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Relationships between selected characteristics of Tennessee broiler producers, their production operations and their use of recommended management practices

Olayinka A. Ogunleye

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I am submitting herewith a thesis written by Olayinka A. Ogunleye entitled "Relationships between selected characteristics of Tennessee broiler producers, their production operations and their use of recommended management practices." I have examined the final electronic 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.

Robert S. Dotson, Major Professor

We have read this thesis and recommend its acceptance:

Cecil E. Carter Jr., Robert W. Bastien

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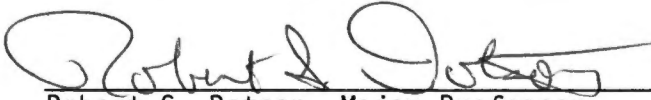
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To the Graduate Council:


I am submitting herewith a thesis written by Olayinka A. Ogunleye entitled "Relationships Between Selected Characteristics of Tennessee Broiler Producers, Their Production Operations and Their Use of Recommended Management Practices." 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.


Robert S. Dotson, Major Professor

We have read this thesis
and recommend its acceptance:

Accepted for the Council:


Vice Chancellor
Graduate Studies and Research

RELATIONSHIPS BETWEEN SELECTED CHARACTERISTICS OF TENNESSEE
BROILER PRODUCERS, THEIR PRODUCTION OPERATIONS AND THEIR
USE OF RECOMMENDED MANAGEMENT PRACTICES

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

Olayinka A. Ogunleye

June 1983

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ABSTRACT

The purposes of the study were: (1) to characterize Tennessee broiler producers and their farming operations; (2) to identify practices they were using; (3) to study factors influencing practice adoption and (4) to characterize Tennessee broiler contracts in terms of type and content.

Extension agents interviewed 123 randomly selected broiler growers in the Fall of 1982, in a state-wide survey. Analysis of variance and Chi-square statistics were used to determine relations between six dependent variables and 30 independent variables. Dependent variables included: mean house capacity; mean years having grown broilers; main source of income; future plans; mean total Extension contacts; and mean percent of total practices used. Independent variables included: 15 recommended management practices and 15 characteristics, including six used as dependent variables plus nine others.

Regarding characteristics of broiler growers and their operations, it was found that: (1) mean broiler house capacity was 31,500 birds; (2) growers had produced broilers a mean of nearly 11 years; (3) one-half of the growers gave poultry as a major source of income; (4) almost all growers planned to continue at the same or increased size of operation; (5) most had one or more Extension contacts in 1981; (6) nearly all used conventional type of housing and most used a combination of ventilation types; and (7) most used

shavings and/or sawdust for litter, and put used litter on land.

Highly significant and significant relations included the following:

1. For mean house capacity: poultry as a major source of income; type of ventilation; use of fogger for cooling; type of feeder; water medicator; and three recommended management practices (i.e. check thermostat, add feed to trays, and use milk solution with viral vaccine).
2. For mean years having grown broilers: main source of income; total house capacity; type of feeders; type of waterers; type of litter; and four recommended management practices (i.e. clean waterers daily and between growouts, check house three times daily, mow grass around houses).
3. For main source of income: total house capacity; years grown broilers; total Extension contacts; used foggers for cooling; type of waterers and had water medicators; dead bird disposal; types of litter; use of litter; and use of six recommended management practices (i.e. clean waterers between growouts; check thermostat for accuracy; clean waterers daily; add feed to trays three times daily; check each house three times daily; and use milk solution with viral vaccine).
4. For future plans: type of housing; type of waterers; and keep mortality records.
5. For total Extension contacts: main income source; house capacity; type feeders; growouts on same litter; use of litter;

and one recommended practice (i.e. check each house three times daily).

6. For mean percent of total practices used: total house capacity; type housing; use of foggers for cooling; and feeder type.

Regarding broiler contracts, it was seen that contractors tended to make most decisions, giving growers improved economic security in return. The economic reward built into the broiler contracts and resulting constant supervision seemed to be the major factor influencing producers to use recommended practices, since growers' payments were based on feed conversion adjusted for mortality and condemnation.

Implications and recommendations also were included.

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CHAPTER I

INTRODUCTION

A. THE PROBLEM AND ITS SETTING

Livestock and its products amounted to 45.7 percent of total cash receipts of Tennessee farm products in 1981. Chickens, including broilers, contributed less than 4 percent to total farm sales receipts in 1981, just 1 percent over 1980 receipts. Sales from broilers ranked fourth, coming after cattle and calves, dairy products and hogs (12:64).¹

Commercial broiler production for 1981 totaled 64.5 million broilers, down 4 percent from 1980, but up 12 percent from 1979 (12:36). The drop from 1980 may indicate a downward trend in commercial broiler production in Tennessee for the first time. Tennessee's gross income from broiler production was \$62.7 million in 1981, up 1 percent from 1980 gross income (12:51), while gross broiler income for the entire nation was up 9 percent.

The Tennessee broiler industry is only a small part of the United States broiler industry. Tennessee produced less than 2 percent of the 3.98 billion broilers produced in the United States in 1981 (13:10). However, broilers contributed a significant portion

¹Numbers in parentheses are alphabetically listed references in the Bibliography; those after the colon are page numbers.

of the total agricultural sales of Tennessee counties where production was concentrated. In 1978, poultry and its products accounted for over 68 percent of the total value of farm products sold in Grundy County (14:357); 62 percent in Bradley County (14:232); and more than 54 percent in Polk County (4:552). The Tennessee broiler industry has failed to keep pace with the rest of the nation. Due to increasing production costs and very narrow profit margins, an increasing number of broiler houses in Tennessee are empty.

Practically all broilers produced in Tennessee are grown under contract. The contractor provides servicemen, who keep growers updated on the latest management practices. This kind of setting has limited the educational role of the Agricultural Extension agent on the broiler farms. However, this does not totally exclude the Extension Service from influencing events in the broiler industry.

B. NEED FOR THE STUDY

The Tennessee Agricultural Extension Service needs to improve the quality of educational programs in order to increase the income and standard of living of Tennesseans. To improve Extension programs, adequate information is necessary to establish priorities and evaluate program effectiveness. Data from the broiler survey conducted in the Fall of 1982, needed to be analyzed to fully determine Extension's future role in the broiler industry.

C. PURPOSE OF THE STUDY

This study was intended to determine the characteristics of Tennessee broiler producers and their farming operations, to determine what recommended production practices they were using and to identify what factors may have influenced them to adopt practices. Part of the study also was devoted to a brief examination of the characteristics of Tennessee broiler contracts.

The specific objectives of this study were:

1. To characterize broiler producers in Tennessee and their farming operations.
2. To determine if there was a relationship between total broiler capacity, selected grower characteristics and the use of recommended practices.
3. To determine if a relationship existed between the number of years producers have grown broilers, selected grower characteristics and the use of recommended practices.
4. To ascertain if a relationship existed between the main source of income earned by broiler producers, selected grower characteristics and the use of recommended practices.
5. To determine if a relationship existed between the future plans of broiler producers, selected characteristics and use of recommended practices.
5. To identify the relationship between the total number of Extension contracts broiler producers had over the previous 12

months period, selected characteristics and use of recommended practices.

7. To establish the relationship between selected characteristics of the broiler producers and the proportion of 15 recommended practices used.

8. To characterize Tennessee broiler contracts, in terms of type and content.

D. DEFINITIONS OF TERMS

Broiler

A young chicken, six to seven weeks old, that is tender meated with a soft, pliable, smooth-textured skin and flexible breastbone cartilage.

Contractor or Integrator

A firm, cooperative, or person that controls more than one stage in the production of broilers, usually everything from broiler or egg production through processing. It owns the broilers and contracts with farmers to grow them.

Litter

The blanket of wood chips, sawdust, or other absorbent material upon which birds walk and rest in the house. It is removed or covered as it becomes caked.

Serviceman

An employee of the contracting firm who visits the broiler growers regularly, perhaps twice per week, to see how broilers are progressing toward market weight. He also provides technical assistance to the broiler growers as needed.

Incinerators

Incinerators are the most effective method of disposing of dead birds, and of reducing the spread of disease. The high initial and operating costs have prevented their being used extensively on broiler farms.

Feed Conversion

The feed conversion ratio is a function of the amount of feed used by birds and the weight gained. Feed conversion is used in most contracts to determine a grower's payment. The better the feed conversion, the higher the grower's payments.

Partial House Brooding

A brooding system that saves energy costs by heating only required portions of a broiler house during the chick's first three to four weeks.

E. LIMITATIONS OF THE STUDY

The study was limited to the data available in the 1982 University of Tennessee Agricultural Extension Service Broiler Survey. Extension agents conducted personal interviews with the

broiler producers selected. Also, the space for broiler housing capacity was inadvertently limited to five instead of six spaces when the survey form was prepared. Hence, a few producers reported having greater housing capacity than could be coded on the forms used. In addition, a few questions were misinterpreted by the growers, the computer classified their responses as unacceptable data, and therefore, such items could not be processed.

Further, the study to characterize Tennessee broiler contracts was limited to the contractual agreements and grower manuals provided by two of the major contracting companies in the state. Others were not available for study.

CHAPTER II

REVIEW OF LITERATURE

A. CHARACTERISTICS OF BROILER GROWERS AND THEIR FARMING OPERATIONS

In 1978, Hunter (4) did a study on the analysis of contract broiler production in Tennessee. Lance (5) in 1977, did a similar study in Georgia, to examine the economic comparison of contract broiler production and housing systems in that state. Both reported some of the characteristics of broiler producers.

The average broiler grower in Tennessee in 1977, as reported by Hunter, was 47 years old and had a ninth grade education (4:73). Comparatively, Lance reported an average age of 48 years, and 78 percent of the Georgia sample had at least a high school education (5:11). Growers in Tennessee had an average of about nine years of experience in contract broiler production of which almost six years was with the company they were contracting with at study time (4:73). In Georgia, producers averaged 12.6 years of prior experience growing broilers and started producing broilers at an average age of 36 years (5:11).

Hunter reported an average of 17,698 broilers capacity per farm for Tennessee broiler growers. The broiler capacity ranged from 6,000 to 108,000 birds (4:17). In comparison, broiler housing capacity per farm in Georgia ranged from 7,000 to 105,000 and

averaged 24,290 broilers placed per batch (5:11). The average size of the total farm land owned by broiler growers in Tennessee in the 1977 study averaged 110 acres (4:73). This compared to 108 acres on the average for the producers in Georgia (5:11).

Beef cattle and hogs were the major classes of other livestock reported on broiler farms in both studies. Hunter (4:93) reported that dairy cattle also were kept on some Tennessee broiler farms, while Lance (5:11) reported broiler breeder hens in addition to beef cattle and hogs being raised on Georgia farms.

Hunter (4:9) noted that the major crops grown by broiler growers in 1977 were corn, hay and tobacco. Lance (5:11) also reported corn, soybeans, apples, wheat and peaches had been grown by producers in Georgia.

Over 50 percent of the broiler growers sampled by Hunter worked an average of 11 months off the farm in 1976 (4:32), while only about 8 percent of growers in Georgia were reported to be full time broiler producers. It was noted that off farm employment was often necessary because the broiler enterprise did not always generate sufficient income to support the farm family before the loans on broiler housing and equipment were paid off (5:11). Off farm employment as reported by Lance (5:11) included: textiles, industrial manufacturing, residential construction, school bus drivers, waitresses, school teachers, hairdressers and real estate sales. Others included working as part-time poultry servicemen, poultry house cleanout and poultry house litter hauling.

Lance (1980) reported that over 15 percent of the broiler growers were retired from off-farm work and about 64 percent were part-time farmers (6:11).

B. BROILER PRODUCTION PRACTICES USED

No studies were found on management practices used by Tennessee broiler growers.

Brown (1:37) in a 1978 study of 43 Jamaica contract broiler producers found that all 16 management practices recommended by The University of Tennessee were being followed. Practices included:

1. Houses cleaned and disinfected one week before chicks' arrival;
2. Heat turned on 24 hours prior to chicks' arrival;
3. Feed trays or boxlids left down until chicks reached four to five days of age;
4. Water jugs cleaned daily;
5. Caked or wet litter removed;
6. Feeders were raised periodically as broilers grew;
7. Used partial house brooding;
8. Dead birds were removed as required;
9. Weeds were not allowed to grow around broiler house;
10. Wild birds were kept away from broiler houses,
11. Mortality records were kept;
12. Contractors kept enough feed in barns at all times;
13. The broilers were debeaked;
14. Water troughs were cleaned;

15. Visitors were kept away from houses;
16. The servicemen attended to problems promptly.

C. FACTORS INFLUENCING PRACTICE USE

Contractual Agreements

In the 1978 study conducted by Brown (1) to determine the characteristics and management practices of Jamaican broiler growers, findings showed that the most important factor influencing practice use of growers was the broiler contract. This, with the related almost daily supervision by industry servicemen or fieldmen, constituted the major factors causing growers to use research-verified management practices (1:38).

Waldron (16) in his 1971 Tennessee study of egg producers in the Knox County area, found that the type of ownership slightly influenced the use of 27 recommended egg production practices studied. The findings also showed that an average of 87 percent of 25 contract producers and 82 percent of 26 owners carried out all recommended practices (16:92).

Rogers (9:151) supports a long-held contention that decentralized decision making in poultry and egg production has often led to uneven adoption of technology and has slowed gains in production efficiency and product uniformity. Rogers contends that with the ascendancy of vertical integration, technological adoption has been more rapid and greater gains in production efficiency have been realized. Rogers further notes that this has allowed for new

methods and practices to be adopted en masse and mistakes to be quickly corrected.

Other influential factors affecting practice use found in the literature included: (a) economics (2, 8, 9), (b) size of operation, (3) and (c) Extension contacts (11, 15).

Economics

The overall economic factor influencing practice adoption in the broiler industry as listed by Rogers (9:164-165), was the desire to meet consumer demands and satisfaction. This encouraged mass production in the poultry industry to provide regular supply, uniformity, improved standardization and quality control which users desire.

Rogers (9:169) points out that the emphasis on energy conservation has developed additional pressures for insulated and environmentally controlled housing. Growers who could not or did not meet new requirements have been paid less or dropped.

Fisher (2) reported that partial house brooding reduced energy costs by up to 50 percent; this has influenced many producers to adopt the partial house brooding practice.

The adoption of recommended practices which will improve broiler feed conversion should be readily acceptable to broiler growers, provided the benefits outweigh the cost to institute the practice. To support this contention, Raney (8:84) in 1964 showed a direct relationship between the use of recommended beef practices and returns per head of beef cattle. Raney's study showed that the

difference in return was as much as \$50 per cow for farmers who used more recommended practices than it was for farmers who did not use as many practices.

Size of Operation

Henson (3) in 1980 reported that the amount of labor used on broiler operation per thousand birds in the North Atlantic region and Delmarva areas was inversely proportional to the flock sizes (3:50). Hence, the smallest farmers used twice as much labor as the biggest. This suggests that the larger producers tended to use automatic equipment more than the smaller producers.

Extension Contacts

Vezev (15) in 1982, reported that Extension Service contacts influenced broiler management practices used in poultry production in Georgia. Vezev noted several changes were made in grower production management practices in order to solve an excessively high early chick mortality problem.

Rutter (11) in 1982, examined the relationship between the use of management practices of beef producers and the number of contacts they had with the Extension Service. Based on 1977 data, the study showed a significant relationship between the use of 13 recommended practices by beef producers and the total number of contacts producers had per year with the Extension agents (11:84-85).

D. TENNESSEE BROILER CONTRACTS

In 1978, Hunter (4) detailed the major characteristics of Tennessee broiler contracts. He noted that there were two basic types of contracts used by companies located in Tennessee (i.e. competitive and non-competitive) which differed by the type of methods used to determine the growers' payments. Payments under the non-competitive contracts were based on either feed conversion or a combination of feed conversion and the attained weight of the broilers. Payments under the competitive contracts were determined by calculating a formula cost per pound of broiler produced, growers with the lowest formula cost receiving the highest payment per pound (4:78).

Under the broiler contracts used in Tennessee, Hunter reported that the growers were responsible for providing, paying for and maintaining the broiler house and all equipment, such as feeders, waterers, brooders and litter. Growers also provided all labor required for growing the chicks to market size (4:53).

The contractor provides the chicks, feed, veterinary services and medicine necessary for broiler production. The company also provides the labor and equipment for catching and transporting the broiler to the market. The contractor, in addition, has servicemen who provide technical assistance to growers at no cost (4:53-54).

Hunter states that contractual agreement was an important factor which influenced the degree of satisfaction of growers in Tennessee. Over 54 percent of the growers surveyed rated the

contract as only "fair" or "poor," which indicated they were not completely satisfied with them (4:76).

On suggestions regarding how broiler contracts could be improved, growers surveyed by Hunter responded as follows: (1) about 42 percent of the growers suggested that an increase in growers' payment would improve their contracts (4:39); (2) the next most frequently mentioned suggestion, made by 26 percent of the growers, was that the contracting company should pay more of the cost of inputs such as fuel, utilities, medication and labor (4:39); (3) 15 percent suggested minimum payment per 1,000 chicks as insurance against high condemnation and mortality losses; and (4) they also requested to be allowed more supervisory control over catching crews, weighing of feed and broilers (4:39).

In concluding the study, Hunter noted that substantial increase in grower payments is unlikely under present conditions in the Tennessee broiler industry, because broiler contracting companies in most areas of the state have no competitors (4:80).

Roy (10) also supported the above viewpoint by noting that growers usually have a limited choice of contracts. He maintained that even when several contractors operate within an area, over a period of time, broiler contracts become standardized within an area so that growers are limited in the type of contract available (10:139). However, Roy suggested that growers could do three things to improve their return under any contract, namely by: (1) improving feed conversion; (2) mechanizing more to reduce labor input; and (3) bargaining cooperatively for a higher contract payment (10:139).

CHAPTER III

METHODS OF PROCEDURE

A. POPULATION AND SAMPLE

Complete lists of all contract broiler growers were obtained from agents in the counties involved in the survey. The Nth number technique was applied to identify 25 producers, of whom the first 20 were to be included in the survey and the last five producers identified served as alternates. Alternates were used only to replace producers who for some reason could not be interviewed. In situations where the number of producers totaled less than 20, all producers were surveyed.

One hundred and twenty-three producers were interviewed from three Extension Supervisory Districts. Seventy-four producers were interviewed from District III, 42 producers from District IV and seven from District V. (See Appendix A for list of counties by district and number of producers.)

