Evaluation of farm educational programs of electric power suppliers in the United States

Elwood Forrest Olver

Iowa State College

Follow this and additional works at: https://lib.dr.iastate.edu/rtd

Part of the Agriculture Commons

Recommended Citation

Olver, Elwood Forrest, "Evaluation of farm educational programs of electric power suppliers in the United States" (1957). Retrospective Theses and Dissertations. 2230.

https://lib.dr.iastate.edu/rtd/2230

This Dissertation is brought to you for free and open access by the Iowa State University Capstones, Theses and Dissertations at Iowa State University Digital Repository. It has been accepted for inclusion in Retrospective Theses and Dissertations by an authorized administrator of Iowa State University Digital Repository. For more information, please contact digirep@iastate.edu.
EVALUATION OF FARM EDUCATIONAL PROGRAMS OF ELECTRIC POWER SUPPLIERS IN THE UNITED STATES

by

Elwood Forrest Olver

A Dissertation Submitted to the Graduate Faculty in Partial Fulfillment of The Requirements for the Degree of

DOCTOR OF PHILOSOPHY

Major Subject: Vocational Education

Approved:

Signature was redacted for privacy.

In Charge of Major Work

Signature was redacted for privacy.

Head of Major Department

Signature was redacted for privacy.

Dean of Graduate College

Iowa State College

1957
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>II. DEVELOPMENT OF RURAL ELECTRIFICATION</td>
<td>8</td>
</tr>
<tr>
<td>A. Early Attempts to Stimulate Electrification</td>
<td>8</td>
</tr>
<tr>
<td>B. Early Attitudes Toward Electrification</td>
<td>14</td>
</tr>
<tr>
<td>C. Federal Government Action</td>
<td>17</td>
</tr>
<tr>
<td>D. Statistics of the Electric Industry</td>
<td>20</td>
</tr>
<tr>
<td>E. Future of Electrification</td>
<td>23</td>
</tr>
<tr>
<td>F. Power Use Programs</td>
<td>30</td>
</tr>
<tr>
<td>III. METHOD OF PROCEDURE</td>
<td>36</td>
</tr>
<tr>
<td>IV. CHARACTERISTICS OF POWER SUPPLIERS</td>
<td>39</td>
</tr>
<tr>
<td>V. FARM EDUCATIONAL PROGRAMS</td>
<td>52</td>
</tr>
<tr>
<td>A. Age of Farm Programs</td>
<td>52</td>
</tr>
<tr>
<td>B. Agricultural Development Programs</td>
<td>57</td>
</tr>
<tr>
<td>C. Practices Employed in Programs</td>
<td>59</td>
</tr>
<tr>
<td>D. Program Success Standards</td>
<td>70</td>
</tr>
<tr>
<td>VI. INCREASING ELECTRICAL CONSUMPTION</td>
<td>78</td>
</tr>
<tr>
<td>A. Techniques</td>
<td>78</td>
</tr>
<tr>
<td>B. Merchandising</td>
<td>86</td>
</tr>
<tr>
<td>C. Publications</td>
<td>89</td>
</tr>
<tr>
<td>VII. FARM PROGRAM AIDS</td>
<td>94</td>
</tr>
<tr>
<td>VIII. FARM SERVICE ADVISERS</td>
<td>104</td>
</tr>
<tr>
<td>A. Number of Advisers</td>
<td>104</td>
</tr>
<tr>
<td>B. Time Spent in Educational Farm Programs</td>
<td>105</td>
</tr>
<tr>
<td>C. Activities of Advisers</td>
<td>106</td>
</tr>
<tr>
<td>D. Education and Experience of Advisers</td>
<td>115</td>
</tr>
<tr>
<td>IX. RECOMMENDATIONS AND IMPLICATIONS</td>
<td>120</td>
</tr>
<tr>
<td>X. SUMMARY</td>
<td>126</td>
</tr>
<tr>
<td>XI. LITERATURE CITED</td>
<td>133</td>
</tr>
</tbody>
</table>
# LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 1.</td>
<td>Electrified farms and type of organization.</td>
<td>40</td>
</tr>
<tr>
<td>Table 2.</td>
<td>Size and type of organization.</td>
<td>41</td>
</tr>
<tr>
<td>Table 3.</td>
<td>Regions of the United States.</td>
<td>42</td>
</tr>
<tr>
<td>Table 4.</td>
<td>Region and type of organization.</td>
<td>43</td>
</tr>
<tr>
<td>Table 5.</td>
<td>Size of organization and region.</td>
<td>44</td>
</tr>
<tr>
<td>Table 6.</td>
<td>Sum of item weights indicating quality of educational program.</td>
<td>46</td>
</tr>
<tr>
<td>Table 7.</td>
<td>Quality of program and type of organization.</td>
<td>48</td>
</tr>
<tr>
<td>Table 8.</td>
<td>Quality of program and size of organization.</td>
<td>49</td>
</tr>
<tr>
<td>Table 9.</td>
<td>Analysis of variance of FEP scores.</td>
<td>50</td>
</tr>
<tr>
<td>Table 10.</td>
<td>Quality of program and region.</td>
<td>51</td>
</tr>
<tr>
<td>Table 11.</td>
<td>Age of farm educational programs and type of organization.</td>
<td>53</td>
</tr>
<tr>
<td>Table 12.</td>
<td>Age of farm educational program and size of organization.</td>
<td>54</td>
</tr>
<tr>
<td>Table 13.</td>
<td>Age of farm educational programs and regions.</td>
<td>55</td>
</tr>
<tr>
<td>Table 14.</td>
<td>Age and quality of farm educational programs.</td>
<td>56</td>
</tr>
<tr>
<td>Table 15.</td>
<td>Agricultural development programs for youth and adults by regions and quality of program.</td>
<td>58</td>
</tr>
<tr>
<td>Table 16.</td>
<td>Farm educational program practices and type of organization.</td>
<td>60</td>
</tr>
<tr>
<td>Table 17.</td>
<td>Technical-advice practice by type of organization and region.</td>
<td>61</td>
</tr>
<tr>
<td>Table 18.</td>
<td>Technical-advice practice by size of organization and quality of program.</td>
<td>63</td>
</tr>
<tr>
<td>Table 19.</td>
<td>High-school-teacher practice by type of organization and region.</td>
<td>64</td>
</tr>
</tbody>
</table>
Table 20. High-school-teacher practice by size of organization and quality of program... 65
Table 21. Dealer-encouragement practice by size of organization and quality of program. 66
Table 22. Farm-youth practice by size of organization and quality of program. 69
Table 23. Sales-promotion practice by size of organization and quality of program. 71
Table 24. Supplier success standards for programs by type of organization. 73
Table 25. Supplier success standards for programs by region. 74
Table 26. Supplier success standards for programs and size of organization. 75
Table 27. Supplier success standards and quality of programs. 77
Table 28. Techniques for increasing consumption and type of organization. 79
Table 29. Techniques for increasing consumption by region. 81
Table 30. Techniques for increasing consumption and size of organization. 82
Table 31. Techniques for increasing consumption and quality of program. 84
Table 32. Merchandising by quality of program and size of organization. 87
Table 33. Publications and type of organization. 90
Table 34. Publications and size of organization. 91
Table 35. Publications and quality of program. 92
Table 36. Farm program aids and type of organization. 96
<table>
<thead>
<tr>
<th>Table 37.</th>
<th>Farm program aids and size of organization</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 38.</td>
<td>Farm program aids and quality of program</td>
<td>97</td>
</tr>
<tr>
<td>Table 39.</td>
<td>Kinds of displays and exhibits by type of organization</td>
<td>100</td>
</tr>
<tr>
<td>Table 40.</td>
<td>Kinds of displays and exhibits by quality of program</td>
<td>101</td>
</tr>
<tr>
<td>Table 41.</td>
<td>Number of kinds of displays and exhibits by quality of program</td>
<td>103</td>
</tr>
<tr>
<td>Table 42.</td>
<td>Yearly farm visits and type of organization</td>
<td>107</td>
</tr>
<tr>
<td>Table 43.</td>
<td>Activities of advisers and type of organization</td>
<td>110</td>
</tr>
<tr>
<td>Table 44.</td>
<td>Activities of advisers and size of organization</td>
<td>111</td>
</tr>
<tr>
<td>Table 45.</td>
<td>Activities of advisers and quality of program</td>
<td>112</td>
</tr>
<tr>
<td>Table 46.</td>
<td>Number of meeting types attended by advisers and type of organization</td>
<td>114</td>
</tr>
<tr>
<td>Table 47.</td>
<td>Number of meeting types attended by advisers and size of organization</td>
<td>116</td>
</tr>
<tr>
<td>Table 48.</td>
<td>Adviser training schools and type of organization</td>
<td>117</td>
</tr>
</tbody>
</table>
I. INTRODUCTION

The United States\(^1\) with only 6% of the world's population uses 41% of the world's electric power. Since 1916 the United States population has increased 67% while the generating capacity for electricity has increased 1371%. United States has more electric power capacity than the next seven countries of the world combined and four times as much as Russia. Russia has 32 million kilowatts capacity for 200 million people whereas the United States has 120 million capacity for 170 million people. By 1960 about 44 million kilowatts more generating capacity is scheduled to be installed for the United States.

In 1956 about 529 billion kilowatt hours were sold in the United States of which nearly 145 billion were sold to 46 million residential and rural consumers. Electrical manufacturers established a new record in 1956 by shipping a total of nearly $20 billion worth of electrical products. The capital expenditure for the nation's utilities for 1957 will have been nearly five billion dollars. For cooperatives which serve mainly rural and urban areas, the total accumulative loans approved up to 1957 have been $3.3 billion. Their

\(^1\)Vennard, E. A. This Is Our Challenge. Electrical West 119:77. July 1957.
operating revenues totaled $501 million for 1956 and their sales were 22 billion kilowatt hours as contrasted to nearly four billion in 1947.

The average annual bill for farm varied from $101 to $146 in 1955 which was accompanied by a range of 3650 to 8180 kilowatt hours of electricity for the eastern and western farms. A prediction\(^1\) placed the average consumption at 9300 kilowatt hours per farm for 1965 and showed that $5300 worth of electrical purchases will be made per farm in the next twenty years. Since there were 4,588,425 electrified farms in the United States in 1956, some indication of the electric potential of the farm is given.

The value of this study might be in encouraging better programs and in having a coordinating effect on many existing programs. Better farm programs could mean more farm and power supplier profits, strengthening of the agricultural economy and eventual lowering of electric rates. No such study has been made previously as far as can be determined.

The objective of this study was to summarize, compare and evaluate the practices in prevailing farm programs of all electric power suppliers throughout the country and to

---

point out worth-while implications to the power industry.

The power suppliers have become conscious of the farm business and its potential. As a result better farm programs have been forthcoming and more farm service advisers have been hired to help the farmers with their electrical problems. This has been necessary so that valuable and expensive equipment will be installed with an eye to the future raising the overall efficiency of doing the job.

More than 95% of the farmers have electricity and practically all farmers have electricity who want it. Farm lines must be profitable; thus, the best possible farm programs are needed. Better farm educational programs will help provide a higher standard of living for farmers, increased farm production, a high degree of laborsaving through automation and better public relations. A great challenge faces the electric industry as automation becomes more important to the agricultural industry.

Power suppliers should find from this study many ways to improve and to expand their farm educational programs for many of the ideas reported by the various power suppliers have been tried over a period of years and proven successful. Successful farm program ideas might have a stimulating and coordinating effect not only among power suppliers but
also among other segments of the electric industry such as manufacturers, contractors and dealers.

There are many such stimulating influences in the country today in farm electrification. The Edison Electric Institute, which is supported by many power companies in the United States, has stimulated the establishment of farm educational programs among the power companies. Likewise, the National Rural Electric Cooperative Association, supported by the rural electric cooperatives, has stimulated the establishment of farm educational programs among the cooperatives. The Rural Electrification Administration has had a coordinating influence on its borrowers, which are mainly rural electric cooperatives. To protect all loans, it has been necessary to emphasize power use activities among the borrowers to help insure a higher return to prevent default in payments. The more recent development of the National Inter-Industry Farm Electric Utilization Council has done much to coordinate and stimulate activities in farm electrification in all segments of the electric industry. The National Electrical Manufacturers Association has been active in promoting electrification in this country. Perhaps farm educational programs can be improved most easily through such established organizations.

Even with these major influences on farm electrification there is a wide variation among existing farm educational
programs. Better farm programs are a necessity. With the
great increase in the use of electricity since World War II,
the farmer has become more and more dependent on electricity
for his production and comforts. With such dependence on
electricity by the farmers, the power supplier has a certain
responsibility in providing the farmer with adequate consulta-
tion for his electrification needs. Well-trained advisers can
do much to develop the farm electrification industry of any
area, which benefits everyone. Increasing the consumption of
electric current is mutually advantageous to the farmer and
power supplier.

For the convenience of the reader the following abbrevia-
tions and terms shall be used throughout this manuscript:
Definitions:
1. Suppliers or power suppliers refer to the
   cooperatives, municipals and the utilities
   as a group. Each organization was asked to
   check on the questionnaire under which of the
   three types of organizations it wished to be
   classified. Public power districts were in-
   cluded with cooperatives. A utility is classi-
   fied as a power company in this study.
2. Consumers are farm consumers of electricity.
3. Advisers are farm service advisers.
4. Farm educational program, FEP, is limited to
electric power suppliers. The major purpose of a farm educational program is to stimulate uses of electricity that are financially and mutually beneficial to farmers and suppliers alike.

5. FEP score, assumed to represent quality of program, is the percentile rank given each farm educational program.

6. The size of power supplier or size of organization has been defined for purposes of this study in terms of the number of farm consumers for each supplier or organization. It should be apparent that the size of an organization, as here defined, is not in terms of the total number of consumers. Furthermore the size of supplier or organization does not take into account the number of kilowatt hours which a supplier furnishes although there is no doubt a relationship between the size of a power supplier as here defined and the total number of kilowatt hours furnished by the supplier or organization.

Abbreviations:

1. FEP -- farm educational program
2. USDA -- United States Department of Agriculture
3. REA -- Rural Electrification Administration
4. CREA -- Committee on the Relation of Electricity
to Agriculture

5. ASAE — American Society of Agricultural Engineers
6. EHFA — Electric Home and Farm Authority
7. Kwhr — kilowatt hour
8. % — percent
9. mm. — millimeter
10. Agr. — agriculture
11. TV — television
12. Vo-ag — vocational agriculture

This study was sponsored and financed by Iowa State College through the Agricultural Engineering and Vocational Education Departments and the Agricultural Experiment Station as Project No. 1308.
II. DEVELOPMENT OF RURAL ELECTRIFICATION

The first step toward electrifying America, as expected, came in providing populated areas with electricity. Farm electrification lagged behind since it was thought by most of the electric industry to be economically infeasible. Many attempts were made to discover the value in farm lines.

A. Early Attempts to Stimulate Electrification

Earp\(^1\) stated that the use of central-station electric service on farms in this country got its greatest impetus in California. Between 1900 and 1910 farmers in this state began to make extensive use of electricity for irrigation pumping.

In 1909 The Puget Sound Power and Light Company built the first distribution line devoted exclusively to farm service.\(^2\) Slattery\(^3\) stated that in 1910 the National Electric Light Association started the first study in this country of farm electrification. The study was nation-wide, and the number of bona fide farmers, other than those in irrigation districts, using electricity was found to be too small to report. The


findings and recommendations of this report are important. The industry was advised to wake up and go after rural business, but was warned that, unless served on the same basis of rates as applied in adjacent towns and cities, the farmer would regard the rates as excessive.

In 1912 the Middle West Utilities System\(^1\) formulated rural policy which recognized only that service could be profitably extended to compact groups of small towns. This attitude was just about in line with that of the industry as a whole which was discussing rural industries as possible buyers of current but did not at that time consider the farm itself as a rural industry.

Progress continued on the Pacific Coast. Between 1916 and 1921 the California-Oregon Power Company\(^2\) increased its agricultural power sales 535% with an increase in the number of rural customers of only 31%. The power uses of electricity were still limited to irrigation, cooking and water heating. The Northern Iowa Gas & Electric Company\(^3\) in 1917-18 absorbed and linked together several small rural systems with an average number of customers per mile of 31.5 which could not be considered strictly a rural load.

The municipally-owned systems of Los Angeles, California\(^4\)

---

\(^1\)Coyle. *op. cit.*, p. 60.
\(^2\)Ibid., p. 60.
\(^3\)Ibid., p. 61.
and of McPherson, Kansas were extending rural lines as early as 1923. Farmer-owned and -operated cooperatives were forming on the Minidoka Reclamation Project in Idaho. In 1919 some eight farm electric nonprofit cooperatives were organized in the country surrounding Webster City, Iowa, buying their current wholesale from the city's plant. Prior to 1923 there had been 31 voluntary farmer cooperatives incorporated in nine states.

In 1920 in southern Idaho a farmers' mutual company\(^1\) built 265 miles of line getting favorable wholesale rates for current from the Reclamation Service Plant. In the same year various cooperative groups in Ohio built lines which they turned over to the power companies to operate. Also in 1920 the Wisconsin River Power Company\(^2\) launched an experimental project with only 2.6 consumers per mile and with construction costs kept down to $826 per mile.

The Adirondack Power & Light Corporation of New York State\(^3\) established in 1921 a plan known as the Adirondack Plan. The Company required no initial outlay by the farmers but a minimum monthly payment of two dollars for each 1440 feet of line, with 50 cents additional for each 110 feet in

\(^1\)Coyle. op. cit., p. 61.
\(^2\)Ibid., p. 61.
\(^3\)Ibid., p. 67.
excess. The Northern States Power Company had a policy in 1930, as reported to the Federal Trade Commission,\(^1\) to make the consumer pay only for the connection from the main distribution line to the farmstead.

Most famous of these lines was the Red Wing project in Minnesota\(^2\) which was the first of its kind. It was under the direction of E. A. Stewart, Professor of Agricultural Engineering, University of Minnesota. The Northern States Power Company built the 6.3 miles of line for $1770 per mile. Seventy-nine manufacturing companies loaned to the 16 co-operating farmers $21,632 worth of appliances. The University of Minnesota and the state Committee on the Relation of Electricity to Agriculture (CREA) spent $26,874 from 1923 to 1928 in supervision experiments. The minimum bill was set at $6.90 per month per farmer. A similar type of experimental rural line was constructed near Garner, Iowa, about this time. The results failed to impress agricultural leaders for the costs were much too high.

On September 11, 1923, CREA\(^3\) was formed partly as a result of agitation for rural electrification which started in Pennsylvania. Of its 12 members, three were officers of the

\(^{1}\)Ibid., p. 67.

\(^{2}\)Slattery, op. cit., p. 18.

\(^{3}\)Ibid., p. 15.
Farm Bureau Federation, four were representatives of the National Electric Light Association, and one each represented the American Society of Agricultural Engineers (ASAE), manufacturers of farm electric plants, and the United States Departments of the Interior and Commerce.

Of great value was the research work stimulated by the CREA. By 1932 twenty-five committees had been formed in various states to study use of electricity on the farm. As a rule they worked with the State Agricultural Experiment Stations but the funds and extent of the work were limited. The cooperating agencies, therefore, supplemented the program with a special project at College Park, Maryland. This project\(^1\) made studies and published bulletins on a large number of agricultural applications of electricity, from feed grinding to insect trapping. The purpose of this project was to demonstrate the appliances and their value as increased income producers.

