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# Agricultural Information As An Aspect of Decision Making

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## FOREWORD

### Modern Farming

These are fast moving times and many changes continue to take place in farming. A modern farm manager is called upon daily to make new decisions — important decisions. The information he has at his disposal partially determines these decisions. This bulletin reports an effort to measure the kinds of information used by mid-western farmers in organizing and operating their farms. It also compares these results with the kinds of information contained in selected publications. In total it reports the results obtained from but a small part of a very detailed questionnaire completed by personal interviews with more than 1,000 farmers in 7 states. The researchers who participated in the study and, in particular, the authors, recognize the near impossible task of evaluating all kinds of information for all kinds of purposes. Also, other practical considerations necessarily limited the scope of the study.

In addition to the methodology employed, readers will be interested in the conclusions of the study. In particular, agricultural extension services and experiment stations are cast in a relatively favorable light in terms of their printed information and the needs of farm managers. However, possibilities for improvements are evident.

Rarely is a research undertaking attempted so broad in scope as the total project under which this bulletin emerged. Such efforts call for complete cooperation, understanding and the placing of a high priority on science and its values by all who contributed to its completion.

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## PREFACE

THE RESEARCH REPORTED was carried out in cooperation with personnel from six other experiment stations located in Indiana, Iowa, Kansas, Kentucky, Ohio and North Dakota. The research was sponsored by the Risk and Uncertainty Subcommittee of the North Central Farm Management Research Committee whose expenses were, in turn, carried largely with funds from the Farm Foundation. The costs of data collection were borne almost entirely by the seven cooperating experiment stations with the Michigan Agricultural Experiment Station bearing virtually all of the processing and tabulating costs for the data with the exception of the tabulations of the informational output of the cooperating experiment stations. This later work was done by Cecil B. Haver, while on the University of Chicago staff, but, formerly a member of the North Dakota Agricultural Experiment Station staff.

Special credit should be extended to Joel Smith, Department of Sociology and Anthropology, Michigan State University, and Albert N. Halter, University of Kentucky, formerly on the Michigan Agricultural Economics staff. These two workers made extensive, basic contributions to the design of the study, to construction of the field schedules, and in setting-up and carrying out coding procedures. Thanks, too, are due to the Economics Department, University of Chicago, for making Cecil B. Haver's time available to co-author this bulletin. The manuscript was sent to the departments of agricultural economics in the cooperating experiment stations for suggestions and comments most of which were, in turn, incorporated into the text. Special appreciation is due to C. A. Bratton, L. A. Fourt, Zvi Griliches, Albert Halter, Dale Hathaway, Peter Hildebrand, Harald Jensen, Dale Knight, Glynn McBride, Dean McKee, Earl Partenheimer, J. C. Redman, R. O. Rogers, Robert B. Schwartz, James Shaffer, Joel Smith, Woods Thomas and Lawrence Witt for detailed constructive criticisms and suggestions. The authors, of course, bear all responsibility for facts presented and opinions expressed.

## SUMMARY AND CONCLUSIONS

THIS STUDY INDICATED that in 1954, 1,075 farmers selected at random in eight midwestern sample areas would have required and used proportionately different information patterns in organizing farms than they would have in operating them either to maximize profits or enhance satisfactions.

The use of production information ranks high for the three aforementioned purposes. Institutional information ranks high also except where strict profit maximization is an operational objective. On the other hand, new technological information ranks relatively low, except when operating farms for profit. Prices and human information, concerning how to get along with various kinds of people who farmers deal with, occupy intermediate positions of relative importance.

For farm operation, farmers tend to emphasize the need for information on production methods, new technology, prices and institutions when operating for profit. By contrast, they emphasize institutions and human information when family satisfactions are the first considerations.

The empirical classification of information obtained in coding and tabulating farmer responses to unstructured projective questions indicated that information on *home* as distinct from *production* technology is important. Similarly, the need for and desire to use information on the managerial processes were indicated.

### Prices Rank First

In the opinion of farmers, prices ranked first in relative *importance* among the kinds of information considered. This was followed by production information, although price *was not used* as much as production information. The least important category, according to the survey, was information on humans. The information patterns emphasized by farmers indicate important differences between operating to maximize profits and family satisfactions. These differences are not apparent, however, in the relative importance farmers indicate they attach to the different kinds of information.

Although it should be recognized that agricultural college experiment stations and extensions services serve many groups other than farmers, such as rural businessmen, farm organizations, scientists,

teachers, rural residents and homemakers, it is instructive to compare the patterns of information produced by agricultural colleges with the kinds of information farmers said they would use.

Agricultural college publication services have developed and emphasized somewhat different information patterns (Table 1). Our

**TABLE 1—A comparison of farmer information patterns with those in selected agricultural college materials and farm management text books, percentage distribution for each of six major types of information**

Type of information	Farmer emphasis for			Information patterns in			
	Organizing farms	Operating farms for		Printed publications		Farm and home materials(b)	Farm management texts(c)
		Profit	Satisfaction	Extension services(a)	Experiment stations(a)		
				Percent			
Price.....	1.6	26.0	See	24.3	12.9	3.1	11.7
Production methods....	53.0	44.1	Table	46.9	58.4	74.9	67.4
New production technology.....	0.1	18.1	VII	1.1	2.1	....	0.7
Human.....	15.4	1.4	for	3.2	6.1	13.1	4.8
Institutional.....	29.5	9.1	state	17.9	17.9	3.6	14.5
Home technology.....	0.4	1.3	data	6.5	2.6	5.3	0.9
Totals.....	100.0	100.0		100.0	100.0	100.0	100.0

(a) For the seven states cooperating in I.M.S., 1953-55.

(b) For five of seven states cooperating in the I.M.S., 1953-55.

(c) For five texts.

study indicates the information pattern used in extension and experiment station publications as well as in farm and home development materials.

There is a marked similarity in the emphasis pattern of the extension service and that of farm management texts. Both emphasize production over other phases of farming.

### Some Conclusions From the Study

In general, the relative patterns of information disseminated in printed form in farm management texts, agricultural college experiment stations and extension programs conform rather closely with the patterns of information used by farmers and with the importance attached by farmers to different kinds of information.

The primary criterion used for evaluating information content of publications considered was the use farmers indicated they would make of information.

A criterion of this kind has both advantages and disadvantages. An obvious advantage is that it reflects what farmers want and prefer.

Agricultural colleges were created by farm leaders and legislators who were convinced that the information needs of farm people should be satisfied. Thus, this criterion is fundamental for evaluating the information content of these public efforts.

It should not be implied, however, that the tabulations of what farmers would use are entirely appropriate as sole, final authorities. For one thing, these tabulations are subject to the usual sampling errors as well as to possible biases.

Still more fundamentally, questions should be raised about using a criterion based on what farmers use or would use regardless of how accurately measured. It is quite possible that scientists may be able to foresee future needs of farmers and the information they will need more accurately than farmers themselves.

Still further, agricultural colleges serve many people other than farmers, such as businesses, urban residences, scientists, the press, radio and TV, agricultural teachers and farm organizations whose desires for information must also be considered.

Another disadvantage of this criterion is the danger of implying that the agencies involved are necessarily in the best position to produce and extend all types of information needed by farmers. For instance, agricultural colleges have long recognized the advisability of working through such media as the farm press, radio and television in extending their information. They have also recognized the advantages of coordinating their research and teaching efforts with corresponding efforts in industry, foundations, government and non-land grant educational and research agencies.

### **Extension Publications**

Evaluation of patterns of information contained in the printed publications of seven midwestern extension services and experiment stations from 1953-55 indicates that the information patterns in these publications are a compromise between what farmers regard as important and information they would use. There is also a compromise between what farmers would use in organizing and operating farms.

Some evidence was found that indicates extension service publications tend to under-emphasize relatively information on (1) new methods which would help farmers operate for maximum profit; (2) human factors which would enhance the family satisfaction as-



pects of farming; and (3) information on institutions, the human element and home technology which would help farmers organize farms.

Farmers have other sources of information in addition to extension service printed publications. These include mimeographed extension publications, extension meetings, radio and television programs, and other non-agricultural college sources.

For the most part, this study could indicate only *relative* not absolute over or under-emphasis of different kinds of information; hence, its conclusions do not necessarily imply absolute contraction or expansion of efforts to supply particular types of information.

Relatively few farmers indicated that information on new production technology, institutions and human factors was "least difficult" to secure.

### Experiment Station Publications

Generally speaking, the patterns of information present in experiment station publications are also somewhat of an average of what farmers would use in organizing farms, operating them for profit and in operating farms to maximize family satisfactions. However, in contrast to the extension service publications, the pattern of information in printed experiment station publications reports is more similar to the patterns of information emphasized by farmers in organizing and operating farms to maximize family satisfaction than to those stressed in operating for profits.

There is evidence that experiment station publications under-emphasize (1) information on prices and new production technology which would aid in operating farms to maximize profits; (2) information on institutions, home technology and the human element, relative to existing production methods, which would help in operating farms to maximize family satisfaction; and (3) information on institutions, home technology and human elements, relative to production methods, as an aid in organizing farms.

### Farm and Home Development Materials

Our survey discloses these implications about farm and home development materials: They are organization-oriented, i.e. the pattern of information they contain corresponds very closely with information farmers indicate they would use in organizing farms. They

do not, however, correspond with what farmers said they would use in operating farms for profit or family satisfaction.

The study indicates there is a need for more information on prices and new technology to meet the needs of farmers operating for profit and a need for relatively more material on the human and institutional aspects for the satisfaction guided farmers.

### **Farm Management Texts**

Tabulation of information contained in five current farm management texts, as revealed by index entries, indicates they emphasize about the same type of information experiment stations do in their publications. They are relatively heavy on production information, light on prices and still lighter on new production technology, the human element, institutions, and home technology. The texts material corresponds closely to what farmers say they use in organizing farms, but not so much to the information patterns used in the operation of them. While more organization-oriented than printed extension publications, farm management texts are less organization-oriented than the farm home development manuals.

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## INTRODUCTION

WITH THE INCREASING COMPLEXITY of farm technology, farm programs and of society in general, it becomes increasingly important that agricultural colleges and the discipline of farm management be effective in providing information to farmers. The importance of information for farmers has been recognized with increased public support of research, extension and resident teaching efforts in agriculture including farm management. Acceptance of such support carries with it an obligation to see that the support is used effectively.

