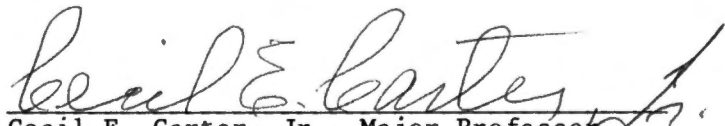
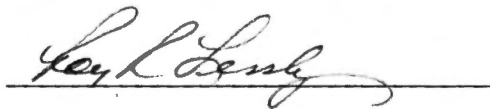


To the Graduate Council

I am submitting herewith a thesis written by Mona Elizabeth Idles entitled "Relationships Between the Use of Recommended Energy Conservation Practices in Tennessee Homes and Characteristics of the Home, the Homemaker and the Number of Contacts Made With Extension Agents." I have examined the final copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Agricultural Extension.


Cecil E. Carter, Jr., Major Professor

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RELATIONSHIPS BETWEEN THE USE OF RECOMMENDED ENERGY CONSERVATION
PRACTICES IN TENNESSEE HOMES AND CHARACTERISTICS OF THE
HOME, THE HOMEMAKER AND THE NUMBER OF CONTACTS
MADE WITH EXTENSION AGENTS

A Thesis
Presented for the
Master of Science
Degree
The University of Tennessee, Knoxville

Mona Elizabeth Idles

December 1987

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DEDICATION

Dedicated in loving memory of my parents, the late Mr. and Mrs. Louis H. Idles for their dream, inspiration, guidance, support and encouragement during the years of my undergraduate and graduate studies.

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ABSTRACT

The major purpose of this study was to examine the energy conservation practices of the homemakers and to look at the characteristics of the home and the characteristics of the homemaker as related to the use of recommended energy conservation practices. A major concern of the study was to determine relationships between the contacts the homemaker had with the Agricultural Extension Service and their use of 14 energy conservation practices.

An underlying purpose of this study was to provide information that might be used to plan and implement educational programs for the Extension clientele in Tennessee.

The population of the study included Extension homemakers club members and general homemakers in 89 Tennessee counties. The "nth" number technique was used to randomly select 30 Extension homemaker club members and 40 general homemakers.

The major findings of the study indicated:

1. A higher percentage of the homemakers who lived in urban homes, compared to those who lived in rural farm and rural non-farm homes, had a home energy audit conducted.
2. Homemakers who were married were members of EHC, had larger families, were under 60 years of age, and had adequate income were more likely to have conducted a home energy audit.
3. Homemakers who had one or more contacts with the Extension agent by way of meetings, office visits, telephone calls, letters,

publications or radio programs were more apt to have an energy audit conducted than those who did not have contacts with the Extension agent.

4. Homemakers who lived in newer homes in the rural farm area for 10 years or less were less likely to have insulation recommended for the home after the energy audit was conducted.

5. The age of the dwelling, number of people in the household, and family income was significantly related to whether or not insulation was installed in the home. The location of dwelling, years lived in dwelling, marital status, employment status, age of the homemaker and ECH membership were not related to whether insulation was installed by the homemaker. There was no relationship between whether or not homemakers had Extension contacts and adding insulation.

6. Homemakers who lived in their home less than 30 years and the homes were less than 30 years old tended to use more of the energy conservation practices. Homemakers that were employed, married, with larger families, below the age of 60, were EHC members and had contacts with Extension agent used more of the 14 home energy conservation practices.

7. Homemakers were more likely to live in homes that had ceiling insulation than homes that had the floors of their homes insulated.

TABLE OF CONTENTS

CHAPTER	PAGE
I. BACKGROUND AND PROBLEM	1
Introduction.	1
Need for the Study.	3
Purpose of the Study.	3
Limitation of the Study	5
Methods and Procedures.	6
II. REVIEW OF RELATED STUDIES.	10
Relationships Between the Adopted Practices in Related Home Economics Subject Matter Areas and the Personal Characteristics of the Homemakers .	10
Related Research Regarding the Relationships Between the Number of Extension Contact and Practices Adopted.	12
Related Research Regarding Selected Characteristics of the Home and the Family as Related to the Adoption of Energy Conservation Practices. . . .	13
III. STUDY FINDINGS	17
Frequency of Characteristics.	18
Relationships Between Whether or not a Home Energy Audit was Conducted and the Characteristics of the Home, the Homemaker and the Number of Extension Contacts	25
Relationships Between Whether or not Insulation was Recommended by the Home Energy Audit and the Characteristics of the Home.	34
Relationships Between Whether or not Insulation was Installed and the Characteristics of the Home, Characteristics of the Homemaker and the Number of Extension Contacts	37
Relationships Between the Use of Energy Conservation Practices and the Characteristics of the Home, the Homemaker and the Number of Extension Contacts	45
Relationships Between the Location of the Dwelling and Selected Insulation Practices for Home Energy Conservation	53
Relationships Between Age of the Dwelling and Selected Insulation Practices for Home Energy Conservation.	56
Relationships Between the Marital Status and use of Selected Insulation Practices for Home Energy Conservation	59

CHAPTER	PAGE
III. (Continued)	
Relationships Between the Age of the Homemaker and Use of Selected Insulation Practices for Home Energy Conservation	62
Relationships Between Employment Status and Selected Insulation Practices for Home Energy Conservation.	65
Relationships Between Family Income and Selected Insulation Practices for Home Energy Conservation.	68
IV. SUMMARY OF MAJOR FINDINGS.	72
Purpose of the Study.	72
Limitation of the Study	74
Methods and Procedures.	74
Major Findings.	76
Implications and Recommendations.	83
BIBLIOGRAPHY.	87
APPENDIXES.	90
APPENDIX A. 1985 HOUSING SURVEY	91
APPENDIX B. SURVEY REPORT	97
VITA.	99

LIST OF TABLES

TABLE	PAGE
I. Characteristics of the Home, the Homemaker, the Number of Extension Contacts and the Use of Home Energy Conservation Practices	19
II. Relationships Between Whether or not a Home Energy Audit was Conducted and the Characteristics of the Home, Homemaker and the Number of Extension Contacts.	26
III. Relationships Between Whether or not Insulation was Recommended by the Home Energy Audit and the Characteristics of the Home	36
IV. Relationships Between Whether or not Insulation was Installed and the Characteristics of the Home, the Homemaker and the Number of Extension Contacts.	38
V. Relationships Between the Mean Number of Home Energy Conservation Practices Used and the Characteristics of the Home, the Homemaker and the Number of Extension Contacts	46
VI. Relationships Between the Location of the Dwelling and Selected Insulation Practices for Home Energy Conservation	54
VII. Relationships Between the Age of the Dwelling and Selected Insulation Practices for Home Energy Conservation.	57
VIII. Relationships Between the Marital Status and Selected Insulation Practices for Home Energy Conservation	61
IX. Relationships Between the Age of the Homemaker and Selected Insulation Practices for Home Energy Conservation.	64
X. Relationships Between Employment Status and Selected Insulation Practices for Home Energy Conservation.	66

TABLE

PAGE

XI.	Relationships Between Family Income and Selected Insulation Practices for Home Energy Conservation.	69
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CHAPTER I

BACKGROUND AND PROBLEM

I. INTRODUCTION

One of the most reliable records of the civilization of mankind is in the houses which have been built over the ages. Houses are an expressive product of a civilization revealing the amount of leisure time, number of servants, types of furniture, habits of eating, products of craftsmen and a variety of other things that are related to one's very existence (17:4).*

At various points in history, climate has effected the development of the housing units which were built. In general walls were thick to counteract the effect of heat and cold. Thickness was the only insulation against undesirable temperatures. Heavy columns were also needed to support heavy walls (17:4). Although the homes of the past greatly influence the homes of today, newer methods of construction and workmanship have given way to more efficient homes.

With the oil shortage of a few years ago we all felt the energy crunch and thus energy conservation practices were needed and used more often. Energy is a major concern of many people because in the United States our national energy consumption for dwellings is 23 percent of the total energy use (11,32).

*Numbers in parentheses refer to alphabetically listed sources in the Bibliography, those after the colon are page numbers.

Yet, experts indicate that 30 percent of the energy we consume in the home is still wasted. This is very important because in the 1970's the average household used 5 percent of their income for energy use and it is projected that by the 1990's 20 percent of the family income will be spent on energy consumption (18:36-39). Methods of energy conservation are not only needed but have become a necessity since the family income is effected so greatly. The Tennessee Valley Authority, along with other utility companies, recognized that home owners were consuming too much energy and needed to be more conservative in their energy practices. In 1977, 20 percent of all Tennessee homes did not contain attic insulation. The average attic insulation was only an R-6 in 1977 (20:4).

The Tennessee Valley Authority implemented a program in 1977 for the purpose of reducing energy consumption in the Tennessee Valley region. In cooperation with the Tennessee Valley Authority, the Extension Service in Tennessee increased its efforts to increase the use of housing and energy conservation practices to improve the quality of life for the clientele of Tennessee. The Tennessee Valley Authority provided funding and educational materials in order to promote a better understanding of energy conservation practices.

Many factors may influence the acceptance of energy conservation practices in homes. Thus the education of consumers to conserve energy is a difficult task. One can learn the importance of energy conservation practices but never implement the practices if some change has not

occurred in the person's habits. This study was designed to help shed some light on the present situation regarding the use of energy conservation practices recommended by the Tennessee Agricultural Extension Service.

II. NEED FOR THE STUDY

To provide a bases for planning educational programs on housing needs in Tennessee a housing survey was conducted in 1985. The housing survey as conducted by Extension agents in 89 Tennessee counties to identify housing problems, to assist the planning and implementation of housing programs in Tennessee.

A major area of emphasis in the 1985 survey dealt with questions on the use of energy conservation practices. There was a need to analyze and summarize these data for the purpose of planning future housing programs. This study placed primary emphasis upon the use of energy conservation practices in the home.

III. PURPOSE OF THE STUDY

The purpose of the study was to gain information concerning the use of energy conservation practices. Questions used to guide the study included: (1) to what extent have home energy audits been conducted in Tennessee? (see Appendix B), (2) what proportion of the homes audited needed additional insulation? (3) what proportion of the homes installed insulation of various types after the audit? (4) what

proportion of the homemakers in Tennessee were using each energy conservation practice? and (5) what factors were related to the use of energy conservation practices?

The specific objectives of the study were:

1. To determine the characteristics of the home, characteristics of the homemaker, the number of contacts homemakers had with Extension agents and the homemakers' use of recommended energy conservation practices.

2. To determine relationships between whether or not a home energy audit was conducted, characteristics of the home, characteristics of the homemaker and the number of contacts with Extension agents.

3. To determine relationships between whether or not insulation was recommended by the home energy audit and the characteristics of the home.

4. To determine relationships between whether or not home insulation was installed after the home energy audit was conducted, characteristics of the home, characteristics of the homemaker and the number of contacts homemakers had with Extension agents.

5. To determine relationships between the use of recommended energy conservation practices, characteristics of the home, characteristics of the homemaker and the number of contacts with Extension agents.

6. To determine relationships between the location of the dwelling and homemakers use of selected home energy conservation practices.

7. To determine relationships between the age of dwelling and homemakers use of selected home energy conservation practices.

8. To determine relationships between the marital status of the homemakers and their use of selected home energy conservation practices.

9. To determine relationships between the age of the homemaker and their use of selected home energy conservation practices.

10. To determine relationships between the employment status of the homemakers and their use of selected home energy conservation practices.

11. To determine relationships between the family income of the homemakers and their use of selected home energy conservation practices.

IV. LIMITATION OF THE STUDY

This study was limited to data collected in the 1985 Housing Survey conducted by the University of Tennessee Agricultural Extension Service. The survey was available for use in all 95 counties in Tennessee except Lake County. Data were collected by County Extension Agents-Home Economics through personal contacts and telephone interviews with 5,418 homemakers in 89 counties. The time period for determining practices used was 12 months prior to the survey. The use of recommended home energy conservation practices was limited to the 14 practices included in the survey. These practices included insulation of walls, ceilings, floors, the addition of storm windows, doors, insulation of water heaters, water pipes and heat ducts. A copy of the survey is included as Appendix A.

V. METHODS AND PROCEDURES

The methods and procedures discussed in this section were used to secure and analyze the survey data.

Population and Sample Studied

The population for the 1985 Housing survey was members of Extension Homemakers Club and General Homemakers. Seventy homemakers were randomly selected from each county. The two homemaker audiences studied were Extension homemakers and general homemakers. The Extension agent used the "nth" number technique to select homemakers to be surveyed.

Thirty homemakers were randomly selected from a listing of EHC membership and 40 homemakers were randomly selected using the telephone directory. Responses were obtained from 5,418 homemakers in 89 Tennessee counties.

Survey Instrument

The Tennessee Agricultural Extension Specialist, Maxine McManus, developed the housing instrument used for the survey. Information was obtained regarding homemakers personal characteristics, the characteristics of the home and the total number of contacts homemakers had with Extension agents during the previous 12 months.

Part I of the survey was designed to give general information about the home, these included location of the dwelling, type of dwelling, home ownership, years homemakers had lived in the dwelling and age of dwelling. The number of bedrooms and bathrooms also was included.

The survey also indicated whether or not a home energy audit had been conducted, who conducted the audit, whether or not insulation was recommended by the audit and whether or not insulation was installed as recommended.

Part II included questions regarding dwelling problems that the homemaker may have had. This study did not investigate these data.

The main part of the survey that is addressed in this study deals with Part III, energy conservation. Homemakers indicated whether or not they used each of the following 14 recommended energy conservation practices: (1) wall insulation, (2) ceiling insulation, (3) floor insulation, (4) water heater insulation, (5) water pipe insulation, (6) heat-air duct insulation, (7) storm windows, (8) plastic film on windows, (9) storm doors, (10) plastic film on doors, (11) caulked doors, (12) caulked windows, (13) caulked around water pipes, and (14) weather stripped doors.

In Part IV the respondent was asked to give personal and family characteristics including marital status, employment status, age, family income and EHC membership.

Part V obtained data regarding the number of contacts the homemakers had with the Extension agent over the past 12 months through: (1) meetings, (2) office visits, (3) telephone calls, (4) letters, (5) publications, and (6) radio programs.

Analysis of Data

The individual counties, on completion of the survey forms, submitted the surveys to each district office and then to the

State Agricultural Extension Education Office at The University of Tennessee in Knoxville. The data were checked for completeness and accuracy and otherwise processed for statistical analysis at the University of Tennessee Computer Center.

Frequency counts were made and Chi-Square test and analysis of variance F test were used to determine the strength of the relationships between selected dependent and independent variables. A probability level of .05 was used to make decisions regarding the significance of observed relationships between variables.

Definition of Terms

The following terms are defined to indicate how certain terms are used in this study.

1. EHC-Extension Homemaker Club--Organized group of homemakers in a club for the specific purpose of supporting homemaking skills. EHC is a support group for the county level home economics program related to the Agricultural Extension Service.

2. Homemaker--The primary individual responsible for the maintenance of the home environment in a family situation. Homemaker could be male or female.

3. Home Energy Audit--An on-site survey by TVA or private company trained energy advisor to determine the insulation levels of the attic, floor, duct work, water heater, windows, doors, and other areas of the home. When the survey is completed the energy advisor recommends the improvements needed and provides information on potential savings and estimated cost of improvements.

4. T.V.A.--A federal agency established to aid selected southern states by manufacturing low cost electricity in the Tennessee Valley region.