B. DEVELOPMENT OF INTERVIEW SCHEDULE

The broiler survey used in this study was developed by the Tennessee Agricultural Extension specialist staff in the Animal Science, Poultry Section in collaboration with the Extension Education Section (see Appendix B). The survey was conducted by agents in participating counties through personal interviews. The completed

surveys were then returned to the Agricultural Extension office for analysis.

C. METHODS OF ANALYSIS

Data from the broiler survey were coded and punched on computer cards. Computations were made by The University of Tennessee Computing Center. Responses to survey questions were summarized using means and frequency counts of producers. The mean capacity of houses, mean number of years grown broilers, and mean number of total Extension contacts were computed in relation to responses on selected grower characteristics and the use of selected recommended practices.

The one way analysis of variance (F-test) was used to determine the relationships between quantitative dependent (i.e. total house capacity, years grown broilers, total number of Extension contacts, total number of practices used) and qualitative independent variables (i.e. future plans, main source of income, types of housing, equipment and litter and 15 recommended practices used).

On the qualitative dependent variables (i.e. main source of income, and future plans), the Chi-square test was used to determine relationships with independent variables (i.e. total house capacity, years grown broilers, total Extension contacts, type housing, equipment, litter and recommended practices used). The .05 probability level was accepted as being significant on the F-tests and Chi-square tests.

CHAPTER IV

FINDINGS OF THE STUDY

Findings of the study were organized into eight sections according to the specific objectives of the study. Data pertaining to the objectives of the study were presented in 33 tables. Selected independent and dependent variables and their relationships were used to meet the objectives of the study.

Section A presents findings regarding the characteristics of broiler producers and their farming operations.

Section B contains findings regarding the relationship between the total capacity of all houses owned by broiler producers, their selected characteristics and use of recommended practices.

Section C includes findings regarding the relationship between the number of years broiler producers had grown broilers, their selected characteristics and use of recommended practices.

Section D consists of findings regarding the relationships between the main source of income earned by broiler producers, their selected characteristics and use of recommended practices.

Section E has findings regarding the relationships between the future plans indicated by broiler producers, their selected characteristics and use of recommended practices.

Section F presents findings concerning the relations between the total number of Extension contacts broiler producers had over the

previous 12 months period, their selected characteristics and use of recommended practices.

Section G is made up of findings regarding the relationship between selected characteristics of broiler producers and the proportion of the total, 15, recommended practices used.

Section H includes findings regarding the characteristics of Tennessee broiler contracts.

A. CHARACTERISTICS OF TENNESSEE BROILER PRODUCERS AND THEIR FARMING OPERATIONS

Findings regarding 15 variables selected to characterize the broiler producers and their farming operations are presented in Table I. The numbers and percentages of producers were shown in this early section to give a full description of the producers and their farming operations. The later chapters will not be dealing with so much detail.

Total Capacity of All Houses Owned by Producers

As seen in Table I, the total capacities of all broiler houses owned by selected Tennessee broiler producers ranged from 6,000 to 98,000 plus. Few producers reported over 100,000 bird house capacities, but the data could not be recorded as noted earlier under the study limitations (i.e. page 5).

For the purpose of categorizing producers by size of operations, they were classified into low, medium and high groups as follows: 6,000-21,000; 22,000-31,000; and 32,000 and over bird

TABLE I
 CHARACTERISTICS OF SELECTED TENNESSEE BROILER PRODUCERS
 AND THEIR FARMING OPERATIONS, 1981

Selected Characteristic	Number of Producers (N=123)	Percent of Producers
<u>Total capacity of all houses owned</u>		
1. 6,000-21,000	42	34
2. 22,000-31,000	39	32
3. 32,000 and over	42	34
<u>Years grown broilers</u>		
1. 1-5	37	30
2. 6-14	50	41
3. 15-34	36	29
<u>Main source of income</u>		
1. Poultry	62	51
2. Non-farm	36	29
3. Other farm	25	20
<u>Future plans</u>		
1. Increase size	23	19
2. Same size	92	75
3. Reduce or quit	5	4
4. No response	3	2
<u>Total Extension contacts</u>		
1. Not any	38	31
2. One or more	85	69
<u>Type of housing</u>		
1. Conventional	119	96
2. Environmental	2	2
3. No response	2	2
<u>Type of ventilation</u>		
1. Natural	13	11
2. Fan	14	11
3. Combination	94	76
4. No response	2	2
<u>Use foggers for cooling</u>		
1. No	75	61
2. Yes	44	36
3. No response	4	3

TABLE I (Continued)

Selected Characteristic	Number of Producers (N=123)	Percent of Producers
<u>Type of feeder</u>		
1. Mechanical chain	41	33
2. Chain with pan	19	16
3. Automatic round pan	53	43
4. Other	10	8
<u>Type of waterers</u>		
1. Automatic trough	91	74
2. Nipple	27	22
3. Bell shape	5	4
<u>Water medicator</u>		
1. No	13	11
2. Yes	79	64
3. One available when needed	31	25
<u>Dead bird disposal</u>		
1. Incinerator	9	7
2. Pit	54	44
3. Other	60	49
<u>Type of litter used</u>		
1. Shavings	56	46
2. Sawdust	53	43
3. Straw	10	8
4. Pine bark	0	--
5. Combination	4	3
<u>Number of growouts on same litter</u>		
One	25	20
Two	30	24
Three	31	25
Four	2	2
Five	32	26
Six	3	3
<u>Use of litter</u>		
1. Put on land	88	72
2. Feed to cattle	2	2
3. Sell	30	24
4. Other	3	2

capacities, respectively. Approximately one-third each of the broiler producers were in the three capacity of house categories.

Years Producers had Grown Broilers

The number of years selected Tennessee broiler producers had grown broilers ranged from 1 to 34 years. The largest percent, 41, had produced broilers from 6 to 14 years. Nearly equal percents reported the other two categories.

Main Source of Income

Just over one-half (i.e. 51 percent) of the producers surveyed reported Poultry as their main source of income. Other farm sources including dairy, beef and crops constituted 20 percent of the total. Thus all farm sources made up 71 percent of the respondents. Twenty-nine percent of all producers had most of their income from Non-farm sources in 1981.

Future Plans Indicated by Producers

Seventy-five percent of those reporting did not plan to alter the size of their broiler operation. Nineteen percent had planned to increase the size of their operation in the future. Four percent reported plans to reduce or quit broiler production entirely. Two percent of the producers did not respond.

Total Extension Contacts

The Total Extension contacts item in Table I was made up of the average Extension meetings attended, office visits made and farm

visits received. Sixty-nine percent of the producers had one or more Extension contacts. Thirty-one percent did not have any in 1981.

Type of Housing

A very high percent of the producers surveyed reported the use of Conventional (i.e. open-sided) housing for their broilers. Ninety-six percent reported such usage, 2 percent used Environmental (i.e. windowless, temperature controlled) housing, while 2 percent did not respond.

Type of Ventilation

A majority of the producers, 76 percent, used a Combination of different ventilation types. An equal percent (i.e. 11 percent) reported using Natural and Fan types of ventilation, while 2 percent did not respond.

Use Foggers for Cooling

Seventy-five of the producers surveyed, constituting over 60 percent, did not Use foggers for supplemental cooling of their broiler houses. Thirty-six percent reported they did. Three percent did not respond.

Type of Feeders

The highest percentage of the producers used Automatic round pan feeder type, 43 percent reported this usage, followed by Mechanical chain used by 33 percent of the respondents. Sixteen percent used Chain with pan, while 8 percent reported using Other types of feeders not specified.

Types of Waterers

Most of the producers surveyed, 74 percent, used the Automatic trough type of waterer. Also, 22 percent used the Nipple type. Four percent reported the use of Bell shape type waterers.

Water Medicator

Almost two-thirds of the producers had Water medicators in 1981. Although one-fourth did not report ownership, they indicated having access to one when needed. Eleven percent of the broiler producers did not have Water medicators in 1981.

Dead Bird Disposal

Almost one-half of the producers used Other means of dead bird disposal not specified. Forty-four percent disposed of their dead birds by the use of disposal Pits, while only 7 percent used Incinerators.

Type of Litter Used

Shavings and sawdust were the most common types of litter used by broiler producers in 1981. Nearly 90 percent of the respondents used either one or the other. Others used Straw and a Combination of litters. None of the producers was found using Pine bark.

Number of Growouts on Same Litter

The number of growouts reported ranged from one to six. Almost equal percentages reported having Two, Three and Five growouts on the same litter (i.e. 24, 25 and 26 percent, respectively).

Twenty percent had just one growout on the same litter. The rest reported Four and Six growouts.

Use of Litter

Most of the producers surveyed used broiler litter as fertilizer on their farms, 72 percent reporting this use. Twenty percent sold their broiler litter in 1981, while an equal percent (i.e. 2 percent each) reported feeding to cattle and using the litter for Other unstated purposes.

B. RELATIONSHIPS BETWEEN TOTAL CAPACITY OF ALL HOUSES OWNED BY BROILER PRODUCERS, THEIR SELECTED CHARACTERISTICS AND USE OF RECOMMENDED PRACTICES

In this analysis, mean capacity of all broiler houses owned by broiler producers was compared with various producers and operational characteristics and with practices used.

Total Broiler Capacity and Selected Characteristics

Data in Tables II-V relate selected characteristics with mean capacity of all houses owned. Analyses of variance (i.e. F-tests) were used for testing. The overall mean for all, 123, producers was about 31,500 birds.

Main source of income. As may be seen in Table II, main source of income earned by producers was significantly related to the mean capacity of all houses they owned. Producers deriving most income from Poultry has larger mean capacity (i.e. 36,600 birds) than others.

TABLE II

RELATIONSHIPS BETWEEN THE TOTAL CAPACITY OF ALL BROILER HOUSES OWNED BY SELECTED
TENNESSEE BROILER PRODUCERS AND THEIR SELECTED CHARACTERISTICS, 1981

<u>Selected Characteristic</u>	<u>Number of Producers</u>	<u>Mean Capacity of All Houses (Thousands)</u>	<u>F Value</u>	<u>df</u>	<u>P Level</u>
<u>Main source of income</u>					
1. Poultry	62	36.6			
2. Other farm	25	22.8			
3. Non-farm	36	28.9			
Total	123	31.5	3.8	2	0.025
<u>Future plans</u>					
1. Increase size	23	26.8			
2. Same size	92	32.4			
3. Reduce or quit	9	30.6			
Total	120	31.3	0.6	2	0.568
<u>Years grown broilers</u>					
1. 1-5	37	33.0			
2. 6-14	50	31.5			
3. 15-34	36	30.1			
Total	123	31.5	0.1	2	0.863
<u>Total Extension contacts</u>					
1. Not any	38	28.0			
2. One or more	85	33.1			
Total	123	31.5	1.3	1	0.249

TABLE III

RELATIONSHIPS BETWEEN THE TOTAL CAPACITY OF ALL BROILER HOUSES OWNED BY SELECTED TENNESSEE BROILER PRODUCERS AND THE TYPE OF HOUSING FACILITIES USED IN 1981

Housing Facilities	Number of Producers	Mean Capacity of All Houses (Thousands)	F Value	df	P Level
<u>Type of housing</u>					
1. Conventional	119	31.8			
2. Environmental	2	41.0			
Total	121	31.9	0.3	1	0.572
<u>Type of ventilation</u>					
1. Natural	13	14.6			
2. Fan	14	25.9			
3. Combination	94	35.2			
Total	121	31.9	5.7	2	0.005
<u>Use foggers for cooling</u>					
1. No	75	26.2			
2. Yes	44	42.5			
Total	119	32.3	16.1	1	0.001

TABLE IV

RELATIONSHIPS BETWEEN THE TOTAL CAPACITY OF ALL BROILER HOUSES OWNED BY SELECTED TENNESSEE BROILER PRODUCERS AND THE TYPES OF BROILER EQUIPMENT USED IN 1981

Equipment Facilities	Number of Producers	Mean Capacity of All Houses (Thousands)	F Value	df	P Level
<u>Type of feeders</u>					
1. Mechanical chain	41	23.5			
2. Chain with pan	19	35.0			
3. Automatic round pan	53	37.7			
4. Other	10	25.4			
Total	123	31.5	3.6	3	0.016
<u>Type of waterer</u>					
1. Automatic trough	91	32.7			
2. Nipple	27	28.4			
3. Bell shape	5	26.8			
Total	123	31.5	0.5	2	0.625
<u>Water medicator</u>					
1. No	13	11.7			
2. Yes	79	30.6			
3. One is available when needed	31	42.2			
Total	123	31.5	9.6	2	0.001
<u>Dead bird disposal</u>					
1. Incinerator	9	30.8			
2. Pit	54	30.0			
3. Other	60	30.3			
Total	123	31.5	0.2	2	0.815

TABLE V

RELATIONSHIPS BETWEEN THE TOTAL CAPACITY OF ALL BROILER HOUSES OWNED BY SELECTED
TENNESSEE BROILER PRODUCERS AND THEIR LITTER USE PRACTICES IN 1981

Litter Use Practice	Number of Producers	Mean Capacity of All Houses (Thousands)	F Value	df	P Level
<u>Type of litter</u>					
1. Shavings	56	37.3			
2. Sawdust	53	25.5			
3. Straw	10	32.2			
4. Combination	4	28.5			
Total	123	31.5	2.6	3	0.057
<u>Number of growouts on same litter</u>					
One	25	39.4			
Two	30	28.4			
Three	31	28.7			
Four	2	25.5			
Five	32	28.4			
Six	3	64.0			
Total	123	31.5	2.3	5	0.050
<u>Use of litter</u>					
1. Put on land	88	30.0			
2. Feed to cattle	2	28.0			
3. Sell	30	36.0			
4. Other	3	34.7			
Total	123	31.5	0.5	3	0.654

Future plans. Although those planning to have their flock the same size had the largest total mean house capacity (i.e. 32,400 birds), the relationship was not significant. Relatively little difference was noted between those planning to increase size to those reducing or quitting broiler production.

Years grown broilers. The number of years producers had grown broilers did not bear a significant relation to the mean capacity of all houses owned, although the youngest producers reported highest mean capacity (i.e. 33,000 birds).

Total Extension contacts. It was evident that producers who had one or more extension contacts had a higher mean bird capacity (i.e. 33,100 birds) than those without any extension contact. However, the difference was not significant at the .05 level of confidence used.

Type of housing. Reference to Table III shows that producers using the environmental type housing had a higher total mean capacity (i.e. 41,000 birds) than those using conventional type (i.e. 31,800 birds). However, the relationship was not significant, noting that only two producers reported using environmental type housing compared to 119 for the conventional type.

Type of ventilation. The ventilation type used by broiler producers was significantly related to the mean capacity of all houses they owned. Those using a combination of ventilation types had the highest mean capacity (i.e. 35,200 birds). Those using a

Fan for ventilation were next (i.e. 25,900 birds). Producers using Natural ventilation had the least mean capacity (i.e. 14,600 birds).

Use foggers for cooling. It was evident that the use of foggers was very significantly related to the mean capacity of houses owned by producers. Those who used foggers for supplemental broiler house cooling had a larger mean capacity of 42,500 birds compared to 26,200 birds for those who did not use foggers.

Type of feeders. Study of data in Table IV shows that the type of feeder used was significantly related to mean capacity of all houses. Those using Automatic round pan had the largest mean capacity (i.e. 37,700 birds), followed by those using Chain with pan feeder type (i.e. 35,000 birds). Very little difference was shown for the others.

Type of waterers. Although producers using the Automatic trough type of waterer had the largest mean capacity (32,700 birds), the difference was not significant as related to others. Also little difference was noted in mean capacities of those using Nipple and Bell shape type waterers.

Water medicator. Owning a water medicator was significantly related to the mean capacity of all houses. Those who reported they had One available when needed had the highest mean capacity (i.e. 42,200 birds). Those who had water medicators had a mean capacity of 30,600 birds. The producers who did not own one and did not have access to one had the least mean capacity (i.e. 11,700 birds).

Type dead bird disposal. All producers reported they disposed of their birds somehow. The form of disposal did not bear a significant relation to the mean capacity of houses, as little difference was noted within all means.

Type of litter. As seen in Table V, there was a nearly significant relation between the type of litter used and the mean capacity of all houses. Producers using Shavings for litter had the highest mean capacity (i.e. 37,300 birds). Those using Straw had a mean capacity of 32,200 birds. Relatively little difference was noted among the others.

Number of growouts on same litter. The number of growouts on same litter was significantly related to the mean capacity of all houses owned by producers. The three producers reporting Six growouts on same litter had a mean capacity of 64,000 birds. Those reporting One growout had a mean capacity of 39,400 birds, while relatively little difference was shown among the others.

Use of litter. Producers who sold their litter had the highest mean capacity (i.e. 36,000 birds). The three producers who indicated Other for their litter use had a mean capacity of 34,700 birds, while not much difference was shown for the remaining ones. The relation between litter use and the mean capacity of all houses was not found to be statistically significant at the required .05 level of probability.

Total Broiler Capacity and Use of Recommended Practices

Data in Tables VI and VII relate selected practices with mean capacity of all houses owned. Analyses of variance (i.e. F-tests) were used for testing.

Clean houses annually. As shown in Table VI, producers who Cleaned the broiler houses annually had a larger total mean bird capacity (i.e. 32,300) compared to others. However, annual cleaning of houses was not significantly related to the mean capacity of all houses owned by producers.

Clean waterers between growouts. The use of this practice was not significantly related to the mean capacity of all houses, although those who Cleaned waterers between growouts did have a higher mean capacity (i.e. 32,900 birds) than others (i.e. 27,500 birds).

Clean feed bin after each growout. Producers who did not Clean feed bin after each growout had a higher mean capacity of 35,500 birds, compared to 29,400 for those who did. Use of the practice was not significantly related to the mean capacity of all houses owned.

Check thermostat for accuracy. The use of the practice was significantly related to the mean capacity of all houses owned by producers. Those who reported not using the practice had a higher mean capacity (i.e. 38,700 birds) compared to those using it (i.e. 28,600 birds).

