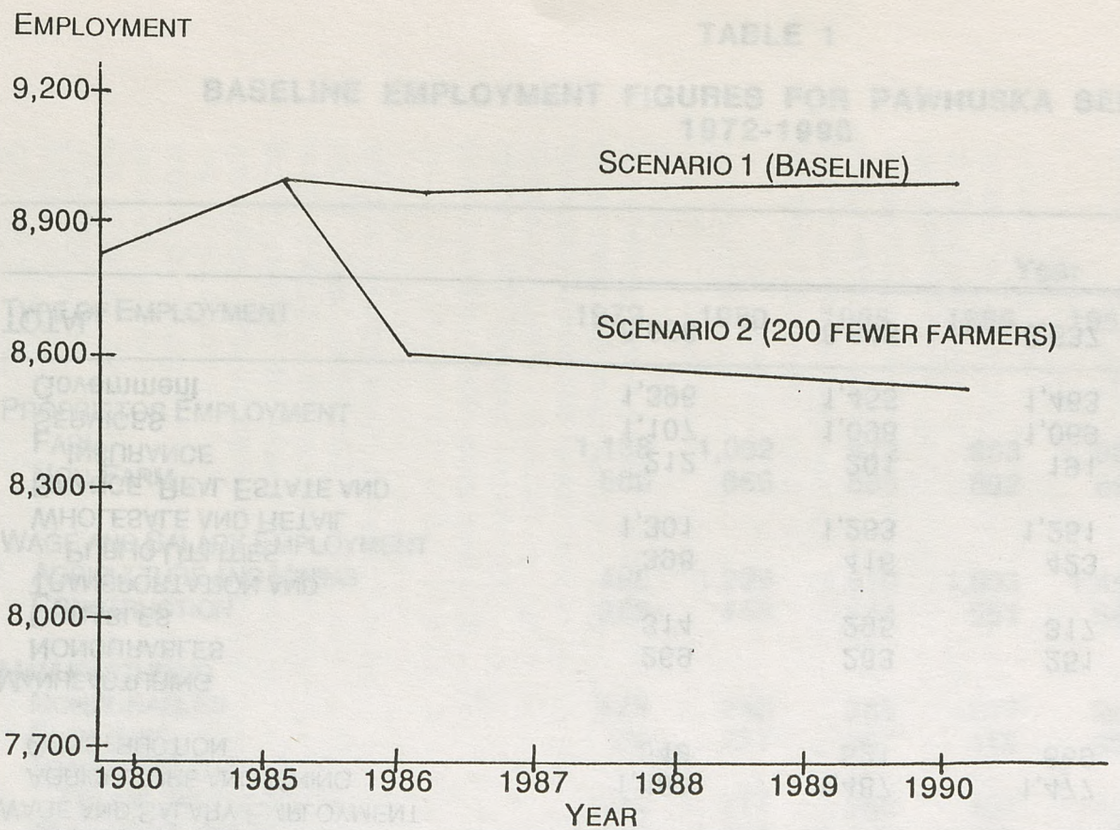

FIGURE 1. ESTIMATED EMPLOYMENT IN PAWHUSKA SERVICE AREA

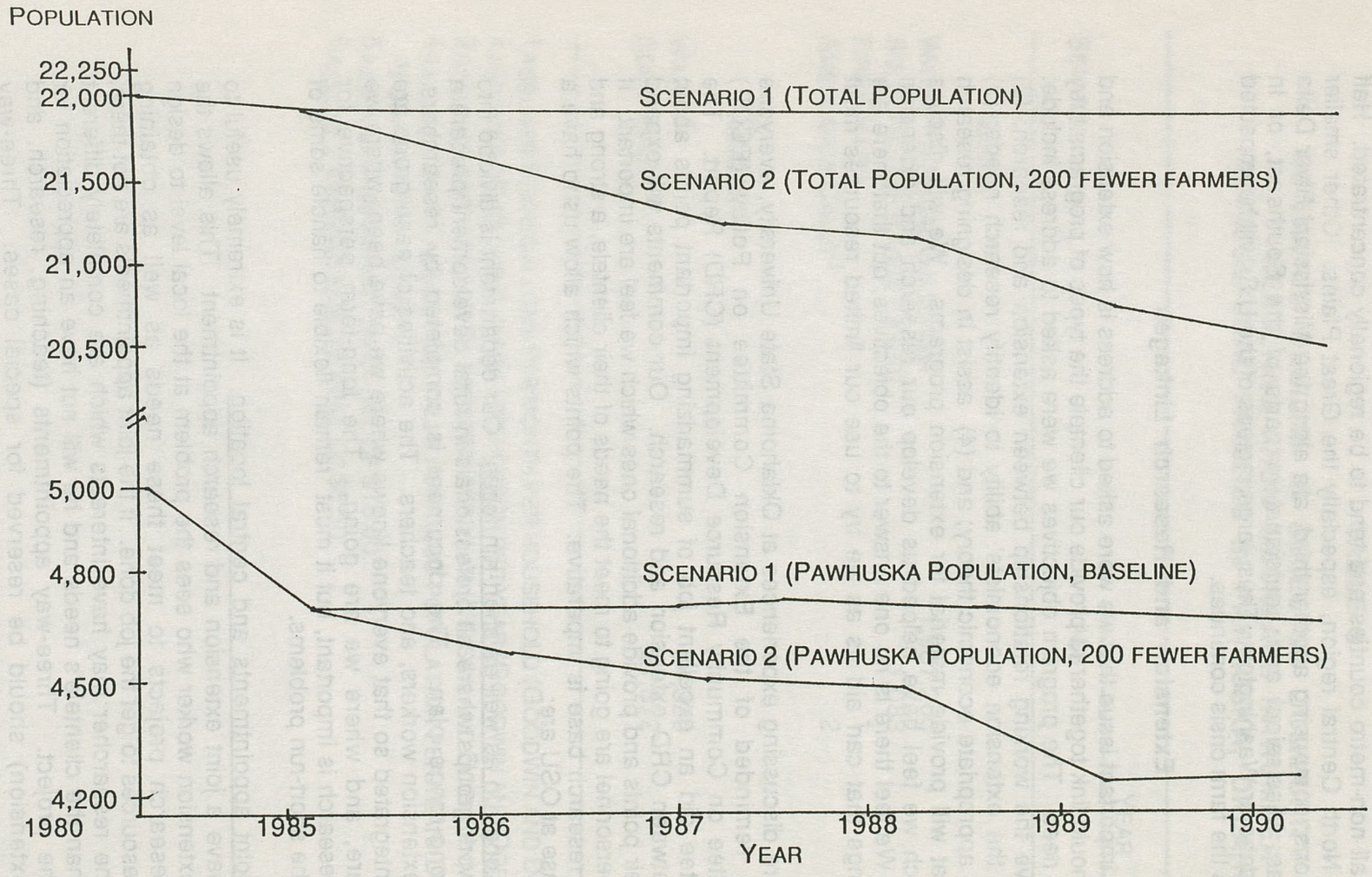

FIGURE 2. ESTIMATED POPULATION FOR PAWHUSKA AND SERVICE AREA

percent of all non-metro counties and tend to be regionally concentrated. Half are in the North Central region, especially the Great Plains. Other smaller concentrations, comprising another third, are along the Mississippi River Delta in Arkansas, Mississippi and Louisiana, in parts of the Southeast, or in Montana, Idaho or Washington. Thus, large regions of the U.S. will be impacted severely as the farm crisis continues.

Extension and Research Linkages

One important issue that we were asked to address is how extension and research should link together to provide our clientele the types of programs they desire and need. The program objectives we were asked to address include: (1) improve the working relationship between extension and research; (2) strengthen the extension economists' ability to identify research needs; (3) identify the appropriate economic theory; and (4) assist in designing research projects that will provide material for extension programs. We will discuss issues which we feel have helped us develop our research and extension programs. We feel there is no one answer to the objectives, but that there are several things that can aid us as we try to use our limited resources most efficiently.

Before discussing experiences at Oklahoma State University, everyone should be reminded of the Extension Committee on Policy (ECOP) Subcommittee on Community Resource Development (CRD) Report. The subcommittee did an excellent job of summarizing important points about linkages between CRD extension and research. Our comments will expand some of their points and provide additional ones which we feel are important. If extension personnel are going to meet the needs of their clientele, a strong and continuous research base is imperative. The points which allow us to have a research base at OSU are:

