INTERPERSONAL COMMUNICATION AND THE ADOPTION OF INNOVATIONS AMONG STRAWBERRY GROWERS IN THE LOWER FRASER VALLEY

by

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ABSTRACT

This study is the second in a series of rural sociological studies relevant to the adoption of innovations by farmers in the Lower Fraser Valley of British Columbia. The adoption performance of strawberry growers, as measured by an adoption score computed for each respondent, was used for classifying the individuals into adopter categories. This classification was then used as the basis for further analysis of: (1) the relationship between adoption and socio-economic characteristics, (2) the relationship between ethnicity and adoption, (3) the differential use of information sources, (4) the innovation response state, (5) reasons for delay in the adoption process and for rejection.

The level of adoption, as indicated by four adopter categories, correlated positively and significantly with social participation, size of farm, acreage in strawberry, gross income from agriculture, strawberry, and from other agricultural enterprises; the amount of farm labour employed for harvesting, and estimated farm value. Age was negatively correlated with adoption. There was no significant relationship with a number of other variables studied.

Extension contact was the most important single variable which showed a significant positive association with adoption. The relationship was strongest for personal contact with the District Horticulturist.

A relatively high level of practice adoption is indicated

by an average of 4.12 adoptions from the total of 6 innovations studied. Characteristics of the innovation accounted for almost one-half of the reasons for delay, and about one-third for rejection. Situational factors, relevant to the particular circumstances of the respondents, were the reasons given most frequently, especially among the early adopters.

Ethnic groupings included Menonites, Japanese and "Other" respondents. Differences were significant for 16 socio-economic characteristics, besides differential levels of extension contact. Japanese, who were the most experienced growers, were characterized by the lowest levels of adoption performance and extension contact. Menonite growers were the least educated and were intermediate in practice adoption.

Information sources were classified into two categories and personal sources were the most frequently used by all adopter categories in both. When classified by Origin, Government sources were second in importance, followed by Commercial and Farm Organization. When classified by the Nature of the Activity, on the other hand, the order of importance was individual instructional, instructional group and mass media.

The study included an analysis of the patterns of interpersonal communication among the growers, both in their search for advice and in informal visiting on a friendship basis. Opinion leaders, identified by sociometric procedures, were mostly early adopters. Sociometric choices extended predominantly to growers in higher adopter categories, or to others at the same level of adoption. There were no dyadic relationships extending from Japanese respondents to other ethnic groups. Selection by other ethnic groups among themselves also did not exceed 30 per cent in any instance. The distribution of sociometric choices either by adopter category or ethnic origin were statistically significant. Interpersonal communication among growers was also largely confined to growers in the community network.

Opinion leadership was positively associated with high socio-economic status, including high social participation, and the ability to keep informed on aspects of their commercial enterprise from sources close to the origin of new information.

TABLE OF CONTENTS

PAGE

LIST OF TABLES

LIST OF FIGURES

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CHAPTER I

INTRODUCTION

The continued modernization of the agricultural sector of the Canadian economy is reflected in increasing capitalization and market orientation.[1] The pace at which agricultural development follows progress in industry, however, is governed to some extent by the rate at which the farmer accepts and integrates into his commercial enterprise, the technology released by scientific advances.

The extent to which innovations are adopted by a group of farmers is, in the first instance, a measure of the success of agricultural extension with its clientele. The adoption of suitable innovations will, in large measure, determine the progress of the farming enterprise, the increase in agricultural income and the relative improvement in the socio-economic status of the farm family. Available data indicates that on a national scale, the "modern" farmers in Canada are but a small proportion, compared to the large number of "small, uneconomic, low income, low productivity"[2] farm units.

Research has shown that farm practice adoption is related to a number of socio-economic characteristics, cultural

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[1]Helen C. Abel, "The Social Consequences of the Modernization of Agriculture," Rural Canada in Transition, Marc-Adélard Tremblay and Walter J. Anderson, editors (Publication No. 6 Ottawa: Agricultural Economics Research Council of Canada, 1966), p. 195.

[2]*Ibid.*, pp. 205, 214.

influences, and the effectiveness of agricultural extension programs. Relative to each social system, the successful diffusion of innovations is further dependent upon the effective utilization of interpersonal communication networks and the legitimization process within the existing leadership structure. It is necessary, however, for the researcher to continue the analysis of these various aspects of farmer populations, so as to provide the necessary data on which the agricultural extension agent can formulate sound programs for the promotion of change.

I. PURPOSE OF THE STUDY

This study is intended to investigate a number of different aspects relevant to strawberry growers in the Lower Fraser Valley of British Columbia. Basic socio-economic data on each respondent included 40 variables which previous studies have indicated as having some measure of significance to adoption performance. These covered personal data relevant to the life cycle of the individual, information on economic characteristics of the farm enterprise, social participation, indices of extension contact between the respondent and the District Horticulturist, together with his contact with other agricultural agents. Of particular relevance to the study of the adoption of innovations, responses were elicited to determine the extent of adoption or non-adoption, the sources of information used, reasons for delay in the adoption process, and for rejection.

Considerable emphasis is given to interpersonal communication. Sociometric questions were used to obtain further information which provided a basis for examing patterns of the interpersonal network. The overall potential for information transfer was also considered, both on a general social basis and with particular reference to the diffusion of innovations within the social system.

In addition, the strawberry farmers in the area comprise a number of different ethnic groups. A point of interest, therefore, is whether there is evidence of significant differences in the variables under investigation, arising out of differences in ethnic background.

II. THE SETTING - THE LOWER FRASER VALLEY

The Fraser Valley is physiographically a portion of what is termed the Lower Coast Area in British Columbia. It is 20 miles wide at the mouth and extends eastward from the Strait of Georgia for about 100 miles, converging gradually with the Fraser Canyon at the town of Hope. The area is bounded by the Coast Mountains on the north, the Cascade Mountains in the East and the International Boundary (49th Parallel) in the South. The general terrain of the valley is flat to undulating with a few hills exceeding 1000 feet in the vicinity of Chilliwack and Agassiz; the lowlands range in elevation from sea level to 70 feet in the East.

The area is characterized by a marine climate with dry warm summers and humid mild winters. Mean January and July temperatures range from 32°F to 37°F and 62°F to 65°F respectively; there is no marked difference in the range between summer and winter temperatures. The number of frost free days average between 180 to 214, but these long periods tend to be offset by cool summers which restrict the growing of heat-loving crops.[3] Annual precipitation reflects the effects of the Coast and Cascade mountains, and increases eastward. This is shown by the annual rainfall records of 36.3, 58.6, 62.6 and 64.4 inches for Ladner, Abbotsford, Mission and Agassiz respectively.[4] Heaviest precipitation is recorded in autumn and winter; the summer months tend to be dry with an average rarely exceeding 13 inches during May to September.

The lowland soils are predominantly recent silty and clayey flood plain and deltaic deposits of the Fraser, Chilliwack, Pitt, Nikomekl and Serpentine rivers. The higher portions of the Fraser Valley in the vicinity of Maple Ridge, Mission, Abbotsford and Matsqui are occupied by forest upland

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[3]Most of the general data on the area is obtained from: Province of British Columbia, Department of Lands, Forests and Water Resources, The Lower Coast Bulletin Area - Bulletin Area No. 3. Queen's Printer, Victoria, B. C., 1962.

[4]Province of British Columbia, Department of Agriculture, Agricultural Outlook Conference, 1964, pp. 74-92.

soils. While not as fertile as the alluvial deposits, they have good potential carrying capacity; they are, however, limited by droughtiness in the dry summer period. Large acreages of peat and muck soils also exist, but these vary in their suitability for agriculture.

While the Lower Fraser Valley is endowed with many favourable factors for agricultural development, there are certain inherent climatic and physical factors which necessitate definite management techniques. High water tables and slow percolation, especially during the winter months, result in poor drainage and limit the productivity of large portions of the fertile lowland soils. During the summer, many of the Gleysolic and higher textured Regosolic soils require supplemental irrigation. This is partly due to the inadequate rainfall received during the rainy season, even though the total annual precipitation is in excess of crop requirements. It is estimated that in 8 out of 10 years, irrigation would benefit most crops.[5]

Agricultural Development

In 1834, the Hudson Bay Co. established the first farm in the Fraser Valley at Fort Langley. Agriculture in the area received its early impetus from the mining camps of the Cariboo gold rush, logging operations and the developing centres of Victoria, Vancouver and New Westminster. Over a 50 year period,

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[5] *Loc. cit.*

agriculture spread to all the districts in the valley. Around the turn of the century, the original agricultural pattern based on grain, butter, root crops and beef changed with greater emphasis on root crops and dairying.[6]

The highly diversified agriculture of the valley ranges from part time subsistence farms through dairying, poultry, forage and grain, potatoes, vegetables, green houses, nursery products, seeds, tree fruits, fur breeding, specialized horticultural and small fruit, including strawberry production. Agriculture in the area is vital to the economy of the province; its diversification is largely responsible for the fact that there is more variety to the agriculture of British Columbia compared to any other province in Canada.[7]

Statistical data show clearly the relative importance of agriculture in the Fraser Valley to the economy of the province. Of the 2 per cent of the total land area in the province which can be classified as farm land, 28.9 per cent (0.6 of the total land area) is improved land. Only 17.2 per cent of the farm land (0.34 per cent of the total land area) is cropped, and the Fraser Valley in 1964 was estimated to have 37 per cent of the total number of farms.[8]

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[6]Province of British Columbia, Department of Agriculture, Agricultural Outlook Conference, 1966, p. 92.

[7]Transactions of the Fifteenth British Columbia Natural Resources Conference, February 26-28, 1964, Victoria, British Columbia, p. 83.

[8]J. S. Allin, "Inventory of Agriculture in British Columbia," Inventory of the Natural Resources of British Columbia, 1964, p. 142.

In 1964, it was estimated that the valley accounted for 55.7 per cent of the total population among 10 major regions in British Columbia. Its farm population was equivalent to 36.3 per cent of the total farm population and 3.4 per cent of the total provincial population.[9]

The intensity and prosperity of farming in the Fraser Valley derives an advantage from its close location and excellent communication facilities with the large metropolitan area of Vancouver which to some extent guarantees a ready market and high prices. The industry provides employment for one out of every five persons in the area. The metropolitan area is supplied with all its fluid milk and poultry, and most of its eggs, vegetables and small fruit from this region.[10] In 1961, 49.2 per cent of the total income from agriculture in the province originated in the Fraser Valley.[11] Also, the area accounted for more than 60 per cent of the total production of dairying, poultry and fur bearers, the major share of small fruit production, and more than 60 per cent of special horticultural products and vegetables.[12]

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[9] Loc. cit.

[10] Province of British Columbia, Department of Agriculture, Agricultural Outlook Conference, 1966, p. 94.

[11] Transactions of the Fifteenth British Columbia Natural Resources Conference, op. cit. p. 83.

[12] J. S. Allin, op. cit. p. 142.

A rising population, urban sprawl and the inevitable demand for land from non-agricultural industry has caused land values to soar. Alternative highly paid employment has contributed to rising labour costs. Fraser Valley farmers have been forced, therefore, to seek means of reducing their labour input in farm enterprise. Labour employed in agriculture declined from 13.1 per cent of the total labour force in 1941 to less than 4.0 per cent in 1961.[13] In addition, the high cost of farm buildings and equipment, and increasing foreign competition is a clear indication that survival in agriculture is only possible with high level management and the advantageous use of modern technology.

III. THE STRAWBERRY INDUSTRY

The commercial production of strawberries in the Fraser Valley started before the First World War. Initial production started in Burnaby; later on it spread to Surrey, and to Haney and Mission on the north side of the Fraser river. Production up to this time remained largely with Japanese growers until they were evacuated to the interior during the Second World War. Today's production is more widespread and is concentrated on the south side of the Fraser Valley;[14] there is also greater

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[13] _Ibid_., p. 153.

[14] I. C. Carne et. al., _Second Approximation Report, Agriculture in the Fraser Valley, 1964-1984_, British Columbia Department of Agriculture, October, 1966, p. 31.

ethnic variety among the population of growers, including immigrants from Eastern Europe, Russia, The British Isles, Scandinavia and Japan.

The major strawberry production areas of the Fraser Valley, in order of importance are: (1) Langley (2) Richmond (3) Matsqui - including Abbotsford, Clearbrook and Bradner - Mt. Lehman (4) Sumas and Chilliwack Municipalities - including Yarrow, Sardis, Chilliwack and Rosedale (5) other areas combined - including Delta, Ladner and the area north of the Fraser River from Haney to Agassiz.[15]

Carne[16] has cited some of the major factors which account for the differential importance of strawberry production in these areas. The Abbotsford-Langley-Aldergrove region contains soil types with high fertility and good drainage which make them most suitable for economic production; the need for irrigation, however, is evident. Heavier texture and high water tables of soils in the Matsqui Prairie area limit root development and the use of wheeled equipment. Soil limitations and urbanization pressure has prevented large scale expansion in the Surrey area.

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[15]British Columbia, Department of Agriculture, Horticultural Branch, <u>1962 Small Fruit Surrey</u>.

[16]I. Carne, "Strawberry Production in the Fraser Valley (Unpublished, Department of Agriculture, Abbotsford, British Columbia, 1959), (Mimeographed).

Data on crop acreages indicate considerable fluctuation over the years. The acreage increased from about 1100 acres in 1920 to a peak of 1800 acres in 1922, before declining to about 1400 acres in 1932.[17] The highest acreage ever recorded was 3,170 acres in 1950; this declined to 1,350 acres in 1963. In recent years, the trend is markedly upward again. While earlier on, a decline in tonnage accompanied the decrease in acreage, increased efficiency and higher production was gradually being reflected in the increased tonnage harvested in spite of the continued decline in acreage between 1960 - 1964. Considering data for 1934 and 1964, while there was a 35.8 per cent drop in acreage, the increase in tonnage was 33.0 per cent.[18] Extensive crop damage resulted from the 1964 freeze out, and only 250 acres are reported to have survived. However, rapid recovery has occurred and the estimated acreages for harvesting in 1966 and 1967 in the Fraser Valley was 1,250 and 1,650 acres respectively.[19]

Data from a 1957 survey indicated that the average strawberry acreage per grower was 2.09 acres. Almost one-half (42.4 per cent) of the growers grew less than one acre; 72.9

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[17] Ibid.

[18] I. C. Carne et. al., op. cit., pp. 31-32.

[19] A. C. Carter, A Report on the Small Fruit Industry in British Columbia, Department of Agriculture, Horticultural Branch, British Columbia, 1966, p. 2.

per cent were growing 2 acres or less. A mere 7 per cent grew 5 acres or more.

At the time, most of the growers with 1 - 2 acres were either elderly or retired or part-time farmers who sought to supplement their off-farm income. Those with 2 - 5 acres were usually combining strawberries with dairy or poultry enterprises. Operators with larger acreages were frequently full-time small fruit operators who attempted to obtain their full income from small fruit, which often included raspberries.[20]

Considerable changes have taken place in the industry in recent years. Economic conditions have brought typical agricultural trends to the industry. A reduction in the number of growers, an increase in the average size of holding and more intensive cultivation are today characteristic of strawberry production. Compared to an average yield of $1\frac{1}{2}$ tons per acre in the 1920's, today's average exceeds 3 tons per acre.[21] Carter[22] reported an average yield of 6 tons per acre for 1966.

According to the 1961 Census,[23] small fruit production

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[20] I. C. Carne, op. cit.

[21] I. C. Carne et. al., op. cit., p. 31.

[22] A. C. Carter, op. cit., p. 1.

[23] Canada, Dominion Bureau of Statistics, Census of Canada, 1961, Bulletin 5. 3-4.

in the Fraser Valley ranked third in product value among all crop combinations, and eighth among all crop and livestock products. The Fraser Valley, however, generally accounts for 73.3 per cent of the total production and about 75.2 per cent of the total cash income from all small fruit in the province.[24] It is also the most important strawberry producing area in the province. Strawberries have, at least in recent years, been the second most important small fruit crop, after raspberries, both at the provincial level and in the Fraser Valley.[25]

Future production estimates for the valley project increases in this crop ahead of raspberries for 1975 and 1985 by 45 and 70 per cent respectively. Production in 1965 was 4,200 tons valued at 1.3 million dollars; long term projected increases for 1975 and 1985 are 95 per cent and 170 per cent, respectively, more than the 1965 figures.[26] Production in 1984 is estimated to value 3.4 million dollars.[27]

In Canada, strawberries are produced in the Maritimes, Quebec, Ontario and British Columbia. This province accounts for about one-third of both the total Canadian production and the processed crop. Approximately the same proportion of

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[24] J. S. Allin, _op_. _cit_., p. 142.

[25] A. C. Carter, _op_. _cit_.

[26] Province of British Columbia, Department of Agriculture, _Agricultural Outlook Conference_, 1967, pp. 52-97.

[27] I. C. Carne, _et_. _al_., p. 67.

retail frozen packs also originates in the province. Provincial producers face competition in the market for fresh fruit and processed products, both from Eastern Canada and from the U.S.A. and Mexico.[28]

The prices received by strawberry farmers are of major importance in the overall economic situation. The 1966 price of 15 cents per lb. was lower than the price received 20 years earlier (18-20 cents per lb.).[29]

IV. AGRICULTURAL EXTENSION

The Provincial Department of Agriculture has a considerable organization within the Fraser Valley. District Officers are located at Abbotsford, New Westminster, Cloverdale, Mission and Chilliwack. In addition, the Canada Department of Agriculture operates a research station at Agassiz which is staffed with two horticulturists and a plant breeder. Advisory work on strawberries is largely the responsibility of two District Horticulturists stationed at New Westminster and Abbotsford.

For official purposes, the District Horticulturist at Abbotsford is a specialist in strawberries and raspberries; he also has the responsibility of administering the certification program aimed at disease control. The officer at New Westminster is the specialist in blueberries and cranberries; but is also

[28] Agricultural Outlook Conference, 1966, op. cit., pp. 100-147.

[29] I. C. Carne et. al., op. cit., p. 31.

responsible for routine advisory requests on strawberries. This division of responsibility has been recognized policy for the past 10 years.

Extension publications for strawberry growers, therefore, originate from the Abbotsford office. Over the past 7 years, publications on various aspects of strawberry cultivation—pest and disease control, varieties, weed-control, fertilizer application and other aspects of crop management—have been prepared at this office.

Research bulletins on varieties and on pest and disease control have also been available from the Agassiz research station. Newsletters containing information on production and marketing of various crops, including strawberries, are also sent out by the Pacific Cooperative Union which is based at Mission. It is no doubt reasonable to assume that at one time or another, any of the 22 advisory and specialist officers stationed in the Fraser Valley may have had some limited measure of contact with at least some of the growers. This would depend upon the type of mixed farming enterprise or the nature of any specific problem which may have necessitated personal investigation by one or more specialists.

The Lower Mainland Horticultural Improvement Association

The Lower Mainland Horticultural Improvement Association was formed in 1955. Its purpose is mainly "educational", and its objective is to promote "the permanent improvement of crop yield" by the adoption among horticultural growers of improved practices and crop varieties. The Association aims at co-operation with the Agassiz Research Station and all other agricultural agencies. All residents of the Lower Mainland who are actively engaged in the production or processing of horticultural crops are eligible for membership.[30] All strawberry growers would, therefore, normally qualify for membership.

The total paid up membership at February, 1967 is 260.[31] Included in the educational program is an annual 2-day Short Course at which a number of talks on various aspects of crop production and management are given by experts in the field. The published proceedings are made available free to paid-up or active financial members, but are also available on sale.[32]

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[30] Lower Mainland Horticultural Improvement Association, By-Laws.

[31] Proceedings of the Lower Mainland Horticultural Improvement Association, Ninth Annual Growers Short Course, February 15-16, 1967, Abbotsford, British Columbia, pp. 86-94.

[32] Ibid.

CHAPTER II

REVIEW OF THE LITERATURE

The acceptance or adoption of a new idea or innovation is seldom either an immediate occurrence or a unit act. In terms of the individual, Bohlen[1] refers to the relevant circumstances as "a complex pattern of mental activities combined with actions taken before an individual fully accepts or adopts a new idea". Following the now classical study by Ryan and Gross[2] with hybrid seed corn in 1943, considerable research has accumulated relevant to the diffusion and adoption of innovations, especially within agricultural communities, and Rogers[3] noted almost 300 studies since this initial investigation.

The adoption-diffusion concept has provided one of the major frameworks within which sociologists have "conceptualized and studied instigated social change".[4] Considerable emphasis has been placed on the individual as a decision maker, and he provides the basis for measurement and comparison, although research has examined and attempted to explain adoption

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[1] Joe M. Bohlen, "The Adoption and Diffusion of Ideas in Agriculture," Our Changing Rural Society: Perspectives and Trends, James H. Copp, editor, (Ames, Iowa: Iowa State University Press, 1964), p. 268.

[2] Bryce Ryan and Neal C. Gross, "The Diffusion of Hybrid Seed Corn in Two Iowa Communities," Rural Sociology, 8:15-24, March, 1943.

[3] Everett M. Rogers, Diffusion of Innovations, (New York: The Free Press of Glencoe, 1962), p. 4.

[4] J. M. Bohlen, op. cit., p. 265.

behaviour within the focus of cultural, economic and other variables.

I. THE ADOPTION PROCESS AND ADOPTER CATEGORIES

The Adoption Process

The definition of the adoption process, as previously cited, indicates clearly a time lag in the decision-making activity of the individual against whom the campaign for a change in opinion, attitude and action is directed. Rogers[5] cites the suggestion by Wilkening of three major forms of activity involved; - learning, decision and action.

In 1955, the Subcommittee for the Study of the Diffusion of Farm Practices[6] published the 5-stage process. Beal and Bohlen[7] in a later paper gave further insight into these stages in their simplified illustration of findings from 35 research studies over a 20 year period. The five stages are Awareness, Interest, Evaluation, Trial and Adoption.

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[5]E. M. Rogers, op. cit., p. 80.

[6]Subcommittee for the Study of Diffusion of Farm Practices, How Farm People Accept New Ideas, (Special Report No. 15, Agricultural Extension Service, Iowa State College, Ames, Iowa, November, 1955).

[7]George M. Beal and Joe M. Bohlen, The Diffusion Process, (Special Report No. 18, Agricultural Extension Service, Iowa State College, Ames, March, 1957).

Beal et. al.[8] established the validity of the concept of stages in the adoption process. In their field study, it was evident that the respondents were aware of having gone through meaningful stages in their decision to adopt the innovation. Rogers[9] has emphasized that the 5-stage model is an arbitrary subdivision for conceptual purposes, and is based on apparent evidence of five main functions being involved in the adoption process. He suggests that any further subdivision into more or less stages should only be undertaken if the result is more fruitful analysis. Concerning the five stage process, he states:

> until more evidence is available, it seems conceptually clear and practically sound to utilize the five-stage adoption process[10]

In general, it is the most widely accepted model used by rural sociologists and other social scientists.[11]

In recent times, however, researchers have questioned specifically the validity of this 5-stage model. Waisanen[12] has proposed the inclusion of two additional stages. The first is a "generalized interest" stage which caters for change

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[8] George M. Beal, Everett M. Rogers and Joe M. Bohlen, "Validity of the Concept of Stages in the Adoption Process", <u>Rural Sociology</u>, 22:166-168, June, 1957.

[9] E. M. Rogers, <u>op. cit</u>., p. 79. [10] <u>Ibid</u>., p. 98.

[11] Joe M. Bohlen, <u>op. cit</u>., p. 269.

[12] F. B. Waisanen, "Change Orientation and the Adoption Process", D. T. Myren, editor (<u>First Inter-American Research Symposium on the Role of Communications in Agricultural Development</u>, Mexico City, Mexico, October, 1964), pp. 85-87.

orientation in terms of a general "receptivity" to innovations. He makes the point that the "evaluation" stage, in the popular 5-stage model, involves a value prediction by the individual when he lacks personally acquired evidence. As a result, it is suggested that the evaluation stage should be followed by a "trial evaluation" stage, which permits a re-examination of the "prediction inherent in the earlier evaluation", and which is not based on actual acquired evidence.

Campbell[13] suggests that the traditional 5-stage model is too simple to "fit" many of the decisions involved in the adoption of innovations. His paradigm of individual decision-making and adoption is constructed around two dichotomies. These are rational or non-rational, and innovation or problem-oriented decisions, thus providing four "ideal type" processes when we combine the two dimensions in alternative arrangements.

Campbell[14] further questions the traditional assumption of rationality in the current diffusion model which projects adoption as the "natural result" of evaluation, thereby implying rationality. He points out that rejection of an innovation may also be the result of a rational decision, and that the "rational traditional" model does not allow for rational and non-rational behaviour in terms of both adoption and non-adoption.

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[13] Rex R. Campbell, "A Suggested Paradigm of the Individual Adoption Process", Rural Sociology 31:458-466, December, 1966.

[14] Ibid.

For the purpose of this study, however, the traditional 5-stage model provides the basis for analysis of the results. These five stages are as follows:

1. Awareness: The individual first learns about a new idea, practice or product; it is one of exposure characterised by incomplete information. While often conceded as a "random or nonpurposive occurrence", it may well be at times the result of positive effort, thereby not being entirely accidental.

2. Interest (or Information): The individual becomes psychologically involved; he is favourably disposed and seeks additional information.

3. Evaluation: The stage has also been called the "mental trial" stage; the individual considers the information and evidence previously obtained in terms of alternatives relevant to his own present and perhaps future situation—resources of land, labour, capital and his management ability. If his overall decision is a positive one, he then considers "physical trial".

4. Trial: Actual trial of the innovation is involved. Usually, trial is on a small scale, and successive trials may occur, each one characterised by an increase in the extent of use. This stage provides empirical evidence in terms of preliminary obstacles to full scale adoption.

5. Adoption: A decision is made to continue the full use of the innovation, and the practice is, therefore, incorporated as an integral part of the particular operation.

Adopter Categories

Researchers have consistently attempted to classify the individuals involved in the adoption process in terms of their relative positions on a continuum relevant to the adoption of a specific innovation or set of innovations over time. Rogers[15] emphasizes the utility of this concept in terms of communicating research findings and their implications to lay audiences and change agents.

While there has been considerable variation in the terminology used to identify selected subdivisions of individuals within the social system, the categories developed by Rogers[16] are the most widely accepted. The major criterion used for this purpose is "innovativeness".[17] His system of adopter categorization is based on the finding that the adoption of innovations either follows the normal distribution or closely approximates normality over time.[18] The individuals within the social system are partitioned on the basis of their earliness to adopt the innovation or set of innovations, which in turn, determines their relative position about the mean of the normal distribution. The five categories[19] are:

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[15] E. M. Rogers, "Categorizing the Adopters of Agricultural Practices", Rural Sociology, 23:345-354, December, 1958.

[16] Ibid.

[17] E. M. Rogers, Diffusion of Innovations, op. cit., p. 159.

[18] Ibid., p. 161.

[19] Ibid., p. 162.

1.	innovators	-	the first 2.5 per cent
2.	early adopter	-	the next 13.5 per cent
3.	early majority	-	the next 34.0 per cent
4.	late majority	-	the next 34.0 per cent
5.	laggards	-	the final 16.0 per cent

Comprehensive reviews[20] have been made of the personal and social characteristics most typical of these various categories. A few of the major attributes relevant to these categories, as indicated by Rogers,[21] are as follows:

1. Innovators: Venturesomeness is an outstanding characteristic; they tend to have cosmopolite social relationships and access to substantial financial resources.

2. Early Adopters: They tend to be more integrated in the local social system; are highly respected and possess the greatest degree of opinion leadership.