More specifically, it is important to know whether or not the discipline of farm management and the agricultural colleges are producing and extending appropriate patterns of information. Answering this complex question involves such sub-questions as "what are appropriate patterns of information?" or, alternatively, "what are the criteria to use in judging patterns of information?" For instance, is what farmers say they would use an adequate criterion? Or, does it need to be supplemented by attention to other criteria such as, in the case of research, the likelihood of successful results or, in the case of extension and teaching, what mature, experienced teachers and extension workers feel farmers "should know?" Another sub-question involved has to do with whether or not the agricultural colleges are the "best" source of specific kinds of information. Still another sub-question involves information needed for different kinds of decisions faced by farmers. For instance, should information patterns furnished match the patterns used by farmers when organizing or when operating farms?

## GENERAL PROCEDURE

This section contains discussions of data sources and the plan of analysis employed in the following sections. Discussion of the plan of analysis necessarily involves criteria for evaluating agricultural information patterns.

### Sources of Data Used

Two data sources are drawn upon in this study. First, data from the Interstate Managerial Survey are used. This survey was designed

specifically in part to provide data for the analysis presented. Second, data on the information patterns in agricultural college publications and farm management texts were assembled to provide comparative statistics.

### The Interstate Managerial Survey

The Interstate Managerial Survey data indicate farmer opinions in 1954 concerning probable use, importance, and difficulties encountered in acquiring and using information. To be more specific, the farmers interviewed answered unstructured, projective questions concerning the information they would use in (a) organizing farms and (b) operating and managing farms. They also provided information about relative importance and difficulties encountered in obtaining various kinds of information.

The Interstate Managerial Survey is a cooperative study. Agricultural economists, statisticians, and sociologists from seven states cooperated in setting up the survey. The Risk and Uncertainty Subcommittee of the North Central Farm Management Research Committee served in establishing cooperative relationships. After the publication of *Decision-making Principles and Managerial Concepts for Agriculturalists*, (which reported preliminary pilot study work) plans were laid for a more general empirical testing of classifications and hypotheses contained therein (Johnson and Haver, 1953 and 1954).

The first task was the development of interview schedules, which took a year to prepare. Study objectives, schedule designs, etc. were the subjects of a conference held at Bozeman, Montana, three meetings of the Risk and Uncertainty Subcommittee of the North Central Farm Management Research Committee, and much correspondence among cooperators. Workers from other disciplines were consulted.<sup>1</sup> The objectives and hypotheses tested were set forth with a list of possible questions. A tentative schedule was drawn up, criticized, re-drafted repeatedly and pretested. From this, final field schedules were prepared<sup>2</sup>

To cover the many facets of decision making, 66 questions were developed, answers to only part of which are used in this bulletin. The pretest revealed that the schedule was so long it created re-

<sup>1</sup>Services of two were contracted, namely Joel Smith, Department of Sociology, M.S.U. and Norman Strand, Iowa State College Statistics Laboratory.

<sup>2</sup>See p. 42 of Summary data from the interstate managerial survey, Ky. Agr. Expt. Sta. Bul. 669, June 1959, for the master questionnaire and the distribution of questions from the master questionnaire for the field schedules.

spondent fatigue thereby lessening the reliability of responses. To meet this problem, different field questionnaires were developed with part of the questions rotated from questionnaire to questionnaire, so that no respondent would have to answer all of them. Ultimately, six different field questionnaires were devised to be used in a fixed rotation.

The questions and the sequence in which they were used followed a pattern. Answers to open-ended, non-structured questions considered in this study are used to test certain *a priori* classifications, hypotheses and concepts. Thus, it was necessary to avoid "building in" answers by asking structured questions prior to unstructured questions.

The sample for the study was random with respect to sample segments in (1) the geographic areas delimited within each state and (2) the entire geographic area delimited within the seven cooperating states: Indiana, Iowa, Kansas, Kentucky, Michigan, N. Dakota and Ohio.

The farmers sampled were those having primary entrepreneurial responsibilities for business units producing more than \$2500 worth of farm products, including the value of home consumption but excluding the rental value of farm dwellings. Farmers with types of leases and partnership arrangements restricting their performance of the managerial functions were excluded.

Cash and crop sharing rental arrangements and partnerships where all the partners or other groups of joint entrepreneurs ate at the same table and the respondent exercised dominant control were included. Farmers having livestock-share leases, tobacco-share croppers and multiple-family partnerships were excluded.

The sampling design and the drawing of the sample were done by the Iowa State College Statistical Laboratory. A stratified random sample of area sampling units was decided upon as most appropriate. Each of eight areas was designated as a stratum and each stratum was in turn subdivided into segments. Sample segments were each expected to contain two eligible farms (three in Kentucky). The sample drawn was completed using the 1950 Census of Agriculture and the 1947 Revised Master Sample Materials.<sup>3</sup>

<sup>3</sup>The following procedure was used in selecting sample segments: (1) the number of eligible farms for each whole or part county was obtained by taking the 1950 number of commercial farms with gross incomes of \$2500 or more, less the number of livestock share leases less 20 percent to adjust for partnerships, father-son arrangements and changes in the number of farms since 1950, (2) the total number of needed sample segments with two eligible farms within each county was determined, (3) master sample materials were used in subdividing the county into area sampling units of the desired size, (4) a random sample of the desired number of area segments was drawn from each stratum, (5) these segments were numbered and marked on county plat maps.

The sampling and other characteristics of the study are presented in Table 2.<sup>4</sup>

TABLE 2—Sampling characteristics and interviews taken, interstate managerial survey, 1954

Stratum number and state	Estimated number of eligible farms	Estimated number of eligible farms per sampling unit	Expected number of farmers to be interviewed	Sampling rate	Actual number of farmers interviewed
1. Kentucky.....	1,790	3	150	1/12	124
2. Ohio.....	23,599	2	200	1/118	137
3. Indiana.....	15,769	2	200	1/79	189
4. Michigan(a) ...	37,545	2	224	1/150	199
5. Michigan(b) ...	394	2	30	1/13	30
6. North Dakota..	9,301	2	150	1/62	129
7. Iowa.....	23,649	2	140	1/169	120
8. Kansas.....	6,985	2	206	1/29	147

(a) Counties south of Bay City-Muskegon line.

(b) Cheboygan and Presque Isle counties.

An interviewer school was held at Purdue University to acquaint the interviewers with the study, the survey and the schedule, and to instruct them in interviewing techniques. Mimeographed information (1) summarized for the participants the objectives of the study, the intent of the questions, and the sampling procedures, and (2) gave general interviewing instructions, general instructions for the schedule and instructions for specific questions. Following formal instruction, each trainee practice-interviewed a farmer in the vicinity. The instructors then discussed reactions and responses with each interviewer. Further practice interviewing and consulting followed until interviewers had relatively little difficulty attaining interviewing uniformity. After actual schedule taking was initiated, schedules were edited continuously at the state level and at Michigan State University to aid in maintaining uniformity in quality. The actual interviewing was started and in the main completed in the summer of 1954.

The sample used yields unbiased estimates for parameters for the population specified in the geographic areas delimited within seven states: namely, commercial farmers having primary entrepreneurial responsibility and producing more than \$2500 worth of farm products. The applicability of the results over adjacent areas and

<sup>4</sup>See p. 41, Summary of data from the interstate managerial survey, June, 1959, Ky. Agr. Expt. Sta. Bul. 689, for a map of the strata.

perhaps the country as a whole is implied though not explicitly stated. This hope for more universal applicability of the results and conclusions is based on the geographical spread of the areas in the study. It should also be observed that some of the raw study results *may* contain certain biases because of almost unavoidable (1) difficulties in questionnaire construction, (2) failures of enumerators properly to identify each observational unit, (3) failures of enumerators to interview in a manner which elicited unbiased responses and (4) difficulties in handling, editing and summarization of the data. Chi-square tests for differences in responses among interviewers for each state failed to reveal more than a few states for which genuine differences appeared to exist among interviewers in responses to questions used in this report.

### **Published Information of the Agricultural Colleges**

In addition, three other types of data were assembled to ascertain the patterns of information distributed in various efforts of agricultural colleges to provide information to farmers. *First* an analysis of printed experiment station and extension service publications for the seven cooperating states provided indications of the information patterns present in those publications. *Second*, the content of farm and home development materials was also analyzed to ascertain the patterns of information they present. *Third*, a systematic analysis of recently published farm management texts provided an indication of the patterns of information in them.

A comparison of the survey data with the published outputs of our teaching, research and extension organizations makes it possible to evaluate *partially* the results of research, extension and teaching activities.

### **Criteria for Evaluating Information Patterns**

In this study, the primary criterion used for evaluating the information content of the publications under consideration was the use which farmers indicate they would make of information. As pointed out previously, the patterns of information farmers indicate they would use were ascertainable with respect to both farm organization and operation.

With respect to farm operation, patterns were ascertainable both for when the object was to maximize profits and for when it was to maximize satisfaction for the entire family. When compared with

the information patterns found in research publications, extension publications, farm management texts and farm-home development materials, these tabulations indicate how closely the information patterns in these efforts correspond proportionally to the patterns farmers indicate they would use.

An evaluation criterion of this kind has both advantages and disadvantages. Among the obvious advantages is its reflection of the wants and preferences of farmers. The agricultural colleges were created by farm leaders and legislators deeply convinced that the needs of farm people for information should be satisfied. Thus, this criterion is fundamental for evaluating the information content of these public efforts.

It should not be implied, however, that the tabulations of what farmers would use are entirely appropriate as sole, final authorities. For one thing, these tabulations are subject to the usual sampling errors as well as to possible, though at present unknown and unsuspected, biases. Still more fundamentally, questions should be raised about using what farmers use or would use as a criterion regardless of how accurately measured. For example a well-informed scientist abreast of the new fundamental research in biology, botany, chemistry and physics may be able to foresee the future needs of farmers for information more accurately than farmers themselves. Still further the agricultural colleges serve many people other than farmers such as rural residents, related businessmen, urban residents, scientists, the press, agricultural teachers and farm organizations whose desires for information are also to be considered. Further, the agricultural colleges have also been charged with responsibility for "liberal education."