1. Long-run as well as short-run focus. Our department is divided into work groups where all professionals in rural development prepare a long-range plan. The document is completed by researchers, extension workers, and teachers. The activities of each group are integrated so that everyone knows where we have been, where we are, and where we are going. The long-term perspective for research is important, but it must remain flexible to handle some of the short-run problems.

2. Joint appointments and central location. It is extremely useful to have a joint extension and research appointment. This allows the extension worker who sees the problem at the local level to design research projects to meet these needs as well as obtaining resources to get the job done. If the joint appointments are not there, the researcher may have interests which are completely different than the clientele's needs and he will not have an appreciation for the project. Three-way appointments (teaching, research, and extension) should be reserved for special cases. Three-way

TABLE 3

ESTIMATED DECLINE IN SELECTED COMMUNITY SERVICES RESULTING FROM DECREASE IN NUMBER OF AGRICULTURAL FAMILIES IN PAWHUSKA, OKLAHOMA

Service	Year 1986	1990
Usage		
Water[1] (Annual Gallons)	1,987,200	9,108,000
Solid Waste[2] (Cubic Yards)	1,083	5,024
Fire Calls[3]	1	6
Ambulance Calls[4]	2	10
Revenue		
Water[5]	$4,320	$19,800
Solid Waste[6]	$1,872	$8,580

[1] Assumes 6,900 gallons per month per household (Goodwin and Doeksen).
[2] Assumes 16.42 cubic yards per person per year (Goodwin and Doeksen).
[3] Assumes one fire for 54 persons per year (Nelson and Doeksen).
[4] Assumes 34.25 ambulance calls per 1,000 population per year (Doeksen, Anderson and Lenard).
[5] Assumes average monthly bill of $15.00.
[6] Assumes average monthly bill of $6.50.

appointments may spread the individual in too many directions. It is also very important that professionals be housed together. In fact, researchers and extension personnel should be next door. With extension on one floor and research on another, communication is not what it would be if they were next door to each other. By all means, extension and research should be in the same building and mechanisms should be instigated to make sure they see each other often (such as a joint coffee room). In our opinion, effective extension and research linkages cannot be arranged if research and extension are in different buildings or worse yet, in different communities.

