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TECHNIQUES AND METHODS USED IN WESTERN REGIONAL POULTRY PROJECT WM-7
Marketing Chickens From Producer to First Handler in Oregon, Washington, and Utah

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During the fiscal year 1949-50, Oregon, Washington, and Utah began a comprehensive study of the marketing of chickens in their respective states. The general objective of this project was to study the market structure, including the agencies, functions, and practices involved in moving chickens from the producer to the wholesaler, and to determine the adequacy of the functions and agencies involved. The regional poultry marketing technical committee met in July 1949, to survey the field of work and make decisions regarding the work to be done by each of the three states during the 1949-50 fiscal year. Inasmuch as no work had been done in this field in any of the three states, there was a question as to a logical starting point. After considering the amount of research required to accomplish the general objective, the technical committee decided to divide the work into two phases. The first phase would include the marketing of chickens from the producer to the first handler; the second, from the first handler to the wholesaler. The committee felt that both phases should be completed in each of the three states if any benefit was to be derived from this work. Each of the three states agreed to complete the first phase during the 1949-50 fiscal year, using the same sample design and questionnaire.

The decision to undertake the first phase was based on two fundamental hypotheses:

1. That something less than a high level of competition exists in the marketing of chickens from the producer to first handler.
2. That producers are not satisfied with the present system of marketing chickens.

The specific objectives of the first phase to test these hypotheses were as follows:

1. To study the degree of competition in the marketing of chickens from the producer to first handler and the reasons for its existence or non-existence in the three states.
2. To obtain information on marketing methods and practices used by the various buyers.
3. To obtain detailed information on chickens sold during the 1948-49 chicken-crop year, relative to number sold, prices received, grading and number of chickens falling into the various grades, name, address, and type of buyer.
4. To determine whether producers are satisfied with the present system of marketing chickens; and if not, why not?

It is believed a rather careful discussion of the sample design used by the three states in conducting the first phase of this project would be of value. After a detailed treatment of sample design and sampling, some of the problems uncovered during the study will be discussed. At the outset, it should be mentioned that the sample design was developed by Harold Walkup of The State College of Washington. Its objective was to select randomly a sample

of 250 poultry farms in each participating state, in such a manner that generalizations, within a minimum of error resulting from sampling, could be made for the population of poultry farms on which 100 chickens or more are kept annually. It is quite generally recognized that selecting a sample that is both representative and random is a difficult problem, particularly when working with data relating to agriculture. Included in the overall problem are many smaller problems such as finding basic population data, the type of sample to use, stratification determinants, and the procedure for drawing the sample. A careful review of the sample design used in this study may be of help to workers engaged in other marketing projects.

The representatives of the three states working on this phase of the project deliberately delimited the population to be sampled to those producers having a minimum commercial unit of 100 chickens, since they felt that flocks of less than this number were not of great commercial importance to the poultry meat industry.

The only basic sample information of a uniform nature available in all participating states, to determine the population and the sample parameters was the recent (1945) U.S. Census of Agriculture. It was recognized that such data, with its time lag, could very well present major population and sampling limitations in some areas where poultry production might have changed since 1945. Despite this objection, however, it was decided to use this source of basic sample data since it was the only data of a uniform nature available in the three states.

The population from which the sample was drawn consisted of poultry farms which kept 100 or more chickens between October 1, 1948 and September 30, 1949. These were selected from Minor Civil Divisions in which farms reporting poultry in the U. S. Census of Agriculture (1945)had an average of 100 or more chickens on hand January 1, 1945. Therefore, the first step in determining the population was to select all Minor Civil Divisions in which farms reporting poultry had an average of 100 or more chickens on hand January 1, 1945. The manner in which these Minor Civil Divisions were selected is shown in Table 1.

Table 1. WASHINGTON COUNTY: Data on Chickens; by Minor Civil Divisions, Oregon. 1945 (From U.S. Census)

County and minor civil division	Number of farms	Chickens on hand over 4 months old January 1, 1945		Average number of chickens per farm reporting chickens	Farms reporting chickens of total farms (Percent)
		Farms Reporting	Number		
Washington County	4,519	3,249	314,070		
Prec. 1	102	82	9,747	119	80
Prec. 2	19	13	2,087	160	68
Prec. 3	157	98	5,447	°	
Prec. 4	109	67	6,132	°	
Prec. 5	233	168	11,871		
Prec. 6	83	59	5,925	100	71
Prec. 7	81	52	6,240	120	64
Prec. 8	49	29	2,025	°	
Prec. 9	56	46	1,951		
Prec. 10	114	94	10,907	116	82
Prec. 11	100	82	11,230	137	82
Prec. 12	114	69	8,853	128	60
Prec. 13	181	140	23,786	170	77
Prec. 14	246	186	20,767	112	76
Prec. 15	139	79	10,079	128	57

° less than 100

The last two columns in Table 1 were computed from the first three. This operation was completed for all counties in each of the three states. In Oregon there were 154 Minor Civil Divisions which had an average of 100 or more chickens per farm reporting chickens on hand as of January 1, 1945.

