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ANALYSIS OF RURAL DEVELOPMENT RESEARCH PROGRAMS IN THE UNITED STATES AND SOUTHERN REGION

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ABSTRACT

An understanding of the allocation of research among regions, problem areas, and academic disciplines is essential to coordinating ongoing rural development research activities and setting the direction of future research programs. This paper uses data compiled from the Current Research Information System (CRIS) research abstracts for the entire U.S. to present and discuss the allocaiton of rural development research in the U.S. and the South.

The results show that the distribution of research projects, funds and scientist years within each region are allocated in a similar fashion except for a smaller number of natural resource projects in the Southern region. Compared to the distribution of rural population, only the Northeast had a total number of projects and research funds significantly greater than its share of the rural population. Within the Southern region the distribution of projects has changed significantly between 1973 and 1976 with a greater emphasis now being given to economic development projects. The distribution of research funds among academic departments is not different between the South and the U.S., although the distribution of research funds does show a significant difference.

A correlation analysis of funding in the four major research areas with indicators of rural development needs as measured by variables such as the unemployment rate, average family income, and the high school completion rate showed only the percent of population in rural areas to be significantly correlated (at the 5 percent level) with all four research categories. In the people building area, average family income, the percent of population below the poverty level, the high school completion rate and the percent of housing without plumbing was significantly correlated at the 5 percent level with the level of research funding. In the community service research area, funding

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INTRODUCTION

The improvement of economic and social conditions in rural areas has long been a special goal in our nation's history. Rural development is a broad scale effort encompassing the many dimensions or conditions which determine the quality of life, such as access to public services and facilities, economic development, and the protection or enhancement of natural and environmental resources. As suggested by this diversity of programs, numerous government agencies and academic disciplines are involved in the process of rural development.

While much of rural development's total budget is concerned with implementation or action-oriented programs, research remains a necessary element and involves a sizable amount of manpower and money. In this context, research includes the development of scientific and technical knowledge, new technology and facts useful to private and public decision-makers who plan and carry out rural development action programs. From information available through research abstracts maintained by the Current Research Information System (CRIS) of the USDA, 953 rural development related research projects involving over $27.3 million were ongoing at the 56 agricultural experiment stations, forestry schools and cooperating institutions in FY 1976.

Of the total budget for CRIS projects reviewed in this paper, $3 million are associated with Title V, the research and extension section of the Rural Development Act of 1972. The FY 1976 appropriations for all titles in this Act totaled $1.3 billion. This illustrates the relative position of research within rural development.

Despite the relative position of rural development research, it is an integral aspect of the development process. However, there is still limited information at the national level concerning the coordination and allocation of limited research funds. The Southern Rural Development Center (SRDC) maintains a classification of CRIS projects, but only for the Southern states[1/] [3]. The recent evaluation of rural development projects in Title V was national in scope, but did not include research outside of Title V [2].

The purpose of this paper is to provide a description of the national pattern of rural development research and to identify the existing level of resource use and academic approaches being used in the process. Special emphasis is given to research patterns in the Southern region during the development of this overview. This information provides a basis for discussing the appropriateness of this allocation given the apparent development needs of each state and the policy implications of continuing this existing research pattern.

PROCEDURE

The rural development research abstracts obtained from CRIS were classified according to the Research Problem Areas (RPAs) used by the USDA and SRDC. Although information from the CRIS reports on project objectives and manpower expenditures may not always be the same as the researcher's allocation, these reports provide a measure of aggregate rural development research funding and a means of examining patterns in the distribution of research in the U.S. The four major research areas are community services and facilities, people building, economic

development, and natural environment in rural areas (Table 1). The composition of activity in each area is self-explanatory from the sub-matrix headings, although it is useful to point out that the natural environment projects include only the portion directly involved with rural development and is not a complete listing of all resource projects in the country. In classifying projects, much of the current research activity encompasses more than one area or does not fall conveniently into any of the defined areas. In these cases an assignment was made to what was considered the most appropriate category.