This implies a responsibility for leadership in the establishment and maintenance of fundamental values upon which wants and preferences are based and in terms of which problems are partially defined. Thus, it may not always be appropriate for research and educational institutions to evaluate their efforts in terms of what the public uses or does.

Another disadvantage of this criterion is the danger of implying that the agencies involved are necessarily in the best position to produce and extend *all types of information* needed by farmers. For instance, the agricultural colleges have long recognized the advisability of working through such media as the farm press, radio and television in extending their information. They have also recognized



the advantages of coordinating their research and teaching efforts with corresponding efforts in industry, foundations, government and non-land-grant educational and research agencies.

## **PATTERNS OF INFORMATION FARMERS INDICATE THEY WOULD USE**

In the field of farm management, some attempt has been made to classify the types of information used by farmers in managing farms. The early theoretical work by Knight (1921) on risk drew the attention of agricultural economic theorists to imperfections in knowledge. The first type of information studied empirically and conceptually was prices. Out of this study came D. Gale Johnson's (1947) work on forward prices as well as the interests of a number of agricultural economists and farm management men in the questions of how farmers formulate price forecasts and adjust to price uncertainty. Halcrow (1949) extended the field of inquiry to weather and, hence, yield uncertainty. Farm management men have long been aware of the imperfection in knowledge concerning human behavior and of the consequent need to establish a reputation for reliability in business dealings.

In 1953, the types of information used by farmers were classified into five categories: price, production, technological change, human and institutional (Johnson and Haver, 1953). (See page 28 for help in defining these categories.) Others have advanced more or less similar classifications (Heady, 1954). These classifications, which were based on observation including introspection, can also be derived deductively by examining the assumptions of static economic theory which would have to be relaxed to create a theoretical structure similar to that in which farmers actually operate (Johnson, 1957).

In order to determine the kinds of information used by farmers in organizing and operating farms, three questions were asked in the Interstate Managerial Study. One question dealt with information used in organizing farms for profit. Another dealt with information used in operating farms "to get the greatest profit" while the third concerned information used in operating "for the greatest satisfaction of his (a farmer's) entire family."

The three different questions were asked (1) to test the hypothesis that different patterns of information are used in organizing versus operating a farm, (2) to test the hypothesis that different patterns of information are used in operating for profit versus satisfaction and

(3) to secure descriptive data for use in evaluating the patterns of information in publications of the agricultural colleges and farm management texts.

Despite the respectable empirical and conceptual origins of existing information classes, no classification of information was employed in formulating questions for determining the patterns of information which farmers emphasize. Instead, open-ended, nonstructured, projective type questions were asked. More specifically, they were:

1. "What should a farmer find out before setting up a farm in a strange area for a strange family?"
2. "What kinds of information do you think a farmer ought to keep up with in order to operate a going farm business?"
  - a. In order to get the greatest profit?
  - b. In order to get the greatest satisfaction for his entire family?

In all cases, the question involving satisfaction followed, immediately, the question on profit maximization and there are definite indications of respondent fatigue in the recorded answers to the question on satisfaction maximization. While this fatigue undoubtedly reduced the total number of times component categories were mentioned, there is no clear reason for suspecting bias in the distribution of those components mentioned.

In handling open-ended questions of this type, interviewers were instructed to probe extensively by asking the interviewee successively how his initial answers affect "what information a farmer ought to keep up with?" The questions are, of course, projective in the sense that they do not deal with the interviewee's situation thus freeing him from the biasing influences of pride and embarrassment. Further, projection into a situation involving a strange area and an *unknown* family made it necessary for the respondent to conceive of more of the kinds of information which would actually be needed. In other words, the respondents were induced to verbalize information needs which they might regard as obvious and therefore not worth mentioning in their own familiar situations but which they, nonetheless, realize are of importance in organizing and operating farms.

Previously existing classifications of information were also avoided in the coding of interview results. Instead, detailed empirical classes were established on the basis of what was recorded on the schedules.

After the detailed empirical codes were established, it was apparent that *most of the detailed classes could, in turn, be grouped into the five a priori information categories.* (See appendix A for details on the categories.)

Three difficulties arose, however, in using the *a priori* categories. *First, home technology*, as distinct from production technology, appeared to have enough importance and significance (particularly in view of the Farm and Home Development Program of the state extension services) to justify a sixth and separate category.

*Second*, the need for and use of information on how to analyze, decide, act and bear responsibility was sometimes noted. While strictly speaking, facts concerning the performance of the managerial process are information, they constitute a special type of information. While this type of information was partially coded, it must be regarded as "volunteer data" procured by chance from a procedure which should not be expected to elicit such responses in all instances where respondents actually felt a need for more skill in carrying out the managerial processes.

The *third* difficulty involves a confusion between information and problems. This confusion arose in the literature at least as early as 1953 when the authors "unfortunately" referred to the *information* categories, (price, production, technological change, human and institutional) as *problem* categories (Johnson and Haver, 1953). This confusion also appeared in the answers given by farmers and in the early stages of code construction. Investigation of the combinations of information mentioned by farmers revealed that most problems require use of several kinds of information for their solution and that, hence, a classification for information would not be satisfactory for classifying problems.

In general, it appears advisable to maintain a sharp distinction (both conceptually and empirically) among the following: subject matter information and information on how to perform the managerial processes and problems. Further, it appears that the following is a reasonably usable, broad classification of the detailed component categories of information used by farm managers: price, production, technological change, human, institutional and home technology. In this classification, technological information, generally speaking is broken down into three categories, i.e., information on existing production technology, new production technology and home technology.

The available data were not detailed enough to justify breaking

home technology into existing and new technology. For the same reason no attempt was made to break information on prices, humans and institutions into categories dealing with existing and forthcoming situations.

Among the many different ways of summarizing the data on types of information used by farmers, two were considered. Both methods utilize the classification discussed above. The one method is to tabulate the number of times the component categories of each of the major information categories are mentioned. The other is to tabulate the number of farmers who mention at least one of the component categories. Table 3 presents data on the number of times the component categories were mentioned while Table 4 presents data on the number of farmers mentioning at least one of the component categories falling within each major category.

*Table 3—Number of times components (a) of each of six major types(b) of information were mentioned by farmers*

Type of information	In connection with organizing farms		In connection with operating farms for profit	
	Number	Percent	Number	Percent
Price.....	46	1.6	919	26.0
Production methods.....	1,565	53.0	1,562	44.1
New production technology.....	4	.1	642	18.1
Human.....	455	15.4	50	1.4
Institutional.....	871	29.5	322	9.1
Home technology.....	11	.4	45	1.3
Total.....	2,952	100	3,540	100
Number of farmers interviewed	534	....	903	....

(a) Excludes mentions of the six broad types—only mentions of component categories are tabulated. Chi-square = 1980.94 with 15.1 required for significance at the one percent level.

(b) See page 28 for explanation of types.

In general, these two tables reveal the same pattern of responses. Those major categories of information whose component categories were mentioned most frequently at least once are also the ones whose component categories were mentioned most frequently in total. When the mentions of the component categories are tabulated, the percentage for the most used major categories increases relative to the least used categories.

There are distinct differences in the patterns of information farmers indicate they would use when organizing as contrasted to

**TABLE 4—Number of farmers mentioning at least one component of each of the six major types of information**

Type of information	In connection with organizing farms		In connection with operating farms for profit	
	Number	Percent	Number	Percent
Price.....	42	3.6	513	28.2
Production methods.....	495	42.5	607	33.4
New production technology.....	4	.3	389	21.4
Human.....	269	23.2	46	2.5
Institutional.....	344	29.5	260	14.4
Home technology.....	11	.9	1	.1
Total.....	1,165	100	1,816	100
Number of farmers interviewed	534	....	903	....

Chi-square = 865.27 with 15.1 required at the one percent level of significance.

operating a farm business. Further, the patterns of information farmers indicate they would use when operating for profit are distinctly different from and less uniform between states than those involved when operating for family satisfaction (See Table 7, p. 25).

### Information Patterns Farmers Indicate They Would Use in Organizing Farms

In organizing farms, information on production methods (yields, soil capability, marketing services, buildings, fences, appropriate varieties, etc.) were the ones most frequently mentioned for the hypothetical situation. The component categories under production methods were mentioned at least once by 495 out of 534 farmers while these same 495 farmers mentioned 1565 sub-categories.

The next most used category was information on institutional arrangements (schools, roads, churches, taxes, acreage allotments, markets, etc.). In all, 344 of 534 farmers mentioned components of this major category at least once; the number of times components were mentioned was 871.

Human information ran a rather close third while information on prices, home technology and new production technology ran fourth, fifth and sixth, respectively. Component categories of new technology were mentioned at least once by only four of 534 farmers while the total number of such components mentioned was only four. The corresponding numbers for price information were only 42 and 46.

**TABLE 5—Number and percent of farmers mentioning at least one component of each of the six major information categories, in connection with organizing farms for profit, by cooperating states**

States	Prices		Production methods		New production technology		Human factors		Institutional factors		Home technology		Total for all farmers interviewed	
	No.	Per-cent	No.	Per-cent	No.	Per-cent	No.	Per-cent	No.	Per-cent	No.	Per-cent	No.	Per-cent
Kentucky.....	3	2.5	54	45.5	1	.8	35	29.4	25	21.0	1	.8	119	100
Ohio.....	4	2.6	68	43.0	1	.6	37	23.4	44	27.8	4	2.6	158	100
Indiana.....	9	3.7	91	37.5	0	..	65	26.7	76	31.3	2	.8	243	100
Michigan(a).....	12	5.7	88	41.7	2	.9	43	20.4	64	30.4	2	.9	211	100
Michigan(b).....	1	3.1	11	34.4	0	..	9	28.1	11	34.4	0	..	32	100
North Dakota.....	9	7.4	58	47.9	0	..	21	17.4	33	27.3	0	..	121	100
Iowa.....	2	1.5	56	41.5	0	..	28	20.7	47	34.8	2	1.5	135	100
Kansas.....	2	1.4	68	46.9	0	..	31	21.4	44	30.3	0	..	145	100

Chi-square = 40.95 with 49.5 required at the .05 percent level of significance.

Coefficient of concordance =  $W = 0.956$ ;  $Xr^2 = 38.25$  with 15.1 required at the one percent level of significance.