A two-way stratification of these 154 Minor Civil Divisions was developed from which the primary sample units were selected. This stratification was determined by (1) percent of chicken farms as compared to all farms per MCD and (2) chicken numbers per farm reporting chickens. The range of each stratum per sub-stratum was determined by arraying both (1) and (2), using class intervals of appropriate size so that the distribution of the population could be determined. After the distribution was determined, each sub-stratum range was established so that approximately 1/3 of (1) and (2) fell in each stratum.

It is probably not too obvious why the percent of chicken farms as compared to all farms per MCD was used as a stratification determinant. This stratifying element was used as an indicator of the degree of concentration of poultry farms. The object was to attempt to force selection of chicken farms in areas with varying degrees of chicken concentration. It should be readily apparent why chicken numbers per farm reporting chickens was used as one stratification determinant. This tended to force selection of chicken farms of varying sizes and at the same time allowed the investigators to select a reasonably small sample and maintain randomness.

After the preliminary work described above was completed, it was possible to prepare a diagram as shown in Table 2 and insert each of the 154 MCD's previously selected in its appropriate sub-stratum. In order to secure a sample

Table 2. STRATIFICATION OF MINOR CIVIL DIVISIONS WHICH AVERAGED 100 OR MORE CHICKENS PER FARM AS OF JAN. 1, 1945

Chicken farms as a percentage of all farms per MCD

Size of flock	100 - 81 percent	80 - 71 percent	70 percent & less
100 thru 115	**1-A** Marion - Turner -- 103* Linn - Santiam -- 96 Clackamas - Killin -- 127 ----- 21 MCD's ----- 1254 1254 is 15% of (Total) 8366 15% of 250 37**	**2-A** Wash. - Prec. 14 -- 186* Linn - Price -- 53 Marion - Union Hill -- 80 ----- 20 MCD's -- 1375 1375 is 16.4% of 8366 16.4% of 250 41**	**3-A** Douglas - Edenbower -- 65* Benton - Fairmont -- 71 Lane - Santa Clara -- 92 ----- 9 MCD's -- 396 396 is 4.7% of 8366 4.7% of 250 12**
116 thru 150	**1-B** Wash. - Prec. 10 -- 94* Lane - Veneta -- 86 Linn - Peoria -- 54 ----- 15 MCD's -- 911 911 is 10.9% of 8366 10.9% of 250 27**	**2-B** Wash. - Prec. 1 -- 82* Lane - Lancaster -- 99 Polk - S.E. Monmouth -- 18 ----- 23 MCD's -- 1647 1647 is 19.7% of 8366 19.7% of 250 49**	**3-B** Wash. - Prec. 15 -- 79* Clackamas - Clackamas -- 64 Lane - Silk Creek -- 56 ----- 13 MCD's -- 570 570 is 6.8% of 8366 6.8% of 250 17**
151 & over	**1-C** Lane - Zumwalt -- 82* Linn - West Halsey -- 71 Marion - St. Paul -- 68 ----- 16 MCD's -- 1050 1050 is 12.6% of 8366 12.6% of 250 32**	**2-C** Benton - Palestine -- 52* Yamhill - Prec. 22 -- 23 Lane - Alvadore -- 62 ----- 10 MCD's -- 730 730 is 8.7% of 8366 8.7% of 250 22**	**3-C** Linn - West Brownsville -- 26* Marion - Croisan -- 26 Douglas - Garden Valley -- 36 ----- 27 MCD's -- 433 433 is 5.2% of 8366 5.2% of 250 13**

* Farms Reporting Chickens on Hand, January 1, 1945 totalled 8366.
** Number of schedules to be taken in MCD's drawn in this sub-stratum.

as representative of the total population as possible, it was necessary to determine the percentage of the total chicken farm population contained in each sub-stratum. The percentage indicated for each sub-stratum was then used to determine the proportional part of the 250 sample farms to be drawn from each sub-stratum.

In a random manner, enough MCD's were selected from each sub-stratum to include at least twice the number of farms necessary for the sample from each sub-stratum. The MCD's selected will be referred to hereafter as primary sample units.

The primary sample units (sample MCD's) selected were outlined on county maps. It was then necessary to determine, through one means or another, the location of all chicken farms in each primary sample unit on which 100 or more chickens were kept between October 1, 1948 and September 30, 1949. In Oregon no individual, agency, or business could provide the information needed. As a result, it was necessary to personally survey every primary sample unit to obtain the desired information.

After a primary sample unit was surveyed, and all the farms which kept 100 or more chickens between October 1, 1948 and September 30, 1949 were plotted on the map, the farms were combined into groups of two or three to form sample units. In Oregon, two farms made up one sample unit. Each sample unit was given a number to facilitate sampling. Within each sample unit the farms were also numbered (i.e. each sample unit contained a Farm #1 and a Farm #2).