3. Link with clientele. We feel that it is crucial that a good extension and research program have links with clientele. This may be formalized with a committee structure as is the case at OSU or it may be informal. Our formal arrangement is a county committee system where local people present their concerns. This is aggregated into district and state committees and reports. Equally important are the informal arrangements where extension and researchers interact with local decision makers, listening to their problems and concerns. This may be done at association meetings such as those for county officers or just through regular meetings. It is important to listen and then relate what is heard to a researchable project. Again, the joint appointment allows the researcher direct access to extension clientele and further supports joint appointments.

4. Work with other agencies. Community development work is different from agriculture in that we have many agencies and departments out there also trying to help local leaders. There is more than enough work to do, so rather than compete, a joint working arrangement should be developed. We have developed strong ties with many agencies. In fact, when we deliver many of our extension programs, we have other agencies as co-sponsors and if we produce a written report, we make them a co-author. This type of trust and relationship makes everyone happy and is a must. Personnel from these agencies become some of our strongest supporters and will often help us gather research data, get us grants, or assist us in getting grants.

5. Aggressively seek grants. Our program is where it is because we have been very aggressive in seeking grants. With tightening budgets at the federal level and hard times in many states, we can not expect new positions or increased funds for research and extension. Funds can be used to support research projects which directly fill a local need. These are often very applied projects funded by state agencies. Again, the working relationship discussed above has opened these doors. Since CRD personnel are limited, it is also crucial that the Regional Centers and USDA fund research that is regional or national in scope. Many states do not have researchers, thus their research base must come from other states,

the centers, or USDA. Even states with resources must share with everyone to insure that our limited resources are used efficiently.

6. Regional and national networks. We have developed programs from other professionals as well as shared our programs with others. For instance, we have borrowed heavily from Wisconsin in building our economic development program and others have borrowed heavily from OSU regarding our community service programs. The centers and others need to continue to support regional and national seminars, workshops, and projects. It is imperative that we share research and extension knowledge.

7. Reward system. Regardless of the format used, it is important that there is an adequate reward system. Our administrators have been good to us and have rewarded extension and research. If an institution has a publish or perish philosophy, the extension component may suffer. Likewise, if the other extreme is in place the research component will suffer.

8. USDA linkage. The research efforts of the USDA have been very useful to developing the community facilities extension program at OSU. We are concerned about the fact that there are no ERS personnel in the field and how we can have input to guide the research efforts of ERS and USDA. We do not mean to dictate their efforts, but to provide input regarding national and regional programs that many states need but can not conduct themselves.

Extension Programs for Rural Communities

This paper illustrates that rural communities will have serious adjustments in the coming years. It further illustrates the vital importance of extension/research linkages. This section of the paper attempts to illustrate how we are working with community leaders as they make adjustments. Our research base as well as research from others has allowed us to develop three specific programs which may help local decision makers. These include economic development planning, assisting community businesses, and planning community services.

Planning Economic Development[3]

If community leaders decide they do not like the results as predicted by the simulation model, they may wish to attempt to expand their economic base. Extension personnel can assist leaders in organizing for economic development, analyzing resources, and developing appropriate economic strategies. Leadership training and organizing an economic development team are activities which a practitioner may undertake in the organization phase.

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3 This section of our extension program borrows from information obtained from Wisconsin.

During the analysis phase, practitioners may wish to provide background economic data, conduct an economic base study, complete an impact study or a retail sales study. Assisting community decision makers in delineating a community economic development strategy is another activity with which the practitioners may be involved. The practitioner may also be involved in various community economic development strategies. For example, the practitioner may train a team to work with local industries and businesses with the goal of retaining an expanding them. Another example would be to train an industrial recruitment team. This has been a high priority in Oklahoma in recent years. Extension educational programs have been eagerly received and the existing research base has been very useful. Many current research activities are a result of the needs identified through extension economic development activities.

Assisting Community Business[4]

The simulation model indicates that rural businesses will face declining sales if farmers move and the economic base is not expanded. Educational programs to help the local business community are extremely important. Some examples include:

1. effective advertising techniques
2. effective customer relations;
3. consumer opinion surveys;
4. time and office management;
5. financial management; and
6. inventory management.

The purpose of these programs is to make the local businesses more competitive and thus, more profitable. This is an important part of over-all economic development efforts in a rural community.

Planning Community Services

The simulation model also projects estimates of community service usage and revenue. Community development practitioners can use this information to assist community leaders in planning community service delivery systems. Alternative delivery systems for community services can be presented with related costs. For example, fire protection or emergency medical services may have to rely on volunteers rather than an existing delivery system with paid personnel. Practitioners can help prepare budgets for these alternative delivery systems for local decision makers. Another example is the combining of some county or community services. A good example is sharing a landfill. Again, a practitioner can assist in preparing budgets of alternative systems. In addition,

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[4] This section of our program borrows from researchers and extension professionals in Texas and Iowa.

budget information is extremely important to local decision makers as they plan community services. The model can provide this data to help leaders develop alternative revenue sources.