CHAPTER II

REVIEW OF RELATED STUDIES

The purpose of this chapter was to present research findings related to the present study. The chapter was divided into three sections:

1. Related research regarding relationships between practices used in related home economics subject matter areas and the personal characteristics of the homemaker.
2. Related research regarding relationships between the number of contacts homemakers had with the Extension agent and use of the recommended practices.
3. Related research regarding selected characteristics of the home and the family as related to the adoption of energy conservation practices.

I. RELATIONSHIPS BETWEEN THE ADOPTED PRACTICES IN RELATED HOME ECONOMICS SUBJECT MATTER AREAS AND THE PERSONAL CHARACTERISTICS OF THE HOMEMAKERS

A variety of studies have been conducted regarding the adoption of recommended practices in various home economic related areas of study.

Jackson's 1981 study of the adoption of food and nutrition practices revealed that a larger percentage of Extension Homemaker Club Members followed the recommended practice of broiling or baking

foods (81.4 percent) more often than frying foods, than did non-members (10:12).

In her 1985 study of characteristics of Tennessee homemakers and selected income and security variables, Judd found that the marital status of the homemaker did influence the adoption of the 11 money saving activities (13:74).

According to a study by Webb in 1979, a higher percentage of Extension Homemaker Club Members than non-members reported following the recommended practices in interior design. However, there was no relationship between their use of practices and their employment status (21:77).

The majority of the 75 respondents in the 1969 study by Davis in Hardeman County, Tennessee followed the recommended practices in meal planning using the basic 4 food groups. Extension Homemaker Club members reported following the recommended practices 68 percent of the time; whereas, less than 50 percent of the county wide and 24 percent of the housing authority group reported the use of the recommended practices (4:67).

Holt conducted a study in Union County, Tennessee that indicated the relationship between the homemakers, use of recommended budgeting and record keeping practices and selected personal and family characteristic (8:81). Her findings indicated that the homemakers who did follow the recommended practices were better educated, had higher salaries and were buying their homes.

Cherry, in the 1981 housing survey, found that the six personal and family characteristics that she studied were positively related

to the mean number of housing problems reported. Also, those homemakers that were younger reported the most housing problems and as income increased, housing problems decreased in this study (3:131).

II. RELATED RESEARCH REGARDING THE RELATIONSHIPS BETWEEN THE NUMBER OF EXTENSION CONTACT AND PRACTICES ADOPTED

In Boyce's study it was reported that 85 percent of homemakers who received Extension newsletters indicate that they did follow some of the money management principles taught (1:87).

Bryan found that homemakers who had more Extension contacts worried less than homemakers who did not regularly attend Extension functions (2:78).

Jackson reported that as the number of Extension meetings attended increased so did the average number of recommended food and nutrition practices used (10:61).

Judd's study showed a significant increasing feeling of financial security, possession of a will and use of money saving activities were the results of an increase in Extension meetings attended (13:142).

Webb's findings revealed that a higher percentage of married homemakers than single homemakers made calls to the Extension office (21:87). Webb also found that the number of visits to the Extension office was significantly related to the employment of the homemaker. Those who were employed did not visit the Extension office as frequently as the unemployed homemakers (21:88).

III. RELATED RESEARCH REGARDING SELECTED CHARACTERISTICS OF THE HOME AND THE FAMILY AS RELATED TO THE ADOPTION OF ENERGY CONSERVATION PRACTICES

The Tennessee Valley Authority in 1977 conducted an energy conservation survey in the Tennessee valley region for the purpose of identifying the basic needs of consumers in the region. Those findings indicated that homes in the TVA region were not properly insulated. Approximately 20 percent of the homes had no attic insulation. In 1981 the survey was conducted again and did indicate some improvement had been made. Fourteen percent of the homes, after the home energy audit had been in existence for several years, reported to have no attic insulation (20:4).

Johnson, in 1981 reported that 84.5 percent of the new homes in the Knoxville, Tennessee area had storm windows and were heated with electric heat pumps. About 35 percent of the existing homes heated with electric resistance units and had storm windows (12:68).

The 1975 Annual Housing Survey showed that 42 percent of all metro homes had no storm windows and 22 percent reported no attic insulation (19:197).

Gladhart, in the study of "Interactions of Prices and Household Characteristics and Residential Energy Conservation" found that in the 95 households which were surveyed in 1973-74 and again in 1977-78 consumption had declined by 21.6 percent in this time period. The majority had conserved more than 2 percent after four seasons and 59 percent had conserved at least 20 percent after four seasons. The

energy cost, family income, family size, employment status and dwelling size prove to be related to the annual consumption of electricity. Family characteristics were related to consumption but had little to do with use of conservation practices (7:149).

In a Kentucky Energy Conservation program the Extension Service was recognized as the agency to develop and carry out the educational programs of the states' clientele. The program emphasis would be the energy conservation practices of storm windows, storm doors and additional insulation for the home (9:57).

In an Idaho study, the residents were asked about an energy audit and their willingness to be involved with this form of home survey. The homemakers' willingness to have an energy audit conducted was positively related to education, home ownership and size of the home. Age and willingness were negatively related in the survey. The older the respondent was the less likely they were to have the energy audit completed (14:39).

Eichner and Morris found in their Iowa study that an estimated 25 to 50 percent of energy consumption for residential heating was the result of infiltration. Also, home owners can reduce the infiltration by up to 25 percent by weather stripping and caulking in their homes. The study hypothesized that home owners and higher income households have more energy conservation features in their home. Age, household size and employment status in this study did not influence energy conservation features of the home (6:1).

The Texas Extension Service was given the responsibility of the "Save Home Energy" program in that state. Representatives from the communities were involved in the planning, implementing and evaluating educational activities. Surveys were taken and programs were designed to teach energy conservation practices. Programs were designed to teach how to use inexpensive ways to prevent air leakage in homes, how to caulk, weatherstrip, make storm windows, baffles and screens. The findings indicated that with new approaches, the help of people and funding can help the families handle energy related problems (22:54-56).

The Western State Survey indicated that 33 percent of the respondents were in favor of requiring the energy audit of homes in their region and 83 percent were in favor of larger tax credits for improving home energy efficiency (5:87-88).

Cherry, in the 1981 study of housing problems in Tennessee found that the fewer years the homemaker had lived in the home the less they reported problems in heating and cooling the home. Those who had lived in the home 20 years or more reported having the most problems (3:101). This study was limited to housing problems and did not relate directly to energy conservation except in the area of heating and cooling. Of the 14 characteristics of the house all were significant by being related to whether or not the homemaker considered the home expensive to heat and cool (3:142).

In Lane's study in 1984, she found that some of the problems that led up to the use of new energy conservation practices were

socioeconomically based. Her research in Knoxville, Tennessee reported that rural, low income minorities had the greatest number of housing problems (15:21).

CHAPTER III

STUDY FINDINGS

Findings were summarized in eleven tables. Each table was organized into a section for purposes of presenting study findings.

Section I gives the characteristics of the homemakers, their homes, contacts with Extension agents and their use of home energy conservation practices.

Section II shows relationships of whether home energy audit was conducted and characteristics of the homes, the homemakers and the contacts with Extension agent.

Section III presents relationships between whether insulation was recommended after the home energy audit had been conducted and characteristics of the homes, the homemakers and their contacts with Extension agents.

Section IV gives data showing relationships between whether insulation was installed after recommendations were made by the home energy audit and characteristics of the home, the homemaker and their contacts with Extension agents.

Section V presents the mean number of recommended practices used and characteristics of the home, the homemaker and their contacts with Extension agents.

Section VI shows relationships between use of five selected insulation practices and the location of the dwelling.

Section VII presents relationships between use of five selected insulation practices and the age of the dwelling.

Section VIII presents relationships between use of five selected insulation practices and the marital status of the homemaker.

Section IX presents relationships between use of five selected insulation practices and the age of the homemaker.

Section X presents relationships between use of five selected insulation practices and the employment status of the homemaker.

Section XI presents relationships between use of five selected insulation practices and the family income of the homemaker.

A frequency table is used to summarize data presented in Section I. The Chi-Square test is used in Sections II, III, IV, VI, VII, VIII, IX, X and XI to determine relationships between analyzed variables. The F test was used in Section V to show relationships between dependent and independent variables.

I. FREQUENCY OF CHARACTERISTICS

This section contains one table showing the frequency of responses as to characteristics of the home, the homemaker, their contacts with Extension agents and use of home energy conservation practices.

Characteristics of the Home, Homemaker and the Number of Extension Contacts

Data in Table I shows the frequency that each homemaker gave informative data as a bases for the study areas to be studied are

TABLE 1. Characteristics of the Home, the Homemaker, the Number of Extension Contacts and the Use of Home Energy Conservation Practices

Characteristics of the Home, Homemaker and Number of Extension Contacts; Also Use of Recommended Home Energy Practices	Number of Homemakers	Percent of Homemakers
CHARACTERISTICS OF THE HOME		
Location of dwelling		
Urban	1,229	22.7
Rural farm	2,005	37.0
Rural non-farm	2,143	39.6
Years lived in dwelling		
10 years or less	2,168	40.0
11-30	2,264	41.8
30 +	986	18.2
Age of dwelling		
10 years or less	1,170	21.6
11-30	2,571	47.5
30 +	1,677	31.0
CHARACTERISTICS OF THE HOMEMAKER		
Number of persons in household		
1-3	4,063	75.0
4 +	1,355	25.0
Marital status		
Married	4,148	76.6
Single	1,188	23.4
Employment status		
Employed	2,211	40.8
Unemployed	1,149	21.2
Retired	2,015	38.0
Age of respondent		
Below 60	3,128	57.7
Above 60	2,251	42.2
Family income		
Adequate	4,134	76.3
Inadequate	1,174	23.7
Presently EHC member		
No	2,828	52.2
Yes	2,529	47.8
NUMBER OF EXTENSION CONTACTS		
Number of meetings attended		
Not any	3,589	66.2
1 +	1,829	33.8
Visits to Extension office		
Not any	4,481	82.7
1 +	937	17.3
Phone calls to Extension office		
Not any	4,473	82.6
1 +	945	17.4
Letters from Extension office		
Not any	3,073	56.7
1 +	2,348	43.3
Publications from Extension office		
Not any	3,480	64.2
1 +	1,938	35.8
Radio programs from Extension office		
Not any	4,646	85.8
1 +	772	14.2
RECOMMENDED ENERGY CONSERVATION PRACTICES		
Conducted an energy audit		
No	3,134	57.8
Yes	1,956	36.1
Do not know	328	6.1
Was insulation recommended		
No	546	10.1
Yes	1,328	24.5
Does not apply	3,544	65.4

TABLE I (Continued)

Characteristics of the Home, Homemaker and Number of Extension Contacts; Also Use of Recommended Home Energy Practices	Number of Homemakers	Percent of Homemakers
Was insulation installed		
No	647	11.9
Yes	1,180	21.8
Does not apply	3,591	66.3
Expensive to heat and cool		
Not a problem	3,192	58.9
Slight problem	1,440	26.6
Big problem	645	11.9
Does not apply	141	2.6
Walls insulated		
No	553	10.2
Yes	4,179	77.1
Do not know	686	12.6
Ceilings insulated		
No	316	5.8
Yes	4,666	86.1
Do not know	436	8.1
Floors insulated		
No	1,728	31.9
Yes	2,679	49.4
Do not know	1,011	18.6
Water heater insulated		
No	1,926	35.5
Yes	2,848	52.6
Do not know	644	11.9
Water pipes insulated		
No	1,445	26.7
Yes	3,283	60.6
Do not know	690	12.7
Heat/air duct insulated		
No	1,220	22.5
Yes	2,260	41.7
Do not know	1,938	35.8
Dwelling has storm windows		
No	912	16.8
Yes	4,317	79.7
Does not apply	189	3.4
Windows covered with plastic film		
No	3,729	68.8
Yes	684	12.6
Does not apply	1,005	18.5
Dwelling has storm doors		
No	766	14.1
Yes	4,477	82.6
Does not apply	175	3.2
Outside door covered with plastic film		
No	3,986	73.6
Yes	271	5.0
Does not apply	1,161	21.5
Doors caulked		
No	1,681	31.0
Yes	3,164	58.4
Do not know	573	10.6
Windows caulked		
No	1,389	25.6
Yes	3,529	65.1
Do not know	500	9.3
Water pipes caulked		
No	2,053	37.9
Yes	2,054	37.9
Do not know	1,311	24.1
Doors weatherstripped		
No	1,209	22.3
Yes	3,793	70.0
Do not know	316	7.6

characteristics of the home, characteristics of the homemakers and the number of Extension contacts.

The characteristics of the home include location of the dwelling, years lived in the dwelling and age of the dwelling. Data in Table I indicate that of the 5,418 participants 1,229 (27.7 percent) live in the urban areas, 2,005 (37.0 percent) live in rural farm areas, and 2,143 (39.6 percent) live in rural non-farm areas.

The largest percentage of the homemakers lived in their homes 11-30 years (41.8 percent) following was the less than 10 year group with 2,168 (41.8 percent). The balance lived in their homes for 30 or more years (18.2 percent).

Just over 21 percent of the homemakers lived in homes 10 years old or less and 31 percent lived in homes 30 years old or older.

The characteristics of the homemaker include number of persons in the household, marital status, employment status, age of respondents, family income and Extension Homemaker Club membership. One to 3 people live in 4,063 (75 percent) of the homes surveyed, 1,355 (25 percent) had 4 or more people in the household.

Seventy-six percent of those surveyed were married (4,148) with the next group being single (1,188). Single marital status includes divorced, widowed, and never married.

The number of Extension contacts are classified as contacts through meetings, visits, phone calls, letters received, publications received, and radio programs.

Table I indicated the largest percent of those surveyed had not attended any Extension meetings in the past 12 months (3,589 or 66.2 percent). The number that had attended 1 or more Extension meetings were 1,829 or one-third of the respondents.

Of the 5,418 homemakers surveyed only 937 (17.3 percent) had made a visit to the Extension office in the past 12 months with housing questions. The percentage of respondents making telephone calls to the Extension office was almost the same (17.4 percent) as those visiting the Extension office.

More than one-half (56.7 percent) of the homemakers had not received any letters from the Extension service regarding housing during the past 12 months.

Publications are a teaching method for Extension contacts. Of the 5,418 respondents surveyed, 1,938 (35.8 percent) had received publications from the Extension Service on housing.

Of the 5,418 surveyed, only 772 (14.2 percent) had heard a radio program presented by the Extension Service regarding housing.

Use of Recommended Energy Practices

Table I indicates that of the 5,418 respondents surveyed, 3,134 (57.8 percent) had never had a home energy audit conducted. Some 36.1 percent (1,956) did have a home energy audit conducted and 10.1 percent of those who had the audit conducted had no insulation recommended. Twenty-five percent did have insulation recommended and 21 percent had the insulation installed after it was recommended.

Of the respondents, 3,192 (58.9 percent) considered their homes not an economic problem to heat and cool. Only 11.9 percent considered heating and cooling expense a big problem for their family.

Table I also indicates the frequency the energy conservation practices were used in the home.

The walls of the home were insulated 77.1 percent of the time. Some of the respondents did not know if the walls of their home were insulated (686 or 12.6 percent).

The ceilings were insulated the highest percentage of the time with 86.1 percent of those surveyed having the ceilings insulated. Only 5.8 percent had no ceiling insulation in the home.

The floor insulation was not in the homes of 31.9 percent of those surveyed. Almost one-half of the respondents did have floor insulation (49.4 percent) and 18.6 percent of those surveyed did not know if the floor of their home had insulation. Educational efforts and consumer awareness could be used to help those who did not have any insulation in the floor or who did not know if any insulation was in the floor of their homes.

Water heater insulation was reported by 52.6 percent of the homemakers responding. About one-third of the homemakers did not have any insulation on the water heater and 11.9 percent did not know if the water heater was insulated.