Apparently, in planning the general organization of a farm, farmers do not use the more changeable kinds of information such as prices and new technology as much as the more stable kinds such as information on institutions and existing technologies; nor are they highly concerned with home technology (either existing or new). While the answers with respect to home technology might have been different had wives instead of husbands been interviewed, it is important to note that the men were quite aware of home technology when questioned about operating a farm for maximum family satisfaction.

Table 5 presents a state by state breakdown of the numbers and percentages of farmers mentioning at least one component of each of the six major categories in connection with organizing farms. The state by state patterns reveal the same general heavy emphasis on production methods, institutional factors and human factors which appears for the total. Similarly, emphasis on prices and the virtual omission of new production technology and home technology was quite uniform among the states.<sup>5</sup> Thus, the quantitative and order differences in the information patterns mentioned for the various states appear to have little practical significance. Despite a low probability of securing the observed differences as a matter of chance according to the chi-square test, the coefficient of concordance indicates that the rank correlation among the state patterns was highly significant.

### **Information Patterns Farmers Indicate They Would Use in Operating Farms**

The information patterns farmers indicate they would use in farm operation are quite different from those they indicate they would use in setting up farms. Information on production methods, however, remains in first place so long as the object of operation is stressed to be profit. Continuing in connection with profit maximization, price information moves up to second place followed closely by information on new technology and, less closely, on institutions. Human information and information on home technology ranked fifth and sixth, respectively, when profit maximization was under consideration.

Table 6 contains patterns of information by states which farmers

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<sup>5</sup>It is also of interest to note that research not reported in detail here is indicating that the patterns of information mentioned by farmers are not related to such factors as age, education, size of farm, type of farm, etc. As the answers were in response to projective type questions which abstracted from the respondents environment, this lack of relationship should be expected. Further, it should be noted that the lack of such relationships in these data is no indication that relationships between patterns of information actually used and such factors are nonexistent.

**TABLE 6—Number and percent of farmers mentioning at least one component of each of the six major information categories in connection with operating farms for maximum profit by cooperating states**

States	Prices		Production methods		New production technology		Human factors		Institutional factors		Home technology		Total for all farmers interviewed	
	No.	Per-cent	No.	Per-cent	No.	Per-cent	No.	Per-cent	No.	Per-cent	No.	Per-cent	No.	Per-cent
Kentucky.....	62	35.2	71	40.3	16	9.2	5	2.8	22	12.5	0	..	176	100
Ohio.....	45	22.4	85	42.3	38	18.9	1	.5	32	15.9	0	..	201	100
Indiana.....	137	32.0	116	27.1	98	22.9	13	3.0	64	15.0	0	..	428	100
Michigan(a).....	107	29.3	124	34.0	68	18.6	15	4.1	51	14.0	0	..	365	100
Michigan(b).....	8	19.5	17	41.5	7	17.1	3	7.3	6	14.6	0	..	41	100
North Dakota.....	41	21.7	51	27.0	66	34.9	0	...	31	16.4	0	..	189	100
Iowa.....	58	28.9	68	33.8	50	24.9	2	1.0	23	11.4	0	..	201	100
Kansas.....	54	25.3	74	34.7	46	21.6	7	3.3	31	14.6	1	.5	213	100

$X^2 = 88.63$  with 49.5 required at the 95 percent level of significance.

56.5 required at the 99 percent level of significance.

Coefficient of concordance  $W = 0.841$ ;  $Xr^2 = 26.9$  (significant at the one percent level) with 15.1 required at the one percent level.



mentioned in connection with operating farms for profit. As was true in the case of the state patterns for organization, the state patterns for operating for profit are quite similar, for practical purposes, to those for the total sample.<sup>6</sup> Information on production methods is in first place and price information in second place for five of the seven states. For the other states, production and price information are interchanged.

New technology falls in third place for five of the seven states; for one state it is interchanged and falls in fourth place and, in another into first. Institutional information tends to fall in fourth, human information into fifth, while home technology falls uniformly in sixth place.

Though the patterns are similar and the differences small enough for them to be ignored for practical purposes, it is worthwhile noting that the probability of getting differences as large as those displayed in Table 6, as a matter of chance, is very low. Conversely, the probability of getting a rank correlation as high, by chance, as that displayed in Table 7 is less than .01.

When farmers were asked about operating farms to maximize family satisfaction, the pattern of information usage was quite different. Institutional information tended to move into first place. Human information and information on production methods appear to be used about equally and came second and third. Information on home technology tended to fall in fourth place while information on prices and new technology tended to fall in fifth and sixth place, respectively.

Table 7 presents the state by state break down of major categories of information mentioned by farmers in connection with operating farms for satisfaction. In contrast to the situation with respect to organization and operation for profits, the differences among the state patterns are quite pronounced. Institutional information was most important in 6 of the 7 states. While human information tended to be in second place it shared this distinction in a number of states with information on home technology and production methods. New technology accounted for almost one fifth of the mentions in Iowa but for less than one percent of those in Ohio. The quantitative importance of prices, too, varied widely among states. The differences among states are significant from both practical and statistical stand-

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<sup>6</sup>These similarities for both organization and operation for profits reduce the advantages to be gained by weighting the state data by sampling rates in arriving at overall numbers and percentages; hence, the data in Tables 2 and 3 are all derived from simple sums.

**TABLE 7—Number and percent of farmers mentioning at least one component of each of the six major information categories in connection with operating farms for maximum family satisfactions by cooperating states**

States	Prices		Production methods		New production technology		Human factors		Institutional factors		Home technology		Total for all farmers interviewed	
	No.	Per-cent	No.	Per-cent	No.	Per-cent	No.	Per-cent	No.	Per-cent	No.	Per-cent	No.	Per-cent
Kentucky.....	4	8.7	8	17.4	2	4.3	5	10.9	18	39.1	9	19.6	46	100
Ohio.....	0	...	8	6.7	1	.8	24	20.0	61	50.8	26	21.7	120	100
Indiana.....	12	4.9	12	4.9	12	4.9	77	31.4	109	44.5	23	9.4	245	100
Michigan(a).....	20	12.2	26	15.8	16	9.8	42	25.6	43	26.2	17	10.4	164	100
Michigan(b).....	4	30.9	4	30.9	1	7.6	2	15.4	1	7.6	1	7.6	13	100
North Dakota.....	0	...	7	9.5	3	4.1	20	27.0	33	44.6	11	14.8	74	100
Iowa.....	27	16.7	38	23.5	30	18.5	13	8.0	48	29.6	6	3.7	162	100
Kansas.....	6	5.3	13	11.5	10	8.8	13	11.5	47	41.7	24	21.2	113	100

(a)  $X^2 = 207.99$  with 56.5 required at the 99 percent level of significance.

(b) Coefficient of concordance  $W = .4875$ ;  $X^2 r = 19.50$  (significant at the one percent level) with 15.1 required at the one percent level.

points. Since, in this instance, totals and percentages for the seven states are rather meaningless, such totals are not presented.

### Some Contrasts Between Information Patterns For Organizing and Operating Farms

It is clear that farmers indicate, in general, they are more concerned with short-lived types of information in connection with operation than organization. Further, it is clear that human and institutional information are emphasized more in connection with operating for greatest family satisfaction but that this interest also shows up in connection with farm organization.

The average number of component categories mentioned per

**TABLE 8**—*Number of farmers assigning different degrees of relative importance to the five major types of information in setting-up and operating farms (1) to get the most out of life and (2) for profit*

Degree of importance by type of information	Purpose		Total
	To get most out of life	For profit	
<b>Most important(a)</b>			
Prices.....	101	251	352
Production methods.....	103	222	325
New technology.....	20	44	64
Human information.....	27	52	79
Institutional.....	37	55	92
Could not rank a first.....	3	5	8
<b>Second most important(b)</b>			
Prices.....	74	157	231
Production methods.....	83	182	265
New technology.....	42	101	143
Human information.....	31	69	100
Institutional.....	49	88	137
Could not rank a second.....	12	32	44
<b>Least important(c)</b>			
Prices.....	25	31	56
Production methods.....	9	34	43
New technology.....	71	145	216
Human information.....	88	208	296
Institutional.....	70	134	204
Could not rank a fifth.....	28	77	105
All equally important.....	..	..	100
Could not rank any.....	..	..	47
Questions not answered.....	..	..	8
Number of farmers interviewed.....	..	..	1,075

(a) Chi-square = 4.9 with 15.1 required at the one percent level of significance.

(b) Chi-square = 1.9 with 15.1 required at the one percent level of significance.

(c) Chi-square = 9.2 with 15.1 required at the one percent level of significance.

farmer interviewed was almost six in connection with the organization question as compared with less than four in connection with operating for profit and less than two in connection with operating for maximum family satisfaction. While a greater interest in organization might be inferred from these data, it should not be inferred that farmers are less interested in operating for family satisfaction than for profits.

### RELATIVE IMPORTANCE OF DIFFERENT KINDS OF INFORMATION

Each respondent was requested to rank five major types of information with respect to their importance in setting up and running their farm for one of two objectives. Iowa farmers and two-thirds of the non-Iowa farmers were requested to consider "profits" as their objective in setting up and running their farm while two-thirds of the non-Iowa farmers were asked to consider "getting the most out of life as their objectives."<sup>7</sup>

Profit and satisfaction maximization are of course not mutually exclusive. In economic theory, profit is regarded as an instrumental end to be maximized for attainment of more ultimate ends, sometimes regarded as measurable in terms of "satisfaction" as a least common denominator.

The respondent was introduced to the problem of ranking the major types of information as to importance with the following statement, "Here is a list of five types of information which at one time or another you may have had to obtain in order to make decisions about things which have come up in the course of your farming career. Each type is explained in this list and if the explanation is not completely clear, I'll try to help you with it." At this point the interviewer was instructed to present the list, pause and let the respondent read it, and explain it if necessary. The list complete with explanations and examples was printed on the 5 x 8 inch card shown in Fig. 1.

This was the first time the respondent was confronted with a structured question based on the five broad categories of information delimited in earlier work on the managerial process. If the respondent were among those asked to indicate the kinds of information necessary for organizing and operating a farm, he had already answered this question.

<sup>7</sup>Iowa researchers were not as interested in the influence of more ultimate objectives than profits while non-Iowa cooperators gathered data on the influence of more ultimate objectives as well as of profits.

Fig. 1. Flash Card for Explaining Information Categories to Respondents.