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Appendix A

Summary of Oklahoma Simulation Model

The simulation model was originally developed in Oklahoma [4]. The model has been used by Community Development professionals in Oklahoma and Texas. The data necessary for the operation of this model are divided into five accounts: an economic account, a capital account, a demographic account, and municipal accounts for community services and community revenue. The accounts are then linked through a series of equations. Figure A1 presents an overview of the accounts.

The economic portion of the model is the driving force. It includes a community specific input-output model and a gravity model. The gravity model is used to determine the service area of a community, based on population levels and distance to nearby communities. A location quotient technique is applied to a regional or state input-output model to derive a community specific input-output model. The community model is made dynamic through the use of equations which predict final demand over time.

The capital account allows for the simulation of investment and its effects on the economy. Capital transactions by industry sectors are included in the capital coefficient matrix. Capacity levels and capital-output ratios describe the relationship between capital investment and industry output. The capital data are related to the inter-industry information included in the input-ouput model.

The demographic account contains information on community population. A gravity model (based on distance to other communities and population) is utilized to estimate the community service area. A cohort survival sub-model predicts population by age-sex categories based on birth rates, death rates, and migration. Population information is stored for both the community and the service area.

The community service account contains usage coefficients for services provided in the community. Services analyzed include hospitals, clinics, emergency medical services, fire protection, water, sewer, and solid waste. Community requirements for each of these services are estimated based on model output. The community service information is based on research conducted for each service in Oklahoma.

The revenue account provides projections of local revenue by sources such as sales taxes, licenses, permits, and user changes for various services. The revenue projections are based on community specific revenue data available for Oklahoma communities.

Figure A2 presents an overview of major computations contained in the model. The economic account contains a local input-output model. Equations for each category (households, capital investment, inventory change, federal government, state and local government, and exports) predict final demand