Water pipe insulation was used in over 60 percent of the homes surveyed. Twenty-six percent did not follow the recommended practice and 12.7 percent did not know if the water pipes were insulated. The

results of not using this recommended practice is easily known by interrupted water service to most homes, thus the practice is followed a greater percentage of the time.

The heat-air duct insulation recommendation surprisingly revealed that 35.8 percent of the home owners did not know whether or not the heat-air duct for the home was insulated. In contrast, 41 percent did use the insulation as recommended for their homes. As in the other insulation practices, there is a large percentage that did not follow the practice at all (22.5 percent).

Realizing that much energy is lost through doors and windows, it is not surprising to learn that this is one conservation measure that the overwhelming majority has adopted. Knowing the need to cover most windows, the recommended practice of storm windows or plastic film on the windows were followed by 92.3 percent of those who responded. Use of storm doors or plastic film on doors were also very high in the homes surveyed (87.6 percent). These two openings into homes are easily seen to be a place for energy to be lost where other recommended practices are not as obvious.

Caulking was a consideration for doors, windows and water pipes. Doors were caulked by 58.4 percent of the respondents, windows were caulked by 65.1 percent of the homes, and water pipes were caulked in 37.9 percent of the homes surveyed. Again, in the areas that are less seen, fewer homemakers are knowledgeable of the conservation practice. Twenty-four percent did not know if the water pipes in their homes were caulked as a home energy conservation measure.

Homemakers were following the practice of weatherstripping doors in 70 percent of the homes. Twenty-two had no weatherstripping and 7.6 percent did not know if weatherstripping was on the doors of their home.

II. RELATIONSHIPS BETWEEN WHETHER OR NOT A HOME ENERGY AUDIT WAS CONDUCTED AND THE CHARACTERISTICS OF THE HOME, THE HOMEMAKER AND THE NUMBER OF EXTENSION CONTACTS

The purpose of this section is to present data in Table II concerning whether or not a home energy audit was conducted by the Tennessee homemakers and how that related to the homes, the families who occupy the homes and the number of times they had contacts with the Tennessee Agricultural Extension Service regarding the Housing/Energy program area of emphasis.

Each subsection will describe the characteristics of the home, the homemaker and the type of Extension contacts used for the study.

Characteristics of the Home

For this study, the home is divided into three categories: (1) location of dwelling, (2) number of years lived in the dwelling, and (3) age of the dwelling.

Location of the dwelling. The location of the dwelling was described as: (1) urban, (2) rural farm, and (3) rural non-farm.

Of those homemakers who lived in the urban area, 50.4 percent had conducted a home energy audit in their homes; this compares to

TABLE II. Relationships Between Whether or not a Home Energy Audit was Conducted and the Characteristics of the Home, Homemaker and the Number of Extension Contacts

Characteristics of the Home, Homemaker and the Number of Extension Contacts	Energy Audit Conducted				Total	
	No		Yes		Number of Respondents	Percent Respondents
	Number of Respondents	Percent Respondents	Number of Respondents	Percent Respondents		
CHARACTERISTICS OF THE HOME						
Location of dwelling						
Urban	552	49.6	562	50.4	1,114	100.0
Rural farm	1,331	68.9	600	31.1	1,931	100.0
Rural non-farm	1,226	61.2	778	38.8	2,004	100.0
TOTAL	3,109		1,940			
Chi-Square Test	$x^2 = 112.33$; $df = 2$; $p = .0001$					
Years lived in dwelling						
10 years or less	1,209	62.3	731	37.7	1,940	100.0
11-30	1,288	58.7	905	41.3	2,193	100.0
30 +	637	66.6	320	33.4	957	100.0
TOTAL	3,134		1,956			
Chi-Square Test	$x^2 = 18.00$; $df = 2$; $p = .0001$					
Age of dwelling						
10 years or less	680	64.4	376	35.6	1,056	100.0
11-30	1,395	57.5	1,030	42.5	2,425	100.0
30 +	1,059	65.8	550	34.2	1,609	100.0
TOTAL	3,134		1,956			
Chi-Square Test	$x^2 = 32.59$; $df = 2$; $p = .0001$					
CHARACTERISTICS OF THE HOMEMAKER						
Number of persons in household						
1-3 persons	2,401	62.9	1,417	37.1	3,818	100.0
4 + persons	733	57.6	539	42.4	1,272	100.0
TOTAL	3,134		1,956			
Chi-Square Test	$x^2 = 10.93$; $df = 1$; $p = .0009$					
Marital status						
Married	2,385	60.6	1,548	39.4	3,933	100.0
Single	699	64.9	378	35.1	1,077	100.0
TOTAL	3,084		1,926			
Chi-Square Test	$x^2 = 6.31$; $df = 1$; $p = .0100$					

TABLE II (Continued)

Characteristics of the Home, Homemaker and the Number of Extension Contacts	Energy Audit Conducted						Total	
	No			Yes			Number of Respondents	Percent Respondents
	Number of Respondents	Percent Respondents		Number of Respondents	Percent Respondents			
Employment Status								
Employed	1,243	60.3		891	39.7		2,062	100.0
Unemployed	650	60.8		419	39.2		1,069	100.0
Retired	1,214	63.3		705	36.7		1,919	100.0
TOTAL	3,107			1,943				
Chi-Square Test	$x^2 = 4.03$; $df = 2$; $p = .1334$							
Age of respondents								
Below 60	1,756	60.1		1,164	39.9		2,920	100.0
Above 60	1,355	63.5		778	36.5		2,133	100.0
TOTAL	3,111			1,942				
Chi-Square Test	$x^2 = 5.83$; $df = 1$; $p = .0160$							
Family income								
Adequate	2,358	60.2		719	39.8		3,914	100.0
Inadequate	719	66.9		355	33.1		1,074	100.0
TOTAL	3,077			1,074				
Chi-Square Test	$x^2 = 16.72$; $df = 1$; $p = .0001$							
Presently EHC member								
No	1,696	64.5		1,405	35.5		2,631	100.0
Yes	935	58.5		998	41.5		2,403	100.0
TOTAL	2,631			2,403				
Chi-Square Test	$x^2 = 18.82$; $df = 1$; $p = .0001$							
NUMBER OF EXTENSION CONTACTS								
Number of meetings attended								
Not any	2,137	63.8		1,212	36.2		3,349	100.0
1 +	997	57.3		744	42.7		1,741	100.0
TOTAL	3,134			1,956				
Chi-Square Test	$x^2 = 20.46$; $df = 1$; $p = .0001$							

TABLE II (Continued)

Characteristics of the Home, Homemaker and the Number of Extension Contacts	Energy Audit Conducted						Total	
	No			Yes				
	Number of Respondents	Percent Respondents		Number of Respondents	Percent Respondents		Number of Respondents	Percent Respondents
Visits to Extension office								
Not any	2,641	62.9		1,557	37.1		4,198	100.0
1 +	493	55.3		399	44.7		892	100.0
TOTAL	3,134			1,956				
Chi-Square Test	$x^2 = 17.86$;		$df = 1$;	$p = .0001$				
Phone calls to Extension office								
Not any	2,627	62.7		1,560	37.3		4,187	100.0
1 +	507	56.1		396	43.9		903	100.0
TOTAL	3,134			1,956				
Chi-Square Test	$x^2 = 13.38$;		$df = 1$;	$p = .0003$				
Letters from Extension office								
Not any	1,816	63.5		1,042	36.5		2,858	100.0
1 +	1,318	59.1		914	40.9		2,232	100.0
TOTAL	3,134			1,956				
Chi-Square Test	$x^2 = 10.49$;		$df = 1$;	$p = .0012$				
Publications from Extension office								
Not any	2,071	63.8		1,173	36.2		3,244	100.0
1 +	1,063	57.6		783	42.4		1,846	100.0
TOTAL	3,134			1,956				
Chi-Square Test	$x^2 = 19.2$;		$df = 1$;	$p = .0001$				
Radio programs from Extension office								
Not any	2,703	62.1		1,651	37.9		4,354	100.0
1 +	431	58.6		305	41.4		736	100.0
TOTAL	3,134			1,956				
Chi-Square Test	$x^2 = 3.15$;		$df = 1$;	$p = .07$				

31 percent of the homemakers who lived in the rural farm homes. As tested by the Chi-Square test, the location of the dwelling was significantly related to whether or not the homemaker had conducted a home energy audit. A higher proportion of the homemakers who lived in urban areas, as compared to those who lived in rural farm and rural non-farm homes, had conducted a home energy audit.

Years lived in dwelling. Forty-one percent of the homemakers who had lived in their dwelling for 11-30 years, compared to 33 percent of the homemakers who had lived in their homes for 30 or more years, had conducted a home energy audit. When tested by the Chi-Square test, the number of years the homemakers had lived in the dwelling was significantly related to whether or not a home energy audit had been conducted. Homemakers who had lived in their homes for less than 30 years tended to have a home energy audit conducted more frequently than those who lived in their home for more than 30 years.

Age of the dwelling. Almost 43 percent of the homemakers living in homes that were 11-30 years old, compared to 34 percent of those living in homes 30 years old or more, conducted the home energy audit. As tested by the χ^2 test using the .05 level of probability, the age of the dwelling was significantly related to whether or not a home energy audit was conducted.

Homemakers who lived in their homes for more than 30 years were more likely to have conducted a home energy audit than were those who had lived in their homes a longer period of time.

Characteristics of the Homemakers

Selected homemaker characteristics studied were: (1) number of persons living in the household, (2) marital status, (3) employment status, (4) age, (5) family income, and (6) Extension Homemaker Club membership.

Number of persons in the household. About 42 percent of the homemakers who had 4 or more persons in the family had a home energy audit conducted on their home, compared to 37 percent of those families with 1-3 persons.

When tested by the χ^2 test, the number of persons in the household was significantly related to whether or not a home energy audit was conducted.

Homemakers with a larger number of persons in the household were more likely than those with fewer persons to conduct a home energy audit.

Marital status. Thirty-nine percent of the married homemakers, compared to 35 percent of the homemakers who were single, had conducted a home energy audit.

When tested by the Chi-Square test, marital status was significantly related to whether or not a home energy audit was conducted. A greater proportion of married homemakers than single homemakers conducted a home energy audit.

Employment status. Almost 40 percent of the homemakers who were employed compared to 39.2 percent of the homemakers who were unemployed

and 36.7 percent of those retired conducted the home energy audit. As tested by the χ^2 test, these differences were not significant. Therefore, there was not a significant relationship between the employment status of the homemakers and whether or not the home energy audit was conducted.

Age of respondent. Forty percent of the homemakers under the age of 60, compared to 37 percent over the age of 60, had conducted a home energy audit.

When tested by the Chi-Square test, the age of the respondent was significantly related to whether or not a home energy audit was conducted. Younger homemakers were more likely to conduct the home energy audit than were the older homemakers.

Family income. Almost 40 percent of the homemakers who considered their income to be adequate, compared to 33 percent of the homemakers who considered their income inadequate, did have a home energy audit conducted.

When tested by the Chi-Square test, the homemakers' family income was significantly related to whether or not a home energy audit was conducted. Homemakers with an adequate family income were more likely to conduct the home energy audit than those who considered their income to be inadequate.

Presently Extension Homemaker Club member. Almost 42 percent of the homemakers who were EHC members, compared to 36 percent of the homemakers who were not EHC members, conducted a home energy audit.

As tested by the Chi-Square test, the Extension Homemaker Club membership was significant as related to whether or not a home energy audit was conducted. Homemakers who were members of an Extension Homemakers Club, compared to homemakers who were not members of EHC, conducted the home energy audit for their homes most often.

Number of Extension Contacts

Extension contacts were described as follows: number of meetings attended, visits to Extension office, phone calls to Extension office, letters from the Extension office, and radio programs from the Extension office. Homemakers were classified as to whether or not they had any contact with Extension regarding housing during the past 12 months.

Number of meetings attended. About 43 percent of the homemakers who had attended 1 or more Extension meetings, compared to about 36 percent who had not attended any Extension meetings, reported that a home energy audit had been conducted.

The number of Extension meetings attended was significantly related to whether or not the homemaker conducted the home energy audit. Homemakers who attended 1 or more Extension meetings were more likely than those who had not attended any meetings to conduct a home energy audit.

Visits to the Extension office. About 45 percent of the homemakers with 1 or more visits, compared to 37 percent of those who had made no visits to the Extension office in the last 12 months, had

conducted a home energy audit. Whether or not visits were made to the Extension office by homemakers was significantly related to whether or not a home energy audit was conducted when tested by the x^2 test.

Homemakers who made 1 or more visits to the Extension office were more likely than those who had not visited the Extension office to conduct the home energy audit.

Phone calls to Extension office. Almost 44 percent of the homemakers who had telephoned at least once to the Extension office, compared to 37 percent that had not telephoned the Extension office in the past 12 months, had conducted the home energy audit.

The number of telephone calls made to the Extension office were significantly related to whether or not a home energy audit was conducted. Homemakers who made 1 or more telephone calls to the Extension office about housing were more likely than those who had not telephoned the Extension office to conduct the home energy audit.

Letters from Extension. Forty-one percent of the homemakers who had received letters from the Extension office regarding housing compared to almost 37 percent of the homemakers who had not received letters from the Extension office, did have the home energy audit conducted.

Letters received from the Extension office was significantly related to whether or not a home energy audit was conducted. Homemakers who had received 1 or more letters from the Extension office were more likely than those who had not received any letters from the Extension office to conduct the home energy audit.

Publications received. About 42 percent of the homemakers had received at least 1 Extension publication on housing, compared to about 36 percent who had received no publications in the past 12 months from the Extension office, conducted the home energy audit.

As tested by the χ^2 test, the number of Extension housing publications that the homemakers received was significantly related to whether or not a home energy audit was conducted in their home. Homemakers who received publications on housing from the Extension office were more likely than those who had not received publications to conduct the home energy audit.

Radio programs. Almost 42 percent of the homemakers who had heard 1 or more Extension radio programs on housing in the past 12 months, compared to 38 percent of the homemakers who had not heard any radio programs, had conducted the home energy audit. Whether or not the homemakers had heard 1 or more Extension radio programs on housing in the past 12 months were not significantly related to whether a home energy audit was conducted in their homes.

III. RELATIONSHIPS BETWEEN WHETHER OR NOT INSULATION WAS RECOMMENDED BY THE HOME ENERGY AUDIT AND THE CHARACTERISTICS OF THE HOME

The purpose of this section is to present findings comparing whether a home energy audit revealed that home insulation was needed and the characteristics of the home. The characteristics of the home included:

(1) the location of the dwelling, (2) years lived in the dwelling, (3) age of dwelling, and (4) whether the home was expensive to heat and cool. Findings are presented in Table III.

Characteristics of the Home

Location of the dwelling. Almost 68 percent of the homemakers who lived in the rural farm areas, compared to 73 percent of the homemakers living in the urban and rural non-farm areas, had insulation recommended by the home energy audit.

When tested by the Chi-Square test, the location of the dwelling was significantly related to whether or not home insulation was recommended. The rural farm homemakers had insulation recommended after the home energy audit less often than did those homemakers who lived in the rural non-farm and urban homes.

Years lived in dwelling. Over 75 percent of the homemakers who had lived in the homes 30 years or more, compared to 67 percent who had lived in their homes 10 years or less had insulation recommended for their homes by the energy audit. The number of years the homemakers had lived in the home was significantly related to whether or not insulation was recommended by the home energy audit. Homemakers who had lived in their homes more than 30 years were more likely to have insulation recommended than those who had lived in their homes less than 30 years.