Some of the outstanding leaders in this movement on the part of the utilities were Arthur Huntington of the Iowa Railway Light and Power Company, one of the earlier presidents of ASAE; Professor J. B. Davidson, formerly Head of the Agricultural Engineering Department at Iowa State College; and G. W. Kable, who was engaged as Director of Research. Kable, a

\(^1\)Coyle. *op. cit.*, p. 63.
prominent agricultural engineer, later said of the situation in 1923, "The rural demand for electric service became so insistent that something had to be done."

State CREA committees were formed in 27 commonwealths with a total membership of over 200 prominent persons. The work was liberally underwritten by the power companies. The CREA was primarily a fact-finding organization and an educational agency. Also it had the cooperation of the power companies in testing laboratory findings in actual practice on selected typical farm lines in 27 states. The projects undertaken by the CREA Committee were the first on a coordinated nation-wide basis.

The cost of research and experimental work done by CREA in actual cash, time and facilities amounted to over two million dollars during its existence. It was financed directly by the National Electric Light Association until 1933 and after that by the Edison Electric Institute. The CREA did not consider the cost of service or construction. The first essential of success was ignored because it was impossible for an average farmer to pay for constructing the lines, or for wiring and

\[1\] Slattery. *op. cit.*, p. 16.

equipment. After an 11-year trial of this method of solving the problem, the large farm organizations, which had co-operated in good faith and in sincere belief in the soundness of the policy, finally saw its futility and declined further to exert themselves.

Between 1923 and 1935 the number of farms receiving service from electric companies more than quadrupled. Despite the economic set-back of the depression, almost 800,000 farms had electricity in 1935.1

A valuable survey of the use of power on American farms was made under the direction of C. D. Kinsman2 and published in 1925 by the Department of Agriculture. This is generally referred to as the National Farm Power Survey. A later bulletin, published by the Department in 1933, supplemented some of Kinsman's findings.

B. Early Attitudes Toward Electrification

In the middle 1930's Norway, Sweden, Denmark, France, Germany, The Netherlands, Australia and New Zealand had far outdistanced the United States in rural electrification. The number of farms having central station service in these

---


2Coyle. op. cit., pp. 63-64.
countries ranged from 50% to 90% as against our 10%. The chief reason for this remarkable progress had been central government aid or sponsorship in various ways according to Slattery.\(^1\) He also stated\(^2\) that the attitude of the electric industry was doubtless expressed in an editorial news article in the Electrical World for May 28, 1932, entitled "How Stands Rural Electrification?".

The primary interest of the electric utility in rural electrification is revenue. Social responsibility is a factor, a strong one, but electric utilities are not eleemosynary institutions and they cannot undertake to serve any class of customers on any narrower base than that the revenue will pay at least the cost. Therefore, conspicuous advances in farm electrification must wait until the converging efforts in reduction of cost of service and in persuading the farmer actually to use electricity have met and merged into a single stream of progress.

The utilities\(^3\) stated that the national level of farm income must be raised to a point at which they could profitably afford to serve agriculture. The farm organizations, authorities on agriculture and many others, including President Franklin D. Roosevelt, stated that cost of electrical service must be lowered to a point where farmers could pay for it out of their present income and thus help increase those incomes. From the 1935 convention of the Edison Electric

\(^1\)Slattery. op. cit., p. 31.
\(^2\)Ibid., p. 25.
\(^3\)Ibid., p. 26.
Institute\(^1\) came the dictum which the convention accepted and which must be considered the ultimatum of the industry at that time. "Neither governmentally nor privately-financed lines in most rural districts not now served can be made to pay out."

In 1930 the Middle States Utilities Company\(^2\) felt that if every farmer had been prepared to replace all animal and engine power with electric equipment, the possible revenue from all this power would not have justified the construction of a generation and transmission system large enough to serve more than a tiny portion of the farms of the country.

Utility executives\(^3\) contended that the problem of the farmer was not one of rates but of financing the wiring and purchasing of appliances. The REA took exception, contending that rate simplification and even rate reductions over large areas were the heart of the problem of electrifying rural America.

The National Resources Board\(^4\) in December of 1934 advocated positive action for rural electrification. The Board stated that other industries had almost universally adopted electricity but agriculture had lagged frequently because

\(^{1}\text{Ibid., p. 87.}\)
\(^{2}\text{Earp. op. cit., p. 8.}\)
\(^{3}\text{Ibid., p. 10.}\)
\(^{4}\text{Slattery. op. cit., p. 27.}\)
service was not available. "It therefore seems necessary" the Board stated, "for the Government to stimulate the extension of this service in many areas". The Mississippi Valley Committee\(^1\) made a similar recommendation that widespread electrification of rural areas within a reasonable time must depend upon the active leadership of the Federal Government.

In 1933 the Tennessee Valley Authority\(^2\) was established by an act of Congress. As a part of the full development of the natural resources of the Tennessee River area, the TVA was authorized to sell the surplus power generated at its dams for the benefit of the people of that section.

The Connecticut state legislature\(^3\) had one answer to the problem of electric distribution to rural areas when in 1941 it passed the "two per mile" bill. This bill required all electric utility companies distributing current in that state to extend lines to all unserved areas having a density averaging at least two subscribers per mile.

C. Federal Government Action

The twenty-year-old rural electrification impasse\(^4\) was broken up by President Franklin D. Roosevelt on May 11, 1935, by an executive order creating the Rural Electrification Ad-

\(^1\)Ibid., p. 87.

\(^2\)Earp. op. cit., p. 8.

\(^3\)Ibid., p. 10.

\(^4\)Slattery. op. cit., p. 27.
ministration, authorizing it "to initiate, formulate, administer, and supervise a program of approved projects with respect to the generation, transmission and distribution of electric energy in rural areas".

In November of 1934 The National Grange unanimously adopted a resolution to deliver power to the people under Government operation and control at the lowest possible cost. In December of the same year the American Farm Bureau Federation passed a like resolution to extend electrification of agriculture into every possible section of the country and to provide financing at low interest rates. At the same time, The National Resources Board after a widespread survey, concluded that "It therefore seems necessary for the Government to stimulate the extension of this service in many areas."

Beginning on March 15, 1934, the Civil Works Administration made a rural electrification survey in 25 typical states which showed a widespread desire for electricity for rural areas, for lower service charges and rates and for lower wiring and appliance costs. Farmers suggested the formation of rural cooperatives to serve all farmers. In January 4, 1935, President Roosevelt in his Annual Message to Congress included rural electrification among emergency relief projects, which would relieve unemployment, aid business and promote useful public enterprises. Congress in the Emergency Relief Appropriation Act, approved on April 8, 1935, made available to the
President $100,000,000 for rural electrification. "It is clear, therefore," said Slattery,\(^1\) "that the President created REA on the urgent solicitation of and in cooperation with the many farm organizations of the nation."

Popular support for a rural electrification program by the Federal Government\(^2\) steadily grew, and under the leadership of Senator Norris and Representative Rayburn, Congress enacted the Rural Electrification Act of 1936. This act continued the rural electrification program initiated under emergency relief legislation. It provided for a ten-year program of rural electrification for the United States; funds were available for lending in every state for rural line construction. For financing house wiring in rural areas and for acquisition and installation of electrical and plumbing appliances and equipment, additional funds were available.

The REA\(^3\) has gained results for a number of reasons. It acts as a national coordinating center and clearing house, and can move with speed to bring the best features of one project to another project. It has reduced costs in electrical construction through use of a mass-production line build-

\(^1\)Ibid., p. 30.
\(^2\)Coyle. op. cit., p. 95.
ing system and by eliminating wasteful methods. Construction costs had been lowered from $1500 to $2000 a mile to less than $900 a mile.

D. Statistics of the Electric Industry

The year 1924 found only 204,780 farms\(^1\) that were served by central station service in the United States and by 1934 the figure had jumped to 743,954 farms. At this rate over these ten years, it would have taken about 50 years to make electricity available to 50% of the American farms. By December 1934, of the 6,812,350 farms in the United States\(^2\) only 10.9% were electrified through central station service.

Davis\(^3\) made the statement that soon after 1950 it became evident that the amount of electricity used by farmers exceeded the estimates that in earlier years had been considered liberal. In January of 1940 the number of farms rose to over 1,700,000 electrified or about 30% of all farms\(^4\). More farms had been electrified between 1935 and 1940 than had been

---

\(^1\)Ibid., p. 69.


\(^4\)Slattery. op. cit., p. xiii.
during the previous 50 years. Then in 1945 nearly 46% of the farms were electrified and in 1950 about 77%. This increase shows the speed with which electrification of farms took place. Progress slowed down only during the World War II period. For example, at the time of this study, Iowa was 99.2% electrified with 191,374 farms receiving service. Pennsylvania was 98.4% electrified with 126,875 farms receiving service.

Over 4.5 million of all the farms in the United States were estimated by the Edison Electric Institute\(^1\) to be electrified, making a total of 95.9% having central station service in December 1956, which was six times the number of farms that had service only two decades earlier. The 1954 Census revealed that the number of farms in the United States had decreased 11% from 1950.

At the time of this study, power lines extended to almost all farming communities. Thirty-three states had over 95% of their farms with electric service. All states had more than 90% of their farms electrified except Mississippi. Electric companies\(^2\) served 43% of the farms on power lines; REA co-


operatives, 51%; and municipal and other governmental systems, 6%.

In 1955 the Edison Electric Institute\(^1\) showed the average kilowatt hour use on farms east of the 100th meridian rose 4.04 kilowatt hours, the largest gain in history for these farms. A 12.4% increase over the previous year put the average use at 3,650 kilowatt hours. Average annual consumption on farms west of the 100th meridian, where consumption is affected by requirements of water pumping for irrigation, was up 1000 kilowatt hours to an average annual consumption of 8180 kilowatt hours.

In 1935 electrified farms used an average of 2200 kilowatt hours per farm stated Davis.\(^2\) The REA Statistical Quarterly\(^3\) reported that for the calendar year of 1955, an average monthly kilowatt-hour farm consumption was 246 for REA borrowers whereas in 1946 it was only 90.

Kilowatt hour sales\(^4\) in 1956 totaled about 529 billion kilowatt hours, up 10% over the previous year, and a gain of

\(^{\text{1}}\)Ibid., p. 15.

\(^{\text{2}}\)Davis. \textit{op. cit.}, p. 5.


\(^{\text{4}}\)Edison Electric Institute. \textit{I Want to Know About the Electric Industry. \textit{op. cit.}, pp. 11-15.}
177\% over total kilowatt hour sales in 1946 for all types of consumers. The increase in kilowatt hour sales to residential customers in 1956 over 1955 was the largest in history. Although residential customers which included farms, accounted for 84.7\% of the total customers, they consumed over 25\% of the electricity used.

E. Future of Electrification

In the years ahead the Edison Electric Institute\(^1\) stated that it is expected that power needs will continue to increase rapidly. To supply these needs, it is estimated that at least 191 million kilowatts of generating capability will be necessary by 1966, and perhaps, as much as 233 million kilowatts compared to the total 1956 industry capability of 126.5 million kilowatts. By 1976 this amount may be between 301 and 452 million kilowatts.

The conclusion seems obvious that farmers will use more electricity in the foreseeable future than they have used in the past. Average farm and home consumption has increased in geometric rates. Davis\(^2\) stated that such rates of increase cannot continue indefinitely. In fact, there is now some indication of a slowing down in the rates of increase in some

\(^{1}\)Tbid., p. 6.
\(^{2}\)Davis. op. cit., p. 37.
areas that were electrified a number of years ago.

For the United States, Davis\(^1\) said that the average annual consumption per farm would reach 9300 kilowatt hours by 1965 if the past rate of increase, 7.5% per year, should continue. The average for 1956 was 3228 kilowatt hours. The Federal Power Commission\(^2\) anticipated that residential use will increase to 7000 kilowatt hours per farm home and non-farm home in 1980. There are opportunities for increasing the use of electricity in almost all farm homes but more than half of the farms are so small that they have little opportunity to use electricity in their farming operations.

The consumption levels that farms will reach will be conditioned partly by the economic climate in which they operate was a point made by Davis.\(^3\) War or a severe depression could alter, temporarily at least, the material progress of our society. Technological developments, the perfection of equipment and appliances suitable for farms of various types and sizes, will be influential. Much will also depend on the scope and effectiveness of educational programs. Thus, the combined efforts of research workers, the electric industry,

\(^{1}\)Ibid., p. 38.


\(^{3}\)Davis. op. cit., p. 38.
financial institutions, engineers, home economists and farm management experts are necessary if farmers are to make full use of electrical energy now available to them.

For the last twenty years much attention has been given by government agencies and by the electric industry to making central station service available to farmers. For the most part, effort has been concentrated on extending distribution systems to unserved areas. Except for a few localities, this work is about completed. Davis\(^1\) believed that emphasis now is being shifted to:

1. Encouraging the farmer to make effective use of this new source of power.
2. Developing new uses for it.
3. Improving the service available to farmers.

If the past is a guide to the future, much of the equipment that will be commonplace tomorrow is only in the idea stage today. An additional possibility that is not to be underestimated is the harnessing of atomic power for civilian use. Potentialities for greater use of electricity for purposes now generally adopted must not be overlooked.

The homes of this country probably represent the greatest potential market available for increasing electric power sales. The typical fully electrified home, of which there are

\(^1\)Ibid., p. 34.
relatively few today, consumes from 20,000 to 25,000 kilowatt hours per year, whereas the average home uses 3238 kilowatt hours, the Federal Power Commission\(^1\) pointed out.

The results of a study made by the Federal Power Commission\(^2\) indicated that electric water heaters, air coolers, ranges, refrigerators, television sets, deep freezers and clothes dryers will be the most important appliances from the standpoint of energy consumption, and in the order given. These appliances will account for nearly three-quarters of the total home use in 1980 exclusive of lighting and electric heat. Lighting is estimated at an average of 725 kilowatt hours per customer in 1980, and 1,450 kilowatt hours are allowed for electric heating.

United States Department of Agriculture\(^3\) indicated that the farm electrical purchases in the next twenty years will amount to $21.4 billion or an average of $5300 per farm. During the next five years the purchases are expected to amount to about $5.3 billion and during the next ten years to about $11.3 billion or an average expenditure of about $1100 per farm for the 1956-1960 period and approximately $1300 for the

\(^1\)U. S. Federal Power Commission. *op. cit.*

\(^2\)Ibid.

1961-1965 period.

The study from which these data were taken was based on previous estimates that the power requirements of REA-financed systems will nearly double by 1965 and triple by 1975. It assumed there will be no drastic changes in income, prices and technology and that the number of farms based on census definitions will decline by 15% in the next twenty years.

Lights and house wiring will be the best sellers. For these items farmers will spend a little over $1 billion in the next five years. Refrigerators are second with estimated purchases of $535 million. For the same period television receivers are third with $472 million. Washing machines are fourth with $439 million. Plumbing and related facilities come next with $394 million. Home freezers are sixth with $363 million. In seventh place is the electric range, $213 million.

Milk coolers and water pumps will be the best sellers in the farm equipment field. For each of these, expenditures of $124 million are anticipated. They are followed by milking machines, $77 million; drill presses, $33 million; fractional horsepower motors, $29 million; power saws, $21 million; feed grinders, $19 million; chick brooders, $16 million; tool grinders, $15 million; and dairy water heaters, $10 million.

California offers the top market for the appliances and equipment. Sales in that state in the next five years are
expected to reach $297 million. Tennessee is second with $284 million. Iowa comes third with $278 million. Ohio is fourth with $270 million, and Wisconsin fifth with $241 million. These are followed by Minnesota, North Carolina, Washington, Illinois and Indiana.

Until recently the primary concern in farm electrification was the extension of power lines to the farmer. But with power available to 98% of the nation's farms, the emphasis today is shifting to the study and development of techniques and equipment to help the farmer make profitable use of his electric service.

More than half the farms in the United States are so small that their operators have little opportunity to use electrical equipment outside their homes. Of the 5.4 million farms reported by the 1950 Census of Agriculture, only 64,000 had 30 or more milk cows and only 3000 had as many as 3200 chickens, four months old or over. Between 1940 and 1950 the number of milking herds of less than 10 cows decreased 26% while herds of 20 or more cows increased 46%.

Davis\(^2\) indicated that greater opportunity exists for effective use of mechanical devices in farm production on a few farms with large herds or flocks than on a greater number

\(^1\text{Davis. op. cit., pp. 2, 3, 35.}\)

\(^2\text{Ibid., p. 38.}\)
of farms with small enterprises. Thus, the shift to larger dairy and poultry enterprises no doubt will encourage greater consumption of electricity and use of more electric equipment.

Based on 1955 retail prices, Davis\(^1\) reported that a well-equipped, one-man, 30-cow dairy farm in the northern part of the country can easily have an investment of $8900 in electrically-operated equipment. Of this, $3200 would be for household operations and $5700 for use in service buildings and service areas. To the total should be added $1500 to $2000 for farmstead wiring and at least $400 for the cost of rewiring a farmstead. The total equipment costs would be around $8900 to indicate the size of the investment that the operator of a well-electrified farm might have in electrically-operated equipment. In contrast the comparable figure for the average dairy area of Wisconsin in 1955 was estimated to be about $3400.

Electrical energy used in household operations\(^2\) ranged from 58\% to 87\% of the total used in each study area. Equipment used in farming operations required from 3\% to 30\% of the total, the lighting of homes and of service buildings from 5\% to 26\% and pumping water from 2\% to 7\%.

More than 400 different applications of electricity on

---

\(^1\)Ibid., pp. 24-25.

\(^2\)Ibid., p. 26.
farms and in farm homes have been identified. Davis said that of the electrical equipment used in farming operations, shop tools were most numerous. Dairy and poultry equipment, however, required much more electrical energy. Pieces of equipment for household operations were more numerous than for farm operations.

According to the 1955 Census of Agriculture, the number of farms with running water in the operator's dwelling increased from 1.7 million in 1945 to 2.3 million in 1950, or 36%.

Average consumption of electrical energy per electrified farm has increased at geometric rates since about 1940. The average increase per farm in the United States was at a rate of 7.5% a year. Obviously, these rates of increase cannot continue indefinitely. There must come a time when the rate of increase will slow down. The actual level that will be attained will be determined in part by general economic conditions, technological developments, and the scope and effectiveness of educational programs.

F. Power Use Programs

Brown stated that education in the field of farm elec-

1Ibid., p. 16.
2Ibid., p. 21.
trification is a prerequisite to successful applications of electricity.\(^1\) A successful farm electric program is a quick and effective way for the farmer to obtain increased benefits from his labors.

The Middle West Utilities Company\(^2\) pointed out in 1930 that there was springing up a corps of experts, the rural service men of the power companies who must know about farming, a good deal about electrical technology, much about economics, finance and accounting, and above all, the minds of men.

An REA pamphlet\(^3\) set forth the attitude of the United States government as the lending agency to borrowers in regard to educational programs. Its attitude was that such programs were absolutely essential in the development of widespread rural electrification. However, such programs were to be made fully cooperative with all other agencies so that every agency having a part could conduct its own activities in the light of all the rest.