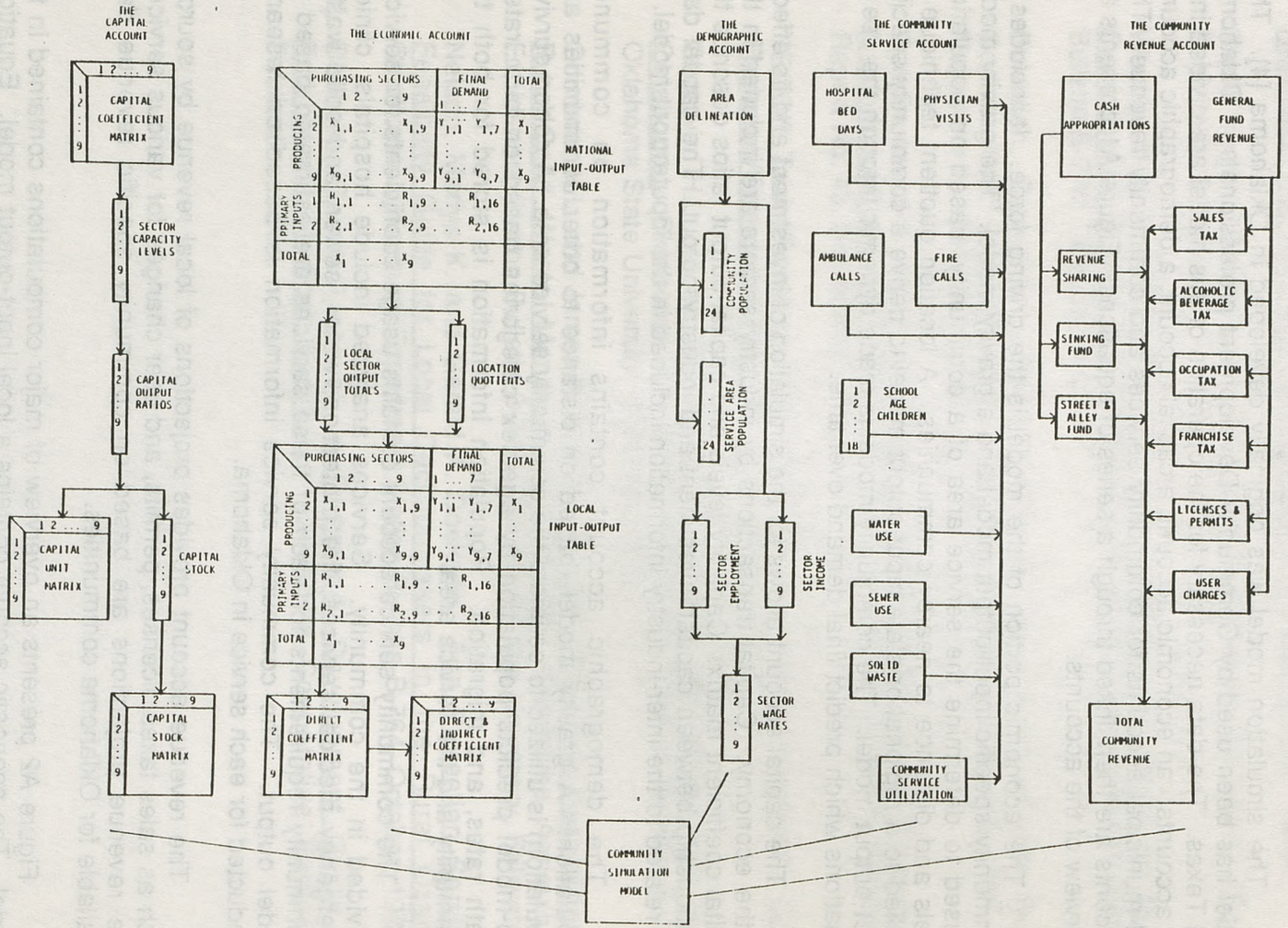

Figure A1. OVERVIEW OF SOCIAL ACCOUNTS

over time. Production relationships then determine output levels by economic sector. Labor productivity rates are used to estimate employment requirements by sector. At the same time, the demographic account is estimating population using an age-sex cohort survival technique. Using local labor force productivity rates, the available labor force is then estimated for each year. The resulting final population values are then included in the next year's calculations. The complete model has over 200 equations describing the economic and social relations within a community.

The model is designed to be easily adapted to a wide range of community applications. Specific information on the community is requested variables, employment data, and geographic location. These data are readily available from Census Publications and State Employment Agency reports. A large secondary data base is included with the model to minimize data collection. Growth rates, input-output parameters, and community service coefficients are included in this data base. The computer model is interactive and asks a series of questions to which the user responds by providing the input data required. The model is written in FORTRAN and compiled on an IBM 370/168 computer. At the time of development, the data base and equations required so much storage space that a main frame computer was required. However, given the rapid developments in the micro-computer field, conversion to a micro-computer may be possible in the future. Table A1 provides a summary of the information provided by the model.