TABLE III. Relationships Between Whether or Not Insulation was Recommended by the Home Energy Audit and the Characteristics of the Home

Characteristics of the Home	Was Insulation Recommended			
	No		Yes	
	Number of Respondents	Percent Respondents	Number of Respondents	Percent Respondents
Location of the dwelling				
Urban	137	26.9	373	73.1
Rural farm	182	32.2	380	67.6
Rural non-farm	187	26.2	527	73.8
Chi-Square test	$\chi^2 = 6.7$; df = 2; p = .0300			
Years lived in dwelling				
10 years or less	215	33.2	433	66.8
11-30 years	226	26.6	625	73.4
30 + years	70	23.2	232	76.8
Chi-Square test	$\chi^2 = 12.75$; df = 2; p = .0017			
Age of the dwelling				
10 years or less	156	47.1	175	52.9
11-30 years	227	23.8	727	76.2
30 + years	128	24.8	388	75.2
Chi-Square test	$\chi^2 = 70$; df = 2; p = .0001			
Expensive to heat or cool				
Not a problem	340	30.6	772	69.4
Slight problem	114	24.8	345	75.2
Big problem	39	20.2	154	79.8
Chi-Squares test	$\chi^2 = 11.76$; df = 2; p = .0028			

Age of dwelling. Almost 75 percent of the homemakers who lived in homes that were 11-30 or more years old, compared to 53 percent of the homemakers who lived in homes that were less than 10 years old, had insulation recommended by the home energy audit.

When tested by the x^2 test at the .05 level, the age of the dwelling was significantly related to whether or not insulation was recommended by the home energy audit. Homemakers with newer homes had insulation recommended for their homes less often than did those who lived in homes that were over 10 years old.

Expense to heat and cool. Almost 80 percent of the homemakers who considered the home a big problem to heat and cool, compared to 70 percent who considered heating and cooling not a problem, had insulation recommended after the home energy audit was conducted.

Heating and cooling expense was significantly related to whether or not insulation was recommended by the home energy audit. Homemakers who considered the home a big problem to heat and cool were more likely to have had insulation recommended than did those who considered heating and cooling not a problem.

IV. RELATIONSHIPS BETWEEN WHETHER OR NOT INSULATION WAS INSTALLED AND THE CHARACTERISTICS OF THE HOME, CHARACTERISTICS OF THE HOMEMAKER AND THE NUMBER OF EXTENSION CONTACTS

Table IV presents findings concerning whether or not insulation was installed after the home energy audit revealed insulation was needed.

TABLE IV. Relationships Between Whether or Not Insulation Was Installed and the Characteristics of the Home, the Homemaker and the Number of Extension Contacts

Characteristics of the Home, the Homemaker and the Number of Extension Contacts	Was Insulation Installed			
	No		Yes	
	Number of Respondents	Percent Respondents	Number of Respondents	Percent Respondents
CHARACTERISTICS OF THE HOME				
Location of the dwelling				
Urban	45	12.2	325	87.8
Rural farm	59	15.6	320	84.4
Rural non-farm	91	17.5	430	82.5
Chi-Square Test $\chi^2 = 4.70$; $df = 2$; $p = .953$				
Years in dwelling				
10 years or less	72	16.9	354	83.1
11-30 years	84	13.5	539	86.5
30 + years	41	17.7	190	82.3
Chi-Square Test $\chi^2 = 3.47$; $df = 2$; $p = .1760$				
Age of dwelling				
10 years or less	39	22.7	133	77.3
11-30 years	96	13.3	626	86.7
30 + years	62	16.1	324	83.9
Chi-Square Test $\chi^2 = 9.57$; $df = 2$; $p = .0083$				
CHARACTERISTICS OF THE HOMEMAKER				
Number of persons in household				
1-3 persons	154	16.8	761	83.2
4 + persons	43	11.8	322	88.2
Chi-Square Test $\chi^2 = 4.73$; $df = 1$; $p = .0297$				
Marital status				
Married	154	15.0	874	85.0
Single	39	16.4	199	83.6
Chi-Square Test $\chi^2 = .1968$; $df = 1$; $p = .6600$				
Employment status				
Employed	75	13.2	494	86.8
Unemployed	46	16.9	226	83.1
Retired	74	17.1	359	82.9
Chi-Square Test $\chi^2 = 3.59$; $df = 2$; $p = .1660$				
Age of respondent				
Under 60	114	14.6	668	85.4
Over 60	81	16.4	412	83.6
Chi-Square Test $\chi^2 = .664$; $df = 1$; $p = .4150$				

TABLE IV (Continued)

Characteristics of the Home the Homemaker and the Number of Extension Contacts	Was Insulation Installed			
	No		Yes	
	Number of Respondents	Percent Respondents	Number of Respondents	Percent Respondents
Family income				
Adequate	138	13.6	880	86.4
Inadequate	52	21.8	186	78.2
Chi-Square Test $\chi^2 = 9.697$; df = 1; p = .0018				
Extension Homemakers Club membership				
No	101	16.4	514	83.6
Yes	93	14.1	566	85.9
Chi-Square Test $\chi^2 = 1.143$; df = 1; p = .2850				
NUMBER OF EXTENSION CONTACTS				
Number of Extension meetings attended				
None	125	16.3	644	83.7
One +	72	14.1	439	85.9
Chi-Square Test $\chi^2 = 7.28$; df = 5; p = .2017				
Visits to Extension office				
None	153	15.2	856	84.8
One +	44	16.2	227	83.8
Chi-Square Test $\chi^2 = .115$; df = 1; p = .7340				
Phone calls to Extension office				
None	149	15.5	864	84.5
One +	38	14.8	219	85.2
Chi-Square Test $\chi^2 = .042$; df = 1; p = .8390				
Letters received from Extension				
None	104	15.9	551	84.1
One +	93	14.9	532	85.0
Chi-Square Test $\chi^2 = .174$; df = 1; p = .6770				
Publications received from Extension				
None	118	15.7	632	84.3
One +	79	14.9	451	85.1
Chi-Square Test $\chi^2 = .106$; df = 1; p = .7450				
Radio programs from Extension				
None	172	16.0	906	84.0
One +	25	12.4	177	87.6
Chi-Square Test $\chi^2 = 1.41$; df = 1; p = .2350				

Characteristics of the Home

The characteristics of the home, the characteristics of the homemaker and the number of Extension contacts were analyzed in relation to the use of energy insulation practices.

Location of the dwelling. Almost 88 percent of the homemakers in the urban homes, compared to 83 percent in the rural non-farm homes, had insulation installed after the recommendation was made by the home energy audit.

When tested by the Chi-Square test, the location of the dwelling was not significantly related to whether or not insulation was installed by the homemaker based on the home energy audit. Homemakers who had insulation installed after the home energy audit did not vary significantly by location of the homes.

Years lived in dwelling. Almost 87 percent of the homemakers who lived in their homes 11-30 years had installed insulation as recommended by the home energy audit; this compares to 83 percent of those who had lived in their homes 10 years or less and 82 percent of those who had lived in their homes 30 or more years.

When tested by the Chi-Square test, the years the homemakers had lived in the home was not significantly related to whether or not insulation was installed after the home energy audit. If insulation was recommended by the home energy audit, the number of years the homemaker had lived in the dwelling was not related to whether the insulation was installed.

Age of the dwelling. About 87 percent of the homemakers whose homes were 11-30 years old, compared to 84 percent whose homes were 30 or more years old and 77 percent whose homes were 10 years old or less, reported installing insulation as recommended by the home energy audit.

As tested by the Chi-Square test, the age of the dwelling was significantly related to the installation of insulation in homemakers homes. Homemakers in newer homes were less likely than those in homes of 10 or more years old to have had additional insulation installed after an energy audit.

Characteristics of the Homemaker

Number of persons in the household. Almost 88 percent of the homemakers with 4 or more in the household, compared to 83 percent of those with less than 4 in the household, installed insulation when recommended by the home energy audit.

When tested by the χ^2 test, the number of people in the household was significantly related to whether or not insulation was installed in the home. Homemakers with larger families were more likely to install the recommended insulation more often than were smaller families.

Marital status. About 85 percent of the homemakers who were married and 84 percent of the homemakers who were single did install insulation in their homes as recommended by the home energy audit.

These differences were not significant, therefore, the marital status of the homemaker did not significantly relate to whether or not insulation was installed after the home energy audit had been conducted.

Employment status. About 87 percent of the employed homemakers, compared to about 83 percent of those who were unemployed or retired, did have insulation installed in their homes as recommended by the home energy audit.

The employment status of the homemaker, when tested by the Chi-Square test, did not prove to be significantly related to whether or not insulation was installed in the home. Homemakers tended to install insulation after the recommendation regardless to the current employment status.

Age of respondent. Eighty-five percent of the homemakers who were under 60 years of age, compared to about 84 percent of those over 60 years of age, had installed insulation in their homes. The age of the respondent was not related significantly to whether or not insulation was installed.

Family income. About 86 percent of the homemakers who considered their income to be adequate, compared to 78 percent who said their income was inadequate, had installed insulation in the home.

When tested, the relationship between family income and whether or not insulation was installed did prove to be significantly related. Homemakers who had an adequate income were more likely to install insulation than were homemakers who considered their income inadequate.

Extension Homemaker Club membership. About 86 percent of the homemakers who were EHC members, compared to 84 percent of those who were not EHC members, did install insulation when recommended by the home energy audit.

As tested, these differences were not significantly related. EHC membership did not influence whether or not insulation was installed.

Number of Extension Contacts

The number of Extension contacts are considered for this study to include meetings the respondent attended, visits with the Extension agent, telephone calls made to the Extension office, letters received from the Extension office, publications received from the Extension office and radio programs from the Extension office. All of these contacts were made during the past 12 months and were made regarding housing.

Number of Extension meetings attended. Almost 86 percent of the homemakers who had attended 1 or more Extension meetings, compared to 84 percent who had not attended any Extension meetings, had installed insulation as recommended by the home energy audit.

When tested by the x^2 test, the number of Extension meetings on housing the homemaker had attended in the past 12 months was not significantly related to whether or not insulation was installed after the home energy audit.

Visits to the Extension office. About 85 percent of the homemakers who had no visits to the Extension office, compared to 84 percent who had 1 or more, had installed insulation in their homes.

The findings indicated that there was not a significant relationship between the number of visits made to the Extension office and whether or not insulation was installed.

Phone calls to the Extension office. About 85 percent of the homemakers who had 1 or more telephone calls to the Extension office regarding housing, compared to 84 percent who had not made any calls to the Extension office, had installed insulation as recommended.

When tested, the number of telephone calls made to the Extension office was not significantly related to whether or not insulation was installed in the homes.

Letters received from Extension. About 85 percent of the homemakers who had 1 or more contacts by letter from the Extension office regarding housing, compared to 84 percent who had no contacts by letter from Extension, reported having home insulation installed as recommended.

When tested by the χ^2 test, the number of contacts made by letter were not significantly related to whether or not insulation was installed in the home.

Publication received from Extension. Approximately 85 percent of the homemakers who had received 1 or more housing publications from the Extension office, compared to 84 percent who had not received any

publications had installed insulation as recommended by the home energy audit.

When tested by the x^2 test, these differences were not significant at the .05 level.

Radio programs from Extension. About 88 percent of the homemakers who had heard 1 or more radio programs on housing in the past 12 months, compared to 84 percent who had no radio contacts, had installed insulation in their homes.

When tested by the x^2 test at the .05 level, these differences were not significant. The number of radio programs the homemakers heard on housing in the past 12 months was not related to whether or not insulation was installed in the home.

V. RELATIONSHIPS BETWEEN THE USE OF ENERGY CONSERVATION

PRACTICES AND THE CHARACTERISTICS OF THE HOME, THE

HOMEMAKER AND THE NUMBER OF EXTENSION CONTACTS

The purpose of this section is to present findings (Table V) regarding relationships between the mean number of the 14 recommended practices used by the respondents and characteristics of their homes, the homemakers, and contacts with Extension agents. The recommended practices included: (1) wall insulation, (2) ceiling insulation, (3) floor insulation, (4) water pipe insulation, (5) water heater insulation, (6) heat-air insulation, (7) storm windows, (8) plastic film for windows, (9) storm doors, (10) plastic film for doors, (11) caulked

TABLE V. Relationships Between the Mean Number of Home Energy Conservation Practices Used and the Characteristics of the Home, the Homemaker and the Number of Extension Contacts

Characteristics of the Home, Homemaker and Number of Extension Contacts	Number of Respondents	Mean Number of Recommended Insulation Practices Used
CHARACTERISTICS OF THE HOME		
Location of dwelling		
Urban	1,229	8.17
Rural farm	2,005	8.24
Rural non-farm	2,143	8.33
Analysis of Variance $F = 1.16$; $p = .3135$		
Number of years lived in dwelling		
10 years or less	2,164	8.15
11-30	2,264	8.51
30 +	986	7.92
Analysis of Variance $F = 16.50$; $p = .0001$		
Age of dwelling		
10 years or less	1,170	8.72
11-30	2,571	8.35
30 +	1,677	7.80
Analysis of Variance $F = 35.61$; $p = .0001$		
CHARACTERISTICS OF THE HOMEMAKER		
Number of people living in household		
1-3	4,063	8.02
4 +	1,355	8.97
Analysis of Variance $F = 106.10$; $p = .0001$		
Marital status		
Married	4,148	8.39
Single	1,188	7.85
Analysis of Variance $F = 31.56$; $p = .0001$		
Employment status		
Employed	2,211	8.43
Unemployed	1,149	8.30
Retired	2,015	8.11
Analysis of Variance $F = 6.44$; $p = .0016$		
Age of respondents		
Under 60	3,128	8.48
Over 60	2,251	7.99
Analysis of Variance $F = 36.53$; $p = .0001$		
Family income		
Adequate	4,134	8.56
Inadequate	1,174	7.33
Analysis of Variance $F = 164.96$; $p = .0001$		
EHC membership		
No	2,829	8.17
Yes	2,529	8.39
Analysis of Variance $F = 7.32$; $p = .0068$		
NUMBER OF EXTENSION CONTACTS		
Meetings attended on housing		
None	3,589	8.07
1 +	1,829	8.63
Analysis of Variance $F = 42.67$; $p = .0001$		
Visits to Extension office		
None	4,481	8.11
1 +	937	8.97
Analysis of Variance $F = 42.67$; $p = .0001$		
Phone calls to Extension office		
None	4,473	8.11
1 +	945	8.96
Analysis of Variance $F = 64.94$; $p = .0001$		
Letters from Extension office		
None	3,073	8.02
1 +	2,345	8.56
Analysis of Variance $F = 43.46$; $p = .0001$		
Publications from Extension office		
None	3,480	8.01
1 +	1,938	8.70
Analysis of Variance $F = 68.91$; $p = .0001$		
Radio programs from Extension office		
None	4,646	8.15
1 +	772	8.91
Analysis of Variance $F = 43.60$; $p = .0001$		

doors, (12) caulked windows, (13) caulked around water pipes, and (14) weatherstripped doors.

The one-way analysis of variance F test was used to determine strengths of relationships.

Characteristics of the Home

Study of the characteristics of the home included location of the dwelling, number of years in the dwelling and age of the dwelling.

Location of the dwelling. Of those who responded to the survey, 1,229 lived in the urban area and on the average used 8.17 of the 14 recommended conservation practices. The highest number of recommended practices were followed by those who live in the rural non-farm areas with 8.33 practices used. Those who lived in the rural farm areas reported using 8.24 practices. The analysis of variance F test showed that these differences in practices used and the location of the dwelling was not significant. The location of the dwelling did not influence the number of recommended practices used by the respondents.