TABLE VI

RELATIONSHIPS BETWEEN THE TOTAL CAPACITY OF ALL BROILER HOUSES OWNED BY SELECTED TENNESSEE BROILER PRODUCERS AND THE USE OF SELECTED RECOMMENDED PRACTICES, 1981

Name of Practice	Number of Producers	Mean Capacity of All Houses (Thousands)	F Value	df	P Level
<u>Clean houses annually</u>					
1. No	12	24.0			
2. Yes	111	32.3			
Total	123	31.5	1.5	1	0.223
<u>Clean waterers between growouts</u>					
1. No	31	27.5			
2. Yes	92	32.9			
Total	123	31.5	1.3	1	0.258
<u>Clean feed bins after each growout</u>					
1. No	43	35.5			
2. Yes	80	29.4			
Total	123	31.5	2.1	1	0.151
<u>Check thermostat for accuracy</u>					
1. No	36	38.7			
2. Yes	87	28.6			
Total	123	31.5	5.2	1	0.024
<u>Adjust brooder height</u>					
1. No	3	26.7			
2. Yes	120	31.7			
Total	123	31.5	0.1	1	0.710

TABLE VI (Continued)

Name of Practice	Number of Producers	Mean Capacity of All Houses (Thousands)	F Value	df	P Level
<u>Use partial house brooding</u>					
1. No	14	28.9			
2. Yes	109	31.9			
Total	123	31.5	0.2	1	0.652
<u>Clean waterers daily</u>					
1. No	30	32.7			
2. Yes	93	31.1			
Total	123	31.5	0.1	1	0.740
<u>Add feed to trays three times daily</u>					
1. No	77	35.4			
2. Yes	45	25.3			
Total	122	31.7	5.8	1	0.018

TABLE VII

RELATIONSHIPS BETWEEN THE TOTAL CAPACITY OF ALL BROILER HOUSES OWNED BY SELECTED
TENNESSEE BROILER PRODUCERS AND USE OF SELECTED RECOMMENDED PRACTICES IN 1981

Name of Practice	Number of Producers	Mean Capacity of All Houses (Thousands)	F Value	df	P Level
<u>Check each house at least three times daily</u>					
1. No	21	34.8			
2. Yes	101	30.4			
Total	122	31.1	0.7	1	0.411
<u>Use milk solution with viral vaccine</u>					
1. No	67	28.0			
2. Yes	37	40.8			
Total	104	32.6	7.7	1	0.007
<u>Keep mortality records</u>					
1. No	2	21.0			
2. Yes	119	31.3			
Total	121	31.1	0.4	1	0.523
<u>Remove caked or wet litter</u>					
1. No	41	30.6			
2. Yes	81	31.4			
Total	122	31.1	0.0	1	0.863

TABLE VII (Continued)

Name of Practice		Number of Producers	Mean Capacity of All Houses (Thousands)	F Value	df	P Level
<u>Mow grass around houses</u>						
1.	No	22	34.0			
2.	Yes	100	30.5			
	Total	122	31.1	0.4	1	0.510
<u>Keep wild birds from houses</u>						
1.	No	5	36.8			
2.	Yes	117	30.9			
	Total	122	31.1	0.3	1	0.566
<u>Follow rodent control program</u>						
1.	No	4	28.5			
2.	Yes	118	31.2			
	Total	122	31.4	0.1	1	0.813

Adjust brooder height. A vast majority of the producers surveyed adjusted their brooder height, with a mean capacity of 31,700 birds. The three not using the practice had a lower mean capacity of 26,700 birds. However, use of the practice had no significant relationship to the mean capacity of all houses owned by the producers.

Use partial house brooding. The use of partial house brooding was not significantly related to the mean capacity of all houses owned. However, those using the practice had a somewhat higher mean capacity of 31,900 birds compared to 28,900 birds for those not using.

Clean waterers daily. There was a very small difference noted in the mean capacities of those using and those not using this practice, 31,100 and 32,700 birds, respectively. The use of the practice was not significantly related to the mean capacity of all houses producers owned.

Add feed to tray three times daily. The use of this practice was significantly related to the mean capacity of all houses. Those who responded "no" had a higher mean bird capacity (i.e. 35,400), compared to 25,300 birds for others responding "yes."

Check each house at least three times daily. As shown in Table VII, the use of the practice was not significantly related to the mean capacity of all houses owned. Nevertheless, those who were not using the practice had a higher mean house capacity (i.e. 34,800 birds).

Use milk solution with viral vaccine. The use of this practice was very significantly related to the mean capacity of all broiler houses owned. Those using the practice had a mean capacity of 40,800 birds compared to 28,000 for those not using.

Keep mortality records. Almost all producers kept mortality records, with a mean capacity of 31,300 birds. The two not using the practice reported a lower mean of 21,000 birds capacity. However, no significant relationship was noted between the use of the practice and the mean capacity of all houses owned.

Remove caked or wet litter. No significant relation was shown between the use of this practice and the mean capacity of all houses owned by the broiler producers. Also, extremely little difference was noted between the mean bird capacities of those using and those not using the practice (i.e. 31,400 and 30,600 birds, respectively).

Mow grass around houses. Producers using this practice were not significantly different from those not mowing, as regards to the mean capacity of all houses they owned. Nevertheless, those who reported not using the practice had a higher mean house capacity, 34,000 birds, compared to 30,500 birds for those using.

Keep wild birds from houses. The use or non-use of this practice was not significantly related to the mean capacity of all houses owned by the producers. However, the five producers reporting non-use had a higher total mean capacity of 36,800 birds than those using it (i.e. 30,900 birds).

Follow rodent control program. The total mean bird capacity of producers following rodent control program were not significantly different from those not following. Nevertheless, a higher total mean bird capacity (i.e. 31,200) was noted for those using than for others (i.e. 28,500 birds).

C. RELATIONSHIPS BETWEEN THE NUMBER OF YEARS PRODUCERS HAD GROWN BROILERS, THEIR SELECTED CHARACTERISTICS AND USE OF RECOMMENDED PRACTICES

In order to analyze the data for this section, the mean number of years producers had grown broilers was compared with various producer and operational characteristics and with practices used.

Years Grown Broilers and Selected Characteristics

Data in Tables VIII-XI relate selected characteristics with the mean number of years producers had grown broilers. The analysis of variance (i.e. F-test) was used for testing. The overall mean number of years all producers had grown broilers was about 10.7 years.

Main source of income. As may be seen in Table VIII, main source of income was significantly related to the mean number of years producers had grown broilers. Those deriving most income from Poultry had more years of experience growing broilers on the average (i.e. 12.1 years) than others. Those who indicated Non-farm as their main income source had the least experience (i.e. 7.9 years).

TABLE VIII

RELATIONSHIPS BETWEEN SELECTED CHARACTERISTICS OF TENNESSEE BROILER PRODUCERS
AND THE NUMBER OF YEARS THEY HAD GROWN BROILERS, 1981

Selected Characteristic	Number of Producers	Mean Number of Years Grown Broilers	F Value	df	P Level
<u>Main source of income</u>					
1. Poultry	61	12.1			
2. Other farm	25	11.5			
3. Non-farm	36	7.9			
Total	122	10.7	4.8	2	0.010
<u>Future plans</u>					
1. Increase size	22	9.4			
2. Same size	92	10.9			
3. Quit or reduce size	5	14.8			
Total	119	10.8	1.4	2	0.254
<u>Total capacity of all houses</u>					
1. 6,000-21,000	41	12.9			
2. 22,000-31,000	39	7.9			
3. 32,000 and over	42	11.2			
Total	122	10.7	5.9	2	0.004
<u>Total Extension contacts</u>					
1. One or more	84	11.3			
2. Not any	38	9.3			
Total	122	10.7	2.2	1	0.139

TABLE IX

RELATIONSHIPS BETWEEN THE NUMBER OF YEARS SELECTED TENNESSEE BROILER PRODUCERS HAD GROWN BROILERS AND THE TYPE OF HOUSING FACILITIES USED IN 1981

Housing Facilities	Number of Producers	Mean Number of Years Grown Broilers	F Value	df	P Level
<u>Type of housing</u>					
1. Conventional	118	10.6			
2. Environmental	2	15.0			
Total	120	10.7	0.8	1	0.369
<u>Type of ventilation</u>					
1. Natural	13	13.0			
2. Fan	14	10.6			
3. Combination	93	10.4			
Total	120	10.7	0.8	2	0.439
<u>Use foggers for cooling</u>					
1. No	75	10.9			
2. Yes	43	10.4			
Total	118	10.8	0.2	1	0.699

TABLE X

RELATIONSHIPS BETWEEN THE NUMBER OF YEARS SELECTED TENNESSEE BROILER PRODUCERS HAD GROWN BROILERS AND THE TYPES OF BROILER EQUIPMENT USED IN 1981

Equipment Facilities	Number of Producers	Mean Number of Years Grown Broilers	F Value	df	P Level
<u>Type of feeders</u>					
1. Mechanical chain	41	12.5			
2. Chain with pan	18	14.2			
3. Automatic round pan	53	8.6			
4. Other	10	8.1			
Total	122	10.7	5.3	3	0.002
<u>Type of waterers</u>					
1. Automatic trough	90	11.8			
2. Nipple	27	5.3			
3. Bell shape	5	19.8			
Total	122	10.7	18.5	2	0.001
<u>Water medicator</u>					
1. No	13	13.4			
2. Yes	78	10.9			
3. One available when needed	31	9.1			
Total	122	10.7	3.9	2	0.051
<u>Type dead bird disposal</u>					
1. Incinerator	9	10.3			
2. Pit	54	11.9			
3. Other	59	9.7			
Total	122	10.7	1.6	2	0.202

TABLE XI

RELATIONSHIPS BETWEEN THE NUMBER OF YEARS SELECTED TENNESSEE BROILER PRODUCERS HAD GROWN BROILERS AND THEIR LITTER USE PRACTICES IN 1981

Litter Use Practice	Number of Producers	Mean Number of Years Grown Broilers	F Value	df	P Level
<u>Type of litter</u>					
1. Shavings	56	9.2			
2. Sawdust	52	12.7			
3. Straw	10	8.8			
4. Combination	4	11.2			
Total	122	10.7	2.8	3	0.043
<u>Number of growouts on same litter</u>					
One	25	11.1			
Two	30	9.2			
Three	31	10.1			
Four	2	10.0			
Five	31	12.2			
Six	3	14.3			
Total	122	10.7	0.8	5	0.531
<u>Use of litter</u>					
1. Put on land	87	11.4			
2. Feed to cattle	2	3.5			
3. Sell	30	8.8			
4. Other	3	15.3			
Total	122	10.7	2.4	3	0.071

Future plans. The future plans indicated by producers were not significantly related to the number of years they had grown broilers. At the same time, those who reported plans to Quit or reduce size had the highest mean number of years producing broilers (i.e. 14.8 years), compared to those who planned to remain the Same and Increase size (i.e. 10.9 and 9.4 years, respectively).

Total capacity of all houses. The total capacity of all houses owned by producers was very significantly related to the mean number of years grown broilers. The smallest size category (i.e. 6,000-21,000 birds) had the highest mean number of 12.9 years growing broilers. The largest producers (i.e. 32,000 and over birds) followed with 11.2 years. The middle size category (i.e. 22,000-31,000 birds) had the smallest mean number of years growing broilers (i.e. 7.9 years).

Total Extension contacts. Total Extension contact was not significantly related to the mean number of years producers had grown broilers. However, those who had One or more Extension contacts reported a higher mean number of years growing broilers (i.e. 11.3 years) compared to 9.3 years on the average for those who did not have any.

Type of housing. The only two producers using Environmental type housing (see Table IX) reported a higher mean number of years growing broilers, 15 years, compared to 10.6 years for those using the Conventional type. However, the type of housing used was not

significantly related to the mean number of years producers had grown broilers.

Type of ventilation. Producers using Natural type ventilation reported the highest mean number of years producing broilers (i.e. 13.0 years). Little difference was shown for those using Fan or Combination of ventilation types. The relationship was not a significant one.

Use foggers for cooling. The Use of foggers for supplemental broiler house cooling was not significantly related to the mean number of years grown broilers. Little difference was noted for those using and those not using the practice.

Type of feeders. As may be noted in Table X, the type of feeder used had a very significant relationship to the mean number of years producers had grown broilers. Producers using Chain with pan type feeders reported the highest mean number (i.e. 14.2 years), compared to 12.5 years for those using Mechanical chain. Automatic round pan and Other types had only 8.6 and 8.1 years, respectively.

Type of waterers. The type of waterers used was very significantly related to the mean number of years producers had grown broilers. The highest mean number of years was shown for producers using Bell shape type waterers (i.e. 19.8 years). Those using Nipple type waterers reported the least (i.e. 5.3 years).

Water medicator. The use of the practice was not quite significantly related to the number of years producers had grown broilers, though it approached it. Those who did not own water medicators reported the highest mean (i.e. 13.4 years). Those having one available when needed had the least experience growing broilers (i.e. 9.1 years), on the average.

Type of dead bird disposal. No significant relationship was shown between the type of dead bird disposal used and the mean number of years producers had grown broilers. Those who disposed of their birds by means of a disposal Pit did have a higher mean (i.e. 11.9 years) than others.

Type of litter. Reference to Table XI discloses that the type of litter used was significantly related to the mean number of years producers had grown broilers. Those using Sawdust as litter had the highest mean number of years growing broilers (i.e. 12.7 years). Those using Straw had the lowest with 8.8 years.

Number of growouts on same litter. No significant relationship was found between this variable and the mean number of years producers had grown broilers. However, it was noted that those who reported Six growouts had the highest mean number of years (i.e. 14.3 years), while those who reported Two growouts had the lowest mean number of years (i.e. 9.2 years) growing broilers.

Use of litter. The use of litter was not significantly related to the mean number of years grown broilers. It was noted that those who indicated Other, for litter use, had the highest mean number of years growing broilers (i.e. 15.3 years). The lowest mean was shown for the two producers who Fed their litter to cattle (i.e. 3.5 years).

Years Growing Broilers and Use of Recommended Practices

Data in Tables XII and XIII analyze selected practices with the mean number of years producers had grown broilers. Analyses of variance were used for testing.

Clean houses annually. As noted in Table XII, those who Cleaned their broiler houses annually were not significantly different from those who did not in terms of the mean number of years they had grown broilers. However, those who had not used the practice reported a higher mean (i.e. 13.1 years) compared to 10.5 years for those who had.

Clean waterer between growouts. There was a very significant relationship between the use of this practice and the mean number of years producers had grown broilers. Those who Cleaned waterer between growouts had a higher mean (i.e. 11.6 years) compared to 8.0 years for those who did not use the practice.

Clean feed bin after each growout. The use of the practice was almost significantly related to the mean number of years producers had grown broilers. Those who Cleaned their feed bin after

TABLE XII

RELATIONSHIPS BETWEEN THE NUMBER OF YEARS SELECTED TENNESSEE BROILER PRODUCERS HAD GROWN BROILERS AND THE USE OF SELECTED RECOMMENDED PRACTICES IN 1981

Name of Practice	Number of Producers	Mean Number of Years Grown Broilers	F Value	df	P Level
<u>Clean houses annually</u>					
1. No	12	13.1			
2. Yes	110	10.5			
Total	122	10.7	1.7	1	0.201
<u>Clean waterer between growouts</u>					
1. No	31	8.0			
2. Yes	91	11.6			
Total	122	10.7	7.1	1	0.009
<u>Clean feed bin after each growout</u>					
1. No	43	9.1			
2. Yes	79	11.6			
Total	122	10.7	3.8	1	0.053
<u>Check thermostat for accuracy</u>					
1. No	36	12.3			
2. Yes	86	10.1			
Total	122	10.7	2.7	1	0.104

TABLE XII (Continued)

Name of Practice	Number of Producers	Mean Number of Years Grown Broilers	F Value	df	P Level
<u>Adjust brooder height</u>					
1. No	3	8.3			
2. Yes	119	10.8			
Total	122	10.7	0.4	1	0.538
<u>Use partial house brooding</u>					
1. No	14	13.6			
2. Yes	108	10.3			
Total	122	10.7	3.0	1	0.084
<u>Clean waterer daily</u>					
1. No	30	6.6			
2. Yes	92	12.1			
Total	122	10.7	17.1	1	0.001
<u>Add feed to tray three times daily</u>					
1. No	76	10.0			
2. Yes	45	11.7			
Total	121	10.6	2.0	1	0.164

TABLE XIII

RELATIONSHIPS BETWEEN THE NUMBER OF YEARS SELECTED TENNESSEE BROILER PRODUCERS HAD GROWN BROILERS AND THE USE OF SELECTED RECOMMENDED PRACTICES, 1981

Name of Practice	Number of Producers	Mean Number of Years Grown Broilers	F Value	df	P Level
<u>Check each house three times daily</u>					
1. No	21	7.1			
2. Yes	100	11.5			
Total	121	10.8	8.0	1	0.006
<u>Use milk solution with viral vaccine</u>					
1. No	67	9.4			
2. Yes	36	11.6			
Total	103	10.1	2.8	1	0.095
<u>Keep mortality records</u>					
1. No	2	17.5			
2. Yes	118	10.7			
Total	120	10.8	2.0	1	0.158
<u>Remove caked or wet litter</u>					
1. No	40	10.6			
2. Yes	81	10.9			
Total	121	10.8	0.1	1	0.803

TABLE XIII (Continued)

Name of Practice	Number of Producers	Mean Number of Years Grown Broilers	F Value	df	P Level
<u>Mow grass around houses</u>					
1. No	22	7.5			
2. Yes	99	11.5			
Total	121	10.8	6.2	1	0.014
<u>Keep wild birds from houses</u>					
1. No	5	12.6			
2. Yes	116	10.7			
Total	121	10.8	0.4	1	0.537
<u>Follow rodent control program</u>					
1. No	4	10.0			
2. Yes	117	10.8			
Total	121	10.8	0.1	1	0.818

each growout appeared to have a higher mean number of years growing broilers (i.e. 11.6 years) than those who did not (i.e. 9.1 years).

Check thermostat for accuracy. Producers not using the practice had a higher mean number of years growing broilers than those who did (i.e. 12.3 and 10.1 years, respectively). However, the use of the practice was not significantly related to the mean number of years producers had grown broilers.

Adjust brooder height. Those who used the practice were not significantly different from those who did not. Nevertheless, a higher mean number of years growing broilers was shown for those who Adjusted their brooder height than those who did not (i.e. 10.8 and 8.3 years, respectively).

Use partial house brooding. The Use of partial house brooding was not significantly related to the mean number of years grown broilers. However, it was noted that those with higher mean number (i.e. 13.6 years) were not using the practice (i.e. versus 10.3 years).