The CRIS abstracts represent all rural development research at state agricultural experiment stations which have federal USDA funding and a portion of state funded projects which are voluntarily submitted to the CRIS system. While CRIS maintains projects in its system beyond the termination date, only projects with FY 1976 appropriations were included in the classification.

After discussing research allocation patterns, the distribution by academic disciplines is also presented. The multitude of disciplines involved in rural development necessitated combining disciplines using similar approaches to research. For example, agricultural economics is composed of economics, business, statistics, resource economics, and combined agricultural economics and rural sociology departments. Rural sociology consists of rural sociology, sociology, political science, and other social sciences. Education consists of agricultural and regular education, agricultural journalism, and community education. By aggregating in this manner the number of academic disciplines was kept to nine.

ANALYSIS AND RESULTS

In this section four types of analyses of rural development research are considered. (1) The distribution in the Southern region by problem areas

TABLE 1. MATRIX OF PROJECT CLASSIFICATION AND NUMBER OF PROJECTS UNDER EACH CLASSIFICATION FOR THE U.S. AND SOUTHERN REGION, FY 1976.

Problem Areas	U.S.	Southern Region
Community Services and Facilities		
1.01 Health services and facilities	12	7
1.02 Water systems	9	4
1.03 Sewage and waste disposal	14	5
1.04 Community recreation	4	2
1.05 Fire and fire protection	7	6
1.06 Transportation and communication	16	3
1.07 General community services	60	11
1.08 Planning and community decision-making services	14	1
1.09 Housing, equipment, furnishing	24	11
1.10 Taxation and financing in rural communities	26	7
1.11 Miscellaneous	7	2
	193	59
People Building		
2.01 Human development	56	25
2.02 Education and human development evaluation	30	9
2.03 Rural labor market studies	31	12
2.04 Demography	67	18
2.05 Health, nutrition and safety	16	12
2.06 Household management and decision-making	36	16
2.07 Community decision-making	29	7
2.08 Quality of life, index, indicators	48	21
2.09 Sociological aspects of small farming	14	2
	327	122
Economic Development		
3.01 Hold and attract industry	13	5
3.02 Plant location	6	2
3.03 Income and employment effects of rural industry	35	15
3.04 Income and employment effects of natural resource development policies	30	6
3.05 Impacts of rural recreation plans, projects	56	19
3.06 Rural co-ops	7	4
3.07 Technologies and enterprises for farms	38	17
3.08 Economic interaction in rural areas	64	20
3.09 Income and employment effects of governmental programs, regulations, taxes	25	5
3.10 Plans for rural economic development	45	17
3.11 Miscellaneous	7	1
	326	111
Natural Environment		
4.01 Land use planning, zoning	70	3
4.02 Natural resources and recreation	9	0
4.03 Natural resources and water	11	1
4.04 Natural resources: soils	5	4
4.05 Natural resources: forest	3	0
4.06 Natural resources preservation	5	1
4.07 Miscellaneous	4	0
	107	9

SOURCE: Compiled from CRIS research abstracts.

and overtime, (2) the geographic distribution by problem areas, (3) the distribution by disciplines and problems areas in the South and the U.S., and (4) a correlation analysis of research funds and selected measures of rural development needs in the South and the U.S.

Rural Development Research in the Southern Region

Using the major classification categories from the SRDC, 76.7 percent of the Southern region's 301 projects are in the economic development and human resource development area (Table 2). The natural environment component of rural development which primarily deals with land use planning, is not heavily emphasized in the South and accounts for only 3.1 percent of the region's total projects. Land use and environmental concerns are apparently more pressing issues in other regions of the country as evidenced by a greater percentage of the total projects.

The 301 projects reported in FY 1976 represents a 50% increase over a similar study made on the Southern region in 1973 (Table 3). Some interesting changes have occurred between these periods. In addition to new projects in the Natural Resources area, there has been a significant change in the distribution of projects within the other three areas. Based on a chi-square test, the difference in project distribution was significant at the 2.5 percent level with the major change being a 125 percent increase from 49 to 111 economic development projects. This shift perhaps indicates a recognition of a need for research or income and employment problems to act as complements to research on developing human resources.