Number of years lived in dwelling. Of the 5,418 homemakers, almost one-half had lived in their home for less than 10 years (2,164) and followed 8.15 of the 14 recommended practices. The largest group of homemakers had lived in their homes 11-30 years and used 8.51 of the recommended energy practices. Those who lived in their homes 30 or more years reported using the fewest number of recommended practices (7.92).

The analysis of variance F test showed that these differences were significant. Homemakers who lived in their home for a longer period of time (30 + years) tended to be using fewer of the recommended practices.

Age of dwelling. Those who lived in the home for less than 10 years reported to using 8.72 of the 14 recommended practices. Those who lived in the home for 11-30 years reported using 8.35 of the 14 recommended practices and those who had a home over 30 years reported using only 7.80 of the energy conservation practices.

The analysis of variance F test indicates that the age of the dwelling was significantly related to the number of energy conservation practices used. Therefore, the younger the home, the more likely the home was to have the energy conservation practices applied.

Characteristics of the Homemaker

The characteristics of the homemaker studied included the number of people living in the household, marital status, employment status, age, family income, and Extension Homemaker Club membership.

Number of people living in the household. Those who had families with 4 or more people in the household used 8.97 of the recommended energy conservation practices compared to families with 1-3 people who used 8.02 of the recommended practices.

The analysis of variance F test indicated that the mean number of energy conservation practices used differed significantly as to number of people living in the house. The more people in the family

household, the greater the number of home energy conservation practices used.

Marital status. Those homemakers that were married reported using 8.39 of the 14 recommended energy conservation practices, compared to those homemakers who were single reporting using 7.85 of the recommended practices.

When tested by the analysis of variance F test, marital status was significantly related to the number of energy conservation practices used. Married people were more likely than single people to be using the home energy conservation practices.

Employment status. Of the 5,418 homemakers who participated in the survey, 2,211 were employed and used 8.34 of the 14 recommended energy conservation practices. This compares to those who were unemployed using 8.30 of the recommended practices and those who were retired using 8.11 of the recommended practices.

When tested by the analysis of variance F test, the number of recommended practices used by those families were significantly related to employment status. Homemakers who were employed were more likely to be using the recommended practices than did those who were unemployed or retired.

Age of the respondent. The mean number of recommended practices used by those under 60 years of age was 8.48 practices, compared to 7.99 for the homemakers over the age of 60 years. The younger homemakers were more likely to be using the recommended practices than those over 60 years of age.

Family income. Those who consider their income inadequate used 7.33 of the 14 recommended practices compared to the use of 8.56 used by those who consider their income adequate.

When tested by the analysis of variance F test, family income was significantly related to the number of recommended practices used by the family. When family income was considered by the homemaker to be adequate there was an increase in the use of recommended practices.

Extension Homemakers Club membership. Homemakers who reported that they were EHC members reported following 8.39 of the recommended energy conservation practices, compared to 8.17 of the 14 homemakers who were not a member of an Extension Homemakers Club.

Using the analysis of variance F test, the membership in an EHC did prove to be significantly related to the number of recommended practices used in home energy conservation. Homemakers who were members of Extension Homemakers Clubs more often used the recommended practices for home energy conservation than did homemakers who were not Extension Homemaker Club members.

Number of Extension Contacts

The number of Extension contacts were reported as the number of Extension housing meetings attended, visits made to the Extension office, telephone calls made to the Extension office, letters received from the Extension office, publications received from the Extension office and radio programs presented by the Extension agents on housing in the past 12 months. The mean number of 14 recommended practices used

by the homemakers was studied in relation to the number of Extension contacts of various types made.

Meetings attended on housing. Those who attended 1 or more Extension meetings followed 8.63 of the 14 recommended practices. Those who had attended no Extension meetings on housing followed 8.07 of the recommended practices. The number of meetings attended by the respondents was significantly related to the number of recommended practices used. Homemakers who attended Extension meetings on housing tended to use more of the energy conservation practices than those who did not attend any meetings regarding housing.

Visits to the Extension office. Homemakers who had no Extension office visits regarding housing were using 8.11 of the 14 recommended energy conservation practices, as compared to the homemakers who had made 1 or more visits to the Extension office who were using 8.97 of the home energy conservation practices.

The number of visits that were made to the Extension office was significantly related to the mean number of home energy conservation practices used by the homemaker. Homemakers who visited the Extension office used more of the home energy conservation practices than those who had not visited the office regarding housing during the past 12 months.

Phone calls to Extension office. Homemakers who had not telephoned the Extension office concerning housing problems were using 8.11 of

the 14 recommended home energy conservation practices, compared to those who had 1 or more telephone calls who were using 8.96 of the practices.

The number of telephone calls made to the Extension office were significantly related to the number of recommended practices on home energy conservation practices used. As the number of telephone calls made to the Extension office increased, the number of recommended home energy conservation practices used also increased.

Letters from Extension office. Homemakers who received 1 or more letters from the Extension office reported following 8.56 of the 14 recommended practices on home energy conservation. Those receiving no letters from the Extension office regarding housing reported following only 8.02 of the home energy conservation practices. Using the analysis of variance F test, the number of letters received from the Extension office and the number of recommended home energy conservation practices were significantly related. The use of energy conservation practices increased as the homemakers received letters from Extension agents.

Publications from Extension office. Those who had not received any publications from the Extension office followed 8.01 of the 14 recommended practices on home energy conservation, compared to the homemakers who had received 1 or more publications from the Extension office reporting using 8.70 of the recommended home energy conservation practices.

When tested by the analysis of variance F test, the number of publications received from the Extension office was significantly

related to the number of recommended practices followed on home energy conservation. The use of energy conservation practices increased as the Extension contact with publications were made with the homemaker.

Radio programs from Extension office. Those homemakers who had not been exposed to radio programs on housing reported following 8.15 of the recommended home energy conservation practices. The homemakers who had heard 1 or more of the radio programs on housing reported an increase in the recommended home energy conservation practices (8.91). Therefore, when the analysis of variance F test was used to test the significance, the number of radio programs that the respondents heard were significantly related to the number of the recommended practices on housing/energy conservation that they followed.

The use of energy conservation practices by homemakers increased as the contacts with Extension agents in radio programs were made on housing.

VI. RELATIONSHIPS BETWEEN THE LOCATION OF THE DWELLING AND SELECTED INSULATION PRACTICES FOR HOME ENERGY CONSERVATION

Insulation Practices

The following home energy conservation practices were selected to look further into the aspects of insulation and how that relates to the characteristics of the home. The insulation areas discussed in Table VI are the areas that are described as the most important

TABLE VI. Relationships Between the Location of the Dwelling and Selected Insulation Practices for Home Energy Conservation

Insulation Practices	Location of the Dwelling					
	Urban			Rural Farm		
	Number of Respondents	Percent		Number of Respondents	Percent	Rural Non-farm Respondents
CHARACTERISTICS OF THE HOME						
Walls insulated						
No	327	27.3		368	18.7	431
Yes	871	72.7		1,598	81.3	1,680
TOTAL	1,198	100.0		1,966	100.0	2,111
Chi-Square Test	$\chi^2 = 34.4$; $df = 2$		$p = .0001$			
Ceilings insulated						
No	184	15.3		225	11.4	250
Yes	1,017	84.7		1,747	88.6	1,865
TOTAL	1,201	100.0		1,972	100.0	2,115
Chi-Square Test	$\chi^2 = 11.8$; $df = 2$		$p = .0027$			
Floors insulated						
No	578	48.9		954	49.7	974
Yes	604	51.1		966	50.3	1,090
TOTAL	1,182	100.0		1,920	100.0	2,064
Chi-Square Test	$\chi^2 = 2.57$; $df = 2$		$p = .275$			
Doors caulked						
No	421	36.3		745	39.8	761
Yes	739	63.7		1,127	60.2	1,270
TOTAL	1,160	100.0		1,872	100.0	2,031
Chi-Square Test	$\chi^2 = 4.23$; $df = 2$		$p = .1205$			
Windows caulked						
No	368	31.6		589	31.2	648
Yes	798	68.4		1,296	68.8	1,405
TOTAL	1,166	100.0		1,885	100.0	2,053
Chi-Square Test	$\chi^2 = .055$; $df = 4$		$p = .973$			

in the insulation of a home. These selected practices include: (1) wall insulation, (2) ceiling insulation, (3) floor insulation, (4) door caulking, and (5) windows caulked.

Walls insulated. Almost 73 percent of the respondents who lived in the urban areas followed the recommended home energy conservation practice of wall insulation, compared to 80 percent of those who lived in the rural farm and rural non-farm areas. The location of the dwelling was significantly related to whether or not the walls of the homes were insulated.

The findings indicated that homemakers who lived in urban areas were less likely than those who lived in rural farm or rural non-farm to live in homes with insulated walls.

Ceilings insulated. Almost 85 percent of the homemakers in the urban homes had insulation in the ceiling, compared to about 88 percent of those living in the rural farm and rural non-farm areas.

When tested by the Chi-Square test, the location of the dwelling was significantly related to whether or not ceilings were insulated. Homemakers living in urban areas were less likely than those living in other areas to have the ceilings insulated.

Floors insulated. About 51 percent of the urban homemakers reported having floor insulation in their homes, compared to about 50 percent of the rural farm homemakers and about 53 percent of the rural non-farm homemakers.

When tested by the Chi-Square test, the location of the dwelling was not significantly related to the use of floor insulation in the homes. Almost as many homemakers were using the recommended practice of floor insulation regardless of the location of their dwelling.

Doors caulked. Sixty-four percent of the homemakers who lived in the urban homes reported having the doors caulked in their homes, compared to 63 percent who live in the rural non-farm and 61 percent who live on rural farms.

When tested by the Chi-Square test, the location of the dwelling was not significantly related to whether or not the homemakers caulked the doors of their homes.

Windows caulked. Most energy loss is through windows and doors, therefore, it is important to caulk around open air spaces for the most efficiency. Of the homemakers, 68.4 percent who lived in the urban area had followed the recommended practice of caulking around the windows in their homes, compared to 68 percent of the rural farm and rural non-farm homemakers. These differences in the location of the dwelling did not significantly relate to the caulking of windows in the homes. Therefore, homemakers caulked around windows an average of 68 percent, regardless of where the home was located.

VII. RELATIONSHIPS BETWEEN AGE OF THE DWELLING AND SELECTED INSULATION PRACTICES FOR HOME ENERGY CONSERVATION

The age of the dwelling is a characteristic of the home that could influence the use of the recommended insulation practices. Table VII

TABLE VII. Relationships Between the Age of the Dwelling and Selected Insulation Practices for Home Energy Conservation

Insulation Practices	Age of Dwelling (Years)					
	Less than 10		11-30		30 +	
	Number of Respondents	Percent Respondents	Number of Respondents	Percent Respondents	Number of Respondents	Percent Respondents
CHARACTERISTICS OF THE HOME						
Walls insulated						
No	137	11.9	482	19.0	516	31.6
Yes	1,013	88.1	2,050	81.0	1,116	62.4
TOTAL	1,150	100.0	2,532	100.0	1,632	100.0
	Chi-Square Test $\chi^2 = 171.5$; $df = 2$; $p = .0001$					
Ceilings insulated						
No	117	10.2	266	10.5	278	16.9
Yes	1,031	89.8	2,272	89.5	1,363	83.1
TOTAL	1,148	100.0	2,538	100.0	1,641	100.0
	Chi-Square Test $\chi^2 = 130.9$; $df = 2$; $p = .0001$					
Floors insulated						
No	412	36.8	1,169	47.2	944	58.8
Yes	707	63.2	1,310	52.8	662	41.2
TOTAL	1,119	100.0	2,479	100.0	1,606	100.0
	Chi-Square Test $\chi^2 = 130.87$; $df = 2$; $p = .0001$					
Doors caulked						
No	383	34.8	890	36.6	664	42.3
Yes	717	65.2	1,540	63.4	907	57.7
TOTAL	1,100	100.0	2,430	100.0	1,571	100.0
	Chi-Square Test $\chi^2 = 18.81$; $df = 2$; $p = .0001$					
Windows caulked						
No	335	30.3	737	30.2	542	34.0
Yes	771	69.7	1,705	69.8	1,053	66.0
TOTAL	1,106	100.0	2,442	100.0	1,595	100.0
	Chi-Square Test $\chi^2 = 7.25$; $df = 2$; $p = .0266$					

presents findings regarding age of the dwelling and the use of five energy conservation practices. The conservation practices studied were: (1) wall insulation, (2) ceiling insulation, (3) floor insulation, (4) door caulking, and (5) window caulking.

Walls insulated. About 88 percent of the homemakers living in homes 10 years or less in age, compared to just over 62 percent of those living in homes 30 or more years old, reported that the walls of their homes were insulated. Age of the dwelling was significantly related to whether or not walls were insulated. The older a home, the less likely the home was to have wall insulation.

Ceilings insulated. About 89 percent of the homemakers who lived in homes 10 years old or less and those homemakers who lived in homes 11-30 years old reported ceiling insulation in the homes compared to 62 percent of homemakers who lived in homes that were 30 or more years old.

The age of the dwelling was significantly related to whether or not insulation was installed in the ceiling of homes, as tested by the Chi-Square test. The homemakers that lived in homes that were 30 or more years had insulation in the ceiling less often than those who lived in homes less than 30 years old.

Floors insulated. About 63 percent of the homemakers who lived in homes that were 10 years or less in age reported the floors were insulated, compared to about 53 percent of the homes that were 11-30

years old and 41 percent of homes that were 30 or more years old.

When tested by the Chi-Square test, the age of the dwelling was significantly related to floor insulation. As the age of the home increased, the use of the floor insulation practice decreased.

Doors caulked. Sixty-five percent of the homemakers who live in homes that were 10 years old or less reported having the doors in their homes caulked, compared to 63 percent of those who lived in homes that were 11-30 years old reporting and about 58 percent of the homemakers who lived in homes that were over 30 years old.

The age of the dwelling was significantly related to whether or not doors were caulked. The older the home, the less likely the homemakers were to follow the practice of caulking around doors.

Windows caulked. Sixty-nine percent of the homemakers who lived in homes that were 10 to 30 years old reported using the recommended practice of window caulking, compared to 66 percent of those who lived in homes that were over 30 years old.

The age of the dwelling was significantly related to whether or not the windows in homes were caulked. Older homes were less likely than younger homes to have windows caulked.

VIII. RELATIONSHIPS BETWEEN THE MARITAL STATUS AND USE OF SELECTED INSULATION PRACTICES FOR HOME ENERGY CONSERVATION

The relationships of the use of selected insulation practices were considered as the practices relate to the marital status of the

homemaker. The relationships should give a picture of whether or not the marital status of the homemaker influences use of the insulation practices used by the homemaker. Findings are presented in Table VIII.

Insulation Practices

The selected insulation practices were chosen for their energy demand. The insulation practices include: (1) wall insulation, (2) ceiling insulation, (3) floor insulation, (4) door caulking, and (5) window caulking.

Walls insulated. Of those surveyed, 81.8 percent of the married respondents reported having the walls of their home were insulated, compared to 67 percent of single homemakers.

As tested by the Chi-Square test, marital status was significantly related to whether or not the walls were insulated in their homes. Those homemakers that were married had insulation in the walls of their homes more often than did single homemakers.

Ceilings insulated. Almost 90 percent of the married homemakers compared to 80 percent of single homemakers reported that the ceiling in their homes were insulated. Whether or not ceilings were insulated was significantly related to marital status of the homemaker. Married homemakers were more likely than single homemakers to live in homes with ceiling insulated.

Floor insulated. Of homemakers that were married, 54 percent reported floors were insulated compared to 42 percent of those that

TABLE VIII. Relationships Between the Marital Status and Selected Insulation Practices for Home Energy Conservation

Insulation Practices	Marital Status			
	Married		Single	
	Number of Respondents	Percent Respondents	Number of Respondents	Percent Respondents
Walls insulated				
No	745	18.2	379	33.0
Yes	3,348	81.8	771	67.0
TOTAL	4,093	100.0	1,150	100.0
Chi-Square Test	$x^2 = 115.2$; $df = 1$; $p = .0001$			
Ceilings insulated				
No	423	10.3	226	19.6
Yes	3,680	89.7	928	80.4
TOTAL	4,103	100.0	1,152	100.0
Chi-Square Test	$x^2 = 71.14$; $df = 1$; $p = .0001$			
Floors insulated				
No	1,851	46.1	650	58.1
Yes	2,168	53.9	468	41.9
TOTAL	4,019	100.0	1,118	100.0
Chi-Square Test	$x^2 = 50.63$; $df = 1$; $p = .0001$			
Doors caulked				
No	1,371	34.8	545	49.8
Yes	2,574	65.2	549	50.2
TOTAL	3,945	100.0	1,894	100.0
Chi-Square Test	$x^2 = 81.84$; $df = 1$; $p = .0001$			
Windows caulked				
No	1,122	28.2	476	43.0
Yes	2,852	71.8	631	57.0
TOTAL	3,974	100.0	1,107	100.0
Chi-Square Test	$x^2 = 86.87$; $df = 1$; $p = .0001$			

were single. When tested by the Chi-Square test, whether or not insulation was installed in the floors of homes was significantly related to marital status.

Married homemakers were more likely to have insulation in the floor of their homes more often than were the single homemakers.

Doors caulked. The homemakers reported that 65 percent of the homes of married homemakers were caulked at the doorways, compared to 50 percent of the single homemakers. Whether or not the doors in homes were caulked was significantly related to the marital status of the homemaker. Married homemakers were more likely than single homemakers to live in homes that had the doors caulked.

Windows caulked. Seventy-one percent of those married responded that windows in their homes were caulked, compared to 57 percent of the single homemakers. Whether or not the windows in dwelling were caulked was significantly related to marital status of the homemaker. Married homemakers were more likely than single homemakers to live in houses having caulked windows.

IX. RELATIONSHIPS BETWEEN THE AGE OF THE HOMEMAKER AND USE OF SELECTED INSULATION PRACTICES FOR HOME ENERGY CONSERVATION

The age of the homemaker could have an influence on whether or not the selected home insulation practices were used. The purpose of this section is to take a closer look at the age of the homemaker

in terms of use of the five selected insulation practices. Table IX presents a summary of the findings.

Insulation Practices

The insulation practices to be included in this subsection are: (1) wall insulation, (2) ceiling insulation, (3) floor insulation, (4) door caulking, and (5) window caulking.

Walls insulated. About 82 percent of the homemakers under 60, compared to 75 percent of those over 60 years of age, reported that the walls of their homes were insulated.

Whether or not the walls of homes were insulated was significantly related to the ages of the homemaker. Homemakers over 60 were more likely than those under 60 to live in homes where the walls were not insulated.

Ceilings insulated. Almost 89 percent of the homemakers under the age of 60 reported following the recommended practice of ceiling insulation, compared to 86 percent of those homemakers over 60 years old.

When tested by the Chi-Square test, the age of the homemaker and the recommended practice of ceiling insulation were significantly related. As the age of the homemaker increased, the use of ceiling insulation decreased.

Floors insulated. Of those surveyed, 55 percent of those that were 60 years old reported having floor insulation, compared to 50

TABLE IX. Relationships Between the Age of the Homemaker and Selected Insulation Practices for Home Energy Conservation

Insulation Practices	Age of Respondent			
	Under 60		Over 60	
	Number of Respondents	Percent Respondents	Number of Respondents	Percent Respondents
Walls insulated				
No	584	18.9	543	24.8
Yes	2,507	81.8	1,650	75.2
TOTAL	3,091	100.0	2,193	100.0
Chi-Square Test	$\chi^2 = 25.97$; $df = 1$; $p = .0001$			
Ceilings insulated				
No	351	11.3	313	13.8
Yes	2,748	88.7	1,895	86.2
TOTAL	3,099	100.0	2,198	100.0
Chi-Square Test	$\chi^2 = 6.95$; $df = 1$; $p = .0083$			
Floors insulated				
No	1,387	45.6	1,127	52.7
Yes	1,656	54.4	1,010	47.3
TOTAL	3,043	100.0	2,137	100.0
Chi-Square Test	$\chi^2 = 25.46$; $df = 1$; $p = .0001$			
Doors caulked				
No	1,109	36.9	820	39.5
Yes	1,897	63.1	1,256	60.5
TOTAL	3,006	100.0	2,076	100.0
Chi-Square Test	$\chi^2 = 3.43$; $df = 1$; $p = .064$			
Windows caulked				
No	899	29.8	707	33.6
Yes	2,119	70.2	1,399	66.4
TOTAL	3,018	100.0	2,106	100.0
Chi-Square Test	$\chi^2 = 8.07$; $df = 1$; $p = .0045$			

percent of those that were over 60 years old. Whether or not floors in homes were insulated was significantly related to ages of the homemaker. Younger homemakers (those under 60) were more likely than those older homemakers to live in homes that had floor insulation.

Doors caulked. About 63 percent of the homemakers under the age of 60, compared to 61 percent of those homemakers over the age of 60 reported having the doors of their homes caulked. Whether or not doors in homes were caulked was significantly related to ages of the homemaker. Homemakers under 60 years of age were more likely than those over 60 years of age to live in homes with doors caulked.

Windows caulked. About 70 percent of the homemakers under the age of 60, compared to 66 percent of those over the age of 60, reported having the windows in their homes caulked. Whether or not the windows of the home were caulked was significantly related to ages of the homemakers. Homemakers over 60 years of age were less likely than those under 60 to live in homes with its windows caulked.

X. RELATIONSHIPS BETWEEN EMPLOYMENT STATUS AND SELECTED INSULATION PRACTICES FOR HOME ENERGY CONSERVATION

Relationships between employment status of homemakers and their use of five selected insulation practices are summarized in this section. Table X presents a summary of the findings.

TABLE X. Relationships Between Employment Status and Selected Insulation Practices for Home Energy Conservation

Insulation Practices	Employment Status					
	Employed			Unemployed		
	Number of Respondents	Percent Respondents		Number of Respondents	Percent Respondents	Retired Number of Respondents
Walls insulated						
No	413	18.8		252	22.4	465
Yes	1,778	81.2		874	77.6	1,503
TOTAL	2,191	100.0		1,126	100.0	1,968
Chi-Square Test	$\chi^2 = 14.93$; $df = 2$; $p = .0006$					
Ceilings insulated						
No	261	11.9		143	12.6	252
Yes	1,933	88.1		988	87.4	1,721
TOTAL	2,194	100.0		1,131	100.0	1,973
Chi-Square Test	$\chi^2 = .826$; $df = 2$; $p = .6616$					
Floors insulated						
No	975	45.5		555	49.8	985
Yes	1,170	54.5		559	50.2	931
TOTAL	2,145	100.0		1,114	100.0	1,916
Chi-Square Test	$\chi^2 = 15.21$; $df = 2$; $p = .005$					
Doors caulked						
No	795	37.5		404	36.6	731
Yes	1,324	62.5		699	63.4	1,131
TOTAL	2,119	100.0		1,103	100.0	1,862
Chi-Square Test	$\chi^2 = 2.34$; $df = 2$; $p = .3101$					
Windows caulked						
No	659	30.9		331	29.9	618
Yes	1,472	69.1		775	70.1	1,270
TOTAL	2,131	100.0		1,106	100.0	1,888
Chi-Square Test	$\chi^2 = 2.89$; $df = 2$; $p = .2353$					

Insulation Practices

The insulation practices that were studied include: (1) wall insulation, (2) ceiling insulation, (3) floor insulation, (4) door caulking, and (5) window caulking.

Walls insulated. Of the homemakers who responded to the survey, 81.2 percent of the employed compared to 78 percent of the unemployed and 76 percent of the retired homemakers lived in homes that had wall insulation. Whether or not the walls were insulated was significantly related to employment status of the homemaker. Employed homemakers were more likely than unemployed homemakers to live in homes that had wall insulation.

Ceilings insulated. About 88 percent of the homemakers who were employed, compared to 87 percent who were unemployed or retired, lived in homes that had ceiling insulation. Whether or not insulation was installed in the ceiling of the homes surveyed was not significantly related to employment status of the homemaker. The employment status of the homemaker was not a factor in whether or not insulation was in the ceiling of the homes.

Floors insulated. Fifty-five percent of the homemakers that were employed, compared to 50 percent of those that were unemployed and 49 percent of the retired homemakers lived in homes that had the floors insulated. Whether or not the floors were insulated was significantly related to employment status of the homemakers. Employed homemakers were more likely than either unemployed or retired homemakers to live in homes that had floor insulation.

Doors caulked. About 63 percent of the homemakers who were unemployed, compared to 62 percent that were employed and 61 of the homemakers that were retired, had the doors of their home caulked.

When tested by the Chi-Square test, the employment status of the homemaker was not significantly related to the doors in the home being caulked.

Windows caulked. About 70 percent of the homemakers who were unemployed, compared to 69 percent of those who were employed and 67 percent of those who were retired, had followed the recommended practice of window caulking.

When tested, the employment status of the homemaker was not significantly related to the caulking of the windows in the home.

XI. RELATIONSHIPS BETWEEN FAMILY INCOME AND SELECTED

INSULATION PRACTICES FOR HOME ENERGY

CONSERVATION

The purpose of this section is to report findings about relationships between the family income and use of the five selected insulation practices. Family income was described as adequate or inadequate by the respondents. Findings are reported in Table XI.

Insulation Practices

Five of the most important home energy conservation practices were studied: (1) wall insulation, (2) ceiling insulation, (3) floor insulation, (4) door caulking, and (5) window caulking.

TABLE XI. Relationships Between Family Income and Selected Insulation Practices for Home Energy Conservation

Insulation Practices	Family Income			
	Adequate		Inadequate	
	Number of Respondents	Percent Respondents	Number of Respondents	Percent Respondents
Walls insulated				
No	749	18.4	368	32.1
Yes	3,327	81.6	777	67.9
TOTAL	4,076	100.0	1,145	100.0
Chi-Square Test	$\chi^2 = 99.9$; $df = 1$; $p = .0001$			
Ceilings insulated				
No	420	10.3	229	19.9
Yes	3,665	89.7	920	80.1
TOTAL	4,085	100.0	1,149	100.0
Chi-Square Test	$\chi^2 = 75.98$; $df = 1$; $p = .0001$			
Floors insulated				
No	1,784	44.8	699	61.6
Yes	2,198	55.2	435	38.4
TOTAL	3,982	100.0	1,134	100.0
Chi-Square Test	$\chi^2 = 99.52$; $df = 1$; $p = .0001$			
Doors caulked				
No	1,364	35.0	543	48.4
Yes	2,535	65.0	578	51.6
TOTAL	3,899	100.0	1,121	100.0
Chi-Square Test	$\chi^2 = 66.35$; $df = 1$; $p = .0001$			
Windows caulked				
No	1,109	28.2	478	42.2
Yes	2,817	71.8	656	57.8
TOTAL	3,926	100.0	1,134	100.0
Chi-Square Test	$\chi^2 = 78.37$; $df = 1$; $p = .0001$			

Walls insulated. About 82 percent of the homemakers who considered their income adequate, compared to 68 percent of those who considered their income inadequate, had wall insulation in their homes. Whether or not homemakers lived in homes having wall insulation was significantly related to homemakers' feeling about adequacy of their income. Homemakers who felt their family income was adequate were more likely than those who felt family income was inadequate to live in homes with walls insulated.

Ceilings insulated. Ninety percent of the homemakers who considered their income adequate, compared to 81 percent who considered their income inadequate, reported having the ceilings of their home insulated. Whether or not the ceilings in homes were insulated was significantly related to whether or not homemakers felt their income was adequate. When family income was considered adequate, the use of the recommended practices of ceiling insulation was used by a higher proportion of the homemakers.

Floors insulated. About 55 percent of the homemakers who considered their income adequate, compared to 38 percent who considered their income inadequate, had insulation in the floor of their homes. Whether or not floors were insulated was significantly related to whether or not the homemakers felt their income was adequate. Homemakers who felt their income was adequate were more likely than those who felt their family income was inadequate to live in homes where floors were insulated.

Doors caulked. Sixty-five percent of the homemakers who considered their income adequate, compared to 51.6 percent who considered their income inadequate, had the doors of their homes caulked.

When the findings were tested, the family income was significantly related to whether or not the doors were caulked. Homemakers who felt their family income was inadequate were more likely to live in homes where doors were not caulked.

Windows caulked. About 72 percent of the homemakers who considered their incomes adequate, compared to about 58 percent who considered their income inadequate, had the windows caulked in their homes. The income of the family was significantly related to the caulking of the windows in the home. Homemakers who felt their income was adequate were more likely than those who felt it was inadequate to live in houses with window caulking.

CHAPTER IV

SUMMARY OF MAJOR FINDINGS

I. PURPOSE OF THE STUDY

The purpose of the study was to gain information concerning the use of home energy conservation practices for use in planning the Extension housing programs in Tennessee. Questions used to guide the study included: (1) To what extent have home energy audits been conducted in Tennessee? (see Appendix B), (2) What proportion of the homes audited needed additional insulation? (3) What proportion of the homemakers installed insulation of various types after the audit? (4) What proportion of the homemakers in Tennessee were using each home energy conservation practice? and (5) What factors were related to the use of home energy conservation practices?

The specific objectives of the study were:

1. To determine the characteristics of the home, characteristics of the homemaker and the number of contacts homemakers had with Extension agents and the homemakers use of recommended home energy conservation practices.

2. To determine relationships between whether or not a home energy audit was conducted and characteristics of the home, characteristics of the homemaker and the number of contacts with Extension agents.

3. To determine relationships between whether or not insulation was recommended by the home energy audit and the characteristics of the home.

4. To determine relationships between whether or not home insulation was installed after the home energy audit was conducted and characteristics of the home, characteristics of the homemaker and the number of contacts homemakers had with Extension agents.

5. To determine relationships between the use of recommended home energy conservation practices and characteristics of the home, characteristics of the homemaker and the number of contacts with Extension agents.

6. To determine relationships between the location of the dwelling and homemakers use of selected home energy conservation practices.

7. To determine relationships between the age of dwelling, and homemakers use of selected home energy conservation practices.

8. To determine relationships between the marital status of homemakers and their use of selected home energy conservation practices.

9. To determine relationships between the age of the homemakers and their use of selected home energy conservation practices.

10. To determine relationships between the employment status of the homemakers and their use of selected home energy conservation practices.

11. To determine relationships between the family income of the homemakers and their use of selected home energy conservation practices.

II. LIMITATION OF THE STUDY

This study was limited to data collected in the 1985 Housing Survey conducted by the University of Tennessee Agricultural Extension Service. The survey was available for use in all 95 counties in Tennessee except Lake County. Data were collected by County Extension Agents-Home Economics through personal contacts and telephone interviews with 5,418 homemakers in 89 counties. The time period for determining practices used was 12 months prior to the survey. Study of homemakers' use of recommended home energy conservation practices was limited to 14 practices.

III. METHODS AND PROCEDURES

The methods and procedures discussed in this section were used to secure and analyze the survey data.