1. **PRICES:** Information on prices received for farm products and prices paid for items used in farm production — this includes past, present, and future prices.

**Examples:**

Current market prices	Feed and supply prices
Market outlook	Machinery prices
Corn-hog ratio	Wage rates
Dairy-feed ratio	Interest rates

2. **PRODUCTION FACTORS:** Information on the effects of all accepted farm practices and items used in production on rates of crop and livestock production — also information on how soils, disease, and weather affect yields.

**Examples:**

Fertilizers	Storage methods
Sprays and insects	Work methods
Crop varieties	Tillage practices
Feeding rates	Building layout

3. **NEW DEVELOPMENTS:** Information on new developments or changes in farm practices and items used in production.

**Examples:**

Supplemental irrigation	Meat-type hogs
Antibiotics	New feed supplements
Anhydrous ammonia	Self-feeding silos
Chemical weed killers	Krihium

4. **HUMAN FACTORS:** Information about individuals you may have to deal with or consider in making decisions about a farm.

**Examples:**

Family members	Dealers and buyers
Relatives	Salesmen
Neighbors or friends	County agents
Other people	Hired workers

5. **POLITICAL, SOCIAL, RELIGIOUS FACTORS:** Information on local, national and international governments and formal and informal groups whose actions affect a farm.

**Examples:**

Acreage controls	Church practices
Tax rates	Conservation programs
Draft	Drainage districts
School districts	Co-op policies

As pointed out earlier (p. 18), detailed, non-structured coding of the answers to the non-structured questions revealed the general validity of the five major information classes so long as they were (1) interpreted as excluding information on the managerial process, (2) not confused with problem categories and (3) regarded as incomplete in the sense that they do not differentiate adequately between home and production technology. Thus, the use of structured questions for purposes of securing rankings of the relative importance of different types of information appears to have been warranted.

Once the meanings of the terms describing the major types of information were clear to the respondent, the questioning continued. "In the light of your experience in getting information to set up and run your farm to get the most out of life (or, alternatively, 'for profit'), which of these five types of information have you found to be most important to you?" The answer to this question was recorded as rank 1. The respondent, who it should be recalled had the 5 x 8 flash card before him, was then asked, "Which of the remaining four has been most important to you?" and the answer recorded as rank 2. The respondent was then asked, "Which of the five has been least important?" This yielded rank 5. The next question, which was supposed to produce rank 3, was, "Now of the remaining two — (whatever they were was stated here) — which do you think you've found more important in solving your farm problems?" The remaining type was then assigned rank 4. In general, this procedure produced what appeared to be reliable first, second, and fifth ranks. Ranks three and four, however, were often unobtainable and interviewers expressed doubt concerning the reliability of the answers. On the basis of these two considerations, the third or fourth ranks were not coded and tabulated.

Responses to the ranking questions for the different types of information indicate that farmers regard price information to be the most important type of information. This conclusion holds with respect to setting up (organizing) and operating farms regardless of whether the objective is to get "the most out of life" or "profits." Of the 920 farmers who ranked the different kinds of information, 352 indicated that price information was the most important to them in setting up and operating farms. Production methods information was ranked first by 325 farmers while fewer farmers ranked institutional, human information and new technology first (Table 8).

Equally clearly, information on production methods seems to

be the second most important from the viewpoint of farmers of the five types of information considered. It ranked second (as was noted above) in terms of the number of farmers who thought it was the most important and, still more significantly, more farmers ranked it second most important of the five information categories. In all, 265 out of 920 farmers indicated information on production methods to be second most important when only 231 indicated they felt the same way about price information.

Clearly, the least important of the five information categories from the viewpoint of the farmers surveyed is information on the human factor.

The fewest farmers indicated human information to be most important while the greatest number indicated that such information was of least importance.

In general, these empirical findings agree very closely with those reported by Johnson, 1954 for Montgomery County, Kentucky farmers in 1951.

While great differences existed in the information patterns farmers indicated they would *use* in maximizing profits as contrasted with family satisfaction, similar differences were not at all evident in the importance which farmers indicate they attach to the different kinds of information. Table 8 shows almost identical rankings of the five information categories with respect to first, second and least important.

Tabulations of the rankings were made for the six separate states. The conclusions drawn above hold for almost every state despite the fact that  $X^2$  tests revealed that the differences between states were statistically significant at at least the 90 percent level for the first, second and fifth ranking.<sup>8</sup>

## SOURCES OF INFORMATION USED BY FARMERS

Farmers secure information from many sources. Part of these are communicative, part noncommunicative. Noncommunicative sources do not require that information pass from one person to another. They can be used by a farmer on his own volition without the cooperation of others. The communicative sources, on the other hand, involve a method and means of transferring information between people.

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<sup>8</sup>The lack of practically important differences, despite statistically significant differences, reduced the advantage of weighting the state data by sampling percentages; hence, the data in Table 8 are simple, not weighted totals.

Communicative and noncommunicative sources of information used by farmers in various areas, by types of farms etc. tend to be different.

## DIFFICULTY IN GETTING INFORMATION

The farmers interviewed were also asked to rank the five major types of information with respect to the difficulty they encounter in securing each type. As pretest results indicated an inability of farmers to establish five ranks, the main effort was limited to ranking the most difficult type to secure, the second most difficult and, finally, the least difficult.

More specifically, the actual questioning technique was as follows. The respondent used the same flash card (see page 28) used to explain the information categories in ranking the importance of the major types of information. The question was, "The kinds of information you find most important may not be equally difficult to get hold of. In the light of your own experience in getting information, then, which of these types has been the most difficult to get?" Using the ranking procedures described on page 29, ranks one to five were established.

*TABLE 9—Number of farmers indicating different relative difficulties experienced in securing five major types of information*

Relative difficulty and types of information	Difficulty in securing		
	Most difficult	Second most difficult	Least difficult
Price.....	150	90	241
Production.....	105	115	129
New technology.....	138	122	60
Human.....	150	126	91
Institutional.....	142	134	95
Could not choose.....	28	126	97
All five equally difficult.....	213	213	213
All five equally easy.....	33	33	33
Could not rank any.....	109	109	109
Question not answered.....	7	7	7
Number of farmers interviewed.....	1,075	1,075	1,075

Chi-square-190.5 with 34.8 required at the one percent level of significance.



The answers were tabulated<sup>9</sup> and are presented in Table 9. Only the numbers of farmers indicating the most, second most and least difficult type of information to secure are reported. The numbers of farmers finding each of the five information types most difficult to secure were about the same, the possible exception being production information which was indicated to be most difficult to secure only about three fourths as often as the other types. Similarly, no marked differences arose among the kinds of information when farmers were asked to indicate the second most difficult kind of information to secure.

Greater differences were apparent, however, when farmers were asked to indicate the least difficult kinds of information to secure. In all, 241 farmers indicated that price information was the least difficult of the five types to secure while only 60 farmers felt the same way about information on new technology. The second greatest number of farmers indicated that production information was the least difficult to secure while human and institutional information were nearly tied for third place.

The general observation that about equal numbers of farmers find each of the five kinds of information the most difficult to secure fits in with the fact that 213 farmers indicated they found all types equally difficult to secure. Conversely, only 33 farmers found all types equally easy to secure which is consistent with the general observation that there are marked differences in the number of farmers finding each of the five types of information least difficult to secure. Apparently, farmers have rather ready access to information on prices and production methods yet encounter considerable difficulty in securing certain kinds of information on these subjects.

## INFORMATION PATTERNS IN AGRICULTURAL COLLEGE PUBLICATIONS AND FARM MANAGEMENT TEXTS

One of the main purposes of the agricultural colleges and the farm management discipline is to aid farm families in making decisions. A primary purpose of this study was to appraise the effectiveness of the agricultural colleges in providing farmers with information useful in finding solutions to their problems insofar as such appraisal can be made on the basis of data from the Interstate Managerial

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<sup>9</sup>Again between state differences were statistically significant at at least the 95 percent level in the case of the first and fifth rank but were not of practical importance; hence, the tabulations in Table 9 are not weighted by sampling ratios.

Survey. A related purpose was to make a similar appraisal of farm management texts.

In order to secure a quantitative indication of the information put out by the agricultural colleges, four special tabulations were made.

*First*, the printed research publications released in the three year period 1953-55 by the seven experiment stations cooperating in this study were tabulated for information content.

*Second*, printed extension service publications for the seven cooperating states were tabulated to ascertain the patterns of information they presented.

*Third*, the information patterns in current farm and home development manuals from five of the seven cooperating states were tabulated.

*Fourth*, and lastly, the patterns of information in five recently published farm management texts were determined.

These measures of information patterns for research, extension and teaching have certain obvious limitations. Content analysis of published materials, for instance, is a limited measure of the total research and information dissemination program of the agricultural colleges as they distribute information via many media, their own printed publications being only one outlet. On the other hand, most research work and extension ideas are formulated in writing at one time or another.

Though the actual use and reuse of such information by agricultural college workers and by press, radio and television media are difficult to qualify, information on output as measured in terms of publication content and frequency of publication does provide a rough measure, at least, of *relative* emphasis. It should also be observed that content analysis of farm management textbooks may not reflect the real emphasis placed on the different types of information by farm management teachers.

Prices of inputs and products and well established practices and techniques are more likely used as textbook examples than are new, untried technical developments. Further, as quantitative data on the human factor are relatively undeveloped, other types of information are more likely to be used for illustrative purposes. Textbook writers depend on teachers to keep the class up-to-date with ephemeral types of information instead of trying to incorporate such information in their texts.

However, despite these and other obvious shortcomings of these measures of the output of the agricultural colleges (including the discipline of farm management), careful interpretation produces useful comparisons.

### Information Content in the Printed Agricultural Experiment Station and Extension Service Publications of Seven States

Representatives of the seven state experiment stations in the Interstate Managerial Study provided the authors with copies of most printed material distributed from 1953-55 inclusive by their station and by their extension service. In a few instances, out-of-print material was not available. All of the available *printed* (not mimeographed) material was analyzed to ascertain the emphasis (relative not absolute) placed on each of the six information categories and 42 secondary categories. The latter secondary or sub-categories were established in coding the farmer responses to questions on the kinds of information mentioned in connection with organizing and operating farms. Within the sub-categories are the "components" discussed earlier. (See Appendix, page 46)

The purpose in tabulating the printed output of these seven institutions was to obtain an objective measure of information patterns. Some of the special limitations of the measure follow. One is that the limited time period considered excludes publications on certain categories where research was completed and published in earlier years and where research is in progress but not yet published. Thus, the patterns do not reflect current trends in the information production and dissemination programs nor indicate fully the content of the publications currently being distributed. Also the measure does not indicate or attach significance to the number of publications distributed annually by information categories. A further limitation is that only the relative not absolute emphasis is measured.