Another change occurring has been an apparent increase in research effort per project as indicated by the increase of .353 scientist years per project in FY 1973 to .467 SYs per project in FY 1976. The greatest change has been in the people building area where researchers have increased their effort per project from .278 to .475 scientist years.

TABLE 2. NUMBER AND VALUE OF PROJECT TYPES BY REGION, FY 1976.[a/]

Region	Research Areas					
	Community Services	People Building	Economic Development	Natural Environment	Total	Percent of Total
SOUTH						
Number of Projects	52	100	98	8	258	(30.1)
Percent of Total (w/in region)	20.2	38.7	38.0	3.1	--	
Dollar Value Per Project	30,875	35,019	33,706	48,679	34,109	
Total RPA Research Dollars (w/in region)					8,800,122	(32.37)
NORTH EAST						
Number of Projects	47	58	69	31	205	(23.92)
Percent of Total	22.9	28.4	33.6	15.1	--	
Dollar Value Per Project	29,804	20,400	40,819	31,358	34,115	
Total RPA Research Dollars (w/in region)					6,993,575	(25.73)
NORTH CENTRAL						
Number of Projects	51	83	78	41	253	(29.52)
Percent of Total	20.2	32.8	30.8	16.2	--	
Dollar Value Per Project	29,060	25,249	31,063	42,660	30,631	
Total RPA Research Dollars (w/in region)					7,749,643	(28.51)
WESTERN						
Number of Projects	26	42	50	23	141	(16.45)
Percent of Total	18.4	29.8	35.5	16.3	--	
Dollar Value Per Project	19,229	22,332	28,127	34,502	25,800	
Total RPA Research Dollars (w/in region)					3,637,800	(13.38)
TOTAL						
Number of Projects	176	283	295	103	857	(100)
Percent of Total	20.5	33	34.4	12.0	--	
Dollar Value Per Project	28,343	27,275	35,831	37,903	31,717	
Total RPA Research Dollars (w/in region)					27,181,140	(100)

SOURCE: Compiled from CRIS abstracts obtained from Cooperative State Research Service (CSRS), USDA.

[a/] Classification does not include 98 projects where funding information was not available, 43 of which are in the Southern region.

TABLE 3. Allocation of Research Within the Southern Region by Research Areas for Fiscal Year 1973 and 1976.

	FY 1973					FY 1976				
Research Areas	No.	% of Total	S. Yrs.	% of Total	S Yrs./ Proj.	No.	% of Total	S. Yrs.	% of Total	S. Yrs./ Proj.
Community Services	40	(19.8)	19.1	(26.75)	.477	59	(19.60)	27.0	(19.78)	.457
People Building	113	(55.9)	31.46	(44.06)	.278	112	(40.53)	53.2	(37.79)	.475
Economic Development	49	(24.3)	20.84	(29.19)	.425	111	(36.87)	53.4	(37.93)	.481
Natural Environment	NA	0	NA	0		9	(3.0)	7.2	(5.11)	.800
Total	202	(100)	71.4	(100)	.353	301	(100)	140.8	(100)	.467

SOURCE: Compiled from CRIS research abstracts and Davis, Carlton G., "Rural Development Research Programs of Southern 1862 and 1890 Land Grant Institutions: Characteristics, Needs, and Priorities for the 1970's," Southern Journal of Agricultural Economics, Vol. 6, No. 1 (july 1974), pp. 79-89.

Geographic Distribution of Rural Development Research

In other regions of the country, the economic and human resource development areas are also emphasized in research. A major difference in the research programs of regions outside the South is a greater involvement in projects concerned with the natural environment. This is especially apparent in the North East and North Central regions where a higher number of urban population centers create more potential land use conflicts. The distribution of projects among the other three research areas appears to be very similar for all regions. This observation was formulated as a hypothesis to test that there is no difference between regions in the distribution of research projects and research money. Using a chi-square test, only the Southern region (with the small number of projects in the natural environment area) had a distribution significantly different (at the 5 percent level) from the national distribution. Thus, the Western region which has the fewest number of rural development projects has an allocation within the region which is similar to the Northeast, North Central regions and to the Southern region with the exception of the smaller number of natural resource projects.