3. Early Majority: They are characterized by a noticeable degree of deliberation and tend to adopt new ideas only just before the average member of the social system. They follow, but seldom lead in the adoption process.

4. Late Majority: Skepticism is their outstanding characteristic.

5. Laggards: They are traditional, and are the last to adopt an innovation; they tend to be the most localite, and their point of reference is the past.

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[20]Ibid., pp. 168-189, See also J. M. Bohlen, op. cit., pp. 276-281.

[21]E. M. Rogers, op. cit., pp. 168-189.

Characteristics of Adopter Categories

The characteristics of individual farmers relevant to their classification in adopter categories have been continuously investigated. Rogers'[22] generalizations indicate that early adopters, compared to later adopters, are younger in age and are characterized by higher social status, a more favourable financial position, more specialized operations, a different type of mental ability, the utilization of a greater number of different information sources which are in closer contact with the origin of new ideas, cosmopoliteness and the greater use of more impersonal and cosmopolite sources of information.

Bohlen,[23] in a more recent review of the characteristics of innovators and early adopters, also points out that they are characterized by greater emphasis on economic profit maximization, greater willingness to take risk, shorter adoption periods, less concern about the trustworthiness of an information source as distinct from the supporting expertise, greater participation in secular and Gesellschaft systems as distinct from sacred and Gemeinschaft systems, and a higher professional orientation towards farming.

Research findings, however, have not been in total agreement on all aspects of socio-economic variables. Havens,[24] for

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[22] E. M. Rogers, op. cit., p. 313.

[23] J. M. Bohler, op. cit., pp. 279-280.

[24] A. E. Havens, "Increasing the Effectiveness of Predicting Innovativeness", Rural Sociology, 30:150-165, June, 1965.

example, examined a number of variables which previous researchers had found to be significantly associated with adoption. Among those not significant in his analysis were acreage farmed, rental status, years in farming and formal education. Education, a single dimension of social status, has been reported as being associated with adoption in many studies.[25] Leuthold[26] found that education of the farm wife was systematically associated with early acceptance of practice.

It would seem, however, that in many instances, age may be the determining factor in education levels, as shown by Lionberger.[27] Both Coughenour[28] and Photiadas[29] have clearly shown that the impact of formal general education is largely in terms of its dimensional relationship to socio-economic status, which is influential in determining the measure of contact with institutional sources of information.

Very little attention has been given to the specificity of educational experience and adoption tendency. Verner and

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[25] E. M. Rogers, op. cit., p. 175.

[26] Frank O. Leuthold, Communication and Diffusion of Improved Farm Practices in Two Northern Saskatchewan Farm Communities, Canadian Centre for Community Studies, Saskatoon, Saskatchewan, 1966, p. 121.

[27] Herbert F. Lionberger, Low Income Farmers in Missouri, University of Missouri, College of Agriculture, Agricultural Experiment Station, Columbia, April, 1948.

[28] C. Milton Coughenour, "The Functioning of Farmers' Characteristics in Relation to Contact with Media and Practice Adoption", Rural Sociology, 25:283-297, June, 1960.

[29] J. D. Photiadas, "Motivation, Contacts and Technological Change", Rural Sociology, 27:316-326, September, 1962.

Millerd[30] isolated specifically, adult education as an independent variable. They found the highest significance with adult education activity specifically directed at the farmer population. The sum total of agricultural training—high school, university and adult education—was more significant than formal education by itself.

Characteristics of Innovations

It would seem that the economic motive, or profitability, cannot by itself ensure the adoption of innovations for the majority of farmers. According to Bohlen,[31] acceptance of an innovation involves a reorientation of values on the part of the individual; alteration and substitution of attitudes and beliefs may become necessary. Adoption behaviour has been found to vary with types of practices. Rogers[32] suggests five major characteristics which may be relevant to practice adoption:

(1) relative advantage - the degree to which an innovation is superior to ideas it supersedes.

(2) compatibility - the degree to which it is consistent with existing values and past experiences of the adopter.

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[30] Coolie Verner and Frank W. Millerd, Adult Education and the Adoption of Innovations by Orchardists in the Okanagan Valley of British Columbia, Department of Agricultural Economics, The University of British Columbia, Vancouver, B.C., 1966 (Rural Sociological Monograph No. 1).

[31] J. M. Bohlen, op. cit., p. 272.

[32] E. M. Rogers, op. cit., pp. 124-133.

(3) complexity - relative difficulty to understand and use.

(4) divisibility - extent to which the nature of the practice permits trial on a limited basis.

(5) communicability - degree to which results can be diffused to others. Between 16 and 60 per cent of variation in adoption has been explained by these various factors either singly or in combination.[33] Fliegel and Kivlin[34] list additional items in a more detailed manner, and include mechanical attraction, initial and continuing cost, saving of time and the saving of physical discomfort.

The Adoption Period

The normality of adoption distributions is related to an established pattern of adoption behaviour among the individuals in the population. The typical pattern is a slow initial start, followed by adoption at an increasing rate until approximately half of the potential adopters have accepted the change, and finally the continuation of acceptance at a decreasing rate.[35] Within any given practice, however, variation in time lag between awareness and adoption is partly explained by

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[33] Ibid., pp. 135-136.

[34] Frederick C. Fliegel and Joseph E. Kivlin, Differences Among Improved Farm Practices as Related to Rates of Adoption, College of Agriculture, Pennsylvania State University, Pennsylvania, 1962 (Bulletin 691).

[35] Herbert F. Lionberger, Adoption of New Ideas and Practices, (Ames, Iowa: Iowa State University Press, 1960), p. 33.

differences in personal and social characteristics of individual adopters.

Research has, in general, isolated two important periods in the adoption process continuum; these are awareness-to-trial and trial-to-adoption. According to Rogers,[36] relatively earlier adopters have a shorter awareness-to-trial period, but a longer trial-to-adoption period compared to later adopters. The longer span in the latter period is apparently explained by a more cautious behaviour as they proceed with adoption in trial installments, in view of the inherent risks involved. The diffusion period or length of the diffusion process, is partly a function of the length of the adoption process.

Rejection and Discontinuance of Practices

Most of the research on the adoption of innovations has been based on a two-way alternative of rational behaviour, as exemplified by adoption, or the non-adoption of the practice. As previously discussed, Campbell[37] has questioned this limited interpretation of rationality.

Rejection is the decision not to adopt the innovation. Rejection may be rational or irrational depending upon the

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[36] E. M. Rogers, *op. cit.*, pp. 113-118.

[37] Rex R. Campbell, *op. cit.*

particular circumstances. Bohlen,[38] and Rogers and Pitzer[39] have emphasized the need for research on this aspect of adoption behaviour.

Discontinuance is the decision to cease use of an innovation after previously adopting it. While the absence of standardized terminology has made comparison between different studies difficult, between 20 to 50 per cent discontinuance has been recorded.[40] Incorrect initial usage or evaluation of trial results may be the causal factor in discontinuance.[41]

Bishop and Coughenour[42] cite a particular study in which adoption and discontinuance occurred at about the same rate. Later adopters, including laggards tend to discontinue practices at double the rate, or more, reported for early adopters.[43,44] Discontinuance is not only the result of economic reasons. Potential discontinuance is higher where the application of the practice requires multiple decisions and where adoption hinges

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[38] J. M. Bohlen, op. cit. p. 284.

[39] E. M. Rogers and R. L. Pitzer, The Adoption of Irrigation by Ohio Farmers, Ohio Agricultural Experiment Station, Wooster, Ohio, 1960 (Research Bulletin 851).

[40] E. M. Rogers, op. cit., pp. 89-90.

[41] F. O. Leuthold, op. cit., p. 112.

[42] R. Bishop and C. M. Coughenour, Discontinuance of Farm Innovations, Department of Agricultural Economics and Rural Sociology, Ohio State University, 1964, (Department Series A.E. 361).

[43] Ibid., p. 4. [44] E. M. Rogers, op. cit., p. 90.

upon complex relations relevant to other farming operations.

Verner and Gubbels[46] investigated the reasons for rejection and discontinuance among dairymen in terms of both adopter categories and stages in the adoption process. About two-thirds of the reasons given relate to characteristics of the innovation; one-third related to situational factors. McMillon[47] cites the reasons given for rejections among dairymen in an Australian study; the lack of knowledge about the particular innovation is very evident.

II. SOURCES OF INFORMATION

In the diffusion research tradition, there has been considerable emphasis on the various sources of information which may be involved at one time or another in the dissemination of information into the cultural system. Katz et. al.[48] have expressed the opinion that there has been excessive

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[46]Coolie Verner and Peter M. Gubbels, The Adoption or Rejection of Innovations by Dairy Farm Operators in the Lower Fraser Valley, Agricultural Economics Research Council of Canada, 1967, p. 56.

[47]Martin B. McMillon, The Sources of Information and Factors Which Influence Farmers in Adopting Recommended Practices in Two New Zealand Counties, Lincoln College, University of New Zealand, July, 1960, (Technical Publication No. 19), pp. 31-36.

[48]Elihu Katz, Martin L. Levin and Herbert Hamilton, "Traditions of Research on the Diffusion of Innovations", American Sociological Review, 28:237-252, April, 1963.

emphasis on channels.[49] The term "channel" is here used in the context of their very comprehensive definition of diffusion:

> diffusion may be characterized as the (1) acceptance (2) over time (3) of some specific item—an idea or practice (4) by individuals, groups or other adopting units, linked (5) to specific channels of communication (6) to a social structure, and (7) to a given system of values, or culture.[50]

Research on this aspect of the adoption-diffusion tradition has shown that there are variations between sources, adopter categories, different practices and between the farmer populations being studied. In cross cultural studies, the availability or non-availability of alternative sources is itself a variable.

Researchers have classified information sources in a variety of ways. Verner and others,[51] however, have used classification systems which encompass all the various subtitles observed in the literature. Their most recent presentation[52] is a two-way alternative system which allows for the classification of a source either in terms of its "origin"—government, commercial, farm organizations or personal—or the "nature of its activity"—personal, mass, instructional group or individual instruction. The first alternative corresponds closely to traditional classification models which

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[49] Ibid., p. 245.

[50] Ibid., p. 240.

[51] C. Verner and F. W. Millerd, op. cit., see also Coolie Verner and Peter M. Gubbels, op. cit.

[52] C. Verner and P. M. Gubbels, op. cit., pp. 29-39.

tend to include mass media, commercial, neighbours and friends and agricultural agencies.[53] The second alternative, however, introduces a new dimension of sophistication by giving consideration to the "specific instructional situation" relevant to directed behavioural change by the farmer client.

The two major dimensions to the use of information sources are reflected by source use at various stages in the adoption process, and between adopter categories. The nature of the specific practice, however, introduces another variable which tends to qualify research findings relevant to any particular study.[54]

From a review of numerous studies, Rogers makes the generalizations:

> impersonal information sources are most important at the awareness stage, and personal sources are most important at the evaluation stage in the adoption process. . . . .
> Cosmopolite information sources are most important at the awareness stage, and localite information sources are most important at the evaluation stage.[55]

In general, personal sources, by means of the interpersonal network, are of especial importance as progress is made through evaluation, trial and adoption.[56] At the trial stage, commercial

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[53]J. M. Bohlen, op. cit., p. 282.

[54]Ibid., p. 281.

[55]E. M. Rogers, op. cit., pp. 99-102.

[56]J. M. Bohlen, op. cit., p. 282.

sources may be important, especially where new equipment may necessitate information on procedure.[57] Leuthold[58] suggests that the relative importance of various sources beyond trial needs further investigation.

When adopter categories are introduced, the analysis of sources of information becomes more specific, and significant differences in communication behaviour are established.[59] According to Rogers,[60] impersonal and cosmopolite sources are more important for relatively earlier adopters. Also, earlier adopters, besides using more sources, maintain a closer contact with the original sources of information. In particular, relatively later adopters place greater reliance on personal sources.[61]

III. INTERPERSONAL COMMUNICATION IN THE DIFFUSION PROCESS

Unlike the adoption process, the emphasis in the diffusion process shifts from the behaviour of a single individual to a range of individuals within the population being studied. Interest is in the diffusion of the innovation from the source to the ultimate users in the social system.[62]

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[57] F. O. Leuthold, *op. cit.*, p. 55.

[58] *Ibid.*

[59] J. M. Bohlen, *op. cit.*, p. 282.

[60] E. M. Rogers, *op. cit.*, p. 181.

[61] *Ibid.*, p. 220. [62] *Ibid.*, pp. 13-18.

The relative importance of inter-personal communication in the diffusion of information has been placed in true perspective by Katz and Lazarsfeld.[63] The proposal of a "two-step flow of communication" implied networks of people, in contrast to the alternative theory of an atomized society manipulated by the mass media. Their attempt to determine relative degrees of personal influence resulted in the isolation of "opinion leaders", who apparently belonged to every level of society and were very much like the people whom they "influence".[64] It was felt that opinion leaders served as an intermediary between the mass media and their "everyday associates."[66]

The concept of opinion leaders demonstrated the existence of "sources of influence which are not inherently relevant to the subject matter at hand".[66] These social contact networks were of considerable importance in the diffusion of information, even when highly competent, scientific agencies were involved.[67]

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[63] Elihu Katz and Paul F. Lazarsfeld, *Personal Influence: The Part Played by People in the Flow of Mass Communication*, (Glencoe, Illinois: Free Press, 1955).

[64] Elihu Katz, "The Two Step Flow of Communication", *Mass Communications*, Wilbur Schramm, editor, (Second Edition, University of Illinois Press, 1960), pp. 346-355.

[65] *Ibid*., p. 346.

[66] Herbert Menzel and Elihu Katz, "Social Relations and Innovation in the Medical Profession: The Epidemiology of a New Drug", *The Public Opinion Quarterly*, 19:337-352, Winter 1955-56, p. 337.

[67] *Ibid*., p. 338.

Subsequently, research findings resulted in the amendment of the original model to allow for a "multistep"[68] flow of communication. It was found that possible interaction among opinion leaders themselves could involve transmission in more than two steps. Menzel and Katz concluded that the role of sociometric contact extended beyond mere information and influence for a particular innovation, to the determination of general response behaviour with reference to outside sources of information and influence.[69] Investigation over a wider population confirmed the importance of networks of "discussion and advisorship" as a crucial determinant of innovativeness.[70]

Coleman et. al. recognized that the accumulated diffusion curves for their profession and patient oriented respondents (doctors) suggested successive stages in the diffusion process.[71] Rogers[72] discusses the "interaction effect" as a major reason for the normality of adopter distributions. Katz,[73] however, points out that the drug study provides empirical support for what could only be hypothesized by the classic investigation of the diffusion of hybrid corn. The S-shaped

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[68]Ibid., p. 343. [69]Ibid., p. 341.

[70]James Coleman, Elihu Katz and Herbert Menzel, "The Diffusion of an Innovation Among Physicians", Sociometry, 20:253-270, December, 1957, p. 258.

[71]Ibid., p. 266. [72]E. M. Rogers, op. cit., p. 154.

[73]Elihu Katz, "The Social Itinerary of Technical Change: Two Studies on the Diffusion of Innovations", Human Organization, 20:70-82, Summer, 1961, p. 74.

curve in the drug study was clearly the effect of intercommunication and differences in receptivity among the "integrated" and "isolated" groups of doctors.[74]

The relative importance of informal personal information sources at various stages in the adoption process has been previously discussed. Lionberger,[75] in his comparison of information sources, points out that mass media—radio, television, and to some extent periodicals—have an inherent disadvantage for evaluation and decision. They are not accessible for subsequent reference and review, do not lend themselves to two-way communication and cannot relate to the specific situation of the individual farmer. He states:

> The next best thing to actual trial on their own farms is advice of another farmer who is known and trusted and who has had the required experience.[76]

Researchers have attempted to identify different "functionaries" in the diffusion process. These different individuals have been identified in terms of introduction, communication, advisement,reinforcement and approval ("legitimation") of innovations. Varying terminology has been used to identify these opinion leaders; their major characteristic is that they take the lead in influencing others, since they are

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[74] Loc. cit.

[75] H. F. Lionberger, Adoption of New Ideas and Practices, op. cit.

[76] Ibid., p. 49.

the ones to whom other farmers turn for information and advice.[77] Lionberger and Chang[78] have indicated that overlap may occur in functionary roles; among the "multiple-functionaries" they observed were "communicator-legitimator" and "innovator-legitimator".

Research has shown that information seeking among farmers is by no means random; it is possible to discern distinguishable network patterns or groups. The degree of exposure to outside influences is a noticeable characteristic of those sought as sources of information.[79] Lionberger and Campbell distinguished four different types of dyads in the "information seeker-sought" communicative relationship On the basis of a one-way directional information flow in any single dyad, the classification is based on whether or not one, both, or some of the members of the dyad receive information directly from an outside source. This particular situation determines the potential of the dyad for reinforcement, indirect

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[77]E. M. Rogers, op. cit., pp. 258-259.

[78]Herbert F. Lionberger and H. C. Chang, Comparative Characteristics of Special Functionaries in the Acceptance of Agricultural Innovations in Two Missouri Communities, Ozark and Prairie, University of Missouri, College of Agriculture, Agricultural Experiment Station, Columbia, Missouri, 1965, (Research Bulletin 885).

[79]Herbert F. Lionberger and Rex R. Campbell, The Potential of Interpersonal Communicative Networks for Message Transfer from Outside Information Sources: A Study of Two Missouri Communities, University of Missouri, College of Agriculture, Agricultural Experiment Station, Columbia, Missouri, September, 1963, (Bulletin 842).

transfer or no transfer.[80]

Sheppard,[81] in his study with British grassland farmers, discusses the difficulty of separating information as distinct from influence in the interpersonal farmer contact network. He found that while farmers did not know very much about the activities of "most other farmers", they appeared to be better informed about particular farmers, especially those isolated as "leaders" by sociometric methods. He concluded therefore that a basis for influence was established, but that the problem was one of quantitative analysis.[82]

IV. LOCALITY GROUP AND CULTURAL INFLUENCES

Adoption studies have shown distinct, and occasionally significant, differences in adoption or communication behaviour between different cultural groups and between different localities or neighbourhoods, in contrast to the usual investigation of individual farmer characteristics. Pedersen,[83] in his study of distinct Danish and Polish subcultures in a single region, found evidence which indicated that different cultural adjustments either facilitated or hindered the introduction and acceptance of new ideas. The Danish group consistently showed

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[80] Ibid., pp. 10-13.

[81] D. Sheppard, "The Importance of 'Other Farmers'", Sociologia Ruralis, III: 127-141, 1963.

[82] Ibid., pp. 137-139.

[83] Harold A. Pedersen, "Cultural Differences in the Acceptance of Recommended Practices", Rural Sociology, 16:37-49, March, 1951.

a higher level of performance for all practices, and adopted recommended practices to a significantly greater extent. Pedersen concluded that the ethnic groups constituted different universes in terms of reaction to the recommended dairy farm practices.[84]

Van den Ban[85] also sought to explain differences in adoption behaviour in terms of differences in "ethnic co-hesiveness" between two groups of Calvinistic Dutch and Norwegian - German Lutheran farmers. There were significant differences between township quartiles regardless of individual farmer prediction scores based on the usually accepted major socio-economic variables.[86] The final conclusion was that the influence of social structures was more important than values directly related to adoption.[87]

It would seem that neighbourhood interaction relationships which lead to the development of mutual expectations and norms, result in a lack of independence relevant to individual behaviour.[88] From their study of adoption in low, medium and high adoption areas, Marsh and Coleman[89] found support for their

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[84] Ibid., p. 45.

[85] A. W. Van den Ban, "Locality Group Differences in the Adoption of New Farm Practices", Rural Sociology, 25:308-320, September, 1960.

[86] Ibid., p. 310. [87] Ibid., p. 318.

[88] C. Paul Marsh and A. Lee Coleman, "The Relation of Neighbourhood of Residence to Adoption of Recommended Farm Practices", Rural Sociology, 19:385-389, December, 1954, p. 385.

[89] Ibid., p. 387.

hypothesis that adoption is partly explained as a function of residence locality, which determines the particular "attitudinal-expectation framework".

The influence of neighbourhood residence is also reflected in patterns of interpersonal communication. Lionberger[90] found significant differences in the extent to which farmers named opinion leaders as sources of information within a particular neighbourhood. The effect was not only to localize contacts, but also to provide a conditioning influence in the evaluation process.

Differences in the types of interpersonal network dyads for sources of information have also been observed between neighbourhoods.[91] Similarly there may be different values placed upon varying kinds of information sources between neighbourhood and non-neighbourhood farmers.[92] Leuthold[93] observed differences in communication media contact between tight-knit German-Dutch and Ukranian communities.

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[90]Herbert F. Lionberger, "Neighbourhoods as a Factor in the Diffusion of Farm Information in a Northeast Missouri Farming Community", Rural Sociology, 19:377-384, December, 1954.

[91]H. F. Lionberger and R. R. Campbell, op. cit., p. 13.

[92]Herbert F. Lionberger and C. Milton Coughenour, Social Structure and Diffusion of Farm Information, University of Missouri, College of Agriculture, Agricultural Experiment Station, April, 1957, (Research Bulletin 631).

[93]F. O. Leuthold, Communication and Diffusion of Improved Farm Practices in Two Northern Saskatchewan Communities, op. cit., pp. 169-170.

V. EXTENSION CONTACT

The measurement of extension contact gives consideration to the "human relationships" between the change agent and his client.[94] Rogers and Capener[95] used a two-way classification of personal (or face-to-face communication) and impersonal contact. Personal contact includes farm visits by the agent, visit to the agent's office by the farmer, meetings and field days and telephone conversations. Impersonal contact includes mass media; circular letters, publications, mailed announcements, bulletins and newspaper articles.

Photiadas[96] observed that motivational factors, including social status, net worth and money invested in the enterprise, influenced the seeking of contact with agricultural agents. As stated by Abel,[97] while a few farmers use every possible way to obtain information, a great many fail to make maximum use of the many sources available. Abel et. al.[98]

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[94] Everett M. Rogers and Harold R. Capener, The County Extension Agent and His Constituents, Ohio Agricultural Experiment Station, Wooster, Ohio, June, 1960, (Research Bulletin 858), p. 5.

[95] Ibid., pp. 10-11.

[96] J. D. Photiadas, op. cit.

[97] Helen C. Abel, The Exchange of Farming Information, Marketing Service, Economics Division, Canada Department of Agriculture, Ottawa, August, 1953, p. 19.

[98] Helen C. Abel, Olaf F. Larson and Elizabeth R. Dickerson, Communication of Agricultural Information in a South-Central New York County, Department of Rural Sociology, Cornell University Agricultural Experiment Station, Ithaca, New York, January, 1957, p. 33.

found a notable positive relationship between adoption rate and the use of information sources. Verner and Millerd's[99] findings are similar to those of Rogers and Capener,[100] in that early adopters tended to make greater use of agricultural agencies. Verner and Gubbels,[101] however, found that while the District Agriculturist was used to a very small extent by all adopter categories, he tended to seek out individuals with a lower adoption score to a greater extent.

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[99] C. Verner and F. W. Millerd, *op. cit.*, p. 44.

[100] E. M. Rogers and H. R. Capener, *op. cit.*, p. 24.

[101] C. Verner and P. M. Gubbels, *op. cit.*, pp. 32, 52.

CHAPTER III

PROCEDURE

The analytical survey method was used to conduct this study of the adoption of innovations by strawberry growers in the Fraser Valley. The data were collected by personal interviews in the Summer of 1967. The detailed procedure used in data collection, and the method of data analysis are discussed in the sections which follow.

I. HYPOTHESES

For purposes of statistical analysis the following hypotheses were tested using the .01 and .05 levels of significance.

1. The adoption of innovations is not influenced by certain socio-economic characteristics.

2. There is no statistically significant difference in the distribution of socio-economic characteristics between farmers of different ethnic origin.

3. There is no statistically significant difference in the distribution by adopter categories between farmers of different ethnic origin.

4. Ethnic origin does not influence the distribution of sociometric choices in personal contacts among farmers.

II. DEFINITION OF TERMS

Even though there has been a noted lack of contact and coordination of research in the diffusion-adoption tradition, there is now noticeable agreement in the literature on relevant terminology. The following list of definitions include those used most frequently in this study, and are as cited by Rogers.[1]

Innovation: an idea perceived as new by the individual.

Adoption: a decision to continue full use of an innovation.

Adoption Process: the mental process through which an individual passes from first hearing about an innovation to final adoption.

Adoption Period: the length of time required for an individual to pass through the adoption process from awareness to adoption.

Social System: a population of individuals who are functionally differentiated and engaged in collective problem-solving behaviour.

Rate of Adoption:[2] the relative speed with which an innovation is adopted by members of a social system.

Diffusion: the process by which an innovation spreads.

Diffusion Process: the spread of a new idea from its

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[1]E. M. Rogers, op. cit., pp. 12-20, except where page numbers are otherwise indicated.

[2]Ibid., p. 134.

source of invention or creation to its ultimate users or adopters.

Innovativeness: the degree to which an individual is relatively earlier in adopting new ideas than the other members of his social system.

Interaction Effect:[3] the process through which individuals in a social system who have adopted an innovation influence those who have not yet adopted.

Opinion Leaders: those individuals from whom others seek information.

Cosmopoliteness:[4] the degree to which an individual's orientation is external to a particular social system.

Change Agent: a professional person who attempts to influence adoption decisions in a direction that he feels is desirable.

III. THE INNOVATIONS

The innovations selected for study had been recommended to growers over a period of five to seven years. This period was stipulated to ensure that reasonable time had elapsed after the introduction of an innovation to permit the growers to make a decision about it. The innovations studied were as follows:

(1) picking carts

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[3]Ibid., p. 154. [4]Ibid., p. 102.

Picking carts are used in the harvesting operation for the transfer of fruit from within the field to a point of collection. They allow for a much larger quantity of fruit to be transported by any single individual, thus ensuring a greater number of man hours in the actual picking operation. In addition, there is less handling of the fruit, and an improved marketable product is obtained.

This method is almost standard practice among strawberry growers in the United States, it was first recommended by the local Department of Agriculture about 7 years ago.

(2) <u>matted row as a cultural system in field layout</u>

The "hill" and "matted row" systems are the two basic types of field layout for strawberry plants. The hill system allows for the cultivation of individual plants while matted row results in continuous bands of fairly dense foliage. While matted row cultivation was more or less always used in the Richmond and Lulu Island areas, the hill system was typical of other areas until 7 to 8 years ago.

Research results have not been conclusive,[5] but there is evidence that a matted row layout gives higher yields and tends to compensate for weak plants. While the hill system is generally easier to keep weed free and reduces the incidence of rotting due to better air circulation, it also renders

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[5]Canada Department of Agriculture, Research Branch, Experimental Farm, Agassiz, British Columbia, <u>Research Report, 1958-1960</u>, p. 16.

the plants more vulnerable to the effects of low temperatures, thereby resulting in higher losses. A well established matted row usually retards weed establishment.[6]

(3) spraying with Captan for fruit-rot control

The incidence of berry rot is frequently the major cause for concern of the strawberry grower, since a heavy infection may result in the loss of almost his entire crop. Extensive spraying with Captan has shown an increase in 50 to 100 per cent of sound fruit. Such results necessitate a spray program which commences with the opening of first blooms and continues with at least four sprays at intervals of 7 to 10 days, through the harvesting season, if necessary.

One peculiarity of this problem which, perhaps, may result in some difficulty in its acceptance by the farmer is that there is usually a considerable amount of rotted berries in the field in spite of the comparative success of the spray application. Beneficial results have been reported in terms of both fruit size and post-harvest quality.[7] This practice was recommended to growers 7 to 8 years ago.