The distinction between research and extension publications in some states is not great. Research is sometimes reported in a manner which permits it to serve both research and extension purposes thus making the distinction between research and extension publications less meaningful. The tabulations presented herein should be regarded as "information content indicators" rather than as exact measures of content.

The tabulation was made as follows: Each article, circular or

bulletin was reviewed for content with respect to 42 sub-categories. A bulletin received only one check for each sub-category; thus, any one of the six major information categories could receive only as many checks or references as it had sub-categories. No attempt was made to weigh the importance of references, i.e. a 30-page bulletin on "livestock price trends" could receive one check in one sub-category while a 5-page article on "family relations" could receive 10 checks in 10 sub-categories in three different major categories.

While some subjects lend themselves to more references than others, it was felt that the weighting problem did not appreciably affect the final measures. As the same system of sub-categories was used in studying the use of information by farmers, (See the appendix) comparisons *on a relative basis* between the measured output of the agricultural colleges and of information patterns emphasized by farmers should be quite valid even if the weighing problem is important with respect to the two measures considered separately. It is important to note that sub-category tabulations should be expected to fall "midway" between major and "component" categories.

Table 10 summarizes the results. Research publications in the seven states received 1774 reference checks and extension publications 2748. The statistically significant difference between the relative emphasis placed on certain information categories by research and extension is explained, in part, as follows: much price information research, particularly on current prices, is done by the U.S.D.A. and

**TABLE 10—Emphasis placed on each of the six major types of information in research and extension publications of seven states for the 1953-55 period**

Type of information	Kind of publication					
	Extension		Research		Research and extension	
	Number	Percent	Number	Percent	Number	Percent
Price.....	669	24.3	228	12.9	897	19.8
Production methods.....	1,290	46.9	1,036	58.4	2,326	51.4
New production technology....	31	1.1	37	2.1	68	1.5
Human.....	88	3.2	109	6.1	197	4.4
Institution.....	491	17.9	317	17.9	808	17.9
Home technology.....	179	6.5	47	2.6	226	5.0
<b>Total.....</b>	<b>2,748</b>	<b>100.0</b>	<b>1,774</b>	<b>100.0</b>	<b>4,522</b>	<b>100.0</b>

Chi-square = 159.5 with 23.2 required at the one percent level of significance.

reported in its publications<sup>10</sup> rather than by the experiment stations while, on the other hand, numerous extension publications popularize the current U.S.D.A. price information for use by farmers. Thus, as one would expect, extension (24 percent) exceeded research price information output (13 percent). While there are certain exceptions among states, the differences would have been even greater if mimeographed material had been included in the analysis. Production information in research publications exceeded (relatively) extension references (58 to 47 percent) but extension has a greater number of checks, i.e. 1290 compared to 1036 for research. In many states, research publications are accompanied by a companion extension report which promotes a one to one ratio in this category.

In both research and extension efforts, major emphasis is placed on production methods information. Over one-half of the subject matter references tabulated dealt with production. Prices and institutional information were virtually tied for second place, the former being slightly more important for extension. Human information and information on new technologies play minor roles in the printed output of both the extension services and the experiment stations.

### **Information Patterns in the Farm and Home Development Materials**

Representatives of the states cooperating in the Interstate Managerial Study were requested to forward the "farm and home development" materials prepared at their institutions for distribution to county offices. The information patterns in these materials were tabulated for five states, according to the 42 secondary information categories established earlier in coding the answers to the questions on kinds of information used by farmers in organizing and operating farms.

The tabulations for the secondary categories were then consolidated into sums for the six major types of information and the results presented in Table 11 in which states are designated by capital letters. While a chi-square test revealed statistically significant differences among states, the differences themselves are not large enough in view of the quality of the data to justify detailed consideration of between-state differences.

Farm and home development materials contain very little infor-

<sup>10</sup>*Agricultural Prices, Agricultural Statistics, The situation reports and the annual outlook reports are examples.*

**TABLE 11—Relative emphasis judged to be placed on each of the six major types of information in the farm and home development materials distributed by five different state extension services**

Type of information	State					Total
	A	B	C	D	E	
	Percentages					
Prices.....	2.9	0.0	0.0	5.3	6.7	3.1
Production methods.....	86.5	91.3	62.5	84.2	53.3	74.9
New production technology.....	virtually none					
Human.....	2.4	4.3	23.6	10.5	30.7	13.1
Institutional.....	4.7	4.4	1.4	0.0	4.0	3.6
Home technology.....	3.5	0.0	12.5	0.0	5.3	5.3
Total.....	100	100	100	100	100	100

Chi-square=67.94 with 32.0 required for significance at the one percent level, as computed from the absolute data. The coefficient of concordance,  $W=0.6843$ ,  $X^2r=17.11$  with 15.1 required at the one percent level of significance.

mation on new technology as defined herein. Usually only widely accepted methods are suggested for budgeting and planning. Also, prices and institutional arrangements tend to be assumed as given and are not usually treated at length in these manuals, reports and publications. The main emphasis in organization is on production methods and human factors. For the materials tabulated here, 88 percent of the references (checks) fell in these two information categories. There was a relatively lower emphasis on information on prices, institutions and new technology.

### Information Patterns in Farm Management Texts

The subject matter content of farm management texts was compared with the information patterns emphasized by farmers for the benefit of farm management teachers and textbook writers. For purposes of making this comparison, five textbooks were selected. All of the five were published after World War II. It is felt that they represent rather adequately the different points of view prevalent among academic farm management personnel.

The information content (not dealing with problems or the managerial processes) as revealed by index entries was tabulated according to the 42 secondary information categories established in coding responses to the questions involving types of information used by farmers in organizing and operating farms. These results were then

**TABLE 12—Percentage distribution of number of times each of six major types of information was mentioned in the indexes of five recent farm management texts**

Type of information	Text					Total
	A	B	C	D	E	
	Percentages					
Prices.....	10.4	16.5	12.3	10.1	11.1	11.7
Production.....	70.1	67.5	75.0	61.0	71.8	67.4
New production technology.....	0.0	.8	.4	1.0	.9	.7
Human.....	7.8	10.1	2.7	3.9	2.4	4.8
Institutional.....	10.9	2.5	9.4	23.2	13.7	14.5
Home technology.....	.8	2.6	.2	.8	.1	.9
Total.....	100	100	100	100	100	100

Chi-square = 310.79 with 31.4 and 37.6 required at the five and one percent levels of significance, respectively, as computed from absolute data. The coefficient of concordance,  $W = .8491$ .  $X^2_r$  equals 21.23 with 15.1 required at the one percent level of significance.

summed into the six major information categories and the results presented in Table 12. While the chi-square test reveals a statistically significant difference among the information patterns present in the five texts, little practical significance can be attached to the differences revealed. Text D appeared to place a relatively heavy emphasis on institutional information while Text B placed a relatively heavy emphasis on the human factor and was light on institutional information. In general, however, the uniformity is surprising in view of the differences generally supposed to exist among different texts.

Though the heavy emphasis on production information in farm management texts was not expected, consideration of the kinds of information within this category and the concern of farm management people with what to produce, what equipment to use, what practices to employ, how much to use, etc., suggests that the emphasis on the production category should not be a surprise. This does not imply, however, that 67 percent is the optimal emphasis on production information.

## COLLEGE PUBLICATIONS AND FARM MANAGEMENT TEXTBOOKS AS SOURCES OF INFORMATION

This section is divided in four sub-sections. The first deals with the printed extension service publications, the second with the

printed experiment station reports, the third with the farm and home development materials and the fourth with farm management textbooks.

### Farmers Information Needs and Extension Service Publications

As the interstate managerial data revealed differences in the patterns of information emphasized by farmers *in organizing* as contrasted to operating farms, the information patterns in extension service publications can be evaluated from both standpoints.

#### With Respect to Farm Organization

In this study, farmers ranked the five major information categories in organizing farms as follows: production information first, information on institutions second and human information third. Apparently, in the opinion of the farmers interviewed, the need for price information and new technological information is not as great, relatively, in organizing farms.

The extension service prints production information primarily. In second rank is price information, in third institutional information, and fourth home information. Thus, *there is a fairly close correspondence between the pattern of information which farmers indicate they use in organizing farms and the information pattern disseminated in printed extension service publications.* For human information, 3 percent *disseminated to 15 percent needed* indicates the direction of a *possible desirable* adjustment in the pattern of information in extension service publications. Farmers indicate that they would use proportionally more information of the following type in organizing farms: how to appraise, handle, and deal with people such as salesmen, dealers, buyers, county agents, hired workers, relatives, neighbors, family and others.

Whether or not agricultural colleges should attempt to fill this need depends in part on (1) how effective it (including both the extension services and experiment stations) is and can be in producing and disseminating this type of information and (2) how much farm organization is being stressed in relation to operation. Further, it should be observed that farmers use noncommunicative sources of information quite extensively though local communicative sources (neighbors and relatives or bankers and lending agents) are also used. On the other hand, an opportunity for agricultural colleges may



exist in the considerable interest which farmers display in information on motivating and training youth, in information on handling migrant laborers and in management, as a phase of human behavior.

### With Respect to Farm Operation

Farmers emphasize different information patterns when seeking information for operating a farm to maximize profits as contrasted to family satisfaction.

When operating for *profits*, information on production methods ranks first, with prices and new production technology second and third, respectively. Institutional information is fourth and human information ranks fifth. A comparison of these ranks with those from printed extension service publications indicates that all types of information needs are met proportionally with the exception of new technological information. Here the disparity is 1.1 percent produced to 18.1 percent emphasized as needed by farmers.

Again, a possible opportunity for adjusting extension work is indicated. While the study indicates that farmers would use relatively more information on new technology of various kinds and types, the question must be raised again as to whether or not the extension service is the appropriate agency to fill this need. Farmers depend heavily on magazines, dealers, salesmen, buyers and observed experiences of others for such information in addition to county agents, vocational agricultural teachers and experiment station workers.

When the information patterns present in extension publications are compared with those farmers indicate they would use in operating to maximize *family satisfaction*, the picture changes somewhat. Extension service publications contain proportionally more information on existing production methods and prices than farmers indicate they would use in operating farms to maximize family satisfactions. On the other hand, extension service publications may fall short of the proportions farmers would use with respect to institutions, human factors, and new technology. Extension stress on the latter two information areas, (human factors and new technology), it should be recalled, was also short proportionally with respect to the patterns of information used in (a) organizing farms and (b) in operating farms for maximum profit. In addition, the institutional information in extension publications fell considerably short relative to farmer emphasis in operating farms to maximize satisfactions; that is, farmers indicated they would use relatively more information on markets;

transportation; state, local and national governments; credit and tenure arrangements; farm and other organizations; social, recreational educational and other activities, etc.

### **With Respect to Both Purposes**

When the pattern of information distributed in printed extension service publications is compared with patterns used by farmers both in *operating* and in *organizing* farms, it is apparent that the extension service patterns represent somewhat of a compromise between the two. When farmers were asked to rank the different types of information as to relative importance for both purposes, they too presented a similar compromise. Price and production information were in the first two places with respect to importance. The same is true in the pattern of information distributed in extension service publications. Institutional information is in third place in both series while information on human beings and new technology falling in the fourth and fifth spots.

Generally speaking, the relative emphasis placed on different types of information in extension service publications appears quite appropriate. However, modification would be called for if the extension services were to specialize on either farm organization or farm operation as the present pattern is a compromise between the distinctly different patterns involved in organization and operation.

### **Farmers' Information Patterns and Experiment Station Publications**

The agricultural experiment stations whose research publications were tabulated have developed the patterns of emphasis on different types of information presented in Table 10.

### **With Respect to Farm Organization**

Farmers have indicated that in organizing farms they would rank production information first, institutional information second, human information third, price information fourth and information on new technology fifth. It should be observed that price ranks lower than human factor information when farmers are considering farm organization while printed experiment station publications rank prices over the human factor. Again, the difference in the relative emphasis may be important; human factor information received a 15

percent emphasis while the research emphasis was observed to run at the 6 percent level. Thus there is a divergence between the relative emphasis farmers place on human factor information in farm organization and the relative supply of this information in printed experiment station publications.

While this suggests that relatively more research is needed insofar as farm organization is concerned on how to analyze, handle and deal with people, the question raised earlier with respect to extension service activities should be considered again. Are the agricultural colleges an appropriate source of such information? Perhaps only a small proportion of human factor information can come from the agricultural colleges.

### With Respect to Farm Operation

In operating a farm for maximum profit, the pattern of information farmers would use is different from that in experiment station research publications (see Table 10). The tabulations indicate that farmers rank the different types of information as follows: first, production; second, prices; third, new technology; fourth institutions and fifth, human. While experiment station publications also rank production methods first, all other information categories are different from the farmer's ranking.

The important difference is the divergence between the proportional need for and the proportional supply of the following: price information — 26 percent indicated to be needed vs 13 percent supplied, and new technological information — 18 percent vs 2 percent supplied. This suggests that relatively more research may be needed on these categories of information.

The information patterns needed by farmers in *operating farms to maximize satisfactions* for the entire family display the following ranks: first, institutional information; second, human information; followed by production information; information on new technology, and price information in indefinite order depending on the state being considered. The emphasis in printed experiment station publications has been indicated above.

The proportional demand for information on the part of farmers in operating farms to maximize satisfactions and the supply of information diverges for the following information categories: institutional information, *proportionally* more needed than supplied; human, more needed than supplied; new technology, more needed

than supplied; production, less needed than supplied; price, proportionally less needed than supplied. This indicates some possible redirections for experiment station publications if they are to be directed towards the patterns of information emphasized by farmers in operating to maximize family satisfaction.

### **With Respect to Both Purposes**

The experiment station publications like those of the extension service represent a sort of compromise (insofar as information content is concerned) among the patterns of information used by farmers in organizing and in operating farms for profits and/or family satisfaction. Perhaps it is safe to state that the difference between the extension and experiment station patterns result mainly from (1) the availability of price information from non-college research agencies and (2) the fact that researchers deal primarily with what is unknown while extension distributes primarily what is known.

### **Farmers' Information Needs and Farm and Home Development Materials**

The farm and home development programs are designed, among other things, to aid farmers in organizing their farms. The information pattern emphasized in material distributed to county personnel under this program is as presented in Table 10.

### **With Respect to Farm Organization**

The farmer respondents in this study ranked the information needed in organizing a farm for profit as follows: (1) production, (2) institutions, (3) human factor, (4) prices, and (5) new technology. The ranking is similar, except that institutions and human factor are ranked in reverse to the farm and home development emphasis. However, there is a divergence in emphasis with respect to institutional information; farmer needs suggest a 30 percent emphasis while the farm and home development materials offer a 3.6 percent emphasis.

### **With Respect to Farm Operation**

In operating a farm for *maximum profit*, the pattern of information emphasized by farmers is very different from that in the farm and home development materials distributed by the agricultural colleges.

The indicated demand for information from the farmers operating for profit and the supply of information in farm and home development materials indicates a divergence in the following categories: prices, 26 percent indicated to be needed vs 3 percent supplied; new technology, 18 percent vs virtually none supplied; and institutions, 9 percent vs 3.6 percent supplied. These results indicate a needed redirection of the farm and home development materials, if they are to be oriented to farm operation as well as organization.

In operating farms to *maximize satisfaction* for the entire family, the information pattern used by farmers takes on a still different emphasis. In comparing this pattern with that offered by the farm and home development program, certain divergences are noted in the following information categories: institutional *proportionally* more needed than supplied; new technology, more needed than supplied; and prices, more needed than supplied. These divergences suggest a possible adjustment in the materials offered by the farm and home development program, particularly if this program is to be operation-oriented and is to stress the home (family satisfactions) as well as the business end of farming.

### **With Respect to Both Purposes**

It is clear that the pattern of information contained in the farm and home development program materials is rather admirably adapted for purposes of organizing the business end of farming. As it also contains significant amounts of home technology, it can be said that it is rather well adapted to the business or production aspect of the home. It is not, however, well adapted to either farm or home operation as contrasted to organization; nor is it well adapted to operating farms to maximize family satisfactions.

### **Farmers' Information Needs and Farm Management Texts**

The subject matter content of college farm management texts yields an interesting comparison to the information patterns needed by farmers. The emphasis pattern derived from the five textbooks selected was as follows: first, production methods; second, institutions; third, prices; fourth, human factor and fifth, new technology.

## With Respect to Farm Organization

When the pattern in farm management texts is compared to the information pattern needed by farmers in organizing farms, the ranking is similar except prices and the human factor are reversed. Divergences emerge with respect to the following: prices, 12 percent presented in texts vs 2 percent needed by farmers; production, 67 percent presented vs 53 percent needed; human, 5 percent presented vs 15 percent needed; institutions, 15 percent presented vs 30 percent needed. The important divergences are for the latter two categories for which need significantly exceed offerings or output.

## With Respect to Farm Operation

In comparing the information content pattern of farm management texts to that suggested by farmers when operating a farm for *profit*, the following patterns emerge: prices, 12 percent presented in texts vs 26 percent needed by farmers; production, 67 percent presented vs 44 percent needed; new technology, 0.7 percent presented vs 18 percent needed; human factor, 5 percent presented vs 1.5 percent needed; institutions, 15 percent presented vs 90 percent needed. Proportionally, use exceeds offerings in the case of prices, new technology and institutions.

The information pattern emphasized by farmers in operating farms to *maximize satisfactions for the entire family* is considerably different from that found in farm management texts. Proportionally, the use of information on the part of farmers in operating to maximize family satisfactions exceeds the offerings presented in farm management texts in the case of new technology, human factor, and institutional information.

## With Respect to Both Purposes

Farm management texts, like the farm and home development materials, appear to be organization-oriented though they represent somewhat more of a compromise between organization and operation than those programs. Farm management texts, again like the farm and home development materials, do not contain appropriate patterns for maximizing family satisfactions.

## APPENDIX

### Tables on Types of Information Used by Farmers

**TABLE 1A—Types of price information used by farmers in organizing farms, in operating farms to maximize profits and in operating farms to maximize satisfaction for entire family**

Type of information	In organizing farm	In operating farm	
		For profit	To maximize satisfaction for entire family
	Number	Number	Number
Any clear statement of general interest in the category.....	0	27	4
Any statements of general interest in the category without specific subcategory reference.....	1	34	7
Prices paid by farmers.....	12	62	5
Prices received by farmers			
General and unspecialized.....	2	35	4
Prices for crops.....	0	33	5
Prices for livestock and livestock products..	0	49	6
Support price information.....	0	7	1
Other information about kinds of price.....	1	1	0
Sub total.....	16	248	32
Characteristics of price			
Long range trends in prices.....	0	39	4
Relative prices.....	1	1	0
General economic outlook.....	0	30	4
Seasonal prices.....	0	13	2
Current prices and short term trends.....	2	134	14
Other list.....	0	2	0
Past prices.....	0	8	0
Cost of living and farming.....	13	25	6
Sub total.....	16	252	30
Factors affecting prices			
Current market conditions.....	14	219	27
Supply outlook.....	0	85	10
Demand outlook.....	0	42	7
Inflation, deflation and war as price level indicators.....	0	2	0
Price outlook.....	0	63	9
Other factors affecting prices.....	0	3	0
Price information mentioned specifically but no subcategory applicable.....	0	5	1
Sub total.....	14	419	54
Grand total.....	46	919	116
No price information mentioned.....	488	382	676
Number of farmers interviewed.....	534	903	903

**TABLE 2A—Types of production information used by farmers in organizing farms, in operating farms to maximize profits, and in operating farms to maximize satisfaction for entire family**