Clean waterer daily. Producers who cleaned waterer daily had a higher mean number of years growing broilers (i.e. 12.1 years) compared to 6.6 years for those who did not. The relationship between the two variables tested was highly significant.

Add feed to tray three times daily. There was little difference noted in the mean number of years grown broilers for those who used this practice and those who did not. Also, the relation between the two variables was not significant.

Check each house three times daily. As shown in Table XIII, a very significant relationship was found between the use of the practice and the mean number of years producers had grown broilers. Those who Checked their broiler houses three times daily had produced broilers longer on the average (i.e. 11.5 years) than those who did not (i.e. 7.1 years).

Use milk solution with viral vaccine. Producers who Used milk solution with viral vaccine were not significantly different from those who did not use, when compared by the average number of years they had grown broilers. However, those who used the practice had been producing broilers longer on the average (i.e. 11.6 years) than those who did not (i.e. 9.4 years).

Keep mortality records. On the average producers who Kept mortality records were more experienced at growing broilers (i.e. 17.5 years), compared to those who did not use the practice (i.e. 10.7 years). However, the relationship was not statistically significant.

Remove caked or wet litter. Little or no visible difference was noted in the mean number of years producers had grown broilers, for those who Removed caked or wet litter and those who did not

(i.e. 10.9 and 10.6 years, respectively). Also, the use of the practice was not significantly related to the mean number of years producers had grown broilers.

Mow grass around each house. The use of the practice was significantly related to the mean number of years broilers were grown. On the average, producers who used the practice were more experienced (i.e. 11.5 years) than those who did not mow grass around houses (i.e. 7.5 years).

Keep wild birds from houses. Those using the practice were not significantly different from those not using on the mean number of years growing broilers. Nevertheless, it was noted that the five producers not using the practice had a higher mean number of years growing broilers (i.e. 12.6 years) than those using (i.e. 10.7 years).

Follow rodent control program. The use of the practice and the mean number of years producers had grown broilers were not significantly related at the required level. Little difference was noted between those using the practice and those not using it (i.e. 10.8 and 10.0 years, respectively).

D. RELATIONSHIPS BETWEEN THE MAIN SOURCE OF INCOME EARNED BY
BROILER PRODUCERS, THEIR SELECTED CHARACTERISTICS
AND USE OF RECOMMENDED PRACTICES

For the purpose of analysis, data on the main sources of income earned by broiler producers were compared with various producers and operational characteristics, and with practices used. Data were presented in numbers and percent of producers in each income category.

Main Source of Income and Selected Characteristics

Data in Tables XIV-XVII relate selected characteristics with main source of income earned by broiler producers in numbers and percentages. Chi-square was used to determine the strength of relationship between dependent and independent variables. Chi-square values which achieved the .05 probability level were considered significant. Almost one-half (i.e. 62) of all (i.e. 123) producers gave Poultry as their main income source. Thirty-six indicated Non-farm sources, while others (i.e. 25) reported Other farm sources.

Future plans. As seen in Table XIV, most producers (i.e. 77 percent) in all main income groups combined planned to remain the same size in operations in the future. When income groups were compared, it may be seen that the greatest difference among the three groups was between those naming Poultry (i.e. 74 percent) and Non-farm (i.e. 83 percent) sources. A 9 percent, or consequential,

TABLE XIV

RELATIONSHIPS BETWEEN THE MAIN SOURCE OF INCOME EARNED BY SELECTED TENNESSEE
BROILER PRODUCERS AND THEIR SELECTED CHARACTERISTICS, 1981

Selected Characteristic	Total		Main Source of Income					
	No.	%	Poultry		Other Farm		Non-farm	
	No.	%	No.	%	No.	%	No.	%
<u>Future plans</u>								
1. Increase size	23	19	11	18	6	25	6	17
2. Same size	92	77	45	74	18	75	29	83
3. Reduce or quit	5	4	5	8	0	--	0	--
Total	120	100	61	100	24	100	35	100
			$\chi^2 = 5.6$		df = 4		P = 0.229	
<u>Total capacity of all houses</u>								
1. 6,000-21,000	42	34	15	24	15	60	12	33
2. 22,000-31,000	39	32	17	28	4	24	16	45
3. 32,000 and over	42	34	30	48	4	16	8	22
Total	123	100	62	100	25	100	36	100
			$\chi^2 = 17.0$		df = 4		P = 0.002	

TABLE XIV (Continued)

Selected Characteristic	Main Source of Income							
	Total		Poultry		Other Farm		Non-farm	
	No.	%	No.	%	No.	%	No.	%
<u>Years grown broilers</u>								
1. 1-5	37	30	13	21	6	24	18	50
2. 6-14	50	41	27	44	11	44	12	33
3. 15-34	36	29	22	35	8	32	6	17
Total	123	100	62	100	25	100	36	100
			$\chi^2 = 10.3$		df = 4		P = 0.036	
<u>Total Extension contacts</u>								
1. Not any	38	31	19	31	2	8	17	47
2. One or more	85	69	43	69	23	92	19	53
Total	123	100	62	100	25	100	36	100
			$\chi^2 = 10.6$		df = 2		P = 0.005	

TABLE XV

RELATIONSHIPS BETWEEN THE MAIN SOURCE OF INCOME EARNED BY SELECTED TENNESSEE
BROILER PRODUCERS AND THE TYPE OF HOUSING FACILITIES USED IN 1981

Housing Facilities	Total		Main Source of Income					
	No.	%	Poultry		Other Farm		Non-farm	
	No.	%	No.	%	No.	%	No.	%
<u>Type of housing</u>								
1. Conventional	119	98	58	97	25	100	36	100
2. Environmental	2	2	2	3	0	--	0	--
Total	121	100	60	100	25	100	36	100
			$\chi^2 = 2.1$		df = 2		P = 0.356	
<u>Type of ventilation</u>								
1. Natural	13	11	3	5	5	20	5	14
2. Fan	14	12	7	12	2	8	5	14
3. Combination	94	77	50	83	18	72	26	72
Total	121	100	60	100	25	100	36	100
			$\chi^2 = 5.1$		df = 4		P = 0.277	
<u>Use foggers for cooling</u>								
1. No	75	63	27	46	23	95	25	69
2. Yes	44	37	32	54	1	5	11	31
Total	119	100	59	100	24	100	36	100
			$\chi^2 = 19.3$		df = 2		P = 0.001	

TABLE XVI

RELATIONSHIPS BETWEEN THE MAIN SOURCE OF INCOME EARNED BY SELECTED TENNESSEE BROILER PRODUCERS AND THE TYPE OF EQUIPMENT USED IN THEIR BROILER HOUSING FACILITIES IN 1981

Equipment Facilities	Total		Main Source of Income					
	No.	%	Poultry		Other Farm		Non-farm	
	No.	%	No.	%	No.	%	No.	%
<u>Type of feeders</u>								
1. Mechanical chain	41	33	18	29	8	32	15	42
2. Chain with pan	19	16	12	19	4	16	3	8
3. Automatic round pan	53	43	28	45	10	40	15	42
4. Other	10	8	4	7	3	12	3	8
Total	123	100	62	100	25	100	36	100
		$\chi^2 = 3.7$		$df = 6$		$P = 0.715$		
<u>Type of waterers</u>								
1. Automatic trough	91	74	52	84	14	56	25	69
2. Nipple	27	22	6	10	10	40	11	31
3. Bell shape	5	4	4	6	1	4	0	--
Total	123	100	62	100	25	100	36	100
		$\chi^2 = 13.5$		$df = 4$		$P = 0.009$		

TABLE XVI (Continued)

Equipment Facilities	Total		Main Source of Income					
			Poultry		Other Farm		Non-farm	
	No.	%	No.	%	No.	%	No.	%
<u>Water medicator</u>								
1. No	13	11	1	2	6	24	6	17
2. Yes	79	64	47	76	15	60	17	47
3. One is available when needed	31	25	14	22	4	16	13	36
Total	123	100	62	100	25	100	36	100
		$\chi^2 = 15.9$		$df = 4$		$P = 0.003$		
<u>Type dead bird disposal</u>								
1. Incinerator	9	4	8	13	0	--	1	3
2. Pit	54	44	32	52	7	28	15	42
3. Other	60	49	22	35	18	72	20	56
Total	123	100	62	100	25	100	36	100
		$\chi^2 = 13.2$		$df = 4$		$P = 0.011$		

TABLE XVII

RELATIONSHIPS BETWEEN THE MAIN SOURCE OF INCOME EARNED BY SELECTED
TENNESSEE BROILER PRODUCERS AND THEIR LITTER USE PRACTICES IN 1981

Litter Use Practice	Total		Main Source of Income					
			Poultry		Other Farm		Non-farm	
	No.	%	No.	%	No.	%	No.	%
<u>Type of litter</u>								
1. Shavings	56	46	27	44	7	28	22	61
2. Sawdust	53	43	24	39	16	64	13	36
3. Straw	10	8	9	14	1	4	0	--
4. Combination	4	3	2	3	1	4	1	3
Total	123	100	62	100	25	100	36	100
			$\chi^2 = 13.5$		df = 6		P = 0.036	
<u>Number of growouts on same litter</u>								
One	25	20	16	26	3	12	6	17
Two	30	25	11	18	8	32	11	31
Three	31	25	12	19	7	28	12	33
Four	2	2	1	1	0	--	1	3
Five	32	26	21	34	6	24	5	14
Six	3	3	1	1	1	4	1	3
Total	123	100	62	100	25	100	36	100
			$\chi^2 = 10.8$		df = 10		P = 0.371	

TABLE XVII (Continued)

Litter Use Practice	Total		Main Source of Income					
	No.	%	Poultry		Other Farm		Non-farm	
	No.	%	No.	%	No.	%	No.	%
<u>Use of litter</u>								
1. Put on land	88	72	43	69	23	92	22	61
2. Feed to cattle	2	2	0	--	2	8	0	--
3. Sell	30	24	16	26	0	--	14	39
4. Other	3	2	3	5	0	--	0	--
Total	123	100	62	100	25	100	36	100
		$\chi^2 = 22.1$		df = 6		P = 0.001		

difference was noted between the two. However, the Chi-square test was not significant.

Total capacity of all houses. When sources of income categories are compared (see Table XIV, page 56), it is seen that nearly one-half (i.e. 48 percent) of those declaring Poultry as a main source of income had 32,000 or more bird capacities, while only 16 percent of those in the Other farm source group and 22 percent in the Non-farm category had such broiler capacity. This difference was highly significant. Most, 60 percent, of those in the Other farm main income source group had total capacities of 6,000-21,000 birds, and most, 45 percent, in the Non-farm category had 22,000-31,000 bird capacities.

Years grown broilers. The number of years producers had grown broilers was significantly related to the main sources of income they earned in 1981. Forty-four percent each of the producers who earned most income from Poultry and of those from Other farm sources had grown broilers from six to 14 years, compared to only 33 percent for those who indicated Non-farm income sources. It was noted that 50 percent of the producers who derived most of their income from Non-farm sources had the least experience at growing broilers (i.e. 1-5 years).

Total Extension contacts. The total Extension contacts broiler producers had was significantly related to their main sources of income. It was noted that 92 percent of producers declaring

Other farm as a main source of income had One or more Extension contacts, while 69 percent of those who indicated Poultry and 53 percent of the Non-farm main income groups also reported having One or more Extension contacts in 1981.

Type of housing. As shown in Table XV, page 58, the type of broiler housing used was not significantly related to the main source of income. Almost all producers responding reported the use of Conventional (i.e. opensided) type housing except for 3 percent who indicated Poultry as a main source. Two reported Environmental type housing.

Type of ventilation. The type of ventilation used was found not to be significantly related to the main sources of income producers earned. Eighty-three percent of the producers deriving most of their income from Poultry used a Combination of ventilation types, while equal proportions (i.e. 72 percent) were noted for the other two main source of income groups. The smallest proportion (i.e. 5 percent) of those using Natural ventilation had Poultry as the main source of income, compared to 14 and 20 percents for those indicating Non-farm and Other farm income sources, respectively.

Use foggers for cooling. The use of foggers for cooling was very significantly related to the main source of income earned by producers. It was evident that the vast majority (i.e. 95 percent) of those who reported Other farm as their main income source were not using the practice. Also, 69 percent of those in Non-farm main

income source group did not use foggers for cooling. At the same time, most (i.e. 54 percent) of those who indicated Poultry as the main income source were using the practice.

Type of feeders. The type of feeders producers used had no significant relationship to the main source of income. As may be seen in Table XVI, page 59, the largest group (i.e. 43 percent) of all producers used Automatic round pan feeder type. Little difference was noted among the three main income source groups.

Type of waterers. The type of waterer used was very significantly associated with the main source of income. Eighty-four percent of the producers deriving most of their income from Poultry reported Automatic waterer use, while 69 percent of the Non-farm and 56 percent of Other farm main income sources also did. It was noted that the highest proportion (i.e. 40 percent) of those indicating Nipple type waterers were in the Other farm group.

Water medicator. Having a water medicator was very significantly related to main source of income. Highest percents of growers in all three source of income categories owned medicators (i.e. Poultry, 76 percent; Other farm, 60 percent; Non-farm, 47 percent).

Type of dead bird disposal. Almost one-half, 49 percent, of the broiler producers indicated Other type of unspecified dead bird disposal. It was noted that eight of the nine producers who used Incinerator had most of their income from Poultry. Also, more than

one-half (i.e. 51 percent) of those who declared Poultry income sources disposed of their dead birds in Pits. A high proportion (i.e. 72 percent) of those who had their main income from Other farm sources indicated Other types of dead bird disposal, which could raise the possibility that they might be feeding them to other animals. Also, more than one-half (i.e. 56 percent) of those who indicated Non-farm main sources of income reported such dead bird disposal methods. The two variables were found to be significantly related.

Type of litter. As may be seen in Table XVII, page 61, the type of litter used by producers was significantly related to their main source of income. A majority, 61 percent, of the producers in the Non-farm main income group used Shavings as litter, compared to 44 percent for those who indicated Poultry and 28 percent for Other farm main income group. Almost two-thirds (i.e. 64 percent) with Other farm as a main income source used Sawdust for litter, as was the case for 39 percent of those reporting Poultry and 36 percent in the Non-farm group. The smallest proportion of all producers, mostly from the Poultry group, used Straw and a Combination of litters.

Number of growouts on same litter. The number of growouts producers had on the same litter was not significantly related to their main sources of income. However, it was noted that consequentially higher percents of the producers who had their main source of income from Poultry had One and Five growouts on

the same litter, compared with Two and Three growouts for other sources.

Use of litter. The use of broiler litter was very significantly related to the main source of income. Majorities of producers in all main income source groups Put their litters on land. Ninety-two percent of those naming Other farm, 69 percent of Poultry and 61 percent of Non-farm main income source group reported this use. More than one-fourth (i.e. 26 percent) of those having Poultry as a main income source and more than one-third (i.e. 39 percent) naming Non-farm Sold their litter. The smallest percent of all groups Fed litter to cattle.

Main Source of Income and Use of Recommended Practices

Table XVIII includes data regarding relations between main sources of income and recommended broiler production practices used. Six of the 15 practices studied were found to be significantly related to the main source of income when the Chi-square test was applied. These six included: Practice No. 2 Clean waterers between growouts; Practice No. 4, Check thermostat for accuracy; Practice No. 7, Clean waterers daily; Practice No. 8, Add feed to trays three times daily; Practice No. 9, Check each house three times daily; and Practice No. 10, Use milk solution with viral vaccine.

When sources of income groups were compared on significant practices, certain facts emerged. For example, a vast majority (i.e. 90 percent) of the broiler producers deriving most income from Poultry reportedly Cleaned waterers between growouts. This compared

TABLE XVIII

RELATIONSHIPS BETWEEN THE MAIN SOURCE OF INCOME EARNED BY SELECTED TENNESSEE BROILER PRODUCERS AND THEIR USE OF RECOMMENDED BROILER MANAGEMENT PRACTICES IN 1981

Recommended Practice	Total		Main Source of Income					
			Poultry		Other Farm		Non-farm	
	No.	%	No.	%	No.	%	No.	%
1. Clean house annually	123	90	62	90	25	96	36	86
2. Clean waterers between growouts	123	75 ^a	62	90	25	60	36	58
3. Clean feed bin after each growout	123	65	62	73	25	64	36	53
4. Check thermostat for accuracy	123	71 ^a	62	57	25	88	36	83
5. Adjust brooder height	123	98	62	98	25	100	36	94
6. Use partial house brooding	123	89	62	89	25	80	36	94
7. Clean waterer daily	123	76 ^a	62	89	25	72	36	56
8. Add feed to trays three times daily	122	37 ^a	61	23	25	64	36	42
9. Check each house three times daily	122	83 ^a	61	95	25	84	36	61
10. Use milk solution with viral vaccine	104	36 ^a	48	56	23	9	33	24
11. Keep mortality records	121	98	61	98	25	96	35	100
12. Remove caked or wet litter	122	66	61	71	25	68	36	58
13. Mow grass around houses	122	82	61	90	25	80	36	69
14. Keep wild birds from houses	122	96	61	97	25	92	36	97
15. Follow rodent control program	122	97	61	100	25	92	36	94

^aChi-square was significant at .01 level of probability.

to 60 percent of the Other farm group and 58 percent for Non-farm. A higher percent of those who named Other farm as a main income source checked thermostat for accuracy, compared to 83 percent for those in Non-farm main income source and 57 percent of those reporting Poultry.

Producers in the Poultry main income group had the highest percent (i.e. 89 percent) Cleaning waterers daily. Seventy-two percent of those in the Other farm main income group and 56 percent with Non-farm income reported using the practice. Practice #8, Add feed to trays three times daily, was found to be highly significant in its relation to main sources of income. Producers who earned most income from Other farm sources reported the highest (i.e. 64 percent) usage of the practice, 42 percent being noted for those in Non-farm and the least, 23 percent, for those naming Poultry. Ninety-five percent of producers in the Poultry main income source group checked houses three times daily. Eighty-four percent of those in Other farm main income group, and only 61 percent of those with Non-farm income used the practice.

A very wide margin was noted in the percentages of producers Using milk solution with viral vaccine. A majority (i.e. 56 percent) with Poultry income used the practice, compared to 24 percent for Non-farm and 9 percent for Other farm.

