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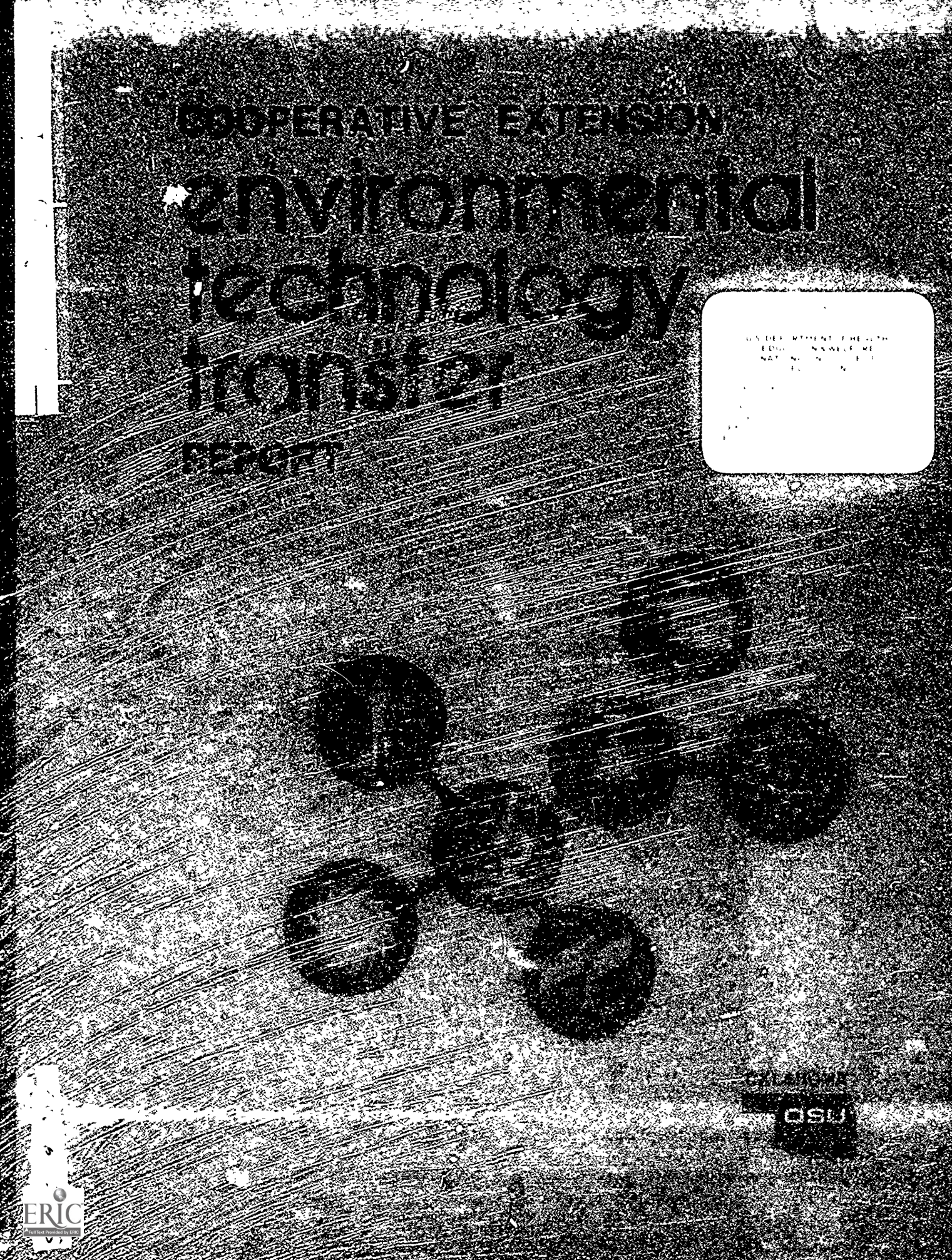
ABSTRACT

Concern has been growing at the national level regarding the large sums which have been spent on research and development and the corresponding inability of the resulting technology at the local level to solve problems involving the environment, transportation, energy crisis, and public health. The following report describes the investigation undertaken by Oklahoma State University (LSU) to survey and determine what extent the Oklahoma Cooperative Extension service might be utilized to help alleviate the problems. The investigation focused on three primary objectives: (1) identification of felt problems in Oklahoma, (2) identification of obstacles to the solutions, and (3) assessment of county and community decision making processes to determine which environmental transfer methods might be most effective. From this information the OSU team designed a pilot program for an Environmental Extension Service through the Oklahoma Cooperative Extension. Several recommendations arose from this investigation, such as: (1) federal agencies should support Environmental Extension Programs; (2) the Oklahoma Cooperative Extension should be involved in a pilot program; and (3) both federal and state agencies should support such a project with funds. (TK)

COOPERATIVE EXTENSION

environmental technology transfer

REPORT



OKLAHOMA

OSU

COOPERATIVE EXTENSION SERVICE

OKLAHOMA STATE UNIVERSITY
OFFICE OF THE VICE PRESIDENT
FOR EXTENSION

UNIVERSITY EXTENSION
STILLWATER, OKLAHOMA 74074
405-372-6211, EXT. 212

March 7, 1974

Dr. M. Frank Hersman, Director
Office of Intergovernmental Science
and Research Utilization
National Science Foundation
Washington, D. C. 20550

Dear Dr. Hersman:

I am transmitting our final report on the preliminary study which was designed as a first step in demonstrating clearly and convincingly that the Cooperative Extension Service can transfer environmental technology information. We are pleased with the results of this study in Oklahoma to date and are looking forward optimistically and enthusiastically to future work in this area.

Although originally oriented towards the transfer of technology in agriculture and home economics, the Cooperative Extension Service in Oklahoma is deeply committed to helping solve problems through educational programs in many additional areas. During 60 years of service to the people, the Cooperative Extension Service has developed a rapport and position of trust in almost any community in the nation which now strengthen efforts to solve each new problem.

It is our thesis that the Cooperative Extension Service can facilitate the transfer of much of the technical environmental information needed by local government officials and other community leaders and do it at least as effectively and probably more economically than any alternate system.

We are most pleased to be a part of a national effort to help solve the environmental problems now being faced by state and local governments.

Sincerely yours,

J. C. Evans

J. C. Evans
Vice President for Extension

JCE:cap

ACKNOWLEDGMENTS

This project was carried out by an OKLAHOMA STATE UNIVERSITY TEAM composed of:

Dr. George Abshier, Director, Community Development Institute

Dr. Charlie Burns, Extension Community Resource Program Specialist

Dr. Robert Fite, Extension, Director of Programs for Professionals

Mr. J. O. Grantham, Assistant to the Vice President for Extension

Dr. Stephen J. Miller, Associate Professor of Marketing, College of Business

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In addition, a statewide PROGRAM PLANNING COMMITTEE provided invaluable advice and counsel on the completion of the study and the preparation of this report. The members of this committee were:

Mr. David Campbell, OSU County Extension Director

Mr. Harold Liles, Community Resource Development Field Specialist, OSU

Mr. Howard Powell, OSU District Extension Director

Mrs. Vera Taylor, Extension Home Economist, OSU

Dr. Larry Canter, Chairman, Civil Engineering and Environmental Sciences, University of Oklahoma, Norman

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J. O. Grantham
Project Director

PROJECT REPORT

ON

UTILIZING EXTENSION SERVICE IN LAND-GRANT UNIVERSITIES AS A TECHNOLOGY TRANSFER SYSTEM FOR ENVIRONMENTAL AFFAIRS

Project Conducted and Report Prepared

by

Oklahoma State University

In Keeping With

NSF Grant #GT-39426

January 15, 1974

(Revised January 31, 1974)

By: J. O. Grantham, Project Director
Assistant to the Vice President
for Extension

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Part I

SUMMARY AND RECOMMENDATIONS

The contents of this report may best be summarized as follows:

1. Concern has been growing at the National level regarding the large sums which have been spent on research and development and the corresponding inability to utilize the resulting technology at the local level to solve increasingly serious public problems involving the environment, transportation, energy crisis and public health.

2. At the same time as "new federalism" has been permeating the furthest reaches of local governments throughout the land, new local leadership, better educated and more sophisticated, is becoming increasingly concerned about inadequate knowledge and resources to solve local problems.

3. These forces have caused scientific leadership at the highest levels in the National Science Foundation to seek ways whereby more public technology might be brought to the local level in a form in which local leadership could use it.

4. As investigations have been conducted (by "blue ribbon" committees) on what might be done, invariably the U.S. Department of Agriculture's Cooperative Extension System has been cited as one example of technology transfer which has a fifty year history of success. Little wonder then that sooner or later the proposition would be made to examine how this system might be utilized in a broader mission.

5. The National Science Foundation, in April 1973, gave small planning grants to three Land Grant Universities (Colorado, Oklahoma, and Tennessee) to investigate how their respective Cooperative Extension Services might be utilized in a broad demonstration project to test the capability of this system to be effective in technology transfer on environmental issues.

6. The following report describes the investigation undertaken by Oklahoma State University to survey the situation and determine what type of demonstration the Oklahoma Cooperative Extension Service might participate in to determine its role in an Environmental Extension System.

7. The report indicates that local leaders are concerned about environmental matters and want technical assistance to cope with such problems locally. Considerable environmental research is going on within the state and not being utilized at the local level. Other efforts at establishing a solid technology transfer system have failed. The nature of the problem is very much akin to what Cooperative Extension deals with constantly.

8. A plan is proposed whereby a demonstration project may be mounted in Oklahoma to show how effective Cooperative Extension can be in transferring environmental technology.

In keeping with the results of the investigation described in this report, it is recommended:

1. That the National Science Foundation and other federal agencies engaged in environmental research increase their efforts to establish a much needed Environmental Extension System.

2. That the Cooperative Extension Service in Oklahoma be enlisted in a demonstration project to determine how it, and possibly other State Cooperative Services, might be utilized in an Environmental Extension System.

3. That those federal agencies and laboratories engaged in environmental research support with funds and cooperative effort the conduct of this demonstration.

4. That Oklahoma State agencies and institutions, including the private sector, be enlisted in support of this demonstration project.

5. That Environmental Sub-Committee of the Extension Committee on Organization and Policy work closely with this demonstration project to provide a necessary overview and a communications link to other Cooperative Extension Services.

6. That the demonstration be funded for a three year period to allow sufficient time for adequate programmatic development and evaluation.

7. That the funding level for this demonstration be sufficient for a "critical mass" of resources with which to adequately develop, operate and evaluate demonstration programs. All too often projects of this nature are inadequately funded, thereby guaranteeing failure.

Part II

BACKGROUND AND OBJECTIVES

Genesis of Project

Vast stores of technology have been accumulated in our nation's laboratories over the years as atomic energy has been harnessed, space has been conquered, and our defense posture has been kept second to none. Concern has been growing among policy makers at all levels of government regarding the inability of our nation to utilize much of this technology in the solution of public problems (i.e., environment, public health, energy conservation, transportation, etc.) involving state and local governments. A determined effort, led by the National Science Foundation, is now being made to correct this situation. Oklahoma State University is participating in this endeavor, by utilizing its Cooperative Extension network in a demonstration pilot project. Circumstances leading to this participation are as follows:

1. The President's message to Congress on Science and Technology in March, 1972, enunciated the basic national policy upon which this action is now based. This message said in part:

> "To help build a greater sense of partnership among the three levels of the federal system, I am directing my Science Advisor, in cooperation with the Office of Intergovernmental Relations, to serve as a focal point for discussions among various federal agencies and the representatives of state and local governments. These discussions should lay the basis for developing a better means for collaboration and consultation on scientific and technological questions in the future. They should focus on the following specific subjects:
>
> 1. Systematic ways for communicating to the appropriate federal agencies the priority needs of state and local governments, along with information concerning locally generated solutions to such problems. In this way, such information can be incorporated into the federal research and development planning process.
>
> 2. Ways of assuring state and local governments adequate access to the technical resources of major federal research and development centers, such as those which are concerned with transportation, the environment and the development of new sources of energy." 1/

1/ President's Message to Congress on Science and Technology, March, 1972.

2. The Committee on Intergovernmental Science Relations was established in October, 1969, by the Federal Council for Science and Technology to explore the interaction of federal, state and local government research and development policies and programs. The committee was comprised of representatives from twenty federal agencies and was directed, among other things, to:

> "Recommend policies, procedures and programs to improve management, information exchange, planning and coordination of federal science and technology activites with related activities of state and local governments." 2/

The committee's findings published in May, 1972, under the title: "Public Technology, A Tool For Solving National Problems," included the following statement:

> "It is instructive to look at one example of a federal technology transfer program in a specific field that has proven record of achievement, state and local involvement, and political durability: The Agriculture Department's Extension Service, Cooperative State Research Service, and Land-Grant University System. In this system, the functions of identifying and disseminating and applying it in the field are well integrated. A key element in the success of the Extension Service, for instance, is an effective local federal feedback mechanism. The agents live in a community, know its people and are directly concerned with its problems. They are effective communicators on problems requiring technical know how. They become aware of the concerns of the farmer, related business and community leaders, and thus can give meaningful direction to new research or modification of existing techniques. A two-way flow of information is, thus, an integral part of the department's operations." 3/

3. The Council of State Governments undertook a study, under a grant from the National Science Foundation, to probe the intergovernmental uses of federal research and development centers and laboratories. 4/ The purpose was to examine the existing policies and practices applicable to the external uses of the federal laboratories; to review the resources and potentials of the laboratories for assisting state governments; and to suggest workable approaches to the optimum utilization of these resources in treating domestic problems. The study program was under the

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2/ Committee on Intergovernmental Science Relations, established October, 1969, by Federal Council for Science and Technology.

3/ "Public Technology, A Tool For Solving National Problems", published May, 1972.

4/ Study by Council of State Governments under grant from the National Science Foundation.

direction of Dr. George A. Bell, Director of Research for the Council of State Governments, and the technical work was carried out under contract with Arthur D. Little, Inc. In the final report issued in August, 1973, when discussing barriers to technology transfer from federal installations, this study included the following statement:

> "Although the effectiveness of the Agriculture Extension Service has been evident for decades, no consideration is being given to exploring an expansion of this proven strategy for technology transfer." 5/

4. A report also released in August, 1973, prepared for the National Science Foundation, Office of Intergovernmental Science and Research Utilization, by Dr. Todd Anuskiewicz of George Washington University, and entitled: "Federal Technology Transfer" states, among other things, the following:

> "The Department of Agriculture Research and Extension Program which had evolved from initial legislation in 1862, is generally considered to have the most effective program. The concept of technology transfer as a raison d'etre for agriculture research is prevalent in the department." 6/

IT IS OBVIOUS, THEREFORE, FROM THE ABOVE STATEMENTS, THAT AT THE SAME TIME CONCERN HAS BEEN GROWING NATIONALLY ABOUT THE NEED TO TRANSFER TECHNOLOGY, A PARALLEL DESIRE HAS BEEN BUILDING TO TEST HOW THE COOPERATIVE EXTENSION NETWORK MIGHT BE UTILIZED IN THIS IMPORTANT NATIONAL MISSION. The National Science Foundation took steps in this direction as follows:

1. In November, 1972, the Office of Intergovernmental Science and Research Utilization of the National Science Foundation called a conference of Cooperative Extension representatives from the State Land-Grant Universities and asked them to submit proposals on how their Extension networks might be utilized in the transfer of technology to state and local governments. The Environment was selected as the technical area for the initial experiment. The Environmental Protection Agency, USDA, Department of Interior, and Corps of Engineers were asked to cooperate in this endeavor. Small planning grants were given to three state universities in the spring, 1973, to conduct surveys and prepare experimental projects. The states chosen for these initial investigations were Oklahoma, Tennessee and Colorado.

5/ Final Report, Council of State Governments' Study, August, 1973.

6/ "Federal Technology Transfer", by Dr. Todd Anuskiewicz, George Washington University, August, 1973.

2. M. Frank Hersman, Director, Office of Intergovernmental Science and Research Utilization, in a policy statement issued in conjunction with the National RANN Symposium held in Washington, D.C., November 18, 19 and 20, 1973, stated the following:

> "The Agriculture Extension System was one of the nation's most effective and efficient means of delivering scientific and technical knowledge. It has been a main contributor for several generations to the world leadership enjoyed by American Agriculture . . . . In the RANN Program, we are working to develop services and techniques as effective as the Agriculture Extension System to market and disseminate the best of the RANN results . . . . Current major thrusts in research utilization include an effort to develop a national environmental Extension system, sponsored by three federal agencies with three states cooperating in pilot plan activities. In all of these projects, the cost is shared and the aim is to bring them to self-supporting status as soon as possible." 7/

Oklahoma State University Planning Study

Objectives of Project:

1. In June, 1973, a small planning grant ($6,000) was received from the Office of Intergovernmental Science and Research Utilization of the National Science Foundation to "develop an operational plan for a pilot test of using the Cooperative Extension Service as a vehicle for transferring technology relating to the environment to state and local officials."

2. The planning project will determine which of Oklahoma's environmental problems should be used in a test and which forms of delivery should be tried. It will include the development of measurement criteria to judge the effects of delivery variations.

3. The pilot test is to be built around information obtained from a comprehensive survey directed toward officials and opinion leaders at the grass roots level throughout the State of Oklahoma.

4. Local problem areas will be identified from these data and the feelings of local officials about obstacles to their solutions will be pinpointed.

5. A comprehensive plan will be proposed whereby Cooperative Extension can serve as a transfer mechanism to supply the needed technology, in a form in which it can be utilized and in a manner in which it will be accepted, to aid in the solution of such environmental problems.

7/ Policy Statement issued by M. Frank Hersman, Director, Office of Intergovernmental Science and Research Utilization, National Science Foundation, November, 1973.

Part III

METHODS USED TO ACHIEVE OBJECTIVES

Research Design:

The field research dealt with the perceived environmental problems in Oklahoma and the county and community decision making processes related to the solutions of these problems. For purposes of the research, environment was defined as the conditions of the air, water, land and natural beauty as they affect the well being of people. Major issues specifically concerning population control and the energy crisis were excluded from this investigation, although their impact will obviously color reactions to other environmental problems.

This research provided a data base for understanding how state and local officials feel about Oklahoma environmental problems and the role of education in the solution of these problems. By combining survey results with practical experience, educational specialists should be able to offer a viable plan for environmental technology transfer to assist local government decision making.

In this section, the various aspects of the field research design are explained. This includes the objective, mode of data collection, the survey instrument, the sampling process and the data analysis. A copy of the survey instrument is attached in Appendix E.

Study Objectives:

Attention in the study focused on three primary objectives. Based on the perceptions of the community leaders throughout the state, the objectives were:

1. identification of the felt environmental problems in Oklahoma;

2. identification of primary obstacles to the solution of environmental problems at the county and community level; and

3. assessment of county and community decision making processes for clues as to which technology transfer methods might meaningfully influence the solution of environmental problems.

Research Strategy:

Data for the study were obtained from a relatively simple questionnaire capable of being self-administered. These were issued to groups of respondents in each county of the state by the County Extension Directors. Also, a small proportion of the respondents were contacted by mail or at their places of residence to collect the data. The population for the study was composed of community leaders throughout the state. This population included various state, county and community government officials as well as private citizens.

The survey responses have been analyzed by a number of statistical methods. Primary attention was focused on a simple frequency count and calculation of

descriptive parameters (e.g., arithmetic mean). Cross-tabulation by classification data was utilized along with certain exploratory multivariate statistics (e.g., factor analysis).

The survey instrument was carefully designed and tested. Constructive inputs were secured from a number of interested parties beyond the research team. In particular, a cross-section of individuals familiar with the interests, attitudes and backgrounds of the target audience provided reactions to planned questions and valuable inputs regarding compatibility of the instrument to the study population. Finally, a pre-test of the instrument was administered to groups whose composition reasonably matched the study population. The data were collected by the County Extension Director in each county within a four-week period.

The Sample:

The general population for the study can be defined as the individuals throughout the state who are:

> "active leaders interested in various community activities. (They are to be) . . . . dedicated, broadminded, highly respected individuals, sensitive to the community needs, who . . . . (can be) . . . . entrusted with leadership in the development of the community." 1/

Such was the case with the County Development Councils in each county of Oklahoma. These Councils were recently organized in 73 of the 77 counties in the State of Oklahoma (see Appendix B for details). In the remaining four counties, groups existed which were close enough in character to County Development Councils to warrant surveying them. These Councils were one principal respondent pool for the study. The other principal respondent group for the study were those holding office at Regional (Sub-State), county and municipal levels. Rounding out the categories of respondents were special groups and individuals whose names were submitted by interested state agencies as a check on the validity of the survey.

The Survey Instrument:

The survey instrument had three primary parts in addition to a respondent classification section (see Appendix E). This survey provided the data necessary to achieve the study objectives. All of the questions were structured and required personal evaluation. Parts I and II were direct questions on the county environment and obstacles to the solution of environmental problems. Part III utilized indirect questioning by means of which inferences on educational needs were drawn. Each section is discussed below.

1/ Charlie A. Burns, Dean F. Barrett, George S. Abshier, A Guide for Organizing a County Development Council, Stillwater, Oklahoma, 1972, page 6.

Classification:

A brief set of classification questions were included to provide information on each respondent. This included his/her geographic point of reference, formal position as a county leader, and a general indication of education, occupation, etc.

Part I - Environmental Problems

This section of the survey instrument measured the feelings of respondents on environmental problems in their counties. The four initial questions covered general problems, while the remainder dealt with a large number of specific problems within the broader spectrum. This part provided the data necessary for achieving Objective A of the study.

Part II - Obstacles to Problem Solution

This section identified the degree to which various aspects of the officials' administrative processes represented obstacles to the local solution of environmental problems. The obstacles covered included items from general public problem recognition through problem analysis on to final action. Objective B is directly linked to this section of the survey instrument.

Part III - Decision-Making Atmosphere
(Techniques for Successful Technology Transfer)

This section explored, through indirect questioning, the local decision-making atmosphere and opportunities for educational impact on subsequent environmental decisions. The various questions were interdependent and each jointly reflected various education dimensions. Typical dimensions were: latent need for public education on environmental problems, county and community government needs for information, technical assistance, liaison in intergovernment relationships, and the general nature of a technology transfer system.

Data Analysis:

The data analysis assumed many different forms. Processing of these data have been facilitated by utilizing computer techniques. Simple tabulation of response frequency patterns for all of the questions provided obvious insights into the objectives. Also, aggregation of results by multi-county groups, such as the Sub-State Planning Districts, provided regionalized responses.