Type of information	In organizing farm	In operating farm	
		For profit	To maximize satisfaction for entire family
INPUTS	Number	Number	Number
<b>Livestock production</b>			
General or unspecified.....	3	34	3
Breeds.....	4	41	3
Breeding stock.....	1	33	5
Grains and roughage.....	0	22	0
Feeding rates.....	2	104	14
Labor.....	1	0	0
Management.....	2	32	2
Insects and diseases.....	1	20	2
Water supply.....	66	3	1
Other livestock production practices.....	2	12	0
Sub total.....	82	301	30
<b>Crop production</b>			
General or unspecified.....	7	28	4
Varieties.....	38	132	18
Timing.....	5	26	3
Rotations.....	5	77	12
Machinery and equipment.....	8	12	3
Insects, diseases and weeds.....	14	46	7
Management.....	5	42	5
Labor.....	1	1	0
Fertilizer and fertilizer use.....	21	226	30
Irrigation.....	5	8	0
Seeds, seeding rakes and seeding methods..	0	7	0
Sub total.....	109	605	82
<b>Soils</b>			
General or unspecified.....	57	20	5
Handling characteristics, texture, and soil conditions.....	61	11	0
Topography and profile (includes depth)...	45	1	0
Type and kind.....	156	7	2
Productivity.....	142	26	4
Fertility and acidity (include references to testing the soil and what the soil needs)..	110	97	13
Drainage and tiling.....	128	24	6
Moisture.....	9	3	0
History of the soil.....	16	1	0



TABLE 2A—Continued

Type of information	In organizing farm	In operating farm	
		For profit	To maximize satisfaction for entire family
INPUTS—Continued	Number	Number	Number
<b>Soils—Continued</b>			
Adaptability.....	142	24	4
Management practices.....	9	87	19
Tillage practices.....	13	35	1
Erosion.....	7	3	0
Sub total.....	895	339	54
<b>Other inputs (crop, livestock or soil unspecified)</b>			
Labor uses.....	0	0	7
Weather.....	89	53	5
Farm buildings.....	92	16	5
Fencing.....	47	5	1
Machinery and equipment.....	19	52	9
Diseases and insects.....	4	33	8
Others.....	10	11	0
Maintenance and improvements of the farm.....	0	0	2
Sub total.....	261	170	37
<b>Crops</b>			
General.....	1	2	0
Yields.....	28	10	3
Kinds.....	35	15	6
<b>Livestock</b>			
General and others.....	0	2	0
Kinds.....	5	5	0
Productive capacity.....	0	9	0
Marketing weights.....	0	5	0
Other output information.....	1	7	2
Sub total.....	70	55	11
<b>Other production information</b>			
Farming practices of neighbors.....	13	0	0
Farming in neighborhood, community and area.....	20	0	0
Livestock (no input-output distinction).....	2	13	0
Crops (no input-output distinction).....	5	6	2
Marketing process.....	4	19	5
General history of the farm.....	30	1	0
Remaining unclassifiable production information.....	1	7	2
Farm composition (e.g., size, acres of crops, land, cleared land and waste land.....	14	0	0
Type of farming area.....	37	0	0

**TABLE 2A—Concluded**

Type of information	In organizing farm	In operating farm	
		For profit	To maximize satisfaction for entire family
	Number	Number	Number
<b>Other production information—Continued</b>			
Kind and quality of farm.....	22	0	0
Production methods and factors (unspecified)	0	18	0
Enterprise combinations (e.g. diversification, crop, and livestock program).....	0	16	7
Production practices of others in the area...	0	12	0
Sub total.....	148	92	16
Grand total.....	1,565	1,562	230
No production information mentioned.....	35	288	635
Number of farmers interviewed.....	534	903	903

**TABLE 3A—Types of information on new technology used by farmers in organizing farm, in operating farm to maximize profit and in operating farm to maximize satisfaction for the entire family**

Type of information	In organizing farm	In operating farm	
		For profit	To maximize satisfaction for entire family
	Number	Number	Number
Disease, insect and weed control.....	0	45	10
Feeds and feeding rates.....	1	50	6
Machinery, equipment, and labor saving devices and practices.....	1	130	36
Fertilizers and fertilizer rates.....	0	70	9
Crop and soil production practices (includes varieties and kinds).....	0	201	27
Livestock production practices (includes va- rieties and kinds).....	1	70	8
Buildings, fencing and nonland real estate....	1	8	2
Other specific new developments.....	0	68	5
<b>Total.....</b>	<b>4</b>	<b>642</b>	<b>103</b>
<b>No new technological information mentioned ..</b>	<b>526</b>	<b>506</b>	<b>473</b>
<b>Number of farmers interviewed.....</b>	<b>534</b>	<b>903</b>	<b>903</b>

**TABLE 4A—Types of information on farmer or self, self-environment of farm, other individuals, neighbors as a group and community populace as a group, used by farmers in organizing farms, in operating farms to maximize profit and in operating farms to maximize satisfaction for the entire family**

Type of information	In organizing farm	In operating farm	
		For profit	To maximize satisfaction for entire family
	Number	Number	Number
<b>Farmer or self</b>			
General personal qualities (e.g., ability to get along with people, reliability, honesty, moral standards, citizenship).....	30	1	15
Education and experience.....	31	8	0
Credit rating and financial status.....	31	3	3
Work attitudes and orientation.....	17	0	1
Managerial capacity.....	22	12	24
Health and age.....	4	1	2
Religion and religious practices.....	4	0	12
General and specific aspects of his preference system.....	39	5	15
Others.....	5	1	7
Sub total.....	183	31	79
<b>Self-environment of farm</b>			
Family characteristics (e.g., presence of family, size, preferences).....	19	0	83
Location and setting.....	53	0	16
Others.....	1	0	24
Sub total.....	73	0	123
<b>Other individuals</b>			
Landlords.....	5	8	1
Businessmen.....	6	2	1
Others.....	4	4	2
Sub total.....	15	14	4
<b>Neighbors as a group</b>			
Sociability (e.g., clannishness, friendliness, neighboring activities).....	27	2	13
Status (e.g., religion, economic position, quality).....	21	0	5
Cooperativeness in work and emergency situations.....	8	1	3
Others (e.g. progressiveness).....	0	0	8
General or unspecified.....	51	2	11
Sub total.....	107	5	40

**TABLE 4A—Concluded**

Type of information	In organizing farm	In operating farm	
		For profit	To maximize satisfaction for entire family
	Number	Number	Number
<b>Community populace</b>			
Sociability.....	11	0	0
Status.....	24	0	2
Others.....	6	0	1
General or unspecified.....	33	0	4
Information on other aspects of local human relationships.....	3	0	2
<b>Sub total.....</b>	<b>77</b>	<b>0</b>	<b>9</b>
<b>Grand total.....</b>	<b>455</b>	<b>50</b>	<b>255</b>
<b>No such information mentioned.....</b>	<b>261</b>	<b>849</b>	<b>552</b>
<b>Number of farmers interviewed.....</b>	<b>534</b>	<b>903</b>	<b>903</b>

**TABLE 5A—Types of information on institutions used by farmers in organizing farm, in operating farm to maximize profit and in operating farm to maximize satisfaction for the entire family**

Type of information	In organizing farm	In operating farm	
		For profit	To maximize satisfaction for entire family
	Number	Number	Number
Neighborhood.....	29	1	6
Community as a unit			
General structure and service facilities (excludes schools, churches, markets, roads and recreational facilities).....	47	5	11
Customs.....	9	0	3
Activities.....	6	1	88
Status and control mechanisms (e.g., prosperity, morality, management).....	10	0	10
General or unspecified.....	38	0	5
Sub total.....	139	7	123
School (includes colleges)			
Kind and quality.....	80	0	47
Distance, location, accessibility.....	47	0	3
Activities.....	1	1	57
Other specific.....	3	1	15
General or unspecified.....	113	1	81
Sub total.....	244	3	203
Churches			
Kind and quality.....	68	0	22
Distance and location.....	29	0	3
Activities.....	7	1	76
Other specific.....	1	0	10
General or unspecified.....	78	0	61
Sub total.....	183	1	172
Markets			
Distance and location.....	66	11	1
Kinds and quality.....	46	28	1
Other specific.....	0	1	0
General or unspecified.....	41	98	13
Sub total.....	153	138	15
Social, recreational and entertainment facilities and activities.....	3	4	106
Transportation systems—Roads.....	82	3	7
Politics and political parties.....	0	16	6
Governmental financing—Taxes.....	25	7	3

TABLE 5A—Concluded

Type of information	In organizing farm	In operating farm	
		For profit	To maximize satisfaction for entire family
	Number	Number	Number
All local and state government and unspecified references to national government and the government.....	1	10	8
National government			
Policies and programs.....	4	72	17
Organizations specified (e.g., 4-H, FFA, SCS).....	2	12	63
Private credit arrangements.....	16	5	1
Tenure arrangements.....	8	0	1
Labor organizations.....	0	0	0
Non-governmental farm organizations (e.g., Farm Bureau, Farmer's Union, Grange)...	2	7	33
Foreign and world news and world affairs.....	0	13	21
Other organizations (characteristics and activities).....	0	0	15
Other information on institutions.....	1	4	7
Labor market and general labor situation.....	8	5	2
Experiment stations and their work.....	0	15	1
Sub total.....	152	173	291
Grand total.....	871	322	804
No such information mentioned.....	186	635	387
Number of farmers interviewed.....	534	903	903

**TABLE 6A—Types of information on analysis used by farmers in organizing farm, in operating farm to maximize profit and in operating farm to maximize satisfaction for the entire family**

Type of information	In organizing farm	In operating farm	
		For profit	To maximize satisfaction for entire family
	Number	Number	Number
<b>Ways of analyzing</b>			
How to relate farming activities to family satisfaction.....	0	0	6
How to figure, reduce and/or carry costs...	1	4	1
How to figure, improve and/or maximize profits.....	2	2	0
How to diversify and/or integrate enterprize.	0	2	0
How to relate, spread or shave farm operating function.....	0	2	1
General requests for ways of analyzing relationships among information categories.	1	3	1
<b>Sub total.....</b>	<b>4</b>	<b>13</b>	<b>9</b>
<b>Advice to analyze</b>			
Keep records and keep books (so that analysis will be possible).....	0	28	6
Statements to analyze.....	1	4	1
<b>Sub total.....</b>	<b>1</b>	<b>32</b>	<b>7</b>
<b>Grand total.....</b>	<b>5</b>	<b>45</b>	<b>16</b>
<b>No such information mentioned.....</b>	<b>525</b>	<b>851</b>	<b>733</b>
<b>Number of farmers interviewed.....</b>	<b>534</b>	<b>903</b>	<b>903</b>



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