Though not significant, consequential differences (i.e. 9 percent or more) were noted among income sources groups on Practices Nos. 1, 3, 6, 12 and 13. The highest percent, 96, of Other farm income source producers reported use of Practice No. 1, Clean houses

annually. The lowest income group, Non-farm, had 86 percent using. Broiler producers in the Poultry main income source group reported the highest percent usage, 73, for Practice No. 3, Clean feed bin after each growout, and lowest usage, 53 percent, was reported for the Non-farm group.

On Practice No. 6, Use partial house brooding, a consequential difference of 14 percent was noted between producers declaring Non-farm and Other farm as main sources of income (i.e. 94 and 80 percent, respectively). On Practice No. 12, Remove caked or wet litter, a high, 71, percent of broiler producers having most income from Poultry reported the use of this practice. The lowest percent, 58, usage was seen for those in the Non-farm group. On the use of Practice No. 13, Mow grass around houses, a consequential difference of 21 percent was noted between producers in Poultry and Non-farm main income source groups (i.e. 90 percent versus 69 percent).

E. RELATIONSHIPS BETWEEN THE FUTURE PLANS INDICATED BY BROILER PRODUCERS, THEIR SELECTED CHARACTERISTICS AND USE OF RECOMMENDED PRACTICES

For the purposes of analysis, data on future plans indicated by broiler producers were compared with various producer and operational characteristics and with practice use. Data were presented in numbers and percents of producers in each Future plan group.

Future Plans and Selected Characteristics

Data in Tables XIX-XXII relate selected characteristics with Future plans indicated by producers, in numbers and percents. Chi-square was used to determine the strength of relationships between independent and dependent variables. Chi-square values which achieved the .05 probability level were considered significant. As seen earlier in Table I, page 19, three-fourths of the producers planned to keep their broiler operations at the Same size. Nineteen percent of the respondents planned to Increase size, while 4 percent planned to Reduce size or quit broiler production. The remaining 2 percent of the producers surveyed did not respond.

Total capacity of all houses. As shown in Table XIX, the total capacity of all broiler houses owned by producers was not significantly related to their future plans. A consequentially higher percent of those with 22,000-31,000 bird capacities planned to increase flock size (i.e. 39 percent versus 20 percent), while the reverse was true for the 32,000 and over group (i.e. 26 percent versus 40 percent) with those planning to Reduce.

Years grown broilers. Higher but not significant proportions of producers who planned to Increase size and remain the Same had grown broilers from six to 14 years (i.e. 48 and 39 percent, respectively) than the Reduce size or quit group (i.e. 20 percent). The 60 percent of the five producers (i.e. three) planning to Reduce size or quit broiler production reported the most experience growing broilers (i.e. 15-34 years). Thirty-two percent not planning to

TABLE XIX

RELATIONSHIPS BETWEEN THE FUTURE PLANS INDICATED BY SELECTED
TENNESSEE BROILER PRODUCERS AND THEIR
SELECTED CHARACTERISTICS

Selected Characteristic	Future Plans							
	Total		Increase		Same		Reduce Size or Quit	
	No.	%	No.	%	No.	%	No.	%
<u>Total capacity of all houses</u>								
1. 6,000-21,000	42	35	8	35	32	35	2	40
2. 22,000-31,000	37	31	9	39	27	29	1	20
3. 32,000 and over	41	34	6	26	33	36	2	40
Total	120	100	23	100	92	100	5	100
	$\chi^2 = 1.4$		df = 4		F = 0.849			
<u>Years grown broilers</u>								
1. 1-5	36	30	8	35	27	29	1	20
2. 6-14	48	40	11	48	36	39	1	20
3. 15-34	36	30	4	17	29	32	3	60
Total	120	100	23	100	92	100	5	100
	$\chi^2 = 4.0$		df = 4		F = 0.404			
<u>Main source of income</u>								
1. Poultry	61	51	11	48	45	49	5	100
2. Other farm	24	20	6	26	18	20	0	--
3. Non-farm	35	29	6	26	29	31	0	--
Total	120	100	23	100	92	100	5	100
	$\chi^2 = 5.6$		df = 4		F = 0.229			
<u>Total Extension contacts</u>								
1. Not any	38	32	5	22	31	34	2	40
2. One or more	82	68	18	78	61	66	3	60
Total	120	100	23	100	92	100	5	100
	$\chi^2 = 1.4$		df = 2		F = 0.501			

TABLE XX

RELATIONSHIPS BETWEEN THE FUTURE PLANS INDICATED BY SELECTED
TENNESSEE BROILER PRODUCERS AND THE TYPES OF BROILER
HOUSING FACILITIES USED IN 1981

Housing Facilities	Total		Future Plans					
	No.	%	Increase		Same		Reduce Size or Quit	
	No.	%	No.	%	No.	%	No.	%
<u>Type of housing</u>								
1. Conventional	116	98	22	100	91	99	3	75
2. Environmental	2	2	0	--	1	1	1	25
Total	118	100	22	100	92	100	4	100
			$\chi^2 = 13.6$		df = 2	P = 0.001		
<u>Type of ventilation</u>								
1. Natural	13	11	2	9	11	12	0	--
2. Fan	13	11	2	9	11	12	0	--
3. Combination	92	78	18	82	70	76	4	100
Total	118	100	22	100	92	100	4	100
			$\chi^2 = 1.5$		df = 4	P = 0.825		
<u>Use foggers for cooling</u>								
1. No	72	62	12	55	57	63	3	75
2. Yes	44	38	10	45	33	37	1	25
Total	116	100	22	100	90	100	4	100
			$\chi^2 = 0.9$		df = 2	P = 0.646		

TABLE XXI

RELATIONSHIPS BETWEEN THE FUTURE PLANS INDICATED BY SELECTED
TENNESSEE BROILER PRODUCERS AND THE TYPES OF EQUIPMENT
USED IN BROILER FACILITIES IN 1981

Equipment Facilities	Future Plans							
	Total		Increase		Same		Reduce Size or Quit	
	No.	%	No.	%	No.	%	No.	%
<u>Type of feeders</u>								
1. Mechanical chain	39	33	7	30	29	32	3	60
2. Chain with pan	19	16	4	18	14	15	1	20
3. Automatic round pan	52	43	10	44	41	44	1	20
4. Other	10	8	2	9	8	9	0	--
Total	120	100	23	100	92	100	5	100
	$\chi^2 = 2.4$		df = 6		P = 0.876			
<u>Type of waterers</u>								
1. Automatic trough	89	74	17	74	71	77	1	20
2. Nipple	26	22	6	26	18	20	2	40
3. Bell shape	5	4	0	--	3	3	2	40
Total	120	100	23	100	92	100	5	100
	$\chi^2 = 19.8$		df = 4		P = 0.001			
<u>Water medicators</u>								
1. No	13	11	1	4	12	13	0	--
2. Yes	78	65	16	70	57	62	5	100
3. One is available when needed	29	24	6	26	23	25	0	--
Total	120	100	23	100	92	100	5	100
	$\chi^2 = 4.3$		df = 4		P = 0.371			
<u>Dead bird disposal</u>								
1. Incinerator	9	8	1	4	7	8	1	20
2. Pit	53	44	6	26	44	48	3	60
3. Other	58	48	16	70	41	45	1	20
Total	120	100	23	100	92	100	5	100
	$\chi^2 = 6.9$		df = 4		P = 0.144			

TABLE XXII

RELATIONSHIPS BETWEEN THE FUTURE PLANS INDICATED BY SELECTED
TENNESSEE BROILER PRODUCERS AND THEIR
LITTER USE PRACTICES IN 1981

Litter Use Practice	Total		Future Plans					
	No.	%	Increase		Same		Reduce Size or Quit	
	No.	%	No.	%	No.	%	No.	%
<u>Type of litter</u>								
1. Shavings	55	46	11	48	43	47	1	20
2. Sawdust	51	43	8	35	40	44	3	60
3. Straw	10	8	4	17	6	7	0	--
4. Combination	4	3	0	--	3	3	1	20
Total	120	100	23	100	92	100	5	100
			$\chi^2 = 9.4$		df = 6		P = 0.150	
<u>Number of growouts on same litter</u>								
One	25	21	2	9	23	25	0	--
Two	27	22	8	35	18	20	1	20
Three	31	26	5	21	23	25	3	60
Four	2	2	0	--	2	2	0	--
Five	32	26	8	35	23	25	1	20
Six	3	3	0	--	3	3	0	--
Total	120	100	23	100	92	100	5	100
			$\chi^2 = 10.0$		df = 10		P = 0.437	
<u>Use of litter</u>								
1. Put on land	85	71	17	74	65	71	3	60
2. Feed to cattle	2	2	1	4	1	1	0	--
3. Sell	30	25	4	18	24	26	2	40
4. Other	3	2	1	4	2	2	0	--
Total	120	100	23	100	92	100	5	100
			$\chi^2 = 2.9$		df = 6		P = 0.824	

change and 17 percent planning to Increase size also indicated 15 to 34 years growing broilers. However, the relationship was not a significant one.

Main source of income. Almost one-half of the producers planning to Increase size and those remaining the Same size earned most income from Poultry (i.e. 48 and 49 percent, respectively). Also, all the five producers planning to Reduce size or quit broiler production had declared Poultry as their main source of income. Nevertheless, the relationship was not found to be significant.

Total Extension contacts. No significant relationship was shown between the total Extension contacts producers had and their future plans. However, most producers in each future plan category reported having at least One or more Extension contacts in 1981. Seventy-eight percent of those Increasing size, 66 percent of those remaining the Same size and 60 percent of those Reducing or quitting reported such contacts.

Type of housing. As may be seen in Table XX, the type of housing used by broiler producers was very significantly related to the future plans they indicated. All producers (i.e. 100 percent) who had planned to Increase their size of broiler operation used Conventional type housing. Ninety-nine percent of the producers who planned to remain the Same size and 75 percent of those who planned to Reduce size or quit also used Conventional type housing. It

should be noted that only two of those responding used Environmental type housing.

Type of ventilation. All (i.e. 100 percent) of the four producers who planned to Reduce size or quit broiler production, reported using a Combination of ventilation types. Eighty-two percent of those who planned to Increase size, as well as 76 percent of those who planned to remain the Same size, also were using a Combination of ventilation types. Equal percents of those who planned to Increase size and remain the Same size used each of the Other ventilation types (i.e. Natural and Fan ventilation types). However, this relationship was found not significant.

Use foggers for cooling. Most, 62 percent, of the producers in all Future plan groups combined, did not use foggers for cooling. Three-fourths (i.e. 75 percent) of those who planned to Reduce flock size or quit broiler production did not use the practice. Sixty-three percent of the producers who planned to remain the same size and 55 percent of those Increasing flock size in the future also were found not using this practice. However, the use of foggers for supplemental broiler house cooling was found not significantly related to producers future plan.

Type of feeders. A study of data in Table XXI discloses that 44 percent each of those who planned to Increase size and remain the Same size reported the use of Automatic round pan type feeders. Only 20 percent of the five producers who planned to Reduce flock size or

quit production also reported the use of this type of feeder. Sixty percent of these last producers reported the use of Mechanical chain type feeders. It was noted that the smallest percent of producers in each future plan group were using other types of feeders not specified. However, the two variables studied were not significantly related.

Type of waterers. The Type of waterers used was very significantly related to the future plans producers indicated. Seventy-seven percent of those who planned to remain the Same size and 74 percent of those who planned to Increase size reported the use of Automatic waterers. Equal percents (i.e. 40 percent) of those who planned to Reduce size or quit broiler production were found using Nipple and Bell shape type waterers, respectively.

Water medicator. Ownership of a water medicator (see Table XXI) was not significantly related to the future plans. However, it was noted that a consequentially higher percent, 100, of producers who planned to Reduce size or quit production owned a Water medicator. Seventy percent of those who planned to remain the Same and 62 percent of those who planned to Increase size had Water medicators. About one-fourth (i.e. 25 percent) each of those who planned to Increase size and remain the Same did not report owning one, but indicated having One available when needed.

Dead bird disposal. Forms of Dead bird disposal facilities other than Incinerator and Pit were used by 70 percent of producers who had planned to Increase their flock sizes. Most of the producers who had planned to Reduce size or quit and those who planned to remain the Same size used Pits for disposal of their dead birds (i.e. 60 and 48 percents, respectively). It was noted that seven of the nine producers who used Incinerators had planned to remain the Same size. Nevertheless, these variables were not significantly related.

Type of litter. As may be seen in Table XXII, most (i.e. almost 90 percent) of the broiler producers in all categories used either Shavings or Sawdust as litter. Forty-eight percent of those who planned to Increase size and 47 percent of those who planned to remain the Same were found using Shavings as litter. Most, 60 percent, of the five producers who planned to Reduce size or quit broiler production used Sawdust. Not many producers were found using other types of litter. The type of litter used by producers was not found to be significantly related to their future plans.

Number of growouts on same litter. The number of growouts on same litter was not significantly related to the future plans producers indicated. However, it was noted that high percents of producers in all categories had Three and Five growouts on same litter. Most (i.e. 70 percent combined) of the producers that planned to Increase size reported two and five growouts on the same litter. Twenty-five percent each of the producers (i.e. 75 percent combined) that planned to remain Same had One, Three and Five

growouts on the same litter. By way of comparison, most, 60 percent, of the five producers who planned to Reduce size or quit production reported Three growouts on the same litter.

Use of litter. A majority of the broiler producers in all groups Put their broiler litter on land for crop use. Seventy-four percent of those who planned to Increase size reported Putting litter on land, 71 percent of the producers who planned to remain the Same size and 60 percent of the five who planned to Reduce size or quit so indicated. The relationship was not a significant one.

Future Plans and Use of Recommended Practices

Table XXIII relates the future plans indicated by broiler producers with the use of selected recommended practices. Only one of the 15 recommended practices studied was found to be significantly related to the future plans when the Chi-square test was applied.

The only practice found to be significantly related to the future plans was Practice No. 11, Keep mortality records. All the producers (i.e. 100 percent) who planned to remain the Same size were found to be Keeping mortality records. Ninety-six percent of those who planned to Increase size and 80 percent of those who planned to Reduce or quit broiler production also were found to be using this practice.

Though not related significantly, consequential differences were noted for all practices, excepting Practice No. 5, Adjust brooder height. On Practice No. 1, Clean houses annually, 96 percent of the producers who planned to Increase size were found using this

TABLE XXIII

RELATIONSHIPS BETWEEN THE FUTURE PLANS INDICATED BY SELECTED
TENNESSEE BROILER PRODUCERS AND THEIR USE OF
SELECTED RECOMMENDED PRACTICES IN 1981

Recommended Practice	Future Plans							
	Total		Increase		Same		Reduce Size or Quit	
	No.	%	No.	%	No.	%	No.	%
1. Clean houses annually	120	90	23	96	92	89	5	80
2. Clean waterer between growouts	120	76	23	61	92	80	5	60
3. Clean feed bin after each growout	120	66	23	78	92	62	5	80
4. Check thermostat for accuracy	120	71	23	87	92	66	5	80
5. Adjust brooder height	120	98	23	96	92	98	5	100
6. Use partial house brooding	120	88	23	78	92	90	5	100
7. Clean waterer daily	120	77	23	61	92	80	5	80
8. Add feed to tray three times daily	119	38	23	34	92	37	4	75
9. Check each house three times daily	119	84	23	83	91	84	5	100
10. Use milk solution with viral vaccine	101	37	19	26	79	39	3	33
11. Keep mortality records	118	98 ^a	22	96	91	100	5	80
12. Remove caked or wet litter	119	66	23	57	91	69	5	60
13. Mow grass around houses	119	82	23	78	91	82	5	100
14. Keep wild birds from houses	119	96	23	91	91	97	5	100
15. Follow rodent control program	119	97	23	91	91	98	5	100

^aChi-square was significant at .01 level of probability.

practice, compared to 80 percent of those who planned to Reduce or quit broiler production. On Practice No. 2, Clean waterers between growouts, a consequential difference of about 20 percent was shown between producers who planned to remain the Same size, 80 percent, and those planning to Reduce or quit, 60 percent. A consequentially larger percent, 80 percent, of the five producers who planned to Reduce or quit production had used Practice No. 3, Clean feed bin after each growout, compared to those staying the Same, 62 percent. The highest percent (i.e. 87 percent) of those who planned to Increase size were found using Practice No. 4, Check thermostat for accuracy, compared to only 66 percent for those who planned to Remain the same size. All (i.e. 100 percent) of the five broiler producers who planned to Reduce or quit production reported the use of Practice No. 6, Use partial house brooding, compared to 78 percent of those who planned to Increase size. On Practice No. 7, Clean waterers daily, equal percents (i.e. 80 percent) of the producers who planned to remain the Same size and those who planned to Reduce or quit production were found using this practice, compared to 61 percent for those who planned to Increase size.

Three-fourths (i.e. 75 percent) of the five producers who planned to Reduce size or quit production reported the use of Practice No. 8, Add feed to trays three times daily, compared to 34 percent of those Increasing size. All the five producers who planned to Reduce size or quit broiler production reported the use of Practice No. 9, Check each house three times daily. This compared with 83 percent of those who planned to Increase size of operations.

Producers in all groups reported a relatively low level of usage for Practice No. 10, Use milk with viral vaccine, 39 percent of those who planned to remain the Same and 26 percent of those Increasing size reported the use. On Practice No. 12, Remove wet and caked litter, the highest of 69 percent was reported for producers who planned to remain the Same size, this compared with 57 percent of those who planned to Increase broiler operation size. All the five producers who planned to Reduce size or quit broiler production were using Practice No. 13, Mow grass around houses. Those planning to Increase size had the lowest usage on this practice (i.e. 72 percent).

On Practice No. 14, Keep wild birds from houses, and Practice No. 15, Follow rodent control program, consequential differences of 9 percent were noted between producers who planned to Reduce size or quit (i.e. all) and Increase size (i.e. 91 percent).

F. RELATIONSHIPS BETWEEN THE TOTAL NUMBER OF EXTENSION CONTACTS BROILER PRODUCERS HAD OVER THE PREVIOUS 12 MONTHS PERIOD, THEIR SELECTED CHARACTERISTICS AND USE OF RECOMMENDED PRACTICES

This section presents analyses comparing selected data with the mean number of total Extension contacts producers had over the previous 12 months period. The number of contacts was compared with various producer and operational characteristics and with practices used.

Extension Contacts and Selected Characteristics

Data in Tables XXIV-XXVII relate selected characteristics of producers with the mean number of Extension contacts they had over the previous 12 months period. Analysis of variance was used for testing. The mean for all 123 producers was about 2.8 contacts.