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[6] I. C. Carne, op. cit.

[7] J. A. Freeman, "The Control of Strawberry Fruit Rot in Coastal British Columbia", Canadian Plant Disease Survey 44:96-104, June, 1964; see also J. A. Freeman, "New Findings in Fruit Rot Control in Strawberries", Proceedings of the Lower Mainland Horticultural Improvement Association, 1967 op. cit., pp. 4-8.

(4) certified, virus-free plants

The selection of strawberry varieties involve resistance to disease, yield, fruit quality and winter hardiness. For many years the British Soverign variety, which was introduced 20 years ago, and the Marshall were the most popular types. Recent introductions include Northwest, Siletz, Puget Beauty and Agassiz.[8] Research has shown that virus-free plants possess superior vigour and produce higher yields and better fruit quality.[9]

This particular practice has received considerable emphasis in extension bulletins prepared for circulation by the Department of Agriculture. In a single bulletin,[10] farmers are advised on the use of "approved or certified" stock with reference to three different possible pests or diseases. Virus-free stocks of all local varieties, except Northwest, have been available to growers in recent years.[11]

(5) soil analysis for nematode control

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[8] H. A. Daubeny and J. A. Freeman, "Strawberry Variety Performance in Coastal British Columbia", Fruit Varieties and Horticultural Digest, 19:75-77, April, 1965.

[9] J. A. Freeman and F. C. Mellor, "Influences of Latent Viruses on Vigour, Yield and Quality of British Soverign Strawberries", Canadian Journal of Plant Science, 42:602-610, October, 1962.

[10] Province of British Columbia, Department of Agriculture, Control of Small Fruit Pests and Diseases, 1967.

[11] J. A. Freeman, "Small Fruits Research", Paper presented at 1967 Outlook Conference on Agriculture, Vancouver, British Columbia, 1967.

Nematode damage to strawberry plants causes a reduction of plant vigour. This practice is especially recommended for new plantings. Treatment is supposed to last for a period of approximately 3 to 4 years. This recommendation was first made to growers about 7 years ago, but has received considerably more emphasis during the past 5 years.

(6) chemical weed control

Carne's[12] study has shown that labour for weed control was one of the major expenses to be borne by the strawberry grower. Research by the Department of Agriculture over the past 17 years[13] has made available recommendations for chemical weed control. Simazine and Tenoran are the two most widely recommended chemicals at present. Excellent results have been obtained with Simazine, but varietal differences in susceptibility to the chemical has been reported for Tenoran.[14] Crop damage may also occur depending upon the vigour of the

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[12] I. C. Carne, Strawberry Production in the Fraser Valley", op. cit.

[13] Canada Department of Agriculture, Experimental Farm, Agassiz, British Columbia, Research Report, 1958-1960, op. cit., pp. 16-17; see also J. A. Freeman, "Chemical Weed Control in Strawberries", Proceedings of the Lower Mainland Horticultural Improvement Association, 1967, op. cit. pp. 18-20.

[14] J. A. Freeman, "Use of Simazine for Control of Weeds in Strawberries in Coastal British Columbia", Canadian Journal of Plant Science 44:555-560, 1964.

established crop.[15] Freeman[16] has indicated that effective herbicide application for strawberry cultivation demands an appreciation by the grower of the complex interrelationship of soil type, root establishment and the mode of chemical action.

It is hardly necessary to emphasize, therefore, the importance of most of these practices to the serious strawberry operator. In fact, Freeman[17] has recently made specific mention of four of these practices in considering improvements in cultural field management.

IV. THE SAMPLE

The population for this study consisted of all the known strawberry growers in the Fraser Valley. These were identified by a list of growers who had suffered crop damage during the 1964 freeze-out of the strawberry crop, and had applied for Government assistance. An effort was made to bring this list up to date with the assistance of two District Horticulturists stationed in the Lower Fraser Valley at Abbotsford and New Westminster, and other individuals who were identified as being knowledgeable about the growers in

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[15] J. A. Freeman, "Chemical Weed Control in Strawberries", *op. cit.*, p. 18.

[16] *Ibid.*, p. 20.

[17] J. A. Freeman, 1967 Confederation Year Outlook for British Columbia Agriculture, Small Fruits Panel (Mineographed).

the area. The final corrected list of growers numbered 194 and a table of random numbers was used to draw a 50 per cent sample. Since this sample totalled 97 growers, a sample of 100 was decided upon to facilitate the use of percentages in the distribution. A 20 per cent sample of alternative respondents was also selected.

The geographical distribution of the growers in the area was such that forty-six growers were found in a small cluster in one particular location.[18] Since the study was concerned with sociometric relationships among growers, additional interviews were conducted in the cluster to include all growers in that area. Twenty-two of the growers resident in the cluster had been drawn in the random sample, so in order to include all growers in the cluster an additional sample of twenty-four interviews were completed for a total of 124 interviews.

The additional population of growers located in the cluster, and not included in the original random sample, were not incorporated into the sample used for the general analysis of the data but were included in the analysis of sociometric contacts reported in Chapter VII. Thus, the main body of the study reports data and analysis from a random sample of the strawberry growers in the Fraser Valley

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[18]The area in Langley is bounded: 232nd St. on the West, 256 St. on the East, 60th Avenue on the North and 36th Avenue on the South.

while the analysis of interpersonal contacts includes all growers resident in a specific geographical location.

V. DATA COLLECTION

The data for this study were collected by personal interviews with the strawberry growers. These interviews were conducted between May and September in 1967.

Because of a relatively low initial price offered this year by the processors, and the introduction of new grading procedures with which many growers were dissatisfied, many of them were to some extent antagonistic. In many instances, therefore, the interviewer was forced to listen patiently, and with non-commitance, to the anti-government invective before the actual interview could proceed. Tact and patience were often necessary during the interview to redirect the respondent's attention to the specific data being sought. In addition, it would seem that the farmers of the Lower Fraser Valley are simply tired of being interviewed for agricultural surveys, especially since they claim that they are never aware of the results.

The average time per interview, without excessive interruptions was approximately thirty minutes. Because of the circumstances mentioned, however, it was hardly possible to conduct more than three or four interviews on most days.

Seven respondents refused to be interviewed. Three of them did not give any specific reason; four claimed that they were not interested since they were ceasing strawberry cultivation after the current crop, having been convinced that it was uneconomic for small scale growers like themselves. Sixteen other sample choices were not interviewed because they could not be located, had recently retired due to age, had ceased growing strawberries, or due to illness or death. All such sample choices were replaced from the alternative sample list. A total of approximately 236 visits were made during the period of the survey.

An interview schedule was designed to record data relevant to the purpose of the study including the following categories:

1. Personal characteristics of the growers related to the socio-economic measures found to be relevant to the adoption of innovations in other research studies.

2. Characteristics pertaining to the farm enterprise in general and strawberry growing in particular.

3. Contacts with the Agricultural Extension Service by the grower and the nature of such contact.

4. Sources of information used by the growers.

5. Adoption behaviour with respect to the innovations studied so as to determine the stage in the adoption process and adopter category for each respondent.

6. Personal contacts with others for the purpose of securing information or help related to farming matters, and personal contacts for social reasons not related to farming.

VI. DATA ANALYSIS

On completion of the field interviews and editing of the schedules, the data was keypunched on to IBM cards for processing by the use of the 7040 Computer at the University of British Columbia Computer Center.

Standard computer programmes in operation at this center were used for programming the data. Tests of significance were made primarily at the .05 level in the first instance; where appropriate, however, the .01 or .001 level of significance is indicated.

Statistical procedures used include the following:

Partial Correlation: This test measures the relationship between two variables; its particular advantage is that in examining the relationship between the particular variables, the effects of others are held fixed, thereby eliminating their interference.

Chi-square: This test compares observed and expected frequency values, thereby allowing for the determination of whether the observed frequencies are due purely to chance.

Differences between Proportions: This test is used to decide if the difference between the two proportions is significant, or whether it may reasonably be attributed to chance.

CHAPTER IV

CHARACTERISTICS OF THE SAMPLE

While there is some measure of agreement on the relationship between certain socio-economic characteristics and the adoption of innovations, the general situation remains indeterminate. It is necessary, therefore, to describe the particular population studied here in order to test the relationship of the characteristics studied to the adoption of innovations. The data were analyzed with particular reference to individual characteristics, economic characteristics, extension contact and possible differences arising out of the ethnic origin of the respondents.

I. PERSONAL CHARACTERISTICS

Age

As is typical of farm populations, the age distribution was skewed toward the upper ages. The median age group was between 45-54 years of age. Only 10 per cent of the respondents were below 35 years of age, with one individual in the 20-24 year category. Thirty-six per cent were above 55 years of age, and as much as 14 per cent were 65 years or more.

[1]Since the sample consisted of 100 respondents, the whole numbers are also representative of the frequency percentages, except if otherwise indicated.

Partial correlation analysis (Table I)[2] indicates that older respondents had more children (r=.27), more farming experience (r=.38) and experience in strawberry production (r=.28). They were among the earliest immigrants (r= -.46), and as would be expected, their wives had lower levels of formal education (= -.26). Age correlated negatively with adoption, indicating that the older farmers generally exhibited lower levels of practice adoption.

Marital Status

Eighty-eight per cent of the respondents were married; 9 were single and 3 were widowed.

Number of Children

The median category of 3-4 children included 36 per cent of respondents. Approximately the same proportions reported 1-2 children (24.0 per cent) and 5 or more children (26.0 per cent). Fourteen respondents reported not having any children. There was no relationship with adoption.

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[2]In view of the large number of variables involved in the correlation table, an attempt is made to facilitate examination of the relationships referred to in the discussion. Heavy lines are used to partition blocks of closely allied variables which measure either essentially the same characteristic or some aspect of it; for example Nos. 23-28 are all relevant to personal extension contact while Nos. 13-15 are relevant to the size of the farm operation.

TABLE 1

PARTIAL CORRELATION COEFFICIENTS

	1	2	3	4	5	6	7	8	9	10	11	12
1. Adoption Score	1.00											
2. Age	-.31	1.00										
3. Number of Children	.15	.27	1.00									
4. Educational Level	.13	-.26	-.24	1.00								
5. Adult Education (Agr.)	.21	-.18	-.04	.15	1.00							
6. Adult Education (Gen.)	.14	-.16	.01	.15	-.20	1.00						
7. Wife's Education	.24	-.26	-.17	.39	.24	.15	1.00					
8. Years of farming	.04	.38	.25	-.29	.03	-.04	.06	1.00				
9. Years in strawberry	-.02	.28	.06	-.15	-.03	-.08	.01	.53	1.00			
10. Years on present farm	.01	.17	.09	.04	.08	-.02	.27	.51	.45	1.00		
11. Social Participation	.42	-.16	-.07	.31	.27	.10	.48	.21	.01	.28	1.00	
12. Year of immigration	.02	-.46	-.02	-.09	.36	.02	-.09	-.45	-.49	-.59	-.32	1.00
13. Total acreage farmed	.35	-.19	.10	.24	.33	.12	.42	.19	.09	.38	.56	-.03
14. Acres in strawberry	.52	-.21	.09	.17	.29	.09	.42	.09	.04	.25	.47	-.06
15. Acres - other agriculture	.33	-.14	.09	.34	.38	.14	.49	.20	.04	.40	.59	-.07
16. Gross sales - all agr.	.40	-.26	.02	.21	.38	.07	.47	.09	.03	.24	.59	.06
17. Gross sales - strawberry	.46	-.13	.08	.26	.32	.15	.46	.14	.05	.25	.47	-.04
18. Gross sales - all other agr.	.49	-.23	.11	.21	.37	.02	.47	.12	.03	.27	.57	-.03
19. Tenure	-.02	-.03	-.01	-.06	.10	-.03	.06	.08	.06	.08	.12	-.07
20. Off-farm work	.13	-.17	.12	-.03	-.10	.27	-.21	-.22	-.28	-.31	-.18	.24
21. Labour employed	.43	-.13	.10	.19	.31	.16	.31	.05	.10	.22	.40	-.07
22. Farm Value	.32	-.19	.11	.20	.27	.13	.45	.21	.12	.32	.55	-.10
23. Office Visits - Dis. Hort.	.33	-.09	.11	-.08	.27	.12	.05	.16	.10	.03	.13	-.06
24. Office Visits - other agents	.27	-.30	.00	.13	.20	.32	.26	.04	.19	-.03	.34	.14
25. Telephone - Dis. Hort.	.58	-.06	.24	.13	.36	.23	.31	.12	.06	.12	.39	-.06
26. Telephone - other agents	.15	-.14	-.07	.36	.19	.24	.43	-.11	-.22	.11	.41	.04
27. Farm Visits - Dis. Hort.	.51	.00	.17	.14	.18	.13	.26	.19	.15	.18	.37	-.06
28. Farm Visits - other agents	.23	-.15	-.01	.31	.22	.23	.45	-.01	-.08	.18	.49	-.04
29. Circular letters - Dis. Hort.	.45	-.24	-.16	.33	.36	.15	.26	.01	-.04	.17	.55	-.10
30. Circular letters - Other agents	.35	-.05	.12	.20	.26	.10	.31	.19	-.11	.15	.48	.03
31. Radio - Dis. Hort.	.35	-.07	.12	-.10	.27	.22	.11	-.02	-.06	.01	.15	.07
32. Radio - Other agents	.36	.11	.15	-.14	.06	.11	-.11	.10	.04	.04	.10	-.02
33. Television - Dis. Hort.	.08	.08	.23	.13	.14	.03	.03	.14	.19	.11	.14	.13
34. Television - Other agents	.25	-.11	.05	.14	.25	.13	.14	.17	-.02	.14	.39	-.19
35. Newspapers - Dis. Hort.	.40	-.18	.00	.10	.35	.12	.28	.09	-.03	.11	.39	-.06
36. Newspapers - Other agents	.28	-.16	-.12	.20	.16	.25	.16	-.07	-.14	.01	.40	-.11
37. Meetings - L.M.H.I.A.	.31	-.19	.10	.17	.47	.31	.21	.12	.02	.20	.45	.08
38. Local Meetings, F. Days, Dem.	.23	-.18	.04	.23	.33	.00	.28	.10	-.07	.10	.48	-.03
39. Short Courses (1966)	.26	-.01	.16	.08	.70	.26	.15	.19	-.01	.15	.40	.17
40. Short Courses (1967)	.36	-.17	.12	.07	.52	.16	.22	.05	-.04	.15	.32	.27
41. Extension Contact (All)	.58	-.24	.05	.20	.44	.26	.39	.11	-.07	.14	.58	-.08
42. Extension Contact - Dis. Hort.	.64	-.15	.08	.12	.43	.17	.32	.11	-.01	.08	.48	-.03
43. Personal Contact (All)	.51	-.15	.13	.25	.35	.30	.43	.09	-.02	.16	.51	-.04
44. Impersonal Contact (All)	.55	-.15	.05	.20	.39	.24	.28	.12	-.07	.15	.58	-.09
45. Personal Contact - Dis. Hort.	.58	-.06	.22	.08	.33	.20	.25	.19	.12	.14	.36	-.07
46. Impersonal Contact - Dis. Hort.	.53	-.21	.01	.20	.44	.20	.30	.06	-.02	.15	.51	-.08

	13	14	15	16	17	18	19	20	21	22	23	24
13. Total acreage farmed	1.00											
14. Acres in strawberry	.81	1.00										
15. Acres - other agriculture	.94	.71	1.00									
16. Gross sales - all agr.	.85	.79	.78	1.00								
17. Gross sales - strawberry	.78	.86	.69	.83	1.00							
18. Gross sales - all other agr.	.78	.73	.75	.90	.66	1.00						
19. Tenure	.29	.29	.37	.36	.20	.38	1.00					
20. Off-farm work	-.27	.18	-.27	-.34	-.22	-.31	-.14	1.00				
21. Labour employed	.75	.88	.71	.77	.85	.68	.26	-.16	1.00			
22. Farm Value	.88	.77	.80	.86	.78	.80	.25	-.23	.74	1.00		
23. Office Visits - Dis. Hort.	.21	.28	.21	.18	.10	.22	.09	-.13	.22	.11	1.00	
24. Office Visits - other agents	.30	.26	.27	.28	.22	.25	-.01	.03	.22	.29	.30	1.00
25. Telephone - Dis. Hort.	.44	.57	.45	.41	.48	.56	.09	.10	.53	.36	.53	.27
26. Telephone - other agents	.48	.41	.48	.46	.44	.39	.07	-.05	.40	.42	.07	.54
27. Farm Visits - Dis. Hort.	.46	.52	.45	.40	.48	.49	.07	-.07	.48	.41	.44	.23
28. Farm Visits - other agents	.57	.49	.56	.55	.50	.44	.19	-.18	.49	.50	.13	.36
29. Circular letters - Dis. Hort.	.39	.43	.39	.37	.33	.33	.16	-.05	.31	.27	.27	.16
30. Circular letters - Other agents	.46	.36	.48	.47	.39	.45	.10	-.11	.28	.39	.26	.39
31. Radio - Dis. Hort.	-.03	.12	.05	.05	.08	.12	.10	.13	.11	-.11	.20	.13
32. Radio - Other agents	.17	.24	.15	.17	.21	.15	.00	-.06	.31	.12	.21	.11
33. Television - Dis. Hort.	.12	.17	.27	.13	.13	.26	.09	.05	.22	.12	.29	.04
34. Television - Other agents	.43	.35	.43	.32	.31	.18	.06	.01	.38	.34	.33	.31
35. Newspapers - Dis. Hort.	.37	.41	.34	.31	.21	.27	.21	-.00	.30	.27	.49	.36
36. Newspapers - Other agents	.29	.26	.26	.21	.11	.14	.15	.05	.22	.22	.22	.28
37. Meetings - L.M.H.I.A.	.47	.39	.49	.38	.37	.38	.12	-.11	.36	.40	.29	.23
38. Local Meetings, F. Days, Dem.	.54	.46	.58	.61	.51	.57	.35	-.26	.48	.52	.32	.31
39. Short Courses (1966)	.39	.36	.44	.33	.36	.32	.11	-.10	.32	.35	.35	.22
40. Short Courses (1967)	.36	.35	.38	.40	.33	.37	.01	-.13	.31	.32	.38	.30
41. Extension Contact (All)	.55	.58	.54	.53	.49	.50	.20	-.04	.52	.46	.50	.40
42. Extension Contact - Dis. Hort.	.37	.49	.39	.36	.35	.47	.08	.01	.39	.26	.61	.27
43. Personal Contact (All)	.61	.63	.59	.57	.57	.57	.13	-.07	.60	.52	.59	.58
44. Impersonal Contact (All)	.50	.52	.49	.46	.39	.39	.19	-.01	.46	.37	.47	.41
45. Personal Contact - Dis. Hort.	.45	.56	.46	.41	.44	.53	.10	-.03	.51	.36	.78	.32
46. Impersonal Contact - Dis. Hort.	.37	.46	.40	.36	.31	.36	.22	.03	.37	.24	.47	.29

	25	26	27	28	29	30	31	32	33	34	35	36
25. Telephone - Dis. Hort.	1.00											
26. Telephone - other agents	.33	1.00										
27. Farm Visits - Dis. Hort.	.60	.22	1.00									
28. Farm Visits - other agents	.36	.72	.36	1.00								
29. Circular letters - Dis. Hort.	.49	.28	.32	.41	1.00							
30. Circular letters - Other agents	.31	.54	.37	.57	.38	1.00						
31. Radio - Dis. Hort.	.25	.15	.26	.13	.15	.11	1.00					
32. Radio - Other agents	.25	.13	.39	.24	.17	.16	.41	1.00				
33. Television - Dis. Hort.	.30	-.02	.32	.08	.21	.20	.09	-.05	1.00			
34. Television - Other agents	.27	.29	.30	.33	.31	.34	.06	-.23	.17	1.00		
35. Newspapers - Dis. Hort.	.49	.32	.26	.36	.51	.31	.28	.16	.14	.29	1.00	
36. Newspapers - Other agents	.24	.33	.15	.35	.50	.32	.03	.21	.03	.33	.58	1.00
37. Meetings - L.M.H.I.A.	.34	.27	.42	.43	.40	.36	.23	.22	.22	.43	.29	.25
38. Local Meetings, F. Days, Dem.	.33	.32	.41	.49	.40	.48	.02	.08	.22	.54	.15	.13
39. Short Courses (1966)	.38	.20	.39	.22	.39	.34	.29	.19	.23	.38	.30	.15
40. Short Courses (1967)	.39	.32	.32	.33	.29	.35	.34	.27	.13	.23	.34	.14
41. Extension Contact (All)	.67	.50	.54	.59	.73	.58	.36	.45	.21	.53	.66	.61
42. Extension Contact - Dis. Hort.	.76	.28	.60	.34	.63	.38	.47	.36	.34	.33	.61	.39
43. Personal Contact (All)	.78	.69	.71	.73	.48	.59	.28	.33	.26	.43	.55	.37
44. Impersonal Contact (All)	.55	.48	.49	.57	.72	.65	.41	.49	.27	.58	.73	.70
45. Personal Contact - Dis. Hort.	.88	.26	.82	.35	.45	.38	.29	.34	.37	.36	.50	.25
46. Impersonal Contact - Dis. Hort.	.60	.33	.41	.42	.81	.40	.53	.28	.37	.33	.81	.52

	37	38	39	40	41	42	43	44	45	46
37. Meetings - L.M.H.I.A.	1.00									
38. Local Meetings, F. Days, Dem.	.45	1.00								
39. Short Courses (1966)	.61	.36	1.00							
40. Short Courses (1967)	.60	.30	.64	1.00						
41. Extension Contact (All)	.47	.49	.49	.43	1.00					
42. Extension Contact - Dis. Hort.	.42	.33	.52	.49	.81	1.00				
43. Personal Contact (All)	.49	.53	.43	.50	.78	.71	1.00			
44. Impersonal Contact (All)	.50	.43	.47	.44	.91	.74	.72	1.00		
45. Personal Contact - Dis. Hort.	.42	.43	.45	.44	.70	.80	.85	.61	1.00	
46. Impersonal Contact - Dis. Hort.	.43	.30	.46	.42	.80	.80	.62	.86	.60	1.00

NOTE: The underlined coefficients show a high degree of association. A significance test for r was carried out using the null hypothesis of no correlation with a .01 level of significance. The test is based on the assumption that under the null hypothesis of no correlation, the sampling distribution of the correlation coefficient can be approximated closely with a normal curve having the mean 0 and the standard deviation $1/\sqrt{n-1}$ where n = the sample size. Therefore, the criterion is to reject the null hypothesis if $r < -2.58/\sqrt{n-1}$ or $r > 2.58/\sqrt{n-1}$.

Education

The median educational level of the sample was 5-8 years of school completed with 46 per cent of respondents included in this category. Thirty-one per cent had progressed beyond this stage with 9-11 years of formal education, but did not complete high school. Of the 15 per cent completing at least grade 12, 5 per cent attended some university, but only 2 received a university degree. Seven per cent may be classified as functional illiterates with less than 5 years of schooling.

The better educated respondents also had wives with higher educational attainment (r=.39); they were less experienced farmers (r=.29) and participated to a greater extent in voluntary organizations (r=.31). Only a very small percentage of respondents (7.0 per cent) reported having had vocational training in agriculture, agriculture in high school (5.0 per cent) or agriculture for credit at university (2.0 per cent). There was no relationship between educational level and adoption.

Education of the Wife

Two of the respondents were married females including one widow who indicated that they were responsible for the management of the farm operations; their educational level is, therefore, discussed within the previous paragraph. Nine respondents were single, and five respondents claimed not to know the relevant information.

The median category of 9-11 years included 21 per cent of respondents' wives. Nineteen per cent completed grade school; four individuals had gone on to university, but none received a degree. Five per cent can be classified as functional illiterates. In general, excluding the university level which is only relevant to a negligible number of individuals in the sample, a larger percentage of wives had completed their education within the categories between grades 5 to 13; and were, therefore, better educated than their husbands. Wives with higher levels of formal education were married to better educated operators who had large, higher valued farms with higher gross sales of strawberry and of total agricultural products.

The education of the spouse was also positively correlated (r=.48) with the level of participation in voluntary organizations. There is no relationship with adoption at the .01 level, (Table I), but there is a significant correlation (r=.24) at the .05 level.

Agricultural Adult Education

Fifty per cent of the respondents reported having taken adult education courses in agriculture. The percentage is perhaps somewhat surprising, considering that the Lower Mainland Horticultural Improvement Association[3] has been conducting

[3]Referred to hereafter as L.M.H.I.A.

annual 2-day short courses, which are of particular interest to small fruit producers, over the past 9 years. The low level of attendance is further borne out by the reported attendance for 1966 and 1967. Forty-one per cent attended in 1966, with 25 per cent attending both days; in 1967 29 per cent attended with only 17 per cent attending on both days.

Respondents were also questioned concerning their attendance at similar annual short courses held in the State of Washington. Ten per cent reported attendance in 1966 and 6 per cent in 1967.

Attendance at agricultural adult education courses and other extension activities such as meetings of the L.M.H.I.A., field days and demonstrations was higher among those respondents with higher levels of social participation; they owned larger, higher valued farms with larger acreages in strawberry and other agricultural enterprises which gave them higher gross income from the sale of farm products. Bigger farm operators, therefore, exhibited a greater tendency to seek information pertaining to successful farming. Among the immigrant population (54 per cent), the most recent immigrants are more likely to have attended adult education courses ($r=.27$ at the .05 level) in 1967.

There is no significant correlation between agricultural adult education courses in 1966 and adoption. Attendance at meetings of the L.M.H.I.A. ($r=.31$) and attendance at the

1967 2-day short course (r=.36) correlated positively with adoption. The relationship between agricultural adult education and extension contact is discussed under the latter section. Unlike the earlier study by Verner and Millerd,[4] the present study does not provide a means of measuring the level of participation by the respondents at the particular educational activity. It is not possible, therefore, to separate those individuals who are most likely to have benefitted from "active participation" in the instructional process.

A significant relationship at the .05 level was obtained by the use of the chi-square statistic, on the basis of the hypothesis that attendance at adult education courses in 1966 - the independent variable - determined the level of adoption (or adopter category) of the respondent. Analysis with respect to adopter categories is discussed in Chapter V.

General Adult Education

Twenty-nine per cent of respondents reported having attended general adult education courses. A positive correlation (r=.27) indicates that respondents who spent a larger proportion of their time on off-farm jobs were most likely to have attended non-agricultural adult education courses.

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[4]C. Verner and F. W. Millerd, op. cit.

Years on Present Farm

The median category of 10-19 years on the present farm included the largest number (40 per cent) of the respondents. Thirty-six per cent reported less than 10 years, while 25 per cent reported 20 or more years on the present farm. The long established respondents had the greatest amount of both general farming experience (r=.51) and experience in strawberry cultivation (r=.45). They operated the larger (r=.38), more highly valued farms (r=.32), and were more likely to have diversified their agricultural enterprises (r=.40). Such operators spent the least amount of time, if any, on off-farm jobs (r=.31).

Immigration

More than half (54 per cent) of the respondents were immigrants to Canada, with an equal proportion coming from both eastern Europe and the Russian-Ukraine region. The next largest group of immigrants (8 per cent) were from Japan. Most of the immigrants (31 per cent) migrated before 1945.

Farming Experience

The respondents were largely experienced farmers, 66 per cent having been in agriculture for 20 years or more. Only 28 per cent had been growing strawberries for such a long period. Older farmers, which also included the earliest immigrants, had both more general farming experience and specific experience with the strawberry crop. The majority of operators (40 per cent) reported 10-19 years of experience with the crop; 13 per cent of the respondents reported less than 10 years of agricultural experience while as much as 32 per cent had the same limited experience with strawberry cultivation.