Various forms of cross-tabulation utilizing the classification data were conducted. For example, a comparison of the feelings expressed by urban vs. rural in educational needs. Certain multivariate statistical analyses were also used. Factor analysis indicated natural groupings of environmental problems, obstacles to solutions, or aspects of the decision making processes. Also, a clustering routine was of value in grouping respondents according to their perspectives.

The raw survey data were assembled for analysis into the basic form demonstrated by Table #1. Here are responses to each of the 70 items listed as a percentage response at each of the five available points on the scale and the average response for each item. For example, in item 1 (Pollution of the Overall Environment) 24% of the respondees felt there was no problem, 42% felt there was

a slight problem, 26% were more concerned, 6% felt it was approaching a severe problem, and only 2% felt it was severe. The average response for item #1 was 2.2 on a scale from 1 to 5.

The data in Table #1 have been rearranged into Tables #2, #3, and #4 to emphasize the relative concerns of the respondents to each part of the survey. These data were further broken down into groups and into geographic subdivisions (see Appendix D).

Table #2 depicts 31 environmental problems identified by the survey and arranged in a descending order of concern. If a person responded by checking Column #1 (No Problem), he did indeed feel there was no problem. On the other hand, a check in Columns #2, #3, #4, or #5 indicated that a problem existed and the degree of intensity of feeling regarding such problem. Thus, the total responses in Columns #2, #3, #4, and #5 represent a "problem recognition" factor and the average response is a measure of "intensity of feeling."

Table #3 depicts the top twenty "obstacles to problem solution" arranged in descending order of responses, as is indicated in Table #2. The total responses and average position on the five-point scale have the same significance as in Table #2.

The respondents were asked the extent of their agreement or disagreement with each of 15 statements about the environment. These data have been summarized in Table #4. When the respondent checked Columns #1 or #2, he was in agreement; when he checked Column #4 or #5, he was in disagreement. Column #3 represented a neutral position or "No Opinion." Some questions were stated negatively to test the respondents' reliability of understanding and the results suggested the statements were clearly understood.

STATE
Total
2132

	OSU Environmental Survey Question	No Problem 1	2	3	4	Severe Problem 5	Avg. Resp.
		Per Cent Response					
1.	Pollution of the overall environment	24	42	26	6	2	2.2
2.	" of the air	41	28	13	6	2	1.9
3.	" of the water	21	33	28	13	5	2.5
4.	" of the land	22	36	26	12	4	2.4
5.	" of foods by pesticides	43	37	15	4	2	1.9
6.	Destruction of the natural beauty	25	33	25	12	5	2.4
7.	" of wildlife habitats	22	29	27	16	6	2.5
8.	" of the natural vegetation	24	33	25	13	5	2.4
9.	Air pollution from automobile exhausts	40	34	17	7	3	2.0
10.	" " from blowing dust	29	38	21	9	3	2.2
11.	" " from open burning	38	36	17	5	3	2.0
12.	" " from industrial smoke	65	21	8	4	2	1.6
13.	" " from foul odors	45	32	15	5	3	1.9
14.	Noise pollution from airplanes	74	16	7	2	2	1.4
15.	" " from cars, trucks, motorcycles	31	38	19	9	4	2.2
16.	" " from industry	75	19	4	1	1	1.3
17.	" " from recreational development	80	15	4	1	1	1.3
18.	Water pollution from municipal sewage	42	29	15	9	5	2.1
19.	" " from septic tanks	41	31	16	8	4	2.0
20.	" " from agricultural chemicals	52	32	12	3	1	1.7
21.	" " from mining and oil production	52	21	16	8	4	1.9
22.	" " from recreational development	69	21	7	2	1	1.4
23.	" " from industrial wastes	57	24	13	5	2	1.7
24.	Land pollution from industrial wastes	56	26	12	4	2	1.7
25.	" " from municipal wastes	43	32	17	6	2	1.9
26.	" " from deteriorated buildings	25	33	25	12	4	2.4
27.	" " from salvage yards	19	31	27	15	8	2.6
28.	" " from strip mining	74	10	7	5	4	1.6
29.	" " from roadside dumping	8	24	27	22	19	3.2
30.	" " from recreational development	62	24	9	3	1	1.6
31.	Soil erosion from rural areas	20	36	28	11	4	2.4
32.	" " from urban developments	41	30	17	8	3	2.0
33.	" " from unsurfaced roads	17	28	27	17	11	2.8
34.	" " from recreational development	60	27	10	3	1	1.6
35	Herbicide drift causing plant damage	47	33	14	4	2	1.8
36.	Lack of public awareness	8	23	32	23	14	3.1
37.	"Don't care attitude" by the public	6	14	28	30	22	3.5
38.	Inadequate law enforcement	15	26	27	18	14	2.9
39.	Failure to appreciate the problem	6	17	33	28	14	3.3
40	Don't know where to begin	10	22	26	22	17	3.1
41.	Discouraged by previous efforts	22	28	26	17	8	2.6
42.	Little cooperation between communities	17	23	25	20	15	2.9
43.	Lack of leadership in seeking solution	15	22	27	20	15	3.0
44.	Responsibility not clearly defined	12	23	29	23	13	3.0
45.	Confusion over alternatives	14	27	29	18	12	2.9
46.	Public good versus private interests	15	24	27	19	13	2.9
47.	Does not serve enough people	22	31	29	11	7	2.5
48.	Unavailability of federal funds	18	24	24	18	16	2.9
49.	Inability to increase local revenue	17	21	24	21	17	3.0
50.	Public unwilling to pay the costs	11	14	22	27	26	3.4
51.	Stop-gap measures used too often	14	22	31	20	13	3.0
52.	Inadequate technical assistance	22	29	26	15	8	2.6
53.	Inadequate legislation	20	24	27	15	14	2.8
54.	Negative impact on business or industry	23	28	27	14	8	2.6
55.	Others will not do their share	14	23	29	18	16	3.0
		AGREE				DISAGREE	
56.	Env. improvement not worth costs involved	8	14	25	26	27	3.5
57.	Need more intergovernment cooperation	31	26	24	11	8	2.4
58.	Bulletins on env. prob. solutions helpful	36	27	25	8	4	2.2
59.	Local info. not always good for decisions	20	27	27	14	12	2.7
60.	Wkshps. & forums on prob. would be helpful	41	29	14	7	3	2.0
61.	Adequate info. on env. problems available	19	26	27	17	11	2.7
62.	Govt. "red tape" prevents solving pollution prob.	28	19	27	17	10	2.6
63.	Jobs are more important than controlling pollution	13	15	27	22	22	3.2
64.	Tech. knowledge on prob. seldom reaches grass roots	30	30	23	12	5	2.3
65.	Small community cannot afford experts to assist	55	21	11	8	5	1.9
66.	Important to have access to unbiased specialists	55	25	12	5	3	1.8
67.	Not easy to read/understand technical env. info.	17	22	26	21	13	2.9
68.	Should consult local officials before making laws	43	28	20	6	3	2.0
69.	Difficulty in knowing which info. to apply	30	33	27	7	3	2.2
70.	Solution to prob. requires recognition of all	63	23	9	2	2	1.6

TABLE #2

FELT ENVIRONMENTAL PROBLEMS ON A STATEWIDE BASIS

(2165 Responses)

	PROBLEM	PROBLEM RECOGNITION	INTENSITY OF FEELING
1.	Land pollution from roadside dumping	92%	3.2
2.	Soil erosion from unsurfaced roads	82%	2.7
3.	Land pollution from salvage yards	81%	2.6
4.	Soil erosion from rural areas	80%	2.4
5.	Destruction of wildlife habitats	77%	2.5
6.	Destruction of natural beauty	75%	2.4
7.	Destruction of natural vegetation	75%	2.4
8.	Land pollution from deteriorated buildings	74%	2.4
9.	Air pollution from blowing dust	71%	2.2
10.	Noise pollution from cars, trucks and motorcycles	69%	2.2
11.	Air pollution from open burning	61%	2.0
12.	Air pollution from auto exhausts	59%	2.0
13.	Water pollution from septic tanks	59%	2.0
14.	Water pollution from municipal sewage	58%	2.1
15.	Soil erosion from urban development	58%	2.0
16.	Land pollution from municipal wastes	56%	1.9
17.	Air pollution from foul odors	54%	1.9
18.	Pollution of foods by pesticides	54%	1.8
19.	Plant damage from herbicide drift	53%	1.8
20.	Water pollution from mining and oil production	48%	1.9
21.	Water pollution from agricultural chemicals	48%	1.7
22.	Land pollution from industrial wastes	44%	1.7
23.	Water pollution from industrial wastes	42%	1.7
24.	Soil erosion from recreational development	39%	1.6
25.	Land pollution from recreational development	37%	1.6
26.	Air pollution from industrial smoke	34%	1.6
27.	Water pollution from recreational development	30%	1.4
28.	Noise pollution from airplanes	26%	1.4
29.	Noise pollution from industry	25%	1.3
30.	Land pollution from strip mining	25%	1.5
31.	Noise pollution from recreational development	20%	1.3

TABLE #3

PRIMARY OBSTACLES TO SOLUTION ON A STATEWIDE BASIS

(2165 Responses)

	OBSTACLE	PROBLEM RECOGNITION	INTENSITY OF FEELING
1.	Don't care attitude by public	94%	3.5
2.	Failure to appreciate problem	93%	3.3
3.	Lack of public awareness	91%	3.1
4.	Don't know where to begin	90%	3.1
5.	Public unwilling to pay costs	88%	3.4
6.	Responsibility not clearly defined	88%	3.0
7.	Inability to increase local revenue	87%	3.0
8.	Others will not do their share	86%	3.0
9.	Stop-gap measures used too often	86%	3.0
10.	Confusion over alternatives	86%	2.8
11.	Public good compromised by private interests	85%	2.9
12.	Lack of leadership in seeking solution	84%	3.0
13.	Inadequate law enforcement	84%	2.9
14.	Lack of cooperation between communities	82%	2.9
15.	Unavailability of federal funds	81%	2.9
16.	Inadequate legislation	80%	2.8
17.	Programs do not serve enough people	78%	2.5
18.	Inadequate technical assistance	77%	2.6
19.	Discouraged by previous efforts	77%	2.6
20.	Negative impact on business and industry	77%	2.6

TABLE #4
ENVIRONMENTAL DECISION MAKING

(2165 Responses)

STATEMENT	Agree	No Opinion	Disagree
1. Satisfactory solutions to local environmental problems require recognition of the people, resources, and special interests involved	87%	9%	4%
2. In dealing with environmental problems, it is important to have access to unbiased specialists	80	12	8
3. The small community cannot afford to employ experts to assist in environmental planning	76	11	13
4. Local officials have important environmental information and perspectives which should be considered before federal laws and regulations are made	71	20	9
5. Workshops and forums on critical local problems (e.g., municipal waste disposal) would greatly assist leaders and the general public	70	19	11
6. In environmental planning, one frequently has difficulty in knowing which information to apply	66	20	9
7. Fact sheets and bulletins on local environmental problems would be very helpful in problem solutions	63	27	10
8. Technical knowledge on environmental problems seldom reaches the grassroots level of decision making	60	23	17
9. There seems to be a need for more intergovernment cooperation on the planning and execution of environmental improvements	57	24	19
10. Information from local sources is not always a satisfactory basis for local decision making	47	27	26
11. Government "red tape" prevents us from solving many of our pollution problems locally	47	27	27
12. Adequate information on which to base environmental decisions is usually available to me	45	27	28
13. It is not easy for me to read and understand technical information on the environment	39	26	34
14. Jobs and business prosperity are more important than the pollution they generate	28	27	44
15. The value of environmental improvement is usually not worth the costs involved	22	25	53

Part IV

STATE ENVIRONMENTAL PROBLEMS

General Survey Conclusions:

It must be stressed that this survey focused on the concerns of local leaders, those now holding office and other influential local citizens. The rationale for this focus rests on the logical assumption that such citizens, more often than not, represent the citizenry as a whole--else they would not be in office or otherwise be recognized by their peers as being influential in the community. More importantly, however, these are the citizens most capable of initiating action to bring about change if they perceive such change to be needed. Over 2100 people have been polled throughout the state. It is believed that they represent a reliable sample of opinion among the local leaders in every county in the state.

Although we cannot say that these survey results represent how the "people of Oklahoma" feel about their environment, we do believe the results reflect the feelings and attitudes of the leaders among the people.

Problem Delineation:

What, then, are the environmental problems of concern to state and local officials in the State of Oklahoma? The following lists the five top specific problems for local officials (i.e., Sub-State Planning Boards, county officials and municipal officials) in the state as a whole, as taken from Appendix D.

TABLE #5

Environmental Problems Perceived By Local Officials

Sub-State Planning Boards (67 People)	County Officials (253 People)	Municipal Officials (439 People)
1. Roadside dumping	1. Roadside dumping	1. Roadside dumping
2. Salvage yards	2. Unsurfaced roads	2. Salvage yards
3. Unsurfaced roads	3. Salvage yards	3. Wildlife habitats
4. Wildlife habitats	4. Wildlife habitats	4. Unsurfaced roads
5. Destruction of natural beauty	5. Rural soil erosion	5. Deteriorated buildings

The environmental concerns of local officials in the State of Oklahoma, therefore, might be summarized as follows:

1. Land Pollution from Solid Waste

   A. Roadside dumping
   B. Salvage yards
   C. Deteriorated buildings

2. Land Erosion

   A. Rural areas
   B. Unsurfaced roads

3. Concern for Ecological Balance

   A. Wildlife habitats
   B. Natural beauty

Do other influential citizens, as exemplified by members of County Development Councils, feel the same way? A look at a tabulation of the top five problems for this group should answer the question.

TABLE #6

Environmental Problems Perceived By Influential Lay Citizens
(1226 People)

1. Roadside dumping
2. Unsurfaced roads
3. Salvage yards
4. Wildlife habitats
5. Rural soil erosion

It is clear that influential lay citizens in the state agree with those holding elective offices regarding environmental problem priorities.

Do professionals, whose job it is to try and keep up with environmental matters, feel any differently about the problems? USDA Rural Development Committee members and Sub-State Planning Districts staffs feel as follows:

TABLE #7

Environmental Problems Perceived By Professionals
(343 People)

1. Roadside dumping
2. Unsurfaced roads
3. Rural soil erosion
4. Salvage yards
5. Wildlife habitats

Again, we have the same five problems delineated. While this group seems to feel more intensely about problems than some of the others, their priorities are definitely the same.

One final comparison needs to be made. Is there a difference in problems because of heavy population in selected areas of the state, as compared with the previously stated opinions? Sub-States #6 and #8 include Tulsa and Oklahoma City metropolitan areas wherein more than half the people in the state live. What are their five top problem areas?

TABLE #8

Environmental Problems Perceived in Urban Areas
(277 People)

1. Roadside dumping
2. Wildlife habitats
3. Vegetation destruction
4. Salvage yards
5. Air pollution from autos

We still have as top priority roadside dumping, an aspect of solid waste management and ecological concerns as exemplified by concern for wildlife and natural vegetation. Air pollution from autos surfaces with this group as might be expected.

It seems reasonable to conclude, therefore, that local officials and influential lay citizens throughout the State of Oklahoma are consistent in their concern about land pollution from solid waste, ecological balance, and land erosion. If we take into account the concerns of urban areas, we must add to this list air pollution from autos.

The initial areas, therefore, wherein the Oklahoma Cooperative Extension Service will concentrate its efforts in technology transfer in behalf of state and local officials in Oklahoma are as follows:

1. Land Pollution from Solid Waste

   A. Roadside dumping improvement
   B. Salvage yard control
   C. Renovation or elimination of deteriorated buildings

2. Ecological Imbalance

   A. Protection of wildlife habitats
   B. Protection of natural vegetation
   C. Protection of natural beauty

3. Land Erosion

   A. Rural soil conservation
   B. Improvement of unsurfaced roads

4. Air Pollution

   A. Control of motor vehicle exhausts

Perceived Obstacles to Environmental Problem Solving:

Part II of the survey refers to obstacles to the solution of environmental problems based on the personal experience of the respondents. It is our contention, based on the relatively mild responses to the environmental problems section (see Table #2), compared to the intense responses to this section (see Table #3), that local officials were not differentiating in this section between environmental problem solving and other problems they face. THIS SECTION COULD VERY WELL BE CONSIDERED AS INDICATIVE OF OBSTACLES TO ALL PUBLIC PROBLEMS FACING LOCAL OFFICIALS.

Responses to this section should provide evidence to pinpoint barriers to problem solving. Once again, listing the five top obstacles (see Appendix D) as perceived by local officials across the State of Oklahoma should be helpful.

TABLE #9

Obstacles As Identified By Local Officials

Sub-State Planning Boards (67 People)	County Officials (253 People)	Municipal Officials (439 People)
1. Public don't care attitude	1. Public don't care attitude	1. Public don't care attitude
2. Inability to increase local revenue	2. Public unwilling to pay costs	2. Public unwilling to pay costs
3. Unavailability of federal funds	3. Inability to increase local revenue	3. Failure to appreciate problems
4. Failure to appreciate problems	4. Failure to appreciate problems	4. Lack of public awareness
5. Don't know where to begin	5. Lack of public awareness	5. Don't know where to begin

Again, we see a similar pattern among these three groups. We can conclude that elected officials within the State of Oklahoma perceive the obstacles to solving local problems as follows:

1. Public don't care attitude
2. Public unwilling to pay costs
3. Failure to appreciate problems
4. Inability to increase local revenue
5. Don't know where to begin

Influential lay citizens generally substantiate this list of obstacles as the following table indicates.

TABLE #10

Obstacles As Identified By Local Influential Lay Citizens
(1226 People)

1. Public "don't care" attitude
2. Public unwilling to pay costs
3. Failure to appreciate problems
4. Don't know where to begin
5. Lack of public awareness

The professionals generally agreed, but seemed more concerned about lack of resources than general public attitudes.

TABLE #11

Obstacles As Identified By Professionals
(343 People)

1. Public unwilling to pay costs
2. Public "don't care" attitude
3. Failure to appreciate problems
4. Inability to increase local revenue
5. Lack of public awareness

Responses to those in urban areas were similar to those from selected groups within the state. Some concern over the power of private interests surfaces with this group, but otherwise the pattern is the same.

TABLE #12

Obstacles Perceived In Urban Areas
(277 People)

1. Public "don't care" attitude
2. Public unwilling to pay costs
3. Public good compromised by private interests
4. Failure to appreciate problems
5. Responsibilities not clear

We can conclude, therefore, that the obstacles of primary concern to local officials in solving their problems, not only concerning the environment but other public problems as well, might be:

1. Lack of public support
2. Inability to generate sufficient revenue
3. Insufficient professional help (i.e., don't know where to begin.)

Techniques for Successful Technology Transfer:

Part III of the survey explores the local decision making atmosphere for clues to techniques for successful technology transfer. It is assumed that transfer will be accomplished through educational and training techniques, but what kind? Let's examine the responses to Part III of the survey for indications. Again, we look at the five top responses to the statements in Part III (see Appendix C) as indicated by three local levels of officials.

TABLE #13

Technology Transfer Assistance Desired By Local Officials

Sub-State Planning Boards (67 People)	County Officials (253 People)	Municipal Officials (439 People)
1. Solutions require recognition	1. Solutions require recognition	1. Solutions require recognition
2. Access to specialists	2. Small towns can't afford specialists	2. Access to specialists
3. Consult local officials	3. Consult local officials	3. Small towns can't afford specialists
4. Small towns can't afford specialists	4. Access to specialists	4. Consult local officials
5. Difficult to know which information to apply	5. Workshops and forums	5. Workshops and forums

The feelings of these local officials and the feelings of other influential citizens in the state (although data not shown here) coincide. We can express these feelings as follows:

1. Problem solutions require recognition of all pertinent data
2. It is important to have access to unbiased specialists
3. Small towns cannot afford experts
4. Local officials should be consulted
5. Workshops and forums are helpful

Support for Environmental Improvements:

Two questions in Part III of the survey attempted to probe the willingness of the respondents to pay for environmental improvements. These statements were (A) The value of environmental improvement is usually not worth the costs involved and (B) Jobs and business prosperity are more important than the pollution they generate. Of the respondents, 53% did not agree with Statement A in comparison with 22% who did. Of the respondents, 44% did not agree with Statement B while 28% did. Here is a significant indication of the fact that local officials believe environmental improvements are worth the costs and some curtailment of jobs and business prosperity is justified to protect the environment.

We might, therefore, summarize and reword the key points revealed by this part of the survey as indicated below:

A. Local officials recognize they need ready access to technical help in order to solve their public problems.

B. Most local officials do not feel they have the resources to pay for the level of technical help they need.

C. They feel keenly the need to give their inputs to state and federal research planners prior to initiating studies in their behalf.

D. Local officials recognize that workshops, conferences and forums are effective group techniques for transferring technology.

E. Local officials believe environmental improvements are worth the costs and would support, if justified, some curtailment of jobs and business prosperity to bring this improvement about.

Oklahoma's Environmental Priorities:
(As delineated from The Governor's Conference Report on Research and Development Priorities for the State of Oklahoma, August, 1973.)

This report was recently assembled from a statewide conference involving professionals from industry, university faculties and federal, state and local officials. It represents a current professional assessment of environmental problems within the state. This report shows that while the concern of the professionals is broader and more comprehensive, it does include those areas identified in our environmental survey by local leaders as being of basic concern to them.

Research and Development Priorities are: 1/

"1. An inventory of ecologically valuable land and water resources is needed in Oklahoma.

2. Detailed characterization of the composition of the air and water media.

3. An assessment of the ability of Oklahoma's environment to assimilate wastes.

4. A study of the potential social and economic problems where pollution control pressures are likely to close industries.

1/ The Governor's Conference on Research and Development Priorities for the State of Oklahoma, submitted to Office of Intergovernmental Science Programs, NSF. Prepared for Governor David Hall by George W. Reid, Regents Professor, College of Engineering, University of Oklahoma, August, 1973, pages C-15 and C-16.

5. Development of solutions to pollution problems for small and marginal industries.

6. The development of new industries to solve environmental quality problems; matching, unique, potentially reclaimable resources with disposal needs.

7. Research into governmental arrangements for effective land use management.

8. Development of methods to measure the costs of incremental improvements in environmental quality and the use of cost-benefit guidelines in decision-making processes.