Future plans. The relations between the future plans indicated by producers and the mean number of Extension contacts was not significant (see Table XIV, page 56). The highest mean number of contacts (i.e. 3.9 contacts) was shown for those who planned to increase size of broiler operations.

Main source of income. The main source of income reported by producers was very significantly related to the mean number of total Extension contacts. Those deriving of their income from Other farm sources had a higher number of mean contacts (i.e. 4.0 contacts) than others. Those who indicated Non-farm sources were noted to have the least number of mean contacts (i.e. 1.2 contacts).

Total capacity of all houses. The largest total broiler house, size category (i.e. 32,000 and over) had the most Extension contacts on the average (i.e. 4.1 contacts). Very little difference was shown among others. Further, the total capacity of all houses owned by producers was significantly related to mean number of all Extension contacts.

TABLE XXIV

RELATIONSHIPS BETWEEN THE TOTAL NUMBER OF EXTENSION CONTACTS SELECTED TENNESSEE BROILER PRODUCERS HAD OVER THE PREVIOUS 12 MONTHS AND THEIR SELECTED CHARACTERISTICS

Selected Characteristic	Number of Producers	Mean Number of Total Extension Contacts	F Value	df	P Level
<u>Future plans</u>					
1. Increase size	23	3.9			
2. Same size	92	2.7			
3. Reduce or quit	5	1.0			
Total	120	2.8	1.4	2	0.245
<u>Main source of income</u>					
1. Poultry	62	3.2			
2. Other farm	25	4.0			
3. Non-farm	36	1.2			
Total	123	2.8	4.9	2	0.009

TABLE XXIV (Continued)

Selected Characteristic	Number of Producers	Mean Number of Total Extension Contacts	F Value	df	P Level
<u>Total capacity of all houses</u>					
1. 6,000-21,000	42	2.2			
2. 22,000-31,000	39	2.0			
3. 32,000 and over	42	4.1			
Total	123	2.8	3.9	2	0.023
<u>Years grown broilers</u>					
1. 1-5	37	2.4			
2. 6-14	50	3.3			
3. 15-34	36	2.4			
Total	123	2.8	0.7	2	0.481

TABLE XXV

RELATIONSHIPS BETWEEN THE TOTAL NUMBER OF EXTENSION CONTACTS SELECTED TENNESSEE BROILER PRODUCERS HAD OVER THE PREVIOUS 12 MONTHS AND THE TYPE OF HOUSING FACILITIES USED IN 1981

Housing Facilities	Number of Producers	Mean Number of Total Extension Contacts	F Value	df	P Level
<u>Type of housing</u>					
1. Conventional	119	2.6			
2. Environmental	2	6.5			
Total	121	2.7	2.3	1	0.136
<u>Type of ventilation</u>					
1. Natural	13	1.7			
2. Fan	14	1.2			
3. Combination	94	3.0			
Total	121	2.7	2.0	2	0.135
<u>Use foggers for cooling</u>					
1. No	75	2.4			
2. Yes	44	3.2			
Total	119	2.7	1.3	1	0.267

TABLE XXVI

RELATIONSHIPS BETWEEN THE TOTAL NUMBER OF EXTENSION CONTACTS SELECTED TENNESSEE BROILER PRODUCERS HAD OVER THE PREVIOUS 12 MONTHS AND THE TYPE OF EQUIPMENT FACILITIES USED IN 1981

Equipment Facilities	Number of Producers	Mean Number of Total Extension Contacts	F Value	df	P Level
<u>Type of feeders</u>					
1. Mechanical chains	41	1.1			
2. Chain with pan	19	4.1			
3. Automatic round pan	53	3.9			
4. Other	10	1.2			
Total	123	2.8	6.0	3	0.001
<u>Type of waterers</u>					
1. Automatic trough	91	2.8			
2. Nipple	27	2.4			
3. Bell shape	5	4.8			
Total	123	2.8	0.8	2	0.471

TABLE XXVI (Continued)

Equipment Facilities	Number of Producers	Mean Number of Total Extension Contacts	F Value	df	P Level
<u>Water medicator</u>					
1. No	13	1.3			
2. Yes	79	3.0			
3. One is available when needed	31	2.8			
Total	123	2.8	1.1	2	0.346
<u>Type dead bird disposal</u>					
1. Incinerator	9	0.8			
2. Pit	54	2.4			
3. Other	60	3.4			
Total	123	2.8	2.2	2	0.117

TABLE XXVII

RELATIONSHIPS BETWEEN THE TOTAL NUMBER OF EXTENSION CONTACTS SELECTED TENNESSEE BROILER PRODUCERS HAD OVER THE PREVIOUS 12 MONTHS AND THEIR LITTER USE PRACTICES IN 1981

Litter Use Practice	Number of Producers	Mean Number of Total Extension Contacts	F Value	df	P Level
<u>Type of litter</u>					
1. Shavings	56	1.9			
2. Sawdust	53	3.4			
3. Straw	10	4.2			
4. Combination	4	2.8			
Total	123	2.8	1.7	3	0.161
<u>Number of growouts on same litter</u>					
One	25	3.4			
Two	30	1.2			
Three	31	1.7			
Four	2	0.5			
Five	32	4.5			
Six	3	7.3			
Total	123	2.8	4.3	5	0.001
<u>Use of litter</u>					
1. Put on land	88	2.5			
2. Feed to cattle	2	13.0			
3. Sell	30	2.9			
4. Other	3	2.3			
Total	123	2.8	5.1	3	0.002

Years grown broilers. The number of years grown broilers and the mean number of total Extension contacts were not significantly related. However, it was shown that those who had grown broilers from six to 14 years had the most mean Extension contact (i.e. 3.3). Equal means of 2.4 Extension contacts each were shown for the other two groups.

Type of housing. Study of information in Table XXV shows that the type of broiler housing used by producers was not significantly related to the mean number of total Extension contacts. The two producers who reported the use of Environmental type housing had more than twice the mean number of total contacts (i.e. 6.5 contacts) others had (i.e. 2.6).

Type of ventilation. The highest mean number of Extension contacts was shown for producers using the Combination type of ventilation. However, the two variables were not significantly related.

Use foggers for cooling. The Use of foggers for cooling was not significantly related to the mean number of Extension contacts producers had. However, those using the practice did score a higher mean, 3.2 contacts, compared to 2.4 for those not using.

Type of feeders. The Type of feeders used and the total mean Extension contacts were shown to be significantly related in Table XXVI. Those using Chain with pan reported the highest mean of 4.1 contacts. Producers using Automatic round pan feeders came fairly

close with 3.9 contacts. The remaining types had much lower mean Extension contact numbers with relatively little difference.

Type of waterer. The few producers reporting the use of the Bell shape type waterers had the highest mean number of Extension contacts with 4.8. However, the type of waterer used had no significant relationship to the mean number of contacts producers had.

Water medicator. The producers owning water medicators had a higher mean number of Extension contacts (i.e. 3.0 contacts) than others. However, the ownership of a water medicator was not significantly related to the average number of Extension contacts producers reported.

Type dead bird disposal. The Type of dead bird disposal facilities used by broiler growers and the average number of Extension contacts they had were not significantly related. Those who indicated Other, for Type of dead bird disposal, had the highest mean of 3.4 contacts. The least mean of 0.8 contacts were shown for the nine producers using Incinerators.

Type of litter. Producers using Straw for litter were noted to average more Extension contacts (i.e. mean of 4.2 contacts) than others. Those using Shavings for litter had the lowest number, 1.9 contacts on the average. However, the type of litter used was not significantly related to the mean number of total contacts producers reported (see Table XXVII).

Number of growouts on same litter. The number of growouts broiler producers had on the same litter was very significantly related to the mean number of total Extension contacts they had. The three with Six growouts on the same litter had the greatest mean number of Extension contacts with 7.3. Those with Five growouts were next with 4.3 total mean contacts. The two producers having Four growouts per litter scored the least with only 0.5 mean contacts.

Use of litter. The only two producers who reported Feeding their litter to cattle had a relatively high mean number, 13.0 of Extension contacts. It was noted that the use of litter was very significantly related to the mean number of total Extension contacts producers had.

Extension Contacts and Use of Recommended Practices

Data in Tables XXVIII and XXIX relate selected recommended broiler production practices with the mean numbers of total Extension contacts producers reported having over the previous 12 months period. Analyses of variance (i.e. F-tests) were used for testing.

Clean houses annually. Reference to Table XXVIII data indicates that annual house cleaning had no signification relationship to the mean number of total Extension contacts producers reported. Also, no visible difference was noted in the mean number of Extension contacts shown for those using and those who did not.

TABLE XXVIII

RELATIONSHIPS BETWEEN THE TOTAL NUMBER OF EXTENSION CONTACTS SELECTED TENNESSEE BROILER PRODUCERS HAD OVER THE PREVIOUS 12 MONTHS AND THE USE OF SELECTED RECOMMENDED PRACTICES IN 1981

Name of Practice	Number of Producers	Mean Number of Total Extension Contacts	F Value	df	P Level
<u>Clean houses annually</u>					
1. No	12	3.0			
2. Yes	111	2.8			
Total	123	2.8	0.0	1	0.839
<u>Clean waterers between growouts</u>					
1. No	31	2.5			
2. Yes	92	2.9			
Total	123	2.8	0.2	1	0.666
<u>Clean feed bin after each growout</u>					
1. No	43	2.5			
2. Yes	80	2.9			
Total	123	2.8	0.4	1	0.547
<u>Check thermostat for accuracy</u>					
1. No	36	4.0			
2. Yes	87	2.3			
Total	123	2.8	5.3	1	0.023

TABLE XXVIII (Continued)

Name of Practice	Number of Producers	Mean Number of Total Extension Contacts	F Value	df	P Level
<u>Adjust brooder height</u>					
1. No	3	8.7			
2. Yes	120	2.6			
Total	123	2.8	7.3	1	0.008
<u>Use partial house brooding</u>					
1. No	14	2.1			
2. Yes	109	2.9			
Total	123	2.8	0.5	1	0.475
<u>Clean waterer daily</u>					
1. No	30	1.7			
2. Yes	93	3.1			
Total	123	2.8	2.9	1	0.093
<u>Add feed to tray three times daily</u>					
1. No	77	2.8			
2. Yes	45	2.8			
Total	122	2.8	0.0	1	0.933

TABLE XXIX

RELATIONSHIPS BETWEEN THE TOTAL NUMBER OF EXTENSION CONTACTS SELECTED TENNESSEE BROILER PRODUCERS HAD OVER THE PREVIOUS 12 MONTHS AND THE USE OF SELECTED RECOMMENDED PRACTICES IN 1981

Name of Practice	Number of Producers	Mean Number of Total Extension Contacts	F Value	df	P Level
<u>Check each house three times daily</u>					
1. No	21	1.0			
2. Yes	101	3.2			
Total	122	2.8	5.4	1	0.017
<u>Use milk solution with viral vaccine</u>					
1. No	67	2.9			
2. Yes	37	2.3			
Total	104	2.7	0.8	1	0.388
<u>Keep mortality records</u>					
1. No	2	3.0			
2. Yes	119	2.8			
Total	121	2.8	0.0	1	0.950
<u>Remove caked or wet litter</u>					
1. No	41	2.5			
2. Yes	81	3.0			
Total	122	2.8	0.4	1	0.531

TABLE XXIX (Continued)

Name of Practice	Number of Producers	Mean Number of Total Extension Contacts	F Value	df	P Level
<u>Mow grass around houses</u>					
1. No	22	3.0			
2. Yes	100	2.8			
Total	122	2.8	0.0	1	0.843
<u>Keep wild birds from houses</u>					
1. No	5	6.4			
2. Yes	117	2.6			
Total	122	2.8	4.5	1	0.036
<u>Follow rodent control program</u>					
1. No	4	1.0			
2. Yes	118	2.9			
Total	122	2.8	0.9	1	0.353

Clean waterers between growouts. The two variables tested were not significantly related. However, it was evident that those using the practice had a slightly higher mean contact than those not using it (i.e. 2.9 and 2.5 contacts, respectively).

Clean feed bin after each growout. Use of the practice was not significantly related to the mean number of total Extension contacts producers had. Those using the practice had a mean of 2.9 contacts compared to 2.5 for those not using.

Check thermostat for accuracy. The F-test analysis showed a significant relationship between the practice of Checking the thermostat for accuracy and the mean number of total Extension contacts producers reported. Broiler producers who reported non-use of the practice had a higher mean of 4.0 Extension contacts compared to 2.3 for those using it.

Adjust brooder height. The few broiler producers (i.e. three) not Adjusting their brooder height, had more than three times the mean number of total Extension contacts reported by those who did use the practice. Means were 8.7 and 2.6 total, respectively. The analysis of variance showed the association to be a very significant one at the .01 level of probability.

Use partial house brooding. Producers Using partial house brooding were not significantly different from those not using when compared as to the mean number of total Extension contacts they had.

Nevertheless, those who had more contacts averaged 2.9 while others averaged 2.1.

Clean waterer daily. Broiler producers who indicated they Cleaned waterers daily reported a higher mean number of total Extension contacts than those who did not (i.e. 3.1 and 1.7 contacts, respectively). It, however, was not a significant relationship.

Add feed to tray three times daily. No significant difference was discovered between the average number of Extension contacts reported by broiler producers and whether or not they Added feed to tray three times daily. Both had identical 2.8 mean number of total Extension contacts in 1981.

Check each house three times daily. Producers who Checked each of their broiler houses three times daily had a significantly higher mean number of Extension contacts than those who did not (Table XXIX). They had 3.2 Extension contacts on the average compared to only 1.0 contacts for those not using the practice.

Use milk solution with viral vaccine. The F-test analysis indicated no significant difference between the mean number of contacts made by producers and Use of milk solution with viral vaccine. Slight difference was noted between the two total mean contacts (i.e. 2.9 for those not using and 2.3 for others).

Keep mortality records. The practice of keeping mortality records was not significantly related to the mean number of total Extension contacts producers had. The two not using the practice had slightly more contacts, 3.0, than others, 2.8.

Remove caked or wet litter. On the average, broiler growers who reported Removing caked or wet litter from their broiler houses had more Extension contacts than those who did not (i.e. 3.0 and 2.5 contacts, respectively). However, the difference was not statistically significant.

Mow grass around houses. Producers who did not mow grass around their broiler houses had slightly more contacts than those who did. However, the F-test showed no significant relationship.

Keep wild birds from houses, The mean number of total Extension contacts was significantly higher for broiler growers who did not keep wild birds from their houses than for others (i.e. 6.4 and 2.6 mean contacts, respectively).

Follow rodent control program. No significant relationship was found between the mean number of total contacts scored by producers who followed a rodent control program and those who did not. Growers using the practice notably had almost three times the mean Extension contacts others had. The mean number of total contacts were 2.9 and 1.0 contacts, respectively.

G. RELATIONSHIPS BETWEEN SELECTED CHARACTERISTICS OF BROILER
PROCEDURES AND THE PROPORTION OF TOTAL
RECOMMENDED PRACTICES USED

In this analysis, mean percent of total practices used by broiler producers was compared with various producer and operational characteristics.

Selected Characteristics Related to Mean Percents of Total Practices

Data in Tables XXX-XXXIII relate selected characteristics with mean percents of total practices used. The analysis of variance (F-test) was used for testing. The overall mean percent of practices used by all 123 producers was 76.4.

Total capacity of all houses. As may be seen in Table XXX, the total capacity of all houses owned by boiler producers was very significantly related to the mean percent of total practices used. On the average the smallest producers (i.e. 6,000-21,000 birds capacity) used a higher proportion of the 15 recommended practices (i.e. 80.7 percent) compared to the low of 69.3 percent for the 22,000-31,000 bird group.

Years grown broilers. Although those who had produced broilers longest (i.e. 15 to 34 years) had used more practices (i.e. 82 percent) on the average than others, the number of years producers had grown broilers was not significantly related to the mean percent of practices used. Those growing broilers from one to five years had the lowest mean percent of practices uses (i.e. 73.3).