Another question which can be raised is whether total research funds and projects are being allocated in accordance with the percentage of the rural population in each region. Using a chi-square test the hypothesis that the percent of total rural development funds and projects within each region is equal to the percentage of the total rural population within each region is rejected at the 5 percent significance level. The largest discrepancy from the expected distribution is in the North East where both the number of projects and research dollars were proportionally larger than the number of rural people living in that region.

Disciplinary Distribution of Rural Development Research

In addition to the geographic distribution of projects, the CRIS abstracts also provide information on the academic disciplines involved in rural development research and some suggestion of the approaches being given to development problems. In the Southern region and the entire U.S., agricultural economics is the department most involved in rural development research, followed by rural sociology departments (Table 4). The predominance of agricultural economics is more pronounced in the economic development area where major research activities are analyzing economic impacts of development strategies and activities. A chi-square test of the pattern of projects by academic discipline indicates that the distribution of projects, research funds and scientist years among the five most active departments is not independent of the research problem areas which is not surprising given various research specialities. Agricultural economics departments are most involved in the economic development research area. Rural sociology's main emphasis is in the people building research area and agronomy is most heavily involved in the natural resources research area.

The hypothesis that the distribution of projects by academic disciplines for the Southern region was different from the distribution observed for the entire U.S. was tested using a chi-square test. The distribution of rural development research projects by academic departments in the South is not significantly different at the 5 percent level from the pattern in the rest of the country. However, the distribution of funds by academic departments is significantly different at the 5 percent level between the South and the U.S. The major differences are in the research area of people building where agricultural economics, agronomy, and home economics departments in

TABLE 4. RURAL DEVELOPMENT RESEARCH INVESTMENTS BY PROBLEM AREA AND ACADEMIC DISCIPLINE FOR THE U.S. AND SOUTHERN REGION

Academic Discipline	U.S. and Southern Region	Community Services			People Building			Economic Development			Natural Environment			Total		
		No.	S.Ys.	Fund/ Proj.	No.	S.Ys.	Fund/ Proj.	No.	S.Ys.	Fund/ Proj.	No.	S.Ys.	Fund/ Proj.	No.	S.Ys.	Fund/ Proj.
Agricultural Economics	U.S.	86	48.5	29,446	88	45.6	26,084	184	105.3	31,527	46	30.6	36,197	404	237.8	30,481
	S.R.	20	7.3	24,674	32	23.3	35,009	54	39.5	35,670	7	7.1	57,433	113	77.2	38,442
Sociology	U.S.	21	7.3	25,439	87	33.0	27,398	25	7.0	23,029	13	4.3	26,937	146	51.6	26,327
	S.R.	7	2.2	19,776	27	12.5	30,922	11	2.0	17,070	1	.1	6,305	46	16.8	25,378
Agronomy	U.S.	9	4.0	34,144	3	1.4	47,265	21	11.7	38,520	22	9.6	31,136	55	26.7	35,327
	S.R.	4	1.7	45,774	3	1.4	47,265	8	3.3	45,405	0	—	—	15	6.4	45,875
Education	U.S.	7	1.2	13,336	31	8.9	30,493	3	1.1	29,429	0	—	—	41	21.2	27,485
	S.R.	1	—	14,902	7	3.6	31,845	1	—	49	0	—	—	9	3.6	26,429
Home Economics	U.S.	10	4.5	19,953	27	10.9	26,501	3	1.1	15,509	0	—	—	40	16.5	24,039
	S.R.	6	3.5	25,802	16	7.2	29,472	1	.6	24,406	0	—	—	23	11.3	28,294
Forestry	U.S.	1	0	14,614	2	.7	8,767	18	13.4	51,534	7	3.5	30,064	28	17.6	41,793
	S.R.	0	—	—	0	—	—	8	7.1	66,161	0	—	—	8	7.1	66,161
Engineering	U.S.	15	8.9	23,364	3	1.1	29,834	3	4.4	84,826	6	3.7	89,157	27	18.1	45,532
	S.R.	5	5.8	42,889	2	.3	9,408	0	—	—	0	—	—	7	6.1	33,323
Economic Development Division	U.S.	7	5.9	47,628	7	4.8	42,942	11	17.8	102,981	0	—	—	25	28.5	70,671
	S.R.	1	.8	36,100	2	4.1	13,300	0	—	—	0	—	—	3	4.9	20,900
Others	U.S.	20	8.3	32,552	35	22.7	23,699	27	13.9	34,609	9	10.6	50,959	91	55.5	31,577
	S.R.	8	5.7	46,293	11	6.1	38,695	15	2.9	18,150	0	—	—	34	14.7	31,418
Total	U.S.	176	88.6	28,343	283	136.1	27,275	295	175.7	35,831	103	62.3	37,905	857	462.7	31,717
	S.R.	52	27.0	29,804	100	55.5	20,400	98	55.4	33,706	8	7.2	48,679	258	145.1	34,109