In the middle 1930's it was obvious to all leaders in farm electrification that it was positively essential that the farm uses of electricity be expanded if farm electric


\(^2\)Middle West Utilities Company. op. cit., p. 118.

lines were to pay their own way. Slattery in describing the REA power use program stated that cooperatives could not pay out on lights alone and that the farmers had to be shown how to use electric energy effectively. Meeting this need became an important function of REA by providing useful literature from the moment the cooperative started.

The nation was divided into 24 sections each of which was served by a corps of three specialists. One specialist was a home economist to help train the women of the home in the proper use of electrical energy and the selection of their household appliances, and the other two were specialists in wiring, electrical appliances, and large and small machines and motors for home and farm. Many times the instruction was individual but generally it was given at large or small meetings.

To promote further understanding, REA in 1938, organized the Demonstration Farm Equipment Tour which has given exhibits in 20 states. It consisted of a tent to house 1000 people and a large collection of farm and home equipment powered by electricity. It traveled by trucks and trailers. It was conducted by REA experts who gave practical demonstrations and lectures aided by county agents and the extension specialists of the state agricultural colleges. Some fourteen manufacturing concerns sent along sideshows to exhibit their products as at

1Slattery. \textit{op. cit.}, p. 65.
A United States Department of Agriculture bulletin provides some very helpful suggestions for any power supplier to use in improving its present farm program or starting a new one. It describes eight major activities of an effective electric farming program:

1. Study the condition of your business.
2. Study farming and its trends.
3. Determine the uses and market for electricity.
4. Determine the availability of equipment and servicing.
5. Establish goals for your program.
6. Prepare work plans.
7. Put your program into action.
8. Measure results.

The National Inter-Industry Farm Electric Utilization Council represents all segments of the electric industry and is a coordinating body designed to stimulate activities through all segments of the industry in the electric farming program. As a result of the activities of the National Council, state councils have been established, made up of all segments of the electric industry and educational and agricultural.

---

tural agencies as well. These state councils are also co-
ordinating groups, designed to promote sale of electric
equipment for better farming and living.

In a letter from Fred H. Strong, Chairman of Inter-
Industry Farm Electric Utilization Council, REA-USDA, Washing-
ton, D. C., on June 5, 1957, he made the following rough
classification of types of programs and the states in which
they exist:

(1) Councils sponsoring active promotional and
educational programs: Arkansas, Colorado, Georgia,
Kentucky, North Dakota, Pennsylvania, and South
Carolina.

(2) Councils sponsoring and giving financial
support to educational and research programs carried
out in cooperation with state agricultural colleges:
Connecticut, Illinois, Kansas, Missouri, Nebraska,
New York, Ohio, Oklahoma, Michigan, Virginia, West
Virginia, and Wisconsin.

(3) Councils coordinating activities carried on
by individual power suppliers or local groups:
Arizona, Kansas, Minnesota, New Mexico, and South
Dakota.

The June 1956 issue of the Edison Electric Institute
Bulletin\(^1\) outlined a nation-wide program by the power compa-
nies, called "Housepower" which has the following objectives:

1. To mass educate homeowners on rewiring.

2. To stimulate customer action and get at least 20
   million homes rewired in the next ten years.

3. To assist and support other programs having the

\(^1\)Housepower Presentation. (Editorial) Edison Electric
same objectives.

The program was being promoted, at the time of this study, through advertising in Better Homes and Gardens, national television programs such as "Today" and "Home", coordinated local advertising support, and a $100,000 "How's Your Housepower" contest.

Edison Electric Institute, with the cooperation of electric and allied industry segments selling the farm market, has launched in 1957 a Farm-Better-Electrically promotional and educational program. With unified industry backing, the program aims to electrify farms to the fullest possible extent, with a goal of 10,000 kilowatt hour average per farm set for 1965. This is almost double the 1956 usage. "This program will benefit from the already established and successful Live Better Electrically and Housepower programs," said M. O. Whithed, Chairman of Edison Electric Institute's Farm Group.

III. METHOD OF PROCEDURE

A preliminary questionnaire was developed and sent to 33 farm electrification leaders in Iowa, Pennsylvania, Georgia, New York, Texas, Missouri, Illinois, Virginia and Washington, D. C. These leaders represented seven rural electric cooperatives, eleven utilities, the United States Department of Agriculture, the Iowa Rural Electric Cooperative Association, the Iowa Utilities Association, the Edison Electric Institute, the National Rural Electric Cooperative Association and five universities. A study of the farm programs of all the power suppliers in the United States was decided upon rather than that of a smaller segment of the country because it was felt the latter would have limited value.

A concise, compact, well-defined and easily-answered four-page questionnaire was then developed. This questionnaire was sent to some cooperatives, the municipals and the utilities listed in the 1948 Directory of Electric and Gas Utilities, Federal Power Commission, Washington, D. C., F. P. C. S-69, latest edition of such a listing. Also fifteen power companies found in the reference, Statistics of Electric Utilities in the United States, 1953, Classes A and B Privately-Owned Companies, Federal Power Commission, Washington, D. C., F. P. C. S-112, that were not listed in the 1948
Directory were also sent questionnaires. Most of the rural electric cooperatives were chosen from the 1953 and 1954 REA Annual Statistics Reports, REA Bulletin 1-1, USDA, Washington 25, D. C. The three sources were compared to prevent duplication or omission of eligible power suppliers.

In the latter source all cooperatives were chosen that listed 500 or more farm and non-farm consumers. In the former source since much growth in farm electrification has taken place since it was published in 1948, all power suppliers that listed 150 rural consumers or more were used since there appeared to be about this growth in the organizations listed in both sources. In those cases where there was no breakdown as to rural consumers, all power suppliers that served two or more towns were sent questionnaires.

The questionnaire was mailed April 20, 1956, to 1612 power suppliers. By June 22, since 452 questionnaires had been returned, 1160 follow-up questionnaires were sent out in the second mailing. The first mailing consisted of a stamped return envelope, two questionnaires and a letter from Dr. G. M. Browning, Associate Director of the Agricultural Experiment Station, Iowa State College, stating the objectives, reasons and purposes for the mailing. One questionnaire was to be sent back and the other was for each power supplier's files. The second mailing consisted of a follow-up letter from Dr. Browning, plus a questionnaire and a stamped return envelope.
In this study certain assumptions were made. It was assumed first that nothing would be lost by disregarding any questionnaires showing less than 500 farm consumers since a supplier with less than 500 farm consumers in all likelihood would have a farm educational program of questionable value. Second, there were sufficient returns to indicate the good points of the various programs.

The regions of the United States used in this study are identical to those listed by the United States Census. It was felt that this regional classification was probably superior to any other since it tends to follow climatic and agricultural similarities.

Coefficients of correlation\(^1\) reported in this study have been obtained from the product-moment formula whenever both variables were numerically expressed; from the biserial formula whenever one variable was expressed in a dichotomy; and from the triserial formula whenever one variable was expressed in a trichotomy.

---

IV. CHARACTERISTICS OF POWER SUPPLIERS

Of the 1612 original questionnaires mailed to the power suppliers, 856 were returned. Of the returned questionnaires, 653 were usable and 203 were not. Of those that were not used, 134 had less than 500 farm users; 20 had no data or were incomplete; 3 were returned unknown; 37 were returned from companies that were sold, merged or liquidated; and 9 were returned from wholesale power companies.

The number of questionnaire returns, by the manner in which the list of suppliers was obtained, is of little concern in this study. It was of major concern, however, to obtain as nearly as possible a census return from electrified farms in the United States.

The 653 power suppliers with returned usable questionnaires served 4,147,316 farms, or 90.4% of the total electrified farms in the United States. Of the remaining 9.6% for which the questionnaires offered no information, an unknown number was served by suppliers with less than 500 farm users and consequently were not sought in this study.

Of the more than four million farm consumers, 44% were served by 485 cooperatives, 3% by 41 municipals and 53% by 127 utilities as shown in Table 1. It was not unexpected to note that on the national scene the municipals played but little part in supplying farm consumers. The average number
Table 1. Electrified farms and type of organization


<table>
<thead>
<tr>
<th>Consumers</th>
<th>Cooperative (N=485)</th>
<th>Municipal (N=41)</th>
<th>Utility (N=127)</th>
<th>Total (N=653)</th>
</tr>
</thead>
<tbody>
<tr>
<td>500-999</td>
<td>19,548</td>
<td>8,169</td>
<td>10,130</td>
<td>37,847</td>
</tr>
<tr>
<td>1000-1999</td>
<td>166,607</td>
<td>14,065</td>
<td>20,797</td>
<td>201,469</td>
</tr>
<tr>
<td>2000-2999</td>
<td>250,744</td>
<td>13,458</td>
<td>23,251</td>
<td>287,453</td>
</tr>
<tr>
<td>3000-3999</td>
<td>251,519</td>
<td>13,429</td>
<td>24,448</td>
<td>289,396</td>
</tr>
<tr>
<td>4000-4999</td>
<td>287,849</td>
<td>12,301</td>
<td>22,414</td>
<td>322,564</td>
</tr>
<tr>
<td>5000-9999</td>
<td>571,855</td>
<td>38,300</td>
<td>181,497</td>
<td>791,652</td>
</tr>
<tr>
<td>10,000 or over</td>
<td>273,218</td>
<td>12,000</td>
<td>1,931,717</td>
<td>2,216,935</td>
</tr>
<tr>
<td>Total</td>
<td>1,821,340</td>
<td>111,722</td>
<td>2,214,254</td>
<td>4,147,316</td>
</tr>
<tr>
<td>Mean</td>
<td>3,755</td>
<td>2,725</td>
<td>17,435</td>
<td>6,351</td>
</tr>
</tbody>
</table>

of consumers was 3755 for the cooperatives, 2725 for the municipals and 17,435 for the utilities.

The cooperatives tend to serve a smaller number of consumers than do the utilities as shown in Table 2. Less than one-fourth of the cooperatives, as contrasted to more than half the utilities, served more than 5000 farm consumers per power supplier. Nearly 50% of the cooperatives served less than 3000 users as compared to 31% of the utilities.

Although no evidence is available in this study, it is likely that most power suppliers will not be increasing the
Table 2. Size and type of organization

<table>
<thead>
<tr>
<th></th>
<th>Consumers</th>
<th>Cooperative (N=485)</th>
<th>Municipal (N=41)</th>
<th>Utility (N=127)</th>
<th>Total (N=653)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>500-999</td>
<td>26</td>
<td>5</td>
<td>12</td>
<td>29</td>
<td>16</td>
</tr>
<tr>
<td>1000-1999</td>
<td>109</td>
<td>23</td>
<td>10</td>
<td>25</td>
<td>13</td>
</tr>
<tr>
<td>2000-2999</td>
<td>104</td>
<td>21</td>
<td>5</td>
<td>12</td>
<td>10</td>
</tr>
<tr>
<td>3000-3999</td>
<td>73</td>
<td>15</td>
<td>4</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>4000-4999</td>
<td>65</td>
<td>13</td>
<td>3</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>5000-9999</td>
<td>85</td>
<td>18</td>
<td>6</td>
<td>15</td>
<td>24</td>
</tr>
<tr>
<td>10,000 or</td>
<td>23</td>
<td>5</td>
<td>1</td>
<td>2</td>
<td>52</td>
</tr>
<tr>
<td>more</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Number of farms served to any extent in the future since rural electrification is approaching the saturation point, i.e., most farms that want electricity have it. At the same time, the national trend is toward larger farms. Thus, the number of farm consumers will tend to decline for most suppliers.

On the other hand, it is believed that there is a tendency, particularly among the utilities, to form mergers which would actually decrease the number of suppliers and increase the number of farms served by each supplier. It may be that in the future, there will be a tendency to consolidate some of the small cooperatives in much the same way that mergers have taken place among the utilities.
Table 3. Regions of the United States

<table>
<thead>
<tr>
<th>Region</th>
<th>Abbreviation</th>
<th>States</th>
</tr>
</thead>
<tbody>
<tr>
<td>East North Central</td>
<td>E. N. Cen.</td>
<td>Ohio, Ind., Ill., Mich., Wis.</td>
</tr>
<tr>
<td>East South Central</td>
<td>E. S. Cen.</td>
<td>Ken., Tenn., Ala., Miss.</td>
</tr>
<tr>
<td>West South Central</td>
<td>W. S. Cen.</td>
<td>Ark., La., Okla., Tex.</td>
</tr>
<tr>
<td>Pacific</td>
<td>Pac.</td>
<td>Wash., Oreg., Calif.</td>
</tr>
</tbody>
</table>

For convenience the United States was classified into regions using the same classification followed by the United States Census. The abbreviations and the states making up each of these regions are shown in Table 3.

Northeastern United States and the Pacific states have relatively fewer cooperatives than the rest of the country, as seen from Table 4. The reason might be that the utilities in these areas had approached area coverage before the REA move-
Table 4. Region and type of organization

<table>
<thead>
<tr>
<th>Region</th>
<th>Cooperative</th>
<th>Municipal</th>
<th>Utility</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Eng.</td>
<td>3</td>
<td>1</td>
<td>14</td>
<td>18</td>
</tr>
<tr>
<td>Mid. Atl.</td>
<td>11</td>
<td>0</td>
<td>12</td>
<td>23</td>
</tr>
<tr>
<td>E. N. Cen.</td>
<td>90</td>
<td>5</td>
<td>22</td>
<td>117</td>
</tr>
<tr>
<td>W. N. Cen.</td>
<td>174</td>
<td>3</td>
<td>21</td>
<td>198</td>
</tr>
<tr>
<td>South Atl.</td>
<td>58</td>
<td>7</td>
<td>17</td>
<td>82</td>
</tr>
<tr>
<td>E. S. Cen.</td>
<td>42</td>
<td>15</td>
<td>3</td>
<td>60</td>
</tr>
<tr>
<td>W. S. Cen.</td>
<td>62</td>
<td>2</td>
<td>13</td>
<td>77</td>
</tr>
<tr>
<td>Moun.</td>
<td>34</td>
<td>1</td>
<td>10</td>
<td>45</td>
</tr>
<tr>
<td>Pac.</td>
<td>11</td>
<td>7</td>
<td>15</td>
<td>33</td>
</tr>
<tr>
<td><strong>U. S.</strong></td>
<td><strong>485</strong></td>
<td><strong>41</strong></td>
<td><strong>127</strong></td>
<td><strong>653</strong></td>
</tr>
</tbody>
</table>

The number of farm consumers is shown according to
### Table 5. Size of organization and region

<table>
<thead>
<tr>
<th>Region</th>
<th>Number of power suppliers with various numbers of farm consumers</th>
<th>Median number consumers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>500 1000 2000 3000 4000 5000 10,000 or more</td>
<td></td>
</tr>
<tr>
<td></td>
<td>999 1999 2999 3999 4999 9999 or more</td>
<td></td>
</tr>
<tr>
<td>New Eng.</td>
<td>5 5 1 1 0 4 2</td>
<td>1800</td>
</tr>
<tr>
<td>Mid. Atl.</td>
<td>2 3 1 2 1 8 6</td>
<td>6563</td>
</tr>
<tr>
<td>E. N. Gen.</td>
<td>6 25 20 15 20 18 13</td>
<td>3500</td>
</tr>
<tr>
<td>W. N. Gen.</td>
<td>12 56 53 25 21 24 7</td>
<td>2585</td>
</tr>
<tr>
<td>South Atl.</td>
<td>7 9 9 10 13 22 12</td>
<td>4462</td>
</tr>
<tr>
<td>E. S. Gen.</td>
<td>1 5 4 8 4 22 16</td>
<td>5364</td>
</tr>
<tr>
<td>W. S. Gen.</td>
<td>2 7 17 16 11 13 11</td>
<td>3781</td>
</tr>
<tr>
<td>Moun.</td>
<td>10 15 9 5 2 2 2</td>
<td>1833</td>
</tr>
<tr>
<td>Pac.</td>
<td>9 7 5 2 1 2 7</td>
<td>2100</td>
</tr>
<tr>
<td>U. S.</td>
<td>54 132 119 84 73 115 76</td>
<td>3256</td>
</tr>
</tbody>
</table>

regions in Table 5. The Middle Atlantic states had the largest median number of farm consumers, 6563, and New England had the smallest, 1800. About 38% of the power suppliers had 1000-2999 farm consumers. Extremes were found in the Middle Atlantic, South Atlantic and the East North Atlantic states where the largest number of power suppliers had from 5000-9999 consumers. Only 8% of the power suppliers had less than 1000 consumers. The northeastern area of the United States, excluding New England, had median numbers of farm consumers.
greater than for the United States which had 3256 per supplier. It does seem apparent that the greater the density of farms in a region the greater the number of farm consumers per supplier.

For many years power suppliers have attempted to stimulate the use of electricity by means of certain techniques and devices. The relative emphasis given to this program needs some type of evaluation score in order that different power supplier programs could be appraised for the degree of completeness of such service.

In this study thought was given to including items in the questionnaire from which some evidence could be obtained concerning the emphasis that was being given to farm educational programs. The items chosen and the relative weights for each item are shown in Table 6. These weights were added for the 22 items chosen and the sums varied for the 653 suppliers from 0 to 76. These sums were then converted to percentile scores from 1 to 100. Thus the percentage of suppliers with poorer programs is shown by the FEP score. For example, an FEP score of 39 means that there are 39% of the power suppliers with poorer programs. The typical FEP score is 50, half of the programs being better and half poorer.

The choice of items and the weights have been decided upon quite arbitrarily and may be open to some serious question. No better way, on the other hand, seemed available.
Table 6. Sum of item weights indicating quality of educational program

<table>
<thead>
<tr>
<th>Weights</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sending of farm electric literature</td>
</tr>
<tr>
<td>0-9</td>
<td>Techniques used for increasing consumption</td>
</tr>
<tr>
<td>1</td>
<td>Use of off-peak controls on certain equipment</td>
</tr>
<tr>
<td>1</td>
<td>Educating farmers on off-peak use</td>
</tr>
<tr>
<td>1-7</td>
<td>Farm program success judged by supplier</td>
</tr>
<tr>
<td>0-8</td>
<td>Visiting various farm leaders</td>
</tr>
<tr>
<td>1</td>
<td>Encouraging dealers to handle new equipment</td>
</tr>
<tr>
<td>0-2</td>
<td>Technical advice service</td>
</tr>
<tr>
<td>1</td>
<td>Sales promotion of seasonal equipment</td>
</tr>
<tr>
<td>0-2</td>
<td>Promoting farm electrification with teachers</td>
</tr>
<tr>
<td>1</td>
<td>Working with farm youth organizations</td>
</tr>
<tr>
<td>1</td>
<td>Keeping records on new equipment</td>
</tr>
<tr>
<td>0-9</td>
<td>Participation in agricultural meetings</td>
</tr>
<tr>
<td>2</td>
<td>Meetings sponsored by supplier</td>
</tr>
<tr>
<td>0-5</td>
<td>Visual aids, equipment and funds</td>
</tr>
<tr>
<td>0-8</td>
<td>Displays and exhibits</td>
</tr>
<tr>
<td>9</td>
<td>Agricultural development programs</td>
</tr>
<tr>
<td>2</td>
<td>Advising farmers and settling complaints</td>
</tr>
<tr>
<td>1</td>
<td>Promoting dealer sales</td>
</tr>
<tr>
<td>1</td>
<td>Promoting equipment for farmer</td>
</tr>
<tr>
<td>0-5</td>
<td>Agency for adviser training</td>
</tr>
<tr>
<td>0-9</td>
<td>Training school attendance</td>
</tr>
</tbody>
</table>
It is assumed for the purposes of this study that the FEP score is a measure of the quality of a farm educational program.

The effectiveness of the farm programs was greatest for the utilities with a median score of 68 and lowest for the municipals with a median score of 13; the cooperatives with a median score of 51 were more or less typical of all power suppliers as shown in Table 7. It does not necessarily follow that the effectiveness of a farm educational program depended upon the type of organization. It may have been a function of the number of farm consumers and there was a great difference in this respect as shown in Table 1.

It is not surprising to note farm programs varied with the number of farm consumers of a supplier. The greater the number of consumers the better the program as indicated by a coefficient of correlation of 0.35. The FEP median score for suppliers with 500 or more consumers and less than 1000 was 22 and increased to 76 for those suppliers with 10,000 or more users as shown in Table 8. The same finding is apparent by consulting the median number of consumers for the seven categories into which FEP scores have been classified. For the lowest scores, there were 55 suppliers with a median number of users with 2045, whereas for those in the highest category of FEP scores there were 36 suppliers with a median number of users of 7143.
### Table 7. Quality of program and type of organization

<table>
<thead>
<tr>
<th>FEP scores</th>
<th>Cooperative (N=485)</th>
<th>Municipal (N=411)</th>
<th>Utility (N=127)</th>
<th>Total (N=653)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>1-9</td>
<td>7</td>
<td>37</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>10-21</td>
<td>11</td>
<td>27</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>22-36</td>
<td>15</td>
<td>22</td>
<td>11</td>
<td>15</td>
</tr>
<tr>
<td>37-57</td>
<td>24</td>
<td>5</td>
<td>14</td>
<td>21</td>
</tr>
<tr>
<td>58-79</td>
<td>25</td>
<td>2</td>
<td>17</td>
<td>22</td>
</tr>
<tr>
<td>80-95</td>
<td>14</td>
<td>7</td>
<td>25</td>
<td>16</td>
</tr>
<tr>
<td>96-100</td>
<td>4</td>
<td>0</td>
<td>14</td>
<td>5</td>
</tr>
<tr>
<td>Median score</td>
<td>51</td>
<td>13</td>
<td>68</td>
<td>50</td>
</tr>
</tbody>
</table>

Judging from the relationship between the FEP scores and number of farm consumers, as shown in Table 8, it would appear that the basic assumption seems justified that little would be lost by eliminating from the study all power suppliers with less than 500 farm consumers.

Since the quality of the farm programs showed considerable relationship to both size and type of organization, and since the latter two classifications have been shown to be related to each other, an attempt was made to find out how much of that relationship was due to type of organization and farm consumers. An analysis of variance of FEP scores was
Table 8. Quality of program and size of organization

<table>
<thead>
<tr>
<th>FEP scores</th>
<th>Percentages of power suppliers with various numbers of farm consumers</th>
<th>Number power suppliers</th>
<th>Median number consumers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>500 1000 2000 3000 4000 5000 10,000 9,999 or more</td>
<td>(N=54) (N=132) (N=119) (N=84) (N=73) (N=115) (N=76)</td>
<td></td>
</tr>
<tr>
<td>1-9</td>
<td>23 11 9 7 5 6 0 55</td>
<td>2045</td>
<td></td>
</tr>
<tr>
<td>10-21</td>
<td>26 14 14 12 18 7 3 82</td>
<td>2500</td>
<td></td>
</tr>
<tr>
<td>22-36</td>
<td>24 17 14 20 12 10 7 95</td>
<td>2735</td>
<td></td>
</tr>
<tr>
<td>37-57</td>
<td>17 25 26 18 21 22 13 139</td>
<td>2871</td>
<td></td>
</tr>
<tr>
<td>58-79</td>
<td>4 20 20 26 18 30 30 144</td>
<td>3909</td>
<td></td>
</tr>
<tr>
<td>80-95</td>
<td>6 9 14 13 22 19 29 103</td>
<td>4531</td>
<td></td>
</tr>
<tr>
<td>96-100</td>
<td>0 4 3 4 4 6 18 35</td>
<td>7143</td>
<td></td>
</tr>
<tr>
<td>Median score</td>
<td>22 43 47 49 52 62 76</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
made. The procedure followed was the one proposed by Patterson.\(^1\) A summarized analysis is shown in Table 9. The conclusion seems warranted that if the number of farm consumers were the same, the effectiveness of the FEP would differ but little, if any, among cooperatives, municipals and utilities.

For the purpose of evaluating regional similarities and differences in FEP scores, Table 10 was prepared. Northeastern United States generally had the highest supplier scores. The poorest scores were found with the power suppliers on the Pacific Coast.

---

<table>
<thead>
<tr>
<th>Region</th>
<th>Percentage of power suppliers with various FEP scores</th>
<th>Median FEP score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1-9 (N=55)</td>
<td>10-21 (N=82)</td>
</tr>
<tr>
<td>New Eng.</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>Mid. Atl.</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>E. N. Gen.</td>
<td>15</td>
<td>13</td>
</tr>
<tr>
<td>W. N. Gen.</td>
<td>18</td>
<td>23</td>
</tr>
<tr>
<td>South Atl.</td>
<td>22</td>
<td>15</td>
</tr>
<tr>
<td>E. S. Gen.</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>W. S. Gen.</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>Moun.</td>
<td>7</td>
<td>10</td>
</tr>
<tr>
<td>Pac.</td>
<td>9</td>
<td>7</td>
</tr>
</tbody>
</table>
V. FARM EDUCATIONAL PROGRAMS

Most power suppliers have some type of farm educational program. In some cases it is not formally organized; however, many other power suppliers have well-developed and well-organized programs. These programs will be discussed as to age, development, practices and standards.

A. Age of Farm Programs

For convenience in this study the age of a farm educational program has been defined as the length of time it has been formally organized. There are probably many reasons why the age may have been somewhat confusing possibly accounting for the nonresponse to this item by many suppliers. If a program had changed from an informal basis to a formal one, if there had been a change in management or if a merger had taken place, it would be difficult to establish exact age.

The median age of the farm programs for the cooperatives was 7 years; for the municipals, 16; and for the utilities, 18, as shown in Table 11. Probably the reason for the recency of establishment of farm programs for the cooperatives results from the relative newness of the rural electric cooperative movement.

Generally speaking, the larger power suppliers had the
Table 11. Age of farm educational programs and type of organization

<table>
<thead>
<tr>
<th>Age in years</th>
<th>Cooperative (N=349)</th>
<th>Municipal (N=19)</th>
<th>Utility (N=100)</th>
<th>Total (N=468)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 2</td>
<td>8</td>
<td>0</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>2 - 4.99</td>
<td>17</td>
<td>11</td>
<td>9</td>
<td>15</td>
</tr>
<tr>
<td>5 - 7.99</td>
<td>34</td>
<td>0</td>
<td>10</td>
<td>28</td>
</tr>
<tr>
<td>8 - 10.99</td>
<td>18</td>
<td>32</td>
<td>17</td>
<td>18</td>
</tr>
<tr>
<td>11 - 13.99</td>
<td>3</td>
<td>0</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>14 - 16.99</td>
<td>6</td>
<td>10</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>17 - 19.99</td>
<td>12</td>
<td>10</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>20 - 23.99</td>
<td>2</td>
<td>5</td>
<td>13</td>
<td>4</td>
</tr>
<tr>
<td>24 or more</td>
<td>0</td>
<td>32</td>
<td>33</td>
<td>9</td>
</tr>
<tr>
<td>Median age</td>
<td>7</td>
<td>16</td>
<td>18</td>
<td>8</td>
</tr>
</tbody>
</table>

Note: Information not available for 185 power suppliers.

older farm programs as indicated by the increase in median program age with an increase in number of consumers as shown in Table 12. The oldest programs existed in northeastern United States as shown in Table 13. Most of those in the rest of the United States had about the same median age. Probably the reason for the older farm educational programs in the Northeast was that this area tended to be the first to have area coverage in rural electrification although there is no
<table>
<thead>
<tr>
<th>Age in years</th>
<th>500 999 (N=24)</th>
<th>1000 1999 (N=85)</th>
<th>2000 2999 (N=85)</th>
<th>3000 3999 (N=60)</th>
<th>4000 4999 (N=53)</th>
<th>5000 5999 (N=90)</th>
<th>10,000 or more (N=72)</th>
<th>Median age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 2</td>
<td>17</td>
<td>12</td>
<td>5</td>
<td>9</td>
<td>6</td>
<td>3</td>
<td>1</td>
<td>2250</td>
</tr>
<tr>
<td>2 - 4.99</td>
<td>21</td>
<td>14</td>
<td>19</td>
<td>18</td>
<td>19</td>
<td>13</td>
<td>7</td>
<td>3227</td>
</tr>
<tr>
<td>5 - 7.99</td>
<td>12</td>
<td>37</td>
<td>33</td>
<td>28</td>
<td>24</td>
<td>27</td>
<td>19</td>
<td>4231</td>
</tr>
<tr>
<td>8 - 10.99</td>
<td>25</td>
<td>19</td>
<td>9</td>
<td>22</td>
<td>17</td>
<td>23</td>
<td>17</td>
<td>3962</td>
</tr>
<tr>
<td>11 - 13.99</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>4750</td>
</tr>
<tr>
<td>14 - 16.99</td>
<td>0</td>
<td>8</td>
<td>5</td>
<td>8</td>
<td>6</td>
<td>3</td>
<td>6</td>
<td>3200</td>
</tr>
<tr>
<td>17 - 19.99</td>
<td>12</td>
<td>5</td>
<td>20</td>
<td>7</td>
<td>15</td>
<td>9</td>
<td>5</td>
<td>3000</td>
</tr>
<tr>
<td>20 - 23.99</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>8</td>
<td>10</td>
<td>7500</td>
</tr>
<tr>
<td>24 or more</td>
<td>9</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>5</td>
<td>9</td>
<td>29</td>
<td>10,000</td>
</tr>
</tbody>
</table>

Note: Information not available for 185 power suppliers.
Table 13. Age of farm educational programs and regions

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 2</td>
<td>0</td>
<td>11</td>
<td>3</td>
<td>10</td>
<td>2</td>
<td>5</td>
<td>8</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>2 - 4.99</td>
<td>8</td>
<td>11</td>
<td>15</td>
<td>16</td>
<td>19</td>
<td>18</td>
<td>11</td>
<td>17</td>
<td>10</td>
</tr>
<tr>
<td>5 - 7.99</td>
<td>25</td>
<td>5</td>
<td>21</td>
<td>36</td>
<td>33</td>
<td>23</td>
<td>30</td>
<td>27</td>
<td>14</td>
</tr>
<tr>
<td>8 - 10.99</td>
<td>17</td>
<td>17</td>
<td>15</td>
<td>17</td>
<td>13</td>
<td>32</td>
<td>17</td>
<td>17</td>
<td>33</td>
</tr>
<tr>
<td>11 - 13.99</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>6</td>
<td>2</td>
<td>10</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>14 - 16.99</td>
<td>0</td>
<td>11</td>
<td>7</td>
<td>3</td>
<td>9</td>
<td>4</td>
<td>9</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>17 - 19.99</td>
<td>0</td>
<td>6</td>
<td>20</td>
<td>9</td>
<td>6</td>
<td>7</td>
<td>13</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>20 - 23.99</td>
<td>17</td>
<td>11</td>
<td>6</td>
<td>3</td>
<td>7</td>
<td>2</td>
<td>0</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>24 or more</td>
<td>33</td>
<td>28</td>
<td>10</td>
<td>3</td>
<td>5</td>
<td>7</td>
<td>2</td>
<td>10</td>
<td>33</td>
</tr>
<tr>
<td>Median age</td>
<td>16</td>
<td>16</td>
<td>10</td>
<td>7</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>10</td>
</tr>
</tbody>
</table>

Note: Information not available for 185 power suppliers.
Table 14. Age and quality of farm educational programs

<table>
<thead>
<tr>
<th>Age in years</th>
<th>1-9 (N=6)</th>
<th>10-21 (N=25)</th>
<th>22-36 (N=60)</th>
<th>37-57 (N=112)</th>
<th>58-79 (N=129)</th>
<th>80-95 (N=102)</th>
<th>96-100 (N=34)</th>
<th>Median FEP score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 2</td>
<td>0</td>
<td>20</td>
<td>9</td>
<td>12</td>
<td>5</td>
<td>1</td>
<td>0</td>
<td>46</td>
</tr>
<tr>
<td>2-4.99</td>
<td>33</td>
<td>4</td>
<td>13</td>
<td>19</td>
<td>12</td>
<td>18</td>
<td>18</td>
<td>65</td>
</tr>
<tr>
<td>5-7.99</td>
<td>17</td>
<td>16</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>26</td>
<td>20</td>
<td>65</td>
</tr>
<tr>
<td>8-10.99</td>
<td>17</td>
<td>8</td>
<td>20</td>
<td>14</td>
<td>20</td>
<td>19</td>
<td>23</td>
<td>70</td>
</tr>
<tr>
<td>11-13.99</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>6</td>
<td>73</td>
</tr>
<tr>
<td>14-16.99</td>
<td>17</td>
<td>12</td>
<td>7</td>
<td>3</td>
<td>7</td>
<td>4</td>
<td>6</td>
<td>65</td>
</tr>
<tr>
<td>17-19.99</td>
<td>16</td>
<td>20</td>
<td>10</td>
<td>12</td>
<td>11</td>
<td>8</td>
<td>0</td>
<td>57</td>
</tr>
<tr>
<td>20-23.99</td>
<td>0</td>
<td>8</td>
<td>3</td>
<td>2</td>
<td>6</td>
<td>5</td>
<td>6</td>
<td>73</td>
</tr>
<tr>
<td>24 or more</td>
<td>0</td>
<td>12</td>
<td>8</td>
<td>4</td>
<td>4</td>
<td>15</td>
<td>21</td>
<td>84</td>
</tr>
</tbody>
</table>

Median age 8 15 8 7 8 9 7

Note: Information not available for 185 power suppliers.

There seems to be no relationship between the age of the educational program and its effectiveness as measured by its FEP scores as in Table 14, coefficient of correlation being 0.08.
B. Agricultural Development Programs

Each power supplier was asked whether it had an organized agricultural development program for direct aid to farm youth and adult organizations. For all regions the median FEP scores were very high for those having such a farm program and varied from 78 for the Middle Atlantic States to 93 for the East North Central region as shown in Table 15. Only three power suppliers with FEP scores less than 21 had such a development program. In general, with few exceptions, only the superior programs had an organized agricultural development program.

Recently there has been a trend toward area development programs especially by the utilities. Many have rural, urban and industrial improvement programs. The Edison Electric Institute Area Development Committee\(^1\) made a survey to find out what the utilities were doing in this developmental work. The basic objectives are mainly to develop area economy, promote growth and improve public relations. Town, city and state agencies predominate among the governmental agencies with which electric companies cooperate in development work.

A large portion of the companies cooperate with youth

---

Table 15. Agricultural development programs for youth and adults by regions and quality of program

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0-9</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>10-21</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>22-36</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>37-57</td>
<td>6</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>58-79</td>
<td>6</td>
<td>13</td>
<td>3</td>
<td>5</td>
<td>11</td>
<td>10</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>80-95</td>
<td>17</td>
<td>9</td>
<td>6</td>
<td>9</td>
<td>12</td>
<td>10</td>
<td>8</td>
<td>13</td>
</tr>
<tr>
<td>16-100</td>
<td>17</td>
<td>0</td>
<td>10</td>
<td>4</td>
<td>0</td>
<td>8</td>
<td>6</td>
<td>0</td>
</tr>
</tbody>
</table>

Median score

|              | 89 | 78 | 93 | 87 | 80 | 85 | 84 | 80 | 87 |
activities and better farming programs. Most of the companies use brochures together with special folders and newspaper advertisements to promote development programs. Many utilities have full-time and part-time personnel working on one or more phases of development programs.

At the time when the questionnaire was prepared for this study, the trend in area development programs was not nearly so evident as it is now. It appears that many of the utility programs are being redirected more toward area development programs. With few exceptions, as shown in Table 15, only the superior farm programs included agricultural development work.

C. Practices Employed in Programs

Power suppliers use various practices as part of their farm educational programs to help farmers and to further farm electrification as shown in Table 16. Responses from power suppliers were solicited concerning the practices followed in their farm programs. These practices are listed in the order of their frequency of occurrence:

1. Technical advice given to all agricultural leaders concerning electrical problems.

2. Work with high school teachers to promote better methods of presenting practical electrification.
Table 16. Farm educational program practices and type of organization

<table>
<thead>
<tr>
<th>Practice</th>
<th>Cooperative (N=185)</th>
<th>Municipal (N=41)</th>
<th>Utility (N=127)</th>
<th>Total (N=653)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical advise</td>
<td>96%</td>
<td>97%</td>
<td>97%</td>
<td>96%</td>
</tr>
<tr>
<td>Help high school teachers</td>
<td>86%</td>
<td>90%</td>
<td>91%</td>
<td>87%</td>
</tr>
<tr>
<td>Dealer encouragement</td>
<td>80%</td>
<td>61%</td>
<td>81%</td>
<td>79%</td>
</tr>
<tr>
<td>Farm youth organizations</td>
<td>77%</td>
<td>41%</td>
<td>81%</td>
<td>76%</td>
</tr>
<tr>
<td>Sales promotion</td>
<td>22%</td>
<td>10%</td>
<td>40%</td>
<td>25%</td>
</tr>
</tbody>
</table>

3. Dealer encouragement to handle electric equipment in previously unavailable areas.

4. Special effort made to work with farm youth organizations.

5. Sales promotions conducted on seasonal equipment.

The practice of giving technical advice to agricultural leaders concerning farm electrification was a popular one as shown in Table 17. Half the organizations gave technical advice regularly and the other half occasionally except the municipals, which followed this practice more regularly than the other types of organizations. Approximately 96% of all the organizations followed this practice regularly or occasionally. Similarity in following this practice was noted among the regions with the exception that the Pacific and
Table 17. Technical advice practice by type of organization and region

<table>
<thead>
<tr>
<th>Classification</th>
<th>N</th>
<th>Regularly</th>
<th>Occasionally</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Organization</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooperative</td>
<td>485</td>
<td>47</td>
<td>49</td>
<td>4</td>
</tr>
<tr>
<td>Municipal</td>
<td>41</td>
<td>73</td>
<td>24</td>
<td>3</td>
</tr>
<tr>
<td>Utility</td>
<td>127</td>
<td>54</td>
<td>43</td>
<td>3</td>
</tr>
<tr>
<td>Regions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New Eng.</td>
<td>18</td>
<td>50</td>
<td>50</td>
<td>0</td>
</tr>
<tr>
<td>Mid. Atl.</td>
<td>23</td>
<td>48</td>
<td>48</td>
<td>4</td>
</tr>
<tr>
<td>E. N. Cen.</td>
<td>117</td>
<td>56</td>
<td>42</td>
<td>2</td>
</tr>
<tr>
<td>W. N. Cen.</td>
<td>198</td>
<td>44</td>
<td>52</td>
<td>4</td>
</tr>
<tr>
<td>South Atl.</td>
<td>82</td>
<td>38</td>
<td>52</td>
<td>10</td>
</tr>
<tr>
<td>E. S. Cen.</td>
<td>60</td>
<td>68</td>
<td>32</td>
<td>0</td>
</tr>
<tr>
<td>W. S. Cen.</td>
<td>77</td>
<td>52</td>
<td>43</td>
<td>5</td>
</tr>
<tr>
<td>Moun.</td>
<td>45</td>
<td>49</td>
<td>47</td>
<td>4</td>
</tr>
<tr>
<td>Pac.</td>
<td>33</td>
<td>61</td>
<td>36</td>
<td>3</td>
</tr>
<tr>
<td>All Suppliers</td>
<td>653</td>
<td>50</td>
<td>46</td>
<td>4</td>
</tr>
</tbody>
</table>

East South Central tended to emphasize this practice somewhat more.

The size of organization did not seem to be a function of the emphasis on furnishing technical advice as indicated.
by a coefficient of correlation of 0.04 as shown in Table 18. The better the farm programs, the greater was the emphasis upon this practice as indicated by a coefficient of correlation of 0.56 and shown in Table 18.

Of the variation among suppliers in the tendency to give technical advice, little may be accounted for by the number of consumers but 31% may be accounted for by the quality of the program. The remaining 69% in the variability among suppliers was associated with organizational differences not considered in this study.

Working with high school teachers to promote better methods of presenting electrification was the second most popular practice used by all suppliers. Between 86% and 91% of the cooperatives, municipals and utilities used it either regularly or occasionally as shown in Table 16. The utilities used this practice more often than the cooperatives and the municipals as shown in Table 19.

This practice was most emphasized in southern United States and New England and was least popular in western United States. In all regions 62% of all suppliers worked with high school teachers on an occasional basis.

The practice of working with high school teachers was emphasized by larger suppliers, indicated by a coefficient of correlation of 0.49, as shown in Table 20. Furthermore, the relationship between size of supplier and the tendency to
<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Number of consumers (1)</th>
<th>Number of consumers (2)</th>
<th>FEP score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Regularly (N=327)</td>
<td>Occasionally (N=300)</td>
<td>Never (N=26)</td>
</tr>
<tr>
<td>Median</td>
<td>3321</td>
<td>3181</td>
<td>3250</td>
</tr>
<tr>
<td>Tendency to use this practice</td>
<td>$r_{y1} = 0.04$</td>
<td>$r_{y2} = 0.56$</td>
<td></td>
</tr>
<tr>
<td>Multiple correlation</td>
<td>$r_{y1.2} = 0$</td>
<td>$r_{y2.1} = 0.56$</td>
<td></td>
</tr>
<tr>
<td>Contribution to relationship</td>
<td>0</td>
<td>31%</td>
<td></td>
</tr>
</tbody>
</table>
### Table 19. High-school-teacher practice by type of organization and region

<table>
<thead>
<tr>
<th>Classification</th>
<th>N</th>
<th>Percentage</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Regularly</td>
<td>Occasionally</td>
<td>Never</td>
<td></td>
</tr>
<tr>
<td>Type of organization</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooperative</td>
<td>485</td>
<td>22</td>
<td>64</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>Municipal</td>
<td>41</td>
<td>10</td>
<td>80</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Utility</td>
<td>127</td>
<td>40</td>
<td>51</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Regions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New Eng.</td>
<td>18</td>
<td>33</td>
<td>56</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Mid. Atl.</td>
<td>23</td>
<td>22</td>
<td>70</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>E. N. Cen.</td>
<td>117</td>
<td>29</td>
<td>62</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>W. N. Cen.</td>
<td>198</td>
<td>19</td>
<td>68</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>South Atl.</td>
<td>82</td>
<td>16</td>
<td>71</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>E. S. Cen.</td>
<td>60</td>
<td>43</td>
<td>52</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>W. S. Cen.</td>
<td>77</td>
<td>35</td>
<td>48</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>Moun.</td>
<td>45</td>
<td>20</td>
<td>62</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Pac.</td>
<td>33</td>
<td>15</td>
<td>67</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>All suppliers</td>
<td>653</td>
<td>25</td>
<td>62</td>
<td>13</td>
<td></td>
</tr>
</tbody>
</table>
Table 20. High-school-teacher practice by size of organization and quality of program

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Number of consumers (1)</th>
<th>FEP score (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Regu-Occasion-Never</td>
<td>Regu-Occasion-Never</td>
</tr>
<tr>
<td></td>
<td>larly</td>
<td>larly</td>
</tr>
<tr>
<td></td>
<td>(N=163)</td>
<td>(N=408)</td>
</tr>
<tr>
<td></td>
<td>(N=82)</td>
<td>(N=163)</td>
</tr>
<tr>
<td></td>
<td>(N=82)</td>
<td>(N=408)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Median</th>
<th>5625</th>
<th>2889</th>
<th>2467</th>
<th>78</th>
<th>47</th>
<th>19</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tendency to use this practice</td>
<td>$r_{y1} = 0.49$</td>
<td>$r_{y2} = 0.70$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multiple correlation</td>
<td>0.75</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contribution to relationship</td>
<td>14%</td>
<td>42%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

follow this practice was less if all suppliers had the same quality farm program. The coefficient of partial correlation was 0.37 as contrasted to coefficient of correlation of 0.49.

The better the farm program of a supplier the greater was the tendency to work with high school teachers, indicated by a coefficient of correlation of 0.70, as shown in Table 20. Also the relationship between the FEP score of each supplier and the tendency to follow this practice was less if all suppliers had the same number of consumers, the coefficient of partial correlation being 0.65 as contrasted to the coefficient of correlation of 0.70.
Table 21. Dealer-encouragement practice by size of organization and quality of program

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Number of consumers (1)</th>
<th>FEP score (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes (N=516)</td>
<td>No (N=137)</td>
</tr>
<tr>
<td></td>
<td>Yes (N=516)</td>
<td>No (N=137)</td>
</tr>
<tr>
<td>Median</td>
<td>3343</td>
<td>2976</td>
</tr>
<tr>
<td>Tendency to use this practice</td>
<td>$r_{y1} = 0.03$</td>
<td>$r_{y2} = 0.50$</td>
</tr>
<tr>
<td></td>
<td>$r_{y1 \cdot 2} = 0$</td>
<td>$r_{y2 \cdot 1} = 0.50$</td>
</tr>
<tr>
<td>Multiple correlation</td>
<td></td>
<td>0.50</td>
</tr>
<tr>
<td>Contribution to relationship</td>
<td></td>
<td>0</td>
</tr>
</tbody>
</table>
The emphasis which suppliers placed on working with high school teachers was shown to be a function of the number of consumers as well as the FEP scores as indicated by a coefficient of multiple correlation of 0.75. Of the variation existing among suppliers in the tendency to work with high school teachers, $14\%$ may be accounted for by the number of consumers and $42\%$ by the quality of the program. The remaining $44\%$ in the variability among suppliers was associated with individual differences in policy and other reasons not here considered.

The practice of encouraging dealers to handle electric equipment in previously unavailable areas was followed by $80\%$ of the cooperatives and utilities and by $61\%$ of the municipals as shown by Table 16. The dealer-encouragement practice was more popular in eastern United States than in the western part.

The practice of encouraging dealers to handle electric equipment was not a function of the size of the power supplier since the coefficient of correlation of $0.03$ was found as indicated in Table 21. The greater the tendency to follow this practice, however, the higher the quality of the educational program as indicated by a coefficient of correlation of $0.50$.

Little of the variation among suppliers in the tendency to encourage dealers to handle electric equipment may be accounted for by the size of the organization but $25\%$ can be
accounted for by the quality of the program. The remaining 75% was associated with organizational differences not considered in this study.

The practice of working with farm youth organizations was followed by 76% of the suppliers with much less emphasis by the municipals than by the cooperatives and utilities, as shown in Table 16. Regional differences were small with slightly less emphasis in the Pacific region and slightly more emphasis in the East North Central regions.

The larger the organization the greater the tendency to adopt this practice as indicated by a coefficient of correlation of 0.28, shown in Table 22. The larger the organization the more satisfactory the farm program as indicated by a coefficient of correlation of 0.76.

The size of organization contributed little or nothing to the tendency of the suppliers to work with farm youth organizations, 58% of the contribution being accounted for by the quality of the program. The other 42% was due to organizational differences not here considered.

The practice of conducting sales promotions on seasonal equipment was followed by 22% of the cooperatives, 10% of the municipals and 40% of the utilities as shown in Table 16. The regional uses made of this practice in the order of occurrence were for the Middle Atlantic States, 100%; the West North Central, 63%; the East South Central, 62%; the
Table 22. Farm-youth practice by size of organization and quality of program

<table>
<thead>
<tr>
<th>Classification</th>
<th>Number of consumers (1)</th>
<th>FEP score (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes (N=496)</td>
<td>No (N=157)</td>
</tr>
<tr>
<td>Median</td>
<td>3689</td>
<td>2294</td>
</tr>
<tr>
<td>Tendency to use this practice</td>
<td>( r_{y1} = 0.28 )</td>
<td>( r_{y2} = 0.76 )</td>
</tr>
<tr>
<td>Multiple correlation</td>
<td>0.76</td>
<td></td>
</tr>
<tr>
<td>Contribution to relationship</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>
East North Central, 61%; the South Atlantic, 54%; the West South Central, 52%; the Mountain, 49%; the Pacific, 42%; and New England, 39%. Sales promotions were emphasized the least in the New England states and western United States and the most in the Middle Atlantic states.

The tendency to follow this practice was only slightly related to the size of the organization as indicated by a coefficient of correlation of 0.14, shown in Table 23. On the other hand the tendency to follow this practice was highly related to the quality of the farm program as indicated by a coefficient of correlation of 0.83.

The size of organization contributed little or nothing to the overall relationship of conducting sales promotions. The quality of the programs accounted for 69% of the variability among suppliers. The remaining 31% was due to organizational differences not here considered.

D. Program Success Standards

Power suppliers furnished information concerning the standard by which they judged the success of their farm educational programs. These success standards, in the order of their occurrence were:

1. Revenue increase from farm consumers.

2. Maintenance and improvement in consumer goodwill
Table 23. Sales-promotion practice by size of organization and quality of program

<table>
<thead>
<tr>
<th>Classification</th>
<th>Number of consumers</th>
<th>PEP score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes (N=379)</td>
<td>No (N=274)</td>
</tr>
<tr>
<td>Median</td>
<td>3500</td>
<td>2925</td>
</tr>
<tr>
<td>Tendency to use this practice</td>
<td>$r_{y1} = 0.14$</td>
<td>$r_{y2} = 0.83$</td>
</tr>
<tr>
<td>Multiple correlation</td>
<td></td>
<td>0.83</td>
</tr>
<tr>
<td>Contribution to relationship</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>
toward organization.

3. Fulfillment of organization's responsibility to its farm consumers.

4. Periodic appliance and farm equipment surveys.

5. Increased sales of farm electric equipment by dealers.

6. Farm and farm leader visits and follow up.

Increasing revenue was indicated as the most important by three out of four of the suppliers and, of the six standards listed, farm visits was the least employed although a third of the suppliers adhered to this standard as shown in Table 24.

These success standards were rated similarly by both the cooperatives and the utilities but were not so often accepted by the municipals. Some variation appeared, however, on individual success standards. The appliance surveys and farm visits were the two most pronounced differences between the cooperatives and the utilities. The utilities held to appliance surveys less frequently than the cooperatives whereas the reverse was true with the farm-visits standard.

The degree to which the success standards were accepted in the different regions is shown in Table 25. Other than the New England and Pacific regions, little difference was found in the degree to which these standards were accepted by power suppliers. In the New England region, in general,
Table 24. Supplier success standards for programs by type of organization

<table>
<thead>
<tr>
<th>Success standard</th>
<th>Cooperative (N=185) %</th>
<th>Municipal (N=141) %</th>
<th>Utility (N=127) %</th>
<th>Total (N=653) %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenue increase</td>
<td>74</td>
<td>49</td>
<td>78</td>
<td>73</td>
</tr>
<tr>
<td>Consumer goodwill</td>
<td>71</td>
<td>46</td>
<td>73</td>
<td>70</td>
</tr>
<tr>
<td>Organization responsibility</td>
<td>63</td>
<td>41</td>
<td>58</td>
<td>61</td>
</tr>
<tr>
<td>Appliance surveys</td>
<td>55</td>
<td>12</td>
<td>25</td>
<td>46</td>
</tr>
<tr>
<td>Sales increase</td>
<td>36</td>
<td>22</td>
<td>51</td>
<td>38</td>
</tr>
<tr>
<td>Farm visits</td>
<td>31</td>
<td>12</td>
<td>53</td>
<td>34</td>
</tr>
</tbody>
</table>

these standards were adhered to less frequently than elsewhere in the United States with the exception of the farm-visits standard. The tendency to stress this standard may have reflected a geographical consideration or it may have been a function of the smaller part which cooperatives play in supplying electric power to consumers.

In the Pacific region the six standards were stressed less than in all regions except New England. The one exception noted was the revenue-increase standard which was quite similar to that prevailing elsewhere.

The degree to which the success standards were emphasized by power suppliers, depending upon the number of farm consumers, is shown in Table 26. There was some tendency to
Table 25. Supplier success standards for programs by region

<table>
<thead>
<tr>
<th>Success standard</th>
<th>Percentage of all power suppliers in region</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(N=18) (N=23) (N=117) (N=198) (N=82) (N=60) (N=77) (N=45) (N=33)</td>
</tr>
<tr>
<td>Revenue increase</td>
<td>61 83 80 76 67 63 71 69 76</td>
</tr>
<tr>
<td>Consumer goodwill</td>
<td>50 70 73 74 62 67 78 67 55</td>
</tr>
<tr>
<td>Organization</td>
<td>44 70 67 66 56 47 61 60 49</td>
</tr>
<tr>
<td>responsibility</td>
<td></td>
</tr>
<tr>
<td>Appliance surveys</td>
<td>22 39 50 58 41 30 49 44 21</td>
</tr>
<tr>
<td>Sales increase</td>
<td>22 52 38 40 33 32 52 40 24</td>
</tr>
<tr>
<td>Farm visits</td>
<td>50 48 39 32 26 32 39 29 24</td>
</tr>
</tbody>
</table>
Table 26. Supplier success standards for programs and size of organization

<table>
<thead>
<tr>
<th>Success standard</th>
<th>Percentage of all power suppliers with various numbers of farm consumers</th>
<th>Median consumers for suppliers having this standard</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>500 1000 2000 3000 4000 5000 10,000 or more (N=54) (N=132) (N=119) (N=84) (N=73) (N=115) (N=76)</td>
<td>Yes No</td>
</tr>
<tr>
<td>Revenue increase</td>
<td>65 69 71 71 70 79 86</td>
<td>3466 2812</td>
</tr>
<tr>
<td>Consumer goodwill</td>
<td>52 65 69 69 73 77 78</td>
<td>3543 3000</td>
</tr>
<tr>
<td>Organization responsibility</td>
<td>41 60 67 56 64 66 61</td>
<td>3372 2730</td>
</tr>
<tr>
<td>Appliance surveys</td>
<td>26 49 49 50 51 46 45</td>
<td>3345 3167</td>
</tr>
<tr>
<td>Sales increase</td>
<td>30 33 37 36 41 33 64</td>
<td>3716 3108</td>
</tr>
<tr>
<td>Farm visits</td>
<td>11 26 34 27 32 41 62</td>
<td>4282 2897</td>
</tr>
</tbody>
</table>
emphasize the success standards more by the larger suppliers especially for the revenue-increase and farm-visits standards as indicated by the differences in medians. In general, the greater the emphasis on the standard, the smaller was the supplier. The larger the supplier the greater the emphasis on the sales-increase and the farm-visits standards, the two standards least accepted of the six.

The standards for farm program success and the quality of the farm educational programs, as indicated by the FEP scores, are shown in Table 27. An inspection of the median FEP scores for those suppliers having and not having any of the six standards reveals that the better programs tended to adhere to these standards. The difference in medians in all cases was pronounced, especially so with the farm-visits standard. Of the 20% having the lowest quality of program, as indicated by FEP scores, only two suppliers held to this standard and 135 did not. On the other hand of the 20% having the highest quality of program, 107 held to this standard and 31 did not.
Table 27. Supplier success standards and quality of programs

<table>
<thead>
<tr>
<th>Success standard</th>
<th>Number of power suppliers with various FEP scores</th>
<th>Median FEP score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1-9</td>
<td>10-21</td>
</tr>
<tr>
<td>Revenue increase</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>20</td>
<td>40</td>
</tr>
<tr>
<td>No</td>
<td>35</td>
<td>42</td>
</tr>
<tr>
<td>Consumer goodwill</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>11</td>
<td>33</td>
</tr>
<tr>
<td>No</td>
<td>44</td>
<td>49</td>
</tr>
<tr>
<td>Organization responsibility</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>9</td>
<td>31</td>
</tr>
<tr>
<td>No</td>
<td>46</td>
<td>51</td>
</tr>
<tr>
<td>Appliance surveys</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>No</td>
<td>50</td>
<td>74</td>
</tr>
<tr>
<td>Sales increase</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>5</td>
<td>14</td>
</tr>
<tr>
<td>No</td>
<td>50</td>
<td>68</td>
</tr>
<tr>
<td>Farm visits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>No</td>
<td>54</td>
<td>81</td>
</tr>
</tbody>
</table>
VI. INCREASING ELECTRICAL CONSUMPTION

The median farm consumption of electricity for all 653 power suppliers was 288 kilowatt hours per farm per month in 1955. Over 55% of the suppliers estimated that the average monthly consumption will be greater than 500 kilowatt hours per farm per month in 1965.

Increasing electrical consumption is a major purpose of the educational programs of all power suppliers. Various techniques, merchandising, electric equipment and sending publications are some of the ways by which suppliers have stimulated electrical consumption.

A. Techniques

Power suppliers indicated many ways of increasing farm electrical consumption as shown in Table 28. They responded on the questionnaire to ten different techniques for doing so. These techniques are listed in the order of the frequency with which they were employed by suppliers as follows:

1. Close cooperation given all appliance dealers for sales promotions.

2. Application of a special incentive rate for the use of certain equipment.

3. Electric literature sent, other than house organ.
Table 28. Techniques for increasing consumption and type of organization

<table>
<thead>
<tr>
<th>Technique</th>
<th>Cooperative (N=485)</th>
<th>Municipal (N=41)</th>
<th>Utility (N=127)</th>
<th>Total (N=653)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dealer cooperation</td>
<td>59%</td>
<td>32%</td>
<td>74%</td>
<td>60%</td>
</tr>
<tr>
<td>Incentive rate</td>
<td>63%</td>
<td>7%</td>
<td>51%</td>
<td>57%</td>
</tr>
<tr>
<td>Send literature</td>
<td>53%</td>
<td>15%</td>
<td>65%</td>
<td>53%</td>
</tr>
<tr>
<td>Sales promotion</td>
<td>36%</td>
<td>7%</td>
<td>43%</td>
<td>36%</td>
</tr>
<tr>
<td>Free electricity</td>
<td>27%</td>
<td>0%</td>
<td>3%</td>
<td>21%</td>
</tr>
<tr>
<td>Appliance trial</td>
<td>15%</td>
<td>0%</td>
<td>17%</td>
<td>14%</td>
</tr>
<tr>
<td>Equipment bonus</td>
<td>10%</td>
<td>2%</td>
<td>9%</td>
<td>9%</td>
</tr>
<tr>
<td>Contractor installation</td>
<td>4%</td>
<td>2%</td>
<td>20%</td>
<td>7%</td>
</tr>
<tr>
<td>All-electric rate</td>
<td>5%</td>
<td>2%</td>
<td>7%</td>
<td>5%</td>
</tr>
<tr>
<td>Free installation</td>
<td>2%</td>
<td>10%</td>
<td>13%</td>
<td>5%</td>
</tr>
</tbody>
</table>

4. Sales promotion plans with electric distributors.
5. Free electricity given for a period of time with the buying of certain appliances.
6. Electrical appliances placed on farms for free trial use.
7. Flat amount of money given with the buying of specific appliances.
8. Installation of major appliances by electrical contractors at a fixed fee.
9. Special rate applied to the all-electric farm user.
10. Free installation given for the purchase of certain appliances.

The typical power supplier used three of these ten techniques. There was, however, one out of every ten suppliers that used six or more of these techniques for increasing electrical consumption.

The technique most popular with all power suppliers was close cooperation with dealers for sales promotions whereas the one least employed was free installation of certain appliances when purchased. The first four techniques listed in Table 28 were the same techniques for the cooperatives and the utilities. Each of the other six techniques was employed by 27% or less for any of the types of power suppliers.

In general, the use of different techniques by a power supplier did not vary from region to region as shown in Table 29. With three exceptions there was a tendency for the larger suppliers to use the techniques more often as indicated by the differences in the median numbers of consumers as shown in Table 30. Actually, there was a reverse situation with the incentive-rate, free-electricity and equipment-bonus techniques in which the smaller suppliers tended to use these techniques more often. Only the larger organizations, of which there were 44, provided installation of major appliances at a fixed fee and 18 of these suppliers had more than
<table>
<thead>
<tr>
<th>Technique</th>
<th>Percentage of power suppliers in region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dealer cooperation</td>
<td>50 83 50 60 62 68 68 58 58 52</td>
</tr>
<tr>
<td>Incentive rate</td>
<td>67 52 67 70 54 20 61 56 68 9</td>
</tr>
<tr>
<td>Sending literature</td>
<td>67 70 59 59 39 40 48 60 39 39</td>
</tr>
<tr>
<td>Sales promotion</td>
<td>17 48 33 33 43 33 48 38 18 38</td>
</tr>
<tr>
<td>Free electricity</td>
<td>0 4 27 31 21 7 16 13 3 13 3</td>
</tr>
<tr>
<td>Appliance trials</td>
<td>17 13 12 25 5 12 13 7 0 7 0</td>
</tr>
<tr>
<td>Equipment bonus</td>
<td>0 13 9 11 11 5 9 7 7 7 7</td>
</tr>
<tr>
<td>Through electric contractors</td>
<td>11 22 10 5 4 3 10 7 7 0</td>
</tr>
<tr>
<td>All-electric rate</td>
<td>11 0 3 5 4 0 9 7 12 12</td>
</tr>
<tr>
<td>Free installation</td>
<td>11 17 22 32 43 30 51 18 0 0</td>
</tr>
</tbody>
</table>
Table 30. Techniques for increasing consumption and size of organization

<table>
<thead>
<tr>
<th>Technique</th>
<th>Percentage of power suppliers with various numbers of farm consumers</th>
<th>Median consumers for suppliers having this technique</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>500 1000 2000 3000 4000 5000 10,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>999 1999 2999 3999 4999 9999 or more</td>
<td>(N=54) (N=132) (N=119) (N=84) (N=73) (N=115) (N=76)</td>
</tr>
<tr>
<td>Dealer cooperation</td>
<td>46 52 58 57 53 68 84</td>
<td>Yes 3687</td>
</tr>
<tr>
<td>Incentive rate</td>
<td>37 54 70 63 58 59 45</td>
<td>No 2770</td>
</tr>
<tr>
<td>Send literature</td>
<td>48 52 54 49 51 52 65</td>
<td>Yes 3341</td>
</tr>
<tr>
<td>Sales promotion</td>
<td>80 30 31 37 34 43 51</td>
<td>No 3174</td>
</tr>
<tr>
<td>Free electricity</td>
<td>15 27 28 18 21 18 9</td>
<td>Yes 2727</td>
</tr>
<tr>
<td>Appliance trial</td>
<td>7 17 13 12 15 14 20</td>
<td>No 3403</td>
</tr>
<tr>
<td>Equipment bonus</td>
<td>7 11 13 12 10 3 8</td>
<td>Yes 2800</td>
</tr>
<tr>
<td>Contractor installation</td>
<td>0 5 7 2 3 7 24</td>
<td>No 7500</td>
</tr>
<tr>
<td>All-electric rate</td>
<td>2 3 6 5 7 4 8</td>
<td>Yes 4000</td>
</tr>
<tr>
<td>Free installation</td>
<td>20 28 27 45 41 33 24</td>
<td>No 3578</td>
</tr>
</tbody>
</table>


10,000 consumers. No supplier with less than 1000 consumers provided this particular service.

The quality of the program, as indicated by the FEP scores, was higher for those using than for those not using each of these ten techniques. The difference between the median FEP scores, shown in Table 31, indicated that, in general, the difference in the quality of the program between those using and those not using the technique placed the usefulness of the technique in about the same order that they were rated by frequency of occurrence. One exception stood out in the installation of major appliances at a fixed fee, as indicated by the differences in the medians, placing this technique as fourth among the ten whereas frequency of occurrence placed it eighth.

Although the power suppliers are much interested in increasing electrical consumption on all farms, they are also keenly aware of the accompanying peak electric loads. Concern over such electric peaks has caused many power suppliers to look for ways of spreading out electric consumption over longer periods of time. Since controls would have a tendency to affect the use of electricity by farmers, power suppliers were asked to check the types of controls employed which are according to their frequency of use:

1. No controls by 61% of the power suppliers.
2. Farmers were educated to use high electrical
Table 31. Techniques for increasing consumption and quality of program

<table>
<thead>
<tr>
<th>Technique</th>
<th>Number of power suppliers with various FEP scores</th>
<th>Median FEP score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1-9</td>
<td>10-21</td>
</tr>
<tr>
<td>Dealer cooperation</td>
<td>Yes</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>49</td>
</tr>
<tr>
<td>Incentive rate</td>
<td>Yes</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>35</td>
</tr>
<tr>
<td>Sending literature</td>
<td>Yes</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>46</td>
</tr>
<tr>
<td>Sales promotion</td>
<td>Yes</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>52</td>
</tr>
<tr>
<td>Free electricity</td>
<td>Yes</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>51</td>
</tr>
<tr>
<td>Appliance trials</td>
<td>Yes</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>54</td>
</tr>
<tr>
<td>Equipment bonus</td>
<td>Yes</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>55</td>
</tr>
<tr>
<td>Through electric</td>
<td>Yes</td>
<td>0</td>
</tr>
<tr>
<td>contractor</td>
<td>No</td>
<td>55</td>
</tr>
</tbody>
</table>
Table 31. (Continued)

<table>
<thead>
<tr>
<th>Technique</th>
<th>Number of power suppliers with various FEP scores</th>
<th>Median FEP score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1-9 (N=55) 10-21 (N=62) 22-36 (N=95) 37-57 (N=139) 58-79 (N=144) 80-95 (N=103) 96-100 (N=35)</td>
<td></td>
</tr>
<tr>
<td>All-electric rate</td>
<td>Yes</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>53</td>
</tr>
<tr>
<td>Free installation</td>
<td>Yes</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>44</td>
</tr>
</tbody>
</table>
demand equipment during off-peak periods - 32%.

3. Off-peak controls placed on certain equipment - 23%.

4. Demand meters installed - 15%

5. Charge made when transformer sizes were increased - 13%

6. Rate increased in cost per kilowatt hour above a certain number - 8%.

7. Monthly charge for certain sized transformers - 2%.

No controls and demand meters tended to be used by the larger power suppliers. Demand meters and off-peak controls were most popular in northeastern United States. Charging for increasing the size of a transformer was most enjoyed in the West South Central and West North Central regions. A monthly transformer charge was most popular in the Mountain and West South Central regions. The power suppliers with the better programs tended to use electric peak controls.

B. Merchandising

In order to find how merchandising fit into the educational farm programs of the various power suppliers, information was sought concerning the selling of bulbs and minor and major electrical appliances as shown in Table 32. Approximately a third of the cooperatives, a fourth of the municipals and two-thirds of the utilities sold at least one of these
Table 32. Merchandising by quality of program and size of organization

<table>
<thead>
<tr>
<th>Item</th>
<th>Percent handling</th>
<th>Median number consumers</th>
<th>Median FEP score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coop-erative</td>
<td>Munie-ality</td>
<td>Util-ity</td>
</tr>
<tr>
<td>(N=125)</td>
<td>(N=41)</td>
<td>(N=127)</td>
<td>(N=653)</td>
</tr>
<tr>
<td>Major equipment</td>
<td>13</td>
<td>10</td>
<td>46</td>
</tr>
<tr>
<td>Minor equipment</td>
<td>15</td>
<td>15</td>
<td>41</td>
</tr>
<tr>
<td>Bulbs</td>
<td>35</td>
<td>22</td>
<td>58</td>
</tr>
<tr>
<td>Some items</td>
<td>39</td>
<td>22</td>
<td>64</td>
</tr>
<tr>
<td>No items</td>
<td>61</td>
<td>78</td>
<td>36</td>
</tr>
</tbody>
</table>

items. The larger power suppliers had a tendency to be engaged more often in merchandising as indicated by the median number of consumers of 3542, shown in Table 32. Those organizations selling none of these items had a smaller number of farm consumers as shown by the median of 3042 consumers.

The power suppliers with the better farm programs, as indicated by their FEP score, had a tendency to sell appliances as illustrated by the median FEP score of 69 in Table
32. Those suppliers doing no merchandising had a lower median FEP score of 46.

Only a sixth of the cooperatives, a tenth of the municipals and nearly half the utilities sold major electric equipment. The larger suppliers sold farm electric equipment as indicated by a median number of consumers of 4179 as shown in Table 32. The power suppliers with the better farm programs sold major equipment indicated by a median FEP score of 65 whereas those suppliers not selling major equipment had a median score of 48.

Minor electric equipment was handled by nearly a seventh of the cooperatives and municipals and over a third of the utilities. As was true with all merchandising, the larger organizations tended to handle minor equipment as shown in Table 32 by the 3833 median number of consumers, as contrasted to the median of 3159 for those organizations not selling minor equipment. Also the suppliers with the better farm programs sold minor equipment as indicated by the median FEP score of 68 which can be compared to the median of 48 for those suppliers not selling this equipment.

Bulbs were handled by approximately one-third of the cooperatives, a quarter of the municipals and over half the utilities as shown in Table 32. Bulbs were handled more generally than any other items and hence by the smaller organizations. This was indicated by the median number of
consumers of 3,458 which was smaller than the median for other equipment. The smaller organizations, however, had a greater tendency not to sell bulbs as indicated by the median number of consumers, 3,104, than the larger organizations.

C. Publications

The communication from the power supplier to the farm consumer by means of some printed publication presumably should be an integral part of a farm educational program for any power supplier. A tenth of the cooperatives, nearly nine-tenths of the municipals and two-thirds of the utilities did not send any type of interorganizational publication to their consumers as shown in Table 33. For those organizations that did send one, the monthly publication was the most frequent. Nearly three-fourths of all cooperatives, a tenth of all municipals and a fourth of all utilities sent their publications monthly.

The organizations reporting no publications or one publication and those sending more than ten times per year tended to be smaller than did those sending publications from two to nine times per year as shown by the median number of consumers in Table 34. No analysis was made which would yield evidence for this relationship, if indeed any evidence is available from the information collected from the power suppliers.
Table 33. Publications and type of organization

<table>
<thead>
<tr>
<th>Times sent annually</th>
<th>Cooperative (N=485) %</th>
<th>Municipal (N=41) %</th>
<th>Utility (N=27) %</th>
<th>Total (N=653) %</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>10</td>
<td>88</td>
<td>60</td>
<td>25</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>2-5</td>
<td>7</td>
<td>2</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>6-9</td>
<td>7</td>
<td>0</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td>10-12</td>
<td>73</td>
<td>10</td>
<td>24</td>
<td>59</td>
</tr>
<tr>
<td>Over 12</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Median</td>
<td>11</td>
<td>11</td>
<td>10</td>
<td>11</td>
</tr>
</tbody>
</table>

Note: Median was computed for those suppliers sending publications only.

Nearly half the power suppliers with FEP scores of less than 21 sent no publications to their farm consumers; however, less than a fourth of the suppliers with higher scores did not send any publications as shown in Table 35. Power suppliers with the better farm programs, as indicated by their FEP scores, sent publications from one to nine times yearly. The suppliers with the poorer programs tended either to send no publications or to send them ten or more times yearly as shown by the median FEP scores in Table 35. Since such a large portion of the cooperatives sent monthly publications as shown in Table 33, and since the cooperatives
Table 34. Publications and size of organization

<table>
<thead>
<tr>
<th>Times sent annually</th>
<th>500</th>
<th>1000</th>
<th>2000</th>
<th>3000</th>
<th>4000</th>
<th>5000</th>
<th>10,000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>999 (N=54)</td>
<td>(N=132)</td>
<td>(N=119)</td>
<td>(N=84)</td>
<td>(N=73)</td>
<td>(N=115)</td>
<td>(N=76)</td>
</tr>
<tr>
<td>None</td>
<td>50</td>
<td>23</td>
<td>19</td>
<td>17</td>
<td>15</td>
<td>24</td>
<td>36</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>3000</td>
</tr>
<tr>
<td>2-5</td>
<td>0</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>8</td>
<td>11</td>
<td>14</td>
</tr>
<tr>
<td>6-9</td>
<td>4</td>
<td>4</td>
<td>7</td>
<td>6</td>
<td>8</td>
<td>8</td>
<td>13</td>
</tr>
<tr>
<td>10-12</td>
<td>46</td>
<td>67</td>
<td>65</td>
<td>71</td>
<td>63</td>
<td>55</td>
<td>36</td>
</tr>
<tr>
<td>Over 12</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Median</td>
<td>11</td>
<td>11</td>
<td>11</td>
<td>11</td>
<td>11</td>
<td>11</td>
<td>10</td>
</tr>
</tbody>
</table>

Note: Median was computed for those suppliers sending publications only.
<table>
<thead>
<tr>
<th>Times sent annually</th>
<th>Percentage of power suppliers with various FEP scores</th>
<th>Median FEP score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1-9 (N=55) 10-21 (N=82) 22-36 (N=95) 37-57 (N=139) 58-79 (N=144) 80-95 (N=103) 96-100 (N=35)</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>47 48 24 14 22 13 17</td>
<td>31</td>
</tr>
<tr>
<td>1</td>
<td>0 0 2 3 1 1 0</td>
<td>64</td>
</tr>
<tr>
<td>2-5</td>
<td>4 4 4 7 8 10 11</td>
<td>68</td>
</tr>
<tr>
<td>6-9</td>
<td>6 2 4 8 4 13 20</td>
<td>72</td>
</tr>
<tr>
<td>10-12</td>
<td>38 46 65 67 64 61 52</td>
<td>54</td>
</tr>
<tr>
<td>Over 12</td>
<td>5 0 1 1 1 2 0</td>
<td>44</td>
</tr>
<tr>
<td>Median</td>
<td>11 11 11 11 11 10 10</td>
<td></td>
</tr>
</tbody>
</table>

Note: Median was computed for those suppliers sending publications only.
tended to be smaller than the other organizations, it would appear that the lowering of the FEP scores, as shown in Table 35, for suppliers with monthly publications may have been a function of the size rather than the type of organization. The suppliers with the poorest farm programs sent no publications as shown by the median score of 31.

Since it was known that the *Electricity on the Farm* Magazine was often sent by suppliers to their consumers, it was interesting to find out that of all the suppliers that furnished this magazine, 35% sent it to 14% or less of their farm consumers and 27% sent it to 100% of their farm consumers. Only 62 cooperatives, 6 municipals, and 78 utilities furnished this magazine to any of their farm consumers. The larger organizations tended to send this magazine to some or all of their consumers.
VII. FARM PROGRAM AIDS

Any farm educational program involves working with people. In order to work with people one must have the necessary tools with which to work. Farm program aids are an important part of those tools. How much the various power suppliers used farm program aids is indicated by the following aids listed in the order of the frequency with which they were employed by suppliers:

Visual aids
1. Camera
2. 16 mm. movie projector
3. Slide projector
4. Commercial films owned by power supplier
5. Flannel board
6. Current farm literature

Equipment and funds
1. Vehicle for travel or mileage on personal vehicle
2. Indicating electric meters
3. Funds to make up appropriate exhibits, displays and demonstrations
4. Tool kit for minor repairs
5. Demonstration equipment for most phases of farm electrical work

The visual aid most popular was the camera and the one
least employed was current farm literature as shown in Table 36. The equipment considered most important to the power suppliers was the use of a vehicle for the farm advisers whereas the equipment considered least important was demonstration equipment.

The cooperatives had the same sequence of farm program aids as all the power suppliers. The utilities put more emphasis on the use of a slide projector, a 16 mm. projector, commercial films, the flannel board and farm literature than did the cooperatives. There was little regional variation concerning farm program aids that could be determined.

The most common farm program aids were used by the smaller power suppliers as indicated by the median number of consumers in Table 37. The use or non-use of the slide projector, the commercial films and the flannel board were more a function of the number of farm consumers than the three other visual aids as shown by the differences in the median number of consumers. In general, the larger power suppliers tended to use all the farm program aids more.

The better the farm programs of the various power suppliers, as indicated by their FEP scores, the greater the number of farm program aids used by them as indicated in Table 38.

Displays and exhibits are an important part of a farm educational program as indicated by the number of power
Table 36. Farm program aids and type of organization

<table>
<thead>
<tr>
<th>Program aid</th>
<th>Cooperative (N=485) %</th>
<th>Municipal (N=141) %</th>
<th>Utility (N=127) %</th>
<th>Total (N=653) %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual aid</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Camera</td>
<td>69</td>
<td>17</td>
<td>66</td>
<td>65</td>
</tr>
<tr>
<td>16 mm. projector</td>
<td>64</td>
<td>22</td>
<td>80</td>
<td>64</td>
</tr>
<tr>
<td>Slide projector</td>
<td>40</td>
<td>12</td>
<td>65</td>
<td>43</td>
</tr>
<tr>
<td>Company films</td>
<td>27</td>
<td>10</td>
<td>61</td>
<td>33</td>
</tr>
<tr>
<td>Flannel board</td>
<td>19</td>
<td>7</td>
<td>39</td>
<td>22</td>
</tr>
<tr>
<td>Farm literature</td>
<td>3</td>
<td>15</td>
<td>65</td>
<td>16</td>
</tr>
<tr>
<td>Equipment and funds</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vehicle</td>
<td>78</td>
<td>42</td>
<td>80</td>
<td>76</td>
</tr>
<tr>
<td>Meters</td>
<td>77</td>
<td>49</td>
<td>71</td>
<td>74</td>
</tr>
<tr>
<td>Exhibit funds</td>
<td>60</td>
<td>32</td>
<td>65</td>
<td>59</td>
</tr>
<tr>
<td>Tool kit</td>
<td>52</td>
<td>20</td>
<td>40</td>
<td>47</td>
</tr>
<tr>
<td>Demonstration equipment</td>
<td>47</td>
<td>15</td>
<td>52</td>
<td>46</td>
</tr>
</tbody>
</table>
Table 37. Farm program aids and size of organization

<table>
<thead>
<tr>
<th>Program aid</th>
<th>Percentage of power suppliers with various numbers of farm consumers</th>
<th>Median consumers for suppliers having this aid</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>500  1000  2000  3000  4000  5000  10,000 or more</td>
<td>Yes  No</td>
</tr>
<tr>
<td></td>
<td>(N=54) (N=132) (N=119) (N=84) (N=73) (N=115) (N=76)</td>
<td></td>
</tr>
<tr>
<td>Visual aid</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Camera</td>
<td>28  61  61  73  67  75  79  3721  2521</td>
<td></td>
</tr>
<tr>
<td>16 mm. projector</td>
<td>28  53  61  67  66  79  88  3937  2340</td>
<td></td>
</tr>
<tr>
<td>Slide projector</td>
<td>17  29  39  39  42  61  71  4451  2646</td>
<td></td>
</tr>
<tr>
<td>Company films</td>
<td>9   20  24  25  34  44  75  5294  2714</td>
<td></td>
</tr>
<tr>
<td>Flannel board</td>
<td>4   17  17  14  21  29  49  4962  2949</td>
<td></td>
</tr>
<tr>
<td>Farm literature</td>
<td>33  52  50  57  56  65  83  3843  2678</td>
<td></td>
</tr>
<tr>
<td>Equipment and funds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vehicle</td>
<td>59  73  70  76  73  86  91  3578  2569</td>
<td></td>
</tr>
<tr>
<td>Meters</td>
<td>56  70  71  75  74  83  80  3531  2794</td>
<td></td>
</tr>
<tr>
<td>Exhibit funds</td>
<td>30  52  54  67  59  67  83  3812  2564</td>
<td></td>
</tr>
<tr>
<td>Tool kit</td>
<td>24  48  53  50  47  47  51  3345  3167</td>
<td></td>
</tr>
<tr>
<td>Demonstration equipment</td>
<td>22  34  38  45  45  55  80  4257  2662</td>
<td></td>
</tr>
</tbody>
</table>
Table 38. Farm program aids and quality of program

<table>
<thead>
<tr>
<th>Number of aids</th>
<th>Percentage of power suppliers with various FEP scores</th>
<th>Median FEP score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1-9 (N=55) 10-21 (N=82) 22-36 (N=95) 37-57 (N=139) 58-79 (N=144) 80-95 (N=103) 96-100 (N=35)</td>
<td></td>
</tr>
<tr>
<td>0-1</td>
<td>78 51 20 5 3 1 0</td>
<td>14</td>
</tr>
<tr>
<td>2-3</td>
<td>13 32 30 37 19 9 6</td>
<td>25</td>
</tr>
<tr>
<td>4-5</td>
<td>2 10 32 21 31 46 40</td>
<td>79</td>
</tr>
<tr>
<td>6-7</td>
<td>4 4 12 17 16 5 6</td>
<td>54</td>
</tr>
<tr>
<td>8-9</td>
<td>3 1 5 15 21 19 20</td>
<td>72</td>
</tr>
<tr>
<td>10-11</td>
<td>0 2 1 5 10 20 28</td>
<td>85</td>
</tr>
<tr>
<td>Median</td>
<td>1 1 3 4 5 5 7</td>
<td></td>
</tr>
</tbody>
</table>
suppliers that encouraged and helped prepare displays and exhibits of farm equipment in the following order of their frequency of occurrence for:

1. Fairs
2. Power suppliers and their branch offices
3. Large meetings
4. Electric dealers in their territories

Also, the following farm electric traveling exhibits are listed in the order of the frequency with which they were employed and were sponsored by:

1. State associations
2. Power suppliers
3. Electrification councils
4. Power generating organizations

Between one-third and two-thirds of all power suppliers used displays at fairs, for their offices, for dealers and at large meetings. The utilities placed more emphasis on the use of displays and exhibits than did the cooperatives, both exceeding the municipals as shown in Table 39.

Traveling exhibits were not as popular as displays. Except for municipals the tendency to use traveling exhibits seemingly varied but little depending on type of organization. Furthermore, there was little regional variation in the number of displays and exhibits used.

In general, the larger power suppliers had a greater
Table 39. Kinds of displays and exhibits by type of organization

<table>
<thead>
<tr>
<th>Displays or exhibits</th>
<th>Cooperative (N=485) %</th>
<th>Municipal (N=41) %</th>
<th>Utility (N=127) %</th>
<th>Total (N=653) %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Place of display</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fairs</td>
<td>60</td>
<td>34</td>
<td>75</td>
<td>62</td>
</tr>
<tr>
<td>Company office</td>
<td>57</td>
<td>29</td>
<td>61</td>
<td>56</td>
</tr>
<tr>
<td>Large meetings</td>
<td>46</td>
<td>20</td>
<td>57</td>
<td>47</td>
</tr>
<tr>
<td>Dealers</td>
<td>29</td>
<td>22</td>
<td>47</td>
<td>32</td>
</tr>
<tr>
<td>Traveling exhibits</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>By state association</td>
<td>25</td>
<td>5</td>
<td>13</td>
<td>22</td>
</tr>
<tr>
<td>By power supplier</td>
<td>15</td>
<td>7</td>
<td>16</td>
<td>15</td>
</tr>
<tr>
<td>By electrification council</td>
<td>9</td>
<td>2</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td>By power generating organization</td>
<td>9</td>
<td>12</td>
<td>6</td>
<td>9</td>
</tr>
</tbody>
</table>

tendency to use displays and traveling exhibits as shown by Table 40. The difference in the median number of consumers for those power suppliers using and not using displays also pointed out the tendency for the larger organizations to promote displays especially in company offices and for dealers. The same was true for traveling exhibits with one exception that the smaller organizations rather than the larger ones
Table 4.10. Kinds of displays and exhibits by quality of program

<table>
<thead>
<tr>
<th>Displays and exhibits</th>
<th>Percentage of power suppliers with various numbers of farm consumers</th>
<th>Median consumers for suppliers having this aid</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>500 1000 2000 3000 4000 5000 10,000 or more (N=54) (N=132) (N=119) (N=84) (N=73) (N=115) (N=76)</td>
<td>Yes No</td>
</tr>
<tr>
<td>Place of display</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fairs</td>
<td>35 54 65 65 52 69 83</td>
<td>3618 2702</td>
</tr>
<tr>
<td>Company office</td>
<td>28 51 47 60 59 68 76</td>
<td>3909 2698</td>
</tr>
<tr>
<td>Large meetings</td>
<td>31 40 45 45 41 52 70</td>
<td>3762 2886</td>
</tr>
<tr>
<td>Dealers</td>
<td>20 27 32 23 32 36 57</td>
<td>4065 3015</td>
</tr>
<tr>
<td>Traveling exhibits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>By state association</td>
<td>15 21 20 23 30 22 20</td>
<td>3552 3169</td>
</tr>
<tr>
<td>By own organization</td>
<td>6 11 15 17 18 15 22</td>
<td>3907 3121</td>
</tr>
<tr>
<td>By electrification council</td>
<td>6 8 8 7 10 13 12</td>
<td>4143 3186</td>
</tr>
<tr>
<td>By power generating organization</td>
<td>7 9 14 5 0 6 16</td>
<td>2705 3331</td>
</tr>
</tbody>
</table>
tended to have their power generating organizations promote traveling exhibits.

The better the farm program, as indicated by the FEP score, the greater the number of displays and exhibits employed by power suppliers as shown in Table 41.
Table 41. Number of kinds of displays and exhibits by quality of program

<table>
<thead>
<tr>
<th>Number of kinds</th>
<th>Percentage of power suppliers with various FEP scores</th>
<th>Median FEP score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1-9 (N=55)</td>
<td>10-21 (N=82)</td>
</tr>
<tr>
<td>0</td>
<td>76</td>
<td>55</td>
</tr>
<tr>
<td>1</td>
<td>16</td>
<td>21</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>14</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>8</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Median: 0 0 2 2 3 4 5
Farm educational programs to be successful must have capable personnel to execute them. This phase of the study was designed to analyze the number of advisers handling the various farm programs, the time spent in this work, the type of work accomplished and the training of the advisers.

A. Number of Advisers

Since the number of advisers per organization or number of total advisers would have little meaning in itself, it was felt that the number of farm consumers per adviser would be desirable. The median number of consumers per adviser was approximately 1852 for the cooperatives, 1200 for the municipals and 1563 for the utilities. For all power suppliers the median was 1750 farm consumers per adviser. The utilities had fewer consumers per adviser than did the cooperatives and the municipals had the most.

The number of consumers per adviser is somewhat ambiguous since many power suppliers may have called a manager, a lineman or some other worker an adviser in responding to the questionnaire. Also smaller organizations had the number of consumers per adviser limited by the number of farm consumers served by the organization. Definitely it was found that the
larger power suppliers had a tendency to have more farm consumers per farm service adviser while suppliers with less than 2000 consumers had a median of less than 1000 consumers per adviser. Those organizations with over 5000 consumers had a median of over 3000 consumers per adviser.

Power suppliers in western United States seemed to have fewer consumers per farm service adviser whereas southeastern United States had the most consumers per adviser. The number of farm service advisers employed by a power supplier appeared to have little relationship to the quality of the farm educational programs, as measured by the FEP score.

B. Time Spent in Educational Farm Programs

The number of farm service advisers has little value if it is not coupled with the time spent in farm activities. In general, the median time spent in farm educational programs by the advisers was 27% for the cooperatives, 7% for the municipals and 38% for the utilities.

The larger power suppliers tended to have their advisers spend more time in farm educational program work. Those suppliers whose advisers spent less than 20% of their time in farm work had a median number of consumers of less than 3,000 but those suppliers whose advisers spent over 80% of their time in farm work had a median of over 6,000 consumers.
western and southeastern United States, the advisers spent less time in farm activities than in other areas. Much more of the advisers' time was spent in farm activities in northeastern United States. Evidently the advisers in the latter area were employed more specifically for farm programs whereas power suppliers in many other areas presumably had their advisers doing many tasks.

The power suppliers with the better farm programs, as indicated by their FEP scores, tended to have their advisers spend more time in farm educational work than did the suppliers with the poorer programs. Programs with advisers spending less than 20% of their time in farm work had FEP scores lower than 50. Those programs where the advisers spent over 50% of their time in farm activities had FEP scores above 72.

C. Activities of Advisers

Oftentimes group participation is much more effective than a few individuals working in their own little orbits. Visiting and consulting with farm leaders and others interested in farm electrification will do much to enhance the effect of a farm educational program. The frequency with which organizations employed various types of visitation is shown in Table 4.2.

Visitations to county extension people, electric deal-
Table 4.2. Yearly farm visits and type of organization

<table>
<thead>
<tr>
<th>Visits</th>
<th>Cooperative (N=485)</th>
<th>Municipal (N=11)</th>
<th>Utility (N=127)</th>
<th>Total (N=653)</th>
</tr>
</thead>
<tbody>
<tr>
<td>County extension</td>
<td>78</td>
<td>39</td>
<td>76</td>
<td>75</td>
</tr>
<tr>
<td>Electric dealers</td>
<td>76</td>
<td>41</td>
<td>69</td>
<td>72</td>
</tr>
<tr>
<td>Vo-ag teachers</td>
<td>66</td>
<td>37</td>
<td>74</td>
<td>65</td>
</tr>
<tr>
<td>Newspaper editors</td>
<td>68</td>
<td>29</td>
<td>54</td>
<td>63</td>
</tr>
<tr>
<td>Key farmers</td>
<td>56</td>
<td>29</td>
<td>58</td>
<td>55</td>
</tr>
<tr>
<td>Radio, TV reporters</td>
<td>39</td>
<td>7</td>
<td>45</td>
<td>38</td>
</tr>
<tr>
<td>Other agr. leaders</td>
<td>28</td>
<td>12</td>
<td>46</td>
<td>31</td>
</tr>
</tbody>
</table>
ers, vocational agriculture teachers and newspaper editors headed the list of importance for nearly two-thirds or more of all power suppliers. Working with key farmers was considered important by well over half the power suppliers. Visitation, as shown in Table 42, indicated that many suppliers felt that much individual contact was needed for ideas to take root to improve farm electrification in areas served by a power supplier.

Most types of power suppliers placed about the same importance on the types of visits that they felt should be made as part of their farm programs as shown in Table 42. However, the municipals did not consider visitation of the farm leaders nearly so important as did the other types of organizations.

The type of work which the farm service advisers did as part of their farm educational programs should be of interest to the power industry throughout the nation. The power suppliers indicated many types of work that were part of their programs. The various types of work, which they responded to, are listed in the order of frequency with which they were employed by the suppliers as follows:

1. Farmers helped with their electrical problems
2. Settlement of farmers' complaints
3. Promotion of farm electric equipment sales through dealers
4. Right-of-way work
5. Selective promotion of equipment which was desirable to farmers
6. Staking of electric lines
7. Encouragement of those uses which were desirable loads for power suppliers
8. Direct sales of most types of electric equipment to farmers
9. Service of farm electric equipment for a fee

The activities of the advisers are also shown in Table 43 comparing the various types of organizations. Most of the organizations had about the same order of preference; however, the municipals rated the promotion of the farm electric load much lower than did the other types of organizations. The utilities rated farm load and dealer sales promotions more highly than did the cooperatives.

The larger the power supplier the greater was the tendency for the advisers to advise farmers, to settle complaints and to promote farm loads and dealer sales as indicated by the difference in the medians as shown in Table 44. However, with right-of-way work and the staking of electric lines the reverse was true and the smaller organizations tended to have their advisers engage in these activities.

Advising farmers, settling complaints and promoting dealer sales and farm loads were activities of advisers working in the better programs as indicated by the differences in
Table 43. Activities of advisers and type of organization

<table>
<thead>
<tr>
<th>Activity</th>
<th>Cooperative (N=485)</th>
<th>Municipal (N=41)</th>
<th>Utility (N=127)</th>
<th>Total (N=653)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advising farmers</td>
<td>82</td>
<td>49</td>
<td>82</td>
<td>80</td>
</tr>
<tr>
<td>Settling complaints</td>
<td>76</td>
<td>46</td>
<td>75</td>
<td>74</td>
</tr>
<tr>
<td>Promoting dealer sales</td>
<td>59</td>
<td>27</td>
<td>67</td>
<td>58</td>
</tr>
<tr>
<td>Right-of-way work</td>
<td>39</td>
<td>34</td>
<td>33</td>
<td>38</td>
</tr>
<tr>
<td>Promoting better farm loads</td>
<td>32</td>
<td>7</td>
<td>43</td>
<td>32</td>
</tr>
<tr>
<td>Staking electric lines</td>
<td>33</td>
<td>34</td>
<td>20</td>
<td>30</td>
</tr>
<tr>
<td>Promoting desirable loads</td>
<td>15</td>
<td>15</td>
<td>19</td>
<td>19</td>
</tr>
<tr>
<td>Direct sales</td>
<td>11</td>
<td>7</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>Servicing farm equipment</td>
<td>9</td>
<td>2</td>
<td>3</td>
<td>7</td>
</tr>
</tbody>
</table>

the median FEP scores in Table 45. In the same way the poorer farm programs tended to have their advisers doing right-of-way work and staking of electric lines.

For a farm educational program to be effective, farm service advisers must work and communicate with various groups of people. Information was obtained concerning meeting participation, meetings sponsored and talks given by farm service advisers.

It was difficult to obtain accurately the number of
Table 44. Activities of advisers and size of organization

<table>
<thead>
<tr>
<th>Activity</th>
<th>Percentage of power suppliers with various number of farm consumers</th>
<th>Median consumers for suppliers having this activity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>500 / 999 (N=54)</td>
<td>1000 / 1999 (N=132)</td>
</tr>
<tr>
<td>Advising farmers</td>
<td>50</td>
<td>77</td>
</tr>
<tr>
<td>Settling complaints</td>
<td>48</td>
<td>71</td>
</tr>
<tr>
<td>Promote dealer sales</td>
<td>39</td>
<td>54</td>
</tr>
<tr>
<td>Right-of-way work</td>
<td>30</td>
<td>44</td>
</tr>
<tr>
<td>Promote farm loads</td>
<td>15</td>
<td>26</td>
</tr>
<tr>
<td>Staking electric lines</td>
<td>19</td>
<td>43</td>
</tr>
<tr>
<td>Promote desirable loads</td>
<td>7</td>
<td>20</td>
</tr>
<tr>
<td>Direct sales</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>Servicing farm equipment</td>
<td>4</td>
<td>9</td>
</tr>
</tbody>
</table>
Table 145. Activities of advisers and quality of program

<table>
<thead>
<tr>
<th>Activity</th>
<th>Percentage of power suppliers with various FEP scores</th>
<th>Median FEP score for suppliers having this activity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1-9 (N=55) 10-21 (N=82) 22-36 (N=95) 37-57 (N=139) 58-79 (N=144) 80-95 (N=103) 96-100 (N=35)</td>
<td>Yes No</td>
</tr>
<tr>
<td>Advising farmers</td>
<td>13 46 81 98 98 99 100 61 14</td>
<td>61 19</td>
</tr>
<tr>
<td>Settling complaints</td>
<td>18 41 76 78 91 93 94 61 19</td>
<td>70 27</td>
</tr>
<tr>
<td>Promote dealer sales</td>
<td>7 22 39 62 78 90 89 70 27</td>
<td>70 27</td>
</tr>
<tr>
<td>Right-of-way work</td>
<td>16 33 55 40 36 35 31 49 52</td>
<td>49 52</td>
</tr>
<tr>
<td>Promote farm loads</td>
<td>4 6 20 32 42 52 74 73 46</td>
<td>46 53</td>
</tr>
<tr>
<td>Staking electric lines</td>
<td>13 33 49 32 28 27 11 46 53</td>
<td>46 53</td>
</tr>
<tr>
<td>Promote desirable loads</td>
<td>0 5 16 17 23 21 23 68 48</td>
<td>68 48</td>
</tr>
<tr>
<td>Direct sales</td>
<td>2 4 6 10 14 15 17 68 49</td>
<td>68 49</td>
</tr>
<tr>
<td>Servicing farm equipment</td>
<td>2 6 6 12 8 12 14 58 49</td>
<td>58 49</td>
</tr>
</tbody>
</table>
talks given by advisers at various farm meetings since many of the advisers were part time men. However, the median number of talks given yearly per adviser for all power suppliers was nine. The utility and cooperative advisers gave about the same number but the municipal advisers gave only about half this number. There were 505 suppliers that stated that their advisers gave talks at various meetings.

It was interesting to note that 382 power suppliers sponsored meetings to promote farm electrification in one form or another. The median number of meetings sponsored was approximately four yearly per adviser for both the cooperatives and the utilities but for the municipals there was only about half this number.

The types of meetings participated in by the advisers in the order of frequency with which they were attended, along with the number of power suppliers which participated are as follows:

1. County extension 400
2. Vocational agriculture classes 331
3. Electrical manufacturers, dealers, inspectors, and electricians 317
4. Farm Bureau 233
5. Electrification councils 197
6. Veterans' classes 191
7. Grange 127
Table 46. Number of meeting types attended by advisers and type of organization

<table>
<thead>
<tr>
<th>Number of meeting types yearly</th>
<th>Cooperative (N=485)</th>
<th>Municipal (N=41)</th>
<th>Utility (N=127)</th>
<th>Total (N=653)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>14</td>
<td>42</td>
<td>21</td>
<td>17</td>
</tr>
<tr>
<td>1</td>
<td>5</td>
<td>15</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>11</td>
<td>10</td>
<td>8</td>
<td>11</td>
</tr>
<tr>
<td>3</td>
<td>13</td>
<td>10</td>
<td>5</td>
<td>11</td>
</tr>
<tr>
<td>4</td>
<td>14</td>
<td>7</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>5</td>
<td>12</td>
<td>5</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>6</td>
<td>9</td>
<td>3</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>7</td>
<td>4</td>
<td></td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>8</td>
<td>7</td>
<td>5</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>9 or more</td>
<td>11</td>
<td>3</td>
<td>20</td>
<td>12</td>
</tr>
<tr>
<td>Median</td>
<td>4</td>
<td>1</td>
<td>6</td>
<td>4</td>
</tr>
</tbody>
</table>

Extension, vocational agriculture and electrical organization meetings headed the list for the greatest participation by all power suppliers. Nearly 50% and more of the suppliers cooperated with each of these agencies.

The comparison of organizational participation either by attendance or the giving of talks by advisers at meetings is shown in Table 46. The median number of meeting types attended by advisers for the cooperatives was four; for the
municipals, one; and for the utilities, six. The utilities appeared to consider meeting attendance by the farm advisers more important than the other types of organizations.

In general, the larger power suppliers tended to have their farm service advisers attend more types of farm meetings as shown in Table 47.

D. Education and Experience of Advisers

The training of farm service advisers is an important consideration if a farm educational program is to keep up-to-date. From 30% to 65% of all power suppliers had sent one or more advisers to the first ten training schools listed in Table 48 in the order of frequency with which they are listed. All other training schools had at least 10% to 28% of all suppliers sending advisers. The cooperatives, municipals and utilities had approximately the same order of emphasis as far as training schools were concerned with the exception of house heating which the cooperatives emphasized much more than the others.

Nearly two-thirds of the power suppliers trained their own advisers, had help from the state college or university, and had help from manufacturers. These were the most popular adviser training organizations employed.

The type of experience and education, together with the
<table>
<thead>
<tr>
<th>Number of meeting types yearly</th>
<th>Percentage of power suppliers with various numbers of farm consumers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>500 (N=54)</td>
</tr>
<tr>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>1</td>
<td>35</td>
</tr>
<tr>
<td>2</td>
<td>17</td>
</tr>
<tr>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>4</td>
<td>11</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>9 or more</td>
<td>5</td>
</tr>
<tr>
<td>Median</td>
<td>3</td>
</tr>
</tbody>
</table>

Note: Medians computed for those power suppliers attending meetings.
Table 4.8. Adviser training schools and type of organization

<table>
<thead>
<tr>
<th>Training school</th>
<th>Cooperative (N=485)</th>
<th>Municipal (N=41)</th>
<th>Utility (N=127)</th>
<th>Total (N=653)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Adequate wiring</td>
<td>67</td>
<td>37</td>
<td>67</td>
<td>65</td>
</tr>
<tr>
<td>Water systems</td>
<td>56</td>
<td>20</td>
<td>46</td>
<td>52</td>
</tr>
<tr>
<td>Lighting</td>
<td>46</td>
<td>24</td>
<td>46</td>
<td>45</td>
</tr>
<tr>
<td>Motors</td>
<td>44</td>
<td>17</td>
<td>50</td>
<td>43</td>
</tr>
<tr>
<td>Irrigation</td>
<td>40</td>
<td>22</td>
<td>50</td>
<td>41</td>
</tr>
<tr>
<td>House heating</td>
<td>46</td>
<td>27</td>
<td>27</td>
<td>41</td>
</tr>
<tr>
<td>Hay drying</td>
<td>41</td>
<td>15</td>
<td>45</td>
<td>40</td>
</tr>
<tr>
<td>Range</td>
<td>38</td>
<td>24</td>
<td>34</td>
<td>36</td>
</tr>
<tr>
<td>Laundry equipment</td>
<td>34</td>
<td>17</td>
<td>34</td>
<td>33</td>
</tr>
<tr>
<td>Grain drying</td>
<td>33</td>
<td>7</td>
<td>37</td>
<td>32</td>
</tr>
<tr>
<td>Water heating</td>
<td>32</td>
<td>7</td>
<td>33</td>
<td>30</td>
</tr>
<tr>
<td>Brooding chicks</td>
<td>26</td>
<td>10</td>
<td>40</td>
<td>28</td>
</tr>
<tr>
<td>Demonstration techniques</td>
<td>30</td>
<td>2</td>
<td>27</td>
<td>28</td>
</tr>
<tr>
<td>News writing</td>
<td>35</td>
<td>2</td>
<td>10</td>
<td>28</td>
</tr>
<tr>
<td>Refrigeration</td>
<td>26</td>
<td>15</td>
<td>28</td>
<td>26</td>
</tr>
<tr>
<td>Bulk milk cooling</td>
<td>25</td>
<td>5</td>
<td>37</td>
<td>26</td>
</tr>
<tr>
<td>Visual aids</td>
<td>28</td>
<td>0</td>
<td>28</td>
<td>26</td>
</tr>
<tr>
<td>Welding</td>
<td>24</td>
<td>5</td>
<td>22</td>
<td>23</td>
</tr>
<tr>
<td>Feed grinding and mixing</td>
<td>20</td>
<td>2</td>
<td>32</td>
<td>22</td>
</tr>
<tr>
<td>Brooding pigs</td>
<td>20</td>
<td>5</td>
<td>29</td>
<td>21</td>
</tr>
<tr>
<td>Milk house heating</td>
<td>16</td>
<td>2</td>
<td>24</td>
<td>17</td>
</tr>
<tr>
<td>Materials handling</td>
<td>15</td>
<td>7</td>
<td>29</td>
<td>17</td>
</tr>
<tr>
<td>Livestock ventilation</td>
<td>14</td>
<td>2</td>
<td>33</td>
<td>17</td>
</tr>
<tr>
<td>Soil heating cable</td>
<td>13</td>
<td>2</td>
<td>33</td>
<td>16</td>
</tr>
<tr>
<td>Television</td>
<td>15</td>
<td>10</td>
<td>10</td>
<td>14</td>
</tr>
<tr>
<td>Pipeline milking</td>
<td>11</td>
<td>2</td>
<td>20</td>
<td>13</td>
</tr>
<tr>
<td>Stock tank heating</td>
<td>12</td>
<td>0</td>
<td>16</td>
<td>12</td>
</tr>
<tr>
<td>Gutter cleaners</td>
<td>8</td>
<td>0</td>
<td>23</td>
<td>10</td>
</tr>
</tbody>
</table>
number of suppliers having any advisers with either, is listed in the order of frequency by the suppliers:

Experience:

1. Worked several years farming 363
2. Worked in capacities other than as farm service adviser with power supplier 309
3. Worked as or for, an electrician, an electrical contractor or an electric dealer 279
4. Been an extension worker or agriculture teacher 96

Education:

1. Engineering degree 139
2. Trade school 133
3. Agricultural degree 127
4. Other college degree 91
5. Home economics degree 59

About half or more of the power suppliers had at least one farm adviser that had had a farming background and one that had worked previously with the organization. Nearly a quarter of the power suppliers had at least one farm adviser with an engineering degree, one with an agricultural degree and one with a trade school education.

It seems possible that power suppliers could well give
more attention to the selection of advisers and to the activities for which the advisers are held responsible. It is of particular interest to note that many advisers, dealing with well-educated personnel such as teachers of agriculture, extension workers and engineers have had somewhat less education than would be expected for highly competent personnel.
IX. RECOMMENDATIONS AND IMPLICATIONS

The ever increasing use of electrical equipment on our farms creates a growing need for farmers to be able to use this commodity wisely. Conservation of our natural resources as well as the farmer's economic welfare emphasizes the need to curb waste of electrical energy. The most effective way to provide our farm consumers of electrical energy with the knowledge they need to make the best use of these electrical servants is to raise the standards of our educational programs. In this way farmers will learn how to apply electric power most efficiently and effectively to increase farm production and make farm living more enjoyable.

An unbiased source is desirable to execute the best educational program. The state and federal agricultural extension service, made up of specialists in all phases of agriculture, is already organized and qualified to do the job. An increase in personnel and enlargement of the extension program as a whole would be necessary in order to carry the responsibility for all farm electrical advisory help.

Agricultural specialists who are capable of applying all common sources of energy to best advantage in agriculture would provide advice whereby there would be a minimum of chance for misuse of electrical energy. These specialists are well-trained and are competent to help farmers find a much more
satisfying life. Such extension workers would tend to co-
ordinate the type of agricultural programs encouraged in the
state. In this way the farmer obtains a single answer to his
problem rather than several which sometimes occurs. Major
design, automation and other special problems would be re-
layed to specialists who would be technically trained and
qualified to answer them.

Power suppliers themselves might help in the enlargement
of the extension service by encouraging the increase of pres-
ent agricultural extension staffs. Direct financial aid to
state agricultural colleges and universities could make this
possible at a relatively nominal cost.

If the above proposal does not seem feasible by the
power suppliers, they should then consider strengthening
their own educational programs. Many of these programs could
be improved by giving more thought to the selection of per-
sonnel. These people should have education at least equiva-
lent to that of the rural electrification leaders with whom
they work.

Such personnel must be able to communicate their ideas
and must be well-trained in agricultural work, teaching tech-
niques, visual aids and must be able to work with rural peo-
ple. Periodically they should attend refresher courses,
conferences and other meetings where they can talk over their
problems with experienced people from other areas and organi-
izations. Probably the best training agents are the agricultural extension personnel.

The educational programs for the power suppliers should be much broader than they have been in the past. Years ago they covered the extension of rural lines and how to wire the farmstead. Today such a program should engulf the whole rural area of which the farm is a part.

There appears to be a trend toward agricultural or area development. Such programs should attempt to develop area economy, promote growth and improve public relations. At the same time they should attempt to cooperate with town, city and state agencies. Many of the larger suppliers with the better farm programs have such development programs. The need for well-trained men to head such programs is essential.

Through the medium of mass education customer reaction is stimulated. Much can be accomplished by assisting and supporting other programs having the same objectives. Power suppliers must take advantage of the opportunities afforded them for improving and coordinating educational programs through state farm electrification councils and state and national associations for cooperatives and utilities.

All power suppliers, large and small, should take every opportunity to use their manpower, equipment and buildings to the best advantage in working with the public. Good public relations build public confidence in an organization. Regard-
less of size, the supplier cooperating with other organizations may take advantage of the help of others and profit by fuller use of facilities. This may allow the supplier to provide a worthwhile program at a small additional cost.

Cooperation should be given all rural electrification leaders. The supplier can assist and help in the execution of meetings especially when held in the electrical field. At the same time suppliers should cooperate with one another in promoting certain programs. Such work encourages better relations and leads to cooperation in many other areas, a factor especially important in cases of emergency. Interconnection of electrical facilities of all power suppliers must be given much more consideration, bringing into being the economy and reliability of a national grid to cope with any emergency whether it be caused by wind, ice, storm or the actions of an enemy. Continuity of service is essential to all consumers. People today are almost completely dependent upon electric service. It is a necessity, no longer a luxury.

There was some record in this study of the merging of utilities. Cooperatives may also find it desirable to do the same. With the growth in the size of the organization better educational programs could be made possible.

Large power suppliers might give consideration to employing specialists to handle technical and specific problems: namely, the design of hay driers, irrigation systems and other
applications. This recommendation is based on the premise that one successful design for a farmer sells many others to neighboring farmers. Such specialists are recommended if no attempt is made to expand the extension service to meet this need.

Assisting with or co-sponsoring meetings promoted by local leaders merits closer consideration in any farm program. Such joint efforts will usually not only accomplish the same objectives as self-sponsored meetings but will also help establish better working relations with other organizations.

The public relations program of any organization is strengthened by the distribution of publications of various types. This is an important medium in keeping consumers informed. Houseorgans, commercial literature, magazines and other informative materials are to be encouraged as valuable assets to any program.

Merchandising has many problems and a study of individual situations is usually required before policies are established. One of the major techniques used by the larger suppliers with the better programs was cooperating with dealers. Much can be done by such work to improve selling and servicing of equipment. If the power supplier sells in competition with dealers, disharmony may arise. However, if certain areas do not have adequate dealer coverage for sales and service of electrical equipment, it is necessary for a supplier to consider merchandising in that area.
Every power supplier must continually evaluate and improve its educational program. Adequate standards, necessary to any evaluation program, need constant scrutiny for desired changes and implementation for fulfillment of objectives.

Active support of research work at universities should be considered through councils and state associations. Such research projects can be designed to make use of the facilities and manpower of local power suppliers in the keeping of records which would be impossible otherwise. More emphasis should be placed on encouraging state and federal agencies to do more research in important phases of rural electrification.

New research is always needed. It would be valuable to make a study of the trends over the past ten years in farm and home educational programs. Such a study should be valuable in predicting the future needs for such programs. Other research problems needing attention are house heating by electrical energy, automating the farm and the home and many others.

Finally, my study has indicated a need to find a more adequate method of measuring and charging consumers for electrical energy. The present system of charging for kilowatt hours consumed appears to be much inferior to charging for the electrical demand by consumers at any given time. Further research, to substantiate or disprove this premise, would be an important contribution to the well-being of rural America and indirectly to civilization.
Electrification is big business. In the last 40 years the population of the United States has increased 67% while generating capacity for electricity has mushroomed to 1371%. The United States has more electric power capacity than the next seven countries of the world combined. Approximately 527 billion kilowatt hours were sold in 1956. Electrical manufacturers chalked up a new record in 1956 by shipping a total of $20 billion worth of electrical products.

The objective of this study was to summarize, compare and evaluate the practices in prevailing farm educational programs of all power suppliers throughout the country and to point out worthwhile implications to the power suppliers. Better farm educational programs will result in a higher standard of living, increased farm production and a high degree of laborsaving through automation for farmers. Such farm programs are confronted with a great challenge facing the power suppliers as automation becomes more important to the agricultural industry.

A concise, compact, well-defined and easily-answered questionnaire was developed through the aid of 33 farm electrification leaders from eight states and sent to 1612 cooperatives, municipals and utilities throughout the United States on April 20, 1956. All power suppliers with less than
500 farm consumers were eliminated from the study which gave 653 usable questionnaires from 485 cooperatives with a mean number of 3755 farm consumers, 41 municipals with a mean of 2725 consumers and 127 utilities with a mean of 17,435 consumers.

Usable returns from the questionnaires were obtained from power suppliers that served more than four million farms, over 90% of the total electrified farms in the United States. About 44% of these farms were served by cooperatives, 3% by municipals and 53% by utilities.

Nearly half the responses for this study came from the East North Central and West North Central regions. The Middle Atlantic region had the larger power suppliers and the better farm programs. New England had the smallest power suppliers. The Pacific region had the poorer farm programs as indicated by the standards set up for evaluating the farm programs.

The larger power suppliers tended to have the better farm programs whereas the type of organization showed little relationship to the quality of program. The farm educational programs of the cooperatives were found to be relatively young whereas those of the municipals and utilities averaged two to three times the age of the cooperatives. The larger power suppliers tended to have the older farm programs and the older programs were found more often in northeastern
United States. Many agricultural development programs were reported which, with few exceptions, were carried on by the suppliers with superior farm programs.

Giving technical advice to farm consumers was the most frequently employed practice in farm programs and tended to be included in the better programs. Power suppliers with the better farm programs and with the larger number of consumers tended to work more frequently with high school teachers, the second most popular practice. These two practices were followed by dealer encouragement, working with farm youth and sales promotion which tended to be included by suppliers with the better programs. The use of these practices seemed to vary little with the size of the organization or from region to region. There was a positive relation, however, between the use of these practices and the quality of these programs.

The standards by which the power suppliers judged the success of their farm educational programs in the order of their occurrence were: revenue increase, consumer goodwill, fulfillment of organization's responsibility to farm consumers, appliance surveys, sales increase and farm visits. In the New England and Pacific regions these standards were employed generally less frequently. There was a positive relationship between the standard of success of the suppliers and the quality of the programs. The better farm programs tended to adhere to all six of these standards.
The techniques most widely used by suppliers to increase consumption in the order of occurrence were: dealer cooperation, use of an incentive rate, sending of literature, sales promotions, free electricity for certain purchases, appliance trials and others not so commonly employed. All techniques, however, tended to be used by the better farm programs. The acceptance of these techniques was not apparently related to the geographical region or the size of the organization.

Whenever consumption of electricity increases, more thought is given by power suppliers to controlling peak loads. However, 61% of all the power suppliers used no controls. The larger organizations tended to employ no controls or demand meters only. Suppliers with the better programs tended to employ controls.

About a third of the cooperatives, a fourth of the municipals and two-thirds of the utilities merchandised equipment. The suppliers with the larger number of consumers and with the better farm programs tended to merchandise major and minor items. The utilities did much more merchandising than did the other types of organizations. A sixth of the cooperatives, a tenth of the municipals and nearly a half of the utilities sold major equipment.

Interorganizational publications were not sent to consumers by a tenth of the cooperatives, nearly nine-tenths of the municipals and two-thirds of the utilities. The monthly
publication was most popular. The larger power suppliers and those with the better farm programs tended to send publications less frequently than once a month.

Visual aids were employed by various farm programs in the following order of frequency: camera, movie and slide projectors, commercial films, flannel board and current farm literature. Other farm program aids listed in the order of their preference were: use of a vehicle, electric meters, exhibit funds, tool kit and demonstration equipment. The utilities put more emphasis on the use of projectors and farm literature than did the cooperatives and the municipals. The larger power suppliers and the suppliers with the better programs tended to use all the farm program aids.

Most suppliers having more than 500 farm consumers had one or more advisers to work with farmers and farm organizations. Over 50% of the power suppliers had their advisers making yearly visits in the following order of preference to: county extension personnel, electric dealers, vocational agriculture teachers, newspaper editors and key farmers. Also the main activities of the advisers for over half the suppliers were advising farmers, settling farmer complaints and promoting dealer sales respectively. The larger suppliers and those with the better programs tended to employ these three activities more, in addition to the promotion of farm electric loads.
Over three-fourths of the power suppliers had advisers giving talks at farm meetings and well over half the suppliers sponsored such meetings. Over half the suppliers had their advisers participating in county extension, vocational agriculture and electrical organization meetings. The larger power suppliers tended to have their advisers participating in more meetings.

During the five-year period before this study from 30% to 65% of all suppliers had sent one or more advisers to training schools in the following order of occurrence: adequate wiring, water systems, lighting, motors, irrigation, house heating, hay drying, ranges, laundry equipment, grain drying and water heating. The training of advisers was done by the power suppliers, state college or university, and manufacturer personnel.

Slightly over half the farm advisers had any farming experience. Less than half of them had any electrical experience or had worked in other capacities with the power suppliers. Less than a quarter of the suppliers had any advisers with an engineering, agricultural or other college degree.

In summary, power suppliers in the United States at the time of this study were placing great emphasis upon a farm educational program. Most variations in the emphasis seemed to be related to the size of the organization. On the other
hand it is probable that a power supplier will be able to enhance the quality of its program by noting the techniques and practices prevailing in the more satisfactory programs now in existence.
XI. LITERATURE CITED