TABLE XXX

RELATIONSHIPS BETWEEN THE SELECTED CHARACTERISTICS OF TENNESSEE BROILER PRODUCERS
AND THE PROPORTION OF TOTAL RECOMMENDED PRACTICES USED IN 1981

Selected Characteristic	Number of Producers	Mean Percent of Total Practices Used	F Value	df	P Level
<u>Total capacity of all houses</u>					
1. 6,000-21,000	42	80.7			
2. 22,000-31,000	39	69.3			
3. 32,000 and over	42	78.7			
Total	123	76.4	5.1	2	0.007
<u>Years grown broilers</u>					
1. 1-5	37	73.3			
2. 6-14	50	74.7			
3. 15-34	36	82.0			
Total	123	76.4	2.5	2	0.103
<u>Main source of income</u>					
1. Poultry	62	79.6			
2. Other farm	25	76.3			
3. Non-farm	36	71.1			
Total	123	76.4	2.6	2	0.077

TABLE XXX (Continued)

Selected Characteristics	Number of Producers	Mean Percent of Total Practices Used	F Value	df	P Level
<u>Future plans</u>					
1. Increase size	23	73.6			
2. Same size	92	77.4			
3. Reduce or quit broilers	5	80.0			
Total	120	76.4	0.5	2	0.614
<u>Total Extension contacts</u>					
1. Not any	38	74.0			
2. One or more	85	77.5			
Total	123	76.4	1.0	1	0.324

TABLE XXXI

RELATIONSHIPS BETWEEN THE TYPES OF HOUSING FACILITIES USED BY SELECTED TENNESSEE BROILER PRODUCERS AND THE PROPORTION OF TOTAL RECOMMENDED PRACTICES USED IN 1981

Housing Facilities	Number of Producers	Mean Percent of Total Practices Used	F Value	df	P Level
<u>Type of housing</u>					
1. Conventional	119	77.0			
2. Environmental	2	50.0			
Total	121	76.6	4.6	1	0.034
<u>Type of ventilation</u>					
1. Natural	13	84.1			
2. Fan	14	81.0			
3. Combination	94	74.9			
Total	121	76.6	2.0	2	0.138
<u>Use foggers for cooling</u>					
1. No	75	73.5			
2. Yes	44	81.2			
Total	119	76.4	5.3	1	0.023

TABLE XXXII

RELATIONSHIPS BETWEEN THE TYPE OF EQUIPMENT FACILITIES USED BY SELECTED TENNESSEE BROILER PRODUCERS AND THE PROPORTION OF TOTAL RECOMMENDED PRACTICES USED IN 1981

Equipment Facilities	Number of Producers	Mean Percent of Total Practices Used	F Value	df	P Level
<u>Type of feeders</u>					
1. Mechanical chain	41	76.4			
2. Chain with pan	19	86.7			
3. Automatic round pan	53	75.2			
4. Other	10	63.3			
Total	123	76.4	4.3	3	0.007
<u>Type of waterers</u>					
1. Automatic trough	91	77.5			
2. Nipple	27	72.8			
3. Bell shape	5	76.0			
Total	123	76.4	0.7	2	0.495

TABLE XXXII (Continued)

Equipment Facilities	Number of Producers	Mean Percent of Total Practices Used	F Value	df	P Level
<u>Water medicator</u>					
1. No	13	87.7			
2. Yes	79	80.3			
3. One is available when needed	31	61.9			
Total	123	76.4	18.8	2	0.001
<u>Type dead bird disposal</u>					
1. Incinerator	9	88.1			
2. Pit	54	84.9			
3. Other	60	67.0			
Total	123	76.4	22.0	2	0.001

TABLE XXXIII

RELATIONSHIPS BETWEEN THE LITTER USE PRACTICES OF SELECTED TENNESSEE BROILER PRODUCERS
AND THE PROPORTION OF TOTAL RECOMMENDED PRACTICES USED IN 1981

Litter Use Practices	Number of Producers	Mean Percent of Total Practices Used	F Value	df	P Level
<u>Type of litter</u>					
1. Shavings	56	78.1			
2. Sawdust	53	74.0			
3. Straw	10	78.0			
4. Combination	4	81.7			
Total	123	76.4	0.632	3	0.596
<u>Number of growouts on same litter</u>					
One	25	77.1			
Two	30	65.6			
Three	31	79.6			
Four	2	76.7			
Five	32	82.9			
Six	3	77.8			
Total	123	76.4	3.6	5	0.005
<u>Use of litter</u>					
1. Put on land	88	77.9			
2. Feed to cattle	2	80.0			
3. Sell	30	71.6			
4. Other	3	80.0			
Total	123	76.4	1.0	3	0.395

Main source of income. The main source of income earned by producers was not significantly related to the mean percent of total practices used. However, on the average, producers who had most of their income from Poultry sources used more practices (79.6 percent) than others. The mean percent of total practices used by the Non-farm group, 71.1, was the low.

Future plans. The producers who had planned to Reduce or quit broiler production used more practices (i.e. 80 percent) on the average than other groups. Those who planned to Increase size used the least percent of the practices (i.e. 73.6 percent). However, the future plans were not significantly related to the mean percent of total practices used.

Total Extension contacts. The total number of Extension contacts producers had in 1981 was not significantly related to the mean percent of total practices used, although those who had One or more contacts used more practices (i.e. 77.5 percent) than those who did not have any (i.e. 74 percent).

Type of housing. As shown in Table XXXI, the type of housing used was significantly related to the mean percent of total practices used by producers. Those who used Conventional type housing used more of the total practices (i.e. 77 percent) compared to producers using the Environmental type (i.e. 50 percent).

Type of ventilation. Broiler producers using Natural type ventilation used more (i.e. a mean of 84.1 percent) of the total practices than others. On the average, those who used the Fan type ventilation used 81 percent of the total practices, while those who used a Combination of ventilation types used almost 75 percent. However, no significant relationship was shown to exist between the Type of ventilation used and the proportion of the total practices used.

Use foggers for cooling. Producers that Used foggers for supplemental broiler house cooling used significantly more of the 15 practices (i.e. 81.2 percent) on the average than those not using (i.e. 73.7 percent).

Type of feeders. As presented in Table XXXII, type of feeders used was very significantly related to the proportion of total practices used. Producers who used Chain with pan type feeders used more practices (i.e. 86.7 percent) on the average than others. Those who indicated they used other types of unspecified feeders used the lowest average percent of the 15 recommended practices (i.e. 63.3 percent), while little difference was noted between the remaining two.

Type of waterers. It was evident that producers using Automatic trough for watering their flocks use slightly higher proportions of the 15 recommended practices on the average (i.e. 77.5 percent) than those using the Bell shape type (i.e. 76.0

percent) and Nipple type (i.e. 72.8 percent). However, the type of waterers used by the broiler producers was not significantly related to the mean percent of total practices used (see Table XXXII).

Water medicator. This practice was not very significantly related to the average proportion of the practices used. Producers who did not own medicators averaged a higher mean (87.7 percent) of total practices used than others. Those who had One available when needed had the lowest percent of use (i.e. 62 percent).

Type of dead bird disposal. Broiler producers who disposed of their dead birds by use of Incinerators used more (i.e. mean = 88.1 percent) of practices studied than others. Producers who reported Other types of dead bird disposal used the lowest percent (i.e. mean = 67 percent). The type of dead bird disposal method used was very significantly related to the mean percent of total practices used.

Type of litter. Data in Table XXXIII show that producers who used a combination of litters had used the highest (i.e. mean = 81.7 percent) percent of total practices, while the producers who used Sawdust had the lowest (i.e. mean = 74.0 percent). Nevertheless, the Type of litter used was not significantly related to the mean percent of recommended practices used.

Number of growouts on same litter. Broiler producers who had Five growouts on the same litter used more (i.e. mean = 82.9 percent) of the practices than others. Those who reported Two growouts on same litter had the low (i.e. mean = 65.6 percent). The relationship

between the two variables was found to be highly significant. It appears that the higher the Number of growouts on the same litter, the higher the mean percent of practices used.

Use of litter. The Use of litter was not significantly related to the mean percent of total practices used by producers. Producers who Fed their litter to cattle and those making Other unspecified uses, averaged using the highest mean percent (i.e. 80) of all practices. Those who Sold their litter averaged using the lowest mean percent of practices (i.e. 71.6).

H. THE CHARACTERISTICS OF TENNESSEE BROILER CONTRACTS

This section concerns the characteristics of broiler contracts available to growers in Tennessee in 1982-83. Study was limited to the information obtained from broiler contracts furnished by two of the main contracting companies in the State.

No major differences were noted in the two broiler contracts studied, one of which was a two level integration arrangement between a poultry company and the growers. The second contract was a three level integration between a poultry company, a milling company and the growers. (The contracts will be referred to as Contract A and B, respectively, to conceal the names of the companies.)

The section will be further divided into the following subsections in order to meet the stated objective of the study: type of contracts and contract provisions; supply of inputs; other provisions;

and responsibility for making decisions. The first three of these headings were used by Hunter (4:52) and the last used by Welch (17:52).

Type of Contracts and Contract Provisions

In design, both contracts were of the competitive type. The contracts were meant to motivate growers to decrease production costs by reducing feed costs, mortality and condemnation. Payment to growers on both contracts were based solely on feed conversion. The feed conversion ratios are determined by dividing feed used by total weight of live birds, weighed just prior to killing. Payment schedules on the two contracts were subject to reduction due to certain level of bird mortality and pounds of meat condemned at the processing plant.

Contract A provided for payment deductions on a sliding scale on mortality increasing from 4.1 percent to 7 percent and over, of the total weight of birds. This contract also provided for deductions on live weight of birds condemned in excess of 1.5 percent of total weight. Contract B based the grower's payment on gross live pounds less pounds condemned by USDA and reduced by chick cost of mortality in excess of 10 percent. All payments to growers under both contracts were to be settled after sales of the broilers.

The two contracts were written as most such contracts and had no time stipulation. The contracts were for one growout at a time and could be renewed until cancelled by either party. As spelled out in the contracts, the growers were responsible for feeding and caring

for the broiler flocks supplied by the contracting company. The broilers had to be kept in accordance with the contractor's recommended practices of good poultry management, until they reached market size.

Supply of Inputs

The broiler production contracts studied specify that each party, the contractor and the grower, is responsible for providing and paying for certain inputs. The grower is responsible for providing, paying for and maintaining the broiler houses and related inputs, such as feeders, waterers, brooders and litter. The grower also provides all labor required for growing the birds to market size and for cleaning and rebedding broiler houses between growouts. Broiler growers are stipulated by the contracts to construct and maintain good roads, easily accessible to the poultry houses. Growers also are to pay any expenses for towing services necessitated by faulty roads.

The contractor supplies and delivers to growers, the chicks, feed, veterinary services and medicine in quantities adequate to make possible the proper raising, feeding and caring for the chicks up to market age. Broiler contractors also are responsible for providing labor and equipment for transporting the chicks, feed and medicine to the farms and for catching, loading and transporting broilers to market. The contracting company furnishes the servicemen who provide technical advice and management assistance to growers at no cost. The servicemen help growers regularly in their production and

marketing program and are available to the growers for such advice and assistance as may be needed upon request.

The company provides each grower (7) with a booklet containing information on recommended management procedures required for growing top quality broilers. The booklet specifies the type of housing and equipment facilities recommended to growers. It also lists recommended management practices growers are required to follow from the first day of chick placement until they reach market age.

Responsibilities for Making Decisions

The contracting companies make most of the decisions regarding how the broilers should be grown and disposed of. It seems obvious that the companies would be more knowledgeable about factors and events affecting the broiler business than the growers. Companies gain more knowledge from conducting their own research, learning from experience while working with different growers over the years, and keeping pace with the situation in the poultry field. All these together put companies at an advantage over the growers regarding who should make decisions. Also, the companies provide the feed which is the most expensive item of all inputs having variable costs in the broiler business. Thus, companies stand to risk a greater loss if broilers do not survive to reach market weights. However, all decisions and stipulations laid down by the companies are intended to result in the production of top quality birds at least expense, thereby resulting in mutual benefits for both the growers and the contracting companies. According to contract provisions, growers

waive the right to make decisions in exchange for better economic security. Hunter (4:35) and others findings support the contention that the burdens of difficult decision making and providing supplies of certain inputs have been removed from the growers. This may leave time for growers to do something else along with growing broilers.

Other Provisions

One of the broiler contracts studied, that of Company B, tended to share more of the broiler production costs with the growers. The contract provided for paying a fuel allowance to the growers, depending on placement data of the chicks, which ranged from five dollars (\$5.00) to fifteen dollars (\$15.00) per thousand chicks. The amount of fuel allowance paid depends on the fuel cost through that growing period. The same contract also pays bonuses to growers using houses furnished with certain equipment and facilities required by the company (i.e. approved insulation, feeders, waterers). Houses not approved by the company do not get bonuses.

The broiler contract provided by Company A made provisions for settling disputes between the grower and the contracting company. The contract specified arbitration procedures as a means of settling differences between the two parties in states where the procedures indicated are permitted under the law. Thereby, both parties waived their rights to file lawsuits in an effort to solve differences.

Both broiler contracts may be terminated at any time if the growers do not live up to the expectations of the contractors. In

such cases, all broilers, unused feed and medicine belong to the contracting companies. The companies maintain the right to raise the broilers under their own supervision up to market weight, raised in the same buildings belonging to the grower. Growers would not get paid for broilers they did not raise to market weight.

CHAPTER V

SUMMARY OF MAJOR FINDINGS, IMPLICATIONS AND RECOMMENDATIONS

A. PURPOSES AND SPECIFIC OBJECTIVES

Purposes

The purposes of this study were to find out what the characteristics of Tennessee broiler producers and their farming operations were, to investigate what recommended production practices they were using and to determine what factors influenced them to adopt practices.

Specific Objectives

The specific objectives of this study were:

1. To characterize broiler producers in Tennessee and their farming operations.
2. To determine the relationships between the total capacity of all houses owned by broiler producers, selected grower characteristics and use of recommended practices.
3. To find out the relationships between the number of years producers had grown broilers, selected grower characteristics and use of recommended practices.
4. To ascertain the relationships between the main source of income earned by broiler producers, selected grower characteristics and use of recommended practices.

5. To determine the relationships between the future plans indicated by broiler producers, their selected characteristics and use of recommended practices.

6. To identify the relationships between the total number of Extension contacts broiler producers had over the previous 12 months period, selected grower characteristics and use of recommended practices.

7. To establish the relationships between the selected characteristics of broiler producers and the proportion of the 15 recommended practices used.

8. To characterize Tennessee broiler contracts in terms of types and contract provisions, supply of inputs, responsibility for making decisions and other provisions.

B. METHOD OF INVESTIGATION

The population of this study included all contract broiler producers from counties involved in the survey. The Nth number technique was used to randomly select 25 producers from each county of whom the first 20 were to be surveyed. The last five served as alternates in case any of the first 20 could not be interviewed. All were surveyed in counties where producers numbered fewer than 20.

The broiler survey used for the study was developed by Tennessee Agricultural Extension specialist staff in the Animal Science, Poultry Section in collaboration with the Extension Education Section. Surveys were conducted by agents in participating counties through personal interviews in the Fall of 1982.

The data were coded and punched on computer cards. Computations were made by The University of Tennessee Computing Center. The one way analysis of variance F-test and Chi-square test were used to determine the strength of the relationships between dependent and independent variables. The .05 probability level was accepted as significant.

C. MAJOR FINDINGS

Major findings were classified and presented under headings related to the objectives of the study.

Characteristics of Broiler Producers and Their Farming Operations

1. The total capacity of all broiler houses owned by Tennessee broiler producers ranged from 6,000 to 98,000 plus. A few producers reported over 100,000 bird capacity. The mean capacity for all 123 producers was 31,500 birds.
2. The number of years producers had grown broilers ranged from one to 34 years. The mean for all 123 producers was 10.8 years.
3. Over one-half of all producers, 51 percent, listed poultry as their main source of income.
4. Three-fourths (i.e. 75 percent) of all broiler producers reported future plans to keep the broiler operation at same size.
5. A high proportion, 69 percent, of all producers had at least one or more Extension contacts in 1981.
6. Most producers, 96 percent, used conventional type broiler housing.

7. A majority of producers, 76 percent, used a combination of different ventilation types.

8. Most producers, 61 percent, did not use foggers for supplemental broiler house cooling, while 36 percent did.

9. The largest percent, 43, used automatic type feeders, while 33 percent used mechanical chain.

10. Most producers, 74 percent, used automatic trough type waterers.

11. Most producers, 64 percent, owned water medicators.

12. Almost one-half, 49 percent, of all producers used other, unspecified types of dead bird disposal, 44 percent using disposal pits while only 7 percent had and used incinerators.

13. Shavings and sawdust were the most common litters used by 43 and 46 percents, respectively.

14. Number of growouts on the same litter ranged from one to six. Most producers reported one, two, three and five growouts (i.e. 20, 24, 25 and 26 percents, respectively).

15. Most producers, 72 percent, put their litter on land, while 24 percent sold their litter.

Relationships Between the Total Capacity of All Broiler Houses Owned by Broiler Producers, Selected Grower Characteristics and Use of Recommended Practices

1. The mean capacity of all broiler houses owned by producers was compared with the following selected characteristics: (a) main source of income; (b) future plans; (c) years grown

broilers; and (d) total Extension contacts. The only significant relationship was found between the main source of income and the mean capacity of all houses. Producers deriving most income from poultry had a significantly higher mean broiler capacity (i.e. 36,600 birds) than others.

2. When the mean capacity of all broiler houses was compared with the type of housing and facilities used, very significant relationships were noted between the mean capacity of all houses and: (a) the type of ventilation used (e.g. 35,200 birds for combination; 14,600 for natural), and (b) use of foggers for cooling (e.g. 42,500 birds versus 26,200).

3. When the type of equipment and facilities used were compared with the mean capacity of all houses, significant relationships were found on: (a) the type of feeder used, and (b) ownership of a water medicator. Broiler producers using automatic round pan feeders had a significantly higher mean capacity of 37,700 birds, compared to others. Those using mechanical chain had the lowest mean of 23,500 birds. Producers who reported having a water medicator available when needed, had a significantly higher mean bird capacity (i.e. 42,200 birds) than others.

4. On comparing litter use practices with the total capacity of all houses, a significant relationship was noted on the numbers of growouts producers had on the same litter. The three producers having six growouts on the same litter reported the highest mean capacity of 64,000 birds while the lowest of 25,500 birds was reported for the two producers with four growouts on the same litter.

5. Three of the 15 recommended practices studied were found to bear significant relationships to the mean capacity of all houses. Findings showed that: (a) the mean bird capacity for producers who did not check thermostat for accuracy was significantly higher than for those who did (i.e. 38,700 birds versus 28,600); (b) the mean capacity for those who did not add feed to tray three times daily was significantly higher than others (i.e. 35,400 birds versus 25,300); (c) producers who used milk solution with viral vaccine reported a very significantly higher mean bird capacity than for those who did not use (i.e. 40,800 versus 28,000).

Relationships Between the Number of Years Producers Had Grown Broilers, Selected Grower Characteristics and Use of Recommended Practices

1. The mean number of years producers had grown broilers was compared with the following selected grower characteristics: (a) main source of income; (b) future plans; (c) total capacity of all houses; and (d) total Extension contacts. A very significant relation was found on the main source of income and the total capacity of all broiler houses. On the average, producers earning most income from poultry had produced broilers longer (i.e. 12.1 years) than others. Also, producers that reported the lowest broiler capacity (i.e. 6,000-21,000) had produced broilers longer (i.e. 12.9 years) than others on the average.

2. No significant relationship was found when the type of housing and facilities used was compared with the mean number of years producers had grown broilers.

3. When the equipment used in broiler operation was compared with the mean number of years grown broilers, very significant relationships were found on both type of feeders and type of waterers used. On the average, producers using chain with pan type feeders had produced broilers longer (i.e. 14.2 years) than others. Producers using bell shape waterers had averaged producing broilers longer (i.e. 19.8 years) than others.

4. Comparing litter use practices with the mean number of years producers had grown broilers, a significant relationship was noted on the type of litter used. On the average, producers using sawdust had produced broilers longer (i.e. 12.7 years) than others.

5. Four of the 15 recommended practices studied were found to be at least significantly related to the mean number of years producers had grown broilers. Findings showed that the mean number of years grown broilers was significantly higher for producers who cleaned waterers between growouts, cleaned waterers daily and checked each house three times daily than for those who did not. Also, the mean number of years grown broilers was significantly higher for producers who mowed grass around houses.