Educational level correlated negatively with both aspects of agricultural experience, but was only significant with reference to general farming experience (r=.29). Operators who spent a considerable proportion of their time in off-farm jobs were also relative newcomers among strawberry growers (r=.28).

Social Participation

Chapin's Social Participation Scale[5] was used to measure the degree of social participation. While church membership was not, membership in church-related organizations was included. The median scale score of 5 to 14 included 42 per cent of the respondents, thereby indicating an overall low level of social participation. Twenty-five respondents had a score of less than 5, with 16 per cent recording zero; 17 per cent scored 25 or above. Among the personal characteristics, social participation showed the highest positive

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[5]F. S. Chapin, Social Participation Scale, (Minneapolis: University of Minnesota Press, 1938. The scale allows a score of 1 for membership in an organization, 2 for attendance, 3 for financial contribution, 4 for membership on a committee and 5 for holding office.

correlation (r=.42) with adoption. The more highly educated respondents (r=.31)[6] with better educated wives (r=.48) had higher levels of social participation. Significant but lower positive correlations were also obtained with agricultural adult education (r=.27) and years on the present farm (r=.28). (See Table I.)

The measurement of social participation also illustrates the definite block pattern of correlation significance which is very evident in Table I. This no doubt arises from the multiple-aspect measurement of the size of the farming enterprise (acreage and sales) and of extension contact (personal and impersonal). The consistent inter-relationship for a number of these variables is discussed later. High levels of social participation were characteristic of those respondents with large, high valued farms who received bigger gross agricultural incomes. A similar relationship obtains for personal extension contact by telephone and farm visits, and for impersonal extension contact involving mail and newspaper articles, with reference to both the D.H.[7] and other agents. Contact by radio is not significant, but there is a positive correlation with the use of television, as a single channel of impersonal contact, with other agents. The relationship

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[6]A similar relationship has been observed by Coolie Verner and John S. Newberry, Jr., "The Nature of Adult Participation." Adult Education, 8:208-222, Summer, 1958; and by C. Verner and P. M. Gubbels, *op. cit.*, p. 11.

[7]District Horticulturist.

with impersonal extension contact is at a lower level of significance, compared to personal contact.

Findings concerning personal contact, especially by telephone, illustrates a different relationship to the findings of Verner and Gubbels[8] among dairy farmers in the Fraser Valley. The combined measurements of various aspects of extension contact emphasize the consistency of the relationship previously mentioned. Social participation is positively related to adoption, and with attendance at the adult education short courses held by the L.M.H.I.A.

II. ECONOMIC CHARACTERISTICS

Economic characteristics, with special reference to acreage and sales are consistently related to adoption.

Farm Operations

A large majority of the respondents (80 per cent) reported small fruit as their major farming enterprise. Six per cent reported vegetables as the major operation, while 4 per cent were mainly in dairying or poultry. Other miscellaneous major enterprises included beef cattle or hogs, potatoes, green-houses and seed production. Secondary enterprises were distributed among 54 per cent of the respondents with 19 per cent indicating small fruit and 10 per

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[8] C. Verner and P. M. Gubbels, op. cit., p. 11.

cent vegetables. In addition, 7 per cent mentioned beef cattle or hogs, while dairying, poultry and potatoes were each reported by 5 per cent of the respondents.

Farm Size

Total farm size ranged from less than 3 acres to over 180 acres. The median category (5 to less than 15 acres) included 37 per cent of all respondents, with the next largest group (22 per cent) being in the 15 to less than 30 acres category. Nine per cent had farms exceeding 50 acres, while 17 operators managed holdings less than 5 acres.

Respondents with large farms also had the largest acreages in strawberry (r=.81) and in other agricultural enterprises (r=.94). Sixty-four of the 81 operators with a total acreage of less than 30 acres and 7 of the eleven operators with 120 acres or more reported small fruit as their major enterprises. One half of the respondents, including 41 of the 64 operators who were predominantly strawberry growers cultivated less than 5 acres of strawberry, with 33 per cent reporting less than 3 acres. Thirty-one per cent reported between 5 to 15 acres, 12 per cent between 16 to 49 acres, and 7 per cent 50 or more acres. All operators with 30 or more acres in strawberry had farms of at least 50 acres.

Secondary enterprises were reported by 21 of the 24 operators with more than 30 acres, but only by about one half of the 76 operators with less than 30 acres. Fifteen respondents did not have improved acreage devoted to agricultural operations besides strawberry cultivation. Twenty-nine per cent reported less than 5 acres, 38 per cent between 15 to 29 acres and 10 per cent 80 or more acres. Secondary enterprises were mostly small fruit, dairying, cattle, poultry, vegetables or potatoes.

Adoption was positively and significantly related to total farm acreage (r=.35), acreage in strawberry (r=.52), and to acreage in other agricultural enterprises (r=.33). Large scale operators with larger acreages in strawberry or other agricultural enterprises were therefore much more advanced in the adoption of improved practices.

Gross Agricultural Income

One respondent refused to give information relevant to sales; 3 others reported no sales from agriculture in 1966. Eighteen per cent of the respondents reported less than $3000 sales from all farm products, compared to 35 per cent for gross income from strawberry only. The median category for total agricultural sales was approximately $5,000 - $10,000, compared to $3,000 - $5,000 for strawberry sales only. Gross agricultural sales exceeded $55,000 for 15 operators, compared to 10 operators for strawberry sales only.

More than one quarter (28 per cent) of the operators did not receive income from the sale of other agricultural products in 1966. Thirty-one per cent received less than $5,000, while 10 per cent received more than $40,000. As seen in Table I, there is the expected relationship between acreage and sales in all respects. Most of the respondents receiving more than $15,000 gross total sales were predominantly small fruit growers, with poultry and vegetables second in importance. Among those reporting the highest gross incomes from other agricultural products, besides strawberry, the major farm enterprises were mainly dairying, poultry and vegetables. All gross measurements of agricultural income were consistently and positively related with adoption.

Tenure

Eighty respondents owned their holdings completely, while 13 per cent reported a combination of more than half ownership and rental. Two respondents reported entire rental arrangements, while one was a manager. Higher levels of ownership was positively related with attendance at specific agricultural extension activities such as local meetings, field days and demonstrations.

Labour Employed for Harvesting

Ten respondents reported that they did not employ labour for harvesting in 1966; of this number 6 had less than 3 acres in strawberries and 4 had between 3-4 acres. Three of them did not receive any income from strawberries in 1966 and 6 received less than $3,000. During the interview, it was evident that some small operators harvest their crop using family labour only, or in combination with the "U-Pick" system whereby the buyer picks the crop himself. Most farmers (53 per cent) employed 25 pickers or less. Each of the 7 operators with 50 or more acres in strawberry employed at least 200 pickers; two operators with more than 80 acres employed more than 600 pickers each.

The expected relationship between the employment of labour and the acreage-gross income characteristics is evident in Table I (r ranging between .77 and .88).

Farm Value

Estimated farm value ranged between less than $5,000 to more than $150,000, with the median category of $30,000 to $59,000 including 36 respondents; the same percentage valued their farms between $10,000 to $29,000. Three farms were valued at less than $10,000, and 14 at more than $150,000. Farmers in areas with a considerable potential for housing and industrial development mentioned, in particular, the inflated value of farm land in their vicinity.

The block pattern of significant partial correlation coefficients illustrates the expected consistent relationship between farm value and all acreage measurements (r ranging between .8 to .9). Operators with higher valued farms were resident on the same farms for longer periods (r=.32) and exhibited a higher level of practice adoption (r=.32).

III. EXTENSION CONTACT

The reported distribution of the use of 7 different sources of information with reference to both the D.H. and other agricultural agents, with whom the respondent may have had contact during 1966, is shown in Table II.

TABLE II

PERCENTAGE DISTRIBUTION OF TYPES OF CONTACT, DISTRICT HORTICULTURIST AND OTHER AGRICULTURAL AGENTS

Type of Contact Channel	District Horticulturist		Other Agents	
	Respondents'			
	Use of Contact %	Non-use %	Use of Contact %	Non-use %
1. Visit to office of agent	43	57	14	86
2. Telephone calls to agent	63	37	31	69
3. Farm visits by the agent	56	44	37	63
4. Circular letters, bulletins, pamphlets from the agent	82	18	38	62
5. Radio announcements by the agent	27	73	43	57
6. Television programs by the agent	11	89	44	56
7. Newspaper article by the agent	64	36	69	31

	Use of Contact %	Non-use %
8. Attendance at local meetings, field days, demonstrations sponsored by the District Horticulturist, District Agriculturist or the L.M.H.I.A.	48	52

The distribution for contact item No. 8 is more general in that it also included educational activities which may have been sponsored primarily by the L.M.H.I.A.

The District Horticulturist

Personal type contact with the D.H. including office visits, telephone calls and farm visits, averaged 54 per cent with a high 63 per cent for telephone contact. There were more users than non-users for both telephone (63 per cent) and farm visits (56 per cent), but less for visits to the agent's office (43 per cent).

The detailed distribution for intensity of use[9] is given in Appendix I. For purposes of discussion, the "seldom-occasionally" response range is considered as low intensity and the "frequently-very frequently" response range as high intensity.

Of the 63 per cent users of telephone contact, 36 reported low intensity use compared to 27 per cent at the high level. For farm visits, 44 per cent indicated low level use, compared to 12 per cent at the high level. Thirty-three per cent were low level visitors to the office of the D.H. compared to the 10 per cent at the high level. There was, therefore, twice as much higher intensity telephone contact, compared to the use of other contact channels.

[9]The possible responses for each individual contact channel ranged between "seldom", "occasionally", "frequently" and "very frequently".

The level of personal contact obtained in this study exceeds any other observed in the literature for the same 3 channels. The 54 per cent average is more than twice the calculated average from data reported by Rogers and Capener[10] for Ohio farmers (25 per cent), Rogers and Havens[11] for farm housewives (20 per cent), and data by Verner and Gubbels[12] for dairymen in the Fraser Valley of British Columbia (22.3 per cent).

Impersonal type contact for the 4 channels average 46 per cent, with the highest percentage use (82 per cent) for mail received and read. There were more users than non-users for mail and newspaper articles (64 per cent), but less users for radio announcements (27 per cent) and television announcements (11 per cent). The intensity of use is generally lower for this type of contact, except in the case of mail; 22 per cent were low intensity users, compared to 60 per cent at the high level. There was 22 per cent high intensity users of newspaper articles, compared to 42 per cent at the low level. The lowest intensity use was reported for radio and television. High intensity users did not exceed 4 per cent for either

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[10] E. M. Rogers and H. R. Capener, op. cit., p. 11.

[11] E. M. Rogers and A. E. Havens, Extension Contact of Ohio Farm Housewives, Ohio Agricultural Experiment Station, Wooster, Ohio, November, 1961, (Research Bulletin 890), p. 4.

[12] C. Verner and P. M. Gubbels, op. cit., p. 22.

channel, while 8 and 23 per cent were reported for low level usage of television and radio respectively.

The overall average for impersonal type contact in this study is approximately 10 per cent lower compared to the average for the three previously cited studies. Except for the study by Rogers and Havens,[13] the average is lower in each instance. On closer inspection, however, it is observed that Verner and Gubbels[14] did not include television in their data, and that the Ohio studies used a combined percentage figure for "T.V. or radio". Using a similar combination for this data removes the effect of the low percentage use (11 per cent) of television; the resulting average of 57 per cent then also exceeds the average for Verner and Gubbels'[15] data. While the level of usage for newspaper articles and mail is higher in comparison with the other studies, the use of T.V. or radio is consistently lower. During the interviews, a number of respondents claimed not to have time to listen to the radio, and that they were never aware of the times at which relevant programmes were being broadcast.

Other Agents

The average percentage (27 per cent) users of personal

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[13] E. M. Rogers and A. E. Havens, op. cit., p. 6.

[14] C. Verner and P. M. Gubbels, op. cit., p. 22.

[15] Ibid.

type contact with other agricultural agents was about half the number for the D.H., with lower figures for each individual contact channel. Approximately one-third of the respondents reported contact by telephone and farm visits. This is to be expected considering that 72 per cent of the respondents indicated having 3 acres or more in agricultural enterprises besides strawberries. Also, many small fruit growers are likely to have contact with agents who have a special responsibility for other crops besides strawberries or for general extension work.

Impersonal type contact was about the same level, compared to reported data for the D.H. The average percentage users for all channels was 48.5 per cent. Percentages for individual channel usage were higher for radio and T.V., similar for newspaper articles, but almost three times less for mail.

Forty-eight per cent of the respondents reported participation in local meetings, field days or demonstrations organized by the D.H., D.A.[16] or L.M.H.I.A.

Extension Contact Scales

The extension contact scale, established by Rogers and Capener,[17] was used to measure specifically overall contact between the respondent and the D.H. for this study, however, the scale is slightly modified since T.V. is isolated from

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[16] District Agriculturist.

[17] E. M. Rogers and H. R. Capener, op. cit., p. 14.

radio; also, there is no score for meetings, field days and demonstrations — a single item in the Rogers and Capener scale — since the relevant question in the interview schedule was not specific to the D.H. only.

Eleven per cent of the respondents had no contact whatsoever with the D.H. during 1966. Sixteen per cent of the respondents had the median score of 4 contact channels. On the average, each respondent in the total sample used 3.4 channel contacts. Considering only those who had contact with the D.H., the average was 3.9 (Table III).

TABLE III

PERCENTAGE DISTRIBUTION OF RESPONDENTS
BY EXTENSION CONTACT SCORE
(Rogers and Havens Scale)

Extension Contact Score		Respondents %
0		11
1		7
2		16
3		14
4*		16
5		21
6		13
7		2
	Total	100

* Median

The percentage distribution for an extended type of contact scale which takes into consideration the reported frequency, or intensity, of use of each contact channel is given in Table IV. Scoring was on the basis of 1 for seldom, 2 for occasionally, 3 for frequently and 4 for very frequently. It is a combined score for all 7 channel contacts relevant to both the D.H. and other agents, and has a score range of 0 to 56.

TABLE IV

PERCENTAGE DISTRIBUTION OF RESPONDENTS BY AN EXTENDED EXTENSION CONTACT SCORE, DISTRICT HORTICULTURIST AND OTHER AGENTS

Extension Contact Score		Respondents %
0		5
Less than 5		16
5 - 10		16
11 - 20*		38
21 - 40		23
More than 40		2
	Total	100

* Median

Five per cent of the respondents did not have any contact with any agent during 1966. The median score category of 11 to 20 included 38 per cent of the respondents; 25 per cent scored above the median.

Extension Contact and Adoption

As seen in Table I, personal-type contact is consistently related to the size of the farm operation and gross agricultural income. There is a similar but less consistent trend for impersonal-type contact. In addition, there is an inter-relationship between individual contact channels within any single type — personal or impersonal — of contact, and between the two types.

Bigger farm operators with higher agricultural incomes and higher levels of social participation, both of which are indicators of socio-economic status, had more frequent personal contact by telephone and farm visits with the D.H. and with other agents. Participation in agricultural adult education, and the educational level of the farm wife were significant for contact by telephone. It became evident during the inter-view that it was not uncommon, in some instances, for the operator's wife to speak to the D.H. on the telephone concerning information relevant to the farm enterprise. The data indicates that participants in agricultural adult education were more likely to seek out the change agent either by telephone or by visiting him in his office to obtain desired information. The use of all three personal contact channels were significantly related to adoption, with the highest values for telephone (r=.58) and farm visits (r=.51) in relation to the D.H. Educational level both of the operator and his wife were significantly related to contact by telephone and farm visits by other agents.

The inter-relationship of individual contact channels within a single type indicate clearly a tendency for respondents to seek information on a multi-channel basis. Positive significant inter-correlations include office visits and telephone contact with the D.H. (r=.53), farm visits and telephone contact with the D.H. (r=.60). All three personal-type contact channels are significantly inter-correlated. The trend also extends to contact with other agents as illustrated by the relationship between telephone contact and farm visits (r=.72).

Large farm operators with high levels of social participation and more education used mail contact to a greater extent. The educational level of the farm wife was significant for the use of this channel relevant to other agents. Participants in agricultural adult education were more likely to use all impersonal contact channels, except television, relevant to the D.H. Multi-channel impersonal contact usage is evident from the relationship between mail and newspaper articles for the D.H. (r=.51) and for other agents (r=.32).

Partial correlation coefficients indicated a significant relationship between adoption and two types of impersonal contact with both the D.H. and other agents. These were mail contact (r=.45; r=.35) and newspaper articles (r=.40; r=.28). Also, there was a significant relationship for contact with the D.H. through radio (r=.35). Where the relationship extends to other agents, the correlation value for the agent specific to the innovations under consideration is consistently higher.

Multi-channel contact is also evident from the relationship between individual channels of different types. Combined measurements of personal and impersonal contact give significant high correlations relevant to the D.H. and other agents (r=.72), and for the D.H. separately (r=.60).

In this study, the highest significant correlations relevant to adoption are obtained with reference to extension contact. A partial correlation coefficient of .94 was obtained between adoption score and adopter category, thus indicating an excellent distribution of the scores as used in the analysis. Outstanding significant correlations at the .01 level are:

1. Extension contact with the D.H. (Rogers and Capener scale):...................... 0.64
2. Extended extension contact scale; all agents:.................................... 0.58
3. Personal contact with the D.H.:.................. 0.58
4. Impersonal contact with the D.H.:................ 0.53
5. Personal contact; D.H. and other agents:........ 0.51
6. Impersonal contact; D.H. and other agents:...... 0.55

While it is necessary to be cautious against concluding a casual relationship due to the ex post facto nature of the correlation design,[18] the consistency of the relationship does emphasize the potential significance of this variable. Contact with the D.H. by the Rogers and Havens Contact Scale gives the strongest combined relationship. Personal contact with the change agent, specific to the relevant practices,

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[18]Kenneth H. Kurtz, Foundations of Psychological Research (Boston: Allyn and Bacon, Inc., 1965), p. 209.

however is most outstanding; this fact becomes more evident when consideration is given to farm visits and telephone contact. These two contact channels indicate the closest possible personal relationship between the agent and his clientele, since they occur with great frequency only when the agent-client relationship is better than the average for the farm population as a whole. In particular, it is evident from the interviews that big operators tend to emphasize subtley that the agent comes to the farm rather than the operator going to his office.

Detailed bivariate or cross break analysis between the use of individual personal contact channels and adopter categories support the implications of the partial correlation analysis. Twenty-two per cent of respondents reported not having any personal contact with the D.H. during 1966. In terms of adopter categories, 17 per cent were in the laggard or late majority group, 4 per cent were early majority while one individual was classified in the innovator-early adopter category.

Of the 27 respondents who reported high intensity use of telephone contact, none were laggards, 5 were late majority and 11 were in each of the early majority and innovator-early adopter categories. Of the 12 who reported high intensity farm visit contacts, none were laggards, 1 was late majority, 5 were early majority and 6 were in the innovator-early adopter category. Nine respondents reported high intensity contact by both telephone and farm visits; none were laggards, 1 was early majority, 3 were late majority and 5 were in the innovator-early adopter category.

The analysis of impersonal contacts showed a similar relationship with adoption. There were no early adopter-innovators or early majority respondents among those who reported no impersonal contact with the D.H. This group included 6 (46.2 per cent) of the late majority and 7 (53.9 per cent) of the laggard respondents.

IV. ETHNIC INFLUENCES

In view of the potential cultural influence that ethnic origin may exert in the adoption of innovations, the data was further examined using ethnic origin as a dependent variable. The sample was divided into three groups for this purpose; Menonites (32 per cent), Japanese (23 per cent) and the remaining respondents (45 per cent) classified as "Others". The majority of the Japanese respondents (65.2 per cent), and of those classified as others (51 per cent) were Canadian born, compared to only 19.2 per cent of the Menonites. The chi-square test at the .01 level was then used with a hypothesis of no significant difference, relevant to a number of socio-economic characteristics, between the two groups. The variables with which significant differences were observed are shown in Table V.

TABLE V

STATISTICALLY SIGNIFICANT CHI-SQUARE VALUES FOR SOCIO-ECONOMIC CHARACTERISTICS AGAINST ETHNIC ORIGIN

Socio-Economic Characteristic	Chi-square Value (Significant at .01 level)
Agricultural àdult education	17.0
Education	21.94
Vocational agricultural education	18.31
Wife's education	50.0
Years in Strawberry	36.7
Years on the present farm	76.71
Social participation	22.0
Size of farm	14.0
Acreage in strawberry	38.7
Acreage in other agricultural enterprises	53.9
Gross total agricultural sales	39.6
Gross total sales from strawberry	45.0
Gross total sales from other agricultural enterprises	55.14
Tenure	19.47
Off-farm work	16.04
Farm value	29.28
Telephone contact (D.H.)	28.37
Farm Visits (D.H.)	40.42
Mail Contact with (D.H.)	18.21
Radio contact with (D.H.)	21.97

TABLE V

STATISTICALLY SIGNIFICANT CHI-SQUARE VALUES FOR SOCIO-ECONOMIC CHARACTERISTICS AGAINST ETHNIC ORIGIN (continued)

Socio-Economic Characteristic	Chi-square Value (Significant at .01 level)
Newspaper articles (D.H.)	28.04
Attendance at L.M.H.I.A. Short Course (1966)	35.46
Attendance at L.M.H.I.A. Short Course (1967)	37.7

Menonites reported considerably less formal education, compared to other ethnic groups. Seventy-three per cent had 8 or less years of schooling, compared to 43.5 per cent for Japanese and 47.1 per cent for respondents.

The educational level of wives was somewhat similarly distributed; the percentages in this educational category were 65.4 per cent (Menonites), 21.7 per cent (Japanese) and 35.3 per cent of the others. The apparent higher educational level of Japanese wives is misleading since 26.1 per cent of the Japanese respondents were either not married or did not indicate the educational level of their wives.

Menonites were also the least active in terms of social participation. Thirty-five per cent of this group had no score, compared to 13 per cent for Japanese and 7.8 per cent for others. On the other hand, both Japanese (78.2 per cent) and the other respondents (78.5 per cent) were similar relevant to the median level of social participation or above, compared to 61.6 per cent of Menonites.

Respondents classified as "others" had the larger, higher valued farms, the largest acreages in strawberry and in other agricultural enterprises; they, therefore, received the most total income from agriculture. Twice the proportion of Japanese, however, had other agricultural enterprises involving between 3 to 15 acres; the same proportion also received more gross sales from these enterprises. Complete farm ownership was also more characteristic of Japanese respondents.

Menonites seemed to concentrate more than all others on strawberry cultivation, with twice as many individuals, compared to other groups, reporting between 0 to 3 acres only, in other agricultural enterprises. This is perhaps partly explained by the fact that a larger proportion also spent more than half their normal working hours on off-farm jobs, thus not permitting much time for the operation on a large scale of different agricultural enterprises with varied management requirements.

Personal contact with the D.H. was lowest among the Japanese population, and highest among those respondents who were neither Menonite or Japanese. More than half the Japanese farmers (57 per cent) compared to 46 per cent of Menonites, and 23 per cent of the third group reported no telephone contact. A similar pattern was observed for farm visits, with 70 per cent of the Japanese farmers reporting no contact. While 28 per cent Menonites and 23 per cent of the "others" had high level contact by farm visits, only 4.4 per cent Japanese farmers fell in this category. The chi-square test did not reveal any significant differences between the groups for office visits.

Japanese respondents also reported the lowest level of contact by radio; twice as many Menonites, compared to all other groups reported radio contact. The third group indicated a significantly higher contact level by means of newspaper articles.

CHAPTER V

ADOPTER CATEGORIES AND THE ADOPTION OF INNOVATIONS

Analysis of the data with reference to the adoption of innovations has shown a distribution in adoption performance which fits the normally observed distribution for a population of farmers. It was possible, therefore, to use the classic pattern of adopter categories devised by Rogers.[1] The concept of "innovation response state," as devised by Verner and Gubbels,[2] is also used for further analysis. Finally, the reasons for rejection of the innovations, or for delay in proceeding with adoption are presented in respect of adopter categories.

I. CLASSIFICATION OF RESPONDENTS INTO ADOPTER CATEGORIES

The adoption score was the basis for classifying respondents into adopter categories. The total score for any respondent is cumulative in terms of his reported stage[3] in the adoption process for each practice at the time of the interview. Recorded scores ranged from 10 to 30 with a mean of 25.70 and a standard deviation of 3.914. The general level

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[1]E. M. Rogers, Diffusion of Innovations, op. cit.

[2]C. Verner and P. M. Gubbels, op. cit.

[3]The values assigned to different stages are 0 for not aware, 1 for awareness, 2 for interest, 3 for evaluation, 4 for trial and 5 for adoption. For the 6 practices, therefore, the possible total score for a respondent ranged between 0 for unawareness of any of the innovations to 30 for the adoption of all innovations.

of adoption by the sample was relatively high. Ten per cent had a score of 20 or less, 31 per cent scored between 21 to 25, 43 per cent 26-43, and 17 per cent had the maximum score of 30. Using Rogers'[4] procedure the subdivision of the sample into adopter categories was made on the basis of the mean and standard deviation.

The class limits for each category and the respective number of respondents are shown in Table VI. The innovator - early adopter categories are combined since after separating the first three categories, all other respondents had the maximum score of 30. Categories were distributed as follows:

(1) Laggards - less than the mean minus one standard deviation (0-21)	:12 respondents
(2) Late majority - the mean minus one standard deviation to the mean (22-25)	:28 respondents
(3) Early majority - the mean to the mean plus one standard deviation (26-29)	:43 respondents
(4) Innovator - Early Adopters - greater than the mean plus one standard deviation (more than 29)	:17 respondents
Total	100 respondents

The chi-square test showed that the distribution of respondents within adopter categories approximated the normal curve. Expected frequencies based upon known approximate

[4]E. M. Rogers, *op. cit.*, pp. 161-163.

TABLE VI

CLASSIFICATION OF THE RESPONDENTS INTO ADOPTER CATEGORIES

Adopter Category	Class Boundaries	Number of Standard Deviations from the Mean	Number of Respondents in each Category: Expected (Normal Frequency Curve) (e)	Observed (Sample Frequency (n)	$\frac{(n-e)^2}{e}$
Early adopter-innovator			15.75	17	.10
	29.6	+1			
Early majority			34.13	43	2.31
	25.7	0			
Late majority			34.13	28	1.10
	21.8	-1			
Laggard			15.75	12	.89
			Total	100	4.40 =chi-square value

Note: The null hypothesis that the sample frequency distribution approximated the normal curve distribution was tested at the .01 level of significance. The hypothesis was accepted since the calculated chi-square value was below the critical value of 6.635 (1 df; .01 level)[5]

[5]This level of significance indicates "a (fairly) good fit", — see John E. Freund and Frank J. Williams, Modern Business Statistics, (Englewood Cliffs, New Jersey: Prentice Hall, Inc., 1958), p. 260.

percentage distributions[6] of observations within the normal curve together with the distribution obtained, were used for this test.

II. RELATIONSHIP BETWEEN ADOPTER CATEGORY AND SOCIO-ECONOMIC CHARACTERISTICS

Since the use of adopter categories for classifying the individuals in a farm population relevant to practice adoption is a standard procedure, the data were analysed further by testing for relationships between socio-economic characteristics and adopter categories. Adopter categories can be conceived, within limits, as being a quantitative variable, with a low value assigned at the laggard end and the highest value at the innovator - early majority extreme.