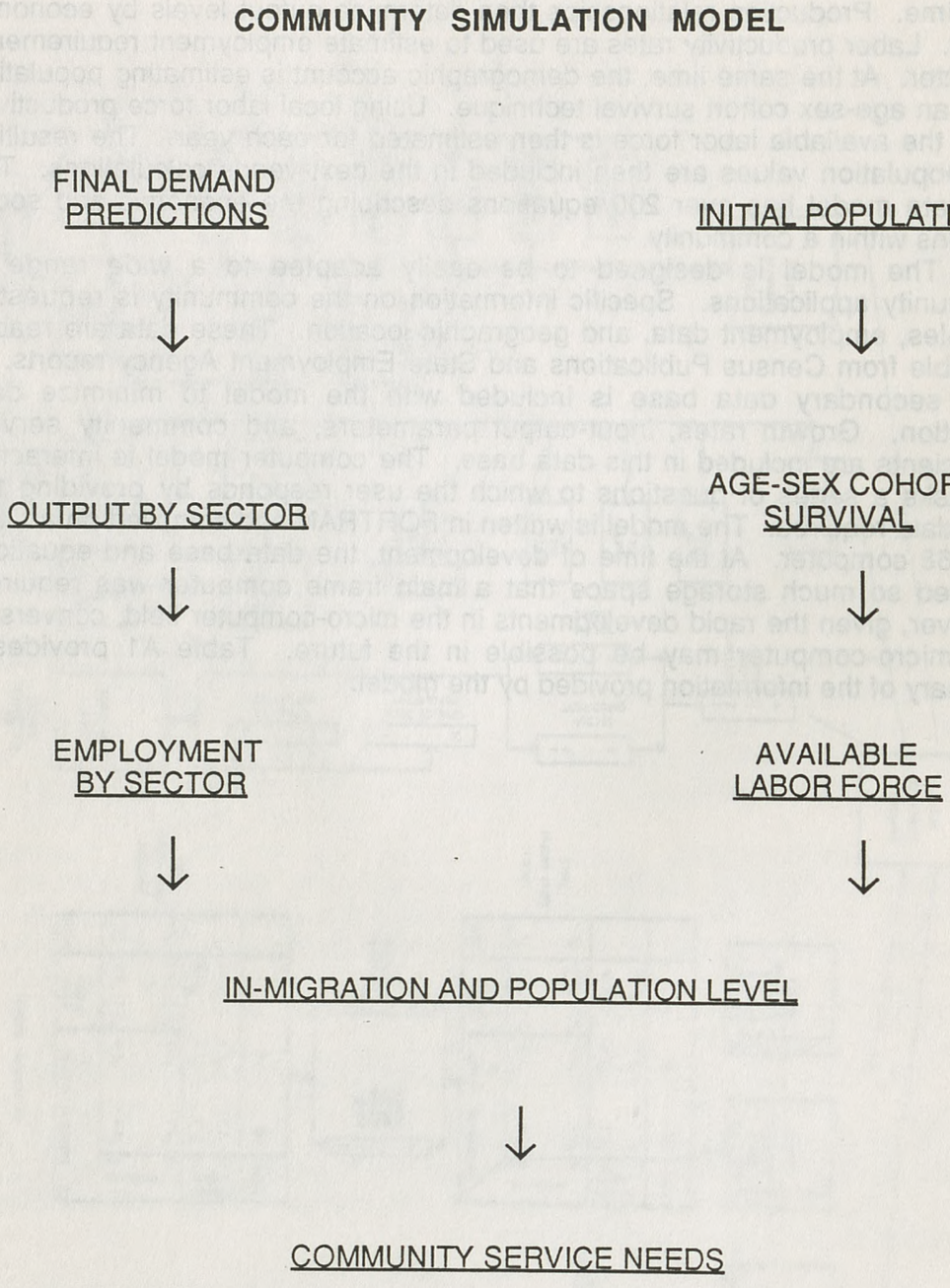

FIGURE A2. OVERVIEW OF MAJOR COMPUTATIONS IN THE COMMUNITY SIMULATION MODEL

Table A1

SUMMARY OF ANNUAL PROJECTIONS PROVIDED BY THE COMMUNITY SIMULATION MODEL

Category	Model Output
Economic	Employment by Industry Sector Income by Industry Sector Output by Industry Sector
Demographic	Population by Age-Sex Cohort Population for Community and Service Area
Service	Hospital Bed Days by Age-Sex Cohort Physician Visits by Age-Sex Cohort Ambulance Calls Number of Fires

Table A1 (Continued)

Category	Model Output
	Water Requirements Sewer Volume Solid Waste Volume
Revenue	Community Revenue by Source

Table A1 (Continued)

Category	Model Output
	Water Requirements
	Sewer Volume
	Solid Waste Volume
Revenue	Community Revenue by Source

DISCUSSION OF "MEASURING THE INTERDEPENDENCIES OF AGRICULTURE AND RURAL COMMUNITIES"

F. Larry Leistritz and Arlen G. Leholm*

The findings of Doeksen and Woods are reinforced by Leistritz and Leholm with North Dakota data about recent trends in retail sales and employment and with data from a six-community survey of residents and of current and former businesses. Most observations by Doeksen and Woods about extension-research linkages are supported.

Our approach to discussing the paper by Drs. Doeksen and Woods will be to first present a few results from our own research which seem to reinforce their findings and then to offer a few comments regarding their observations concerning extension and research linkages.

The fact that the farm crisis is having a major impact on rural communities is particularly evident in North Dakota, where agriculture accounts for a high percentage of the economic base. Statewide, sales of crops and livestock accounted for about 42 percent of total exports (sales to final demand or basic income) in 1984, and in several state planning regions agriculture constituted more than half of the total economic base (Coon et al.). Another indication of the extent to which North Dakota communities are economically dependent on agriculture is provided by a recent study that classified 39 of the state's 53 counties as "farming dependent" (based on the fact that farming contributed a weighted annual average of 20 percent or more of total labor and proprietor income over the five years from 1975 to 1979) (Bender et al.).

Examination of recent trends in retail sales reveals that North Dakota's rural communities have been experiencing a substantial recession. Taxable retail sales, adjusted for inflation, declined 12.5 percent on a statewide basis from 1980 to 1985 (Table 1) and have receded to levels experienced in the early 1970s. The 1980 to 1985 decrease was 23.9 percent for towns under 10,000 compared to 6.4 percent for towns over 10,000. When sales are aggregated to the county level, it can be noted that the state's 39 agriculturally dependent counties experienced a decline of 20.3 percent from 1970 to 1985 while the remaining counties actually increased 13.9 percent.

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*The authors are, respectively, professor and extension economist, Department of Agricultural Economics, North Dakota State University.

TABLE 1. TOTAL RETAIL SALES AND CHANGE IN SALES IN NORTH DAKOTA COUNTIES, 1970-1985 (CONSTANT 1985 DOLLARS)

County Group	No. of Counties	Total Retail Sales[a]				Percent Change		
		1970	1975	1980	1985	1970-85	1970-80	1980-85
		dollars				percent		
Agricultural counties	39	773,849,645	964,371,060	755,165,843	617,061,526	-20.261	-2.414	-18.288
Other counties	14	2,100,282,978	2,780,379,900	2,682,964,915	2,391,816,314	13.880	27.743	-10.852
Counties with town(s) over 10,000	8	1,892,500,812	2,506,098,320	2,454,568,753	2,213,259,475	16.949	29.700	-9.831
Counties with no town(s) over 10,000	45	981,631,812	1,238,652,640	983,562,005	795,618,365	-18.949	0.197	-19.108
All counties	53	2,874,132,623	3,744,750,960	3,438,130,758	3,008,877,840	4.688	19.623	-12.485

[a]Based on sales reported in North Dakota's 200 largest towns. In 1985, these sales amounted to 88 percent of total taxable sales reported in the state. The reader also should note that, prior to 1976, sales from consolidated firms (those firms filing a single return including data for several plants) were assigned to the city (and county) containing the plant that filed the return. Since then, consolidated returns have not been included in city or county totals but, instead, have been reported in a category called "consolidated returns." The consolidated returns amounted to 10.3 percent of total in-state taxable sales in 1985, and sales of businesses located outside the largest 200 cities were 1.7 percent of the total (North Dakota State Tax Department).

Recent trends in employment are similar to those in taxable sales except that the percentage changes in employment are somewhat less. From 1980 to 1985, total employment increased about 1 percent on a statewide basis but decreased 10.6 percent in the agriculturally dependent counties. Similarly, employment declined by 8.8 percent in counties with towns under 10,000 people but increased 8.8 percent in counties with towns of 10,000 or more.