Relationships Between the Main Source of Income Earned by Selected Broiler Producers, Selected Grower Characteristics and Use of Recommended Practices

1. Selected personal characteristics of producers were compared with their main sources of income. Significant relations were shown for the total capacity of all broiler houses owned, years grown

broilers and the total Extension contacts. The largest portion (i.e. 48 percent) of the producers in poultry main income source had a bird capacity of 32,000 and over. Sixty percent of those with other farm main income sources had 6,000 to 21,000 bird capacities. The largest portion (i.e. 45 percent) of those in non-farm main income source had 22,000-31,000 bird capacities.

Fifty percent of producers in non-farm main income source had grown broilers from one to five years. Forty percent of those in poultry and other farm income sources had grown broilers from six to 14 years. Ninety-two percent of the producers deriving most income from other farm sources had at least one or more Extension contacts in 1981. Sixty-nine percent of those in poultry and 53 percent of producers in non-farm income sources reported one or more Extension contacts.

2. The type of housing facilities used by producers was compared with their sources of income. The only significant relationship was found on the use of foggers for cooling. Ninety-five percent of producers in the other-farm main income source, 69 percent of those in non-farm and 46 percent of those in the poultry main income source groups used foggers for broiler houses cooling.

3. The equipment used in broiler operation was compared with the main sources of income. Significant relationships were shown for type of waterer used, ownership of water medicator and type of dead bird disposal. Most producers in poultry, other farm and non-farm main income categories used automatic trough type waterers (i.e. 84, 56 and 69 percents, respectively). A higher percent of producers in

all main income groups owned water medicators. Sixty-nine percent of producers in the poultry main income source, 60 percent in other farm and 47 percent in the non-farm groups reported ownership of water medicator. Eight of the nine producers using incinerators for dead bird disposal had most income from poultry, while most of them (i.e. 52 percent) used pits for disposal of dead birds. Most, 72 percent, of the producers in the other farm main income source group and 56 percent of the non-farm used other forms of unspecified dead bird disposal.

4. On comparing litter use practices with the main source of income, a significant relationship was shown for both types of litter used and the use of litter. The most common type of litter used by producers having most income from poultry and non-farm sources was shavings (i.e. 44 and 61 percents, respectively). Most, 64 percent, of producers deriving main income from other farm sources used sawdust for litter. A high percent of all producers in poultry, other farm and non-farm main income sources put their litter on land (i.e. 69, 92 and 61 percents, respectively).

5. Six of the 15 recommended practices studied were found to be significantly related to the main sources of income reported by producers. There were very significant relationships between the main sources of income and the use of Practices: No. 2, clean waterers between growouts; No. 4. check thermostat for accuracy; No. 7, clean waterers daily; No. 8, add feed to trays three times daily; No. 9, check each house three times daily; and No. 10, use milk solution with viral vaccine.

Though not significant, consequential differences (i.e. 9 percent or more) were shown for main income sources on Practices: No. 1, clean houses annually; No. 3, clean feed bin after each grow-out; No. 6, use partial house brooding; and No. 13, mow grass around houses.

Relationships Between the Future Plans Indicated by Broiler Producers, Their Selected Characteristics and Use of Recommended Practices

1. Selected personal characteristics of producers, including: (a) total capacity of all houses; (b) years grown broilers; (c) main source of income; and (d) total Extension contacts, were compared with producers' future plans. None of these characteristics was found significantly related to the future plans.

2. When the type of housing facilities used was compared with the future plans, the only significant relationship was found on the type of housing used. All producers indicating plans to increase broiler operation size in the future had conventional type housing. Almost all, 99 percent, of producers with plans to remain the same size and 75 percent of the four producers with plans to reduce or quit had conventional type housing.

3. The equipment used by broiler producers, including type of feeders, type of waterers, ownership of water medicator and dead bird disposal was compared with future plans. The only significant relationship was found with the type of waterers used. Most of the producers who planned to increase size and remain the same size used automatic trough type waterers (i.e. 74 and 77 percents,

respectively). Twenty percent of producers planning to reduce size or quit also used automatic trough.

4. Litter use practices including type of litter, number of growouts on same litter and the use of litter were compared with producers' future plans. None of these variables was found to be significantly related.

5. Only Practice No. 11, keep mortality records, out of the 15 recommended practices was found to be significantly related to the future plans. Though not significant, consequential differences (i.e. 9 percent or more) were found on all other practices for future plans, excepting Practice No. 5, adjust brooder height.

Relationship Between the Total Number of Extension Contacts Producers Had Over the Previous 12 Months Period, Selected Grower Characteristics and Use of Recommended Practices

1. Selected characteristics of broiler producers including (a) future plans; (b) main source of income; (c) total capacity of all houses; and (d) years grown broilers were compared with the mean number of total Extension contacts. The only significant relationship was found with the main source of income. Producers who earned most income from other farm sources had the highest, 4, mean number of total Extension contacts, compared with those in poultry and non-farm main income groups (i.e. 3.2 and 1.2, respectively).

2. Housing facilities used, including type of housing, type of ventilation and use of foggers for cooling were compared with the

mean number of total Extension contacts. None of these variables was found to be significantly related.

3. Equipment and facilities used, which included type of feed, type of waterer, ownership of water medicators and type of dead bird disposal were compared with the mean number of total Extension contacts. Findings showed that producers using chain with pan and automatic round pan had very significantly higher mean numbers of total Extension contacts (i.e. 4.1 and 3.1, respectively) than others. No significant relationship was found on the use of the other three variables.

4. Litter use practices were compared with the mean number of total Extension contacts. Findings showed that the three producers having six growouts on the same litter had a significantly higher mean number (i.e. 7.3) of total Extension contacts than others. The two producers that fed litter to cattle also had a significantly higher mean number of Extension contacts (i.e. 13.0 contacts) than others. Relationships on the type of litter used were not significant.

5. The 15 recommended practices studied were compared with the mean number of total Extension contacts producers had over the previous 12 months period. Findings showed that, on the average, producers who did not check thermostat for accuracy had significantly more Extension contacts than others (i.e. 4.0 versus 2.3 contacts). Producers not adjusting brooder height had significantly more Extension contacts than others (i.e. 8.7 versus 2.6 contacts). Those who checked each house three times daily had significantly more

Extension contacts on the average than others (i.e. 3.2 versus 1.0 contacts). Broiler producers who did not keep wild birds from houses averaged having significantly more Extension contacts than others (i.e. 6.4 versus 2.6 contacts). No significant relationship was found on the other 11 practices.

Relationships Between Selected Characteristics of Broiler Producers and the Proportion of the 15 Recommended Practices Used

1. Selected characteristics of producers were compared with the mean percent of the total 15 recommended practices used. All 123 producers averaged using 76.4 percent of all practices. Findings showed that producers having 6,000-21,000 birds capacity averaged using a higher percent (i.e. 80.7 percent) of all 15 practices than others. No significant relationship was shown for other characteristics regarding number of years grown broilers, main source of income, future plans and total Extension contacts.

2. The type of housing facilities used was compared with the mean percent of the 15 practices used. Findings showed that producers using the conventional type of housing averaged using a significantly higher percent of the practices than the two producers using environmental type housing (i.e. 77 versus 50 percent) on the average. A significantly higher portion of practices was being used by producers who used foggers for cooling than by those who did not (i.e. 81.2 versus 73.5 percent). The type of ventilation used by

producers was found not significantly related to the mean number of total practices used.

3. When the equipment and facilities used were compared with the mean percent of total practices used, a highly significant relationship was shown for all except; type of waterers. Broiler producers using chain with pan type feeders, those owning water medicators and those using incinerators for dead bird disposal averaged using significantly more practices than others in their respective categories.

4. Numbers of growouts on same litter were found to be highly significantly in relation to the mean percent of total practices used. Producers with six growouts on same litter averaged using more (i.e. 82.9 percent) of the total practices than others. No significant relationship was shown for type of litter and use of litter.

Characteristics of Tennessee Broiler Contracts

An analysis of contracts was done using information obtained from broiler contracts provided by two of the major contracting companies in the State. No major differences were noted between the two contracts. Both contracts were designed to motivate broiler growers to decrease production costs, since grower's payments are normally based on feed conversion adjusted for bird mortality and condemnation. The broiler contracts studied had no time stipulation and could be cancelled at any time between growouts.

The broiler growers were found to be responsible for providing certain input items such as housing, equipment, utilities, litter,

labor and adequate access roads to broiler houses. The contracting companies were to provide items including chicks, feed, medicine, handling and technical services. The companies also were to make most decisions regarding growing, handling and disposition of the broiler and the proceeds. The companies seemed to be in a better position for decision making because of their superior knowledge about the broiler industry as a whole. They also had a much greater investment than the individual grower had. In addition, improved economic security appeared to compensate the grower for reduced decision making opportunity.

Other peculiar provisions were noted in each contract. One contract was noted to provide for sharing more of the production costs (i.e. housing and fuel costs) with the growers. In the other contract, the contractor did not share in such costs, but provided for differences between the company and the grower to be settled by arbitration procedures (i.e. as opposed to filing lawsuits). Thus, in the main, study of two contracts from major companies operating in Tennessee shows typical vertical integration characteristics of contract ownership of all but contractee's facilities, equipment and labor.

D. IMPLICATIONS

Some main implications that may be drawn from the findings and experience of the researcher are presented below:

1. Since the number of Extension contacts broiler producers had was not positively associated with their use of more recommended

practices, it is implied that Extension contacts did not appreciably influence these producers to use practices. This supports findings from earlier studies (1:3) suggesting that the contractually necessary presence of servicemen representing the interest of the contracting company generally overshadows the educational role of Extension agents on broiler farms.

2. Since producers who earned most income from other farm sources reported a significantly higher number of total Extension contacts than those with poultry and non-farm main income sources, it is implied that most of the Extension contacts reported by these producers were likely directed towards the other, more lucrative, livestock and crop enterprises on the farms.

3. Since total capacity of all broiler houses owned by producers was positively associated with their use of more recommended practices, it is implied that size of broiler operation did appreciably influence producers to use practices. However, since the association does not show a direct pattern, this further implies that some of the practices studied may have lent themselves to more appropriate use for some set of producers, while they were less appropriate for others.

4. Since findings showed that only 7 percent of all producers used incinerators, the technique considered to be the most effective form of dead bird disposal, it is implied that the cost of adopting such a practice weighed against its benefits influences the adoption or use of that practice.

5. Since 94 percent of all producers planned to either continue producing broilers at present levels or to increase the size of operations in the future, it is implied that the majority of the producers were not dissatisfied with their broiler contracts.

E. RECOMMENDATIONS

For Use of Findings

Though the servicemen representing the best interests of the contracting companies may have taken the role of technical advisor that was formerly the agent's, Extension still has a role to play. The main interest of the contracting companies concerns their own economic success and reflects what they have invested in the broilers in comparison to the overall economic progress of broiler growers in the State of Tennessee. And, even though the contractors may know what is best for the broiler farmers, they are not equipped for research and lack special educational skills and techniques needed to convince farmers to adopt proven practices. Therefore, Extension can serve as an intermediary between the servicemen and the broiler growers, gaining the approval of the contracting companies and producers alike. Growers also should be educated regarding their broiler contract and its provisions. Such knowledge and assistance should aid producers to become more efficient, and to earn top dollars for their labor, while improving the comparative advantage of the entire Tennessee broiler industry.

The negative association between major sources of income and selected practices noted especially for those with farm sources other

than poultry suggests the need for Extension agents to take advantage of contacts to include concern for the poultry enterprise, even when the nature of the contact deals with different projects. For example, if the farm visit or other contact deals with dairy, beef, swine, or row crops, the agent may wish to inquire and show an interest in and knowledge of the poultry operation. Agents from poultry counties, yet lacking knowledge to deal with broiler growers, should seek the aid of Extension specialists and take advantage of appropriate in-service training.

Meanwhile, data from the present study should be of assistance to agents planning educational programs at county and state levels.

For Further Study

An Extension study should be conducted to ascertain how the role of Agricultural Extension agents should be modified to work more closely between the servicemen representing the contracting companies and the broiler growers. This should be geared toward an effort to save the faltering broiler industry in the state. Studies also should be conducted to determine how best the relatively large number of empty broiler houses across the state could be put to alternate, productive economic use.

In addition, studies of the specific role of company servicemen and other representatives would help fill knowledge gaps regarding numbers of visits company people make to contractees, the nature and extent of such visits and appropriate activities and events in which Extension might wish to become involved.

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APPENDICES

APPENDIX A

LIST OF COUNTIES BY DISTRICT AND NUMBERS OF PRODUCERS

District III (5 Counties; 74 Producers)

Franklin	(14)
Grundy	(20)
Hamilton	(17)
Monroe	(3)
Polk	(20)

District IV (3 Counties; 42 Producers)

Fentress	(20)
Morgan	(7)
Scott	(15)

District V (2 Counties; 7 Producers)

Jefferson	(2)
Sevier	(5)

APPENDIX B

1982 BROILER SURVEY

TENNESSEE AGRICULTURAL EXTENSION SERVICE

1982 Broiler Survey
(See Instructions on Last Page)



County
(1) (2) (3)

- A. General Information***
1. Number of broilers on hand today? $\frac{\quad}{(4)} \frac{\quad}{(5)}$ (thousand).
 2. Total capacity of all houses? $\frac{\quad}{(6)} \frac{\quad}{(7)} \frac{\text{thousand}}{(8)}$
 3. Number of broiler houses? $\frac{\quad}{(9)}$.
 4. Number of grow-outs per house in 1981? $\frac{\quad}{(10)} \frac{\quad}{(11)}$.
 5. Years grown broilers? $\frac{\quad}{(12)} \frac{\quad}{(13)}$.
 6. Main source of income? $\frac{\quad}{(14)}$ (1 = poultry; 2 = dairy; 3 = beef; 4 = crops; 5 = hort. crops; 6 = other farm; 7 = non-farm).
 7. Future plans? $\frac{\quad}{(15)}$ (1 = reduce size; 2 = increase size; 3 = remain at present size; 4 = quit broiler production).
- B. Housing**
1. Type? $\frac{\quad}{(16)}$ (1 = conventional-open sided; 2 = environmental-windowless).
 2. Ventilation? $\frac{\quad}{(17)}$ (1 = natural; 2 = fan; 3 = combination).
 3. Foggers for supplemental cooling? $\frac{\quad}{(18)}$ (1 = no; 2 = yes).
- C. Equipment**
1. Feeders? $\frac{\quad}{(19)}$ (1 = mechanical chain; 2 = chain with pans; 3 = automatic roundpan; 4 = other).
 2. Waterers? $\frac{\quad}{(20)}$ (1 = automatic trough; 2 = nipple; 3 = cup; 4 = bell shape; 5 = other).
 3. Medicator on waterer? $\frac{\quad}{(21)}$ (1 = no; 2 = yes; 3 = one is available when needed).
 4. Dead bird disposal? $\frac{\quad}{(22)}$ (1 = incinerator; 2 = pit; 3 = other).
- D. Litter**
1. Type? $\frac{\quad}{(23)}$ (1 = shavings; 2 = sawdust; 3 = straw; 4 = pine bark; 5 = combination; 6 = other).
 2. Number growouts on same litter? $\frac{\quad}{(24)}$.
 3. Use of litter? $\frac{\quad}{(25)}$ (1 = put on land; 2 = feed to cattle; 3 = sell; 4 = other).
- E. Management Practices**
1. Between Grow-outs:
 - a. Clean and disinfect each house at least annually? $\frac{\quad}{(26)}$ (1 = no; 2 = yes).
 - b. Clean and disinfect waterers between grow-outs? $\frac{\quad}{(27)}$ (1 = no; 2 = yes).
 - c. Clean feed bin after each grow-out? $\frac{\quad}{(28)}$ (1 = no; 2 = yes).
 2. Before Chick Placement:
 - a. Checks thermostats and thermometers for accuracy? $\frac{\quad}{(29)}$ (1 = no; 2 = yes).
 - b. Adjust brooder height for correct temperature? $\frac{\quad}{(30)}$ (1 = no; 2 = yes).
 3. First Seven Days:
 - a. Follow partial house-brooding? $\frac{\quad}{(31)}$ (1 = no; 2 = yes).
 - b. Clean waterers daily? $\frac{\quad}{(32)}$ (1 = no; 2 = yes).
 - c. Add feed to trays at least 3 times/day? $\frac{\quad}{(33)}$ (1 = no; 2 = yes).

***Coding Instructions**

1. Fill each column (blank)
2. Right justify all column entries
3. Use a nine (9) when a question does not apply.

4. General Management:
- a. Check each house at least 3 times/day? $\frac{\quad}{(34)}$ (1 = no; 2 = yes).
 - b. Flush waterers with milk solution before adding viral vaccine? $\frac{\quad}{(35)}$ (1 = no; 2 = yes; 9 = does not apply).
 - c. Keep mortality records? $\frac{\quad}{(36)}$ (1 = no; 2 = yes).
 - d. Remove caked or wet litter during grow-out? $\frac{\quad}{(37)}$ (1 = no; 2 = yes).
 - e. Mow grass around each house? $\frac{\quad}{(38)}$ (1 = no; 2 = yes).
 - f. Keep wild birds from house? $\frac{\quad}{(39)}$ (1 = no; 2 = yes).
 - g. Follow rodent control program? $\frac{\quad}{(40)}$ (1 = no; 2 = yes).
- F. Extension Contacts (Note: Agent and/or producer estimate the number of contacts the producer had with Extension over the past 12-months): a). Meetings attended? $\frac{\quad}{(41)}$. b). Office visits made? $\frac{\quad}{(42)}$. c). Farm visits received? $\frac{\quad}{(43)}$.

General Instructions for 1982 Broiler Survey

1. Date Due: Completed survey forms are due on or before October 18, 1982.
2. Disposition: Mail the completed survey forms to the Associate District Supervisor of Agricultural programs.
3. Counties to be Surveyed: Bedford in District II; Bradley, Coffee, Franklin, Grundy, Hamilton, Marion, McMinn, Monroe, Moore and Sequatchie in District III; Fentress, Scott, and Morgan in District IV; Cocke, Sevier, Jefferson and Hamblen in District V. Other counties also may want to conduct the survey.
4. Sample Size: Twenty (20) producers per county.
5. Survey Population: All contract broiler growers in 1982.
6. Sampling Procedures:
 - A. Make a list of all contract broiler growers in the county.
 - B. Apply the Nth number technique to identify 25 producers. The last five (5) producers identified will serve as alternates. Alternates should be used only to replace producers who for some good reason cannot be interviewed.

VITA

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