9. Development of methods for reduction of airborne particulate matter from natural and agricultural sources.

10. Development of methods for reduction in unit water use and further methods for water reuse."

Obstacles and Desirable Assistance as Determined by the International City Management Association:

The following tables were compiled from a survey as set forth in a report of the Committee on Intergovernmental Science Relations to the Federal Council for Science and Technology and entitled: "Public Technology - A Tool for Solving National Problems". 2/ These results come from urban areas, but coincide with results of Oklahoma survey.

2/ Report of Committee on Intergovernmental Science Relations to Federal Council for Science and Technology, entitled: "Public Technology - A Tool for Solving National Problems".

TABLE I*

OBSTACLES TO OBTAINING SCIENCE-TECHNOLOGY ADVICE

		Local Government** Percent Ranking Important
1.	Inadequate financial resources	75
2.	Lack of information exchange mechanism between levels of government regarding scientific advice and application	47
3.	Lack of supply of qualified science and technology advisors	28
4.	Absence of support from elected officials	25
5.	Inability of science and technology advisors to understand complex government decision process	18

* Surveys by International City Management Association.

** Based on replies received from 295 cities with over 25,000 population.

TABLE II*

DESIRABLE ASSISTANCE PROGRAMS TO PROMOTE SCIENCE-TECHNOLOGY APPLICATIONS

		Local Government** Percent Ranking Important
1.	Better organized R & D information services for benefit of State/local government by Federal government	47
2.	Better organized R & D information services for benefit of local government by State government	37
3.	Federal grants to provide in-service training opportunities for local administrators	37
4.	Federal grants to provide salary subsidies for scientifically and technically trained manpower	31

* Surveys by International City Management Association.

** Based on replies received from 295 cities with over 25,000 population.

The results indicated by these two tables coincide closely with Parts II and III of the Oklahoma Environmental Survey and further substantiates the conclusions reached.

Summary:

On the basis of the analysis of the statewide survey data, described in the previous paragraphs, and other state and national investigations, what have we learned that might be of value in designing a pilot study?

1. We have learned the environmental problems of most interest to local officials at this time. This list may not be the most critical in the eyes of the professional, but on the premise that any public program must start where the people are, this list is all important. On page 18 of this proposal, that list is set forth. The broad headings, statewide, are:

A. Land Pollution from Solid Waste

B. Ecological Balance

C. Land Erosion

In addition, urban areas expressed concern about air pollution from motor vehicle exhausts.

Can we conclude that bodies of technical knowledge exist in federal laboratories and agencies, in private firms and in state agencies which could assist these local leaders to at least partially alleviate these problems? Obviously, this is the case. 3/ Much has already been done which should be of great assistance to them. Better technology transfer is sorely needed. We, the professionals, see this, but do the local officials?

2. Local officials perceive the major obstacles preventing them from solving, not only their environmental problems, but other problems as well, as follows:

   A. Inadequate Public Support (Apathy)

   B. Inability to Generate Sufficient Revenue (Economics)

   C. Insufficient Technical Help (Technology)

   Might these obstacles be read as a plea for more technical assistance on the part of local officials? If more technical knowledge was made available to them in a usable form, would they use it? One cannot reflect upon the meaning of the three listed obstacles above without concluding that local officials desperately want more technical help, not only scientific and engineering technology to help resolve environmental problems effectively and economically, but social technology to assist them in gaining and keeping public support. They would indeed use such technology.

3. How, and in what form, must the technology be transferred for it to be used most effectively by local officials? We obtain an indication of this from the discussion of obstacles on pages 19 and 20 of this proposal, and from the list of suggestions for help as discussed on page 22. We might summarize the information this way:

   A. Ways must be found to put local officials in closer touch with technical help they can use and trust.

3/ "Federal Technology Transfer", August, 1973. Report prepared for NSF Office of Intergovernmental Science & Research Utilization, by Todd Anuskiewicz of George Washington University.

B. The expanded technology transfer effort for local officials must, at the outset, be accomplished at no extra cost to them. Now they don't believe they have the resources to purchase the service.

C. Local officials want some system established wherein their views can be voiced on pending research plans regarding their activities.

D. Local officials will participate in activities designed to transfer technology (i.e., workshops, conferences, demonstrations, etc.) if they are tailored to their needs. They are familiar with these types of transfer mechanisms. They have been helped by similar activities in the past.

Part V

MECHANISMS FOR GENERATING AND APPLYING ENVIRONMENTAL R&D INFORMATION IN OKLAHOMA

Introduction:

In an effort to obtain some idea of the extent of environmental R&D activity in Oklahoma, information was obtained from the Smithsonian Science Information Exchange, Inc. The Smithsonian automatically receives copies of all federally sponsored research project summaries. Many state and local governmental units, as well as private foundations and business organizations, also voluntarily report on some of their research activities.

While it is recognized that the data obtained from the Smithsonian does not represent all the environmental research going on in Oklahoma, it is representative and is as good an indication as can be found of "the mechanisms for generating environmental R&D in Oklahoma". A detailed summary of these data are contained in Appendix B.

Federal:

Judging from the Smithsonian reports, federally sponsored environmental research (excluding academic institutions) in Oklahoma is probably in the neighborhood of $1½ million per year (Appendix B, page 5). The two federal laboratories in the state most active in environmental research are the Bureau of Mines at Bartlesville and the Kerr Environmental Research Laboratory at Ada. The Oklahoma City office of the Geological Survey Section of the Interior Department, the Civil Aeromedical Institute (in Oklahoma City) of the Department of Transportation, and the USDA Soil and Water Conservation Service in Chickasha and Stillwater also conduct environmental research, but on a smaller scale.

As far as can be determined, no mechanism exists for getting the combined results of these environmental research efforts to the people at the local level on a systematic basis. Technology transfer, if applied at all, is haphazard and spotty. From these data, only two projects totaling about $20,000 out of the over $3 million spent could be classified as an effort in technology transfer.

Obviously, more effort to transfer just the technology generated by these federal efforts within the borders of the State of Oklahoma, let alone the remainder of the country, could materially benefit state and local officials.

State:

The Smithsonian reports indicate only a modest environmental R&D effort by the State of Oklahoma agencies, approximately $180,000. This is in keeping, however, with the findings by the Committee on Intergovernmental Science Relations wherein

they report that state and local R&D effort is, as yet, so small as to produce negligible amounts of public technology. 1/ Even here, over half of the environmental research conducted by state agencies is under federal contract and not from state funds.

An examination of the official mandates of most state agencies reveals that administrative and regulatory functions dominate their work. 2/ Only a modest R&D effort is perceived by most state agencies as being within their purview. This could be one major reason why R&D effort is left to federal agencies, private foundations and academic institutions.

This points out clearly why state government agencies need the technology transfer from the federal, private and academic sectors. They just don't generate enough technology on their own to solve their problems. As far as can be determined, no significant effort is being made to bridge this gap at this time. Several recent attempts have been made, but in the end funding problems have caused cessation of activities or delays in implementation.

Local:

The Smithsonian reports contain no reports of local R&D projects. This does not mean that some modest activity under the name of research is not going on, at least in the state's two major cities. Even here, though, the effort is usually economic analysis or data analysis associated with planning. Environmental research, in the strict sense of the term, is non-existent.

The cities which can afford Engineering Departments or a City Engineer receive what technology transfer they use this way. The private sector, through consulting and sales engineers, furnishes a great majority of the technical information used.

For small and medium sized communities in Oklahoma, who think they cannot afford full time technical capability, not only is there no specific environmental research, but the mechanisms for technical transfer of existing environmental information from other sources are not there. As the Oklahoma environmental survey shows (see pages 22 to 23), local officials want more help which they are not now receiving.

Academic:

According to the Smithsonian reports, environmental research in academic institutions in Oklahoma is near that of the federal laboratories. Over a million dollars per year is spent on environmentally related research in universities and colleges. The two state universities account for practically all of this research (see pages 7 to 10, Appendix C), with Oklahoma State University, the Land-Grant University, conducting the largest program.

1/ "Public Technology--A Tool for Solving National Problems", Report of the Committee on Intergovernmental Science Relations to the Federal Council for Science and Technology, May, 1972.

2/ 1973 Directory of Oklahoma, Compiled by Lee Slater, Secretary, State Election Board.

Here, also, we see greater evidence of technology transfer efforts as should be expected, since this is one of the purposes of universities and colleges. The Environmental Information and Media Center, at East Central State College in Ada, has a legislative mandate to furnish environmental information to Oklahoma agencies and institutions. It spends over $75,000 per year to do this. Oklahoma State University and the University of Oklahoma also engage in projects which can come under the heading of technology transfer. Nevertheless, the effort is modest considering the extent of research, and no system exists (outside of Agricultural Research) to consistently share the results of research with state and local officials or which is even more important, TO INFORM UNIVERSITIES OF ENVIRONMENTAL RESEARCH NEEDS AT THE LOCAL LEVEL.

Other:

Obviously, much environmental research pertaining to the profit-making goals of Oklahoma Industry is not covered by the Smithsonian reports. It is proprietary in nature and is not likely to be disclosed except as a product or service to be sold by the corporations. Still, joint conferences, symposiums and forums can and do provide a basis for sharing much information.

The Smithsonian reports do reflect, however, grants by federal agencies to private firms for specific research. In Appendix B, page 11, an indication is given of such research in Oklahoma. It is significant. There is no mechanism within Oklahoma for sharing the results of this research with state and local officials on a consistent basis and in turn informing the private sector of environmental research needs as perceived by local officials.

One of the grants reported in this category deserves special mention. The Midcontinent Environmental Center Association (MECA) is a recently created consortium of private firms, state agencies and institutions of higher learning concerned with environmental research and development in Oklahoma. In a limited way, it is accomplishing environmental technology transfer. In the spring of 1973, MECA received a $25,000 grant to organize and conduct "A NATIONAL FORUM ON GROWTH WITH ENVIRONMENTAL QUALITY". The forum, held in Tulsa, Oklahoma, in September, 1973, was a great success. Over 600 concerned scientists, business executives, public officials and concerned citizens participated. They came from all over the country. Environmental issues were aired in a comprehensive and thorough manner. The entire forum was recorded on colored video tape and on audio tape. Here was a superb attempt at environmental technology transfer. But when the forum was over, that was it--at least for the present. Local citizens in Oklahoma and elsewhere, outside of the news coverage of the forum, had no means for sharing in this forum. The means does not now exist for disseminating to the grassroots level the costly and highly relevant results of this forum; results which have, at some considerable expense, been caught and preserved on audio and video tape and could easily be shared with a broader audience, if the system existed for doing so.

This, once again, highlights the need for a comprehensive on-going delivery system reaching to the grassroots level which could be employed to multiply significantly the impact of such excellent environmental forums, symposiums, demonstration projects, etc.

Part VI

OPTIONS FOR NEW APPLICATION MECHANISMS

It is obvious from the environmental survey (page 22) that local officials in Oklahoma recognize the need for more technical assistance in solving environmental problems. They want help and they want to convey their ideas on what should be done to the researchers (page 23).

It has also been clearly shown that professional opinions within the state substantiate the concerns of local citizens and stress the need for more utilization of available technology (page 23) to solve local environmental problems --local problems which multiplied by the number of localities in the country become state and national problems.

When a careful examination is made of the environmental research going on just within the State of Oklahoma, it is impressive (see Appendix B), let alone that being conducted elsewhere in the country. Even here, within the state, only a modest and somewhat haphazard effort is being made at environmental technology transfer. Considering the seriousness of the problem (the energy crisis only intensifies the environmental issues) and the desire of local leaders for help--all too little is being done.

New application mechanisms for the results of environmental research are obviously needed. Listed below are four possible approaches to setting up new mechanisms:

1. Create new public organizations within the state whose purpose it is to stimulate research utilization in environmental areas. Federal funds would be utilized for start-up of the program with the hope that state and local funding would be forthcoming to support an on-going program.

   No one can argue that this approach could not work, given sufficient federal funding and state political support. The problem here is adequacy of either ingredient and the accompanying long term support. Starting something new is expensive. It invariably creates political opposition from existing organizations and institutions who have a vested interest in such matters. Considerable time is needed to demonstrate competence and establish the contacts and support necessary for survival; time which the general public and political institutions are usually unwilling to give. So, the examples are legion during the last decade of new programs and new organizations which have been organized and funded, organizations which accomplished their short term goals, but floundered shortly thereafter for lack of federal funds and local support. For example, "The Oklahoma Foundation for Research and Development Utilization" was incorporated on June 1, 1972, under the non-profit private corporation laws of the State of Oklahoma and received its tax exempt certification from the Internal Revenue Service on August 30, 1972.

The Oklahoma Foundation received $6,300 from the National Science Foundation through a supplemental grant to the University of Oklahoma Research Institute for the Governor's Conference. A proposal for first year operation under the NSF's Intergovernmental Science Program was prepared, but due to national funding problems, the actual grant did not materialize. The Foundation was then forced to delay implementing the intent of its organizers due to funding problems. 1/

2. Create and/or expand technology transfer units within existing federal agencies and laboratories to disseminate needed environmental technology to state and local officials.

There is no question but that each federal agency and laboratory is going to have to give more attention to sharing the results of its research with the general public, as previous sections in this report (pages 21 to 23) have pointed out. Some kind of liaison office, if it doesn't already exist, is going to have to be created and/or expanded to expedite technology transfer to the public sector. In addition, special technology transfer units are needed to expedite the entire process. The excellent Technology Transfer Section of EPA is an example of the kind of service federal agencies are going to need to increase. Such an effort will most likely be encouraged by Congress and the Office of Management and Budget.

Such moves as these, however, are far cries from setting up the communication network to reach every nook and cranny of America, to contact every local official in the most remote hamlet and support the efforts of tens of thousands of local action groups.

Furthermore, even if the enormous funds needed for such an endeavor could be gleaned from Congress and supported by the Office of Management and Budget, which is highly unlikely, the time needed to set up such a system, work out the operational mechanisms and GAIN LOCAL ACCEPTANCE would be far greater than the political impatience of the general public referred to above would likely allow. So, it is highly improbable that despite increasing pressure on federal agencies to disseminate the results of environmental research to state and local officials much broad based public assistance can be accomplished by this means.

1/ The Governor's Conference on Research and Development Priorities for the State of Oklahoma, August, 1973, page 49.

3. Encourage universities and other institutions of higher learning, through appropriate funding support, to assume a more active role in technology transfer of environmental research to officials at the state and local level.

There is no question but that such an effort should and will be encouraged. The professor in his classroom and laboratory and the local official at the grassroots level have been distrustful of each other far too long for the benefit of either, or for the benefit of the country as a whole.

The proliferation of community colleges and vocational-technical schools across the country are manifestations of the effort to bring education back closer to the people and their problems. The expansion of University Extension programs (as differentiated from Cooperative Extension Services of Land-Grant Universities and Colleges) in recent years, where the University has been going to the people, is another example of this trend.

We see this movement, however, still bound essentially by traditional educational methods. Classes for credit, schedule and residence requirements, degree awarding, special conferences and symposiums, etc., are all too prevalent in this movement. Not that such is not important; it is. But the kind of quick response, problem solving technology transfer needed by local officials to help them solve their problems when they need the solution is just not designed into this process. The freedom of the professor to drop his class and assist the local official, or work on an emergency problem at the expense of his regular classes is severely limited, and rightly so. The point here is that the higher education Extension process is largely educational in nature and as such is not conducive to the problem solving process central to technology transfer. It has and will continue to make a major contribution to the solution of long term problems, but is not normally constituted to respond to short term needs.

4. Contract with private industry the job of transferring the needed environmental technology.

There is no question but that, all other things being equal, the private sector can often do the job better and at less cost than a corresponding public institution. There is something about the discipline of having to keep expense below income and the corresponding reward of getting to keep the difference (i.e., profit) that motivates most people far more than the altruistic goals of public service.

But the critical point which is so often overlooked when calling on the private sector to assist in the solution of a public problem is that ALL OTHER THINGS ARE NOT EQUAL. The private firm must make a profit to survive. Profit making in the pursuit of solutions to public problems is somehow frowned upon by the general public in this country, despite our supposed widespread belief in the "free enterprise system". Consequently, the private firm finds itself

quickly at a severe disadvantage in carrying out its public mission as the various public institutions with vested interests in the venture slowly but inexorably raise the visible and invisible barriers which drive the private firm from the field.

Private firms can do public research and do it well. They cannot, however, successfully mount a broad based technology transfer program for state and local officials. The cooperation and support so necessary for success, which must be obtained from many public institutions and political bodies, just can't be obtained; and even if it were obtained by some miracle, it could not be sustained long enough for a successful demonstration.

The Cooperative Extension Demonstration

Every study which has been commissioned recently to examine public technology and how to improve its utilization has referred to the Cooperative Extension Service of the U. S. Department of Agriculture and the various State Land-Grant Universities as the prime example of successful technology transfer, almost in the field of technical agriculture.

This successful system did not materialize overnight, but has been slowly evolving over a fifty-year period. It is an established institution very much a part of the locale everywhere it exists. People accept and trust the people who represent the Cooperative Extension Service in their community. This acceptance and trust is a very fragile but vital part of the pattern of success. It has been built by a long history of relating to the needs of the local people and helping them solve their own agricultural problems.

Most of the weaknesses referred to in exploring other options for new application mechanisms for environmental technology transfer do not exist in Cooperative Extension.

1. Cooperative Extension is a long established public institution with adequate funding and broad based public support. Given enough supplementary assistance to institute and stabilize an environmental Extension delivery system, then the vagaries of federal funding and changing public interest will have a minimal effect. Thus, a program instituted within this system should have the greatest possible chance of long-term survival.

2. Cooperative Extension organizations exist in every State in the Union and in almost every County. To the extent that one organization can penetrate "every nook and cranny" of America, Cooperative Extension does. Funds from federal, state, local and private sources exceed $400 million annually. 2/ To replicate such a system today would cost far more than any agency can justify in reference to its other priorities. So, if a compatible means can be found to utilize the Extension network, a relatively inexpensive but highly effective system will be available to transfer environmental technology to the grassroots level throughout America. Such technology can be introduced at the local level with the maximum likelihood of acceptance because of the reputation of Cooperative Extension and the skill of its personnel in adapting programs to local needs.

3. The Cooperative Extension Service has as its major function the quick-response delivery of problem solving information. The educational techniques and training methods utilized are tailored to the requirements of the local citizens. College degrees and classroom hours are not the primary focus of Cooperative Extension. Solving local problems is. Thus, an already functioning system exists for technology transfer. It should not be difficult at all to adapt the system to environmental science. In fact, much agricultural technology today is focused on environmentally related problems (i.e., feedlot runoff control, pesticide management, soil and water conservation, wildlife management, etc.)

4. The high visibility and long-time existence of Cooperative Extension has enabled it to accommodate the other public agencies and institutions within the state. There is a history of cooperative ventures with almost every state institution. The mechanisms exist; the officials are known.

   Here, again, we have a situation where potential forces which can and do kill public programs are already largely neutralized. The managerial awareness and skill in coping with potentially new problems brought on by new programs is an integral part of the Cooperative Extension administrator's capabilities.

No wonder, then, every study group commissioned to examine the question of technology transfer to the public sector has come face to face with Cooperative Extension as an effective system which is already established and working well. It is logical, then, to ask: "Why don't we try to use it in other areas?"

Thus, the issue at hand is how to utilize Cooperative Extension to transfer technology in non-agricultural areas, technology which is important to the solution of the many public problems now plaguing our Nation. For purposes of demonstrating how this might be done, the ENVIRONMENT has been selected as the field on which to concentrate.

2/ "Federal Technology Transfer", by Todd Anuskiewicz of George Washington University, August, 1973.

Part VII

AN ENVIRONMENTAL EXTENSION PROGRAM

Environmental Technology Transfer by the Cooperative Extension System:

This pilot demonstration would focus on environmental issues and attempt to demonstrate that Cooperative Extension can transfer such technology effectively and economically to state and local officials in a form they can and will use to solve their own local problems. It is not proposed that this effort will eliminate the need for alternate transfer mechanisms. Far from it. It will attempt to show how to utilize this existing resource effectively in cooperation with existing organizations before establishing new and expensive additional systems.

The question, then, is how might this be done? The pilot studies to be conducted in Oklahoma, Colorado and Tennessee propose to find out. The critical areas for test are as follow:

1. Can the federal agencies and their counterparts in the Federal Regional Councils interface with the Cooperative Extension system to transfer needed technology to local officials in an effective manner? Can federal laboratories within the state be used? Can research groups be apprised of local needs in time to conduct the relevant research or design the needed technology or legislation?

2. Can the Cooperative Extension system serve the various state agencies and institutions that have technology to transfer but lack an Extension capability necessary to communicate most effectively at the levels of local decision making?

3. Can the technical resources of the private sector be melded into the overall educational effort in a mutually satisfactory manner?

4. Can the Cooperative Extension system, traditionally oriented towards agriculture, adjust to perform a creditable service in this broader area without sacrificing existing programs?

5. Will the technology package and transfer techniques now being used for technical agriculture prove equally effective for other technologies to be transferred to non-agricultural audiences? What new techniques, if any, should be utilized in this new endeavor?

These basically are problems of organization and management. The right combination of men, methods, materials and money should produce a satisfactory solution. The pilot test, then, must come to grips with statewide organizational structure and operational procedures to determine what will and will not accomplish the desired objectives.

Since the purpose of this demonstration is to determine whether or not the Cooperative Extension system is flexible and adaptable enough to meet this new challenge, it seems appropriate that the first administrative design for the

Oklahoma project should be identical to the one now being used by Oklahoma State University Extension. Organizational support most likely will have to be provided to deal with these new dimensions. The pilot study will afford the opportunity to determine what such modifications might be and test their effectiveness. THE STATE-WIDE SYSTEM WILL BE TESTED. INDIVIDUAL DIFFERENCES BETWEEN COUNTIES WILL BE TAKEN INTO ACCOUNT, BUT A STATEWIDE EFFORT WILL BE MOUNTED.

Inadequate technology transfer is basically a problem of communication. Knowledge exists in one place and is needed in another. The challenge of this project is to accomplish the proper linkups and establish suitable channels so that the technology can be transferred to the people who need it, in a form they can use.

For the Pilot Demonstration to be successful, it must do five things:

1. Identify, in conjunction with local leaders and experts, problem areas wherein technical assistance is needed.

2. Search federal and state agencies, laboratories and private firms for applicable technology for local officials to use in solving their perceived problems.

3. Develop suitable ways to accomplish the transfer of this technology in usable forms. This may require additional explanations and illustrations making use of a wide range of communications hardware and techniques and also the expertise of other departments at OSU, as well as the capabilities of other institutions and agencies in the state.