Thus, recent trends in sales and employment point to a stable or even decreasing level of economic activity in the state, especially in the smaller trade centers and in the more agriculturally dependent areas. As a result, many business proprietors, residents, and public officials in such areas are experiencing substantial adjustment problems. In an effort to better understand the situation faced by rural businesses and residents, our research group undertook a survey of selected North Dakota communities. The survey was conducted during the period March through July 1986. Six communities were selected for intensive analysis: Carrington, Casselton, Grafton, Hettinger, Jamestown, and Stanley (Figure 1). An attempt was made to select trade centers of various sizes and in different regions of the state. The six towns range in population from about 1,700 to about 16,000. The smaller towns should be representative of many of the state's smaller agricultural trade centers while the larger communities (Grafton and Jamestown) should be reflective of the situation in the state's larger, nonmetropolitan shopping centers. Five of the six towns experienced modest growth during the 1970s, although four of the counties had population declines during that period.

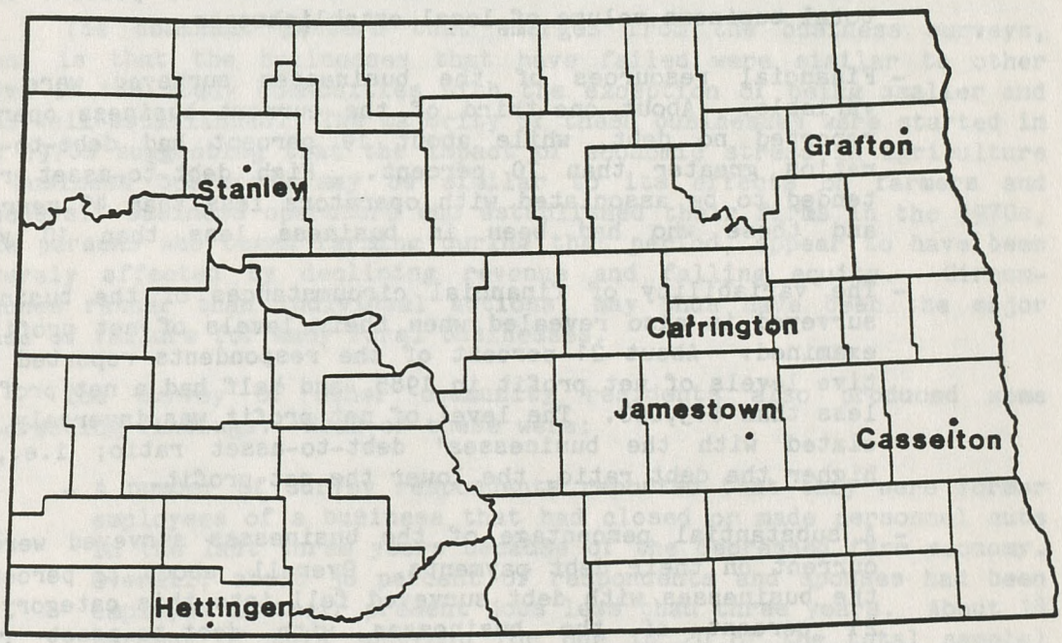

Figure 1. Communities Selected for Analysis

The study communities are all located in heavily agricultural areas. Of the six counties, four had one-fourth or more of their labor force directly employed in agriculture in 1980. Several indicators suggest that the communities' economies have been experiencing negative effects associated with economic stress in agriculture. Retail sales, measured in constant 1985 prices, declined in all of the six communities between 1980 and 1985, and four of the six counties experienced a decrease in total employment between 1980 and 1985. (For a more detailed discussion, see Leistritz, Ekstrom, and Vreugdenhil and Leistritz et al.)

In order to study the effects of the farm crisis on these communities, informal interviews were conducted with community leaders to identify the various forms of impacts that had been experienced. Then three formal research instruments (questionnaires) were developed and administered to three separate groups: current business operators, former business operators, and other community residents.

The results of the surveys of business operators and former business operators in six North Dakota communities lead to a number of conclusions. The most salient of these include the following:

- Farmers are important customers for many businesses. Overall, businesses surveyed reported that direct sales to farmers accounted for more than 40 percent of their business volume.

- The viability of the local community is critical to area businesses. In each community surveyed, residents of the town together with farmers accounted for about 75 percent of the total business volume of local establishments.

- Financial resources of the businesses surveyed were quite variable. About one-third of the current business operators reported no debt, while about 19 percent had debt-to-asset ratios greater than 70 percent. High debt-to-asset ratios tended to be associated with operators less than 45 years old and those who had been in business less than 10 years.

- The variability of financial circumstances of the businesses surveyed is also revealed when their levels of net profit are examined. About 21 percent of the respondents reported negative levels of net profit in 1985, and half had a net profit of less than $13,000. The level of net profit was inversely associated with the businesses' debt-to-asset ratio; i.e., the higher the debt ratio, the lower the net profit.

- A substantial percentage of the businesses surveyed were not current on their debt payments. Overall, about 12 percent of the businesses with debt surveyed fell into this category, and 21 percent of the businesses with debt-to-asset ratios exceeding 70 percent were in this situation.