The inevitability of partitioning individuals within definite class boundaries would seem to make the application of the chi-square test, rather than partial correlation analysis, more suitable, in view of its applicability to qualitative data. Also, there is the added advantage that the cross-break table facilitates examination of relationships between the variables. Values obtained by partial correlation analysis between adopter categories and the variables studied are indicated where they illustrate the relative strength of a relationship.

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[6] See Kenneth H. Kurtz, op. cit., p. 99.

In order to test for "gross relationships" between individuals in the upper and lower levels of adoption performance the four categories previously indicated were combined to obtain two categories. This results in essentially a "low" adoption category — laggards and late majority —, and a "high" adoption category including early majority and the early adopter-innovator respondents.

Tables for the chi-square analysis were set up according to the "percentage computation rule," as indicated by Kerlinger,[7] with all percentages computed "from the independent variable to the dependent variable". In this analysis, therefore, the 100 per cent total for each category of the socio-economic variable — the independent variable — is distributed among respondents in the two or four adopter categories — the dependent variable. This procedure also facilitates considerably, inspection and analysis of the data in terms of the hypothesis.

Where necessary, conditions for the close approximation of the chi-square distribution were ensured by combining cell frequencies so that all theoretical frequencies were equal to or greater than 5. There was the further safeguard that the computer programme used for the analysis, indicated if the data did not fit the requirements for this statistic.[8]

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[7]Fred N. Kerlinger, Foundations of Behavioral Research, (New York: Holt Rinehart and Winston, Inc., 1967), p. 628.

[8]The bivariate tables for which significant results were obtained are given in Appendix IV.

TABLE VII

STATISTICALLY SIGNIFICANT CHI-SQUARE VALUES FOR SOCIO-ECONOMIC CHARACTERISTICS AGAINST TWO AND FOUR ADOPTER CATEGORIES

Socio-economic Characteristic	Chi-square values: Using 2 Adopter Categories	Chi-square values: Using 4 Adopter Categories
Age	33.29*	51.27*
Number of children		19.36*
Education level	19.77*	22.08*
Educational level of wife	15.93*	15.98*
Agricultural courses in high school	9.87*	44.24*
Agricultural courses in vocational school		29.87*
Agricultural adult education	5.33	10.38
Attendance at 1966 short course sponsored by the L.M.H.I.A.	24.01*	30.76*
Attendance at 1967 short course sponsored by the L.M.H.I.A.	31.16*	66.46*
Attendance at 1966 short course in the State of Washington, U.S.A.	11.50*	15.43*
Attendance at 1967 short course in the State of Washington, U.S.A.		11.50*
Number of years of farming experience		37.47*
Number of years in strawberry	32.54*	54.00*
Number of years on present farm	11.67*	42.68*
Ethnic origin	22.66*	33.01*
Social participation	44.72*	110.51*
Total acreage farmed	56.48*	104.40
Acreage in strawberry	112.51*	85.76*
Acreage in other agricultural enterprises	18.74*	33.78*
Gross total sales from agriculture	45.25*	74.08*
Gross sales from strawberry	68.24*	79.75*
Gross sales from other agricultural enterprises	13.66*	31.94*
Amount of time spent in off-farm work		49.11*
Estimated value of farm	33.85*	37.05*
Visits to the office of the D.H.	64.74*	79.32*
Telephone calls to the D.H.	84.59*	92.22*
Visits to the farm by the D.H.	107.53*	143.41*
Mail from the D.H.	94.43*	92.72*

Note: The underlined values are significant. The null hypothesis is that there is no difference in the level of adoption due to the influence of the socio-economic characteristic.

*Significant at the .01 level.

TABLE VII (continued)

STATISTICALLY SIGNIFICANT CHI-SQUARE VALUES FOR SOCIO-ECONOMIC CHARACTERISTICS AGAINST TWO AND FOUR ADOPTER CATEGORIES

Socio-economic Characteristic	Chi-square value: Using 2 Adopter Categories	Chi-square value: Using 4 Adopter Categories
Radio announcements by the D.H.	64.58*	55.43*
Television announcements by the D.H.		16.37*
Newspaper articles by the D.H.	34.56*	37.23*
Attendance at local meetings, field days and demonstrations	36.30*	22.62*
Attendance at meetings of L.M.H.I.A.		36.05*
Extension contact with the D.H. (Rogers and Havens scale)	104.98*	112.63*
Combined extension contact with the D.H. and other agents	101.90*	41.16*

Note: The underlined values are significant. The null hypothesis is that there is no difference in the level of adoption due to the influence of the socio-economic characteristic.

*Significant at the .01 level.

Age

The negative relationship indicated by partial correlation analysis against adoption score (r= -.31) and adopter categories (r= -.30) is supported by the data. Eighty per cent of the respondents in the 20-34 age group were in the combined high level adoption category, compared to 68.5 per cent in the 35-54 age group and 41.6 per cent for respondents 55 or more years of age. Similarly, 20 per cent of the respondents in the youngest age group were at the lower end of the adoption scale, compared to 58.49 per cent of the oldest age group. The relationship has greater significance in terms of four adopter categories than with two categories only.

Number of Children

A significant difference was obtained for four adopter categories only. This is illustrated by the fact that there is a negligible difference between the proportion of respondents in the upper level adopter categories with 0-2 children (63.1 per cent) compared to those with three or more children (58.1 per cent). In comparison with the larger families, there were 29.2 per cent more respondents with 0-2 children in the early majority category, but 18.9 per cent less in the early adopter-innovator group. The relatively low chi-square value, even though significant at the .01 level, is perhaps explained by the low, non-significant, but positive "r" value (r=.15). The partial correlation analysis indicates that the younger respondents, who tended to have less children, were higher on the adoption scale. The relationship between age and number of children (r=.27) indicates that only about 9 per cent of the variation[9] in the number of children is accounted for by variation in age of the parent.

Education

The significant chi-square values were approximately the same for two and four adopter categories. There were fewer laggards (6.5 per cent) among respondents with more

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[9]See K. H. Kurtz, *op. cit.*, p. 207.

than eight years of schooling, compared to 17 per cent for those with eight or less. The difference at the early adopter-innovator level is in favour of the less educated respondents, but is negligible (4.8 per cent). More than twice the percentage of the more highly educated respondents (58.1 per cent) compared to the less educated respondents (26.4 per cent), are in the early majority category. In terms of two adopter categories, the less educated respondents are almost evenly distributed at both ends of the adoption scale, compared to 74 per cent of respondents with more than eight years of schooling in the upper adoption level.

Education of the Wife

In comparison with the analysis for the education of respondents, the education of the wife had lower chi-square values, but these were similar for both two and four adopter categories. Among respondents with better educated wives, a smaller percentage (6.8 per cent) was in the laggard category, compared to 15 per cent for the other group.

The percentage differences were more marked among the upper adopter categories. Fifty per cent were classified as early majority, and 25 per cent as early adopter-innovators, compared to 32.5 and 15 per cent, respectively, for the lower educational level. For combined categories, the percentage distribution of respondents at upper and lower adoption extremes, within each educational level, is almost identical with the distribution for respondents themselves, thus lending support to the "r" value of .39 for partial correlation between the educational levels of respondents and their wives.

Agricultural Courses in High School

Since only five respondents reported having attended agriculture courses in high school, caution is necessary in assessing the degree of significance, as indicated by the chi-square value. None were at either extreme of the adoption classification, but, at the "majority" level, almost twice the percentage (80 per cent) were classified as early majority, compared to those who did not take such courses (41.5 per cent).

Agricultural Courses at Vocational School

The chi-square value was only significant for four adopter categories. There were no laggards among those who had taken such courses. Among respondents who took courses, the percentage at the early adopter-innovator level (42.8 per cent) was much larger than the 15 per cent who did not have such courses.

Agricultural Adult Education

Statistical significance was indicated at the .05 level only. The data indicates that attendance at agricultural adult education courses in 1966 made no difference at the laggard level. Among those who attended, there was a smaller percentage in the late majority category, about the same in the early majority, but 24 per cent in the early adopter-innovator category, compared to only 10 per cent for those who did not attend such courses. For combined categories, there was 16 per cent more participants among the early majority and early adopter-innovator respondents, than among those who did not attend such courses.

Attendance at Short Courses (L.M.H.I.A.)[10]

The chi-square values are significant at the .01 level for attendance at the annual L.M.H.I.A. Short Courses in 1966 and 1967, which were of specific interest to the strawberry and other small fruit farmers. Compared to the relationship for overall attendance at any agricultural adult education course, the chi-square values obtained are at least doubled for four adopter categories, and the increase is 5-6 times more for gross relationships when tested against two adopter categories.

There was a negligible difference between attendance or non-attendance for 1966 at the laggard level, but, there is a larger percentage of respondents who did not attend in both lower adopter categories, with the resulting reversed situation for attendance among the higher adopter categories. The percentage distribution at the higher adoption level,

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[10]Lower Mainland Horticultural Improvement Association.

increases with an increase in the number of days attended, but is more marked at the early adopter-innovator level, where the difference is about 10 per cent.

The larger chi-square value for attendance in 1967 is illustrated by the fact that while the general trend is the same for both years, the apparent relationship with attendance is more outstanding. The percentage of respondents for the combined upper adopter categories are 49 per cent for non-attendance, 75 per cent for attendance on one day and 93 per cent for attendance on both days. At the early adopter-innovator level, the percentage for attendance on both days (35.3 per cent) is at least three times more than for non-attendance (11.3 per cent).

Years of Farming Experience

A significant distribution is indicated by the chi-square value for four adopter categories only. There is a slightly higher percentage of laggards among respondents with nine or less years of experience. The situation is reversed for the late majority category with almost double the percentage in each instance for respondents with 10-19 and 20 or more years of experience, and with no real difference between these two groups. There are no respondents in the early adopter-innovator category with nine or less years of experience, although 69.2 per cent are classified as early majority, compared to a range of 38-42 per cent for the more experienced farmers.

There is no real difference among the two groups of more experienced farmers in terms of the percentage distribution among the adopter categories. Partial correlation analysis which has the advantage of controlling the influence of other variables gave an extremely low "r" value of .04 for the relationship between this variable and adoption.

Number of Years in Strawberry Growing

The data does not indicate a definite continuous trend relevant to this variable as indicated by the extremely low partial correlation value (r= -.02). The percentage of laggards (14-15 per cent) among growers with 10 or more years of experience is about twice that for less experienced growers (6-7 per cent). The early adopter-innovator category includes 5.9 per cent of the respondents among the least experienced growers, compared to 13-27 per cent for those with five or more years experience.

Growers with less than 10 years experience had 53-60 per cent early majority, compared to 36-37 per cent for more experienced farmers. In general, adoption performance is highest for respondents with 5-9 years of experience. Besides having the largest percentage in each of the upper adopter categories, the combined percentage (86.6 per cent) is at least 25 per cent more than all other groups which range between 50-61 per cent.

Number of Years on Present Farm

The relationship between adoption and this variable is somewhat similar to that found for experience with the strawberry crop. The highest combined percentages of low level adopters are among respondents who were on their present farms for less than five years (50 per cent) or for 10-19 years (52 per cent). The reversed situation occurs in the two other categories with the most favourable distribution in terms of adoption performance among respondents resident on their farms for 5-9 years and for 20 or more years.

A negative, but inconsistent relationship is indicated by the fact that respondents who were resident on their farms for less than 10 years had the highest percentage of early adopter-innovators (25 - 27.6 per cent), compared to 7.9 per cent for the 10-19 years group, and 16 per cent among those resident for 20 or more years. Partial correlation analysis (r=.01) supports this general relationship.

Ethnic Origin

The general relationship of adoption performance among various ethnic groups as indicated in Chapter IV is further highlighted by this analysis. There was a larger percentage of laggards (17.4 per cent) among Japanese respondents, compared to Menonites (11.5 per cent) and to "others" (9.8 per cent). The difference is more marked at the other extreme of adoption performance with only 4.3 per cent Japanese, compared to 19.6 per cent for the third group and 23.1 per cent for Menonites. The significantly higher overall level of practice adoption among respondents who were neither Japanese or Menonites, is particularly evident at the early majority level. Fifty-three per cent of this group was classified at this level, compared to a range of 31-35 per cent for Menonites and Japanese. When the upper adopter categories are combined, the general pattern is clear; the result is 39.1 per cent Japanese, 53.9 per cent Menonites and 72.5 per cent for the third group.

Social Participation

The positive significant relationship obtained by partial correlation analysis (r=.42) is borne out by the data. In general, the percentage of laggards is inversely related to the level of social participation. There was 37.5 per cent laggards among respondents with a zero score, compared to 5.9 per cent for a score exceeding 24; this trend continues at the late majority level.

The positive relationship between adoption and this variable is particularly marked at the early majority level with 22.7 per cent for a zero score, compared to 64.7 per cent for a score of more than 24. The combination of adopter categories further strengthens the relationship with an almost four-fold change in the percentage distribution. Higher performance adopter categories range between 27.3 per cent for a score of zero to 82.3 per cent for a score exceeding twenty-four.

Total Acreage Farmed

A positive relationship is evident between farm size and adoption. There is an inverse percentage distribution at the laggard and late majority level of adoption with increase in total acreage farmed. Laggards average 35.3 per cent for the 0-4 acres group, compared to 7.7 per cent for respondents with 30-119 acres; there are no laggards with farms exceeding 119 acres. In the upper adopter categories, combined percentages range through 29.4 per cent (0-4 acres), 61 per cent (5-29 acres), 69.2 per cent (30-119 acres) and 90.9 per cent for respondents with more than 119 acres.

Acreage in Strawberry

The relationship between acreage in strawberry and adoption is similar to that indicated for farm size. There is the typical negative or inverse relationship with adoption at the lower adoption levels, together with a positive relationship for upper adopter categories. The latter relationship is illustrated by the combined percentage range of 30.3 per cent for the 0-3 acre group, compared to 89.5 per cent for respondents with 30 or more acres.

Acreage in Other Agricultural Enterprises

The chi-square values were significant for both two and four adopter categories, but were very much smaller than those for total farm size or acreage in strawberry. The partial correlation coefficient (r=.33) was significant, but is the smallest for all acreage measurements.

There is no consistent trend in the data. The percentage of laggards decreases with acreage; 21.4 per cent for the 0-2 acre group, 10.3 per cent for 3-14 acres and 6.1 per cent for 15 or more acres. A positive relationship is most evident at the early majority level between extreme acreage groups; the percentage distribution ranges between 36 per cent for 0-14 acres, compared to 57.6 per cent for more than 14 acres. Combined percentages at the upper adoption level are 60.8 for the 0-2 acres and 72.7 per cent for 15 or more acres, with the lowest percentage (48.7 per cent) in the 3-14 acre group.

Gross Total Sales from Agriculture

There is some evidence of a relationship between gross total income from agricultural sales and adoption. Except at the early adopter-innovator level, the significance is only marked between respondents reporting sales of less than $5000 and those with $5000 or more. In general, the percentage of respondents at the lower adoption levels decreases with an increase in income, ranging from a combined percentage of

68.6 per cent for the lowest income group to between 22-26 per cent for those with sales totalling $5000 or more.

The reverse trend occurs at the early adopter-innovator level; percentages increase continuously with income from 8.6 per cent for respondents reporting less than $5000 to 30.4 per cent for those with more than $25,000. When percentages are combined for upper adoption categories, 73.8 per cent of the respondents reporting $5 - 25,000 and 78.2 per cent of those reporting more than $25,000 were early adopters. On the other hand, the percentage for respondents reporting less than $5000 (31.4 per cent) was markedly lower.

Gross Sales from Strawberry

Gross strawberry sales, which is specific to the innovations under consideration in this study, shows a more consistent relationship to adoption than does total gross agricultural income. The chi-square values are larger, especially for gross relationships in terms of two adopter categories.

There are 25.6 per cent laggards among respondents reporting $3000 or less, and none among those reporting more than $5000. Combined percentages showed that 64.1 per cent of the respondents in the lowest income group were late adopters, compared to only 36.2 per cent for those reporting $3000 - 5,000, and 8 per cent among respondents receiving more than $5,000. The positive relationship between the two variables is very evident at the upper adoption level. Early adopters comprised 35.9 per cent of respondents reporting less than \$3,000, 63.8 percent (\$3000 - \$5000) and 92 per cent for the more than \$5000 income group.

Gross Sales from Other Agricultural Enterprises

The lower chi-square values, again seem to emphasize that while there is a relationship between the size of the farm operation and practice adoption, its strength and consistency decreases when the variable is not specific to the particular innovations under consideration.

The positive relationship indicated by the partial correlation coefficient (r=.49) is only clearly evident at all levels of adoption between respondents reporting less than \$3000 and those receiving more than \$15,000. The middle sales income category (\$3000 - \$15,000) does not always fit an expected pattern such as would result in a consistent relationship, typical for income and adoption.

The percentage distribution for laggards decreases with an increase in sales: 18.4 per cent in the lowest income group (less than \$3000), 6.9 per cent (\$3000 - \$15,000) and 4.5 per cent for income exceeding \$15,000. At the early majority level, the trend is more limited with 34.7 per cent in the lowest income group, compared to 50-52 per cent for the higher income groups. Combined percentages best indicate the expected pattern; for example, the distribution at the upper adoption level ranges between 52 per cent in the less than

$3000 group, 58.6 per cent in the middle group and 79.3 per cent for sales exceeding $15,000.

Amount of Time Spent in Off-Farm Work

The chi-square value was significant for four adopter categories only. The difference in adoption performance would seem to be clear only in terms of those who either did or did not work off their farms in 1966. There were 16.7 per cent laggards among respondents reporting no off-farm work compared to 7.2 per cent for those who worked one-half or more of their normal working hours on off-farm jobs. There is a slight reversal at the late majority level.

At the upper adoption level, 51.6 per cent of those reporting no off-farm work are in the early majority category, compared to 25-32 per cent for all others reporting off-farm jobs. The percentage distribution again reverses at the early adopter-innovator level. Combined percentages at the upper adoption level remove any evidence of a trend, since the percentage of respondents at either extreme is approximately 62 per cent.

Estimated Farm Value

The relationship with adoption is similar to that indicated for the total acreage farmed. The percentage of respondents at each of the low adoption levels is higher with the lowest valued farms and decreases with increasing farm value. At each of the upper adoption levels, the positive relationship is illustrated; combined percentages range between 41 per cent (less than $3000), 70.7 per cent ($30,000 to less than $90,000) and 78.9 per cent for farms valued at $90,000 or more.

Extension Contact Through Office Visits

Similar to the partial correlation analysis for various aspects of personal contact, this contact channel had the lowest chi-square value. There is a marked difference between the high percentages of respondents in the low adopter categories within the non-contact group and the decline with the increase of contact frequency. There are no laggards in the high frequency contact group, and only 10 per cent of the late majority compared to 27-32 per cent for no contact and low frequency contact groups.

The trend is maintained at the early majority level, but is less marked with 45 per cent having no contact and 30 per cent with high frequency contact. The positive association with adoption is only evident at the early adopter-innovator level with a low 8.8 per cent reporting no contact and a significant rise to 60 per cent with high frequency contact.

Extension Contact by Telephone

While the trend is similar to that obtained for contact by office visits, the decrease in the percentage distributions at the lower adoption levels, in association with increased contact frequency, is more marked in this instance. The higher positive association with an increase in the level of contact is illustrated by combined percentage distributions. At the upper adoption level, 32.4 per cent reporting no contact increases by 49 per cent to 81.4 per cent with high frequency contact. In comparison, the increase for the same percentage relative to office visits is 36 per cent. There are no laggards among respondents reporting high frequency contact.

Extension Contact by Farm Visits

The significance of the highest chi-square value for all personal contact channels is illustrated clearly and relatively consistently at three of the four adopter category levels. There are no laggards in the high frequency contact group; while the overall trend is similar, the strength and consistency of the relationship is very evident from the data (Table LXXXIV), except at the early majority level.

Combined percentages at the lower adoption level decrease by 64.4 per cent from 72.7 per cent for no contact to 8.3 per cent for high frequency contact. Comparative percentage differences for contact by office visits and telephone are 35.6 per cent and 49 per cent, respectively. At the upper adoption level where the positive relationship is most evident, the percentage increases from 27.3 per cent for no contact to 91.7 per cent for high frequency contact.

At the early majority adoption level, the percentage distribution at the middle or low contact level does not follow the basic trend.

Extension Contact by Mail

A positive relationship with extension contact by mail is apparently confined to use or non-use of the channel. The trend in percentage distributions between adopter categories is similar to that obtained for personal contact channels, but it does not extend clearly through both the low and high frequency contact levels. Also, the percentage differences are extremely small, except at the early majority adopter category level.

Extension Contact Through Radio Announcements

The typical trend relationship is evident, except again at the early majority level where the percentage of low frequency contact respondents (43.8 per cent) is still higher, compared to the high frequency contact group (33.3 per cent). The reversed trend does not occur until the early adopter-innovator level with a range of 8.8 per cent for no contact, 17.9 per cent for low frequency contact and 46.7 per cent for high frequency contact. There are no laggards in the high frequency contact group.

Extension Contact Through Television

Because of the small percentage of respondents who reported contact by this channel, only two categories were possible, users and non-users. The trend is similar to that observed for radio contact, with larger percentages of respondents among non-users at all levels of adoption between laggards and early majority. A positive relationship with adoption only becomes evident at the early adopter-innovator level. The relatively weaker relationship with this variable is illustrated by a very small chi-square value, which is only significant, relative to four adopter categories.

Extension Contact Through Newspaper Articles

The positive relationship between adoption and use of this contact channel is only clearly evident at the level of the extreme adopter categories. The difference in percentage distributions is insignificant at the late majority level, and is only significant between users and non-users at the early majority level.

Attendance at Local Meetings, Field Days and Demonstrations

Except for the laggard category, the positive relationship between adoption and attendance at local meetings, field days and demonstrations is more clearly evident between those reporting non attendance and those reporting more than a single attendance. The relationship is less consistent in terms of the comparative distribution of respondents, at various levels of adoption performance, for those reporting a single attendance.

Attendance at Meetings of the L.M.H.I.A.

The chi-square value was only significant in terms of four adopter categories; except at the early adopter-innovator level, the positive relationship with adoption is evident. At the lower adoption level, the percentages decrease with an increase in attendance; for example, the percentage of laggards not attending (16.7 per cent) is higher than that for a single attendance (11.1 per cent) or for attendance at more than one meeting (3.2 per cent).

Combined percentages at the upper adoption level emphasize the relationship; respondents classified as early majority or early adopter-innovator were 46.6 per cent within the group not attending any meetings, compared to 66.7 per cent for a single attendance and 83.7 per cent for more than one attendance.

Extension Contact Scales

The positive relationship between extension contact and adoption is illustrated by the size of the chi-square value, especially in terms of gross relationships for two adopter categories. The typical percentage distributions show the greatest change at extreme ends of the adopter categories. There is a 36.1 per cent decrease for an increasing number of contacts at the laggard end, and a 30.6 per cent increase for an increasing number of contacts at the early adopter-innovator level. This significance is given greater impact by a 61 per cent directional change in percentage distributions for combined categories at the upper and lower levels of adoption performance (Table XCI).

The relationship relevant to the extended extension contact score for the D.H. and other agents is indicated in Table XCII. The trend is similar but is less marked, as indicated by the smaller chi-square values, especially in relation to four adopter categories.

III. ADOPTION AND NON-ADOPTION OF THE INNOVATIONS

Respondents were asked about their progress through the adoption stages for each of the innovations. As would be expected, very few respondents could indicate clearly their stage in the adoption process, and it was necessary to determine the actual stage by further discussion in an attempt to follow the pattern of the adoption process, as recalled by the respondent. In many instances, this procedure contributed to clarification of the actual stage in the adoption process.

Progress Toward Adoption of the Innovations

An overall indication of the progress toward adoption by the sample of farmers is indicated by the following average for the 6 innovations relevant to each stage in the adoption process: not aware 0.1, 0.08 for awareness, 0.4 for interest, 0.7 for evaluation, 0.5 for trial and 4.12 for adoption. The average for discontinuance (0.02) was negligible and only involved a single respondent relevant to each of two practices.

As seen in Table VIII, the percentage range for not aware was between 1 and 8 per cent, and was only recorded for three innovations. Two of the three innovations involved were also the most recently introduced. At the awareness stage, the percentage ranged between 1 and 5 per cent, and was only recorded for three practices, including two of the three indicated for not aware. Respondents who were at the awareness stage included four laggards, three late majority and one early majority.

The percentage of respondents at the interest and evaluation stages were much larger ranging from 2 to 21 per cent for interest and from 2 to 27 per cent for evaluation. Each of these stages were relevant to five of the six innovations. For all stages discussed, the highest percentages were recorded for the same two practices.

TABLE VIII

PERCENTAGE DISTRIBUTION OF RESPONDENTS AT EACH STAGE IN THE ADOPTION PROCESS BY INNOVATION

Innovation	Stage							
	Not Aware	Awareness	Interest	Evaluation	Trial	Adoption	Discontinuance	Total
	%	%	%	%	%	%	%	%
1. Soil analysis for nematode control	8.0	2.0	8.0	23.0	9.0	50.0	0.0	100.0
2. Captan for fruit rot control	1.0	0.0	7.0	2.0	14.0	76.0	0.0	100.0
3. Cultural operation-change from hill to matted row	0.0	0.0	2.0	4.0	10.0	83.0	1.0	100.0
4. Chemical weed control	0.0	1.0	5.0	12.0	5.0	76.0	1.0	100.0
5. Picking carts	5.0	5.0	21.0	27.0	9.0	33.0	0.0	100.0
6. Virus-free plants	0.0	0.0	0.0	0.0	6.0	94.0	0.0	100.0
Average: All innovations	2.3	1.3	7.2	11.3	8.9	68.6	0.3	100.0

Respondents were recorded at the trial stage for all six practices, with the highest percentage (14 per cent) found in the use of Captan for fruit-rot control. Adoption ranged between 33 per cent for the use of picking carts and 94 per cent for the adoption of virus-free certified plants. All innovations, except the use of picking carts, were adopted by at least 50 per cent of the respondents. The percentage distributions between stages in the adoption process for each practice are given in Table VIII.

Except for a single instance involving a late majority respondent, unawareness of innovations was only recorded for laggards. Except for late majority respondents at the evaluation stage, the percentage of respondents at each stage decreases within each of the first five stages in the direction of higher adoption performance, as indicated by adopter category. For example, while there were 5.6 per cent and 19.4 per cent laggards at the awareness and interest stages, respectively, the corresponding percentages for the early majority respondents were 0.4 per cent and 4.2 per cent. At the early adopter-innovator level, 100 per cent adoption was recorded for all practices (Table IX).

At the middle or evaluation stage, the percentages of laggards (11.1 per cent) and early majority (10.9 per cent) were almost the same, with a much higher percentage (19.0 per cent) for late majority. The original trend continues at the trial stage, with the largest percentage among laggards (15.3 per cent), compared to 7.3 per cent for early majority.

TABLE IX

PERCENTAGE DISTRIBUTION OF RESPONDENTS AT EACH STAGE IN THE ADOPTION PROCESS BY ADOPTER CATEGORY

Stage Reached	Adopter Category: Laggard	Late Majority	Early Majority	Early Adopter-Innovator
	%	%	%	%
Not Aware	18.0	0.6	0.0	0.0
Awareness	5.6	1.8	0.4	0.0
Interest	19.4	10.7	4.2	0.0
Evaluation	11.1	19.0	10.9	0.0
Trial	15.3	13.7	7.3	0.0
Adoption	30.6	53.0	77.2	100.0
Total	100.0	98.8*	100.0	100.0

*1.2 per cent accounted for by Discontinuance

Note: A significant chi-square value (.01 level) of 161.17 was obtained.