SOURCE: Compiled from data available on CRIS abstracts.

[a/] Total for all U.S. states.

[b/] Total for Southern region.

the Southern region are receiving proportionally more funds for similar research than corresponding departments in the rest of the U.S.

Correlation Analysis

The previous discussion provided a basic understanding of the distribution of rural development projects by problem areas, geographics and academic disciplines, but does not address questions on the desirability or appropriateness of these allocations. Since much of rural development research is focused on the specific problems of the state where the research is located, the amount of research effort devoted to rural development should in turn be related to the development needs of that state. This relationship is explored using a simple correlation analysis of research expenditures with the development needs of that state as measured by the unemployment rate, average family income, the high school completion rate, and a measure of housing quality. The strength of any inferences drawn from these correlation results depends upon the quality of these variables as measures of rural underdevelopment. Although there admittedly are some problems in using these variables to deal with regional projects, this correlation test does provide some means of judging the allocation of rural development research among states.

The correlation tests are based on a hypothesized relationship between certain of the indicator variables and the level of research funding in each of the four major research areas. For example, in the Community Services research area, the percentage of a state's population in rural areas, the percentage below the poverty level, the percent of substandard housing, and the state's unemployment rate were expected to be positively related to research funds in that state while the high school completion rate and the average

family income measures were expected to be negatively correlated with research funding. Similar hypotheses were set up in each of the other research problem areas.

Results of this correlation analysis are presented in Table 5. Most noticeable is that research funds are strongly correlated (significant at the 1 percent level) in all four research areas with the percent of each state's population living in rural areas. This is perhaps the result of the formula funding process for the allocation of SAES research monies. Within each of the research areas, not all results are as originally hypothesized. The unemployment rate was expected to be positively related to research funding in the people building and economic development research areas. The negative coefficients obtained could be a measurement problem from using aggregate state data rather than statistics on only the rural population. Alternately, if we assume that research funding in the people building and economic development areas are intended to improve employment possibilities, the negative correlation results suggest that inadequate funds are being allocated to states with high unemployment rates.

Within these two research areas, the results for the South showed similar or higher levels of significance suggesting that given the available research funds within the Southern region, states with more pressing development needs (as measured by average family income, percent of families below the poverty level, and the percentage of housing without plumbing) are receiving a higher percentage of the total research funds than are states in the U.S. as a whole.

TABLE 5. Correlation of Research Funds Per Capita in Four Major Project Areas with Selected Demographic Variables for the U.S. and Southern Region, FY 1976.