4. Deliver technology at the right place, at the right time, and in a form the local officials can readily use. This involves making optimal use of the Extension field staff, the unique feature of Cooperative Extension which would be most difficult to duplicate under any alternate delivery system.

5. Report needs for new research to appropriate authorities. Through this means, research laboratories can be alerted to local research needs.

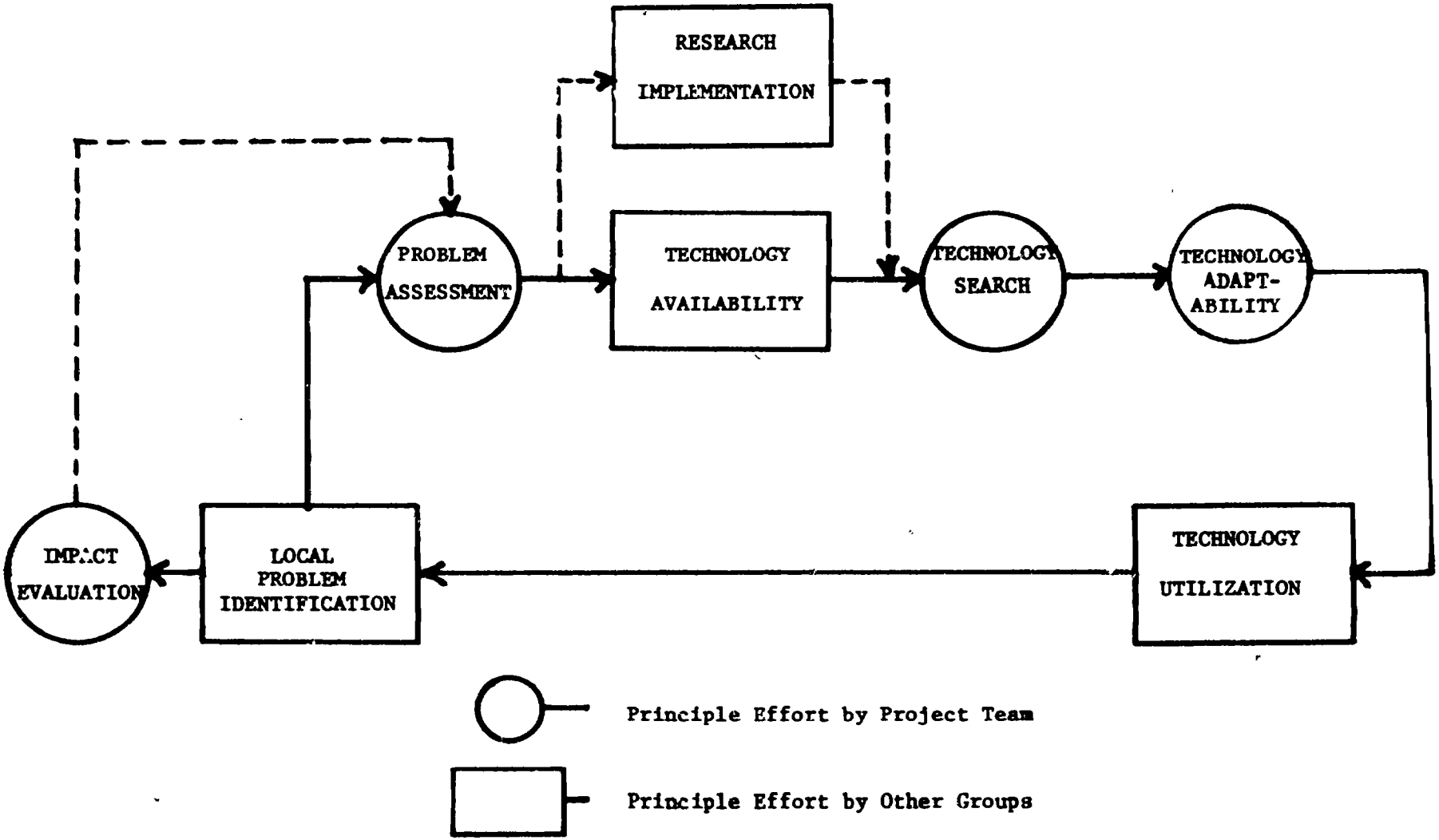
Pilot Demonstration Functions

In order to accomplish the five goals set forth above, eight functions must be accomplished within an organizational framework (see accompanying flow chart). The capability of the Cooperative Extension organization to successfully handle environmental technology transfer can be assessed against these functions. The functions to be covered are:

ENVIRONMENTAL TECHNOLOGY TRANSFER SYSTEM

(A Flow Chart)

NOTE: This is a means for focusing the benefits of technology on locally identified problems.



1. Local Problem Identification Function
2. Problem Assessment Function
3. Technology Availability Function
4. Research Implementation Function
5. Technology Search Function
6. Technology Adaptability Function
7. Technology Utilization Function
8. Impact Evaluation Function

One possible means for discharging these functions is described as follows. It must be stressed, however, that this approach would most likely have to be altered as operational experience dictates. Tentative organizational units (i.e., Project Team, Program Review Committee, Regional Council Interaction Committee, etc.) referred to in this section will be described in detail in a following section.

1. Local Problem Identification Function:

   A. Surveys, group discussions and conferences would be utilized by Cooperative Extension personnel to pinpoint problem areas. RESULTS OF ENVIRONMENTAL SURVEY (CONDUCTED IN INITIAL STUDY) CAN FORM BASIS FOR INITIAL EFFORT. This effort can be accomplished by the PROJECT TEAM and the existing Cooperative Extension network.

   B. Recommendations from State Regulatory Agencies and Sub-State Planning Districts will be considered. This can be accomplished through a PROGRAM REVIEW COMMITTEE composed of members of these organizations.

   C. Necessary inputs, at local level, of federal legislation and regulations can be identified by federal agency representatives at Southwest Regional Council. These inputs can be obtained through a REGIONAL COUNCIL INTERACTION COMMITTEE comprised of Regional representatives of all federal agencies engaged in environmental activities.

2. Problem Assessment Function:

   The Project Team should provide the major thrust for assessing the state of a situation, describing the stage of development, the technical progress already made, and what is left undone. The team should have the technical expertise to scope such an assessment. The PROGRAM REVIEW COMMITTEE should be briefed on major problem areas to be attacked. Any of their suggestions could then be incorporated into a revised problem assessment picture. Inputs

from the IMPACT EVALUATION COMMITTEE should also be taken into consideration as the test demonstration progresses. The end product of this function is as complete a picture of the technical dimensions of the problem as can reasonably be determined. Only by doing this can answerable questions be raised regarding additional technology requirements.

3. Technology Availability Function:

Only after problem area has been properly assessed can technology needs be identified. Once this has been accomplished, as indicated in step 2 above, then it becomes possible to determine where technical help is needed and can be obtained.

The Project Team would most likely prepare a brief on the assessment results. They would include in this brief ideas, generated from their own expertise, regarding the technology needed and where it might be obtained. In addition, in many cases, THE ENVIRONMENTAL INFORMATION AND MEDIA CENTER AT ADA would be asked to do a comprehensive technology information search.

Upon completion of the brief, a TECHNICAL ASSESSMENT COMMITTEE would frequently be convened to explore the problem in greater depth to:

A. determine specific nature of technology to be sought;

B. identify location of repositories of such technology;

C. specify any technical gaps suitable for additional research.

4. Research Implementation Function:

One of the important by-products of this entire process should be the generation of more specific research applied to local needs in the environmental area.

Once a TECHNICAL ASSESSMENT COMMITTEE has pinpointed technical gaps in the problem solution needs area, the PROJECT TEAM can prepare a succinct statement of the nature of this gap and why additional research is needed.

A RESEARCH IMPLEMENTATION COMMITTEE could then be convened. This group could examine the research need and determine a course of action to institute a research program in this area.

The Project Team would see to it that the "course of action" recommended is followed and report back to the Research Implementation Committee on its progress.

5. Technology Search Function:

The Project Team should take the recommendations of the TECHNICAL ASSESSMENT COMMITTEE and do what is necessary to accumulate the technology required.

Contacts should be made with a FEDERAL REGIONAL COUNCIL INTERACTION COMMITTEE for needed assistance from federal agencies.

Required contacts with federal laboratories, other state academic institutions, state agencies and the private sector should be made.

Washington, D.C., liaison would be utilized as well as any other required national contacts. It is anticipated, though, that if the system functions as it should, most necessary out-of-state help can be obtained through the auspices of those institutions already engaged in environmental research within the State and the Federal Region.

6. Technology Adaptability Function:

This is a crucial step in the technology transfer process. Here is where the "TRANSFER" will really be made between the available technology on the one hand and the usability of the technology at the local level on the other.

The expertise of the Project Team will largely determine the effectiveness of this process. Much of this work they must do themselves. Some of it they can sub-contract to university personnel and private contractors. In any event, they must determine what is to be done, what can be farmed out, and what they must do themselves.

Adapting the accumulated technology involves:

A. Determining the form in which technology will be disseminated (i.e., fact sheets, brochures, public information programs, conferences, forums, demonstration projects, etc.)

B. Preparing necessary materials to accomplish transfer.

C. Selecting and determining the training needs of those who will participate in the implementation process. Often the selected program implementers will be Cooperative Extension field personnel with long experience in Extension. University Specialists might well comprise a group. Newly hired specialists and/or consultants might be used. In some instances, selected local officials themselves might be utilized as trainers. In any event, whomever is selected, he or she would be subjected to a vigorous training program before going to the field.

Once the "transfer strategy" has been worked out and the implementation program developed on a major problem, the PROGRAM REVIEW COMMITTEE might often be convened to review and comment on the

proposed program. Here is where a final check can be made regarding any potential duplication or conflict with other state programs. The final plan which emerges from such a review should have broad state support.

7. Technology Utilization Function:

This is the final proof of the value of the work thus far. Here, again, this phase of the work would be closely managed by the PROJECT TEAM and implemented through the Cooperative Extension Network.

The first step most likely would be the training of the program implementers. Here, the use of Implementation Facility (see pages 52 to 53) will be critical. In fact, the ability of Cooperative Extension to utilize its own existing personnel statewide will depend upon the effectiveness of this training system. A Training Center, employing the most advanced educational methods and utilizing from a cost benefit standpoint advanced educational technology, should enable maximum impact to be made on the trainers in a minimum of time. In this business, time is the critical factor.

The second step should involve the standard Cooperative Extension Network. County Directors, Community Resource Specialists, etc., would be called upon to organize and promote required meetings to impart usable technology to the local officials. IT MUST BE REMEMBERED THAT THE TECHNOLOGY TRANSFER PACKAGES WOULD BE EDUCATIONAL IN NATURE. HELP SHOULD BE PROVIDED IN A FORM SUCH THAT LOCAL PEOPLE CAN SOLVE THEIR OWN PROBLEMS.

The final step is the execution of the Implementation Plan. Meetings are held. Demonstrations are conducted. Materials are dispensed, etc.

8. Impact Evaluation Function:

After the final meeting has been held and the last bit of material dispensed, comes the period of watching and waiting. WILL THE PEOPLE USE THE ASSISTANCE PROVIDED? WHAT TANGIBLE EVIDENCE CAN WE PROVIDE TO INDICATE USE?

The internal evaluation process (described in detail in pages 53 to 55) must be handled by the PROJECT TEAM. At the same time the technology transfer program is being developed, the evaluation process must be determined. This is a continuing process.

Observations by Cooperative Extension field staff can provide much of the basic data upon which evaluation can be determined.

Other techniques and methods, however, must be devised to evaluate, not only the impact of the programs upon the recipients, but the capability of the Cooperative Extension System itself to function effectively with this new program area.

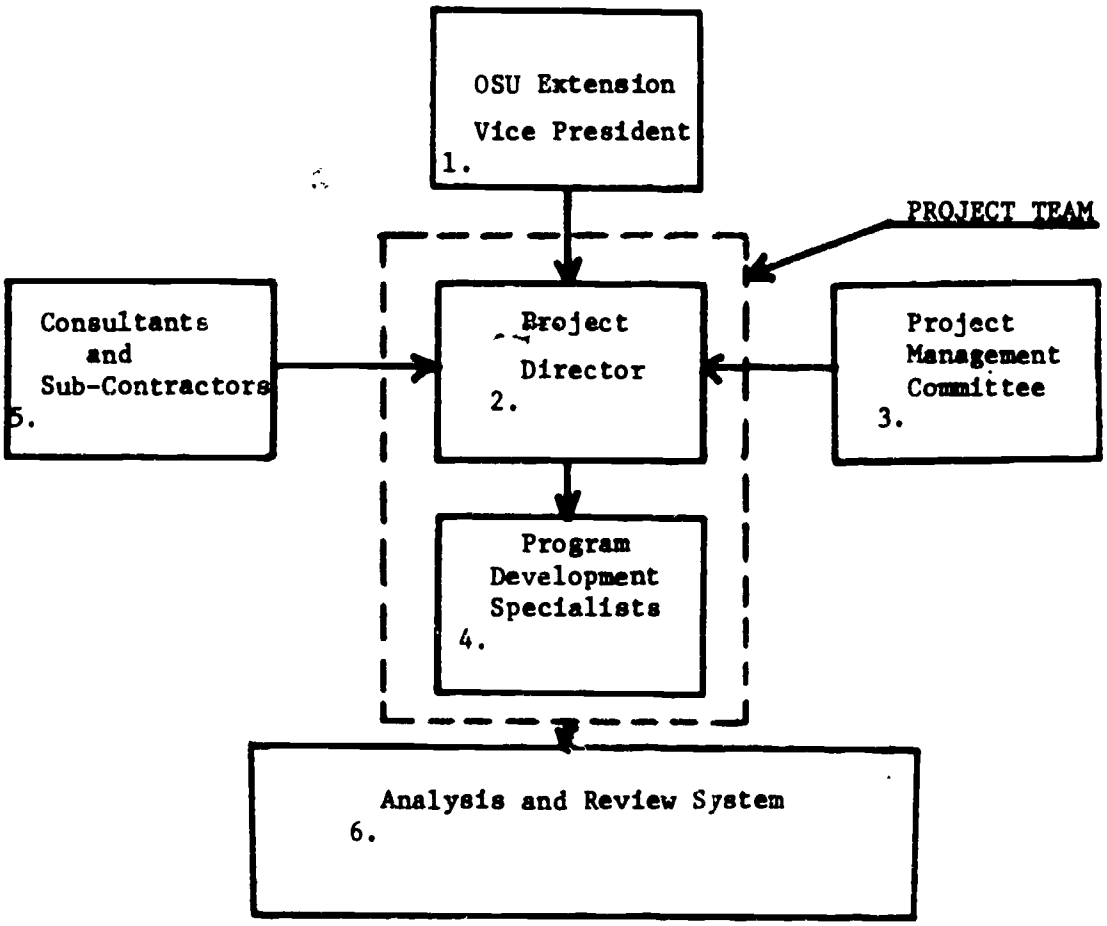
An IMPACT EVALUATION COMMITTEE would finally be convened by PROJECT TEAM to hear results of accumulated evaluations and recommend action.

The final loop in the overall technology transfer system is closed with the feedback provided by the evaluation process to the Problem Assessment Function.

Managerial and Analysis and Review Systems

Successful completion of this Environmental Extension System demonstration calls for a clearly defined managerial system and an analysis and review system.

One approach to a Managerial and an Analysis and Review System is diagrammed as follows:



1. The Vice President for Extension at Oklahoma State University should have final responsibility for the successful completion of this important project. The Project Director would report directly to him.

2. The Project Director would be directly accountable to the Vice President for Extension for the successful completion of the project. He must be an experienced environmental scientist with broad Extension experience. All participants in the project would be under his direction.

3. A Project Management Committee from Oklahoma State University could provide the needed managerial guidance to the Project Director in the conduct of the project. The Director of the Community Development Institute, a specialist in Cooperative Extension field work, the Director of the Center for Local Government Technology from the College of Engineering, and the Assistant to the Vice President for Extension would most likely constitute the committee.

4. Program Development Specialists would be selected to provide needed support for the Project Director in the conduct of the project. These specialists will, in a sense, be Technical Expeditors. They should prepare plans that will bring about the kind of interaction needed for the success of the project. They should facilitate the completion of goals and objectives decided upon in joint deliberations.

   This small group of specialists, along with the Project Director, will constitute the PROJECT TEAM referred to elsewhere in this report.

5. Consultants and Sub-contractors who are technical specialists in their fields can and should participate heavily in the project. Fact sheets, brochures, technical presentations, etc., can be obtained from this source. University professors, private consulting engineers, laboratory workers, etc., will be vital contributors.

6. The Analysis and Review System in this project should be reasonably complex because of the number of organizations and institutions which must be dealt with. There is no way such a project as this can function without these inputs.

   In fact, the success of the project will rest upon the ability of the PROJECT TEAM to orchestrate the concerns, abilities and resources of the following: (See table, page 47.)

A. State Cooperative Extension Service

B. Oklahoma State University

C. University of Oklahoma

D. Environmental Information and Media Center at Ada

E. Federal Laboratories within the State

F. State Agencies and Planning Districts

G. Southwest Regional Council

H. Private Sector (Mid-Continent Environmental Center Association)

I. National Agencies and Institutions

As the table shows, the necessary communication channels would be established through a committee structure. Utilizing these committees in the manner previously shown can enable the PROJECT TEAM to receive the needed inputs necessary to the completion of the project. These committees are suggested for a beginning. Experience will most likely dictate the reorganization of most of these groups before the project is over.

Not all the communications will take place through these channels. Informal communications will probably be the most important. Still, informal communications are greatly enhanced through the existence of a formal structure.

ANALYSIS AND REVIEW SYSTEM TABLE

ORGANIZATION	FUNCTION RESPONSIBILITY	PARTICIPATION METHODS
1. Cooperative Extension Service	1. Local Problem Identification 2. Problem Assessment 3. Technology Adaptability 4. Technology Utilization 5. Impact Evaluation	1. Project Management Committee 2. Program Review Committee 3. Project Team Assignments 4. Project Impact Committee
2. Oklahoma State University	1. Technology Availability 2. Research Implementation 3. Technology Adaptability	1. Project Management Committee 2. Technical Assessment Comm. 3. Research Implementation Comm 4. Program Review Committee
3. University of Oklahoma	1. Technology Availability 2. Research Implementation 3. Technology Adaptability	1. Technical Assessment Comm. 2. Research Implementation Comm 3. Program Review Committee
4. Environmental Information and Media Center at Ada	1. Technology Availability 2. Technology Search 3. Technology Adaptability	1. As an Organizational Unit 2. Program Review Committee 3. Special Assignments
5. Federal Laboratories in State	1. Technology Availability 2. Research Implementation 3. Technology Search	1. Technical Assessment Comm. 2. Research Implementation Comm
6. State Agencies and Planning Districts	1. Local Problem Identification 2. Problem Assessment 3. Technology Adaptability 4. Technology Utilization 5. Impact Evaluation	1. Program Review Committee 2. Project Impact Committee
7. Southwest Regional Council	1. Local Problem Identification 2. Technology Availability 3. Technology Search	1. Regional Council Interaction Committee
8. Private Sector	1. Technology Availability 2. Technology Adaptability	1. MECA 2. Technical Assessment Comm. 3. Program Review Committee
9. National Agencies and Institutions	1. Technology Availability 2. Technology Adaptability	1. Washington, D.C. Based Liaison Center

Project Committees

It is believed that the mechanics of dealing with the groups previously mentioned can best be set up through a committee structure. The following committees are suggested along with the means for organization and operation.

1. A Program Review Committee

   Purpose: To enable concerned state institutions and agencies to become aware of major projects before they are selected for a technology transfer program and then to review planned programs before execution. This way sensitive issues can be recognized in time to resolve them. Duplications can be avoided and supportive elements recognized and used. It is not expected, however, that this committee would pass on every matter. The judgment of the Project Director would determine what matters should come before this committee.

   This is a committee recommended by the statewide Planning Committee which has assisted in the execution of the initial study in Oklahoma.

   Membership:

   A. Concerned State Agencies and Organizations

   B. State Institutions of Higher Learning

   C. The Private Sector

   D. Professional Engineers and Consultants

   E. State Legislative Groups

   F. Environmental Information and Media Center at Ada

   Operation:

   A. Committee would meet on call by PROJECT TEAM. Project Director would be Chairman.

   B. Committee would review major problem area selections (see page 40.)

   C. Committee would review major technology transfer packages prior to implementation (see page 42.)

2. A Technical Assessment Committee

Purpose: To provide a group of technical experts whose technical knowledge of the problem under consideration is sufficient to adequately analyze the situation and pinpoint technology needs suitable for transfer.

Membership:

A. Two permanent members from Oklahoma State University faculty--one an Environmental Scientist and one an Engineer--would be on the committee. Each would be on a part-time assignment.

B. Others would participate on ad hoc basis and would be drawn from over the state as required. Modest honorariums and expenses for services would be allowed.

Operation:

A. Committee would meet on call. Appropriate member of PROJECT TEAM would be Chairman.

B. Committee would meet often enough to conclude what additional technology would be needed for a problem area and where it might be found.

C. Committee would also call attention to technology gaps suitable for research, if such materializes in the course of their deliberations.

3. Research Implementation Committee

Purpose: To encourage research in specific areas identified by technology transfer analyses. To promote the conduct of such research within the research laboratories within the State of Oklahoma.

Membership:

A. The Research Foundation, Engineering Experiment Station, and Agriculture Experiment Stations would be represented from Oklahoma State University.

B. Similar representation would be obtained from the University of Oklahoma.

C. Federal laboratories within the state would participate.

Operation:

A. Chairman might well be Head of Research Foundation at Oklahoma State University.

B. Meetings could be called upon receipt of a "research need" report from PROJECT TEAM.

C. Efforts would be made to determine where the needed research should be conducted and assist, in whatever desirable manner, in developing proposal and obtaining funding.

4. Project Impact Committee

Purpose: To review program evaluation results and determine effectiveness of evaluation.

To recommend remedial action based on evaluation.

Membership:

A. An Environmental Scientist, to be selected.

B. A Social Scientist, to be selected.

C. State Agency and Planning District representatives, to be selected.

Operation:

A. Committee would meet on call by Project Team. The Program Development Evaluation Specialist on the team should probably be Chairman.

B. Committee would review evaluation reports prepared by Project Team and recommend action pertaining thereto.

5. Regional Council Interaction Committee

Purpose: To provide a mechanism for interaction between those federal agencies on the Regional Council with environmental R&D activities and the PROJECT TEAM.