- Business managers are responding to current financial pressures in a variety of ways. More than two-thirds reported they had

stepped up collection efforts on overdue accounts while almost half had attempted to reduce inventories. Almost 40 percent had reduced their labor force in the last three years, and about 38 percent had started charging interest on overdue accounts.

- The economic outlook of the current businesspersons surveyed can best be summarized as cautious. While more than three-fourths felt they could continue to operate for at least three more years, only about one-fourth felt they were likely to expand their businesses during that period. Retail proprietors were the least optimistic concerning business continuation.

- Comparison of salient characteristics of current and former businesses provides several insights. Current and former business operators reported similar reasons for establishing their businesses. When the types of businesses are compared, the former businesses were found to be dominated by retail establishments. Fewer former businesses than current establishments were found in the finance, insurance, and real estate; and professional services categories. Former business operators had been involved in their business for a substantially shorter period than their counterparts who were currently operating, and their businesses had been established for a much shorter period. There was little difference in the types of customers they served, but the former businesses had fewer employees. They also had substantially lower levels of financial resources.

The dominant pattern that emerges from the business surveys, then, is that the businesses that have failed were similar to other firms in the study communities with the exception of being smaller and less well-established. The majority of these businesses were started in the 1970s suggesting that the impact of economic stress in agriculture on business operators may be similar to its effects on farmers and ranchers. Business operators who established their firms in the 1970s, like persons who began farming during that period, appear to have been severely affected by declining revenue and falling equity. Circumstances rather than individual actions, may thus have been the major cause of failure for many rural businesses.

The survey of other community residents also produced some interesting findings. Some of these were:

- A number of survey respondents reported that they were former employees of a business that had closed or made personnel cuts in the last three years because of the depressed farm economy. Overall, about 30 percent of respondents and spouses had been employed at their present jobs less than three years. About 18 percent of this subgroup (or one in 20 of the total sample) reported that they were former employees of firms that had closed or made personnel cutbacks. These persons tended to be somewhat younger than the overall sample; about 78 percent were less than 45 years old. About 70 percent of these former

employees were married, and 59 percent had children at home. About 79 percent of the men, but only 61 percent of the women, were currently employed; about 36 percent of the women planned to look for a different job in 1986.

- The financial resources of these displaced workers were relatively limited. Their median family income in 1985 was $20,000 (compared to $23,000 for the overall sample), and their median net worth was $34,000 (the same value as that for the total sample).

- About 20 percent of men and 16 percent of women responding to the survey indicated that they were likely to look for a different job in 1986, and about 72 percent of these persons would be willing to relocate. Persons who would relocate were generally younger and better educated than average, and most would seek to relocate to one of North Dakota's larger cities. Thus, one effect of the current economic stress in agriculture may be to stimulate additional migration from the state's rural areas.

In summary, this survey of residents of six agricultural trade centers suggests that secondary effects of current economic stress in agriculture are now being experienced by many rural nonfarm residents. Some of these individuals have experienced job loss as their employers ceased operation or initiated personnel cutbacks, while others are contemplating relocation in hope of finding more satisfactory employment. Thus, while the initial effects of reduced farm income have been largely experienced first by farmers and then by local businesses, particularly those dealing in durable goods, the reduced business volume and associated problems experienced by many businesses have led to layoffs, reduced hours, and decreased income for many employees. For rural nonfarm residents, as for farmers and rural business persons, adverse economic trends in agriculture have posed substantial adjustment problems.

Extension and Research Linkages

Against this backdrop of rural economic stress, we (like others) have been concerned with developing more effective research and extension programs. Regarding linkages of research and extension, let us first emphasize that the work on which we have been reporting is the result of a three-year cooperative effort between research and extension at North Dakota State University. The effort was somewhat unique at North Dakota State University in the sense that research and extension have been separately administered and joint appointments are rare. Based on our experience, we would support most of the observations made by Drs. Doeksen and Woods. Specifically,

- Long-run Focus--We would strongly support the need for some long-run planning of research efforts while recognizing a need for some flexibility to deal with short-run problems.

- Joint Appointments and Colocation--Our institution may soon be experimenting in these areas. We can give you a report next year!

- Grants--Our work has been funded primarily by grants, from sources as diverse as the Economic Research Service, Federal Extension, private foundations, and the North Central Rural Development Center.

- Networks--We feel that we have benefited greatly from interactions with colleagues at a number of institutions and in USDA. In the work we have been describing, we have worked very closely with Steve Murdock and his associates at Texas A&M. We jointly designed the questionnaires and survey procedures, and surveys of businesses and residents have also been conducted in several Texas communities.

- Reward System--It would seem almost axiomatic that adequate reward systems are essential. Sometimes, however, it appears that this belief is not universally held.

- USDA Linkage--As I mentioned earlier, we have benefited from both the financial and personal support of the USDA. In particular, Fred Hines, Tom Carlin, and Sara Mazie have been extremely supportive.

- Future Programming--As we look at the needs of rural North Dakota, we too plan to emphasize economic development, assistance to rural businesses, and community service planning, and we have created a Center for Rural Revitalization as a vehicle for focusing program efforts in this area.

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