A complete reversal of the trend in percentage distribution occurs at the adoption stage. There is a continuous increase from a low 30.6 per cent for laggards to 100 per cent for the early adopter-innovators. In the data shown by Verner and Gubbels,[11] the reverse in the percentage distributions occurs at the evaluation stage, while in this study, the change does not occur until the adoption stage. Also, the early adopter-innovators are all at the adoption stage. The chi-square test indicated a level of significance of .01 for the distributions shown in Table IX. The previous condition of all expected frequencies equal to or more than five is relaxed in this instance, in accordance with the suggestion by Kurtz[12] for problems involving more than one degree of freedom; at least 80 per cent of the expected frequencies are five or more, and none is less than one.

The Innovation Response State of the Respondents

Verner and Gubbels[13] used the classification of "innovation response state" in order to categorize respondents in terms of their relative decision regarding a practice at any moment in time. In comparison with the classic five-way classification by Rogers, this procedure would seem to provide continuity of a more action-oriented nature, so long as the respondent is not unaware of the innovation.

A major advantage of this classification by innovation response state is the greater degree of definition given to the respondent's relationship to the innovation. If the

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[11] C. Verner and P. M. Gubbels, op. cit., p. 42.

[12] K. H. Kurtz, op. cit., p. 225.

[13] C. Verner and P. M. Gubbels, op. cit.

practice has not been adopted or rejected, then, the respondent is continuing with the adoption process, and this state of mind facilitates the efforts of the agricultural change agent. The five possible innovation response states, as defined by Verner and Gubbels,[14] are used for further analysis.

The distribution of respondents by innovation response state for each practice is given in Table X. The relative percentage distributions for unawareness and adoption, which are identical categories in the previous analysis, remain unchanged.

The percentage distributions for different response states would seem to bear some definite relationship to available knowledge concerning the innovations. The high adoption percentages for virus-free plants (94 per cent) and the cultural change from hill planting to the matted row system (83 per cent) are partly explained by the fact that they were the first of the six practices to be introduced to the population of farmers. No respondents were unaware of these two practices.

It is hardly to be expected that any strawberry grower who is the least bit progressive would have failed to adopt the use of disease-resistant plants. Detailed analysis for adoption (Table XCV) shows the percentage of adoption increasing progressivel

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[14]C. Verner and P. M. Gubbels, op. cit., p. 45. The five innovation response states are Unawareness, Continuation in the adoption process, Rejection, Adoption and Discontinuance.

from the laggards (83.3 per cent) to the early adopter-innovator category (95.4 per cent). This difference, however, is relatively small, and is the least among all six innovations.

TABLE X

PERCENTAGE DISTRIBUTION OF RESPONDENTS BY INNOVATION RESPONSE STATE FOR EACH INNOVATION

Innovation	Innovation Response State					
	Not Aware	Continuing the adoption process	Rejection	Adoption	Discontinuance	Total
	%	%	%	%	%	%
1. Soil analysis for nematode control	8.0	26.0	16.0	50.0	0.0	100.0
2. Captan for fruit-rot control	1.0	15.0	8.0	76.0	0.0	100.0
3. Cultural operation-change from hill to matted row	0.0	10.0	6.0	83.0	1.0	100.0
4. Chemical weed control	0.0	12.0	11.0	76.0	1.0	100.0
5. Picking carts	5.0	21.0	41.0	33.0	0.0	100.0
6. Virus-free plants	0.0	4.0	2.0	94.0	0.0	100.0
Average: All Innovations	2.3	14.7	14.0	68.6	0.3	100.0

Bivariate analysis showed that among the few respondents who did not adopt the practice, the percentage was greater with each step lower in the level of adoption performance. Non adopters included 16.7 per cent laggards, 7.1 per cent late majority and 4.7 per cent early majority. Only laggards reported that they had rejected the practice.

The next highest percentage for adoption (83 per cent) was reported for the change in the cultural system from hill planting to matted row. Rejection was reported by laggards (33.3 per cent) and late majority (3.6 per cent) respondents. Those continuing with the adoption process were laggards (25 per cent), late majority (17.9 per cent) or early majority (4.6 per cent) (Tables XCIV - XCVI).

Adoption of captan for fruit rot control was reported by 76 per cent of the growers; the only individual unaware of this practice was classified as a laggard. The pattern of rejection among respondents was a typical decreasing proportion in the direction of the upper adoption level. One third of the laggards (33.3 per cent), compared to 10.7 per cent late majority and 2.3 per cent early majority reported rejection. Twenty-five per cent of the laggards and 28.6 per cent late majority were continuing with the adoption process, compared to only 9.3 per cent late majority. One third of the laggards (33.3 per cent), almost twice the proportion of late majority (60.7 per cent) and 88.4 per cent of early majority respondents adopted the innovation. Except for the two innovations already discussed, this practice had the lowest percentage rejection.

The considerable economic losses which may result from fruit rot damage have been indicated, therefore, it is difficult for growers to stop using this practice even if they are not satisfied with the results. As shown earlier (Table VIII), the highest percentage were at the trial stage for this innovation. Similarly, again except for the change over to matted rows, this practice also has the largest combined percentage for interest and evaluation (9 per cent). Reference to Table XCV further illustrates the fact; except for the long introduced innovations, a higher percentage of laggards (33.3 per cent) adopted this practice, compared to any other.

Seventy-six per cent of the respondents also reported adopting the use of chemical weed control, with only a single individual reporting having discontinued the practice (Table VIII). The typical percentage distribution among adopter categories ranged between 16.7 per cent for laggards to 95.4 per cent for early majority and 100 per cent for the early adopter-innovators. A reverse distribution is shown for the innovation response states of continuing with the adoption process and rejection (Tables XCIV and XCVI). The combined percentage for these two innovation response states (23 per cent) is the same for both innovations involving the routine use of chemical treatments — captan and chemical weed control.

The adoption of soil analysis specifically for nematode control was reported by 50 per cent of the respondents. The percentage distribution ranged from 8.3 per cent for laggards to 62.8 per cent for the early majority respondents. More than one-half the laggards (58.3 per cent) and 3.6 per cent of the late majority were unaware of the innovation. This is the only innovation in respect of which any but a laggard reported unawareness. Except for the use of picking carts, this practice had the largest percentage of rejection (16 per cent), and for continuing with the adoption process (26 per cent).

The high percentage of respondents in these two situations is partly explained by a situation which was unique in its relevance to this innovation. A number of respondents were aware of the economic safeguards to be expected from actual field treatment in the event of an infestation; thus, even though they never actually tried the innovation of soil testing, they had gone ahead with application of the treatment process. A few growers with very large acreages, who practiced rotation, felt that they had adequate safeguards in this procedure. While some respondents indicated that they had rejected the practice, others were still evaluating its merits, and were, therefore, considered to be continuing with the adoption process.

The use of picking carts as an innovation had the lowest percentage adoption (33 per cent), and the highest percentage for rejection (41 per cent). The percentage continuing with adoption (21 per cent) is also second only to that for the use of soil analysis in the control of nematodes (Table X). The practice was not adopted by any laggards, and varied within the narrow range of 17.9 per cent adoption for the late majority and 25.6 per cent for the early majority. This innovation, in particular, illustrates the tendency of the early adopter-innovator to get ahead with new innovations in the management of the farm enterprise. Rejection was quite high within all three relevant adopter categories as this innovation response state was reported by at least 50 per cent of the laggards, 57.1 per cent late majority and as much as 46.5 per cent of the early majority respondents (Table XCVI). At least one quarter of the "majority" respondents had not yet made a firm decision about the innovation (Table XCIV). The recency of the innovation is indicated by only 41 per cent awareness among laggards while no other respondents reported unawareness (Table XCIII).

The relationship between innovation response state and adopter category is illustrated in Table XI. Unawareness is largely confined to the respondents classified as laggards. Continuation in the adoption process is at the same general level for respondents in the lower adopter categories (22-23 per cent) with only 12.4 per cent among the early majority. The percentage rejection increases away from the upper adopter category level, while adoption shows the typical reverse trend.

Reasons for Delay in the Adoption Process

For the purpose of this study, delay implies two or more years spent in the adoption process. Since the process begins with the respondent becoming aware of the innovation, many reasons are likely to explain the time span involved. Reasons given were classified into two major sub-types. Where possible, they were classified as being relevant to a characteristic of the innovation, as suggested by Rogers[15]; in other

TABLE XI

PERCENTAGE DISTRIBUTION OF RESPONDENTS BY INNOVATION RESPONSE STATE AND BY ADOPTER CATEGORY

	Adopter Category			
Innovation Response State	Laggard	Late Majority	Early Majority	Early Adopter-Innovator
	%	%	%	%
Unaware	18.0	0.6	0.0	0.0
Continuing with the adoption process	22.2	23.8	12.4	0.0
Rejection	29.2	21.4	10.4	0.0
Adoption	30.6	53.0	77.2	100.0
Total	100.0	98.8*	100.0	100.0

*1.2 per cent accounted for by Discontinuance

[15]E. M. Rogers, op. cit., pp. 124-133.

instances, they are classified under a number of non-specific or general reasons which were relevant to the particular situation as seen by the respondent.

Characteristics of the innovations were of somewhat lesser importance (45.3 per cent) compared to other general reasons (54.7 per cent). Concerning the former sub-type, failure to perceive the relative advantage of the innovation (23.6 per cent) and communicability — difficulty in seeing the beneficial results of its application — (17.3 per cent) were most oustanding. Except for these reasons, a number of miscellaneous situational factors (38.5 per cent) were the only other outstanding category (Table XII).

The reasons classified within the two major sub-heads are almost evenly divided for three of the six innovations — the use of chemical weed control, the use of virus-free certified plants and the change from hill planting to matted row. While there is a 12 per cent difference in favour of innovation characteristics for soil analysis relevant to nematode control, the percentages under this sub-head are much smaller for the use of Captan (22.2 per cent) and picking carts (36 per cent). In general, however, there is a predominance of responses for relevant advantage, communicability and miscellaneous situational factors (Table XIII).

Concerning soil analysis for nematode control, some respondents simply said that they had "no problem" implying that they had never suffered the effects of an infestation.

TABLE XII

PERCENTAGE FREQUENCY DISTRIBUTION OF REASONS FOR DELAY IN PROCEEDING THROUGH THE ADOPTION PROCESS FOR ALL INNOVATIONS COMBINED

Reasons for delay		Frequency
By Characteristic of the innovation		%
Relative advantage		23.6
Compatibility		3.4
Complexity		0.5
Divisibility		0.5
Communicability		17.3
	Subtotal	45.3
Other General Reasons		
Fear or evidence of crop damage		2.4
Needed more information		7.2
Unsatisfactory results by other farmers		0.9
Influenced by other farmers who decided not to adopt the innovation		0.9
Influenced by members of the respondent's family		0.5
Innovation considered to be costly		4.3
Miscellaneous situational factors		38.5
	Subtotal	54.7
	Total for all reasons	100.0

TABLE XIII

PERCENTAGE DISTRIBUTION OF REASONS FOR DELAY IN THE ADOPTION

PROCESS BY INNOVATION

Reasons for Delay	Innovation					
	Soil Analysis for Nematode Control	Captan for fruit-rot Control	Change from Hill to Matted Row	Chemical Weed Control	Use of Picking Carts	Use of Virus-free Certified Plants
By Characteristic of the Innovation	%	%	%	%	%	%
Relative advantage	25.0	-	21.1	25.5	36.0	31.4
Compatibility	2.8	-	-	12.8	-	-
Complexity	-	-	-	2.1	-	-
Divisibility	2.8	-	-	-	-	-
Communicability	25.0	22.2	26.3	8.5	-	20.0
Sub-total	55.6	22.2	47.4	48.9	36.0	51.4
Other General Reasons						
Fear or evidence of crop damage	2.8	-	-	8.5	-	-
Needed more information	5.5	7.4	7.9	6.4	4.0	11.4
Unsatisfactory results by other farmers	-	3.7	-	2.1	-	-
Influenced by other farmers who decided not to adopt the innovation	2.8	-	-	2.1	-	-
Influenced by members of the family	2.8	-	-	-	-	-
Innovation considered to be costly	5.5	3.7	-	2.1	12.0	5.7
Miscellaneous situational factors	25.0	63.0	44.7	29.8	48.0	31.4
Sub-total	44.4	77.8	52.6	51.0	64.0	48.5
Total	100.0	100.0	100.0	100.0	100.0	100.0

The beneficial effects of such an innovation were not clearly evident, and it took some time before they realized the precautionary benefits to be derived from the soil test innovation.

In the case of Captan, it was quite clear that a number of growers were not sure about the degree of effectiveness of its application. Specific recommendations for the local situation did not seem to be available for the first few years after the innovation was introduced. Inadequate field treatment and poor results in some instances must have made it more difficult for the innovation to gain acceptance. Some growers complained that they still obtain a large number of rotten berries. The results to be obtained from such an innovation needs careful explanation, since the benefit derived is not the complete removal of the incidence of rotted fruit but a reduction in the proportion of rotted fruit to marketable product.[16]

The use of picking carts, certified virus-free plants and the change to the matted row system, involve innovations which are meant to replace clearly established practices, but which are not striking in their relative advantage, especially to smaller growers who are not usually as keen on efficiency or as alert to means of reducing costs. With respect to the two latter practices, the communicability aspect is also involved. Some farmers claimed that since plants obtained from their own fields continued to give good yields, they did

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[16] J. A. Freeman, "New Findings in Fruit Rot Control in Strawberries," op. cit., p. 4.

not see any reason for buying certified plants.

Some farmers said that use of the matted row system meant greater difficulty in weed control; as a result, adoption did not occur until they were also able to use chemical weed killers. This linkage in practice adoption is further indicated by the fact that growers were aware that matted rows meant a higher environmental field humidity which resulted in a higher incidence of fruit rot,[17] and that they did not think it was in their best interest to adopt the innovation until they were able to control fruit rot by the use of the captan spray.

Situational factors accounted for a large percentage of the reasons for delay in the adoption process. One such reason which occurred quite frequently, and was of particular relevance to the use of virus-free plants, captan and chemical weed control, and the change in the cultural system, was the fact that a number of growers had ceased operations over short periods for one reason or another. This occurred especially after they suffered extensive damage due to prolonged low temperatures. Another point of interest is that in quite a few instances, especially where less experienced growers were involved, individuals became aware of innovations in strawberry cultivation long before they actually decided to grow the crop themselves.

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[17]J. A. Freeman, _loc_. _cit_.

In the case of soil analysis for nematode control, inability to have the test carried out was a major reason for delay as until quite recently, it was generally necessary to send soil samples across the border to Washington for testing. Others did not have their soil tested, because in the event of a need for soil treatment, field service was generally difficult to obtain.

Even after the matted row system was first introduced, a number of farmers explained their delay in adoption as waiting until they changed over from growing the older British Soverign variety to newer varieties. Others only made the change when their entire crop was destroyed by one of the periodic freeze outs. In any event, the use of this new system of layout was only possible in old fields when the grower decided to replant his crop. Delay in the adoption of virus-free plants seems to have been hampered by the experience of a few farmers with "bad plants"; in other instances they claim that plants were not always available.

The most frequently stated reason by a number of growers for delay in the use of Captan was the small acreage under cultivation especially at the time when they first became aware of the innovation. The cost factor is also involved in this particular situational factor, since even if the grower could afford the necessary expenditure, he would consider the investment to be uneconomical. Non-ownership of a sprayer, and the difficulty of isolated growers obtaining custom service were also mentioned. The acreage factor was also of particular relevance to the use of chemical weed control. Growers generally felt that hoe weeding was much more economical for small holdings. Also, in a few instances, respondents intimated that their particular weed control problem was not serious enough to warrant the additional investment.

Uneconomical expenditure due to small acreages was frequently mentioned as the reason for delay, relevant to the use of picking carts. In many instances, growers preferred not to purchase carts while their hand carriers were still serviceable.

During the interviewing it was quite evident from the enthusiastic responses of some growers that either prior experience with a similar innovation or experience with the same material in another situation facilitated acceptance of a new practice. Growers who were familiar with certified seed potato readily accepted certified strawberry plants, others had used captan with vegetables, while some of them had used chemical weed control with potatoes or other crops.

There is some difference in responses by adopter category between respondents at the upper and lower levels of adoption performance. Laggards and late majority respondents emphasize characteristics of the innovation (60 per cent), with special reference to relative advantage and communicability. On the other hand, early majority and early adopter-innovator respondents stressed situational factors (See Table

XIV). These respondents are more alert to changes and were obviously among the earliest to use the innovation, thus explaining reference to the need for more information and the fear of crop damage. One early majority respondent pointed out that his first trial with chemical weed control resulted in the destruction of five acres of his crop, together with some of his neighbour's.

Reasons for Rejection of the Innovations

In many instances there is a degree of similarity between both the actual reason given and the percentage distribution of reasons given for rejection and those previously indicated for delay in the adoption process. Under characteristics of the innovation, the responses were more evenly distributed between relative advantage (10.6 per cent) and communicability (12.1 per cent) (Table XV). Miscellaneous situational factors increase in importance by almost 20 per cent (57.6 per cent).

Communicability (30.8 per cent) is the most important characteristic indicated for soil analysis for nematode control relevant to the characteristic of the innovation (Table XVI). Relative advantage and the cost of the innovation are evenly weighted (15.4 per cent). A number of laggard and late majority respondents rejected the innovation simply because they had "no problem"; two early majority respondents felt that crop rotation was adequate.

TABLE XIV

PERCENTAGE DISTRIBUTION OF REASONS FOR DELAY IN THE ADOPTION PROCESS BY ADOPTER CATEGORY

Reasons for Delay	Adopter Categories			
	Laggards %	Late Majority %	Early Majority %	Early Adopter Innovator %
By Characteristic of the Innovation				
Relative advantage	26.6	24.3	27.9	17.6
Compatability	6.7	-	3.5	4.1
Complexity	-	3.0	-	-
Divisibility	6.7	-	-	-
Communicability	20.0	33.3	11.6	16.2
Sub-Total	60.0	60.6	43.0	37.9
Other General Reasons				
Fear or evidence of crop damage	-	-	3.5	2.7
Needed more information	-	3.0	8.1	9.5
Unsatisfactory results by other farmers	-	3.0	1.2	-
Influenced by other farmers who decided not to adopt the innovation	6.7	3.0	-	-
Influenced by members of the family	6.7	-	-	-
Innovation considered to be costly	6.7	-	5.8	4.1
Miscellaneous situational factors	20.0	30.3	38.4	45.9
Sub-Total	40.1	39.3	57.0	62.2
GRAND TOTAL	100.0	100.0	100.0	100.0

Note: The chi-square test was used to test the null hypothesis of no significant difference among adopter categories, using only sub-totals. The chi-square value of 16.292 is significant at the .01 level.

Failure to see clear evidence of the advantages of captan is again evident; one late majority respondent said that "they rotten anyway". Situational factors included too small an acreage to justify the expenditure, or where the respondent had decided that he was about to stop growing the crop and was not willing to incur additional expenditure.

TABLE XV

PERCENTAGE FREQUENCY DISTRIBUTION OF REASONS FOR REJECTION OF ALL INNOVATIONS

Reasons for Rejection	Frequency
By Characteristic of the Innovation	%
Relative advantage	10.6
Compatibility	6.1
Complexity	1.5
Divisibility	-
Communicability	12.1
	30.3
Other General Reasons	
Fear or evidence of crop damage	3.0
Unsatisfactory results by other farmers	1.5
Innovation considered to be costly	7.6
Miscellaneous situational factors	57.6
Sub-Total	69.7
Total	100.0

Concerning the use of matted rows, some respondents felt that this practice resulted in an increase in the number of runners and a larger proportion of small berries, drying out of soil moisture on light soils in hilly areas, a need for

TABLE XVI

PERCENTAGE DISTRIBUTION OF REASONS FOR REJECTION BY INNOVATION

:easons for Rejection	Innovation: Soil Analysis for Nematode Control	Captan for fruit-rot Control	Change from Hill to Matted Row	Chemical Weed Control	Use of Picking Carts	Use of Virus-fre Certified Plants
	%	%	%	%	%	%
/ Characteristic of the :nnovation						
:elative advantage	15.4	-	75.0	-	6.1	-
:ompatibility	-	-	-	33.3	3.0	-
:omplexity	-	14.2	-	-	-	-
.visibility	-	-	-	-	-	-
:ommunicability	30.8	42.9	-	-	3.0	-
Sub-total	46.2	57.1	75.0	33.3	12.1	0.0
:her General Reasons						
:ear or evidence of crop damage	-	-	-	22.3	-	-
:nsatisfactory results by other farmers	-	-	-	11.1	-	-
:nnovation considered to be costly	15.4	-	-	-	6.1	-
:iscellaneous situational factors	38.4	42.9	25.0	33.3	81.8	-
Sub-total	53.8	42.9	25.0	66.7	87.9	0.0
Total	100.0	100.0	100.0	100.0	100.0	0.0

more fertilizer and a high incidence of fruit rot. These reasons point to the fact that where necessary the introduction of a new innovation must be accompanied by efforts to ensure that farmers comprehend the changes or adjustments in allied practices which may be vital to success in the overall management operation. The use of matted rows requires adequate pruning for the control of runners, and the reduction of the incidence of under-sized fruit; also the use of captan for fruit rot control becomes more urgent.

One third of the reasons given for the rejection of chemical weed control were classified as compatibility. Some growers just did not "believe" in the use of chemicals. One laggard made it quite clear when he said:

> the way they spray around here, every week, spray for this, spray for that, poison the whole bloody country.

Unsatisfactory results by some farmers, and the general fear of crop damage accounted for 34.3 per cent of the reasons for rejection; too small an acreage to warrant the expenditure was also indicated by some growers.

An extremely high percentage of situational reasons were given for the rejection of picking carts. Growers in the low-lying Delta, Richmond and Ladner areas indicated that the oriental contract labour used for harvesting would not accept the change; the general feeling is expressed by one who said "Chinese don't go for anything new". In addition, these

TABLE XVII

PERCENTAGE DISTRIBUTION OF REASONS FOR REJECTION BY ADOPTER CATEGORY

Reasons for Rejection	Adopter Category: Laggard	Late Majority	Early Majority	Early Adopter-Innovator
	%	%	%	%
By Characteristics of the Innovation				
Relative advantage	16.5	4.5	11.5	-
Compatibility	5.6	4.5	7.7	-
Complexity	5.6	-	-	-
Divisibility	-	-	-	-
Communicability	5.6	32.0	-	-
Sub-total	33.3	41.0	19.2	0.0
Other General Reasons				
Fear or evidence of crop damage	5.6	4.5	-	-
Unsatisfactory results by other farmers	-	4.5	-	-
Innovation considered to be costly	5.6	-	15.4	-
Miscellaneous situational factors	55.5	50.0	65.4	-
Sub-total	66.7	59.0	80.8	0.0
Total	100.0	100.0	100.0	0.0

Note: The chi-square test was used to test the null hypothesis of no significant difference among adopter categories, using only sub-totals for the 3 adopter categories in which responses are recorded. The chi-square value of 11.395 is significant at the .01 level.

particular growers used a different type of field crate and basket arrangement which would have to be changed and accepted by the cannery before they could consider using the new system; others among them made mention of the fact that the heavier clayey soil in the area would provide difficulty in using the carts under moist conditions.

Growers in other areas said that their fields were too hilly, and that children, many of whom are employed at harvest time, would have difficulty using picking carts. Others who had a large stock of hand carriers indicated that they were quite satisfied with this traditional method or that their size of enterprise was too small to justify additional expenditure.

A larger percentage of reasons relevant to innovation characteristics are given by laggards and late majority respondents, while situational factors and other general reasons are much more predominant with early majority respondents (Table XVII).

CHAPTER VI

SOURCES OF INFORMATION

In this study, the differential use of sources of information is not a major consideration, and the analysis of such is, therefore, somewhat limited in scope. Sources of information are classified by two procedures previously used by Verner and Gubbels[1]. The first method of classification is by Origin, with reference to the agency from which the information originated. In the second instance, classification by nature of the activity refers to the method of communication used in each instance and emphasis is on the instructional situation relevant to the learning experience. Both systems of classification are shown in Table XVIII.

I. THE USE OF INFORMATION SOURCES CLASSIFIED BY ORIGIN

This method of classification includes 4 sub-categories:

Government: information sources originating with the federal or provincial governments.

Commercial: information sources originating with business agents, custom operators or establishments dealing with farmers.

Farm Organization: information sources originating from farmers' organizations, such as cooperatives and the L.M.H.I.A.

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[1] C. Verner and P. M. Gubbels, _op_. _cit_., pp. 29-32.

TABLE XVIII

CLASSIFICATION OF SOURCES OF INFORMATION

Sources of Information	Classification by: Nature of the Activity	Origin
General farm magazines	M	C
Special horticultural magazines	M	C
British Columbia Department of Agriculture publications	M	G
Federal Department of Agriculture publications	M	G
Radio, television, newspapers	M	C
Agriculture field days and demonstrations	IG	G
Agriculture meetings	IG	G
Meetings of the Horticultural Improvement Association	IG	FO
Growers' Short Courses sponsored by the L.M.H.I.A.	IG	FO
Growers' Short Courses held in the State of Washington, U.S.A.	IG	FO
Other Adult Education courses	IG	G
Vocational agriculture courses	IF	G
University courses in agriculture	IG	G
Personal visit to an Experimental station or to the University of British Columbia	II	G
District Horticulturist	II	G
District Agriculturist	II	G
Neighbours, friends, wife, children and relatives	P	P
Salesmen and dealers	II	C
Manager or employees of the processing plant	II	C
Farm employees	P	P
Observation on other farms	P	P
Foreign travel or foreign publications	P	P
Personal experience or ideas	P	P
Meetings of the Abbotsford Growers' Cooperative	IG	FO
Meetings of the Matsqui-Aldergrove Berry Growers' Association	IG	FO

Key: Nature of Activity
P: personal
M: mass
IG: Instructional group
II: Individual Instructional

Origin
P: personal
G: Government
C: Commercial
FO: Farm Organization

TABLE XVIII (Continued)

CLASSIFICATION OF SOURCES OF INFORMATION

Sources of Information	Classification by: Nature of the Activity	Origin
Meetings of the Pacific Cooperative Union	IG	FO
Newsletters of the Pacific Cooperative Union	M	FO
Meetings of the Fraser Valley Fruit and Vegetable Growers Association	IG	FO

Key: Nature of the Activity
- P: Personal
- M: Mass
- IG: Instructional group
- II: Individual Instructional

Origin
- P: Personal
- G: Government
- C: Commercial
- FO: Farm Organization

Personal: information sources that lie within the farmer's personal orbit — friends, family, personal observation and experience.

Personal sources had the highest degree of use within all adopter categories, but was slightly larger among the laggard and late majority respondents. Government information sources, which ranked second in importance for all adopter categories, were used least by laggards (20.3 per cent) and slightly more, but at the same general level for the "majority" respondents (approximately 26.5 per cent). The highest percentage use (32.5 per cent) was by the early adopter-innovator category (See Table XIX).

The use of commercial and farm organization sources do not bear any distinct pattern in terms of adoption performance. Commercial sources were third in importance for all adopter categories, except the late majority respondents who used a higher percentage of farm organization sources. Early majority respondents reported the highest percentage use (18.7 per cent), followed by laggards (17.0 per cent), early adopter-innovators (11.5 per cent), with the lowest use by the late majority (9.9 per cent).