Underdevelopment Indicators	Community Services		People Building		Economic Development		Natural Environment		Total	
	U.S.	Southern Region	U.S.	Southern Region	U.S.	Southern Region	U.S.	Southern Region	U.S.	Southern Region
Unemployment Rate	-- --	-- --	-.370 (.0123)	-.295 (.326)	-.090 (.537)	-.067 (.827)	-- --	-- --	-.199 (.281)	.643 (.168)
Average Family Income	-.101 (.503)	-.359 (.228)	-.322 (.031)	-.524 (.065)	-.031 (.828)	-.370 (.212)	.266 (.110)	-.930 (.007)	-.281 (.124)	-.766 (.075)
Percent of Population in Rural Areas	.572 (.0001)	.741 (.0038)	.395 (.007)	.608 (.027)	.625 (.0001)	.667 (.012)	.458 (.004)	.608 (.200)	.801 (.0001)	.896 (.015)
Percent of Population Below Poverty Level	-.034 (.820)	.387 (.190)	.341 (.021)	.607 (.027)	.099 (.494)	.688 (.009)	-.126 (.455)	.382 (.454)	.047 (.799)	.276 (.595)
Labor Force Participation Rate	-.028 (.849)	-.376 (.204)	.054 (.721)	-.092 (.764)	.232 (.107)	-.458 (.115)	.277 (.096)	-.794 (.058)	-.024 (.896)	-.565 (.242)
High School Completion Rate	-- --	-- --	-.103 (.497)	-.505 (.078)	.080 (.581)	-.313 (.297)	-- --	-- --	.070 (.707)	-.506 (.305)
Percent of Housing Without Plumbing	-- --	-- --	-- --	-- --	.145 (.317)	.725 (.005)	-- --	-- --	.053 (.775)	.728 (.100)

SOURCE: Research funds for FY1976 available from CRIS abstracts maintained by CSRS, USDA, and statistics for indicator variables from U.S. Department of Commerce, Bureau of Census, Data Book for the White House Conference on Balanced National Growth and Economic Development, 1978.

NOTE: Numbers in parentheses are levels of significance.

In the Community Services and Natural Resources research areas, the distinction between results for the South and the U.S. is not as great. Only the measure of rural population is significantly related to funding in the Community Services research area.

This previous discussion and use of correlation analysis dealt only with the allocation of total research funds and not with the adequacy of the total level of funding. Whereas in many types of agricultural research, the final research outcome, such as a new wheat or corn strain, is more easily transferable to other regions, rural development is more rigid because the research is often designed to the specific needs or problems of a community. Thus, if these correlation results were used as a measure of the appropriateness of the existing allocation of research funds, improving the distribution of funds (increasing the significance of the correlation coefficients) would mean changing the allocation of research funds between states rather than an across the board increase in research funds for all states.

SUMMARY AND CONCLUSIONS

The data provided by the CRIS abstracts allows an overview of national rural development research activities and an opportunity to compare research in the South to work in other regions. The comparisons show that the allocation of total projects, monies, and manpower is similar for all regions with the exception of the South which has a significantly smaller number of natural resource projects than the other regions. Although the South has proportionally fewer projects and research funds than suggested by its share of the nation's

rural population, only the North East region had research funds and projects significantly greater than its share of the rural population.

Looking at research trends between FY 1973 and FY 1976 for the Southern region as total projects increased from 202 to 301, there has also been a significant reallocation of research effort to providing more emphasis on economic development projects. Another change during this period has been an increase in the scientist years being allocated to each project.

Patterns in academic departments involved in research were also investigated for regional differences. The distribution of research by academic departments is significantly different in the South than in the rest of the U.S. when measured by total research dollars, but not when measured in terms of total projects. Thus, if the indicators are accepted as measures of relative needs, the evidence is mixed as to whether research is going to areas of greatest needs.

A correlation analysis of research funding in each of the four major research areas is significantly related to the percentage of population in rural areas. In the people building and economic development research areas, funding is significantly related at the 5 percent level with average family income, the percent of population below the poverty level, but not with the employment rate, labor force participation rate, and the high school completion rate. In the community services and natural resources areas, only the labor participation rate was significantly related to natural resources research funding.

This discussion provided an initial analysis of rural development research patterns. The analysis could be strengthened by further refining the aggregate indicator variables for each state to better isolate underdevelopment conditions in rural areas.

The problem of assessing the adequacy of the total level of funding in rural development which did not receive much attention in this paper is a much more difficult task. Methodology to complete this type of evaluation is only in the rudimentary stage of development and needs more research to develop adequate techniques.

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FOOTNOTES

1/The 13 states in the Southern region are: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia.