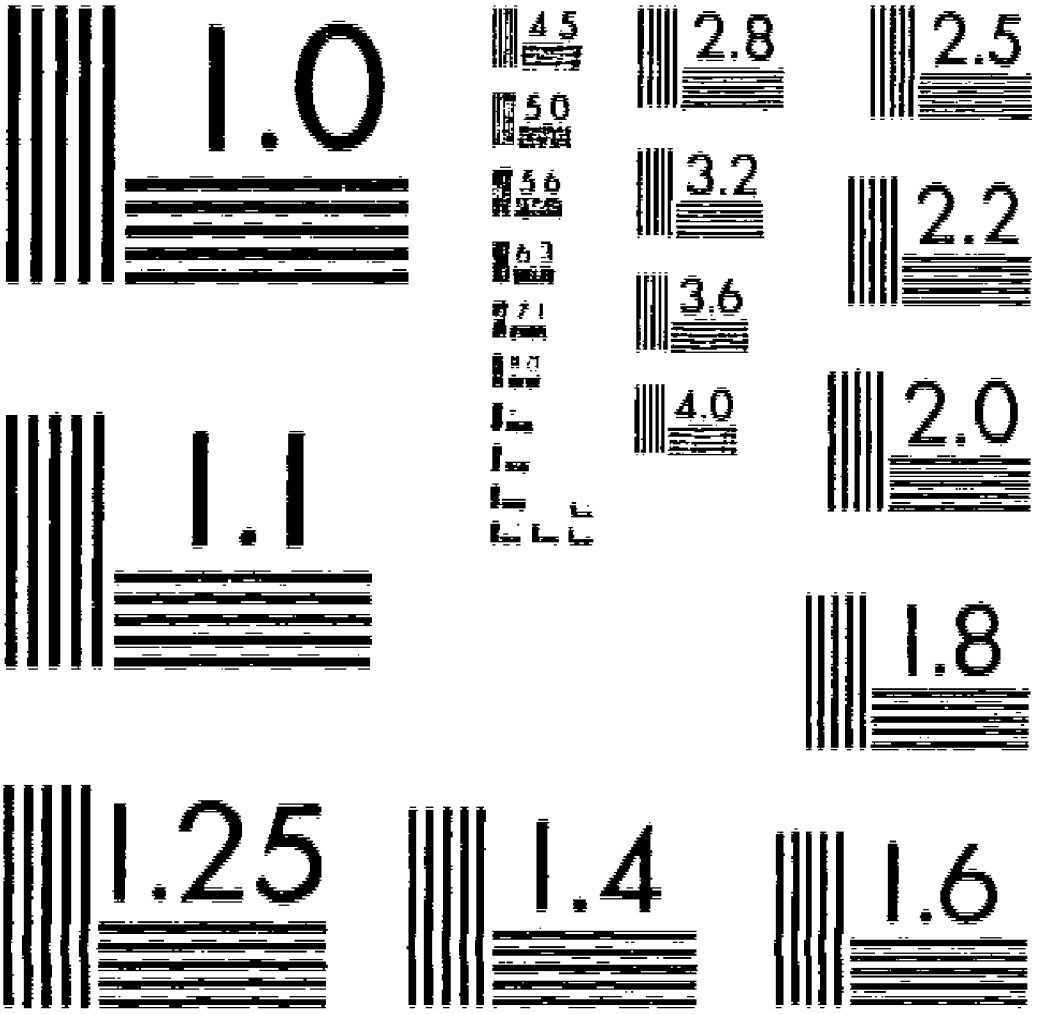

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ABSTRACT

Characteristics of housing units and of their occupants in a 125-county area of the Ozarks were examined in this 1966 study set up to determine how selected physical characteristics of housing units affect the adequacy of rural housing in the Ozarks and to assess personal characteristics of the occupants that may influence the quality of housing the family will occupy. Housing of 1,413 respondents (household heads) was categorized as having complete plumbing, partial plumbing, or no plumbing. Several variables were then defined for each type of housing, and cross-tabulation with chi-square tests for statistical significance was used for analysis. Variables selected for regression analysis included current value of house and land, educational attainment of household head, and net family income for a single year. Major findings of the survey were that (1) the quality of rural housing was significantly related to household incomes; (2) the level of formal education of the household head and of the wife, and the type of employment of the household head, were significantly related to housing quality; (3) age and sex of the household head were not significantly related to housing quality; (4) there was a significantly high correlation between the market value of house and land and quality of housing; (5) farm housing was about the same quality as rural nonfarm housing; (6) renters did not occupy significantly poorer housing than did owners; and (7) of the households with incomes that placed them in the seriously deprived class, 63% lived in substandard housing. (PS)

Rural Housing Quality in the Ozark Region as Related to Characteristics of Housing Units and Occupants, 1966

AGRICULTURAL EXPERIMENT STATION
University of Arkansas Division of Agriculture
Fayetteville, Arkansas
in cooperation with
ECONOMIC DEVELOPMENT DIVISION
Economic Research Service
United States Department of Agriculture

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CONTENTS

PREFACE

This is the second research report on housing conditions in rural areas of the Ozark Region, an area with a concentration of underemployed, unemployed, and low income families and a high incidence of poorly-housed families. The broad objectives of the study are to determine the economic, social, and institutional factors that affect the supply, demand, and quality of rural housing in the region and to identify ways in which those factors can be altered to improve housing quality. The first report (11) presented the status of housing in 1966, changes that had occurred in the 1950's and in the 1960-66 period, and an estimate of the cost of bringing occupied rural housing up to various levels of adequacy.

This publication reports on characteristics of the housing units and of their occupants that seem likely to affect housing quality. The specific purpose was to determine how such factors as the age of the unit, market value of the house and land, amount of income a family receives, and educational level attained by the head affect the quality of housing. A further purpose was to identify target groups in the population with the most pressing need for better housing, so that, if necessary, housing programs may be focused on special target groups requiring emphasis. In a third report the role of credit financing in improving housing in the area will be studied.

Agricultural Experiment Station, University of Arkansas Division of Agriculture, Fayetteville. John W. White, vice president for agriculture; E. M. Cralley, director. PPC2M670

Rural Housing Quality in the Ozark Region as Related to Characteristics of Housing Units and Occupants, 1966

By HUGHES H. SPURLOCK[1]
Department of Agricultural Economics and Rural Sociology

Poor housing is being discussed widely as one of the major economic deficiencies affecting the well being of millions of American families. Improved housing is given high priority in various government programs to raise the level of living of families not sharing sufficiently in the nation's growing affluence. In passing the Housing and Urban Development Act of 1968, the Congress reaffirmed the national housing goals contained in the Housing Act of 1949 of a "decent home and a suitable living environment for every American family" and called for the housing goal to be realized as soon as feasible. Toward attaining this goal, a 10-year housing plan was established which envisioned the construction of 20 million new houses in the period 1969 to 1978 in response to normal market forces plus the production of 6 million new and rehabilitated units with public assistance under the various publicly-assisted housing programs for families with low and moderate incomes (6). The goal of the 10-year plan is to provide an adequate supply of quality housing in all parts of the Nation, including both urban and rural locations. The Farmers Home Administration will have the major role in implementing the programs in rural areas.[2]

National housing statistics show that the quality of housing varies greatly among the various geographic locations (1). This report is concerned with an area which has a high concentration of low income families and one of the nation's highest incidences of poorly-housed families. The two conditions are linked and finding a satisfactory solution requires a broad approach. Development of the region's resources, more and better paying jobs, improved schools, roads, and other facilities, and raising the level of living in general, including better housing, are needed. To help foster these activities, an Ozark Regional Commission has been established with offices in Washington, D. C. and Little Rock, Arkansas.

The Study Area

The U. S. Secretary of Commerce delineated the Ozark Region on March 2, 1966, with concurrence of the states and in accordance

[1]Agricultural economist, Economic Development Division, ERS, U. S. Department of Agriculture, stationed at Fayetteville, Ark.

[2]Farmers Home Administration, an agency of the U. S. Department of Agriculture, carries on a supervised housing credit program for farmers and other people living in rural areas and in towns of up to 5,500 people. FHA county supervisors can supply information on the housing program to interested families.

with the provisions of the "Public Works and Economic Development Act of 1965" (P.L. 89-136). Included in the region are 125 counties located in or near the Ozark and Ouachita mountain areas of Arkansas, Missouri, and Oklahoma. Of the 125 counties included in the designated area, 44 are in Arkansas, 44 in Missouri, and 37 in Oklahoma. Nine counties located in the southeast corner of Kansas that have been added to the designated Ozark Region since data for this study were compiled could not be included.

The reasons cited for designating the region as eligible for public assistance in fostering economic growth and development explain, in large part, the high incidence of poorly-housed families relative to the Nation as a whole. The criteria used in making the designation placed major emphasis on the high and persistent rate of unemployment, underemployment, and low incomes relative to the Nation. Implicit also in singling out the region and similar areas for special emphasis is the evidence that such areas are not progressing fast enough to overcome economic deficiencies unassisted. The region, however, is not standing still economically. Progress is being made. The economy of the region is also quite diverse; some parts are much better off economically than others. In the 1950's, the median family income doubled, yet it was still only three-fifths of the 1960 national median family income, which is also increasing (7). It is this gap in income and the related gap in the level of living that attracts national attention to the Ozarks and other similar regions as problem areas and that provides justification for special consideration and assistance.

A backward look over the 1950's and the first part of the 1960's shows significant changes in the Ozarks that have affected the level of living, including the quality of housing. The decade of the 1950's was characterized by a continued outflow of Ozark citizens from the region looking for jobs or for higher-paying jobs. An absolute decline of 4.8 percent in the population occurred. At the same time a shift from a declining agriculture to industrial employment was taking place. Growth in the industrial sector, however, was not fast enough to absorb the labor released from agriculture.

One visible effect of these economic changes was the improvement in rural housing quality between 1950 and 1960. At the beginning of the period, less than 16 percent of the rural housing units were classified by the U. S. Census of Housing enumerators as not dilapidated and with all plumbing facilities. By the time the 1960 Census was taken the proportion had increased to 47 percent. Similarly, the proportion of rural housing with hot and cold water, a bathtub or shower, and a flush toilet rose from 20 percent in 1950

to more than 50 percent in 1960 (13). These gains in housing quality can be attributed partly to abandonment of some dilapidated housing and the demolition of some such housing that could not be repaired, remodeling of some housing, and the construction of new units. About one-third of the occupied housing in 1966 had been constructed since 1949. Remodeling and new construction reflect the most meaningful progress toward better housing for the future.

The survey taken in 1966 indicated that housing conditions continued to improve. Among the 1,413 rural household heads interviewed, about 75 percent had hot and cold running water inside the structure, 77 percent had a bathroom, and a similar percentage had a flush toilet inside. Also, roughly 78 percent had access to either a commercial water supply or a drilled well. An equally high percentage had access to either public sewage disposal facilities or a septic tank. A detailed analysis of the housing data shows, however, that many households had part of the conveniences mentioned above but did not have all of them. Only 70 percent of the respondents possessed the package of hot and cold running water, a bathtub or shower, and a flush toilet. Only 62 percent of the households sampled were equipped with the above-listed plumbing facilities plus an adequate water supply, defined as either access to commercial water supply or a drilled well, and sewage disposal facilities which could be either access to a public sewer line or a septic tank. Of the remaining households in the sample almost 11 percent did not have any modern plumbing facilities and the remainder lacked one or more of the essentials generally considered necessary for sanitation and health.

The data reveal that the rural sector of the Ozarks, despite some economic progress and housing improvements, remains well behind the Nation as a whole. An effective effort toward closing the gap and affording an opportunity for all families to be adequately housed requires identification of those physical and personal characteristics that enhance or hinder, as the case may be, the likelihood of a family occupying adequate housing. In other words, the underlying causes of poor housing need to be identified and steps need to be taken to correct them.

Purpose of the Study

The general objective of this study was to determine how selected physical characteristics of housing units affect the adequacy of rural housing in the Ozarks and to assess those personal characteristics of the occupants, primarily the household head, that may influence the quality of housing the family will occupy.

Selected characteristics of the housing units that might be expected to reflect variations in housing quality are: (1) market value of house and land, (2) age of the housing unit, (3) location of housing (rural nonfarm and farm), (4) mortgaged and nonmortgaged property, and (5) owned and rented housing. Similarly, personal characteristics that might be expected to reflect variations in housing quality are: (1) level of net family income, (2) household size-income class, (3) educational attainment of household head, (4) educational attainment of wife, (5) type of employment of household head, (6) the household head not being in labor force, (7) race of household head, (8) age of household head, and (9) sex of household head. The above characteristics were analyzed to determine which ones affected housing quality.

Method and Procedure

To obtain an operational indicator of adequate housing, the 1,413 respondents were grouped into three categories. The category **with complete plumbing** includes all housing units in the sample with the following: hot and cold running water, inside; a flush toilet, inside; a bathtub or shower; a commercial water supply or drilled well; and access to a public sewer or septic tank. Such housing units were designated as adequate. It was assumed that such housing would generally be structurally sound and adequate in other quality aspects, though there are undoubtedly exceptions.

The category **with partial plumbing** includes all housing units in the sample which had at least one of the attributes listed under the grouping with complete plumbing, but not all of them. The category **with no plumbing** includes all housing units in the sample that had none of the attributes listed under the category with complete plumbing. In this report the terms with complete plumbing, with partial plumbing, and with no plumbing are used interchangeably with adequate housing, partially adequate housing, and inadequate housing, respectively.

Cross-tabulation with chi square tests for statistical significance was the primary method of analysis. The chi square tests were computed to show whether the observed data differed significantly from the mean value. Such an analysis is complicated because housing quality is influenced by a number of variables, some of which are intercorrelated and overlapping. And from the standpoint of finding ways to achieve desired changes, some of the characteristics affecting housing quality are physical and fixed. The three variables considered most amenable to change and on which data were available that could be analyzed as a continuous

variable were selected for regression analysis. These variables included: (1) current value of house and land, (2) educational attainment of household head, and (3) net family income for a single year. Tables in this study classifying the respondents by social and economic characteristics are not strictly comparable with the classification in "Human Resources in the Ozark Region with Emphasis on the Poor" (4).

CHARACTERISTICS OF HOUSING UNITS AS RELATED TO HOUSING QUALITY

Market Value of the House and Land

Respondents were asked what the house and land that they occupied would sell for in today's market. Farm households, and some nonfarm households with an acreage larger than a lot, consisted of more than the value of the house and lot. Still, about 12 percent estimated the value of their house and land at less than $2,500 (Table 1). Nearly 22 percent said that the market value of their house and land was in the range of $2,500 to $4,999. More than half of the households occupied a house and land with an estimated value of less than $7,500, while less than 5 percent occupied housing and land valued at $25,000 or more. The relationship between the value of the house and land and the percentage of housing meeting adequacy standards was significant at the .01 level.

The data show also that of the respondents reporting the value of their house and land at less than $2,500, about 29 percent occupied adequate housing. This percent of households occupying ade-

Table 1. Levels of Housing Quality for Rural Households of the Ozark Region, by Value of Property, 1966

Value of property	With complete plumbing	With partial plumbing	With no plumbing	Total
		Number of households		
Less than $2,500	44	59	49	152
$2,500 to $4,999	138	98	47	283
$5,000 to $7,499	157	57	21	235
$7,500 to $9,999	132	42	10	184
$10,000 to $14,999	138	54	7	199
$15,000 to $19,999	88	23	2	113
$20,000 to $24,999	52	20	6	78
$25,000 to $34,999	44	13	0	57
Independence test or total	**	**	**	1,301
		Percent		
Less than $2,500	28.9	38.8	32.2	11.7[1]
$2,500 to $4,999	48.8	34.6	16.6	21.7
$5,000 to $7,499	66.8	24.3	8.9	18.1
$7,500 to $9,999	71.7	22.8	5.4	14.1
$10,000 to $14,999	69.3	27.1	3.5	15.3
$15,000 to $19,999	77.9	20.4	1.8	8.7
$20,000 to $24,999	66.7	25.6	7.7	6.0
$25,000 to $34,999	77.2	22.8	0.0	4.4

[1]Equals 152 divided by 1,301.
**Chi square test, 1 percent or less probability.

quate housing is surprisingly high. Part of the explanation for the reported low values may be that the market is poor for much of rural housing because it is located in out-of-way places. Twenty-four percent of the respondents reported that they paid less than $2,000 for their house and land originally. It appears, however, that modern plumbing has been installed in some housing of very low value.

Of the households with property valued at $2,500 to $4,999, almost 49 percent occupied adequate housing. The percentage of housing meeting adequacy standards rose sharply with values above $5,000. Among the households in the top range of the data, over $25,000 value, 77 percent occupied adequate housing, but all of the units had at least partial plumbing and most of them probably lacked only a drilled well to meet adequacy standards used in this study.

In addition to complete plumbing, the likelihood that a family will have such housing quality attributes as furnace heat and air conditioning increases as the value of the house and land goes up (Appendix Table 2).

The previous study estimated that roughly $419 million would be needed to add additional bedrooms, hot water, bathing facilities, and a flush toilet, and to provide adequate water and sewage disposal facilities to the estimated number of occupied housing units in the study area needing these additions (11). This makes no allowance for replacing dilapidated housing that must be replaced or for repairing major structural defects.

The Housing and Urban Development Act of 1968 and the 10-year housing plan envision that the necessary capital for improving housing can be obtained in a decade for all parts of the Nation through joint efforts of the private sector and government—Federal, State, and local. It remains to be seen at what level the programs can be funded. The 1968 Act emphasizes homeownership, but also makes provisions for subsidized rentals for low-income families.

It is beyond the scope of this report to consider financing and location of housing in detail. But the low value of much of the rural housing in the region raises what appears to be a difficult practical problem with policy-program aspects that should be mentioned: Can public funds, loans or grants, be justified on some of the low-value housing locations? It could mean, for example, investing large sums of money to replace housing units that can't be repaired and that are located on property of low value; in some areas of the region such places are often found on poor roads,

away from school bus routes, and well removed from other community facilities and from industrial jobs. Developing growth patterns indicate that future demand for nonfarm housing will tend to center around developing job centers or at least along major highways where commuting is easier.

The practical problem is further complicated by the fact that current occupants are often aged citizens who own the property and may be unwilling to move. A new house or an extensively remodeled house can be expected to provide adequate housing long after the current occupants are gone. Often loans must be amortized over many years and there may not be another occupant willing to live in the location. Moreover, should another family move into such housing, it would be expensive to provide adequate roads, to transport school children, and to finance other tax-supported services. More study and research are needed to reconcile the goals of making the best use of housing expenditures that require public subsidies and of protecting the dignity and sensitivities of the individuals that public-supported housing programs are intended to help.

The above is cited primarily to call attention to the fact that solving the problem of poor housing involves a great many problems other than financing.

Age of the Housing Unit

Approximately two-thirds of the rural households lived in a dwelling that was built before 1950 (Figure 1). The data show that units constructed since 1949 (about one-third of the total) are significantly superior to the older units in the quality attributes considered. Of the units constructed since 1949, 74 percent have all plumbing facilities, compared with less than 56 percent for units built before 1950. Only 5.3 percent of the housing units built from 1950 to 1966 had no modern plumbing facilities, compared with 13 percent for units built before 1950. While a high percentage of the newer homes have the package of a bathroom, hot and cold running water, and a flush toilet, some of the housing units constructed since 1949 did not include all three essential plumbing attributes, though the bulk of current construction is probably of modern design and equipped with modern conveniences.

Many of the older housing units in the Ozarks were constructed out of fine hardwoods and parts of the structure are often remarkably sound after standing many decades, but their design generally does not fit modern concepts and family needs. Often repairs and maintenance have been neglected. Remodeling and modernizing housing built for earlier times and reflecting earlier

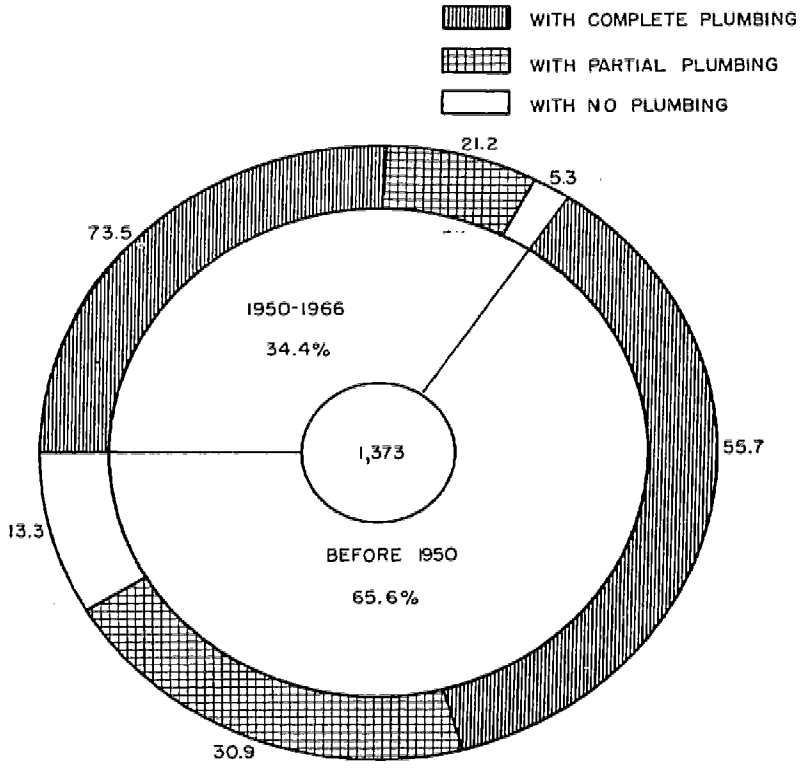

Figure 1. Levels of Quality in Housing for Rural Households of the Ozark Region by Age of the Housing Unit, 1966

Derived from Appendix Table 1.

housing standards is difficult, and is often too expensive, especially for low-income families. The moving-up process in housing, whereby families move into better housing as income rises and a family with lower income moves into the unit vacated, tends to concentrate low-income families in the older units. Of the units built since 1949 a high percentage are occupied by younger persons with more years of schooling, and household heads with higher incomes.

Rural Nonfarm and Farm Housing

Nearly two-thirds of the rural nonfarm households had complete plumbing, compared with about half of the farm households with complete plumbing (Figure 2). However, the definition of complete plumbing used as a measure of adequacy may overstate

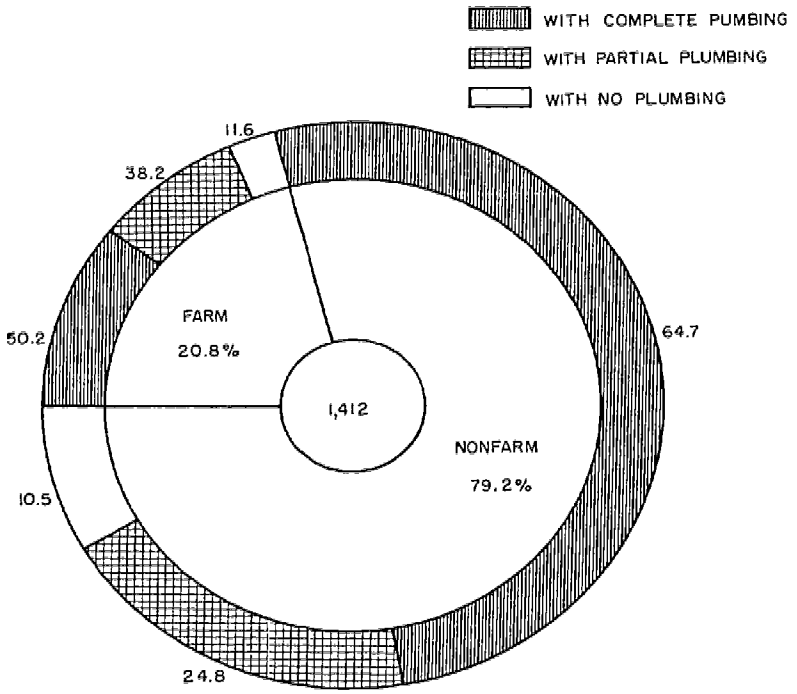

Figure 2. Levels of Quality in Housing for Rural Households of the Ozark Region by Place of Residence, 1966

Derived from Appendix Table 1.

the real differential. Many farm families had a dug well, a cistern, or a pond and thus did not have complete plumbing. While a drilled well or access to a public water system is generally preferable, dug wells, cisterns, and ponds are not always unacceptable; in some areas and locations, ponds and cisterns may be all that is feasible. The depth to which wells must be drilled makes them too expensive, and in some cases underground water is of poor quality or not obtainable.

Differences in housing quality between rural nonfarm and farm housing as shown in Appendix Table 3 indicates that in terms of the three most basic plumbing facilities — a bathroom, hot and cold running water, and a flush toilet — farm housing is not significantly worse than rural nonfarm housing. A higher percentage of farm housing, however, was constructed prior to 1950. Also, the homeownership rate is considerably higher among farm households. Rural nonfarm households are more likely to have approved sewage facilities and central heat.

Mortgaged and Non-Mortgaged Property

Long-term mortgage financing with low down payments, some guaranteed by the Federal government, has enabled millions of American families to upgrade their housing, particularly since World War II. Respondents in the rural areas of the region, who either owned or were buying a house, were asked whether or not they had ever mortgaged the house and land which they occupied. Some 508 household heads, or 47 percent, reported that the house and land either had been mortgaged or was currently mortgaged.

The data indicate that household heads who have been willing to incur debt and who have been able to obtain mortgage credit occupy housing of significantly higher quality than those who have not mortgaged their house and land. Almost 69 percent of homeowners who had used mortgage credit occupied adequate housing, compared with 58 percent for households not using mortgage financing (Figure 3). Also, 13 percent of the families not using mortgage credit did not have any plumbing, compared to less than 6 percent for households with mortgage financing.

A significantly higher percentage of families using mortgage credit occupy housing with furnace heat and air conditioning (Appendix Table 3). Such families also are more likely to occupy newer housing.

Owned and Rented Housing

The homeownership rate in the region is high relative to the national rate. How does being an owner or a renter affect the chances of a family being adequately housed? There was no significant difference between the adequacy of owner-occupied housing and of housing occupied by tenants paying rent (Figure 4). About 63 percent of the owner-occupied housing units had complete plumbing, and almost as high a percentage of the renters occupied such housing. However, households occupied by owners are more likely to have a bathroom and hot and cold running water, and a higher percentage of owner-occupied units are newer, constructed after 1949 (Appendix Table 3).

Rural renters in the Ozark Region appear to pay low monthly rents (Table 2). The 160 households with complete plumbing paid an average monthly rent of $40.58, those occupying housing units with partial plumbing paid $35.06, and renters with no plumbing paid less than $20.00. The above rentals exclude tenants who paid no cash rent.

Of the 71 respondents with no cash rent payments, about half lived in housing with complete plumbing, 31 percent had partial

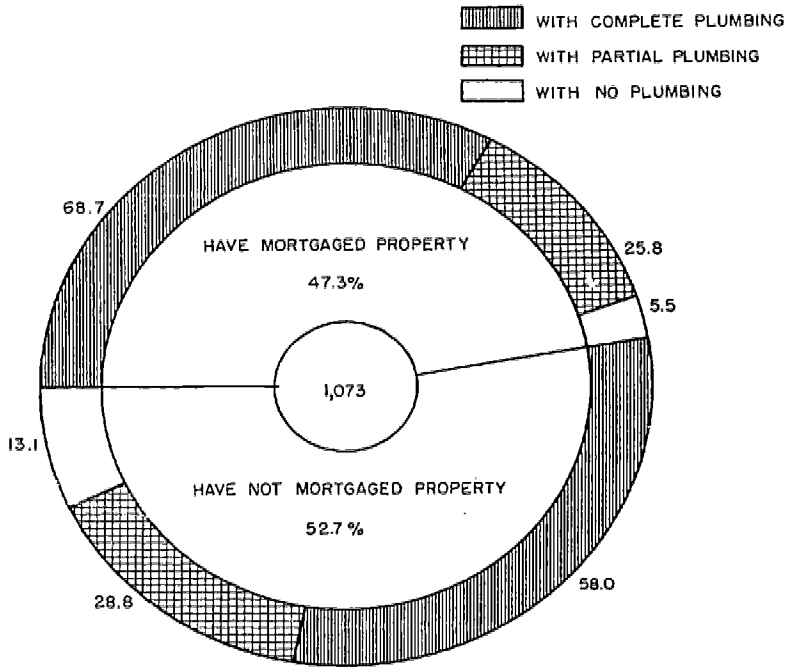

Figure 3. Levels of Quality in Housing for Rural Households of the Ozark Region by Use of Mortgage Financing, 1966

Derived from Appendix Table 1.

plumbing, and less than 20 percent had no plumbing. By comparison, about 60 percent of the tenants who paid rent occupied adequate housing, 27 percent had partial plumbing, and about 14 percent had no plumbing.

CHARACTERISTICS OF HOUSEHOLD OCCUPANTS AS RELATED TO HOUSING QUALITY

This section relates selected characteristics of the occupants, primarily the household head, to the quality of housing. Considered are such factors as level of net family income in 1965, educational attainment of the household head, and age of the household head.

Level of Family Income

Empirical observations indicate that families of low and moderate incomes generally live in lower quality housing than do middle and upper income families. Middle income families gen-

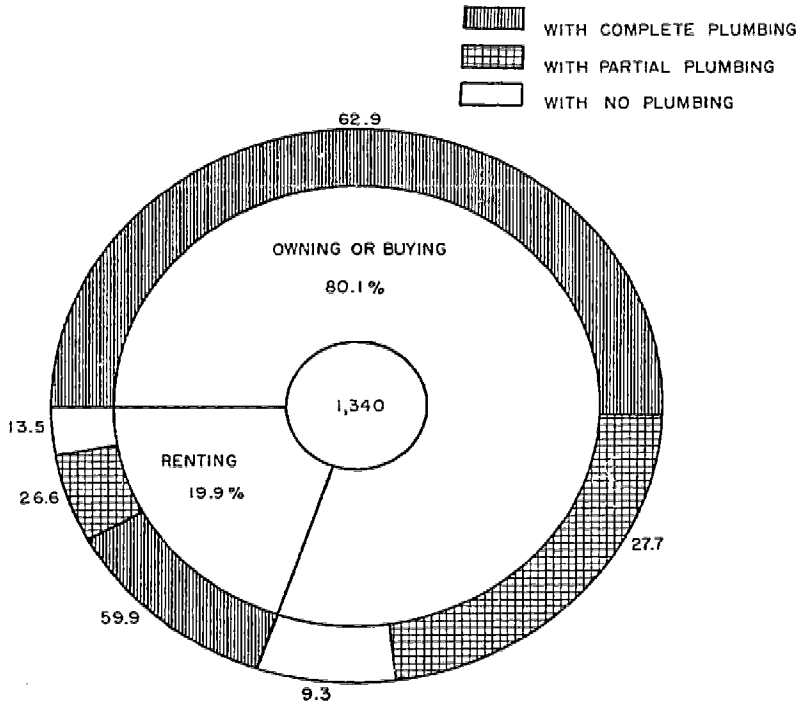

Figure 4. Levels of Quality in Housing for Rural Households of the Ozark Region by Tenure Status, 1966

Derived from Appendix Table 1.

Table 2. Levels of Rural Housing Quality, by Amount of Monthly Rent Paid, 1966

Amount of rent per month	With complete plumbing	With partial plumbing	With no plumbing	Total
		Number of households		
Less than $20	7	16	17	40
$20 to $39	74	45	18	137
$40 to $59	60	4	0	64
$60 to $79	12	2	0	14
$80 to $99	4	0	0	4
$100 to $119	2	2	0	4
$120 and over	1	1	0	2
Median	$40.00	$30.00	$20.00	265
Average	$40.58	$35.06	$19.31	
		Percent		
Less than $20	17	40	42	15[1]
$20 to $39	54	33	13	52
$40 to $59	94	6	0	24
$60 to $79	86	14	0	5
$80 to $99	100	0	0	2
$100 to $119	50	50	0	2
$120 and over	50	50	0	—[2]

[1]Equals 40 divided by 265.
[2]Less than 1 percent.

erally live in housing that is adequate by modern standards, and upper income families generally occupy what might be termed luxurious housing. This study shows that the percentage of households with complete plumbing (adequate housing) is highly correlated with net family income (significant at the .01 level).

Income alone, however, does not assure that a household will be adequately housed. An analysis of the relationship between income and housing quality shows that of the 107 households with net family incomes of less than $1,000 in 1965, 43 percent had complete plumbing, 35 percent had partial plumbing, and slightly less than 22 percent had no modern plumbing facilities (Table 3). The quality of housing improved as income increased: at the $5,000 to $5,999 income class, over 71 percent of the households had complete plumbing, about 25 percent had partial plumbing, and only about 4 percent had no modern plumbing facilities. Among the households with incomes of $9,000 or more, almost 90 percent had complete plumbing and the other 10 percent had partial plumbing.

Housing quality attributes are affected significantly when individual housing quality characteristics other than plumbing facilities are cross tabulated with income strata (Appendix Table 4). Only 12 percent of the households with less than $1,000 income had air conditioning, whereas at the $5,000 to $5,999 level of income over 35 percent had air conditioning, and 68 percent of the households with incomes of $10,000 or more were equipped with air con-

Table 3. Levels of Housing Quality by Net Family Income, 1966

Net family income in 1965	With complete plumbing	With partial plumbing	With no plumbing	Total
		Number of households		
Less than $1,000	46	38	23	107
$1,000 to $1,999	153	77	63	293
$2,000 to $2,999	116	71	27	214
$3,000 to $3,999	107	73	17	197
$4,000 to $4,999	93	33	9	135
$5,000 to $5,999	86	30	5	121
$6,000 to $6,999	79	33	4	116
$7,000 to $7,999	55	13	3	71
$8,000 to $8,999	29	8	0	37
$9,000 to $9,999	26	3	0	29
$10,000 and over	81	11	0	92
Total usable schedules	871	390	151	1,412
Independence test	**	**	**	
		Percent		
Less than $1,000	42.6	35.2	21.3	7.6
$1,000 to $1,999	52.2	26.3	21.5	20.7
$2,000 to $2,999	54.2	33.2	12.6	15.2
$3,000 to $3,999	54.3	37.1	8.6	13.9
$4,000 to $4,999	68.9	24.4	6.7	9.6
$5,000 to $5,999	71.1	24.8	4.1	8.6
$6,000 to $6,999	68.1	28.4	3.4	8.2
$7,000 to $7,999	77.5	18.3	4.2	5.0
$8,000 to $8,999	78.4	21.6	0.0	2.6
$9,000 to $9,999	89.7	10.3	0.0	2.1
$10,000 and over	88.0	12.0	0.0	6.5

**Chi square test, 1 percent or less probability.

ditioning. The percentage of families with central heat also increased as incomes rose: of households with less than $1,000 income, about 57 percent had heating facilities considered as adequate — that is, they had a furnace, built-in wall units, or gas circulating heater. The percentage with this type of heat reached 83 percent for families in the income class of $5,000 to $5,999, and approached 95 percent for families with incomes of $10,000 or more.

Families with higher incomes were far more likely to be living in newer homes, constructed after 1949. Only 24 percent of the households with incomes of less than $1,000 lived in a housing unit constructed after 1949; 42 percent of the families with incomes in the $5,000 to $5,999 range lived in the newer housing; and where incomes exceeded $9,000, the percentage occupying housing built after 1949 was around 56 percent.

It is axiomatic that income is a major measure of whether or not a family can afford adequate housing. But, in evaluating relationships between income and housing quality, it is necessary to consider what is involved in purchasing or making major improvements in a home. First, home purchases and to some extent major home improvements are long-term investments that generally involve saving before the purchase or remodeling, and often involve payments over a number of years. Consequently, the level of income over a span of years becomes important in determining a family's ability to afford better housing. A retired couple with low current income may be living in modern housing bought and paid for over many years when income was higher. Second, the priority an individual puts an housing quality in terms of his scale of wants influences expenditures for housing. Some families may elect to invest in other items and postpone home improvements, even though they could afford better housing. Others may borrow and spend more on housing than their current income justifies. Third, other urgent demands on income such as expenditures for food, clothing, medicine, and transportation — expenses that must be met currently — may force a family to get along with inadequate housing. How large these competing goods and services are depends partly on the size of the family being provided for out of available income.

Household Size-Income Class

Household size-income class stratification combines net family income and the number of people to be fed, clothed, sheltered, and otherwise provided for from available income. The format showing relative income deprivation based on the relationship of income to household size is shown in Table 4. It is believed this

Table 4. Relative Income Deprivation Based on Relationship of Income to Household Size, 1966

Household income range	Seriously deprived	Deprived	Marginal	Probably not deprived	Definitely not deprived
			Household size		
$0 to $999	2 or more persons	1 person	----------	----------	----------
$1,000 to $1,999	5 or more persons	2, 3, or 4 persons	1 person	----------	----------
$2,000 to $2,999	9 or more persons	4 through 8 persons	2 and 3 persons	1 person	----------
$3,000 to $4,999	----------	8 or more persons	4 through 7 persons	2 and 3 persons	1 person
$5,000 to $7,499	----------	----------	9 or more persons	4 through 8 persons	1 through 3 persons
$7,500 to $9,999	----------	----------	----------	6 persons or more	1 through 5 persons
$10,000 and more	----------	----------	----------	9 persons or more	1 through 8 persons

scale provides a better measure of a family's ability to afford housing and other necessities than does income alone.

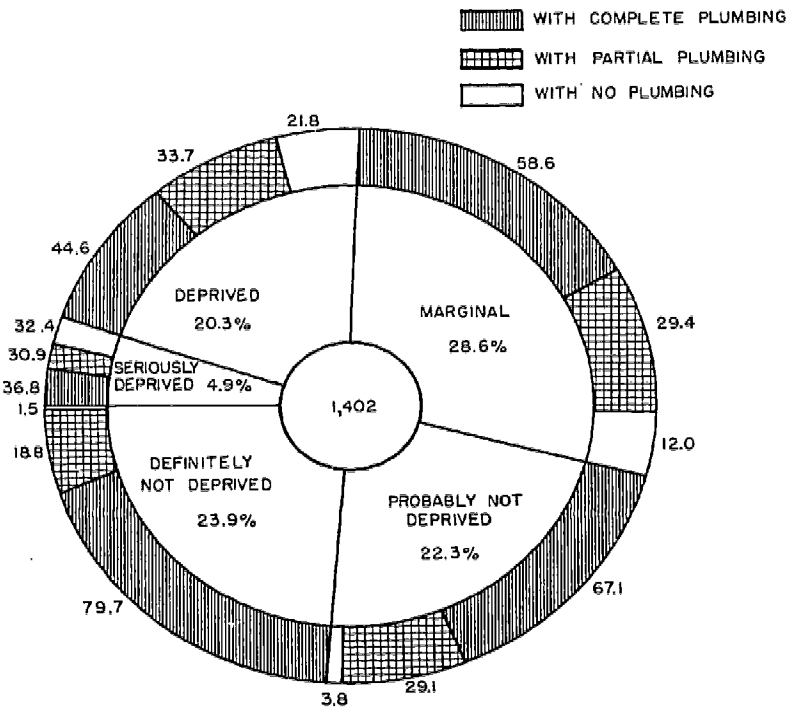

Figure 5. Levels of Quality in Housing for Rural Households of the Ozark Region by Household Size-Income Classes, 1966

Derived from Appendix Table 1.

The deprivation class that characterized a family strongly affected the chances the family had of occupying an adequate house. Of the 65 seriously deprived households, 37 percent had complete plumbing, 31 percent had partial plumbing, and a high percentage, almost one-third, had no modern plumbing (Figure 5). Among the households definitely not deprived, 80 percent had complete plumbing and nearly all of the remainder had partial plumbing. Also, families that were definitely not deprived were far more likely to have satisfactory heating and air conditioning, and to be either buying or owning the dwelling they occupied (Appendix Table 5).

Educational Attainment of the Household Head

Nearly three-fifths of all household heads had completed 8 years or less of schooling. Roughly one-third had some high school training or had completed high school, and less than 9 percent had completed one or more years of college. How much does the level of education attained by the household head affect the chances of a family living in adequate housing? It is generally agreed that individuals with higher levels of education, as a group, can be expected to earn more money. In turn, individuals with greater earnings can afford more of the goods and services considered essential for their material well-being. Also, it seems likely that education changes an individual's value system and priorities in terms of how he will allocate his income among goods and services. The latter may be quite important, though difficult to evaluate and document. Modern, well kept houses and lawns, located in upper or middle-income neighborhoods, are likely to be looked on as a mark of achievement in the community and, consequently, would be likely to have a high priority among the better-educated groups.

This study showed that a person with a high school or college education was significantly more likely to occupy adequate housing than a household head with 8 years of schooling or less (Table 5). Of the households where the heads had dropped out of school before finishing the 8th grade, less than half had complete plumbing facilities. The percentage with complete plumbing increased to 61 for heads with 8 years of schooling; to 73 where household heads had finished 12 years of schooling, and among the college trained 82 percent lived in housing with essential plumbing. The incidence of dwelling units without any modern plumbing facilities was much higher among households where the heads had not completed at least 8 years of schooling. Also, the higher the educational level, the smaller the percentage of households with only partial plumbing. In addition, a higher percentage of the better-educated house-

Table 5. Levels of Housing Quality, by Educational Attainment of the Household Head, 1966

Years of schooling	With complete plumbing	With partial plumbing	With no plumbing	Total
		Number of households		
0	16	12	5	33
1 to 4	70	50	32	152
5 to 7	119	91	42	252
8	229	111	36	376
9 to 11	155	56	18	227
12	182	51	16	249
College, 1 to 3	49	8	2	59
College, 4 or more	51	11	0	62
Independence test or total	**	**	**	1,412
		Percent		
0	48.5	36.4	15.2	2.3
1 to 4	46.1	32.9	21.1	10.8
5 to 7	47.2	36.1	16.7	17.9
8	60.9	29.5	9.6	26.6
9 to 11	67.7	24.5	7.9	16.2
12	73.1	20.5	6.4	17.6
College, 1 to 3	81.7	13.3	3.3	4.2
College, 4 or more	82.3	17.7	0.0	4.4

**Chi square test, 1 percent or less probability.

hold heads had adequate heat, had window or central air conditioning, and occupied housing units constructed after 1949 (Appendix Table 6). Education did not appear to influence homeownership, however.

Educational Attainment of the Wife

Since the wife has the responsibility for preparing meals and performing other housekeeping duties, she would be expected to place a high value on having modern conveniences that make these tasks easier. It also seems probable that wives with more years of schooling would have been conditioned by education to place a higher value on such conveniences than wives with fewer years of schooling, or that better-educated wives might be less willing to do without modern conveniences. It seems likely that an educated housewife generally would be a prime mover in getting the house brought up to modern standards and would be more insistent on having modern housing conveniences.

The data show that the percentage of housing with complete plumbing was significantly higher among families where the wife had more years of schooling (Table 6). Where the wife had 8 years or less of schooling about 52 percent occupied housing with complete plumbing. The percentage increased to almost 75 percent at the high school level and exceeded 85 percent when the wives had attended college. The percentage of families with no plumbing moved in the opposite direction, declining as the level of schooling attained by the wife increased. The better-educated housewives lived in newer houses that were more likely to have central heating and air conditioning (Appendix Table 6).

Table 6. Level of Housing Quality, by Educational Attainment of the Wife, 1966

Years of schooling	With complete plumbing	With partial plumbing	With no plumbing	Total
		Number of households		
0	1	3	4	8
1 to 4	12	15	10	37
5 to 7	68	42	29	139
8	150	83	29	262
9 to 11	179	71	26	276
12	209	63	10	282
College, 1 to 3	47	7	1	55
College, 4 or more	28	5	0	33
Independence test or total	**	**	**	1,092
		Percent		
0	12.5	37.5	50.0	.7
1 to 4	32.4	40.5	27.0	3.4
5 to 7	48.9	30.2	20.9	12.7
8	57.3	31.7	11.1	24.0
9 to 11	64.9	25.7	9.4	25.3
12	74.1	22.3	3.5	25.8
College, 1 to 3	85.5	12.7	1.8	5.1
College, 4 or more	84.8	15.2	0.0	3.0

**Chi square test, 1 percent or less probability.

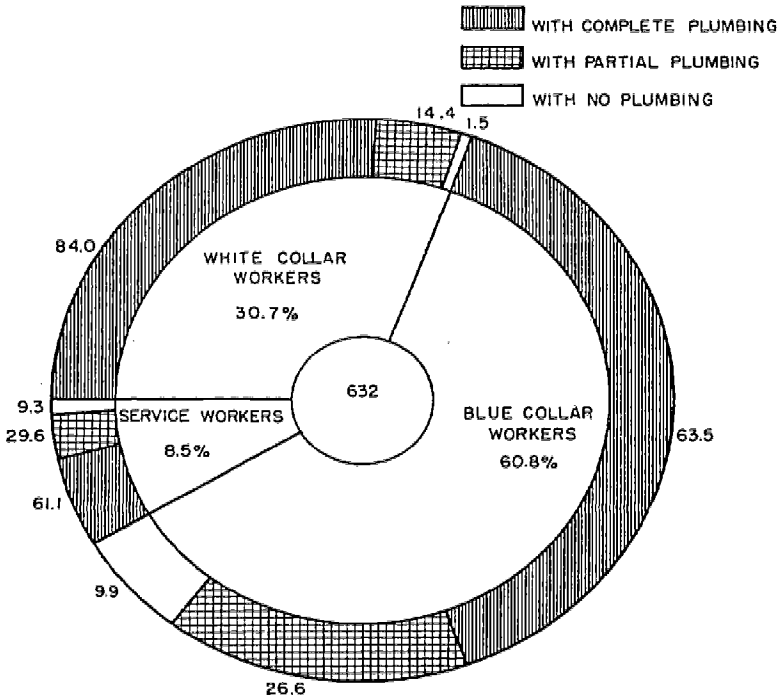

Figure 6. Levels of Quality in Housing for Rural Households of the Ozark Region by Type of Employment of Household Head, 1966

Derived from Appendix Table 1.

Type of Employment of the Household Head

Of 632 respondents in the labor force, 31 percent were classified as white collar workers, 61 percent as blue collar workers, and 8 percent were service workers. White collar workers (which includes professional, managers, sales workers, and clerical personnel) lived in houses of significantly higher quality than did families whose household head was employed in blue collar or service work (Figure 6). Some 84 percent of the white collar group had complete plumbing and less than 2 percent had no plumbing.

The superiority of housing occupied by white collar workers shows up when individual housing quality attributes are considered separately (Appendix Table 7). However, among those owning or buying a home, the blue collar and service workers compared favorably with the white collar group. Also, the percent of blue collar workers occupying a home constructed after 1949 compared favorably with white collar workers, but service workers were considerably lower in this respect.

The higher quality housing of white collar workers suggests the combined influence of higher education and of larger incomes enjoyed by professional and managerial personnel. Including clerical and sales workers in the white collar group may have reduced the differential below what it would have been if they had been excluded.

Household Head Not in the Labor Force

Of the 1,413 household heads in the sample, 540 (40 percent, excluding students) were not in the labor force at the time of the survey. More than one-third of those not in the labor force were housewives, 47 percent were retired household heads, 13 percent were disabled, and about 6 percent were both disabled and retired. Of the heads not in the labor force, 315 (58 percent) occupied adequate housing (Figure 7). At the other extreme, 68 households (13 percent) had no plumbing.

The quality of housing varied widely among groups with heads not in the labor force. Of the retired household heads 64 percent had complete plumbing, while 58 percent of those classified as housewives had complete plumbing. Among the 6 percent classified as both retired and disabled, 60 percent occupied adequate housing. Of the 13 percent of the household heads not in the labor force because of disability, only 38 percent had complete plumbing and almost 17 percent had no plumbing. Disabled household heads were least likely to have a bathroom, hot and cold running water, a flush toilet, a public sewer system, or air conditioning

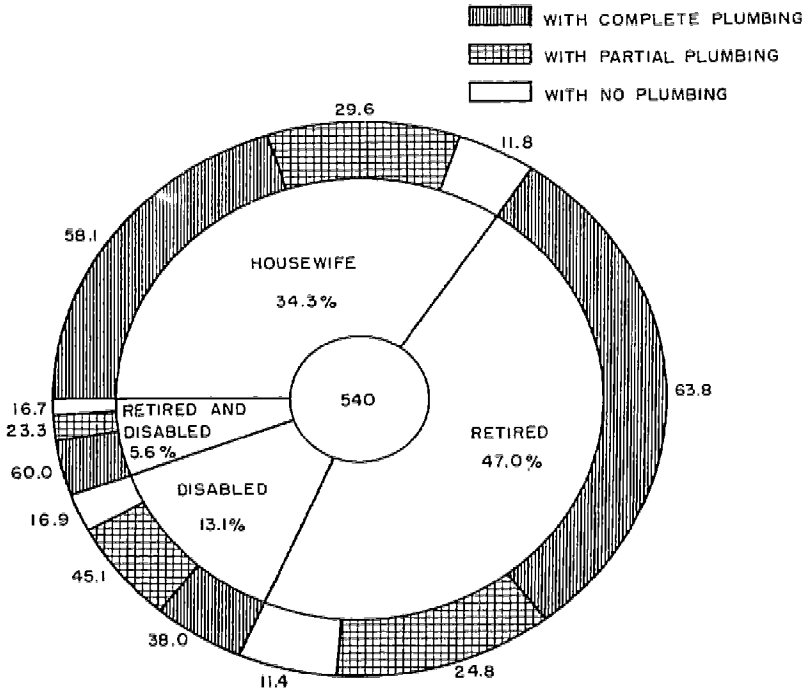

Figure 7. Levels of Quality in Housing for Rural Households of the Ozark Region by Household Head Not in the Labor Force, 1966

Derived from Appendix Table 1.

(Appendix Table 7). There was no significant difference in percentages with approved heat and with a public water system or a drilled well between disabled household heads and others not in the labor force.

Race of the Household Head

Less than 5 percent of the rural population of the Ozark Region is of other than the white race, consisting primarily of Indians and Negroes. The 65 families of the other races were about equally divided between Indians and Negroes and only 3 of these household heads were classified as farmers. With such a small number of observations, relationships and differentials (Figure 8) are only illustrative. The data suggest that white households occupy significantly better housing than do other races. About 63 percent of white households had all plumbing facilities, compared to less than 42 percent for families belonging to other races. Only 10 percent of the white families had no plumbing facilities, com-

pared to more than 18 percent for the households belonging to other races.

There was no significant difference between households headed by different racial groups in the percent of each with a public water system or a drilled well (Appendix Table 7). This may be because nearly all of the households headed by other races are rural nonfarm. There was no significant difference between the two groups in the proportion with air conditioning.

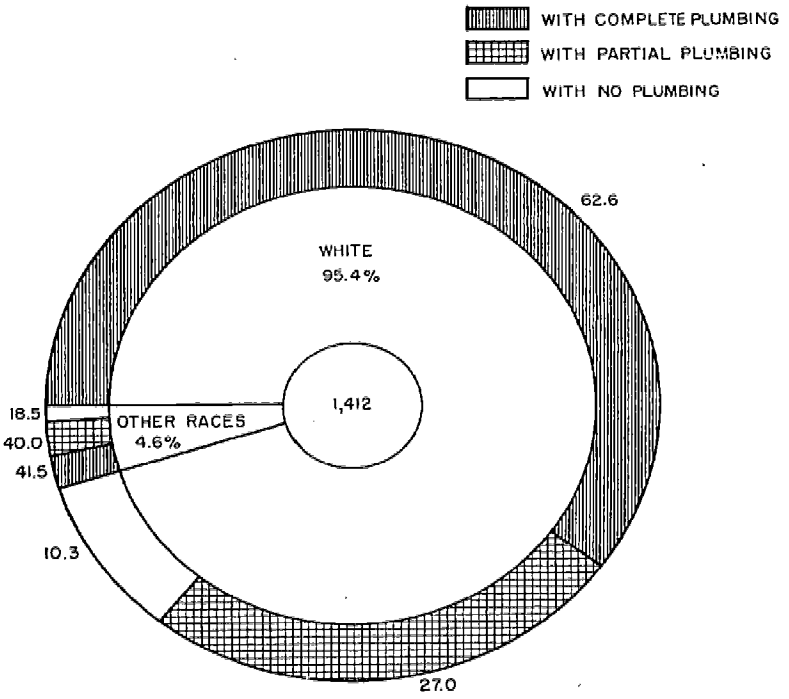

Figure 8. Levels of Quality in Housing for Rural Households of the Ozark Region by Race of Household Head, 1966

Derived from Appendix Table 1.

Age of the Household Head

The population of the Ozark Region has advanced age, because of outmigration of the young and inmigration of retirement families. Half of the 1,413 households surveyed were headed by a person 55 years of age or older and 34 percent had heads 65 years and older (4).

Table 7. Levels of Housing Quality, by Age of the Household Head, 1966

Years of age	With complete plumbing	With partial plumbing	With no plumbing	Total
		Number of households		
Under 25	35	13	4	52
25 to 34	108	31	17	156
35 to 44	138	67	21	226
45 to 54	161	62	27	250
55 to 64	136	80	28	244
65 to 74	193	82	34	309
75 and over	100	55	20	175
Independence test or total	***	***	***	1,412
		Percent		
Under 25	67.3	25.0	7.7	3.7
25 to 34	69.2	19.9	10.8	11.0
35 to 44	61.1	29.6	9.3	16.0
45 to 54	64.4	24.8	10.8	17.7
55 to 64	55.7	32.8	11.5	17.3
65 to 74	62.3	26.5	11.0	21.9
75 and over	57.1	31.4	11.4	12.4

***Chi square test, not significant.

The age of the household head did not significantly affect the proportion of families occupying housing with complete plumbing (Table 7). This is somewhat surprising since the younger household heads generally are better educated than the older generation, are more employable, are probably in a better position to purchase approved housing on long-term housing credit loans, and possibly are less willing to live in substandard housing either as owner or renter.

Part of the explanation may lie in the fact that older citizens have much of their savings invested in housing. Also, many older citizens have retired to the Ozarks from other sections of the Nation and may have brought in savings and retirement incomes sufficient to provide adequate housing.

Older citizens were less likely to have air conditioning and more likely to occupy older housing, constructed before 1949 (Appendix Table 8). On the other hand, the percentage of households owning the home was significantly higher among the middle-aged and older citizens.

Sex of the Household Head

Some 17 percent of the household heads were female. A high proportion (82 percent) of the female household heads had less than $3,000 income annually, compared with 35 percent for male heads. One-fourth of the female household heads received less than $1,000 of income in 1965 (4). It seems likely that housing would reflect this income deficiency. The housing data, however, show that households headed by females lived in housing not

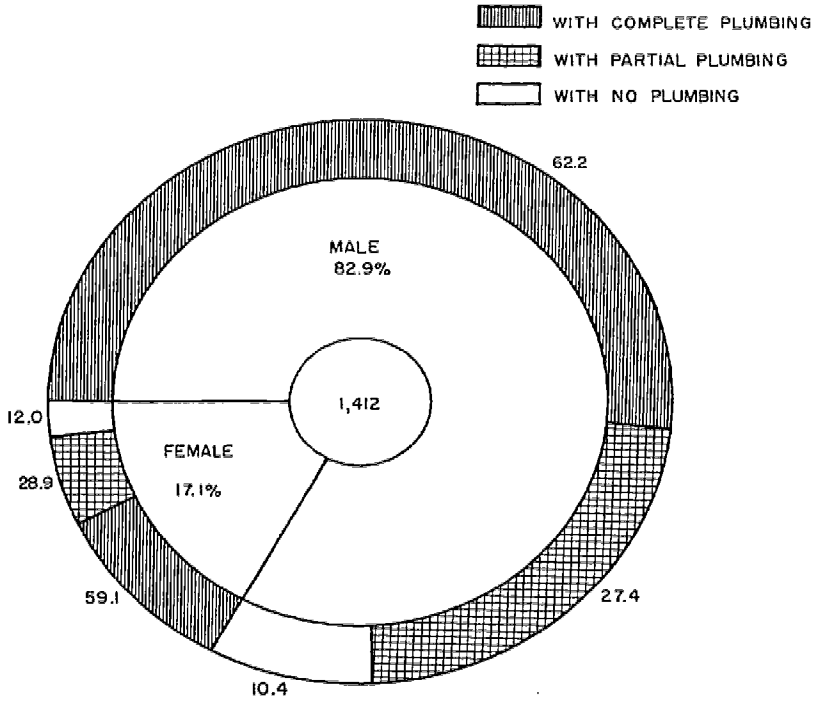

Figure 9. Levels of Quality in Housing for Rural Households of the Ozark Region by Sex of Household Head, 1966

Derived from Appendix Table 1.

significantly different in quality from housing occupied by households headed by males (Figure 9).

A significantly higher percentage of households headed by males had air conditioning, hot and cold running water, and occupied newer housing, constructed after 1949 (Appendix Table 8).

Female household heads may occupy housing of equal or nearly equal quality to their male counterparts because women tend to place a higher value on modern conveniences in the house and are more willing to allocate a higher percentage of the family budget to improving the house. Also, many female household heads may have been left with adequate quality housing provided by their husbands.

INTERRELATIONSHIPS OF HOUSING QUALITY AND SELECTED SOCIOECONOMIC CHARACTERISTICS

Regression analysis was used to explore variations in the quality of housing as measured by complete plumbing.[3] The three socioeconomic variables indicated in the preceding sections as being most significantly related to quality were included as independent variables. These were the market value of the house and land, the level of household income, and the educational attainment of the head of the household.

Methodology

Since individual housing units either do or do not have complete plumbing, housing was classified into 131 groups of 9 or 10 cases each to convert the dependent variables, that is the percentage of units with complete plumbing, into a continuous variable. The initial sorting of the 1,301 cases was by 5 categories of property value, with values under $2,500 being centered at $1,875, from $2,500 to $4,999 at $3,750, from $5,000 to $7,499 at $6,250, from $7,500 to $9,999 at $8,750, and the several categories from $10,000 to $35,000 or more centered at $17,740. The first subsort was by 4 categories of years of education, with 0 to 7 years centered at 3.5, the large number of 8-year graduates at 8.0, 9 through 12 years at 10.5, and those with more than 12 years at 15.0. Within each of these 20 groupings, the data were arrayed by household income and assembled into the final 131 groupings of 9 to 10 cases each.

These grouped data were subjected to stepwise multiple regression of linear, least squares form (Appendix Table 9). The dependent and independent variables were analyzed in arithmetic and logarithmic form. Logarithms were used because scattergrams indicated that individual relationships between housing quality and each of the three socioeconomic variables were curvilinear in form.

Relationships

The correlation coefficients (Table 8) revealed that housing quality was related to each of the three socioeconomic variables, but none of them accounted for a very large part of the variation in quality. The highest correlation coefficient, 0.58, was for the log of property values, while the squared coefficient indicated that only 34 percent of the variation in quality was associated with variations in this factor. The log of years of schooling accounted for 25 percent of the variation in housing quality, and household

[3]Hot and cold running water inside, flush toilet, bathtub or shower, central water or drilled well, and central sewage or septic tank.

Table 8. Correlation Coefficients Relating to Housing Quality[1] in the Ozark Region, 1966

Variable	Quality[1]	Logarithm of			Arithmetic value of		
		Property value	Household income	Years of schooling	Property value	Household income	Years of schooling
Dependent							
Quality[1]	1.00	.58	.46	.50	.48	.46	.50
Independent, log of							
Property value	1.00	.33	.23	.96	.36	.22	
Household income		1.00	.37	.31	.93	.37	
Years of schooling			1.00	.22	.35	.97	
Arithmetic							
Property value				1.00	.34	.21	
Household income					1.00	.35	
Years of schooling						1.00	

[1]Percent of housing units having hot and cold running water inside, flush toilet, bathtub or shower, central water supply or drilled well, and central sewage or septic tank.

Table 9. Stepwise Regression for Housing Quality and Selected Variables in the Ozark Region, 1966

Independent variable	Constant term	Coefficient and standard error				Multiple R	F level
		X_1	X_2	X_3	X_4		
X_1 Log of property value	-.732602	.152924 (.019003)				.578	64.76
X_2 Years of schooling	-.714935	.130340 (.017201)	.023004 (.003775)			.696	37.13
X_3 Property value	-2.628192	.380019 (.056077)	.023222 (.003505)	-.000032 (.000007)		.748	21.57
X_4 Household income	-2.506809	.361748 (.055155)	.020266 (.003592)	-.000032 (.000007)	.000016 (.000006)	.764	7.29

income for 21 percent. The log of property value showed higher coefficients with the quality measure than did the arithmetic value. However, the arithmetic values of income and education had the same coefficients with respect to housing quality as the log forms.

There was considerable intercorrelation among the independent variables. The coefficients between income and years of schooling and between income and property value ranged from .31 to .37. Property value was not as closely related to schooling; the coefficients ranged from .21 to .23.

In the stepwise multiple regression analysis of the percentages of housing with the specified plumbing facilities, the logarithm of property value was the first independent variable called in by the program (Table 9). Apparently the curvilinear property of the total relationship was satisfied by this variable, since the three subsequent steps involved the arithmetic forms of years of schooling, of property value, and of household income. These four variables all had significant F levels and raised the multiple correlation coefficient successively to .764, indicating that 58 percent of the variation in quality was accounted for by variations in these four variables.

The net effects on housing quality of each of the three socioeconomic variables is shown in Figure 10, the other variables being held at their mean values in each case. The curve for property value is the joint result of the log of property values, X_1, and the arithmetic property value, X_3. The downturn in quality at the higher values is not inconsistent since the percentages of houses with complete plumbing fluctuated erratically at property values above $10,000 (Table 1). This, in turn, probably reflects the inclusion of the value of farm land in the value of the residence.

There was considerable interrelationship among the three independent variables. Regressions between quality and either schooling or income show a curvilinear relationship, similar to that for property value in the upper portion of Figure 10. Each curve is steep in the lower range and flattens out at the higher values of education and income.

Five other stepwise regressions were made on selected independent variables — income, education, property values, and their logs — against either the percent with complete plumbing or its log (Appendix Table 9). None explained housing quality as satisfactorily as the regression shown in Table 9 and Figure 10.

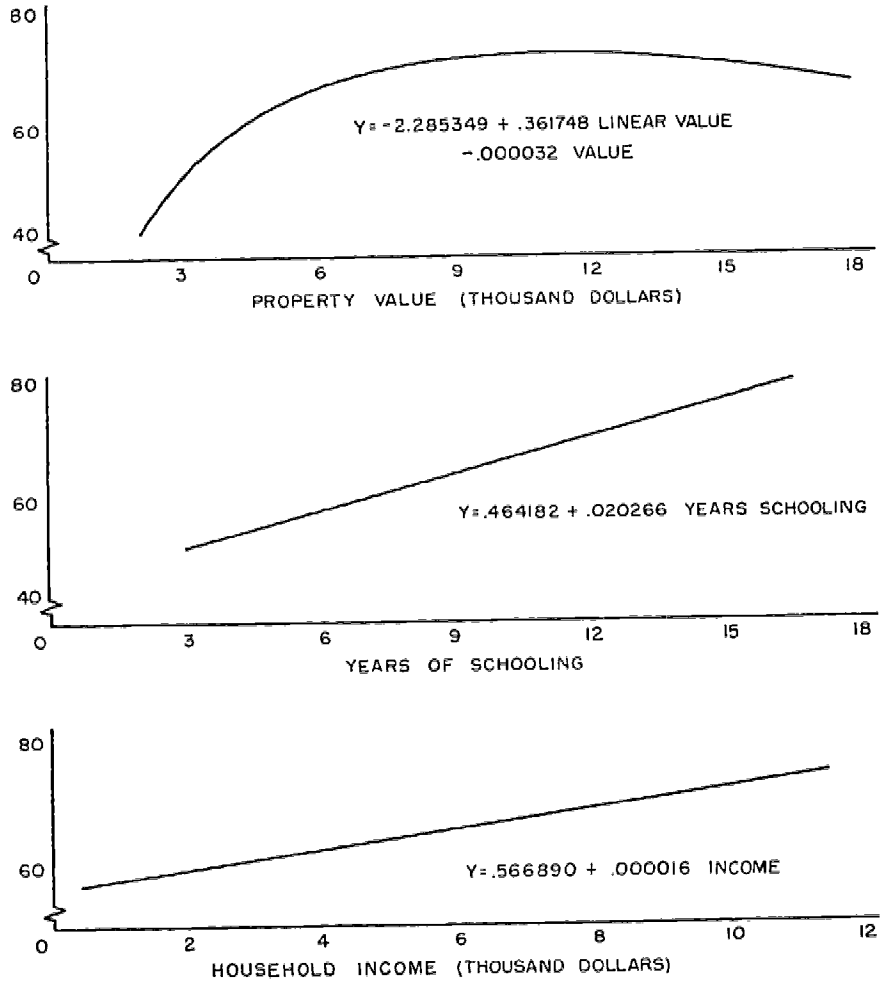

Figure 10. Net Effect on Quality of Housing of Property Value, Education of Household Head, and Household Income, Ozark Region, 1966

Significance

The most significant regression accounted for only 58 percent of the observed variation in housing quality. This low percentage might exist because housing is a large, highly durable investment. Some retirees and others with low current incomes obtained adequate housing from higher incomes in previous years. Conversely, households with higher current incomes may not yet have had

them long enough to acquire better housing, so the relationships are quite complex. Furthermore, since some of the property values include farm land and nonresidential structures, they would not be expected to relate closely to housing quality.

Finally, the net regressions plotted in Figure 10 do not reliably portray the relative influence of each of the three socio-economic variables, since there is substantial interrelationship among them. Income is related to both education and property values, so the stepwise multiple regression cannot completely separate the influence of each variable.

Despite these limitations, the multiple regression analysis was statistically significant for all of the variables and provides a valuable analytical supplement to the individual relationships discussed in the preceding sections.

SUMMARY

An analysis of the socio-economic data obtained from interviews of 1,413 households in the Ozarks in 1966 showed that the quality of rural housing was significantly related to household incomes. Yet, this relationship was far from being comprehensive. Of the households with incomes that placed them in the seriously deprived class, only 63 percent lived in substandard housing, whereas 37 percent were living in adequate dwellings. Even in the most affluent of the five income-size classes, 20 percent of the households were living in substandard housing.

Besides income, three other socio-economic factors were significantly related to housing quality: the level of formal education of the head of the household and of the wife, and the type of employment of the household head — white collar, blue collar, or service worker.

Findings showed a significantly high correlation between the market value of the house and land and the quality of housing. This was especially true of those homes valued under $5,000. Homes that had been mortgaged were significantly better than nonmortgaged homes, but the newer homes were more apt to be mortgaged than the older homes.

Four socio-economic characteristics of the household were not significantly related to the quality of housing. Two of these were the age of the head of the household and whether the household head was a female. Apparently many of the aged and widowed householders gained control of an adequate home before their incomes were reduced, and female household heads may put more emphasis on having modern conveniences in the home.

Also, farm housing was found to be of about the same quality as rural nonfarm housing. This is probably true because many of the farmers obtained a large part of their income from nonfarm sources. They differed from rural non-farmers only because they had more than 10 acres of land and sold $50 or more worth of farm products, or they had less than 10 acres and sold $250 or more worth of farm products in 1965.

In addition, renters did not occupy significantly poorer housing than did owners. This may result from the large number of rental houses that have been vacated in the area, with only the better housing now being rented.

Because of the small number of Negro and Indian households in the area and thus in the sample, it was not possible to make reliable racial comparisons of housing quality.

A multiple regression analysis was made to determine the effects of three of the major socioeconomic factors — household income, level of education of the head of the household, and value of the property — on housing quality. It was found that only 58 percent of the differences in the quality of housing were associated with variations in these factors. Thus other factors must be important in determining housing quality.

The data suggest that programs to correct differences in levels of income and education of household occupants would help to eliminate much, but not all, of the substandard housing in the Ozarks.

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Appendix Table 1. Levels of Quality in Housing for Rural Households of the Ozark Region by Various Characteristics, 1966

Characteristic	With complete plumbing	With partial plumbing	With no plumbing	Total
		Number of households		
Date house was constructed				
1950 to 1966	347	100	25	472
Before 1950	502	279	120	901
Independence test[1]	**	**	**	1,373
Place of residence				
Farm	147	112	34	293
Nonfarm	724	278	117	1,119
Independence test[1]	**	**	**	1,412
Use of mortgage financing				
Mortgaged	349	131	28	508
Not mortgaged	328	163	74	565
Independence test[1]	**	**	**	1,073
Tenure status				
Owning or buying	576	297	100	1,073
Renting	160	71	36	267
Independence test[1]	***	***	***	1,340
Size-income class[2]				
Seriously deprived	25	21	22	68
Deprived	127	96	62	285
Marginal	235	118	48	401
Probably not deprived	210	91	12	313
Definitely not deprived	267	63	5	335
Independence test[1]	**	**	**	1,402
Type of employment				
White collar[3]	163	28	3	194
Blue collar[4]	244	102	38	384
Service workers[5]	33	16	5	54
Independence test[1]	**	**	**	632
Household head not in labor force[6]				
Housewife	108	55	22	185
Retired	162	63	29	254
Disabled	27	32	12	71
Retired & disabled	18	7	5	30
Independence test[1]	*	*	*	540
Race of household head				
White	844	364	139	1,347
Nonwhite	27	26	12	65
Independence test[1]	*	*	*	1,412
Sex of household head				
Male	728	320	122	1,170
Female	143	70	29	242
Independence test[1]	***	***	***	1,412

[1]Chi square test. **, 1 percent probability or less; *, 5 percent probability or less; ***, not significant.

[2]See Table 4 in text for relative income deprivation based on relationship between income and household size.

[3]Heads employed as professionals, managers (except farm managers), clerical workers, and sales workers.

[4]Heads employed as craftsmen, operators, farm laborers and foremen, and laborers other than farm and mine.

[5]Heads employed as private household workers and service workers other than household employees.

[6]Excludes household heads enrolled in school.

Appendix Table 2. Quality Attributes of Housing in Rural Areas of the Ozark Region by Value of Property, 1966

Value of property	Number of respondents	Bathroom in dwelling	Public water system or a drilled well	Hot and cold running water, inside	Flush toilet, inside	Public sewer system or a septic tank	Furnace, built-in wall units, or gas circulating heater	Window or central air conditioning	Home constructed after 1949
					Number				
Less than $2,499	152	60	92	54	60	59	80	19	25
$2,500 - $4,999	284	182	210	166	183	182	187	60	67
$5,000 - $7,499	235	193	191	180	193	186	179	53	87
$7,500 - $9,999	184	160	150	158	162	160	140	60	60
$10,000 - $14,999	199	177	161	175	176	170	153	65	82
$15,000 - $19,999	113	101	99	102	101	100	88	42	52
$20,000 - $24,999	78	66	59	67	66	66	63	33	31
$25,000 - $29,999	57	55	49	53	55	52	44	21	27
$30,000 - $34,999	83	79	66	80	81	78	75	42	37
$35,000 and over	28	18	19	16	18	18	16	5	4
Independence test		**	**	**	**	**	**	**	**
					Percent				
Less than $2,499	100.0	39.5	60.5	35.5	39.5	38.8	52.6	12.5	16.4
$2,500 - $4,999	100.0	64.1	73.9	58.5	64.4	64.1	65.8	21.1	23.6
$5,000 - $7,499	100.0	82.1	81.3	76.6	82.1	79.1	76.2	22.6	37.0
$7,500 - $9,999	100.0	87.0	81.5	85.9	88.0	87.0	76.1	32.6	32.6
$10,000 - $14,999	100.0	88.9	80.9	87.9	88.4	85.4	76.9	32.7	41.2
$15,000 - $19,999	100.0	89.4	87.6	90.3	89.4	88.5	77.9	37.2	46.0
$20,000 - $24,999	100.0	84.6	75.6	85.9	84.6	84.6	80.8	42.3	39.7
$25,000 - $29,999	100.0	96.5	86.0	93.0	96.5	91.2	77.2	36.8	47.4
$30,000 - $34,999	100.0	95.2	79.5	96.4	97.6	94.0	90.4	50.6	44.6
$35 000 and over	100.0	64.3	67.9	57.1	64.3	64.3	57.1	17.9	14.3

** Chi square test, 1 percent or less probability.

Appendix Table 3. Quality Attributes of Housing in Rural Areas of the Ozark Region by Age of Housing Unit, Place of Residence, Mortgage Financing and Tenure Status, 1966

Measure	Number of respondents	Bathroom in dwelling	Public water system or a drilled well	Hot and cold running water, inside	Flush toilet, inside	Public sewer system or a septic tank	Furnace, built-in wall units, or gas circulating heater	Window or central air conditioning	Home constructed after 1949	Owning or buying a home
					Number					
Date of construction										
1950-66	472	416	394	401	413	412	397	190	472	241
Before 1950	902	647	673	623	653	632	597	203	0	537
Independence test		**	**	**	**	**	**	**	**	**
					Percent					
1950-66	100.0	88.1	83.5	85.0	87.5	87.3	84.1	40.3	100.0	51.1
Before 1950	100.0	71.7	74.6	69.1	72.4	70.1	66.2	22.5	0.0	59.5
					Number					
Place of residence										
Farm	293	215	199	216	217	203	175	70	82	267
Nonfarm	1120	876	897	835	878	868	850	330	390	807
Independence test		***	**	***	***	**	**	***	*	**
					Percent					
Farm	100.0	73.4	67.9	73.7	74.1	69.3	59.7	23.9	28.0	91.1
Nonfarm	100.0	78.2	80.1	74.6	78.4	77.5	75.9	29.5	34.8	72.1
					Number					
Mortgage financing										
Property mortgaged	508	431	415	423	432	419	388	178	219	508
Not mortgaged	566	416	419	406	427	418	397	137	174	566
Independence test		**	**	**	**	**	*	**	**	***
					Percent					
Property mortgaged	100.0	84.8	81.7	83.3	85.0	82.5	76.4	35.0	43.1	.....
Not mortgaged	100.0	75.3	74.0	71.7	75.4	73.9	70.1	24.2	30.7	.....
					Number					
Tenure status										
Owning or buying	1074	857	836	828	859	837	785	315	393	.....
Renting	267	193	209	183	195	193	191	63	64	.....
Independence test		**	***	**	*	***	***	***	**	.....
					Percent					
Owning or buying	100.0	79.8	77.8	77.1	80.0	77.9	73.1	29.3	36.6	.....
Renting	100.0	72.3	78.3	68.5	73.0	72.3	71.5	23.6	24.0	.....

* Chi square test, 5 percent probability. ** Chi square test, 1 percent or less probability. *** Not significant.

Appendix Table 4. Quality Attributes of Housing in Rural Areas of the Ozark Region by Net Family Income, 1966

Net family income 1965	Number of respondents	Bathroom in dwelling	Public water system or a drilled well	Hot and cold running water, inside	Flush toilet, inside	Public sewer system or a septic tank	Furnace, built-in wall units, or gas circulating heater	Window or central air conditioning	Home constructed after 1949	Owning or buying a home
					Number					
Less than $1,000	108	65	71	54	64	62	61	13	26	83
$1,000 - $1,999	293	189	205	179	190	188	192	50	59	231
$2,000 - $2,999	214	153	160	149	155	149	140	44	54	151
$3,000 - $3,999	197	142	151	137	143	136	127	40	62	136
$4,000 - $4,999	135	114	110	111	114	115	103	41	48	97
$5,000 - $5,999	121	109	98	107	108	105	99	43	51	86
$6,000 - $6,999	116	100	95	99	101	97	96	44	53	90
$7,000 - $7,999	71	65	63	61	64	65	59	34	36	58
$8,000 - $8,999	37	36	32	34	36	36	34	15	16	34
$9,000 - $9,999	29	29	27	29	29	28	27	13	17	26
$10,000 and over	92	89	84	91	91	90	87	63	50	82
Independence test		**	**	**	**	**	**	**	**	**
					Percent					
Less than $1,000	100.0	60.2	65.7	50.0	59.3	57.4	56.5	12.0	24.1	76.9
$1,000 - $1,999	100.0	64.5	70.0	61.1	64.8	64.2	65.5	17.1	20.1	78.8
$2,000 - $2,999	100.0	71.5	74.8	69.6	72.4	69.6	65.4	20.6	25.2	70.6
$3,000 - $3,999	100.0	72.1	76.6	69.5	72.6	69.0	64.5	20.3	31.5	69.0
$4,000 - $4,999	100.0	84.4	81.5	82.2	84.4	85.2	76.3	30.4	35.6	71.9
$5,000 - $5,999	100.0	90.1	81.0	88.4	89.3	86.8	81.8	35.5	42.1	71.1
$6,000 - $6,999	100.0	86.2	81.9	85.3	87.1	83.6	82.8	37.9	45.7	77.6
$7,000 - $7,999	100.0	91.5	88.7	85.9	90.1	91.5	83.1	47.9	50.7	81.7
$8,000 - $8,999	100.0	97.3	86.5	91.9	97.3	97.3	91.9	40.5	43.2	91.9
$9,000 - $9,999	100.0	100.0	93.1	100.0	100.0	96.6	93.1	44.8	58.6	89.7
$10,000 and over	100.0	96.7	91.3	98.9	98.9	97.8	94.6	68.5	54.3	89.1

**Chi square test, 1 percent or less probability.

Appendix Table 5. Quality Attributes of Housing in Rural Areas of the Ozark Region by Household Size-Income Classes, 1966

Household size-income classes	Number of respondents	Bathroom in dwelling	Public water system or a drilled well	Hot and cold running water, inside	Flush toilet, inside	Public sewer system or a septic tank	Furnace, built-in wall units, or gas circulating heater	Window or central air conditioning	Home constructed after 1949	Owning or buying a home
					Number					
Seriously deprived	68	36	38	33	35	32	33	12	16	47
Deprived	285	167	193	155	166	161	158	39	59	213
Marginal	401	298	308	283	301	298	278	80	110	282
Probably not deprived	313	266	257	262	268	261	246	109	126	244
Definitely not deprived	335	317	293	310	318	312	301	158	158	279
Independence test		**	**	**	**	**	**	**	**	**
					Percent					
Seriously deprived	100.0	52.9	55.9	48.5	51.5	47.1	48.5	17.6	23.5	69.1
Deprived	100.0	58.6	67.7	54.4	58.2	56.5	55.4	13.7	20.7	74.7
Marginal	100.0	74.3	76.8	70.6	75.1	74.3	69.3	20.0	27.4	70.3
Probably not deprived	100.0	85.0	82.1	83.7	85.6	83.4	78.6	34.8	40.3	78.0
Definitely not deprived	100.0	94.6	87.5	92.5	94.9	93.1	89.9	47.2	47.2	83.3

** Chi square test, 1 percent or less probability.

Appendix Table 6. Quality Attributes of Housing in RuralAreas of the Ozark Region by Educational Attainment of Household Head, and of Wife, 1966

Years of schooling	Number of respondents	Bathroom in dwelling	Public water system or a drilled well	Hot and cold running water, inside	Flush toilet, inside	Public sewer system or a septic tank	Furnace, built-in wall units, or gas circulating heater	Window or central air conditioning	Home constructed after 1949	Owning or buying a home
					Number					
Household head										
0	33	20	24	19	20	20	24	5	6	23
1 to 4	152	99	102	94	98	92	97	28	39	117
5 to 7	252	162	172	156	163	157	157	42	63	185
8	376	282	308	265	283	281	254	88	111	300
9 to 11	229	191	178	188	195	192	179	73	97	170
12	249	220	204	216	220	215	304	97	103	185
College, 1 to 3	60	57	53	54	56	55	55	35	28	50
College, 4 or more	62	60	55	59	60	59	55	32	25	44
Independence test		**	**	**	**	**	**	**	**	***
					Percent					
0	100.0	60.6	72.7	57.6	60.6	60.6	72.7	15.2	18.2	69.7
1 to 4	100.0	65.1	67.1	61.8	64.5	60.5	63.8	18.4	25.7	77.0
5 to 7	100.0	64.3	68.3	61.9	64.7	62.3	62.3	16.7	25.0	73.4
8	100.0	75.0	81.9	70.5	75.3	74.7	67.6	23.4	29.5	79.8
9 to 11	100.0	83.4	77.7	82.1	85.2	83.8	78.2	31.9	42.4	74.2
12	100.0	88.4	81.9	86.7	88.4	86.3	81.9	39.0	41.4	74.3
College, 1 to 3	100.0	95.0	88.3	90.0	93.3	91.7	91.7	58.3	46.7	83.3
College, 4 or more	100.0	96.8	88.7	95.2	96.8	95.2	88.7	51.6	40.3	71.0
					Number					
Wife										
0	8	2	3	2	2	2	3	0	1	7
1 to 4	37	20	23	18	20	18	25	5	8	30
5 to 7	139	85	98	80	84	82	81	19	33	106
8	262	198	199	189	201	192	172	56	75	217
9 to 11	276	221	215	219	221	216	206	91	112	191
12	282	253	234	252	254	249	235	113	127	213
College, 1 to 3	55	53	49	52	53	53	48	29	27	45
College, 4 or more	33	32	31	31	32	31	30	19	16	26
Independence test		**	**	**	**	**	**	**	**	*
					Percent					
0	100.0	25.0	37.5	25.0	25.0	25.0	37.5	0.0	12.5	87.5
1 to 4	100.0	54.1	62.2	48.6	54.1	48.6	67.6	13.5	21.6	81.1
5 to 7	100.0	61.2	70.5	57.6	60.4	59.0	58.3	13.7	23.7	76.3
8	100.0	75.6	76.0	72.1	76.7	73.3	65.6	21.4	28.6	82.8
9 to 11	100.0	80.1	77.9	79.3	80.1	78.3	74.6	33.0	40.6	69.2
12	100.0	89.7	83.0	89.4	90.1	88.3	83.3	40.1	45.0	75.5
College, 1 to 3	100.0	96.4	89.1	94.5	96.4	96.4	87.3	52.7	49.1	81.8
College, 4 or more	100.0	97.0	93.9	93.9	97.0	93.9	90.9	57.6	48.5	78.8

* Chi square test, 5 percent probability. ** Chi square test, 1 percent or less probability. *** Not significant.

Appendix Table 7. Quality Attributes of Housing in Rural Areas of the Ozark Region by Type of Employment or Non-employment, and Race of Household Heads, 1966

Measure	Number of respondents	Bathroom in dwelling	Public water system or a drilled well	Hot and cold running water, inside	Flush toilet, inside	Public sewer system or a septic tank	Furnace, built-in wall units, or gas circulating heater	Window or central air conditioning	Home constructed after 1949	Owning or buying a home
					Number					
Type of employment										
White-collar[1]	194	184	175	180	184	182	175	104	90	144
Blue collar[2]	384	297	307	287	299	294	281	104	171	258
Service[3]	54	42	44	38	42	42	37	14	17	40
Independence test		**	**	**	**	**	**	**	***	***
					Percent					
White collar[1]	100.0	94.8	90.2	92.8	94.8	93.8	90.2	53.6	46.4	74.2
Blue collar[2]	100.0	77.3	79.9	74.7	77.9	76.6	73.2	27.1	44.5	67.2
Service[3]	100.0	77.8	81.5	70.4	77.8	77.8	68.5	25.9	31.5	74.1
					Number					
Status of heads not in force[4]										
Housewife	186	137	146	125	139	138	143	30	39	143
Retired	254	199	196	193	199	194	183	74	70	217
Disabled	71	40	51	36	38	38	45	14	16	49
Retired and disabled	30	21	22	21	21	21	19	9	7	26
Independence test		**	***	**	**	**	***	**	***	**
					Percent					
Housewife	100.0	73.7	78.5	67.2	74.7	74.2	76.9	16.1	21.0	76.9
Retired	100.0	78.3	77.2	76.0	78.3	76.4	72.0	29.1	27.6	85.4
Disabled	100.0	56.3	71.8	50.7	53.5	53.5	63.4	19.7	22.5	69.0
Retired and disabled	100.0	70.0	73.3	70.0	70.0	70.0	63.3	30.0	23.3	86.7
					Number					
Race of household head										
White	1348	1055	1049	1015	1059	1035	986	386	458	1032
Nonwhite	65	36	47	36	36	36	39	14	14	42
Independence test		**	***	**	**	**	*	***	*	*
					Percent					
White	100.0	78.3	77.8	75.3	78.6	76.8	73.1	28.6	34.0	76.6
Nonwhite	100.0	55.4	72.3	55.4	55.4	55.4	60.0	21.5	21.5	64.6

[1] Includes household heads employed as professionals, managers except farm managers, clerical workers, and sales workers.
[2] Includes household heads employed as craftsmen, operators, farm laborers and farm foremen, and laborers other than farm and mine.
[3] Includes household heads employed as private household workers and service workers other than household employees.
[4] Excludes household heads enrolled in school.
* Chi square test, 5 percent probability.
** Chi square test, 1 percent or less probability.
*** Not significant.

Appendix Table 8. Quality Attributes of Housing in Rural Areas of the Ozark Region by Age and Sex of Household Head, 1966

Household head	Number of respondents	Bathroom in dwelling	Public water system or a drilled well	Hot and cold running water, inside	Flush toilet, inside	Public sewer system or a septic tank	Furnace, built-in wall units, or gas circulating heater	Window or central air conditioning	Home constructed after 1949	Owning or buying a home
					Number					
Age										
Under 25 years old	52	42	45	40	42	42	40	12	28	18
25 - 34	156	126	124	124	126	124	125	52	85	89
35 - 44	226	172	180	167	174	173	157	83	94	156
45 - 54	250	201	187	196	201	195	183	77	92	197
55 - 64	244	176	185	172	178	169	164	54	59	204
65 - 74	310	244	239	233	243	240	224	86	80	262
75 and over	175	130	136	119	131	128	132	36	34	148
Independence test		***	***	***	***	***	***	**	**	**
					Percent					
Under 25 years old	100.0	80.8	86.5	76.9	80.8	80.8	76.9	23.1	53.8	34.6
25 - 34	100.0	80.8	79.5	79.5	80.8	79.5	80.1	33.3	54.5	57.1
35 - 44	100.0	76.1	79.6	73.9	77.0	76.5	69.5	36.7	41.6	69.0
45 - 54	100.0	80.4	74.8	78.4	80.4	78.0	73.2	30.8	36.8	78.8
55 - 64	100.0	72.1	75.8	70.5	73.0	69.3	67.2	22.1	24.2	83.6
65 - 74	100.0	78.7	77.1	75.2	78.4	77.4	72.3	27.7	25.8	84.5
75 and over	100.0	74.3	77.7	68.0	74.9	73.1	75.4	20.6	19.4	84.6
					Number					
Sex										
Male	1170	908	906	886	910	888	846	347	416	887
Female	243	183	190	165	185	183	179	53	56	187
Independence test		***	***	*	***	***	***	*	**	***
					Percent					
Male	100.0	77.6	77.4	75.7	77.8	75.9	72.3	29.7	35.6	75.8
Female	100.0	75.3	78.2	67.9	76.1	75.3	73.7	21.8	23.0	77.0

* Chi square test, 5 percent probability.
** Chi square test, 1 percent or less probability.
*** Not significant.

Appendix Table 9. Stepwise Regressions between Selected Variables and Housing Quality[1] in the Ozark Region, 1966

Dependent variable	Constant term	Step	Dependent variable			Entering F level	Multiple R
			Variable	Coeffficient	Std. error		
1. Ln percent[1]	-3.382312	1	Ln prop val.	.319316	.038831	67.65	.586
	-3.577186	2	Ln prop val.	.275281	.036134		.682
			Ln of educ.	.300022	.055766	28.96	
	-8.077605	3	Ln prop val.	.863090	.114987		.750
			Ln of educ.	.299778	.050595		
			Prop. val.	-.000076	.000014	28.45	
	-8.429821	4	Ln prop. val.	.826544	.113690		.764
			Ln of educ.	.258138	.052372		
			Prop val.	-.000074	.000014		
			Ln income	.092910	.037503	6.14	
	-8.340394	5	Ln prop val.	.832964	.114238		.765
			Ln of educ.	.098761	.224086		
			Prop val.	-.000075	.000014		
			Ln income	.091167	.037648		
			Education	.023306	.031857	.54	
	-8.740373	6	Ln prop val.	.832836	.114475		.766
			Ln of educ.	.093962	.224657		
			Prop val.	-.000074	.000014		
			Ln income	.151154	.094219		
			Education	.024016	.031940		
			Income	-.000021	.000030	.48	
2. Ln percent[1]	-2.588925	1	Ln income	.256851	.045971	31.22	.441
	-2.462307	2	Ln income	.237963	.128117		.442
			Income	.000007	.000041	.03	
3. Percent[1]	.228030	1	Ln of education	.205257	.031063	43.66	.502
	.209176	2	Ln of education	.158544	.031059		.588
			Income	.000030	.000007	18.23	

Continued

Appendix Table 9. (Continued)

Dependent variable	Constant term	Step	Dependent variable			Entering F level	Multiple R
			Variable	Coeffficient	Std. error		
	-.014274	3	Ln of education	.156247	.031487		.590
			Income	.000020	.000018		
			Ln income	.033083	.056698	.34	
	.036751	4	Ln of education	.090706	.135283		.591
			Income	.000020	.000018		
			Ln income	.033293	.056868		
			Education	.009594	.019257	.25	
4. Ln percent[1]	-1.313093	1	Ln of education	.396222	.065218	39.91	.472
	-2.562450	2	Ln of education	.300156	.066617		.552
			Ln income	.179981	.046145	15.21	
	-2.498148	3	Ln of education	.300049	.066889		.552
			Ln income	.170414	.120446		
			Income	.000003	.000039	.01	
	-2.488678	4	Ln of education	.287385	.287666		.552
			Ln income	.170453	.120925		
			Income	.000003	.000039		
			Education	.001781	.040947	.00	
5. Log percent[1]	-3.382312	1	Ln prop val.	.319316	.038821	67.65	.587
	-3.577186	2	Ln prop val.	.275281	.036134		.682
			Ln of education	.300022	.055756	28.96	
	-4.085639	3	Ln prop val.	.250035	.036826		.700
			Ln of education	.253782	.057691		
			Ln income	.103160	.041262	6.25	
6. Percent[1]	-.732602	1	Ln prop val.	.152924	.019003	64.76	.578
	-.836543	2	Ln prop val.	.129437	.017309		.693
			Ln of education	.160023	.026709	35.90	
	-1.107533	3	Ln prop val.	.115981	.017537		.714
			Ln of education	.135379	.027474		
			Ln income	.054981	.019650	7.83	

[1] Percent with hot and cold running water, flush toilet, bathtub or shower, central water or drilled well, and central sewer or septic tank.

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