TABLE XIX

PERCENTAGE DISTRIBUTION OF THE USE OF SOURCES OF INFORMATION BY ADOPTER CATEGORY WITH THE SOURCES CLASSIFIED BY ORIGIN

Origin	Adopter Category			
	Laggard	Late Majority	Early Majority	Early Adopter Innovator
	%	%	%	%
Government	20.3	26.2	26.8	32.5
Commercial	17.0	9.9	18.7	11.5
Farm Organizations	7.4	12.1	8.9	7.0
Personal	55.3	51.8	45.6	49.0
Total	100.0	100.0	100.0	100.0

Note: A null hypothesis of no difference in class proportions between adopter categories for each type of information source was used at the .05 level. The chi-square value of 9.422 was not significant.

The least used source type was farm organization, ranging between 7 - 9 per cent, except as already indicated for the late majority (12.1 per cent). There was no significant difference between adopter categories in the proportional use of source types.

The pattern of information source use in this study, with special reference to personal and government sources, is in agreement with Rogers'[2] observations. Personal sources are relatively more important at the lower adoption level. On the other hand, sources which are in closer contact with the origin of new ideas — including the D.H., the experiment station and the University — are used to a greater extent by the early adopter-innovator.

The differential use of information sources at the awareness stage for each innovation is presented in Table XX. The chi-square test indicated significant differences at the .001 level. A significantly larger percentage of respondents used government sources for three of the more recent innovations — soil analysis for nematode control, captan for fruit-rot control and chemical weed control (Table XXI). The situation is reversed in the relationship between virus-free plants, a long established practice, and the recently introduced picking carts. It is reasonable to assume that government agencies must have made a special effort in the introduction of this latter innovation to growers, in view of the importance of reducing the incidence of disease and heavy crop losses.

Evidence of a more extensive use of commercial sources for innovations involving the use of chemicals is shown in Table XXII. Responses indicated that salesmen were fairly active in some areas. A sample of such responses include:

> Salesmen keep us pretty well informed.
>
> In this area we find out more about chemicals from salesmen.

TABLE XX

PERCENTAGE DISTRIBUTION OF SOURCES OF INFORMATION USED AT THE AWARENESS STAGE FOR EACH INNOVATION WITH SOURCES CLASSIFIED BY ORIGIN

Innovation	Classified by Origin				
	Government	Commercial	Farm Organization	Personal	Total
	%	%	%	%	%
Soil Analysis for Nematode Control	28.9	15.6	13.3	42.2	100.0
Captan for fruit-rot control	22.7	23.7	14.4	39.2	100.0
Change from hill planting to matted-row	11.0	2.4	4.9	81.7	100.0
Chemical weed control	18.2	27.3	12.1	42.4	100.0
Picking carts	8.7	9.8	8.7	72.8	100.0
Virus-free Certified Plants	20.3	13.9	15.2	50.6	100.0
Average: All Innovations	18.3	15.5	11.4	54.8	100.0

Note: A null hypothesis of no difference in class proportions between innovations for each type of information source was used. The chi-square value of 78.420 is significant at the .001 level.

TABLE XXI

Z VALUES FOR THE DIFFERENTIAL USE OF GOVERNMENT INFORMATION SOURCES BETWEEN INNOVATIONS AT THE AWARENESS STAGE IN THE ADOPTION PROCESS RELEVANT TO THE CLASSIFICATION OF SOURCES BY ORIGIN*

Innovation	Innovation				
	Captan for fruit-rot control	Change from Hill planting to Matted Row	Chemical Weed Control	Picking Carts	Virus-free certified plants
Soil analysis for nematode control	1.020	3.168**	1.672	3.693**	1.414
Captan for fruit-rot control		2.212	0.796	2.750**	0.390
Change from Hill planting to Matted Row			-1.440	0.542	-1.827
Chemical Weed Control				2.026	-2.320

*NOTE: Details of procedure used are given in Appendix VI. Underlined values are significant at the .05 level.
**Significant at the .01 level.

TABLE XXII

Z VALUES FOR THE DIFFERENTIAL USE OF COMMERCIAL INFORMATION SOURCES BETWEEN INNOVATIONS AT THE AWARENESS STAGE IN THE ADOPTION PROCESS RELEVANT TO THE CLASSIFICATION OF SOURCES BY ORIGIN*

Innovation	Innovation				
	Captan for fruit-rot control	Change from Hill planting to Matted Row	Chemical Weed Control	Picking Carts	Virus-free certified plants
Soil analysis for nematode control	-1.434	3.300**	-2.038	1.237	0.340
Captan for fruit-rot control		4.542**	-0.550	2.628**	1.792
Change from Hill planting to Matted Row			-4.980*	-2.236	-3.075**
Chemical Weed Control				3.199**	2.209
Picking Carts					-0.895

*NOTE: Details of procedure used are given in Appendix VI. Underlined values are significant at the .05 level.
**Significant at the .01 level.

To some extent the influence of salesmen as a commercial source of information at the awareness stage may be somewhat understated in this study. In a few instances a grower, who is classified as a "personal" source, may do a certain amount of custom operation or he may be an agent for some chemicals. It is to his advantage, therefore, to encourage other growers to use the relevant innovation, even if done in a somewhat neighbourly manner, as distinct from the non-grower chemical salesmen. The significantly larger percentage use for virus-free plants and picking carts in comparison with the use of matted rows is accounted for largely by advertisement in newspapers and magazines, as indicated by some respondents. On the other hand, there was hardly any relevance of commercial sources to the introduction of the matted row system to growers.

There are few instances of significant differences with respect to farm organization sources, none of which exceed the .05 level (Table XXIII). The pattern of significance observed suggest the greater activity of farm organizations in more recent times, hence their importance for two of the more recent innovations.

Significant differences in the use of personal sources are all at the .01 level (Table XXIV). The greater use of personal sources for simpler innovations which do not involve the use of chemicals, compared to others, is particularly outstanding. In the case of picking carts, frequently used information sources included farm employees and observation on other farms.

TABLE XXIII

Z VALUES FOR THE DIFFERENTIAL USE OF FARM ORGANIZATION INFORMATION SOURCES BETWEEN INNOVATIONS AT THE AWARENESS STAGE IN THE ADOPTION PROCESS RELEVANT TO THE CLASSIFICATION OF SOURCES BY ORIGIN*

Innovation	Innovation: Captan for fruit-rot control	Change from Hill planting to Matted Row	Chemical Weed Control	Picking Carts	Virus-free certified plants
Soil analysis for nematode control	-0.225	2.100	0.256	1.057	-0.389
Captan for fruit-rot control		2.241	0.490	1.245	-0.160
Change from Hill planting to Matted Row			-1.800	-1.055	-2.429
Chemical weed control				0.802	-0.634
Picking carts					-1.419

*NOTE: Details of procedure used are given in Appendix VI. Underlined values are significant at the .05 level.

TABLE XXIV

Z VALUES FOR THE DIFFERENTIAL USE OF PERSONAL INFORMATION SOURCES BETWEEN INNOVATIONS AT THE AWARENESS STAGE IN THE ADOPTION PROCESS RELEVANT TO THE CLASSIFICATION OF SOURCES BY ORIGIN AND BY NATURE OF THE ACTIVITY*

Innovation	Innovation: Captan for fruit-rot control	Change from Hill planting to Matted Row	Chemical Weed Control	Picking Carts	Virus-free certified plants
Soil analysis for nematode control	0.434	-5.766**	-.029	-3.750**	-1.200
Captan for fruit-rot control		-6.142**	-0.462	-4.800**	-1.629
Change from Hill planting to Matted Row			5.737**	1.506	4.691**
Chemical weed control				-4.393**	-1.171
Picking carts					3.241**

*NOTE: Details of procedure used are given in Appendix VI. Underlined values are significant at the .05 level.
**Significant at the .01 level.

II. THE USE OF INFORMATION SOURCES CLASSIFIED BY THE NATURE OF THE ACTIVITY

The four sub-categories within this system of classification are:

Personal: direct face-to-face communication between the communicator and the receiver. The individual sources included in this type are exactly the same as for the previous classification (Table XVIII), and also includes all responses relevant to foreign travel — for example, the United States.

Mass: information media directed to farmers in general, and in which there is no provision for two-way communication.

Instructional Group: educational activities in which information is presented to a number of farmers simultaneously and in which there is an opportunity for two-way communication.

Individual Instructional: educational activities which lend themselves to being conducted with a single farmer at a time, such as farm visits by the D.H. and personal visits to a research station.

There was no significant difference between adopter categories in the total use of different information sources by type (Table XXV). The percentage use of personal sources remained the same as for the previous classification, and were therefore the most extensively used.

TABLE XXV

PERCENTAGE DISTRIBUTION OF THE USE OF SOURCES OF INFORMATION BY ADOPTER CATEGORY WITH THE SOURCES CLASSIFIED BY THE NATURE OF THE ACTICITY

	Adopter Category			
Nature of the Activity	Laggard	Late Majority	Early Majority	Early Adopter Innovator
	%	%	%	%
Personal	55.3	51.8	45.6	49.0
Mass	5.3	7.1	8.5	6.0
Instructional Group	12.8	15.9	11.9	12.0
Individual Instructional	26.6	25.2	34.0	33.0

NOTE: A null hypothesis of no difference in class proportions between adopter categories for each source of information was used at the .05 level. The chi-square value of 9.422 was not significant.

Individual instructional type information sources were second in importance. Even though the differences are not statistically significant, there is more extensive use at the upper adoption level (33 - 34 per cent), compared to late majority and laggard respondents (25 - 27 per cent). Instructional group sources were used slightly more than mass types, but in neither instance is there evidence of a discernible trend in the proportional use between adopter categories. Also, the differences between categories are negligible.

The general rank order, and pattern of use of personal and individual instructional group sources on a total basis is in general agreement with the findings of Verner and Gubbels[3]. In this instance, however, the use of instructional group sources exceed that of mass types.

The chi-square test indicated significant differences in the use of different source types between the innovations at the awareness stage (Table XXVI). Detailed analysis, using Z values for the test of a difference between proportions, is shown in Tables XXVII - XXIX. There is a consistency in the significantly greater use of particular source types such as government and commercial (classified by origin) and mass and individual instructional (classified by the nature of the activity) for the recent innovations of a more complex nature, compared to the proportional use for the Matted Row system and picking carts. Individual instructional sources within this context are largely related to the D.H., fieldmen and dealers, and personal visits to the experimental station. On the other hand, mass types now include government publications with information relevant to the innovations. There are only two instances of a significant difference with respect to instructional group sources (Table XXVIII).

III. THE USE OF INDIVIDUAL SOURCES OF INFORMATION

The predominance of personal sources is again illustrated by the fact that neighbours and friends were used to the greatest extent by all adopter categories. Laggards and late

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[3] C. Verner and P. M. Gubbels, op. cit., p. 33.

majority respondents, however, were the greatest users compared to other adopter categories, the least use being made of this source by early adopter-innovators (Table XXX).

TABLE XXVI

PERCENTAGE DISTRIBUTION OF SOURCES OF INFORMATION AT THE AWARENESS STAGE FOR EACH INNOVATION WITH THE SOURCES CLASSIFIED BY NATURE OF THE ACTIVITY

Innovation	Classified by Nature of the Activity				
	Personal	Mass	Instructional Group	Individual Instructional	Total
	%	%	%	%	%
Soil Analysis for Nematode Control	42.2	13.3	16.7	27.8	100.0
Captan for fruit-rot control	39.2	12.4	15.5	32.9	100.0
Change from Hill planting to Matted Row	81.7	1.2	12.2	4.9	100.0
Chemical weed control	42.4	7.1	14.1	36.4	100.0
Picking carts	72.8	3.3	15.2	8.7	100.0
Virus-free Certified Plants	50.6	7.6	24.1	17.7	100.0
Average: All Innovations	54.8	7.5	16.3	21.4	100.0

NOTE: A null hypothesis of no difference in class proportions between innovations for each type of information source was used. The chi-square value of 89.652 is significant at the .001 level.

TABLE XXVII

Z VALUES FOR THE DIFFERENTIAL USE OF MASS INFORMATION SOURCES BETWEEN INNOVATIONS AT THE AWARENESS STAGE IN THE ADOPTION PROCESS RELEVANT TO THE CLASSIFICATION OF SOURCES BY NATURE OF THE ACTIVITY*

Innovation	Innovation				
	Captan for fruit-rot Control	Change from Hill planting to Matted Row	Chemical Weed Control	Picking Carts	Virus-free certified plants
Soil analysis for nematode control	0.192	3.361**	1.462	2.674**	1.344
Captan for fruit-rot control		3.111**	1.250	2.433	1.132
Change from Hill planting to Matted Row			-2.235	-1.214	-2.424
Chemical weed control				1.267	-0.139
Picking carts					-1.433

*NOTE: Details of procedure used are given in Appendix VI. Underlined values are significant at the .05 level.
**Significant at the .01 level.

TABLE XXVIII

Z VALUES FOR THE DIFFERENTIAL USE OF INSTRUCTIONAL GROUP INFORMATION SOURCES BETWEEN INNOVATIONS AT THE AWARENESS STAGE IN THE ADOPTION PROCESS RELEVANT TO THE CLASSIFICATION OF SOURCES BY NATURE OF THE ACTIVITY

Innovation	Innovation				
	Captan for fruit-rot control	Change from Hill planting to Matted Row	Chemical Weed Control	Picking Carts	Virus-free certified plants
Soil analysis for nematode control	2.575**	0.920	0.520	0.295	-1.310
Captan for fruit-rot control		0.613	0.280	0.060	-1.522
Change from Hill planting to Matted Row			-0.405	-0.613	-2.434
Chemical weed control				-0.225	-1.828
Picking carts					-1.575

*NOTE: Details of procedure used are given in Appendix VI. Underlined values are significant at the .05 level.
**Significant at the .01 level.

The D.H. ranks second in importance for all categories except laggards, with the greatest use by early adopter-innovators (20.5 per cent). Early and late majority respondents reported approximately the same level of use (16 - 17 per cent). In marked contrast, however, this particular source is sixth on the list for laggards, averaging only 6.4 per cent. Salesmen, dealers and custom operators rank second in importance for laggards, sixth for late majority, fifth for early majority, but is not included in the first six sources for early adopter innovator respondents.

TABLE XXIX

Z VALUES FOR THE DIFFERENTIAL USE OF INDIVIDUAL INSTRUCTIONAL INFORMATION SOURCES BETWEEN INNOVATIONS AT THE AWARENESS STAGE IN THE ADOPTION PROCESS RELEVANT TO THE CLASSIFICATION OF SOURCES BY NATURE OF THE ACTIVITY*

Innovation	Innovation				
	Captan for fruit-rot control	Change from Hill planting to Matted Row	Chemical Weed Control	Picking Carts	Virus-free certified plants
Soil analysis for nematode control	-0.787	4.499**	-1.313	3.550**	1.709
Captan for fruit-rot control		5.118**	-0.522	4.159**	2.500
Change from Hill planting to Matted Row			-5.181*	-1.055	-2.943**
Chemical weed control				4.687**	2.997**
Picking carts					-1.919

*NOTE: Details of procedure used are given in Appendix VI.
Underlined values are significant at the .05 level.
**Significant at the .01 level.

TABLE XXX

PERCENTAGE DISTRIBUTION OF THE SIX MOST FREQUENTLY USED SOURCES OF INFORMATION BY ADOPTER CATEGORY

Adopter Category			
Laggard	Late Majority	Early Majority	Early Adopter-Innovator
Neighbours and friends 28.7	Neighbours and friends 32.5	Neighbours and friends 25.1	Neighbours and friends 23.5
Salesmen, dealers and custom operators 11.7	District Horticulturist 17.1	District Horticulturist 15.9	District Horticulturist 20.5
Observation on other farms 10.6	Agricultural meetings and Short Courses sponsored by the L.M.H.I.A., or other Agricultural meetings 13.9	Observation on other farms 8.1	Foreign travel 11.0
Personal Experience 8.5	Observation on other farms 10.4	Agricultural meetings and Short Courses sponsored by the L.M.H.I.A. or other Agricultural Meetings 9.6	Observation on other farms 9.5
Agricultural meetings and Short Courses sponsored by the L.M.H.I.A., or other Agricultural meetings 8.5	Personal Experience 5.4	Salesmen and dealers 7.4	Agricultural meetings and Short Courses sponsored by the L.M.H.I.A. or other Agricultural meetings 8.5
District Horticulturist 6.4	Salesmen and dealers 4.6	Manager of Employees of the Processing Plant 7.2	Personal Experience 5.5
74.4	83.9	73.3	78.5

Foreign travel was third in importance for early adopter-innovators with 11.0 per cent of their responses. Some of these respondents indicated frequent contact with other growers, and they also attended growers' short courses in the State of Washington. A few of them visited experiment stations and had contacts with government horticulturists and other specialists in the United States. As Rogers[4] has indicated, the early adopter-innovators exhibited more cosmopolite behaviour in their use of sources of information. This particular source of information is not included in the first six sources for any other category.

Observation on other farms is third in importance for laggards (10.6 per cent) and early majority (8.1 per cent), but is fourth for late majority respondents (10.4 per cent) and early adopter-innovators (9.5 per cent). Meetings of farm organizations together with short courses sponsored by the L.M.H.I.A. are of increasingly lesser importance between late majority and early adopter innovators — third for late majority, fourth for early majority and fifth for early adopter-innovators. This source ranks sixth for laggards, and accounted for the same percentage use as early adopter innovators (8.5 per cent).

Personal experience is the last of the six sources for early adopter-innovators; it ranks fifth for late majority and fourth for laggards, but is not included for early majority respondents, for whom manager or employees of the processing plant

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[4]E. M. Rogers, _op_. _cit_., p. 180.

occupies the sixth position. This latter source is not included for any other adopter category.

CHAPTER VII

INTERPERSONAL COMMUNICATION

The agricultural extension agent is an agent of change whose efforts are directed at achieving planned or purposeful change within a "client" or target social system.[1] Being an adult educator, he inevitably aims at "cooperation" in the process. His field of concentration is the "community". As Goodenough points out, a "mutual identification" of goals is necessary since "development calls for a considerable degree of cooperative action between community and agent."[2] The "human factor" inevitably becomes a crucial variable in his approach to the promotion of change.

Thus, success in the promotion of the adoption of innovations within the client system implies cooperation with, and acceptance by the existing leadership structure whose personal influence reaches downwards to the more passive members of the community in the nature of an interaction effect.[3]

While there is general agreement on what constitutes leadership, there is some difference in agreement as to how it operates or how it should be studied.[4] Freeman et. al. list

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[1]George M. Beal et. al., Social Action and Interaction in Program Planning (Ames, Iowa: Iowa State University Press, 1966), p. 52.

[2]Ward H. Goodenough, Cooperation in Change (New York: Russell Sage Foundation, 1963), p. 16.

[3]E. M. Rogers, Diffusion of Innovations. op. cit., pp. 208-215.

[4]Linton C. Freeman et. al., "Locating Leaders in Local Communities: A Comparison of Some Alternative Approaches", American Sociological Review, 28:791, October, 1963.

four types of compromise in existing methodology and suggest that the most realistic would seem to have as a basis the assumption of "active participation in decision making", as an index of leadership.[5] When the sociometric technique is used with appropriate responses, specific to the decision-making process, it would seem to fit this particular requirement. The resulting sociogram enables the observer to determine the relative status of individual members, identify leaders, and to obtain some indication of existing groups and cleavages within the social unit being investigated.[6]

1. THE BASIS OF ANALYSIS

This chapter is devoted to the study of interpersonal relationships among the strawberry growers of the Lower Fraser Valley as indicated by the distribution of sociometric choices in the interpersonal network. Ideally, all the growers in the region should be interviewed to achieve a complete picture. The inherent limitation in trying to map the interpersonal network by the use of sociometric responses from the random sample only, is partly compensated for by the fact that this sample consisted of more than 50 per cent of the known 194 growers.

A greater degree of completion in identifying the interpersonal communication patterns was realized in one locality

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[5] *Ibid.*, p. 792.

[6] Urie Bronfenbrenner, *The Measurement of Sociometric Status, Structure and Development* (Sociometry Monographs No. 6, Beacon House, 1945), p. 36.

by interviewing all the growers resident in a single cluster. As previously indicated, this cluster contained a total of 46 growers, including 22 who were picked in the random sample. Where responses on interpersonal communication indicated growers who were not in the sample, their names and addresses were obtained so that it was possible to include them in the sociogram, thus increasing the level of completion of the sociometric presentation.

Growers were asked about other growers from whom they "always" sought advice in arriving at a decision concerning whether or not to try an innovation. In addition, the respondent was asked to indicate three persons whom he visited socially most frequently. The respondent was free to name anyone, and no effort was made to obtain mentions of other growers in particular. This provided further scope for examining the potential for information transfer in informal interpersonal communication behaviour.

Various aspects of the interpersonal network were analysed including the distribution of opinion leaders identified by the concentration of sociometric responses. The communication behaviour of the individual respondent was observed both within and between ethnic groupings, and with reference to the degree of linkage between locality groups. Adoption performance was also used as a basis for the analysis of existing relationships. In the case of the non-randomly selected growers in the cluster who were interviewed, the classification into adopter categories was on the basis of their adoption score as with all growers, and the chi-square test indicated that the distribution of scores obtained represented a fairly good fit in terms of a normal distribution.

II. SOCIOMETRIC BEHAVIOUR FOR ADVISORY DYADS

The sociometric patterns plotted in Figure I illustrate the selection of other growers as a source of advice. This identifies the individuals who are most influential in the decision-making process. The specific reference to another grower from whom advice was "always" sought, in effect, necessitates some thought and a definite commitment on the part of the respondent.

During the interviews, respondents seemed to exercise considerable caution in identifying other growers. While in many instances a grower would acknowledge a general tendency to discuss various aspects of strawberry cultivation with other growers, he would either not name anyone as being relevant to the question, or he would only name a single individual. There would seem to have been no doubt, generally, as to who was considered worthy of being mentioned as a constant source of advice.

This conservative attitude is further illustrated by the extent to which other individuals were named; 45 per cent of all growers interviewed did not name another individual in an advisory relationship.

It would seem also, that the response behaviour is partly explained by a certain degree of distrust among growers as to the reliability of advice obtained from other farmers. This attitude was detected in widely separated locality areas, but was only clearly evident among the non-Japanese growers. A sample of the relevant responses which suggest the opinion expressed are:

> Farmers around here don't like to tell anything they have found out.
>
> I go to them but they don't give me any... they won't tell you anything....
>
> Strawberry growers are the worst liars in the world.

III. THE SAMPLE

Adopter Category and Sociometric Tendency

Differences among adopter categories relative to whether or not the respondent named another grower as a source of advice are not particularly oustanding. The lowest percentage of individuals, by adopter category, naming another grower was among the laggards (41.7 per cent). This differs only slightly from the early majority (46.5 per cent) or the early adopter-innovators (47.1 per cent). A much larger percentage (60.7 per cent) of late majority respondents named someone. Combined average percentages indicate a very slight bias towards later adopters as being more likely to choose someone in an "advisor-advisee" relationship. The chi-square test indicated a significant difference at the .05 level in the overall distribution between adopter categories (Table XXXI)

TABLE XXXI

RESPONSE OF GROWERS TO NAMING ANOTHER GROWER AS A SOURCE OF ADVICE

Adopter Category	Type of Response							
	Random Sample				All Respondents Interviewed			
	Named Someone		Did not name someone		Named Someone		Did not name someone	
	No.	%	No.	%	No.	%	No.	%
Laggard	5	41.7	7	58.3	7	50.0	7	50.0
Late majority	17	60.7	11	39.3	23	62.2	14	37.8
Early majority	20	46.5	23	53.5	25	50.0	25	50.0
Early Adopter-Innovator	8	47.1	9	52.9	13	56.5	10	43.5
Total of Numbers	50	-	50	-	68	-	56	-
	(Total = 100)				(Total = 124)			

Note: The chi-square test was used to test the null hypothesis of no significant difference among adopter categories (random sample only). The chi-square value of 8.0 is significant at the .05 level.

Sociometric Status and Adopter Category

In an investigation of influentials in the decision-making process, those named as a source of advice in the "seeker-sought" dyad are of especial importance. Generally, these influentials fit one or many of the roles in the innovator-communicator-legitimator[7] relationship along the continuum of influence in the particular social system. In this study, the major concern is not to identify individuals with differential behaviour on such

[7] H. F. Lionberger and H. C. Chang, op. cit., pp. 5-6 discuss each of these roles in detail.

a broad basis. The specific question asked suggests strongly the role of the legitimator, granted that he may also serve the innovator-communicator role, either partly or entirely. The specific reference to "advice", therefore, is a clear case of "where a conceptual distinction has been made between becoming informed and being convinced".[8]

Twenty per cent of the sample of 100 growers were named in response to the question; 13 per cent were named once only, while 7 per cent were named more than once. Differences between adopter categories were negligible, especially for those receiving a single choice. This group included a single laggard (8.3 per cent of all laggards), and 2 early adopter-innovators (11.1 per cent). The largest percentage was among the early majority respondents (18.6 per cent).

Differences were more distinct among individuals with a score[9] of 2 or more; they were more likely to be early adopters. These higher status individuals included 17.6 per cent of the early adopter innovators, 4.7 per cent of the early majority, and 7.1 per cent of the late majority, but not a single laggard. The chi-square test indicated a significant difference in the percentage distributions at the .01 level (Table XXXII).

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[8] Ibid., p. 6.

[9] The sociometric score in the context indicates the number of choices (or mentions) an individual received by other growers; abbreviated frequently hereafter as SS.

TABLE XXXII

SOCIOMETRIC STATUS OF GROWERS AS A SOURCE OF ADVICE BY ADOPTER CATEGORY

Adopter Category	Sociometric Status (1) Score = 1		(2) Score = >1		Total (3) Growers with a score of 1 or more		(4) Growers with no score	
	No.	%	No.	%	No.	%	No.	%
Laggard	1	8.3	-	-	1	8.3	11	91.7
Late majority	2	7.1	2	7.1	4	14.2	24	85.7
Early majority	8	18.6	2	4.7	10	23.3	33	76.7
Early Adopter-Innovator	2	11.8	3	17.6	5	29.4	12	70.6
Total of Numbers	13	-	7	-	20	-	80	-

Note: The chi-square test was used to test the null hypothesis of no significant difference among adopter categories. (Using Columns 1, 2 and 4). The chi-square value of 32.84 is significant at the .01 level.

Dyadic Relationships in Relation to Adopter Category

The sociometric analysis was further extended to examine possible dyadic[10] relationships in terms of interaction within and between adopter categories. In this analysis, interest was focused on whether or not there was any apparent relationship in the pattern of advisory sociometric choices, on the basis of

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[10] A dyadic relation is defined as "the interaction which occurs between the two partners in a social stimulus situation. It refers to a pair in sociation, usually, but not always of associative character. It is the relationship between a pair of units or actors" in S. Ivan Nye and Felix M. Berado (ed.), The Emerging Conceptual Frameworks in Family Analysis (New York: The McMillan Company, 1966), p. 108.

adoption performance, relevant to both the influential and his follower.

In a directional sense, dyads were considered as being upward, downward or across depending on whether the sociometric choice was extended to an individual classified in a higher, lower or the same adopter category. For the purpose of this analysis, however, it was only possible to consider those dyadic relationships which extend between two respondents, since an adoption score was not available for growers who were not interviewed.

The analysis for the sample included 41 of the 48 choices originating from randomly selected respondents. A large majority of these sociometric choices (92.7 per cent) extended either upward or across. More than twice the percentage of choices were upward (65.9 per cent) compared to those extended at the same adoption level (26.8 per cent). Upward choices for each adopter category were distributed as follows: early majority (37.5 per cent), late majority (84.2 per cent) and laggards (75 per cent); early adopter-innovators directed all choices to other growers at the same level of adoption. Downward choices were only evident for early majority respondents. This group also directed the largest percentage of choices (43.8 per cent) towards the same adoption performance level (Table XXXIII).