Sampling of the sample units of each sub-stratum was then accomplished in a random manner and included the proportionate share of the sample calculated to be necessary to represent that part of the total population in each sub-stratum.

Alternate sample units were selected at random so that farms within them could be used as substitutes for the originally selected sample observation units. The number of alternate sample units selected per sub-stratum was 1/4 of the sample units. Farms within these units were also numbered as indicated for the original sample units.

Substitutions were made in the order that the alternate sample units were randomly selected. Farms with the same number within the alternate sample units were used as substitutes for like numbered farms in the original sample. For example, if a poultryman on farm number 2 of sample unit 17 refused to be interviewed and this was the second refusal on a farm numbered 2 of the original sample, the alternate selected was farm number 2 of the second alternate sample unit drawn at random.

Shortly after the sample in the three states was drawn, it became evident that some of the provisions of the sample design would have to be modified. The sample design provided for the selection of primary sample units from each sub-stratum to include at least twice the number of farms necessary for the sample from that sub-stratum. It was soon discovered, however, that this allowance was inadequate. It became necessary to draw additional primary sample units so as to increase the number of farms to four times the number necessary for the sample from each sub-stratum. Change in chicken numbers since 1945 was one of the factors necessitating this modification. The other was a short-coming of the basic sample information used. Minor Civil Divisions were selected

for sampling if they had an average of 100 or more chickens per farm as of January 1, 1945. The average number of chickens per farm in certain MCD's was undoubtedly influenced by the inclusion of a small number of very large chicken producers. Their large flocks averaged together with many small flocks (of perhaps less than 100 birds) brought the average of the MCD above 100. This situation points up the principal disadvantage of the arithmetic mean. Namely, that it may be greatly distorted by extreme values and, therefore, may not be typical. A breakdown showing the distribution of chicken farms by sizes for each MCD would have been better in this study, although such a breakdown for the 1948-49 chicken crop year would have undoubtedly been considerably different than the breakdown as of January 1, 1945.

The second difficulty encountered was in locating enough farmers with adequate records so that a schedule could be taken. It was found after a short time that approximately twice as many observation units[1] as schedules desired were necessary. For example, if 25 schedules were to be taken in a certain sub-stratum, it was necessary to contact approximately 50 farms that had 100 or more chickens on hand during the period from October, 1948, through September, 1949. It should be pointed out, however, that most of the enumerating in the three states took place after January 1, 1950. Many farmers keep their sales slips and other such data only until their income tax statement is prepared. It is recommended, therefore, that an investigator planning to obtain data from farmers' records, make his visits before the income-tax filing date.

Due to the difficulties encountered, it was necessary for all three states to reduce the number of schedules to be taken. At the outset, it was decided to take 250 schedules in each of the three states. In view of the difficulty of first of all finding enough observation units, and secondly, finding enough of the observation units with records, the original number of schedules was reduced by approximately one-half.

During the remainder of this paper, some of the problems uncovered in Oregon during this study will be discussed. One of the objectives of the producer-to-first-handler phase of this project was to obtain detailed information on chicken prices, grades, and buyers. Price information is needed in order to make price comparisons between different areas as of a certain date to determine whether an area is at a price disadvantage. Even with accurate price information, however, it is difficult in many instances to arrive at any valid conclusions. Purchase of chickens on a flock-run basis is a good example of this. Buyers in Oregon usually base their price on flock-run chickens on their estimate of how the flock will grade out. An examination of the sales of two flocks of chickens as of a certain date, of the same breed and approximately the same weight, on a flock-run basis may reveal significant differences in price due to the factor just mentioned and others. In view of this situation an investigator has to exercise care in attempting to draw conclusions from sales of flock-run chickens insofar as attempting to determine whether an area is at a price disadvantage.

Price data on sales of chickens on a graded basis are in many instances no better for this purpose than flock-run prices. Generally in speaking of buying chickens by grade, it is usually assumed that grade is a constant, with price being the variable. However, this is not always the case. It was found during this study, that buyers many times reflect price changes in the market place, not by changes in their price, but by relaxing and tightening their

1. An observation unit is a farm within a sampling unit which has been selected for the sample and on which data are to be taken.

grading standard. When the market weakens, such buyers will grade more closely, throwing borderline cases into the next lower grade. On the other hand, when the market strengthens, they will relax their grading somewhat, allowing more chickens to fall in the upper grades. In addition to making price comparisons between different areas difficult, this practice of buying chickens is very unsatisfactory to producers. Most producers feel that a grade standard should be strictly adhered to at all times and should not be adjusted to reflect changes in price. His position is understandable, since under the present system he is at a disadvantage. Even though he may have complete information on chicken prices in various markets (which is very unlikely), and what different buyers in his locality are paying, an element of uncertainty still exists; namely, the way his chickens will be graded by different buyers. Regardless of whether this problem is in the field of the economist or the physical scientist, the fact remains that it is important to the chicken producer and he would like to see someone take appropriate corrective action. Herein lies a fertile field of study.