Through this committee, regional research could be focused on regional grassroots problems and the results of research in federal laboratories could be better applied to local needs.

Membership:

A. The EPA Director of Research in the regional office should probably be chairman.

B. The EPA regional technology transfer representative would be a key member.

C. Representatives from other federal agencies with environmental R&D activities, such as HEW, Interior, Commerce, etc., should also be on committee.

Operation:

A. Committee would meet on call in a joint agreement between Director of PROJECT TEAM and chairman of committee.

B. Meetings would usually be in offices of Federal Regional Council with periodic visits to other locations, as appropriate.

C. Committee would review proposed new programs submitted by the PROJECT TEAM for purpose of suggesting availability of needed technology. Members might also assist in obtaining access to the technology.

D. Committee would also suggest areas where technology transfer to local officials was needed. Anticipated new regulations and/or legislation might well be one example of this need.

Oklahoma State University Involvement

It is vitally important to utilize the vast resources of this Land-Grant Institution in the conduct of this project. Aside from the fact that the Cooperative Extension Service is a part of this institution, it must be remembered that a major environmental research effort is underway (see Appendix C).

At the same time, however, the project cannot be self-serving for Oklahoma State University at the expense of other state institutions without generating a backlash which would kill the project. So, it is important to have a proper balance. This is one reason for all of the committees with statewide membership and an operational design calling for frequent use of such committees.

Oklahoma State University resources will be utilized in the following manner:

1. Faculty members with environmental backgrounds will be recruited as Program Development Specialists on PROJECT TEAM. These faculty will obtain full-or part-time leave from their departments to participate in the project and be paid commensurate with their faculty positions.

2. University Research Administrators and faculty will be members of the various committees created to handle the demonstration project. Depending upon the degree of time-consuming involvement in this committee work, consulting and/or part-time compensation will be offered.

3. Part-time assignments and small contracts would be given to available University professors and graduate students to prepare documents and develop programs under the guidance of the PROJECT TEAM. Such assignments would also be given to participate, when feasible, in implementation programs as expert lecturers, conference leaders, etc.

4. Center for Local Government Technology: In the Division of Engineering of Oklahoma State University, there has been established a Center for Local Government Technology (CLGT). It is concerned with performing research studies on technologically oriented problems of local governments and developing solutions to these problems.

   The Center directs its efforts toward those engineering problems common to small and medium-sized cities. It attempts to provide a formal mechanism for conducting studies of these problems, the development of satisfactory techniques for their solutions, and the application of systems analysis techniques to the management of local government units. It hopes to maintain a "critical mass" of research expertise in the area of local government technology so that research efforts may be pursued as a continuing and coordinating long range program. The Center uses the Oklahoma State University Extension system as a contact and delivery mechanism.

This project will utilize the resources of the CLGT as appropriate when dealing with local environmental problems of a technological nature and will not duplicate unnecessarily resources of staff or materiel. It is anticipated that the services of at least one FTE engineer from the CLGT will be required in this project.

The Environmental Extension Training Center

The training component is critical to the success of the entire demonstration project. If those responsible for technology transfer are not properly trained themselves, then they will waste valuable time in what will very likely be an ineffective job. Furthermore, as has been previously mentioned, the only way that already heavily burdened Cooperative Extension personnel can be effectively utilized is through a comprehensive, but brief, training effort which will show them why a job should be done and how it can be accomplished with a minimum of extra effort.

Educational technology should also be used extensively to transfer technology. Too often we use antiquated methods and equipment to transfer sophisticated technology. The Training Center is proposed to avoid this mistake.

A solid base has already been established for such a Center. The Oklahoma State University Audiovisual Center is a sophisticated organization with extensive services already in existence. These services could be at the disposal of the Center. Technical liaison should be maintained at all times with this group. Their professional expertise will be used in establishing the needed physical resources for the Training Center. When considering physical resources, these too must be dovetailed into available University Extension facilities. If the needed service can be obtained from already existing facilities, then there is no justification for duplication.

The nature of the training, the training population and the circumstances under which the training would take place call for a special training facility, a combination small conference room (30 people) and individualized learning center. The conference room would have built-in television facilities for a direct tie-in to statewide public television and a talk-back TV network. Telephone conference hookups would be available so a specialist or a group of experts could sit and confer with a group of conerned officials anywhere in the state. Movies, slides, and other visual and audio facilities would also be built into such a conference room. Display panels would be installed on appropriate walls. The conference table and chairs would be selected to enhance an atmosphere for effective learning.

An individualized learning center adjacent to the conference room would have ten cubicles for self-paced individualized instruction using, where appropriate, a multi-media approach. Such a center would be utilized to train implementers and/or specific local officials and their designated specialists in a particular subject. It would be designed to provide the recipient with the opportunity to receive instructions according to his or her own capability and to meet each individual's needs. The programs would be self-administered, self-paced, and self-tested for reinforcement. Here, in private or semi-private study, programmed texts, video recordings, audio cassettes, and 35 mm slides could be orchestrated into a total learning experience guaranteed to transfer the technology desired in the most effective and efficient manner.

The Center would also stock a supply of movies, slides, and other visual aids to assist implementers when they take material to the field. For example, an instructional aid called Caramate, manufactured by Singer Graflex, combines a slide and cassette tape capability into a small instrument suitable for office presentations and small group meetings. An appropriate supply of such instruments (not necessarily this model) would be made available to implementers along with the textual materials to give them the best tools available to accomplish their transfer.

Such a facility would pay for itself again and again through the speed and efficiency with which learning experiences could be generated to effect technology transfer and the comprehensive resources which would be available for communication to the farthest reaches of the state. During these days of shortages of energy, such a facility would greatly reduce the need for travel while at the same time maintaining close contact with the local situation.

It is anticipated that should the Environmental Extension System become an integral part of the Cooperative Extension Network nationwide, Regional Training Centers coinciding with Federal Regional Councils will be vital. Such Centers, serving all states within a region, could provide the special training so necessary to the transfer of complicated environmental technology. THE LESSONS LEARNED IN THE OKLAHOMA STATE UNIVERSITY TRAINING FACILITY WOULD INCREASE THE EFFECTIVENESS OF OTHERS WHICH MIGHT BE ESTABLISHED.

Scientific Evaluation

Scientific Evaluation of a basically social project of this nature, while very important, is extremely difficult. The nature of the project is such that program development must evolve with feedback of results so early evaluation of immediate and intermediate goals is important. It is equally important, however, to evaluate the ultimate objectives of the project.

Evaluative research, the approach of primary concern here, emphasizes outputs or effects and it uses the scientific method. The methods employed must yield evidence that is objective, systematic, and comprehensive. Evaluation will be viewed as a phase in systematic program development. Behavioral, rather than attitudinal, measures will be preferred wherever possible (i.e., did the local group use the technology rather than how did they feel about a technology transfer program.)

Although evaluation follows implementation, it is important that it begin prior to implementation in this case. The comprehensive environmental survey in Oklahoma, which has served as a basis for designing this pilot project, will be an excellent benchmark for measuring attitudinal changes over time, as the project unfolds. In addition, however, other techniques such as the following must be utilized.

1. A time-series design, through which the treatment group is used as its own control, through repeated measurements of outcome variables, beginning well before program implementation.

2. A comparison-group design wherein alternate treatments are administered to groups and the respective outcomes are measured. This can be done in an action setting where control groups are unacceptable. Unlike a control group which receives no treatment, a comparison group would receive an alternate treatment.

3. Observational techniques and informal interviewing may provide more rapid feedback than can formal experimentation.

What, then, do we evaluate? The following are examples of what would be examined:

1. The extent to which local officials utilize more technology to solve local problems.

2. The effectiveness of the Technology Transfer Demonstration:

   A. Federal coordinating effort

   B. State coordinating effort

   C. Private sector coordinating effort

   D. Program planning effort

   E. Training effort

   F. Implementation

   G. Feedback function

   H. Acceptance within traditional Cooperative Extension

3. The methods used to transfer technology:

   A. The cost benefit element in all activities

Involvement of Extension Committee on Organization and Policy

Finally, the transferability of the results of this project to other Cooperative Extension Services in other states must be assessed.

To this end, a meeting was attended in Chicago on January 3, 1974, to confer with the Environmental Sub-Committee of ECOP. ECOP is the chief policy making body of the State Cooperative Extension Services throughout the country. As such, it comes as close to speaking for all State Extension Services as any group. This Sub-Committee has expressed formal interest in participating in the research design of the follow-on projects and in the evaluations. Thus, a key link has been established with the remainder of the State Extension Services.

Periodic conferences with this Sub-Committee can guide the completion of this project, including the evaluation, in such a way as to maximize the likelihood of participation by other State Cooperative Extension Services.

Part VIII

CONCLUSIONS

As a result of the knowledge gathered during this initial investigation into the environmental technology situation in Oklahoma, the following conclusions have been reached:

1. Local officials are concerned about environmental problems in Oklahoma. Their greatest state wide concern involves land use (i.e. road side dumping, destruction of wildlife habitats and natural vegetation and deterioration of buildings, etc.)

2. Local officials feel that public apathy, economic constraints and inadequate technology are their greatest barriers to solving environmental problems locally.

3. Local officials want more technical help if they don't have to pay for it. They would like to have their own needs considered in research planning and they would participate in educational programs to learn more about what to do.

4. Considerable environmental research is going on in Oklahoma; much more than at first one might think. No systematic way exists to apply the results of this research to local problems.

5. Despite some concern by State Authorities and the Scientific community, little is now being done to channel research into priority areas. Funding problems have prevented a number of projects from getting underway.

6. The kind of bridging mechanisms needed to bring technical assistance to the solution of local environmental problems is very much akin to that already being administered by the State Cooperative Extension Service. Many of the weaknesses inherent in other application mechanisms do not exist in Cooperative Extension.

7. It seems only logical therefore that some adaptations can be made, some new linkages forged, which can enable the State Cooperative Extension Service to contribute significantly to an Environmental Extension system.

8. A well conceived and funded demonstration program can provide answers to how to best utilize this imminently successful organization in the interest of an effective environmental extension system.

APPENDIX A

APPENDIX A

THE EXTENSION ORGANIZATION

Institutions of higher education in the United States are a great resource for the solution to national problems. Leaders of the National Association of State Universities and Land-Grant Colleges met in conference in Washington, D.C. in May 1972 to discuss this point, to call attention to their capabilities, and to explore ways and means to become more effective in this area. Attention is called to the resolution passed at this convention. It is as follows:

Conference Resolution:

> Institutions of higher education having resources and capabilities, both social and technological and which are potentially and actively of value in the solution of national problems, have a responsibility to serve the public welfare beyond on-campus teaching and research. To enable these resources and capabilities to be more effectively utilized, institutions must relate productively to external groups and agency organizations and associations to provide service. To this end, institutions of higher education, their organizations and associations must develop effective leadership and procedures for themselves as well as establish effective liaison with external groups and agencies. The National Association of State Universities and Land-Grant Colleges is urged to take the initiative in organizing this effort.
>
> Unanimously endorsed by the Conference on
> Institutions of Higher Education as a Resource
> in the Solution of National Problems
>
> May 10, 1972
> Washington, D.C.

Land-Grant University Extension Service

In this paper, we focus specifically on the Extension Services of the Land-Grant Universities located in every state in the Union. This particular division of higher education has a long history of "serving the public welfare beyond on-campus teaching and research". This service is a unique resource, ready and available for immediate use on broader social problems.

If the new federalism espoused by our governmental leaders is to work, local leaders must be informed and trained more completely. The problems faced by local leaders must be communicated more effectively to state and federal agencies. The parallel here is great between the needs of the nation in the battle for adequate food supplies in the 1890's and the needs of our country today in the battle over pollution, economic stagnation, and inadequate social services in the 1980's. As Cooperative Extension assisted the farmer in his efforts to raise food and improve the quality of his life, so it can serve the local leaders in solving the problems of today.

The Basic Organization of University Extension Services

The Land-Grant complex today is massive. It reaches into every state, plus Puerto Rico and the District of Columbia. It has a presence in practically every county in America. It is a rich resource, both in terms of funding and in terms of intellectual resources. It has enormous potential to serve the needs of the people to an even greater extent than is already the case. Tens of thousands of professionally trained people are involved in this complex system. In the Cooperative Extension Services alone, in the 1971 report put out by the U. S. Department of Agriculture, 15,482 professional employees, 10,000 support staff, 11,000 program aides, and an estimated 1,000,000 volunteers were all functioning together on the solution of common problems. Nothing like this exists anywhere else in this country or the world. The good accomplished to date is extensive. Its potential is extraordinary.

Extension Management

Extension Management at the University level is a unique resource, particularly adept in melding together the needs of the public with the professional efforts of research and engineering. The Extension Manager knows how to work with public authorities at state and federal levels, with University specialists, and with private groups in determining the full ramifications of a problem and the steps needed to solve it. Once this investigation has been completed, Extension Management is skilled in drawing on the knowledge of educational specialists to prepare the information in a form that will have maximum impact on the public and therefore on the solution of the problem.

Extension Management is skilled in utilizing the extraordinary Extension delivery system. This system usually has local offices in every county in a state with local directors living with the people and working with them on a day-to-day basis. Specialists attached to these local offices are there to reinforce the effectiveness of the programs at the local level. The Extension Manager works through this network to reach the people and assist them in solving the problems.

The Extension network, works just as well in reverse. Local representatives in the county offices, always alert to what the people are facing, make requests back to Extension Management for special problem solving research and educational programs. Over 50 years of knowledge and know-how have gone into developing this cooperative network. Extension knows how to work with the people. That is its mission.

Extension's Interagency Relationships

Extension has a long history of working cooperatively with such federal agencies as the Bureau of Indian Affairs, Soil Conservation Service, Rural Electric Cooperatives, Farmers Home Administration, etc., on common problems at the local level. Recently the same kind of working relationships have been established with Sub-State Pla g Districts and the State Offices of Community Affairs and Planning. Effecti orking relationships have also been established with private organizations representing various segments of the public, such as farm organizations, banking associations, private development groups, etc. Extension knows how to work with other governmental agencies.

Extension in Transition

The passage of the Smith-Lever Act of 1914 opened a great new era of education in the United States by creating the Cooperative Extension Service in which there was and continues to be Federal, state and local participation, thus the term "Cooperative." Since that time, Extension agents have been disemina 3 agricultural, home economics and other technology from experiment stations and laboratories to American farmers, their wives and children and other interested people with amazing success. By taking new ideas directly to those in a position to put them to immediate use, progress of rural families has been accelerated many fold.

Cooperative Extension programs set a new pattern for economic progress and development in rural America. Extension agents helped youth to assimilate new ideas through various projects and at the same time helped parents to understand and use these ideas. Over the years they developed a rapport and position of trust in the community which now facilitate their efforts and expedite the objectives sought. It took twenty years for the superiority of hybrid seed corn to receive universal acceptance among the corn producers of this country. The technique was developed in the mid-thirties but universal acceptance was not realized until the mid-fifties. A similar technological breakthrough in grain sorghums in the mid-1950's was much easier to transfer and was accomplished in about seven years. Now the acceptance of an improved variety of a staple crop is more a function of the availability of seed than on how long it takes to transfer the technology. Such trust in the extension agent did not come easily and it must not be treated lightly. These skills acquired in packaging and delivering technical information represent a unique institution in this country. Probably no other segment of education has contributed more to the well-being of people in the United States during the past fifty years than has the Cooperative Extension services of the various states.

A Specific Example

About eight years ago, the Oklahoma Cooperative Extension Service began a process of self-examination and reorganization toward the goal of rendering a more effective and complete educational service to the people of Oklahoma. Prior to 1965, the Oklahoma Cooperative Extension Service was administered separately from General Extension, although both activities depended primarily on the resources of Oklahoma State University. Cooperative Extension was relatively narrow with respect to audiences, dealing primarily with rural farm people. General Extension, on the other hand, was very broad in scope but

extremely limited in resources and organization. All Extension activities at Oklahoma State University have now been combined to become the Oklahoma State University Extension Service under a Vice President for Extension. Financial support for Extension at OSU has been tripled since this reorganization, bearing strong testimony to the effectiveness of the new model and to the support given to the Extension function by those being served by it.

The Vice President for Extension is assisted by an administrative staff of seven persona and an Extension Council composed of an Extension Director from each of the seven undergraduate colleges. The Director of Extension for Langston University, Oklahoma's 1890 Extension institution, participates in all administrative meetings to provide liaison between the two extension efforts. The Cooperative Extension field organization includes five district directors and their supporting staffs: 41 multi-county specialists, and 250 county staff members assigned among the 77 county extension offices (see the attached chart of OSU Extension Administrative Structure). The county extension director in each county is first and foremost an administrator and educator. The unification of Oklahoma State University Extension and the use of area specialized agents in selected fields of interest provide him and his county staff with more professional support than formerly. The OSU Extension Service is recognized nationally as a leader in the establishment of this administrative model and a half dozen states are using the model to reorganize their own extension resources.

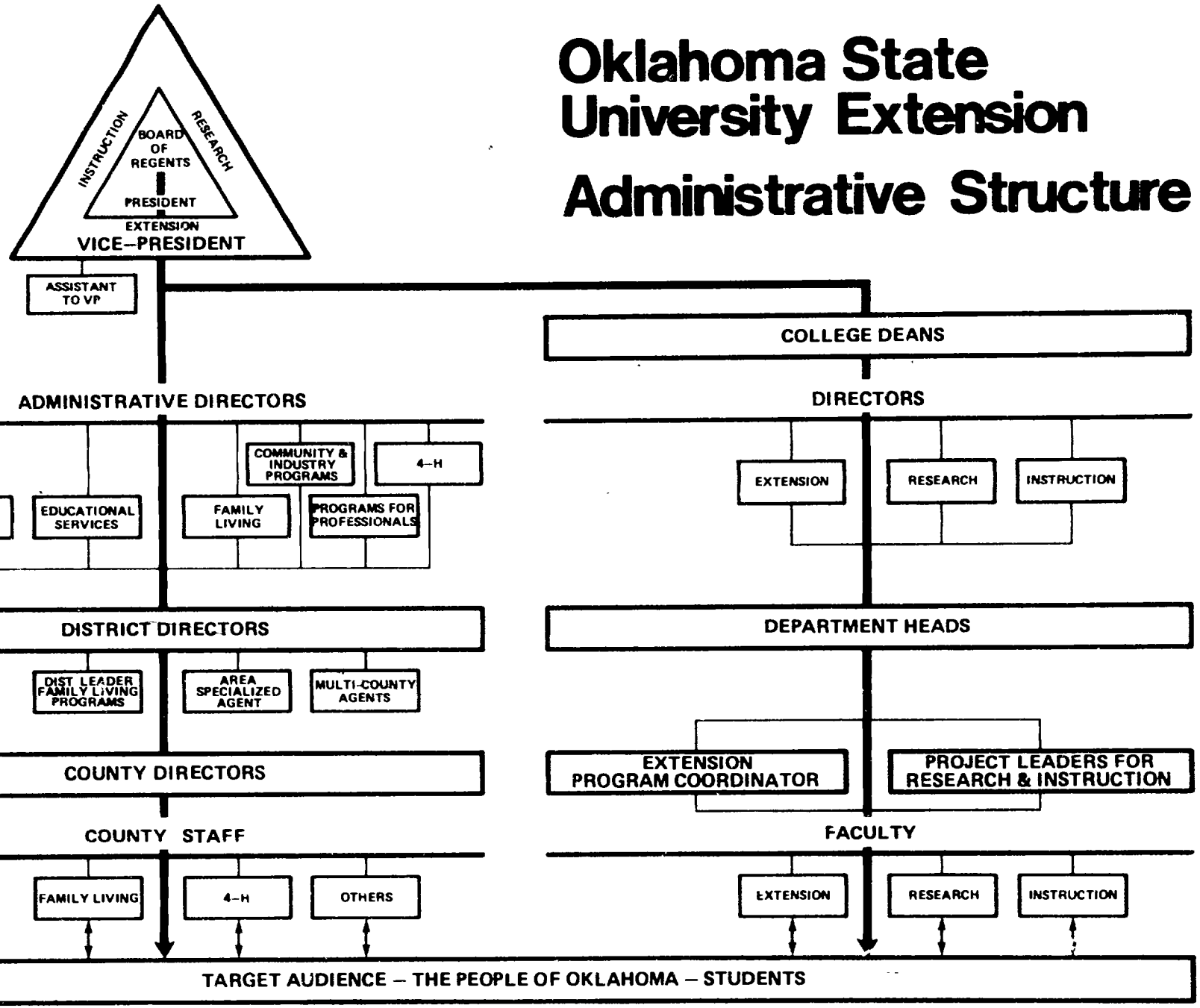
In addition to the administrative structure just described, approximately 70 full-time Extension specialists are employed by Extension at Oklahoma State University to develop and package technical materials and assist in their delivery to the public. OSU Extension literally uses the entire University for technical assistance and support of its field programs.

Oklahoma State University Extension has people who are skilled in program planning, audiovisual techniques, methods and media, and in the planning and actual development of educational packages. It also has people skilled in survey techniques and research analysis. These human resources will be available to the Environmental Technology Transfer Project as needed to develop educational packages that are usable and attractive. Also available will be the county extension directors who are skilled in community leadership and in knowing when and how to approach local people and help them organize into effective groups for dealing with the problems at hand.

More recently OSU Extension, and particularly Cooperative Extension, because of the nature of its funding, is being viewed as a state-wide resource which should serve an extension function for agencies and institutions other than Oklahoma State University. This concept coincides with the rising interest in Cooperative Extension as an extension mechanism for various Federal agencies. Cooperative Extension has a reputation and "grass roots" contacts extending back for sixty years. Its unique success in packaging agricultural technology and transferring it to farmers, ranchers, and agribusinessmen suggests that the same extension system might be expanded to accommodate a much broader need for the transfer of other kinds of technologies. This project will attempt to demonstrate that Cooperative Extension can in many instances transfer environmental technology effectively and economically to state and local officials. It will attempt to show how to utilize this existing resource more effectively rather than establishing a new and expensive parallel capability.

Oklahoma State University Extension

Administrative Structure



It has been previously pointed out that inadequate technology transfer is basically a problem of communication. Technical knowledge exists in one place and is needed in another. The challenge of this project is to accomplish the proper linkups and establish suitable channels so that the technical information can be transferred to the people who need it.

APPENDIX B

APPENDIX B

FEDERAL AGENCY

(OKLAHOMA ENVIRONMENTAL RESEARCH)

TWO-YEAR PERIOD

	RECIPIENT INSTITUTION	FUNDING AGENCY	PROJECT TITLE	PROJECT SIZE
1	Bartlesville Bureau of Mines	EPA	Saline Water Analyses	$ 35,000
			Sub-Total:	$ 35,000
2	"	Interior	Industrial Waste Study	$300,000
3	"	"	Automotive Exhausts	40,000
4	"	"	Oilfield Brines	$
5	"	"	Diesel Emissions	150,000
6	"	"	Low Emission Systems	200,000
7	"	"	Engine Emission Control	140,000
8	"	"	Underground Engine Alarm System	130,000
9	"	"	Waste Oil Recycling	80,000
10	"	"	Further Saline Water Analysis	$
11	"	"	1975 Car Fuel Volatility Study	150,000
12	"	"	Gas From Coal Low Emission Fuel	60,000
			Sub-Total:	$1,250,000 +
			TOTAL:	$1,285,000 +
13-1	Oklahoma City Geological Survey	Interior	Keystone Reservoir Water Quality Study	$
14-1	Oklahoma City Civil Aero-medical Institution	Transportation	Adaptation to Simulated Sonic Boom	$ 35,000
15-2	"	"	Pesticide Exposure and Brain Function	$ 50,200
16-3	"	"	Aerial Exposure to Insecticide Study	$ 58,500

FEDERAL AGENCY - 2.

	RECIPIENT INSTITUTION	FUNDING AGENCY	PROJECT TITLE	PROJECT SIZE
17-4	Oklahoma City Civil Aero-medical Institution	Transportation	Blood Changes in Aerial Applicator Crews	$ 38,300
18-5	"	"	Behavioral Changes from Neuroactive Chemicals	61,900
19-6	"	"	Hearing Changes from Exposure to Aircraft Noise	10,000
20-7	"	"	Physiological Changes in Pilots Exposed to Heat	37,900
21-8	"	"	Sonic Boom Startle Effects	18,400
			TOTAL:	$310,200
22-1	USDA Soil and Water Conser-vation Research	USDA Agricul-tural Research Service	Stream Channel Morphology in South Plains	$
23-2	"	"	Sediment Yield as Function of Watershed Features	$
24-3	"	"	Ground Water and Watershed Management	$
25-4	"	"	Hydrological Performance of Agricultural Lands	$
26-5	"	"	Watershed Management and Water Salinity	$
27-6	"	"	Testing of Conservation Structures	$
28-7	"	"	Hydromechanics of Floodplain Flows	$
			TOTAL:	$
29-1	EPA Kerr Environ-mental Research Laboratory	EPA	Anaerobic Degradation of NTA in Ground Water	$ 40,000
30-2	"	"	Subsurface Biological Studies	10,000
31-3	"	"	Higher Plant Water Quality Improvement	10,000
32-4	"	"	Beef Cattle Runoff Soil Treatment	7,500

FEDERAL AGENCY - 3.

	RECIPIENT INSTITUTION	FUNDING AGENCY	PROJECT TITLE	PROJECT SIZE
33-5	EPA Kerr Environmental Research Laboratory	EPA	Soil Systems to Treat Wastewaters	$ 12,500
34-6	"	"	Biodegradability of Wastewater Organics in Soil	52,500
35-7	"	"	Evaluate Soil Treatment for Wastewaters	60,000
XX		XXX	XXX	XXX
36-8	"	"	Dissemination of Cattle Feedlot Management Information	$ 9,744
37-9	"	"	State-of-Art Uranium Mining, Milling, etc.	20,000
38-10	"	"	Sealing Methods for Tailings Ponds	10,000
39-11	"	"	National Groundwater Pollution Problems	10,000
40-12	"	"	State-of-Art Pollution Problems in Oil Shale Land	- 0 -
41-13	"	"	State-of-Art Sand and Gravel Pollution	22,000
42-14	"	"	Evaluation of Irrigation Management Water Quality Conservation	20,000
43-15	"	"	Soil Treatment of Feedlot Runoff	52,600
44-16	"	"	Solvent Extraction Status Report	$
45-17	"	"	State-of-Art on Artificial Reservoir Treatment	7,500
46-18	"	"	Management of Hydroelectric Pumped Storage Water Quality	7,500
47-19	"	"	Review of Metal Toxicities	15,000
48-20	"	"	Pollution Problems of Irrigation Return Flows	$
49-21	"	"	Treatment Methods for Hard Pesticides	23,400
50-22	"	"	Sludge Disposal Petrochemical Waste Treatment	9,750

FEDERAL AGENCY - 4.

	RECIPIENT INSTITUTION	FUNDING AGENCY	PROJECT TITLE	PROJECT SIZE
51-23	Kerr Environmental Research Laboratory	EPA	Solvents for Industrial Waste Treatment	$ 7,950
52-24	"	"	Soil treatment for Organic Industrial Wastewater	18,900
53-25	"	"	Pollutional Parameters Development	21,400
54-26	"	"	Feasibility of Non-Treatment Pollution Control Systems	7,900
55-27	"	"	Hydroponic Culture for Nutrient Removal from Wastewater	2,000
56-28	"	"	Soil Systems for Tertiary Treatment	9,200
57-29	"	"	Industrial Pollution Control by In-Plant Changes	9,500
58-30	"	"	Effects of Feedlot Runoff on Water Quality of Impoundments	5,900
XXX		XXX	XXX	XXX
59-31	"	"	National Symposium on Industrial Pollution Control	$ 9,800
60-32	"	"	Evaluate Soil Treatment for Domestic Wastewaters	34,500
61-33	"	"	Develop Techniques for Soil Treatment of Feedlot Runoff	26,900
62-34	"	"	Hydroelectric Pumped Storage on Water Quality	14,900
63-35	"	"	Effects of Impoundment on Water Quality	4,800
64-36	"	"	State-of-Art on Artificial Reservoir Destratification	15,900
65-37	"	"	Review Groundwater Resources Programs	47,800
66-38	"	"	Fate of NTA in Ground Water	41,500
67-39	"	"	Nitrate Association During Downward Percolation	38,100
68-40	"	"	Mineral Salt Production in Sedimentary Marine Soils	$ 38,100

OKLAHOMA AGENCY

(ENVIRONMENTAL RESEARCH)

TWO-YEAR PERIOD

	RECIPIENT INSTITUTION	FUNDING AGENCY	PROJECT TITLE	PROJECT SIZE
1.	State Legislative Council	State Government	Oklahoma Laws Study	$
2.	State Water Resources Board	EPA	Salt Water Pollution Study	$ 38,332
3.	State Dept. of Highways	State Government	Slope Stability of Selected Colluvial Soils	81,000
4.	State Dept. of Wildlife	Interior	Waterfowl Nesting Habitats on Small Western Impoundments	4,836
5.	State Dept. of Wildlife	Interior	Development of Fish and Wildlife Plan	3,423
6.	State Dept. of Wildlife	Commerce (NOAA)	Commercial Fisheries Management in Oklahoma	42,400
7.	State Dept. of Wildlife	Commerce (NOAA)	Commercial Fishing Industry Management Program	$ 1,000
			TOTAL:	$170,991 +

NOTE:

a. $81,000 + from State Government

b. $89,991 from federal contracts

c. No moneys for technology transfer

FEDERAL AGENCY - 5.

	RECIPIENT INSTITUTION	FUNDING AGENCY	PROJECT TITLE	PROJECT SIZE
69-41	Kerr Environmental Research Laboratory	EPA	Recharging Surface Waters Groundwater Effect	$ 27,700
70-42	"	"	Methods to Control Saline Water Encroachment	28,200
71-43	"	"	Other Mining Sources	48,200
72-44	"	"	Oil Shale	35,200
73-45	"	"	Oil Production	2,000
74-46	"	"	Small Scale Chloride Waste Treatment	19,000
75-47	"	"	Dual System for Feedlot Wastes	75,850
76-48	"	"	Evaluate Spray Irrigation Treatment	25,350
77-49	"	"	Activated Carbon Treatment of Petroleum Refinery Wastewater	1,950
78-50	"	"	Treatment Methods Summary for Coal and Petroleum	$ 16,900
			TOTAL:	$1,035,394 +
			GRAND TOTAL:	$2,630,000 +

XXX Only two projects totaling $19,544 could be classified as technology transfer.

ACADEMIC RESEARCH

(OKLAHOMA ENVIRONMENTAL)

TWO-YEAR PERIOD

	RECIPIENT INSTITUTION	FUNDING AGENCY	PROJECT TITLE	PROJECT SIZE
	XXX		XXX	XXX
1.	East Central State	EPA	Environmental Information Data Center	$ 87,480
	XXX		XXX	XXX
2.	"	"	Operations Manual - Soil Systems for Municipal Wastewaters	$ 24,343
	XXX		XXX	
3.	"	"	Method for Dissemination of Animal Waste Management System	XXX $ 42,514
			SUB-TOTAL:	$154,337
4-1	Oklahoma State University Arts & Sciences	"	Paunch Manure As Feed For Channel Catfish	$
5-2	OSU Water Resources Research Institute	Interior	Toxic Compounds in Oil Refinery Effluents	$
6-3	OSU Coop Fishery Unit	"	Recreation Use of Scenic River with Dam	$
7-4	OSU Arts and Sciences	"	Analysis of Water-based Recreation	$ 25,000
8-5	OSU Graduate School	EPA	Aerobic Digestion of Organic Waste Sludge	$ 33,500
	XXX		XXX	XXX
9-6	OSU Arts and Sciences	"	Stat. Guidelines and Handbook for EPA Project Engineering	$ 23,776
10-7	OSU Agriculture	"	Soil Parameters for Predicting Pesticide Movement Through Soils	37,000
11-8	"	"	Evaluation Feedlot Waste Management Alternatives	39,640
12-9	"	USDA Agriculture Research Service	Inedible Animal By-Products Rendering Plant Study	$

	RECIPIENT INSTITUTION	FUNDING AGENCY	PROJECT TITLE	PROJECT SIZE
13-10	OSU National Research Economics Division	USDA Economics Research Service	Economics of Rural Water and Sewer Systems	$
14-11	OSU Agriculture Economics	"	Growth and Survival Strategies for Farm Firms	$
15-12	"	"	Planning Multi-County Areas for Economic Development	$
16-13	OSU Agriculture Experimental Stations	State Government	Cattle Feedlot Pen Design	$
17-14	"	USDA Coop. State Research Service	Soil Surface Management Procedures	$
18-15	"	State Government	Economical Effect in Allocation of Irrigation Water	$
19-16	"	USDA Coop. State Research Service	Irrigation Practices for Efficient Water Use	$
20-17	"	"	Control of Undesirable Plants in Rangelands	$
21-18	"	State of Oklahoma	Economical Analysis of Pesticides and Fertilizers	$
22-19	"	Coop. State Research Service	Analysis for Rural Development Planning	$
23-20	"	"	Herbicide Movement from Application Sites	$
24-21	"	"	Animal Waste Management with Pollution Control	$
25-22	OSU Engr. College	Defense	Hydrocyclones in Physical Chemical Wastewater Treatment Systems	$ 27,900
26-23	OSU Civil Engineering	EPA	Biological Concepts of Activated Sludge Process	$ 33,599

ACADEMIC - 3.

	RECIPIENT INSTITUTION	FUNDING AGENCY	PROJECT TITLE	PROJECT SIZE
27-24	OSU Civil Engineering	EPA	Kinetics and Mechanisms in Activated Sludge Process	$ 32,868
28-25	OSU Agricultural Engineering	Interior	Design and Operating Criteria for Rural Water Districts	$
29-26	OSU Civil Engineering	"	Response Mixed Activated Sludge Systems to Environment Change	$ 10,050
30-27	"	"	Water Reclamation for Ground Water Recharge	$
31-28	OSU Electrical Engineering	Defense	Multi-purpose Model for Dynamic Reservoir	$
32-29	"	Kansas Power & Light Co.	Energy Conversion and Storage	$
33-30	"	National Science Foundation	Develop Generator and Electrolsis Cell for Wind Energy Conversion System	$141,600
34-31	"	"	Foreign Energy Conversion and Storage Study	$ 29,170
35-32	"	Oklahoma State University	Develop Numerical Techno-Economic Energy Forecasting Model	$
			ESTIMATE:	$1,000,000 +
36-1	University of Oklahoma Health Sciences School	University of Okla.	Recreational Effects on Quality of Impounded Water Supply	$
37-2	"	"	Ecology of Outdoor Recreation	$
38-3	O.U. Civil Engineering	Interior	Methodology for Assessment Water Resource Development	$ 5,000
39-4	O.U. Environmental Design	EPA	River Basin Model Regional Center	$ 5,017
40-5	O.U. Graduate School	National Science Foundation	Interdisciplinary Research on Engineering of Urban Problems	$ 75,600
41-6	O.U. Bureau Water and Environmental Research	AID	Low Cost Methods of Water and Waste Treatment in LDCS	$ 28,932

	RECIPIENT INSTITUTION	FUNDING AGENCY	PROJECT TITLE	PROJECT SIZE
42-7	O.U. Research Institute	EPA	State-of-Art Evaluation Petroleum and Coal Wastes	$ 17,897
43-8	"	"	Brine Disposal Practices in Oil Production Industry	- 0 -
44-9	"	"	Demonstration Full Scale Waste Treatment System for Cannery	$117,807
45-10	"	"	State-of-Art Evaluation on Petroleum and Coal Wastes	$ 14,297
46-11	"	Interior	Systems Approach to Reg. Water and Sewer Planning	$
			ESTIMATE:	$500,000 +
47-1	University of Tulsa School of Engineering	Interior	Disposal of Soluble Inorganic Salts	$

PRIVATE RESEARCH

(OKLAHOMA ENVIRONMENTAL)

TWO YEAR PERIOD

	RECIPIENT FIRM	FUNDING AGENCY	PROJECT TITLE	PROJECT SIZE
1.	Phillips Scientific Corporation	EPA	Oil Pollution Source Identification	$134,956
2.	Rhodes Corporation	"	Prototype Treatment Plant for Combined Sewer Overflow	$317,733
3.	Halliburton Services	"	R&D of Mine Water Pollution Abatement Methods	$
4.	AVCO Systems	"	Scorm Water Pollution Study	$119,281
5.	Oklahoma Gas & Electric Co.	OG&E	Monitor Ecology at Lake Konawa Power Plant	$
6.	Reeves Packing House	EPA	Small Meatpacker Waste Treatment Systems	$ 35,829
7.	Big Chief Roofing Co.	"	Water Re-use in Paper Reprocessing Plant	$ 45,060
8.	B.J. Nutrients, Inc.	"	Hydrolyzing Poultry Manure for Recycle as Supplement Feed	$ 97,500
9.	National Recreation and Space Association	HUD	Analysis of Urban Open Space and Recreation Needs	$
XXX			XXX	XXX
10.	MECA	NSF	National Forum on Growth with Environmental Quality	$ 25,000
11.	Continental Oil Co.	EPA	Microbiological Removal of Iron from Mine Drainage Waters	$

NOTES:

SMITHSONIAN
SCIENCE INFORMATION EXCHANGE, INC.
1730 M STREET N W PHONE 202 381-5511
WASHINGTON, D C 20036

ACADEMIC 1

SIE NO
AO-20382

NOTICE OF RESEARCH PROJECT

FUNDING AGENCY
ENVIRONMENTAL PROTECT. AGENCY
OFFICE OF RESEARCH & DEV.

AGENCY'S NUMBERS
800477
72P20382

PERFORMING ORGANIZATION
ENVIRONMENTAL INFORMATION DATA CENTER

PRINCIPAL INVESTIGATOR AND DEPARTMENT/SPECIALTY
RV GARNER

PERFORMING INSTITUTION
EAST CENT. STATE COLLEGE
GRADUATE SCHOOL
ADA, OKLAHOMA 74820

PERIOD FOR THIS NRP
7/72 TO 6/73
FY73 FUNDS $87,480

SUMMARY OF PROJECT

"Prototype State-wide Environmental Information/Data Center" Project would develop a center that can provide: (1) problem solving information and assistance to those charged with developing, implementing and enforcing environmental quality control measures; and (2) the public with education and information dissemination programs which show all aspects of the environmental quality challenge. This grant will develop the Oklahoma Environmental Information and Media Center to its full potential as a facility which can meet Oklahoma's environmental information needs while serving as a model for the establishment of such centers in other States.

APPENDIX C

	OSU Environmental Survey Question	No Problem 1	2	3	4	Savere Problem 5	Avg. Resp.
		Per Cent Response					
1.	Pollution of the overall environment	20	43	29	5	2	2.3
2.	" of the air	41	37	14	6	2	1.9
3.	" of the water	18	32	29	15	5	2.6
4.	" of the land	19	36	26	14	4	2.5
5.	" of foods by pesticides	43	35	16	4	2	1.9
6.	Destruction of the natural beauty	24	32	25	13	6	2.4
7.	" of wildlife habitats	21	29	27	16	7	2.6
8.	" of the natural vegetation	24	32	25	14	5	2.4
9.	Air pollution from automobile exhausts	42	32	16	6	3	1.9
10.	" " from blowing dust	28	36	20	9	4	2.2
11.	" " from open burning	37	37	17	6	3	2.0
12.	" " from industrial smoke	68	20	7	4	2	1.5
13.	" " from foul odors	48	30	13	6	3	1.9
14.	Noise pollution from airplanes	74	15	6	2	2	1.4
15.	" " from cars, trucks, motorcycles	35	35	19	7	3	2.1
16.	" " from industry	76	19	4	1	1	1.3
17.	" " from recreational development	81	14	4	1	1	1.3
18.	Water pollution from municipal sewage	44	27	15	8	6	2.0
19.	" " from septic tanks	43	30	14	8	5	2.0
20.	" " from agricultural chemicals	53	31	11	3	1	1.7
21.	" " from mining and oil production	53	20	15	9	3	1.9
22.	" " from recreational development	70	20	8	2	1	1.4
23.	" " from industrial wastes	50	21	13	5	2	1.7
24.	Land pollution from industrial wastes	59	23	12	4	2	1.7
25.	" " from municipal wastes	43	31	18	6	2	1.9
26.	" " from deteriorated buildings	25	34	24	11	5	2.4
27.	" " from salvage yards	19	31	27	15	9	2.6
28.	" " from strip mining	74	9	7	6	4	1.6
29.	" " from roadside dumping	7	22	26	24	21	3.3
30.	" " from recreational development	62	23	10	3	2	1.6
31.	Soil erosion from rural areas	17	36	29	13	4	2.5
32.	" " from urban developments	43	31	17	7	3	2.0
33.	" " from unsurfaced roads	15	25	28	19	13	2.9
34.	" " from recreational development	61	27	10	2	1	1.6
35.	Herbicide drift causing plant damage	49	32	13	6	2	1.8
36.	Lack of public awareness	5	21	32	24	17	3.2
37.	"Don't care attitude" by the public	4	12	27	32	24	3.6
38.	Inadequate law enforcement	13	25	26	20	16	3.0
39.	Failure to appreciate the problem	5	18	31	30	16	3.3
40.	Don't know where to begin	9	19	29	25	19	3.3
41.	Discouraged by previous efforts	20	28	26	17	9	2.7
42.	Little cooperation between communities	14	22	25	20	19	3.1
43.	Lack of leadership in seeking solution	13	21	27	21	18	3.1
44.	Responsibility not clearly defined	10	20	31	25	15	3.2
45.	Confusion over alternatives	12	27	30	19	12	2.9
46.	Public good versus private interests	14	25	27	19	15	3.0
47.	Does not serve enough people	20	29	30	13	9	2.6
48.	Unavailability of federal funds	16	21	26	19	17	3.0
49.	Inability to increase local revenue	15	17	24	22	22	3.2
50.	Public unwilling to pay the costs	11	13	22	25	30	3.5
51.	Stop-gap measures used too often	13	22	31	20	15	3.0
52.	Inadaquate technical assistance	23	27	27	15	9	2.6
53.	Inadequata legislation	18	24	28	15	15	2.9
54.	Negative impact on business or industry	21	27	29	14	10	2.6
55.	Others will not do their share	12	22	29	20	18	3.1
		AGREE				DISAGREE	
56.	Env. improvement not worth costs involved	7	14	25	25	28	3.5
57.	Naad more intergovernment cooperation	32	27	22	12	7	2.4
58.	Bulletins on env. prob. solutions helpful	37	28	25	7	3	2.1
59.	Local info. not always good for decisions	18	28	26	16	12	2.7
60.	Wkshps. & forums on prob. would be helpful	43	29	19	6	3	2.0
61.	Adaquata info. on env. problems available	18	24	28	19	11	2.8
62.	Govt. "red tape" prevants solving pollution prob.	29	18	29	14	10	2.6
63.	Jobs ara mora important than controlling pollution	12	16	27	21	24	3.3
64.	Tech. knowladge on prob. seldom raaches grass roots	32	31	23	11	4	2.2
65.	Small community cannot afford experts to assist	57	18	12	7	5	1.9
66.	Important to hava access to unbiasad specialists	59	23	10	6	3	1.7
67.	Not easy to raad/undarstand technical anv. info.	18	23	28	20	11	2.8
68.	Should consult local officials before making laws	44	28	20	6	2	1.9
69.	Difficulty in knowing which info. to apply	31	34	28	5	3	2.1
70.	Solution to prob. requires recognition of all	65	23	8	1	2	1.5

STATE
County USDA Rural Development Committee
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	OSU Environmental Survey Question	No Problem 1	2	3	4	Severe Problem 5	Avg. Resp
		Per Cent Response					
1	Pollution of the overall environment	15	45	31	6	2	2.3
2.	" of the air	33	43	12	4	1	1.8
3.	" of the water	10	33	39	14	4	2.7
4.	" of the land	14	34	37	13	2	2.6
5.	" of foods by pesticides	51	28	8	2	1	1.5
6.	Destruction of the natural beauty	20	41	25	11	3	2.4
7.	" of wildlife habitats	20	34	27	16	3	2.5
8	" of the natural vegetation	19	40	24	14	3	2.4
9.	Air pollution from automobile exhausts	42	37	17	3	1	1.9
10.	" " from blowing dust	47	30	20	2	1	2.1
11.	" " from open burning	32	44	17	4	3	2.0
12.	" " from industrial smoke	47	32	7	3	1	1.5
13.	" " from foul odors	43	36	16	3	1	1.9
14.	Noise pollution from airplanes	75	14	7	2	2	1.4
15.	" " from cars, trucks, motorcycles	25	49	18	7	2	2.1
16.	" " from industry	75	22	2	1	0	1.3
17.	" " from recreational development	78	17	4	0	0	1.3
18.	Water pollution from municipal sewage	30	34	20	12	4	2.3
19.	" " from septic tanks	29	47	23	6	4	2.2
20	" " frnm agricultural chemicals	46	44	8	1	1	1.7
21.	" " frnm mining and oil production	45	17	22	11	4	2.1
22.	" " from recreational development	61	28	9	2	0	1.5
23.	" " from industrial wastes	53	28	13	4	2	1.7
24.	Land pollution from industrial wastes	53	26	14	4	1	1.7
25.	" " from municipal wastes	36	37	18	7	2	2.0
26.	" " from deteriorated buildings	22	36	29	10	2	2.3
27.	" " from salvage yards	14	23	31	17	5	2.7
28.	" " from strip mining	71	11	9	7	2	1.8
29.	" " from roadside dumping	6	21	24	30	18	3.3
30.	" " from recreational development	58	27	10	4	1	1.6
31	Soil erosion from rural areas	14	29	37	15	5	2.7
32.	" " from urban developments	27	31	32	14	4	2.4
33	" " from unsurfaced roads	11	25	27	21	15	3.1
34	" " from recreational development	50	31	15	3	1	1.7
35	Herbicide drift causing plant damage	37	37	18	6	3	2.0
36	Lack of public awareness	6	25	25	24	10	3.1
37.	"Don't care attitude" by the public	4	14	29	33	20	3.5
38.	Inadequate law enforcement	11	21	32	21	17	3.0
39	Failure to appreciate the problem	4	18	32	25	13	3.4
40.	Don't know where to begin	7	22	27	33	11	3.1
41.	Discouraged by previous efforts	21	27	25	17	9	2.6
42.	Little cooperation between communities	12	21	25	24	18	3.1
43.	Lack of leadership in seeking solution	10	27	30	23	10	3.0
44.	Responsibility not clearly defined	8	26	29	27	10	3.0
45.	Confusion over alternatives	9	31	33	17	10	2.9
46.	Public good versus private interests	10	24	28	28	21	3.1
47.	Does not serve enough people	13	24	31	11	6	2.5
48.	Unavailability of federal funds	14	23	25	23	15	3.0
49.	Inability to increase local revenue	10	20	28	27	16	3.2
50.	Public unwilling to pay the costs	7	13	25	29	26	3.5
51.	Stop-gap measures used too often	10	17	34	26	12	3.1
52.	Inadequate technical assistance	28	37	20	10	5	2.3
53	Inadequate legislation	16	30	26	17	11	2.8
54.	Negative impact on business or industry	19	31	27	15	7	2.6
55.	Others will not do their share	10	28	32	18	13	3.0
		AGREE				DISAGREE	
56.	Env improvement not worth costs involved	4	12	22	34	29	3.7
57.	Need more intergovernment cooperation	28	24	28	13	7	2.5
58.	Bulletins on env. prob. solutions helpful	28	26	32	10	4	2.4
59.	Local info. not always good for decisions	15	26	31	17	10	2.8
60.	Wkshps. & forums on prob. would be helpful	33	35	20	8	4	2.2
61	Adequate info. on env. problems available	22	36	23	14	5	2.4
62.	Govt. "red tape" prevents solving pollution prob.	19	18	29	24	10	2.9
63.	Jobs are more important than controlling pollution	7	12	32	27	23	3.5
64	Tech. knowledge on prob. seldom reaches grass roots	17	28	24	22	7	2.7
65.	Small community cannot afford experts to assist	51	30	8	7	4	1.9
66.	Important to have access to unbiased specialists	55	26	12	4	3	1.8
67.	Not easy to read/understand technical env. info.	10	18	24	31	17	3.3
68.	Should consult local officials before making laws	35	32	23	7	3	2.1
69.	Difficulty in knowing which info. to apply	17	36	30	14	3	2.5
70.	Solution to prob. raquires racognition of all	61	26	9	2	2	1.6

	OSU Environmental Survey Question	No Problem 1	2	3	4	Severe Problem 5	Avg. Resp.
		Per Cent Response					
1.	Pollution of the overall environment	43	31	16	6	4	2.0
2.	" of the air	53	28	10	5	3	1.8
3.	" of the water	33	27	25	9	6	2.3
4.	" of the land	32	30	19	11	8	2.3
5.	" of foods by pesticides	48	31	15	4	2	1.8
6.	Destruction of the natural beauty	32	25	28	10	5	2.3
7.	" of wildlife habitats	26	23	30	14	7	2.5
8.	" of the natural vegetation	33	29	24	11	2	2.2
9.	Air pollution from automobile exhausts	49	28	17	4	3	1.8
10.	" " from blowing dust	32	36	17	9	6	2.2
11.	" " from open burning	45	31	16	4	4	1.9
12.	" " from industrial smoke	72	15	7	3	3	1.5
13.	" " from foul odors	57	23	10	5	4	1.8
14.	Noise pollution from airplanes	81	14	3	1	2	1.3
15.	" " from cars, trucks, motorcycles	43	32	12	6	8	2.0
16.	" " from industry	83	11	3	2	2	1.3
17.	" " from recreational development	80	15	2	2	1	1.3
18.	Water pollution from municipal sewage	40	30	13	10	6	2.1
19.	" " from septic tanks	37	30	23	6	4	2.1
20.	" " from agricultural chemicals	55	28	11	5	1	1.7
21.	" " from mining and oil production	58	22	11	6	3	1.7
22.	" " from recreational development	69	23	4	2	1	1.4
23.	" " from industrial wastes	59	18	13	6	3	1.8
24.	Land pollution from industrial wastes	58	24	11	4	3	1.7
25.	" " from municipal wastes	44	32	17	5	2	1.9
26.	" " from deteriorated buildings	36	36	16	10	2	2.1
27.	" " from salvage yards	26	31	24	12	9	2.5
28.	" " from strip mining	76	10	8	3	3	1.5
29.	" " from roadside dumping	8	18	22	18	33	3.5
30.	" " from recreational development	62	23	8	4	2	1.6
31.	Soil erosion from rural areas	25	35	26	6	8	2.4
32.	" " from urban developments	51	27	13	6	3	1.8
33.	" " from unsurfaced roads	24	29	22	16	9	2.6
34.	" " from recreational development	63	22	11	3	1	1.6
35.	Herbicide drift causing plant damage	60	25	17	5	3	1.9
36.	Lack of public awareness	15	24	30	14	18	2.9
37.	"Don't care attitude" by the public	10	17	29	23	21	3.3
38.	Inadequate law enforcement	28	24	22	11	15	2.6
39.	Failure to appreciate the problem	14	23	32	19	11	2.9
40.	Don't know where to begin	21	24	24	16	16	2.9
41.	Discouraged by previous efforts	31	24	23	12	9	2.4
42.	Little cooperation between communities	28	26	21	9	17	2.6
43.	Lack of leadership in seeking solution	31	22	21	10	16	2.6
44.	Responsibility not clearly defined	23	24	22	17	14	2.7
45.	Confusion over alternatives	22	31	22	13	12	2.6
46.	Public good versus private interests	24	29	21	13	12	2.6
47.	Does not serve enough people	34	32	19	9	6	2.2
48.	Unavailability of federal funds	21	30	17	11	21	2.9
49.	Inability to increase local revenue	16	26	21	15	22	3.0
50.	Public unwilling to pay the costs	15	17	22	16	30	3.3
51.	Stop-gap measures used too often	23	25	29	11	12	2.6
52.	Inadequate technical assistance	33	31	21	6	9	2.3
53.	Inadequate legislation	33	24	22	9	13	2.4
54.	Negative impact on business or industry	36	30	17	10	7	2.2
55.	Others will not do their share	23	22	28	13	13	2.7
		AGREE				DISAGREE	
56.	Env. improvement not worth costs involved	18	12	27	20	23	3.2
57.	Need more intergovernment cooperation	28	18	29	12	12	2.6
58.	Bulletins on env. prob. solutions helpful	36	22	27	7	7	2.3
59.	Local info. not always good for decisions	22	20	30	11	18	2.8
60.	Wkshps. & forums on prob. would be helpful	41	23	22	10	4	2.1
61.	Adequate info. on env. problems available	30	26	27	8	9	2.4
62.	Govt. "red tape" prevents solving pollution prob.	32	21	20	17	10	2.5
63.	Jobs are more important than controlling pollution	20	22	28	12	18	2.9
64.	Tech. knowledge on prob. seldom reaches grass roots	29	27	27	11	6	2.4
65.	Small community cannot afford experts to assist	67	14	8	6	4	1.7
66.	Important to have access to unbiased specialists	47	21	20	7	6	2.0
67.	Not easy to read/understand technical env. info.	21	19	28	20	11	2.8
68.	Should consult local officials before making laws	53	22	19	5	2	1.8
69.	Difficulty in knowing which info. to apply	33	28	31	4	4	2.2
70.	Solution to prob. requires recognition of all	57	22	17	2	1	1.7

	OSU Environmental Survey Question	No Problem 1	2	3	4	Severe Problem 5	Avg. Resp.
		Per Cent Response					
1.	Pollution of the overall environment	37	42	11	6	3	2.0
2.	" of the air	53	32	10	2	3	1.7
3.	" of the water	29	30	18	19	5	2.4
4.	" of the land	28	30	27	12	3	2.3
5.	" of foods by pesticides	35	40	11	12	2	2.0
6.	Destruction of the natural beauty	30	26	28	15	1	2.3
7.	" of wildlife habitats	28	28	23	20	1	2.4
8.	" of the natural vegetation	23	35	30	11	2	2.3
9.	Air pollution from automobile exhausts	40	34	14	9	3	2.0
10.	" " from blowing dust	28	34	25	10	3	2.3
11.	" " from open burning	46	32	14	6	1	1.8
12.	" " from industrial smoke	61	26	7	6	0	1.6
13.	" " from foul odors	38	36	17	6	3	2.0
14.	Noise pollution from airplanes	75	11	11	2	2	1.4
15.	" " from cars, trucks, motorcycles	24	41	11	17	6	2.4
16.	" " from industry	70	20	7	3	0	1.4
17.	" " from recreational development	78	14	4	1	1	1.3
18	Water pollution from municipal sewage	48	30	12	5	5	1.9
19.	" " from septic tanks	46	25	21	7	1	1.9
20.	" " from agricultural chemicals	43	35	13	6	3	1.9
21	" " from mining and oil production	51	15	18	9	7	2.1
22	" " from recreational development	71	21	6	1	1	1.4
23.	" " from industrial wastes	57	17	13	9	4	1.9
24.	Land pollution from industrial wastes	66	17	9	5	3	1.6
25.	" " from municipal wastes	55	27	13	1	5	1.7
26.	" " from deteriorated buildings	26	28	28	4	4	2.1
27	" " from salvage yards	25	17	36	13	9	2.6
28.	" " from strip mining	77	8	11	3	1	1.4
29.	" " from roadside dumping	9	26	21	30	14	3.2
30.	" " from recreational development	68	22	7	1	1	1.5
31.	Soil erosion from rural areas	20	37	21	11	9	2.4
32.	" " from urban developments	49	25	13	7	1	1.9
33.	" " from unsurfaced roads	26	30	23	9	12	2.5
34.	" " from recreational development	66	24	4	0	5	1.5
35	Herbicide drift causing plant damage	40	28	17	8	3	1.9
36.	Lack of public awareness	10	25	38	19	9	2.9
37.	"Don't care attitude" by the public	10	23	21	35	11	3.2
38.	Inadequate law enforcement	24	17	26	19	12	2.7
39.	Failure to appreciate the problem	13	15	35	23	7	3.0
40	Don't know where to begin	13	24	31	17	13	2.9
41.	Discouraged by previous efforts	29	30	24	10	5	2.3
42.	Little cooperation between communities	20	30	23	11	16	2.7
43.	Lack of leadership in seeking solution	21	27	19	21	11	2.7
44	Responsibility not clearly defined	17	23	25	26	9	2.9
45.	Confusion over alternatives	16	25	36	16	7	2.7
46.	Public good versus private interests	14	20	29	20	14	3.0
47.	Does not serve enough people	25	29	29	13	4	2.4
48.	Unavailability of federal funds	20	32	23	10	14	2.7
49.	Inability to increase local revenue	19	24	20	15	22	2.9
50	Public unwilling to pay the costs	13	26	16	22	23	3.2
51.	Stop-gap measures used too often	15	16	37	25	6	2.9
52.	Inadequate technical assistance	22	34	21	18	5	2.5
53.	Inadequate legislation	18	24	20	23	12	2.9
54.	Negative impact on business or industry	30	31	17	17	4	2.3
55.	Others will not do their share	18	24	19	18	22	3.0
		AGREE				DISAGREE	
56.	Env. improvement not worth costs involved	15	4	24	25	32	3.6
57.	Need more intergovernment cooperation	33	24	16	14	10	2.4
58.	Bulletins on env. prob solutions helpful	34	31	25	9	1	2.1
59.	Local info. not always good for decisions	26	24	29	10	10	2.5
60.	Wkshps. & forums on prob. would be helpful	42	25	22	3	9	2.1
61.	Adequate info. on env. problems available	31	19	16	18	15	2.7
62.	Govt. "red tape" prevents solving pollution prob.	34	17	19	22	12	2.7
63.	Jobs are more important than controlling pollution	14	9	26	27	24	3.4
64.	Tech. knowledge on prob. seldom reaches grass roots	34	30	22	7	6	2.2
65.	Small community cannot afford experts to assist	57	19	13	6	6	1.8
66.	Important to have access to unbiased specialists	62	22	12	4	0	1.6
67.	Not easy to read/understand technical env. info.	16	17	32	19	16	3.0
68.	Should consult local officials before making laws	43	30	20	1	4	1.9
69.	Difficulty in knowing which info. to apply	29	31	29	6	4	2.3
70.	Solution to prob. requires recognition of all	68	19	6	6	1	1.5

STATE
Soil Conservation District Board
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	OSU Environmental Survey Question	No Problem 1	2	3	4	Severe Problem 5	Avg. Resp.
		Per Cent Response					
1.	Pollution of the overall environment	29	32	31	5	2	2.2
2.	" of the air	52	32	7	5	4	1.8
3.	" of the water	23	27	29	15	6	2.5
4.	" of the land	21	37	25	11	9	2.5
5.	" of foods by pesticides	59	25	8	3	4	1.7
6.	Destruction of the natural beauty	36	34	17	10	2	2.1
7.	" of wildlife habitats	27	29	27	13	4	2.4
8.	" of the natural vegetation	30	34	20	12	3	2.2
9.	Air pollution from automobile exhausts	51	32	14	2	2	1.7
10.	" " from blowing dust	33	39	21	3	4	2.1
11.	" " from open burning	48	33	11	4	3	1.8
12.	" " from industrial smoke	79	13	4	3	0	1.3
13.	" " from foul odors	61	23	10	2	4	1.7
14.	Noise pollution from air planes	80	8	8	2	1	1.4
15.	" " from cars, trucks, motorcycles	40	42	10	4	3	1.9
16.	" " from industry	82	16	1	1	0	1.2
17.	" " from recreational development	76	15	5	2	2	1.4
18.	Water pollution from municipal sewage	46	28	14	6	5	2.0
19.	" " from septic tanks	49	30	9	7	4	1.9
20.	" " from agricultural chemicals	63	27	5	3	2	1.5
21.	" " from mining and oil production	53	22	11	9	5	1.9
22.	" " from recreational development	72	17	7	3	1	1.4
23.	" " from industrial wastes	64	24	11	0	1	1.5
24.	Land pollution from industrial wastes	66	20	8	4	2	1.6
25.	" " from municipal wastes	53	29	14	3	1	1.7
26.	" " from deteriorated buildings	28	42	19	10	1	2.1
27.	" " from salvage yards	23	35	21	10	10	2.5
28.	" " from strip mining	80	7	5	5	2	1.4
29.	" " from roadside dumping	5	21	22	24	27	3.5
30.	" " from recreational development	64	21	9	4	1	1.6
31.	Soil erosion from rural areas	16	33	32	15	5	2.6
32.	" " from urban developments	34	28	19	14	5	2.3
33.	" " from unsurfaced roads	9	26	28	20	17	3.1
34.	" " from recreational development	55	32	7	3	2	1.6
35.	Herbicide drift causing plant damage	52	32	11	1	3	1.7
36.	Lack of public awareness	11	28	21	19	20	3.1
37.	"Don't care attitude" by the public	9	15	30	16	30	3.4
38.	Inadequate law enforcement	12	24	31	13	20	3.0
39.	Failure to appreciate the problem	7	27	29	22	15	3.1
40.	Don't know where to begin	9	27	26	20	18	3.1
41.	Discouraged by previous efforts	19	28	27	14	12	2.7
42.	Little cooperation between communities	18	19	26	22	14	2.9
43.	Lack of leadership in seeking solution	14	20	28	26	12	3.0
44.	Responsibility not clearly defined	16	22	26	28	8	2.9
45.	Confusion over alternatives	15	25	28	23	9	2.9
46.	Public good versus private interests	17	24	21	27	11	2.9
47.	Does not serve enough people	24	31	26	12	7	2.5
48.	Unavailability of federal funds	12	23	24	17	24	3.2
49.	Inability to increase local revenue	22	16	18	25	20	3.1
50.	Public unwilling to pay the costs	14	13	21	28	24	3.3
51.	Stop-gap measures used too often	12	19	25	26	18	3.2
52.	Inadequate technical assistance	33	34	22	4	7	2.2
53.	Inadequate legislation	28	24	23	11	14	2.6
54.	Negative impact on business or industry	22	23	23	19	12	2.7
55.	Others will not do their share	16	21	30	16	17	3.0
		AGREE				DISAGREE	
56.	Env. improvement not worth costs involved	12	23	22	19	25	3.2
57.	Need more intergovernment cooperation	34	25	18	13	10	2.4
58.	Bulletins on env. prob. solutions helpful	40	26	23	9	2	2.1
59.	Local info. not always good for decisions	13	34	29	11	12	2.8
60.	Wkshps. & forums on prob. would be helpful	41	24	22	9	4	2.1
61.	Adequate info. on env. problems available	31	32	23	10	4	2.2
62.	Govt. "red tape" prevents solving pollution prob.	34	16	27	13	8	2.4
63.	Jobs are more important than controlling pollution	9	17	32	18	24	3.3
64.	Tech. knowledge on prob. seldom reaches grass roots	28	29	20	17	6	2.4
65.	Small community cannot afford experts to assist	58	15	13	7	6	1.9
66.	Important to have access to unbiased specialists	59	18	10	11	2	1.8
67.	Not easy to read/understand technical env. info.	14	23	29	21	12	2.9
68.	Should consult local officials before making laws	44	28	22	2	4	1.9
69.	Difficulty in knowing which info. to apply	28	37	24	8	2	2.2
70.	Solution to prob. requires recognition of all	66	15	9	5	4	1.7

STATE
Elected Municipal
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	OSU Environmental Survey Question	No Problem 1	2	3	4	Severe Problem 5	Avg. Resp
		Per Cent Response					
1.	Pollution of the overall environment	28	40	25	6	2	2.1
2.	" of the air	43	28	12	6	2	1.9
3.	" of the water	28	33	22	12	5	2.3
4.	" of the land	27	35	21	12	5	2.3
5.	" of foods by pesticides	43	27	12	6	2	1.9
6.	Destruction of the natural beauty	26	30	26	13	6	2.4
7.	" of wildlife habitats	23	26	26	18	7	2.6
8.	" of the natural vegetation	25	30	25	15	5	2.4
9.	Air pollution from automobile exhausts	36	37	16	6	4	2.1
10.	" " from blowing dust	29	38	22	9	2	2.2
11.	" " from open burning	40	24	17	6	4	2.0
12.	" " from industrial smoke	68	20	8	2	3	1.5
13.	" " from foul odors	44	31	16	6	3	1.9
14.	Noise pollution from airplanes	73	18	5	1	2	1.4
15.	" " from cars, trucks, motorcycles	21	36	24	12	6	2.4
16.	" " from industry	76	18	4	0	2	1.3
17.	" " from recreational development	83	12	3	1	1	1.2
18.	Water pollution from municipal sewage	48	27	10	8	6	2.0
19.	" " from septic tanks	42	28	14	8	7	2.1
20.	" " from agricultural chemicals	50	32	13	3	2	1.7
21.	" " from mining and oil production	56	25	11	7	3	1.8
22.	" " from recreational development	75	17	5	2	1	1.4
23.	" " from industrial wastes	61	23	10	4	2	1.6
24.	Land pollution from industrial wastes	56	27	10	4	2	1.7
25.	" " from municipal wastes	47	30	16	5	2	1.9
26.	" " from deteriorated buildings	22	30	28	14	5	2.5
27.	" " from salvage yards	17	28	28	18	9	2.7
28.	" " from strip mining	77	8	7	5	4	1.5
29.	" " from roadside dumping	9	25	29	20	17	3.1
30.	" " from recreational development	67	22	8	2	1	1.5
31.	Soil erosion from rural areas	24	41	23	9	3	2.3
32.	" " from urban developments	43	32	16	6	3	1.9
33.	" " from unsurfaced roads	20	34	27	12	7	2.5
34.	" " from recreational development	67	24	5	1	1	1.4
35.	Herbicide drift causing plant damage	55	27	12	5	1	1.7
36.	Lack of public awareness	7	23	31	25	14	3.2
37.	"Don't care attitude" by the public	7	14	30	28	22	3.5
38.	Inadequate law enforcement	17	26	27	17	14	2.9
39.	Failure to appreciate the problem	6	16	35	29	14	3.3
40.	Don't know where to begin	11	25	23	23	17	3.1
41.	Discouraged by previous efforts	22	20	23	18	8	2.6
42.	Little cooperation between communities	20	20	22	23	15	2.9
43.	Lack of leadership in seeking solution	15	23	27	22	14	3.0
44.	Responsibility not clearly defined	11	27	28	21	13	3.0
45.	Confusion over alternatives	15	26	26	18	15	2.9
46.	Public good versus private interests	16	24	28	18	13	2.9
47.	Does not serve enough people	23	32	25	9	6	2.4
48.	Unavailability of federal funds	19	23	23	18	17	2.9
49.	Inability to increase local revenue	18	22	24	21	15	2.9
50.	Public unwilling to pay the costs	11	18	19	27	25	3.4
51.	Stop-gap measures used too often	12	23	31	19	15	3.0
52.	Inadequate technical assistance	17	24	28	17	12	2.8
53.	Inadequate legislation	21	24	28	12	16	2.8
54.	Negative impact on business or industry	23	27	29	13	9	2.6
55.	Others will not do their share	16	20	30	17	17	3.0
		AGREE				DISAGREE	
56.	Env. improvement not worth costs involved	8	12	27	26	28	3.5
57.	Need more intergovernment cooperation	36	25	24	8	8	2.3
58.	Bulletins on env. prob. solutions helpful	45	23	20	8	4	2.0
59.	Local info. not always good for decisions	23	28	26	12	10	2.6
60.	Wkshps. & forums on prob. would be helpful	47	24	19	7	3	1.9
61.	Adequate info. on env. problems available	19	22	26	19	14	2.9
62.	Govt. "red tape" prevents solving pollution prob.	31	19	24	15	9	2.5
63.	Jobs are more important than controlling pollution	14	13	27	23	22	3.3
64.	Tech. knowledge on prob. seldom reaches grass roots	36	28	22	10	4	2.3
65.	Small community cannot afford experts to assist	58	19	9	7	6	1.8
66.	Important to have access to unbiased specialists	57	26	11	4	3	1.7
67.	Not easy to read/understand technical env. info.	17	23	26	20	14	2.9
68.	Should consult local officials before making laws	44	30	18	5	4	1.9
69.	Difficulty in knowing which info. to apply	34	34	24	6	2	2.1
70.	Solution to prob. requires recognition of all	61	26	9	2	2	1.6

	OSU Environmental Survey Question	No Problem 1	2	3	4	Severe Problem 5	Avg. Resp.
		Per Cent Response					
1.	Pollution of the overall environment	18	33	38	9	2	2.4
2.	" of the air	34	38	14	12	2	2.1
3.	" of the water	9	29	29	14	9	2.7
4.	" of the land	8	29	29	20	5	2.7
5.	" of foods by pesticides	39	36	18	6	2	1.9
6.	Destruction of the natural beauty	15	32	36	11	5	2.6
7.	" of wildlife habitats	16	31	30	16	6	2.6
8.	" of the natural vegetation	24	26	32	14	5	2.5
9.	Air pollution from automobile exhausts	38	41	14	3	5	2.0
10.	" " from blowing dust	27	52	18	3	0	2.0
11.	" " from open burning	36	39	18	3	4	2.0
12.	" " from industrial smoke	66	19	10	3	1	1.6
13.	" " from foul odors	45	27	13	10	4	2.0
14.	Noise pollution from airplanes	70	20	8	0	3	1.5
15.	" " from cars, trucks, motorcycles	30	39	19	7	4	2.2
16.	" " from industry	70	25	3	0	1	1.4
17.	" " from recreational development	69	29	1	0	1	1.4
18.	Water pollution from municipal sewage	24	45	17	9	5	2.2
19.	" " from septic tanks	33	37	21	9	0	2.1
20.	" " from agricultural chemicals	39	42	14	3	2	1.8
21.	" " from mining and oil production	46	27	18	3	6	2.0
22.	" " from recreational development	64	27	3	4	1	1.5
23.	" " from industrial wastes	45	27	16	9	3	2.0
24.	Land pollution from industrial wastes	43	32	15	5	5	2.0
25.	" " from municipal wastes	23	52	12	11	2	2.2
26.	" " from deteriorated buildings	15	34	35	12	3	2.5
27.	" " from salvage yards	6	28	36	24	6	3.0
28.	" " from strip mining	66	9	8	11	6	1.8
29.	" " from roadside dumping	3	10	21	31	25	3.6
30.	" " from recreational development	60	30	7	0	3	1.6
31.	Soil erosion from rural areas	14	47	27	9	5	2.4
32.	" " from urban developments	33	28	27	8	5	2.2
33.	" " from unsurfaced roads	18	30	30	14	9	2.7
34.	" " from recreational development	58	34	6	0	2	1.5
35.	Herbicide drift causing plant damage	45	36	11	3	3	1.8
36.	Lack of public awareness	3	18	37	22	19	3.4
37.	"Don't care attitude" by the public	4	10	25	30	30	3.7
38.	Inadequate law enforcement	7	31	22	18	21	3.1
39.	Failure to appreciate the problem	6	12	33	32	17	3.4
40.	Don't know where to begin	8	15	26	34	18	3.4
41.	Discouraged by previous efforts	19	27	27	19	7	2.7
42.	Little cooperation between communities	12	19	31	19	18	3.1
43.	Lack of leadership in seeking solution	9	24	31	19	16	3.1
44.	Responsibility not clearly defined	9	28	24	24	15	3.1
45.	Confusion over alternatives	16	24	27	16	16	2.9
46.	Public good versus private interests	15	19	33	19	15	3.0
47.	Does not serve enough people	18	26	34	14	8	2.7
48.	Unavailability of federal funds	6	15	27	21	27	3.4
49.	Inability to increase local revenue	8	17	20	30	26	3.5
50.	Public unwilling to pay the costs	6	10	27	28	28	3.6
51.	Stop-gap measures used too often	9	24	26	24	17	3.2
52.	Inadequate technical assistance	22	39	18	10	10	2.5
53.	Inadequate legislation	12	29	27	14	18	3.0
54.	Negative impact on business or industry	18	24	33	10	15	2.8
55.	Others will not do their share	12	23	32	20	14	3.0
		AGREE				DISAGREE	
56.	Env. improvement not worth costs involved	9	14	21	32	24	3.5
57.	Need more intergovernment cooperation	36	33	16	7	7	2.2
58.	Bulletins on env prob. solutions helpful	25	33	31	7	3	2.3
59.	Local info. not always good for decisions	18	22	33	19	7	2.8
60.	Wkshps. & forums on prob. would be helpful	39	30	21	8	2	2.0
61.	Adequate info. on env. problems available	21	31	30	9	9	2.5
62.	Govt. "red tape" prevents solving pollution prob.	19	13	33	24	10	2.9
63.	Jobs are more important than controlling pollution	3	17	26	27	27	3.6
64.	Tech. knowledge on prob. seldom reaches grass roots	30	32	18	17	3	2.3
65.	Sma'l community cannot afford experts to assist	59	14	17	9	2	1.8
66.	Important to have access to unbiased specialists	55	29	9	5	3	1.7
67.	Not easy to read/understand technical env. info.	8	23	32	26	12	3.1
68.	Should consult local officials before making laws	48	32	15	3	2	1.8
69.	Difficulty in knowing which info. to apply	21	48	22	6	3	2.2
70.	Solution to prob. requires recognition of all	67	21	9	1	1	1.5

STATE
Sub-State Planning District Staff
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	OSU Environmental Survey Question	No Problem 1	2	3	4	Severe Problem 5	Avg. Resp.
		Per Cent Response					
1.	Pollution of the overall environment	6	41	29	24	0	2.7
2.	" of the air	29	65	6	0	0	1.8
3.	" of the water	18	18	41	18	6	2.8
4.	" of the land	11	33	28	22	6	2.8
5.	" of foods by pesticides	28	28	39	6	0	2.2
6.	Destruction of the natural beauty	6	24	24	41	6	3.2
7.	" of wildlife habitats	11	11	28	28	22	3.4
8.	" of the natural vegetation	11	17	33	22	17	3.2
9.	Air pollution from automobile exhausts	17	44	39	0	0	2.2
10.	" " from blowing dust	12	29	24	35	0	2.8
11.	" " from open burning	17	39	28	17	0	2.4
12.	" " from industrial smoke	44	39	0	17	0	1.9
13.	" " from foul odors	33	33	22	11	0	2.1
14.	Noise pollution from airplanes	71	29	0	0	0	1.3
15.	" " from cars, trucks, motorcycles	11	72	6	11	0	2.2
16.	" " from industry	61	28	11	0	0	1.5
17.	" " from recreational development	67	22	6	6	0	1.5
18.	Water pollution from municipal sewage	22	39	11	17	11	2.6
19.	" " from septic tanks	11	28	33	6	22	3.0
20.	" " from agricultural chemicals	17	39	33	6	6	2.4
21.	" " from mining and oil production	33	28	17	11	11	2.4
22.	" " from recreational development	56	28	6	11	0	1.7
23.	" " from industrial wastes	50	22	28	0	0	1.8
24.	Land pollution from industrial wastes	39	33	17	6	6	2.1
25.	" " from municipal wastes	28	28	17	22	6	2.5
26.	" " from deteriorated buildings	11	17	39	22	11	3.1
27.	" " from salvage yards	6	28	33	22	11	3.1
28.	" " from strip mining	83	11	6	0	0	1.2
29.	" " from roadside dumping	0	17	22	39	22	3.7
30.	" " from recreational development	44	33	11	11	0	1.9
31.	Soil erosion from rural areas	0	44	0	44	11	3.2
32.	" " from urban developments	28	28	17	22	6	2.5
33.	" " from unsurfaced roads	11	11	17	50	11	3.4
34.	" " from recreational development	39	39	17	6	0	1.9
35.	Herbicide drift causing plant damage	18	41	24	12	6	2.5
36.	Lack of public awareness	6	22	6	33	33	3.7
37.	"Don't care attitude" by the public	6	6	22	22	44	3.9
38.	Inadequate law enforcement	6	11	28	22	33	3.7
39.	Failure to appreciate the problem	11	0	33	28	28	3.6
40.	Don't know where to begin	11	11	17	28	33	3.6
41.	Discouraged by previous efforts	11	11	39	22	17	3.2
42.	Little cooperation between communities	6	28	17	17	33	3.4
43.	Lack of leadership in seeking solution	6	17	33	28	17	3.3
44.	Responsibility not clearly defined	11	11	11	44	22	3.6
45.	Confusion over alternatives	11	11	33	22	22	3.3
46.	Public good versus private interests	17	0	33	28	22	3.4
47.	Does not serve enough people	17	6	39	28	11	3.1
48.	Unavailability of federal funds	11	6	28	22	33	3.6
49.	Inability to increase local revenue	11	0	22	33	33	3.8
50.	Public unwilling to pay the costs	6	0	22	28	44	4.1
51.	Stop-gap measures used too often	11	6	39	22	22	3.4
52.	Inadequate technical assistance	28	17	28	22	6	2.6
53.	Inadequate legislation	18	18	12	29	24	3.2
54.	Negative impact on business or industry	17	17	22	33	11	3.1
55.	Others will not do their share	6	6	24	41	24	3.7
		AGREE				DISAGREE	
56.	Env. improvement not worth costs involved	6	6	18	35	35	3.9
57.	Need more intergovernment cooperation	53	29	12	6	0	1.7
58.	Bulletins on env. prob. solutions helpful	24	41	29	6	0	2.2
59.	Local info. not always good for decisions	0	65	24	6	6	2.5
60.	Wkshps. & forums on prob. would be helpful	37	37	19	6	0	1.9
61.	Adequate info. on env. problems available	24	18	24	24	12	2.8
62.	Govt. "red tape" prevents solving pollution prob.	29	12	24	18	18	2.8
63.	Jobs are more important than controlling pollution	7	13	20	20	40	3.7
64.	Tech. knowledge on prob. seldom reaches grass roots	25	37	19	12	6	2.4
65.	Small community cannot afford experts to assist	75	12	0	6	6	1.6
66.	Important to have access to unbiased specialists	60	40	0	0	0	1.4
67.	Not easy to read/understand technical env. info.	19	19	19	12	31	3.2
68.	Should consult local officials before making laws	44	31	12	0	12	2.1
69.	Difficulty in knowing which info. to apply	19	44	19	6	12	2.5
70.	Solution to prob. requires recognition of all	75	19	6	0	0	1.3

	OSU Environmental Survey Question	No Problem 1	2	3	4	Severe Problem 5	Avg. Resp.
		Per Cent Response					
1.	Pollution of the overall environment	23	46	23	5	2	2.2
2.	" of the air	34	40	16	7	3	2.0
3.	" of the water	22	39	23	13	3	2.4
4.	" of the land	23	43	21	10	3	2.3
5.	" of foods by pesticides	36	41	19	4	2	1.9
6.	Destruction of the natural beauty	23	34	27	11	5	2.4
7.	" of wildlife habitats	23	31	24	17	5	2.5
8.	" of the natural vegetation	23	35	24	14	5	2.4
9.	Air pollution from automobile exhausts	33	35	19	11	2	2.1
10.	" " from blowing dust	26	36	22	11	5	2.3
11.	" " from open burning	38	38	18	5	2	1.9
12.	" " from industrial smoke	51	28	11	7	2	1.8
13.	" " from foul odors	37	35	17	6	5	2.1
14.	Noise pollution from airplanes	65	19	10	3	2	1.6
15.	" " from cars, trucks, motorcycles	28	36	18	11	6	2.3
16.	" " from industry	69	21	6	2	2	1.5
17.	" " from recreational development	74	19	5	0	1	1.3
18.	Water pollution from municipal sewage	41	30	18	7	4	2.0
19.	" " from septic tanks	42	32	16	7	4	2.0
20.	" " from agricultural chemicals	51	28	17	3	1	1.8
21.	" " from mining and oil production	49	22	18	7	3	1.9
22.	" " from recreational development	68	22	7	2	1	1.5
23.	" " from industrial wastes	48	30	15	5	3	1.9
24.	Land pollution from industrial wastes	48	30	15	6	2	1.8
25.	" " from municipal wastes	46	32	13	7	2	1.9
26.	" " from deteriorated buildings	23	33	26	14	4	2.4
27.	" " from salvage yards	18	32	28	13	8	2.6
28.	" " from strip mining	71	14	7	6	2	1.5
29.	" " from roadside dumping	11	33	27	16	14	2.9
30.	" " from recreational development	62	25	8	5	0	1.6
31.	Soil erosion from rural areas	26	39	22	10	3	2.3
32.	" " from urban developments	44	26	17	8	3	2.0
33.	" " from unsurfaced roads	22	33	23	14	8	2.5
34.	" " from recreational development	57	31	9	2	1	1.6
35.	Herbicide drift causing plant damage	43	37	14	4	2	1.9
36.	Lack of public awareness	10	25	33	20	13	3.0
37.	"Don't care attitude" by the public	8	14	31	25	22	3.4
38.	Inadequate law enforcement	15	31	28	16	10	2.8
39.	Failure to appreciate the problem	9	17	36	22	16	3.2
40.	Don't know where to begin	11	27	27	19	16	3.0
41.	Discouraged by previous efforts	25	28	25	16	5	2.5
42.	Little cooperation between communities	20	26	27	17	10	2.7
43.	Lack of leadership in seeking solution	16	22	27	21	15	3.0
44.	Responsibility not clearly defined	15	21	28	20	16	3.0
45.	Confusion over alternatives	17	23	32	17	10	2.9
46.	Public good versus private interests	18	29	25	19	11	2.7
47.	Does not serve enough people	23	32	28	12	5	2.4
48.	Unavailability of federal funds	24	28	25	13	10	2.6
49.	Inability to increase local revenue	24	27	23	16	10	2.6
50.	Public unwilling to pay the costs	14	21	22	21	21	3.1
51.	Stop-gap measures used too often	17	22	28	21	11	2.9
52.	Inadequate technical assistance	18	27	28	19	7	2.7
53.	Inadequate legislation	20	20	27	19	14	2.9
54.	Negative impact on business or industry	21	27	29	14	9	2.6
55.	Others will not do their share	15	24	29	15	17	3.0
		AGREE				DISAGREE	
56.	Env. improvement not worth costs involved	8	16	24	26	26	3.5
57.	Need more intergovernment cooperation	31	28	23	8	10	2.4
58.	Bulletins on env. prob. solutions helpful	33	27	27	8	6	2.3
59.	Local info. not always good for decisions	21	30	28	11	12	2.6
60.	Wkshps. & forums on prob. would be helpful	38	31	19	8	4	2.1
61.	Adequate info. on env. problems available	13	25	29	22	12	3.0
62.	Govt. "red tape" prevents solving pollution prob.	29	18	24	20	10	2.6
63.	Jobs are more important than controlling pollution	13	15	26	22	24	3.3
64.	Tech. knowledge on prob. seldom reaches grass roots	29	27	25	13	5	2.4
65.	Small community cannot afford experts to assist	50	24	13	8	5	1.9
66.	Important to have access to unbiased specialists	53	30	11	5	1	1.7
67.	Not easy to read/understand technical env. info.	19	21	22	22	17	3.0
68.	Should consult local officials before making laws	42	25	22	7	4	2.0
69.	Difficulty in knowing which info. to apply	32	32	26	7	3	2.2
70.	Solution to prob. requires recognition of all	63	22	10	3	3	1.6

APPENDIX D

APPENDIX D

ENVIRONMENTAL PROBLEM STUDY
Oklahoma State University Extension Survey
1973

Please provide the information requested to aid in a statistical analysis.

County of Residence _____ Postal Zip Code _____

Neighborhood (check one)

☐ Urban
☐ Rural

Circle no. of years of education

1 2 3 4 5 6 7 8 9 10
11 12 13 14 15 16 17 18 19 20

List your occupation

Group Affiliations (check all appropriate spaces)

☐ County Development Council
☐ County USDA Rural Development Committee
☐ County Commissioner
☐ County Official other than Commissioner
☐ Soil Conservation District Board
☐ Elected Municipal Official
☐ Sub-State Planning District Staff
☐ Sub-State Planning District Board
☐ None of the Above

We would like your personal impressions about the environment in your county. Do not worry or puzzle too much over individual items. There are no right or wrong answers. Simply report your own impressions as you read the statements.

When the word environment is used, it refers to the conditions of the air, water, land and natural beauty of the area as they affect the well-being of people.

Part I - Environmental Problems

Consider the following environmental problems as each relates to your home county. Circle the number that best expresses your feelings regarding the severity of each environmental problem.

PROBLEM	Not A Problem				Very Severe Problem
Example.	1	(2)	3	4	5
Pollution of the overall environment	1	2	3	4	5
" " the air	1	2	3	4	5
" " the water	1	2	3	4	5
" " the land	1	2	3	4	5
" " foods by pesticides	1	2	3	4	5

Part I (continued) Circle the number that best expresses your feelings.

PROBLEM	Not a Problem				Very Severe Problem
Destruction of the natural beauty	1	2	3	4	5
" " wildlife habitats	1	2	3	4	5
" " the natural vegetation	1	2	3	4	5
Air pollution from automobile exhausts	1	2	3	4	5
" " from blowing dust	1	2	3	4	5
" " from open burning	1	2	3	4	5
" " from industrial smoke	1	2	3	4	5
" " from foul odors	1	2	3	4	5
Noise pollution from airplanes	1	2	3	4	5
" " from cars, trucks, motorcycles	1	2	3	4	5
" " from industry	1	2	3	4	5
" " from recreational development	1	2	3	4	5
Water pollution from municipal sewage	1	2	3	4	5
" " from septic tanks	1	2	3	4	5
" " from agricultural chemicals	1	2	3	4	5
" " from mining and oil production	1	2	3	4	5
" " from recreational development	1	2	3	4	5
" " from industrial wastes	1	2	3	4	5
Land pollution from industrial wastes	1	2	3	4	5
" " from municipal wastes	1	2	3	4	5
" " from deteriorated buildings	1	2	3	4	5
" " from salvage yards	1	2	3	4	5
" " from strip mining	1	2	3	4	5
" " from roadside dumping	1	2	3	4	5
" " recreational development	1	2	3	4	5
Soil erosion from rural areas	1	2	3	4	5
" " from urban developments	1	2	3	4	5
" " from unsurfaced roads	1	2	3	4	5
" " from recreational development	1	2	3	4	5
Herbicide drift causing plant damage	1	2	3	4	5

Part II - Obstacles to Problem Solutions

The following have often been reported as obstacles to the solution of environmental problems. Based on your experience, to what extent does each obstacle interfere with the solution of environmental problems in your county. Circle the number that best expresses your feelings.

OBSTACLE	To No Extent				To a Major Extent
Example.	1	(2)	3	4	5
Lack of public awareness	1	2	3	4	5
"Don't care attitude" by the public	1	2	3	4	5
Inadequate law enforcement	1	2	3	4	5
Failure to appreciate the problem	1	2	3	4	5
Don't know where to begin.	1	2	3	4	5
Discouraged by previous efforts	1	2	3	4	5
Little cooperation between communities	1	2	3	4	5
Lack of leadership in seeking solution	1	2	3	4	5
Responsibility not clearly defined	1	2	3	4	5
Confusion over alternatives.	1	2	3	4	5
Public good versus private interests	1	2	3	4	5
Does not serve enough people.	1	2	3	4	5
Unavailability of federal funds	1	2	3	4	5
Inability to increase local revenue	1	2	3	4	5
Public unwilling to pay the costs	1	2	3	4	5
Stop-gap measures used too often	1	2	3	4	5
Inadequate technical assistance.	1	2	3	4	5
Inadequate legislation	1	2	3	4	5
Negative impact on business or industry	1	2	3	4	5
Others will not do their share.	1	2	3	4	5
_____	1	2	3	4	5
Other					
_____	1	2	3	4	5
Other					

Part III - Decision-Making Atmosphere

The following statements have been made by others about how they feel. Circle the number that best represents your feelings toward each viewpoint.

STATEMENT	Strongly Agree				Strongly Disagree
Example.	1	2	3	(4)	5
The value of environmental improvement is usually not worth the costs involved	1	2	3	4	5
There seems to be a need for more inter-government cooperation on the planning and execution of environmental improvements	1	2	3	4	5
Fact sheets and bulletins on local environmental problems would be very helpful in problem solutions . .	1	2	3	4	5
Information from local sources is not always a satisfactory basis for local decision making	1	2	3	4	5
Workshops and forums on critical local problems (e.g. municipal waste disposal) would greatly assist leaders and the general public	1	2	3	4	5
Adequate information on which to base environmental decisions is usually available to me	1	2	3	4	5
Government "red tape" prevents us from solving many of our pollution problems locally	1	2	3	4	5
Jobs and business prosperity are more important than the pollution they generate	1	2	3	4	5
Technical knowledge on environmental problems seldom reaches the grass roots level of decision making . . .	1	2	3	4	5
The small community cannot afford to employ experts to assist in environmental planning	1	2	3	4	5
In dealing with environmental problems, it is important to have access to unbiased specialists	1	2	3	4	5
It is not easy for me to read and understand technical information on the environment	1	2	3	4	5
Local officials have important environmental information and perspectives which should be considered before federal laws and regulations are made .	1	2	3	4	5
In environmental planning, one frequently has difficulty in knowing which information to apply.	1	2	3	4	5
Satisfactory solutions to local environmental problems require recognition of the people, resources, and special interests involved	1	2	3	4	5