Population and Sample Studied

The population for the 1985 Housing survey was members of Extension Homemaker Clubs and general homemakers in 89 counties in Tennessee. Seventy homemakers were randomly selected from each county using the "nth" number technique. Personal and/or group interviews were conducted by county Extension agents and volunteer leaders. Most of the general homemakers were interviewed by telephone by volunteer leaders. Thirty homemakers were randomly selected from a listing of the EHC membership and 40 homemakers were randomly selected using the telephone directory.

Survey Instrument

The Tennessee Agricultural Extension Specialist, Maxine McManus, developed the housing instrument used for the survey. Information was obtained regarding homemakers' personal characteristics, the characteristics of the home and the total number of contacts homemakers had with Extension agents during the previous 12 months.

Part I of the survey was designed to obtain general information about the home and included location of the dwelling, type of dwelling, home ownership, years homemakers had lived in the dwelling and age of the dwelling. The number of bedrooms and bathrooms also was included.

The survey also indicated whether or not a home energy audit had been conducted, who conducted the audit, whether or not insulation was recommended by the audit and whether or not insulation was installed as recommended.

Part II included questions regarding dwelling problems that the homemaker may have had. This study did not investigate these data.

The main part of the survey that is addressed in this study dealt with Part III, energy conservation. Homemakers indicated whether or not they used each of the following 14 recommended home energy conservation practices: (1) wall insulation, (2) ceiling insulation, (3) floor insulation, (4) water heater insulation, (5) water pipe insulation, (6) heat-air duct insulation, (7) storm windows, (8) plastic film on windows, (9) storm doors, (10) plastic film on doors, (11) caulked doors, (12) caulked windows, (13) caulked around water pipes, and (14) weather stripped doors.

In Part IV the respondent was asked to give personal and family characteristics including marital status, employment status, age, family income and EHC membership.

Part V obtained data regarding the number of contacts the homemakers had with the Extension agents over the past 12 months through (1) meetings, (2) office visits, (3) telephone calls, (4) letters, (5) publications, and (6) radio programs.

Analysis of Data

The individual counties on completion of the survey forms, submitted the surveys to each district office and then they were forwarded to the State Agricultural Extension Education Office at the University of Tennessee in Knoxville. The data were checked for completeness and accuracy and otherwise processed for statistical analysis by the University of Tennessee Computer Center.

Frequency counts were made and Chi-Square test and analysis of variance F test were used to determine the strength of the relationships between selected dependent and independent variables. A probability level of .05 was used to make decisions regarding the significance of observed relationships between variables.

IV. MAJOR FINDINGS

Characteristics of the Home, the Homemaker, the Number of Extension Contacts with Extension Agents and the Homemakers Use of Recommended Home Energy Conservation Practices

The majority of the people who participated in the survey were from rural farm and rural non-farm homes and have lived in their home

for less than 30 years. The family composition was 75 percent of the homemakers lived in 1 to 3 person families and over 75 percent were married. Forty-one percent of the homemakers were employed and 59 percent were unemployed. An almost equal split of the homemakers were under the age of 60 and over the age of 60 and about 50 percent were Extension Homemaker Club members.

Higher proportions of homemakers contacted Extension agents through meetings, letter and publications than through office visits or telephone calls.

Over one-third of the homemakers had conducted the home energy audit and about one-fourth of the homemakers had insulation recommended as a result of the home energy audit. A little less than one-fourth of the homemakers said they actually installed the insulation recommended.

Over 50 percent of the homemakers did not consider their homes a problem to heat and cool.

About three-fourths of the homemakers had wall insulation in their homes. Ceiling insulation showed an increase over wall insulation, but floor insulation dropped to about one-half of the homemakers.

Some 50 percent of the homemakers had the water heater insulated and larger percentages had the water pipes insulated. The heat/air duct was insulated by only about 42 percent of homemakers.

Over 90 percent of the homemakers used one of the methods of window covering for their home and about 88 percent used one of the methods of door covering for home energy conservation.

Doors and windows were caulked in the homes by about 60 percent of the homemakers. The caulking of water pipes dropped to only 38 percent with a large percentage (24 percent) unaware of whether or not water pipes were caulked in their homes. Seventy percent did use weatherstripping on the doors.

Relationships Between Whether or Not a Home Energy
Audit was Conducted and the Characteristics of the
Home, the Homemaker and the Number of Extension Contacts

Of the three characteristics of the home studied, all were strongly related to whether or not a home energy audit was conducted by the homemaker. Homemakers who were most likely to have conducted the home energy audit lived in the urban homes and had lived in their homes for 11-30 years.

Characteristics of the homemaker were significantly related to whether or not the home energy audit was conducted with the exception of employment status of the homemaker. Homemakers who conducted the home energy audit tended to be married, had larger families, were below the age of 60, were members of Extension Homemakers Club, and felt their income was adequate. Employment status was not significantly related to whether or not the home energy audit was conducted.

The number of contacts homemakers had with Extension agents was significantly related to whether or not a home energy audit was conducted by the homemaker. Homemakers who had one or more contacts with the Extension agent were more apt to have the home energy audit conducted than those who did not have any contact.

Relationships Between Whether or Not Insulation
Was Recommended by the Home Energy Audit and the
Characteristics of the Home

Of the four characteristics of the home, requested on the survey, all were strongly related to whether or not insulation was recommended by the home energy audit.

Homemakers in the urban and rural non-farm homes were more likely than those in rural farm areas to have had additional insulation recommended for their homes as a result of a home energy audit. The homemakers who had homes that were 11-30 years old, compared to newer homes, were more likely to have had additional insulation recommended. Homemakers who felt that heating and cooling their homes was a big problem were more likely to have had additional insulation recommended as a result of a home energy audit.

Relationships Between Whether or Not Insulation
Was Installed and the Characteristics of the Home,
the Homemaker and the Number of Extension Contacts

The strongest relationship between whether or not insulation was installed after recommended was with the age of the dwelling. The older the home the homemaker lived in the more likely the homemaker was to install insulation as recommended.

The characteristics of the homemaker that significantly related to the installation of insulation were family income and the number of persons in the household. The strongest relationship was between family income and insulation installation. Homemakers who considered

their income adequate were more likely to have had insulation installed than those who considered their income inadequate.

The number of contacts the homemaker had with Extension agents was not significantly related to whether or not insulation was installed in the homes.

Relationships Between the Mean Number of Energy
Conservation Practices Used and the Characteristics
of the Home, the Homemaker and the Number of
Extension Contacts

The use of home energy conservation practices were described by the mean number of practices used. Homemakers who lived in their homes for 11-30 years followed 8.51 of the 14 home energy conservation practices compared to homemakers who have lived in the homes that were 10 years old or less were following 8.72 of the recommended practices. The location of the dwelling was not a significant factor in the use of the 14 home energy conservation practices.

All characteristics of the homemaker were significantly related to the number of home energy conservation practices used. Homemakers with families with 4 or more members were using more of the practices than those with smaller households. Married and employed homemakers were using more of the home energy conservation practices. Those homemakers that were under the age of 60 and those who considered their income to be adequate were using more home energy conservation practices. Extension Homemaker Club members were more likely than non-members to be using the home energy conservation practices.

Whether or not homemakers had made Extension contacts was significantly related to the number of recommended home energy conservation practices used by the homemakers. Those who had been in contact with the Extension agent compared to those who had no contacts through meetings, visits, phone calls, letters, publications or radio programs did follow the greater number of recommended practices in home energy conservation practices.

Relationships Between the Location of the Dwelling
and Use of Selected Insulation Practices for Home
Energy Conservation

Whether or not the ceiling and the walls were insulated was significantly related to the location of the dwelling (i.e., urban, rural farm, rural non-farm). The location of the dwelling was not significantly related to whether or not the floors were insulated and windows and doors were caulked.

Relationships Between the Age of the Dwelling and
Selected Insulation Practices for Home Energy
Conservation

Whether or not insulation was used in walls, ceiling, floors and caulking for doors and windows were all significantly related to age of the dwelling. Homemakers living in older homes were least likely to have ceilings and floors insulated. Regardless of the age of the house, homemakers were more likely to live in homes with insulated ceilings than insulated floors.

Relationships Between the Marital Status and
Use of Selected Insulation Practices for Home
Energy Conservation

Marital status of homemakers was significantly related to the use of recommended home insulation practices. About 80 percent of all homemakers regardless of the marital status reported having ceiling insulation. A greater proportion of the married than single homemakers had walls, ceilings and floors insulated and windows and doors caulked.

Relationships Between the Age of the Homemaker and Use
of Selected Insulation Practices for Home Energy
Conservation

When looking at the selected home energy conservation practices, the age of the homemaker was significantly related to the use of all the practices except the caulking of doors in the home.

Those homemakers under the age of 60 were more likely to be following the recommended practices of home energy conservation than the older homemakers.

Relationships Between the Employment Status and Use
of Selected Insulation Practices for Home Energy
Conservation

Use of wall and floor insulation was significantly related to the employment status of the homemaker. Those homemakers who were employed reported following the recommended practices of wall and floor

insulation more frequently than the unemployed or the retired homemakers. The employment status of the homemaker was not related to whether or not the ceilings were insulated, or whether or not doors and windows were caulked in their homes.

Relationships Between Family Income and Selected Insulation Practices of Home Energy Conservation

All of the energy conservation insulation practices were significantly related to family income. Homemakers who considered their income as adequate did report following the home energy conservation insulation practices more often than those who reported their income to be inadequate. When family income was considered adequate the use of the home energy conservation practices was increased.

V. IMPLICATIONS AND RECOMMENDATIONS

The findings of the study indicated that a greater percentage of homemakers who had the home energy audit conducted lived in urban homes that were 11-30 years old. The homemaker was married, EHC member below the age of 60 and considered the family income adequate. Those who had contacts with Extension were positively related to the home energy audit being conducted regardless of the type of contact with the exception of radio programs. Homemakers who had made Extension contacts were more likely than those who did not to have had a home energy audit conducted.

One implication may be that homemakers living in urban homes had greater awareness of access to or acceptance of the home energy audit

than did those living in rural homes. Also, homes that were 11-30 years old were no longer new enough for insulation to be ignored. These homes were probably built when energy conservation practices were not seen as an important part of the home. Thus, homemakers living in these homes were encouraged to have the audit conducted.

Younger homemakers with larger families and adequate income were more likely to have the home energy audit conducted for their homes more often. It may be implied that the older homemakers with inadequate income may be less informed about energy audits and home energy conservation practices.

Based upon the above findings and possible implications, the following recommendations are suggested:

1. Extension should target more information concerning the importance of a home energy audit to homemakers living in the rural farm and rural non-farm homes.

2. Extension should encourage older homemakers to participate in the home energy audit for their homes.

3. Extension should help educate homemakers with inadequate income about the availability of free home energy audits.

4. A continued effort through educational meetings, office visits, phone calls, letters, publications and radio programs concerning the home energy audit should be included in the Extension agent's plan of work.

The family income and the number of persons in the household were positively related to whether insulation was installed. Homemakers

with larger families and adequate income had the insulation installed in their homes most often. One implication may be that those with inadequate incomes tended to install insulation less often. A further implication may be that as the number of people in the family increases the income becomes more inadequate with fewer dollars for home energy conservation measures.

These findings and implications suggest the need for Extension to provide low income homemakers information regarding the availability of financing programs for home energy conservation purposes.

Homemakers using the greater mean number of the 14 home energy conservation recommended practices tended to live in homes less than 30 years old, were married with larger families and were EHC members. They were employed, under the age of 60 and considered family income to be adequate. There was a highly significant relationship between the number of people in the household and adequacy of family income and use of the 14 energy conservation practices.

Homemakers who had contacts with Extension were more likely than those who did not to be using the energy conservation practices.

Some possible implications regarding these latter findings are that:

1. Homemakers who have larger families are more conservative and thus more likely to use more of the conservation practices.

2. Older homemakers did not use home energy conservation practices as often possibly because of lack of understanding, income and acceptance of the practice.

3. Extension Homemaker Club members used the recommended practices more often than non-members. It may be implied that membership in EHC provided education on home energy conservation practices.

In view of the above findings and implications, the following recommendations are suggested:

1. Homemakers who live in homes over 30 years old should be encouraged to learn more about advantages of using each of the 14 home energy conservation practices.

2. As a target audience, older homemakers need educational programs in home energy conservation.

An additional consideration on use of home energy conservation practices was concerning ceiling and floor insulation in particular. In a recent study by Lindamood in 1979, 20 percent of the energy loss occurred from the floor and 45 percent was lost through the ceiling (16:157). When these two insulation practices were considered specifically, 80 percent of those homemakers surveyed reported having the ceilings insulated and only about 45 percent had the floors insulated.

This would imply that the homemakers surveyed were aware of the amount of energy loss that occurs through the ceiling and have put less emphasis on the floor energy loss.

Because of continued rising energy cost for homes it is important that we look at all major losses and the floor is considered a location of major loss. The homemakers in the survey need to be better educated as to the amount of energy that is lost by not following this practice.

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APPENDIXES

APPENDIX A

1985 HOUSING SURVEY

AEE INFO-22

THE AGRICULTURAL EXTENSION SERVICE
UNIVERSITY OF TENNESSEE

1985 HOUSING SURVEY
(See Instructions on Last Page)



Card No. 1

County Name _____

Year 8 5

Co. TEMIS No. _____

Respondent No. 0 0
(7) (8)

Respondent's telephone number _____

Note: Interviewer should make a record of each telephone call to the respondent.

Record of telephone calls			
Call	Date	Time	Outcome
1			
2			
3			

Hello!

I'm _____ from the County Extension Office. We're doing a housing survey and I'd like to get some information from you about the dwelling where you now live. Your information will help us understand the housing situation in our county and will also help us to determine what our housing needs are. It will take about ten (10) minutes to answer these questions.

PART I: GENERAL HOUSING SITUATION

The first few questions deal with the location, type, size and general situation of your dwelling.

1. Is your family dwelling located in an urban, rural farm or rural nonfarm area?

Location of dwelling

Urban Area Rural Farm Rural Nonfarm

(9)

circle response 1 2 3

2. Do you live in a single family dwelling, apartment, condominium or mobile home?

Type of dwelling

Single Family Apartment Mobile Home Condominium

(10)

circle response 1 2 3 4

3. Do you own or rent your home?

Home ownership

Own Home Rent Home Neither

(11)

circle response 1 2 3

4. How many years have you lived in your present dwelling?

Years lived in present dwelling

----- years -----

Under one One-ten 11-20 21-30 Over 30

(12)

circle one 0 1 2 3 4

Page 2

5. What is the approximate age of your dwelling?
- | | | Under
one | One-
ten | 11-20 | 21-30 | Over
30 |
|------|------------|--------------|-------------|-------|-------|------------|
| (13) | circle one | 0 | 1 | 2 | 3 | 4 |

6. How many bedrooms are in your dwelling?
- | | | <u>Number of bedrooms</u> | | | | | | |
|------|-----------------|---------------------------|---|---|---|---|---|---|
| (14) | circle response | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

7. How many full bathrooms are in your dwelling? (three-piece bath)
- | | | <u>Number of full bathrooms</u> | | | | |
|------|-----------------|---------------------------------|-----|-------|------|------|
| | | one | two | three | four | over |
| (15) | circle response | 1 | 2 | 3 | 4 | 5 |

8. How many half bathrooms are in your dwelling? (two-piece bath)
- | | | <u>Number of half bathrooms</u> | | | | |
|------|-----------------|---------------------------------|-----|-----|-------|------|
| | | none | one | two | three | four |
| (16) | circle response | 0 | 1 | 2 | 3 | 4 |

9. Has an energy audit been done on your dwelling to determine if insulation is adequate?
- | | | <u>Conducted energy audit</u> | | | |
|------|--|-------------------------------|-----|---------------|------|
| | | no | yes | don't
know | DNA* |
| (17) | | 1 | 2 | 3 | 9 |

IF THE ANSWER TO QUESTION #9 IS
NO SKIP TO QUESTION #13.

10. Was the energy audit made by a TVA-utility company or by a private company?
- | | | <u>Who did the energy audit?</u> | | | |
|------|------------|----------------------------------|--------------------|---------------|-----|
| | | TVA-
utility | Private
company | don't
know | DNA |
| (18) | circle one | 1 | 2 | 3 | 9 |

11. Did the energy auditors recommend additional insulation?
- | | | <u>Was insulation recommended?</u> | | | |
|------|------------|------------------------------------|-----|---------------|-----|
| | | no | yes | don't
know | DNA |
| (19) | circle one | 1 | 2 | 3 | 9 |

12. Did you have insulation installed after the energy audit?
- | | | <u>Was insulation installed?</u> | | | |
|------|------------|----------------------------------|-----|---------------|-----|
| | | no | yes | don't
know | DNA |
| (20) | circle one | 1 | 2 | 3 | 9 |

13. Does your homeowners insurance cover the replacement value or the depreciated value of your property?
- | | | <u>Replacement or depreciated
value insured?</u> | | | |
|------|------------|--|----------------------|---------------|-----|
| | | replacement
value | depreciated
value | don't
know | DNA |
| (21) | circle one | 1 | 2 | 3 | 9 |

14. Do you presently have an inventory (listing and/or pictures) of the contents of your dwelling?
- | | | <u>Inventory of contents</u> | | | |
|------|------------|------------------------------|-----|---------------|-----|
| | | no | yes | don't
know | DNA |
| (22) | circle one | 1 | 2 | 3 | 9 |

*DNA = does not apply

IF THE ANSWER TO QUESTION #14 IS
NO SKIP TO PART II.

15. Is your inventory stored in a
fire-proof location?

Inventory in a fire
proof location?

		no	yes	don't know	DNA
(23)	circle one	1	2	3	9

PART II: POSSIBLE DWELLING PROBLEMS

For each of the following dwelling
problems, please indicate whether
it is "not a problem"; "a slight
problem" or "a big problem":

How severe is this problem?

Not a problem	Slight problem	Big problem	Does not apply
------------------	-------------------	----------------	-------------------

(circle response)

(24)	1. TOO SMALL-NOT ENOUGH SPACE INSIDE?	1	2	3	9
(25)	2. NOT ENOUGH BEDROOMS?	1	2	3	9
(26)	3. NOT ENOUGH BATHROOMS?	1	2	3	9
(27)	4. ROOM ARRANGEMENT DOES NOT PROVIDE ADEQUATE PRIVACY?	1	2	3	9
(28)	5. KITCHEN INCONVENIENT TO WORK IN?	1	2	3	9
(29)	6. KITCHEN NEEDS MORE STORAGE SPACE?	1	2	3	9
(30)	7. BEDROOMS NEED MORE STORAGE SPACE?	1	2	3	9
(31)	8. EXPENSIVE TO HEAT AND COOL?	1	2	3	9
(32)	9. MAINTENANCE AND REPAIRS COST TOO MUCH?	1	2	3	9
(33)	10. INADEQUATE OUTSIDE STORAGE?	1	2	3	9
(34)	11. LACK PRIVACY FROM NEIGHBORS?	1	2	3	9

PART III: ENERGY CONSERVATION

Home Insulation

To what extent (i.e. none, part or
all of dwelling) is your home insul-
ated in each of the following ways:

Degree Insulated?

None	Part	All	Don't know	DNA
------	------	-----	------------	-----

(circle response)

(35)	1. WALLS INSULATED?	1	2	3	4	9
(36)	2. CEILING INSULATED?	1	2	3	4	9

Page 4

		<u>Degree Insulated?</u>				
		None	part	all	don't know	DNA
		(circle response)				
(37)	3. FLOORS INSULATED?	1	2	3	4	9
(38)	4. WATER HEATER INSULATED?	1	2	3	4	9
(39)	5. WATER PIPES INSULATED?	1	2	3	4	9
(40)	6. HEAT-AIR DUCT INSULATED?	1	2	3	4	9

Storm Doors and Windows Caulking & Weatherstripping Practices

To what extent (none, part or all of dwelling) has each of the following been done to your home to help prevent heat loss in the Winter and/or heat gain in the Summer :

		<u>None</u>	<u>Part</u>	<u>All</u>	<u>Don't know</u>	<u>DNA</u>
(41)	7. INSTALLED STORM WINDOWS?	1	2	3	4	9
(42)	8. COVERED WINDOWS WITH PLASTIC FILM?	1	2	3	4	9
(43)	9. INSTALLED STORM DOORS?	1	2	3	4	9
(44)	10. COVERED GLASS DOORS WITH PLASTIC FILM?	1	2	3	4	9
(45)	11. CAULKED DOORS?	1	2	3	4	9
(46)	12. CAULKED WINDOWS?	1	2	3	4	9
(47)	13. CAULKED AROUND WATER PIPES?	1	2	3	4	9
(48)	14. WEATHER-STRIPPED DOORS?	1	2	3	4	9

PART IV: PERSONAL AND FAMILY

1. Including yourself, how many persons now live in your household? Number persons living in household
- | | | | | | | | | |
|------|--------------|-----|-------|------|------|-----|-------|------------|
| | one | two | three | four | five | six | seven | over seven |
| (49) | circle one 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
2. Are you married or single? Marital status
- | | | |
|------|--------------|--------|
| | married | single |
| (50) | circle one 1 | 2 |
3. Are you presently employed, unemployed or retired? Employment status
- | | | | |
|------|--------------|------------|---------|
| | employed | unemployed | retired |
| (51) | circle one 1 | 2 | 3 |

- | | | | | |
|------|---|--------------------------|---|-------------------|
| 4. | On your last birthday were you under 60 years of age? | <u>Age of respondent</u> | | |
| | | <u>Under</u> | | <u>60-over</u> |
| | | 60 | | |
| (52) | | circle one | 1 | 2 |
| 5. | Considering your family needs, do you consider your family income to be adequate or inadequate? | <u>Family income</u> | | |
| | | <u>adequate</u> | | <u>inadequate</u> |
| (53) | | circle one | 1 | 2 |
| 6. | Are you presently a member of a Home Demonstration Club? | <u>HDCM</u> | | |
| | | <u>no</u> | | <u>yes</u> |
| (54) | | circle one | 1 | 2 |
| | | <u>no</u> | | <u>yes</u> |
| | | <u>no</u> | | <u>yes</u> |
| | | <u>no</u> | | <u>yes</u> |
| | | <u>no</u> | | <u>yes</u> |
| | | <u>no</u> | | <u>yes</u> |
| | | <u>no</u> | | <u>yes</u> |
| | | <u>no</u> | | <u>yes</u> |
| | | <u>no</u> | | <u>yes</u> |
| | | <u>no</u> | | <u>yes</u> |
| | | <u>no</u> | | <u>yes</u> |
| | | <u>no</u> | | <u>yes</u> |
| | | <u>no</u> | | <u>yes</u> |
| | | <u>no</u> | | <u>yes</u> |
| | | <u>no</u> | | <u>yes</u> |
| | | <u>no</u> | | <u>yes</u> |
| | | <u>no</u> | | <u>yes</u> |
| | | <u>no</u> | | <u>yes</u> |
| | | <u>no</u> | | <u>yes</u> |
| | | <u>no</u> | | <u>yes</u> |

PART V: EXTENSION CONTACTS

Will you please estimate the number of times you received information from Extension Agents about housing (i.e. repair and/or maintenance, energy conservation, remodeling) over the past 12-months through each of the following methods:

- | the past 12-months through each of the following methods: | | No. of times information received-past 12-months? | | | | | |
|---|---|---|---|---|---|---|---|
| <u>METHODS OF OBTAINING INFORMATION FROM EXTENSION</u> | | (circle response) | | | | | |
| (55) | 1. MEETINGS ATTENDED? (regarding housing) | 0 | 1 | 2 | 3 | 4 | 5 |
| (56) | 2. VISITS TO EXTENSION OFFICE? (regarding housing) | 0 | 1 | 2 | 3 | 4 | 5 |
| (57) | 3. TELEPHONE CALLS TO THE EXTENSION OFFICE? (regarding housing) | 0 | 1 | 2 | 3 | 4 | 5 |
| (58) | 4. CIRCULAR LETTERS OR NEWSLETTERS RECEIVED? (regarding housing) | 0 | 1 | 2 | 3 | 4 | 5 |
| (59) | 5. EXTENSION PUBLICATIONS RECEIVED? (regarding housing) | 0 | 1 | 2 | 3 | 4 | 5 |
| (60) | 6. NUMBER OF EXTENSION RADIO PROGRAMS LISTENED TO (regarding housing) | 0 | 1 | 2 | 3 | 4 | 5 |

(Note: After checking to make sure you have recorded a response to each question, thank the respondent and conclude the interview).

PART VI: INTERVIEW TECHNIQUE

(Note: Interviewer should complete the following questions after concluding the interview).

1. Was this interview completed by tele- How data obtained?
phone or face-to-face?
- | | <u>Telephone</u> | <u>Face-to-face</u> |
|------|------------------|---------------------|
| (61) | circle one 1 | 2 |

Page 6

2. Was the person interviewed the one first selected in the sample or was this person an alternate?
- (62)
- | | | <u>Who was interviewed?</u> | |
|------------|---|---|--|
| | | <u>Person originally selected was interviewed</u> | <u>Person interviewed was an alternate</u> |
| circle one | 1 | | 2 |
3. How many times did you (interviewer) call this respondent to complete the interview?
- (63)
- | | | <u>Number of calls made to complete interview?</u> | | | | |
|------------|---|--|-----|-------|------------|-----|
| | | One | Two | Three | Over Three | DNA |
| circle one | 1 | 2 | 3 | 4 | 9 | |
4. Was the person interviewed a male or female?
- (64)
- | | | <u>Sex of respondent</u> | |
|------------|---|--------------------------|--------|
| | | Male | Female |
| circle one | 1 | | 2 |

SURVEY INSTRUCTIONS

1. Date Due: February 15, 1986.
2. Disposition: Mail completed survey forms to Associate District Supervisors.
3. Counties Included: All, except Lake.
4. Survey Population: General Population and Home Demonstration Club Members.
5. Sample Size: Thirty (30) Home Demonstration Club Members and thirty (30) General Population (i.e. randomly selected non-members of HDC).
6. Sampling Procedures:
 - A. For Home Demonstration Club Members: Use the Nth number technique to randomly select 35 HDCM - Five (5) of these should be designated as alternates.
 - B. For General Population: Use a telephone directory or other available listing of all households in the county to randomly select (use Nth number) thirty (30) households from the general population who are not HDCM.
7. Interviewing:
 - A. Home Demonstration Club Members: Interviews with HDCM may be conducted face-to-face or telephone.
 - B. General Population (i.e. non-members of HDC): Interviews with General Population may be conducted face-to-face or telephone.
 - C. Agents and/or volunteers may conduct the interviews.

APPENDIX B

SURVEY REPORT

TVA G254A (C&EM-9-86)
Sheet 1 of 2
OMB No. 3316-0019
EXPIRES DECEMBER 1988

SURVEY REPORT ENERGY PACKAGE (FORM 1) (Sheet 1)

☐ Enter a "S" for single
"M" for multifamily

1. District Number ☐

2. Distributor Number ☐ Name

3. Survey Number CI

4. Name Last First Middle

5. Account Number

6. Complex Name (if applicable)

7. Address Street City State Zip

8. Survey Date Month Day Year

9. Home Phone

10. Business Phone

11. Type of Survey 1. Full 2. Partial

12. Options selected by power distributor and completed by advisor upon the consumer's request: (Home weatherization will always be completed in a full survey.)

☐ Home weatherization ☐ Heat pump ☐ Heat pump water heater ☐ Sunscreen

13. Number of living units

14. Person requesting survey: 1. Customer Homeowner 2. Customer Tenant 3. Customer Landlord
4. Non-Customer Landlord 5. CAA

15. Type of housing: 1. Owner Occupied 2. Private Rental 3. Public Housing 4. Rent Subsidized (Section 8 & other)

16. Type of structure: 1. One story 2. Two story 3. Three story 4. Split level 5. Mobile home
6. More than three stories 7. Combination (Use only for multifamily complex.)

17. Age of residence (years)

18. Water Heater (If there is no water heater, enter a "0" for number and leave fuel type and location blank.)

Number	Fuel Type	Location
1. electric, 2. gas	1. conditioned 2. unconditioned	
3. oil	3. N/A (if fuel type is not electric)	

19. Primary fuel for heating: 1. Electric 2. Natural gas 3. Oil 4. LP gas 5. Wood 6. Coal
7. Other 8. None

20. Type of heating system: 1. Heat pump 2. Central furnace 3. Floor furnace 4. Room heater 5. Boiler
6. Other

21. Type of cooling system: 1. Electric central 2. Electric window/wall 3. None 4. Other

22. Square feet of heated and/or cooled space

24. Number of warm room recommendations

25. Improvements marked are eligible for financing if you have an "Agreement To Participate" signed by your power distributor.

	Estimated		TYPE FINANCING			Estimated		TYPE FINANCING	
	Cost	Savings	0% Int.	Low Int.		Cost	Savings	0% Int.	Low Int.
☐ Attic — Insulation					☐ Water Heater Insulation				
☐ Floor — Insulation					☐ Duct Insulation/Repair				
☐ Storm Windows					☐ Thermal Door				
☐ Caulking/Glazing					☐ —Insulated Door				
☐ —Weatherstripping					☐ —Sliding Storm Door				
☐ —Threshold					☐ Heat Pump				
					☐ Heat Pump Water Heater				
					☐ Sunscreen				
					☐ Rehabilitation Work				

26. Number of heat pump analyses requested.

27. Advisor Nos.

28. No. Buildings

SEE IMPORTANT NOTICES ON BACK.

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TVA 6254A (C&EM-9-86)
Sheet 2 of 2
OMB No. 3316-0019
EXPIRES DECEMBER 1988

SURVEY REPORT
(Sheet 2)

1. District Number Building Number (if multi-family)

2. Distributor Number Name

3. Survey Number		CI
------------------	--	----

4. Name _____ 5. Account Number _____

6. Complex Name (if applicable) _____

7. Address _____
 Street City State Zip

[illegible]**ADVISOR**

No

Name _____

Date _____

NOTE: TO RECEIVE PROGRAM FINANCING, THE WORK MUST MEET THE ABOVE SPECIFICATIONS AND ALL APPLICABLE TVA STANDARDS.

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VITA

Mona Elizabeth Idles, daughter of the late Louis H. and Pauline C. Idles, was born in Knoxville, Tennessee on July 10, 1952 and grew up in Briceville, Tennessee. She attended Briceville Elementary School and graduated from Lake City High School in 1970.

In August 1973, she graduated from Carson-Newman College in Jefferson City, Tennessee with a B.S. degree in Home Economics Education. She entered The University of Tennessee, Knoxville in the graduate program and will receive a Master of Science degree in December 1987, with a major in Agricultural Extension Education.

Ms. Idles was employed by the University of Georgia Cooperative Extension Service from 1973-1976 in Wheeler County, Georgia. In 1978, she became the Assistant Extension Agent in Unicoi County, Tennessee and is currently the Associate Extension Agent at the same location.

She is a member of the Epsilon Sigma Phi, Honorary Extension Faternity, American Home Economics Association and is a Certified Home Economist.