The chi-square value, which was significant at the .001 level indicates quite clearly that sociometric choices on the basis of adoption performance are not random or due to chance.

The concentration of the dyadic relationships in the direction of individuals similar to or better than those who choose their source of legitimation is clearly evident from the percentage distributions in the table.

TABLE XXXIII

PERCENTAGE DISTRIBUTION OF SOCIOMETRIC CHOICES BETWEEN RESPONDENTS BY ADOPTER CATEGORY

Individuals naming others as a source of advice	Individuals Named as a Source of Advice — Adopter Category				
	Laggard	Late Majority	Early Majority	Early Adopter-Innovator	Total
Adopter Category	%	%	%	%	%
Laggard	25.0	25.0	0.0	50.0	100.0
Late majority	0.0	15.8	36.8	47.4	100.0
Early majority	0.0	18.7	43.8	37.5	100.0
Early Adopter-Innovator	0.0	0.0	0.0	100.0	100.0

Note: The chi-square test was used to test the null hypothesis of no significant difference in the distribution of dyadic relationships among adopter categories. The chi-square value of 219.79 is significant at the .001 level.

Sociometric Patterns and Ethnic Origin

The Menonite and Japanese respondents were observed to be concentrated largely in two district locality groups. On the other hand, the other growers are fairly widely distributed throughout the sample area, except for the particular locality where the Japanese growers are concentrated. Seventy-six per cent of the Menonites are in the general area in which the cluster is located; similarly 63 per cent of the Japanese growers are confined to a single locality area.

From the data it is evident that sociometric choices for legitimization purposes are strongly concentrated within each of the three ethnic groups. This is particularly outstanding among the Menonites and Japanese.

Sociometric interaction in the advisor-advisee dyadic relationships indicate quite clearly that ethnicity is an appreciable barrier to interpersonal communication between different ethnic groups. The distribution of dyads among Japanese respondents suggest that they operate on a closed group basis. Not a single Japanese respondent named a non-Japanese grower in all 13 dyads reported within the random sample.

Among Menonites, 6 (75 per cent) of a total of 8 choices were directed to other Menonites, 1 to a Japanese, and the remaining single choice to one of the other respondents. Dyads originating from the third group of respondents occur on a much broader basis; however, again the majority of choices is very largely confined to non-Menonite and non-Japanese individuals. Of 21 choices, 15 (71.4 per cent) were directed to similar growers and 6 (28.6 per cent) to Menonites. Not a single Japanese grower was mentioned, thus giving further support to the apparent isolation of Japanese respondents on a communal basis.

The relevant percentage distributions are given in Table XXXIV. The chi-square value was significant at the .001 level.

TABLE XXXIV

PERCENTAGE DISTRIBUTION OF SOCIOMETRIC CHOICES

BETWEEN RESPONDENTS BY ETHNIC ORIGIN

Individuals naming others as a source of advice	Individuals named as a source of advice Ethnic Origin			Total
	Japanese	Menonite	Others	
Ethnic Origin	%	%	%	%
Japanese	100.0	0.0	0.0	100.0
Menonite	12.5	75.0	12.5	100.0
Others	0.0	28.6	71.4	100.0

Note: The chi-square test was used to test the null hypothesis of no significant difference in the distribution of dyadic relationships among ethnic groups. The chi-square value of 345.28 is significant at the .001 level.

IV. THE CLUSTER

In order to obtain a more complete picture of sociometric behaviour among the close-knit group of individuals, it was decided to select a cluster of growers in an area which seemed to represent a well established locality group. This particular cluster of 46 farmers included 22 who were also picked in the random sample.

Adopter Category and Sociometric Tendency

Among the 46 growers in the cluster, 32 respondents (69.6 per cent) named another grower in an advisory dyadic relationship. There is no obvious difference between adopter categories in the tendency to make a positive choice in response to the question. Within the 4 adopter categories, the relevant percentages were laggards (66.7 per cent), late majority (71.4 per cent), early majority (64.7 per cent) and early adopter-innovators (75 per cent). Combined average percentages for early and late adopters are 69.9 per cent and 69.1 per cent respectively. Thus, the slight tendency toward a greater likelihood of response from later adopters, as was evident in the random sample, is not borne out within the cluster.

Sociometric Status and Adopter Category

Nine respondents (19.6 per cent) were chosen in the advisory dyads. Of the total of 40 choices originating within the cluster, 22 (55 per cent) were for respondent No. 9. His total sociometric advisory status, however, was 25 since he received 3 choices from individuals not included in the cluster, but who lived in the general area.

The sociometric importance of respondent No. 9 as a single individual within a sample area compares quite favourably to other similar studies. Hoffer and Gibson[11] used the percentage of respondents naming an individual as a sociometric index to measure leadership among farmers in several communities. Responses, however, were elicited from a cross-section of members of

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[11]C. R. Hoffer and D. L. Gibson, The Community Situation as it Affects Agricultural Extension Work, (East Lansing: Michigan State College, Agricultural Experiment Station, October, 1941), pp. 10-32.

the community, including non-farmers. They reported indices for single individuals ranging between .23 to .70 for different communities. Leuthold[12] reported a single farmer in one community receiving 28 per cent of all choices for advisory dyads from a total of 136 respondents.

Of the 9 respondents named as influentials in the cluster area, 1 was late majority, 3 early adopter-innovator and 5 (55.6 per cent) early majority. Both for the random sample and for the cluster, therefore, early majority respondents comprised the largest proportion of all influentials. The 5 individuals who received more than a single choice were all early adopters, and included 2 early adopter-innovators and 3 early majority respondents.

Dyadic Relationships in Relation to Adopter Category

Sociometric behaviour among respondents within the cluster shows a similar trend indicated for the random sample. Upward choices comprised 61.1 per cent of the total 36 choices; 27.8 per cent were across and 11.1 per cent downward. Within individual adopter categories, there are some differences. Upward choices were distributed as follows: laggards (100 per cent), late majority (90.9 per cent), early majority (71.4 per cent). Most of the dyadic choices of the early adopter-innovators were across (55.5 per cent) compared to 45.5 per cent downward to early majority respondents.

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[12] F. O. Leuthold, op. cit., p. 91

Choices extending from cluster growers to individuals outside the cluster are discussed in the section on all respondents.

Sociometric Patterns and Ethnic Origin

Since the cluster of growers did not include any Japanese respondents, the analysis of ethnic interaction is confined to Menonites and "other" respondents. This discussion is again based on the 36 advisory dyads previously indicated.

Of the 23 choices originating from Menonite respondents, 20 (87 per cent) extended to Menonites, and 3 (13 per cent) to non-Menonites. Of the 13 choices made by non-Menonites, 9 (69.2 per cent) extended to Menonites, compared to dyads involving growers like themselves (30.8 per cent). This latter distribution does not fit the typical biased pattern previously indicated for these respondents in the random sample, but, 7 of the 9 choices extended to Menonites were in respect of respondent No. 9. In the first instance, it would be reasonable to suggest that non-Menonites resident in the cluster area would be integrated to some extent; also the obvious sociometric importance of No. 9 would seem difficult to resist for any progressive grower in the vicinity, except he had access to other reliable sources of advice and information.

V. ALL RESPONDENTS

Within the limitations of the proportion of the total population which has been mapped, a better picture of sociometric behaviour becomes more evident when all possible dyadic relationships are examined. It is now possible to consider all 152 growers mapped together with the total of 92 sociometric choices indicated for advisory dyads in Figure I.

The previous discussion of the sample or the cluster was confined to dyads extending between the relevant individuals in each case. It is now also possible to consider dyads extending between non-sample members of the cluster and individuals in the sample who were resident outside of the particular locality. Also, while the additional 28 growers not included in the 124 respondents could not be considered in terms of adopter category, since an adoption score would not be available, dyadic relationships which included them could be analysed on the basis of ethnicity.

Adopter Category and Sociometric Tendency

The indication from the random sample of a greater tendency for late adopters to suggest an advisory dyad is somewhat more evident when consideration is given to all respondents who named more than one person. The distribution was 13 per cent of the early adopter-innovators, 16 per cent of the early majority, and 18.9 per cent of the late majority respondents. There were no laggards in this group.

From the data, it is evident that individuals with high sociometric scores either did not name any grower as a source of advice or were most likely to name a foreign grower in the United States. In Figure I, for example, No. 9 with a sociometric score of 25 did not name anyone; the same applies to No. 60 (SS=5), No. 69 (SS=3), No. 116 (SS=4), No. 44 (SS=3). Respondents with high scores who named a single grower included Nos. 23 (SS=4) and 14 (SS=3), both of whom are in the cluster mentioned, and named No. 9, an exceptionally outstanding source of advice to growers in the general locality. No. 88 (SS=4) named a foreign source (S-U.S.A.).

The general response of many of these high status individuals indicated that they were usually conscious of being opinion leaders in the general locality. As would be expected, however, even though some conclusions must be cautious since the entire population of all growers were not interviewed, it would seem that some individuals may have over-rated their relative status as a source of advice, as distinct from a mere source of information. For example, neither No. 79 who said "many come to me and ask me" or No. 92 — "lots of them come to me" — were named by any of the respondents.

Sociometric Status and Adopter Category

Of the 152 growers plotted, 35 (23 per cent) were isolated as opinion leaders. Twenty-five were among the 124 respondents

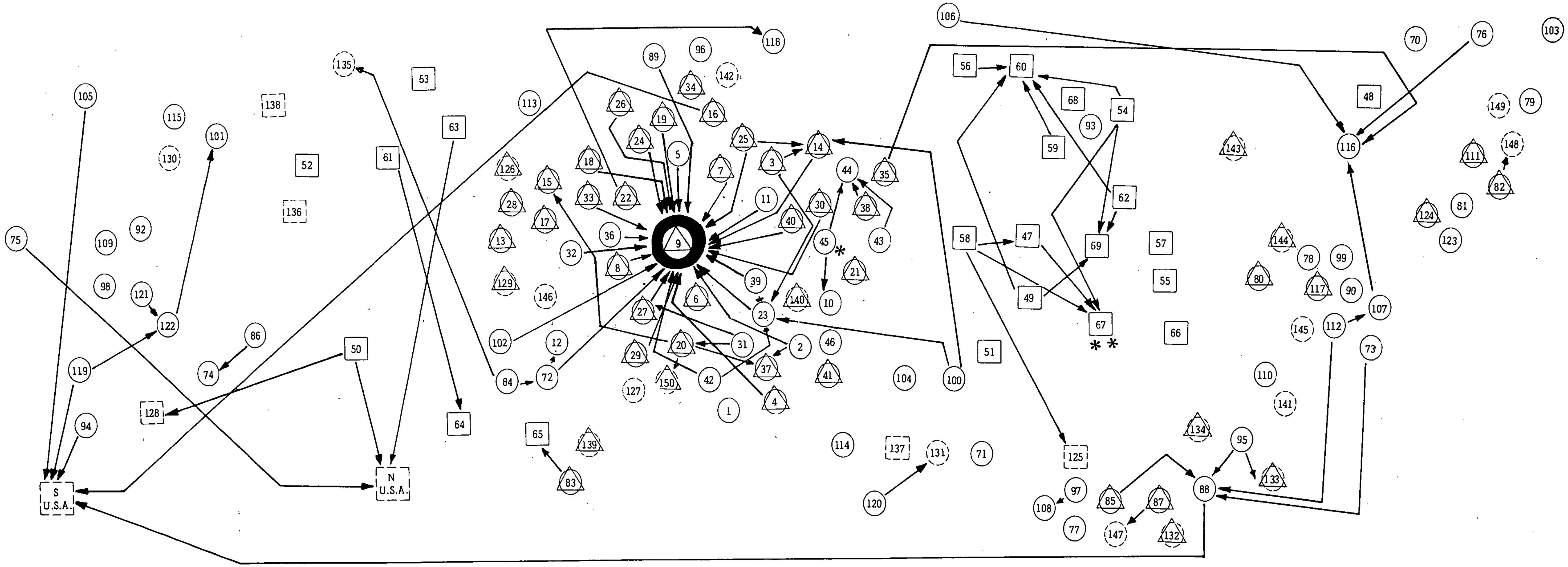

FIGURE I. THE DISTRIBUTION OF SOCIOMETRIC CHOICES IN THE SEARCH FOR ADVICE.

KEY:

MENONITE

"OTHER"

JAPANESE

GROWERS WHO WERE NOT INTERVIEWED

* RESPONDENT NAME FOREIGN GROWER (NOT PLOTTED) AS A SOURCE OF ADVICE.

respondents interviewed; the remaining 10 included the two previously mentioned growers in the U.S.A. Among the 35 influentials, 21 (60 per cent) received a single choice, 9 (25.7 per cent) received 2 or 3, and 5 (14.3 per cent) received more than 3 choices. The overall situation gives an average of 2.6 choices per influential; the average among individuals receiving 2 or more choices is 4.7.

The 68 respondents, from whom the dyadic relationships originate in the "seeker-sought"[13] context, provided a total of 92 instances of opinion leadership selection, as plotted in Figure I. Seventy-six (82.6 per cent) are relevant to 25 growers who were interviewed, while the remaining 16 concern non-interviewed individuals.

Considering the sociometric choices for all respondents, comprising both the sample and the cluster, sociometric status is clearly weighted in favour of higher adoption performance. The percentage of individuals within each adopter category receiving at least one sociometric choice was distributed: laggards (7.1 per cent), late majority (13.5 per cent); early majority (26.0 per cent) and early adopter-innovators (26.1 per cent) were about the same. Combined average percentages were 10.3 per cent for late adopters and more than double (26.1 per cent) for early adopters.

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[13]H. F. Lionberger and H. C. Chang, op. cit. refer to the "seeker-sought information-seeking relationship" as the "elemental social structure" which facilitates interpersonal communication. (p. 10).

Dyadic Relationships in Relation to Adopter Category

The analysis for all respondents in terms of adopter category includes 72 dyadic interactions among those interviewed, out of a total of 92 sociometric choices recorded in the study. All other dyads included non respondents for whom an adoption score was not available.

Forty-seven of the 72 choices are plotted in Figure II. The remaining 25, relevant to respondent No. 9 who received 27.2 per cent of all choices recorded, are shown in Figure III. This separate diagramatic representation avoids an excessive clutter of sociometric lines on Figure II, which would have made the interpretation more difficult.

More than one-half (55.6 per cent) of the 72 choices were directed upwards in terms of adoption performance. One-third (33.3 per cent) were directed across, or to growers on the same adoption level. Eight choices (11.1 per cent) were directed downwards towards a grower in a lower adopter category.

The analysis also suggests an important difference in sociometric behaviour depending upon whether the seeker of advice extends his effort upwards or downwards along the continuum of adoption performance. From the data, it would seem that individuals in search of information, and in particular legitimation, may choose others in one, two or three adopter categories above their own level of performance. However, those from whom advice is sought tend to be not too far distant.

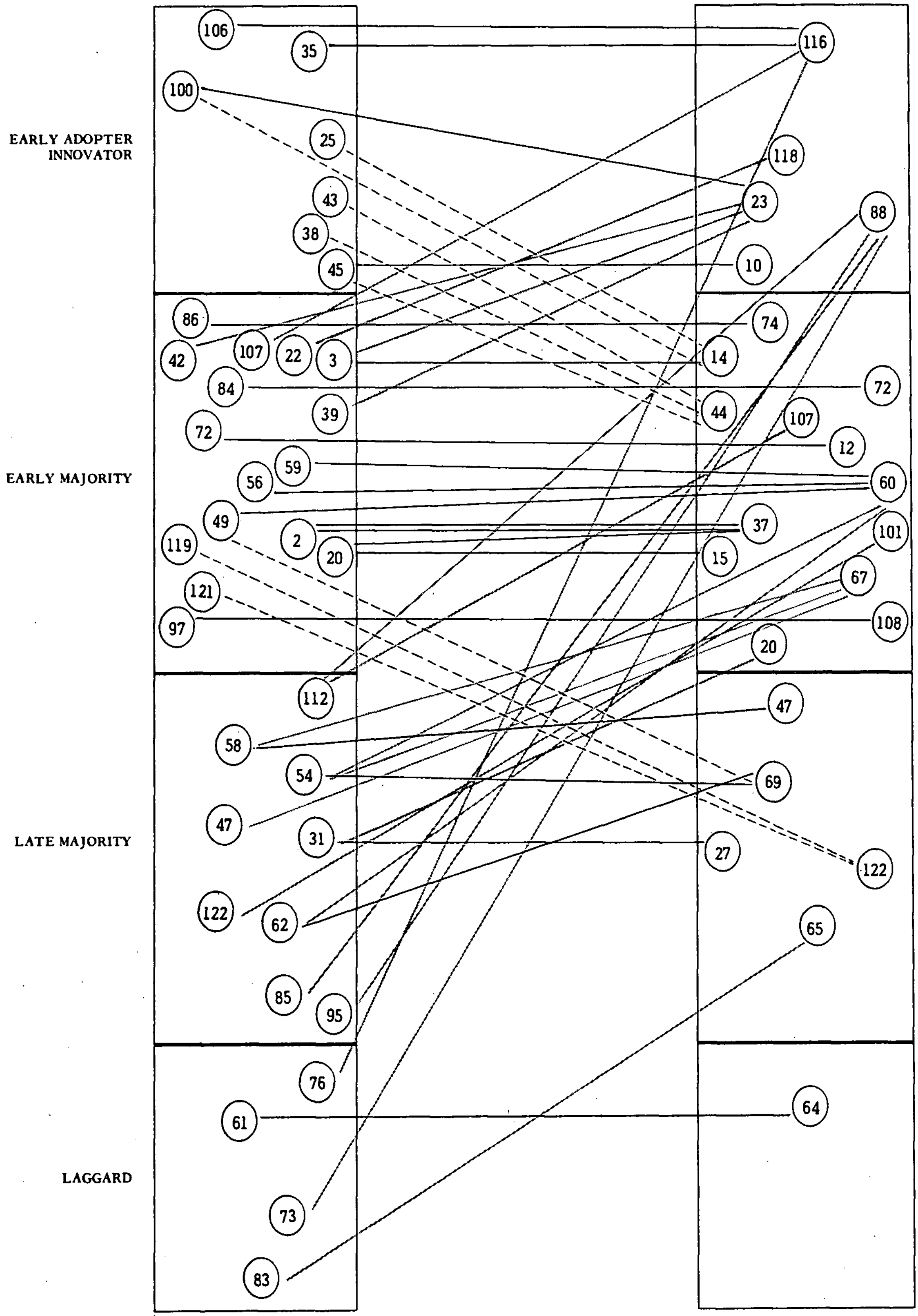

FIGURE 11. THE DISTRIBUTION OF SOCIOMETRIC CHOICES FOR ADVICE IN RELATION TO ADOPTER CATEGORY. KEY:

UPWARD SOCIOMETRIC CHOICE

DOWNWARD SOCIOMETRIC CHOICE

SOCIOMETRIC CHOICE BETWEEN RESPONDENTS IN THE SAME ADOPTER CATEGORY

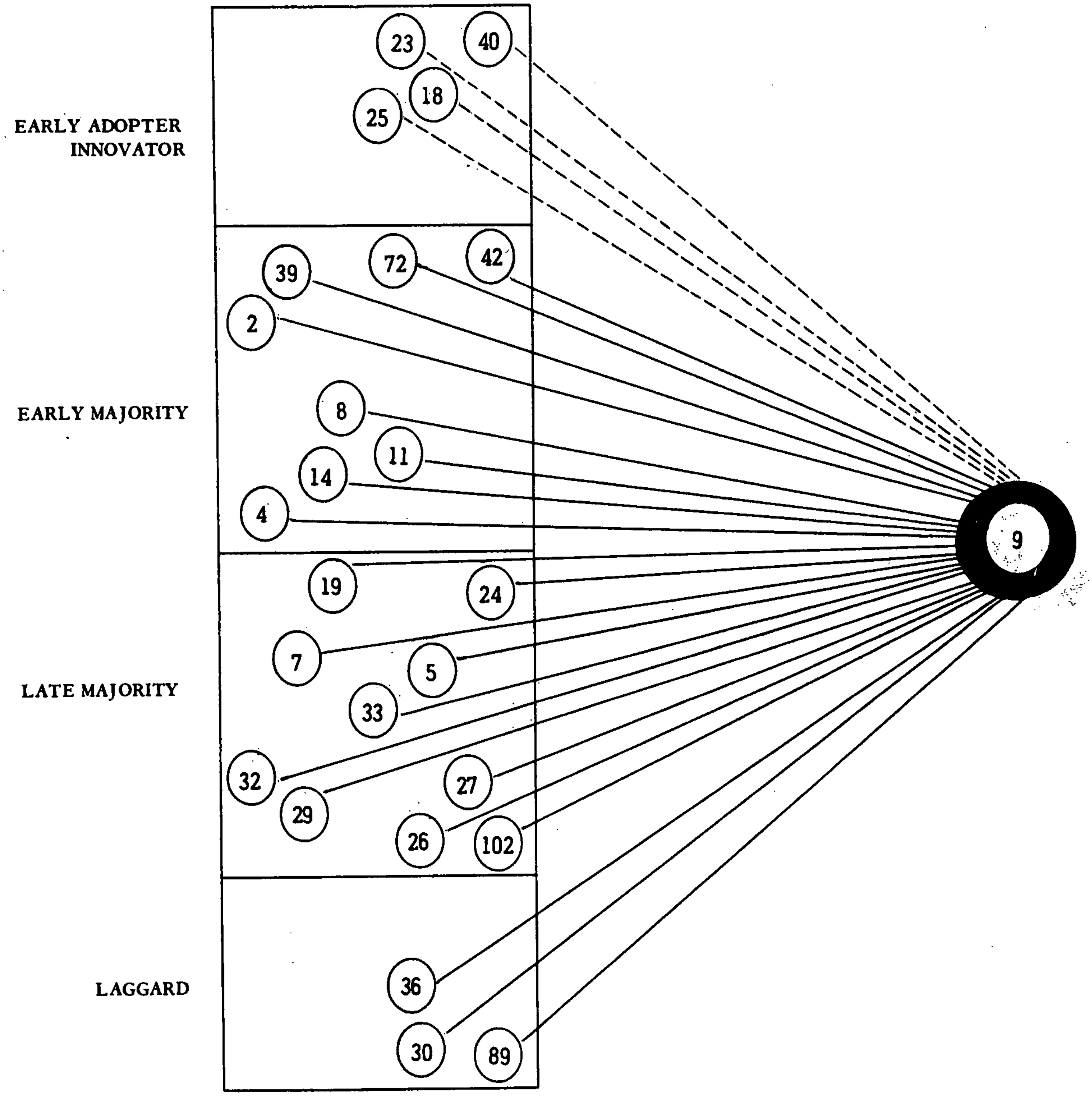

FIGURE III. ILLUSTRATION OF THE SOCIOMETRIC IMPORTANCE OF RESPONDENT NO. 9

KEY: ———— UPWARD SOCIOMETRIC CHOICE

- - - - - - SOCIOMETRIC CHOICE BETWEEN RESPONDENTS IN THE SAME ADOPTER CATEGORY

A breakdown of the total 40 upward choices showed that 22 (55 per cent) were directed upward by one adopter category, 13 (32.5 per cent) by two, and 5 (12.5 per cent) by three.

Lionberger and Campbell[14] concluded from their study in two Missouri communities that the choice of personal referents as sources of information were not random in that there was "a general inclination for likes to choose likes", relevant to the degree of exposure to different information sources. This study suggests that even where operators are most likely to look upward in their search for legitimating advice, the general tendency is to seek individuals as close as possible in adoption performance. These whom they seek are generally better farmers, but not too much so.

Downward sociometric choices, unlike those that extend upward in the adoption scale, did not extend beyond a single adoption category in any instance. In any event, this tendency is not prominent in the sociometric behaviour (Figure II). These particular instances will be discussed later in the chapter where consideration is given to the overall characteristics of opinion leaders.

Sociometric Patterns and Ethnic Origin

When the advisory dyads for all respondents are analysed, the apparent ethnic barrier is again clearly suggested. As

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[14]H. F. Lionberger and R. R. Campbell, op. cit., p. 20.

before, all choices by Japanese are confined to their own group whether the source of advice is a local or foreign grower. Of the 31 choices made by Menonites, 21 (67.7 per cent) were for other Menonites, 2 (6.5 per cent) for Japanese and 8 (25.8 per cent) for the other group. The two choices for Japanese included one prominent foreign grower.

Of the 40 choices originating from the third group, 12.5 per cent were for Japanese individuals, all of whom were prominent, foreign growers; 32.5 per cent for Menonites and 55 per cent for individuals like themselves. From the data, therefore, it is clear that the apparent isolation of Japanese growers is to a large extent a local situation relevant to the Lower Fraser Valley area. Coleman et. al.,[15] in their study on the diffusion of a drug among doctors, found that the more isolated individuals, on the average, introduced the drug considerably later than the more socially integrated doctors. In this study, the relative isolation of the Japanese growers from all other ethnic groups, and their significantly lower level of practice adoption, would seem to bear a similar relationship to the drug study.

Furthermore, sociometric behaviour among Menonites and Japanese is almost totally confined to the local community. In the Menonite cluster, only a single grower, No. 35 — Figure I — named another grower outside of the local community.

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[15] J. Coleman, E. Katz and H. Menzel, op. cit., p. 267.

Similarly, among the individuals in the Japanese cluster, only No. 58 named another grower, No. 125, outside of the immediate locality. This tendency towards the concentration of leadership selection on a locality basis has also been reported by Leuthold[16] who found a high degree of local orientation in the selection of farmers for advice within two different areas.

VI. INFORMAL VISITING AND THE TOTAL POTENTIAL FOR INFORMATION TRANSFER AND LEGITIMATION IN PRACTICE ADOPTION

Sociometric informal visiting patterns are plotted in Figure IV. These were obtained in response to a request for information concerning other individuals with whom respondents visited most frequently. Except for some of the older farmers who claimed that they seldom visited friends at this stage in their life cycle, most respondents did name other individuals in response to the question. In a very few instances, however, some operators felt that this question was too personal, and they, therefore, gave no response. This sociogram also illustrates that where other farmers were named, visiting patterns are also concentrated within the local community to some extent.

The data further suggests that informal visiting behaviour may frequently be allied with the search for information, and perhaps the legitimation of decisions in their farm operations.

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[16] F. O. Leuthold, op. cit., p. 89.

There is evidence of some tendency toward the concentration of sociometric choices for friendship dyads on respondents isolated as high status growers relevant to being a source of advice. Some respondents were evidently particular, however, not to choose these individuals as a source of advice in the first instance. On the other hand, some individuals were named for both reasons by the same growers, thus illustrating what may be considered to be a dual-purpose relationship. Examples of a dual purpose choice are 119-122[17], 122-101.

The super-imposition of the sociometric behaviour patterns in Figures I and IV is shown in Figure V. In the first instance, therefore, an opportunity for viewing the total sociometric behaviour among growers is provided in Figure V, thus indicating the total potential for information transfer. Secondly, changes in the sociometric status of individual growers relevant to the concentration of face-to-face activity for both advice and friendship visiting behaviour becomes evident.

For example, No. 23 — Figure 1 — is an individual whose total potential[18] as an opinion leader increases as his score doubles from 4 to 8. Similarly the score of No. 14 doubles from 3 to 6, No. 20 increases from 1 to 6. Also, a

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[17]Dyad relationships are indicated by two numbers, corresponding to the particular respondents, separated by a hyphen.

[18]An individual's total potential is considered to be his total score, on the basis of one score for each different individual who selects him in response to either of the two questions.

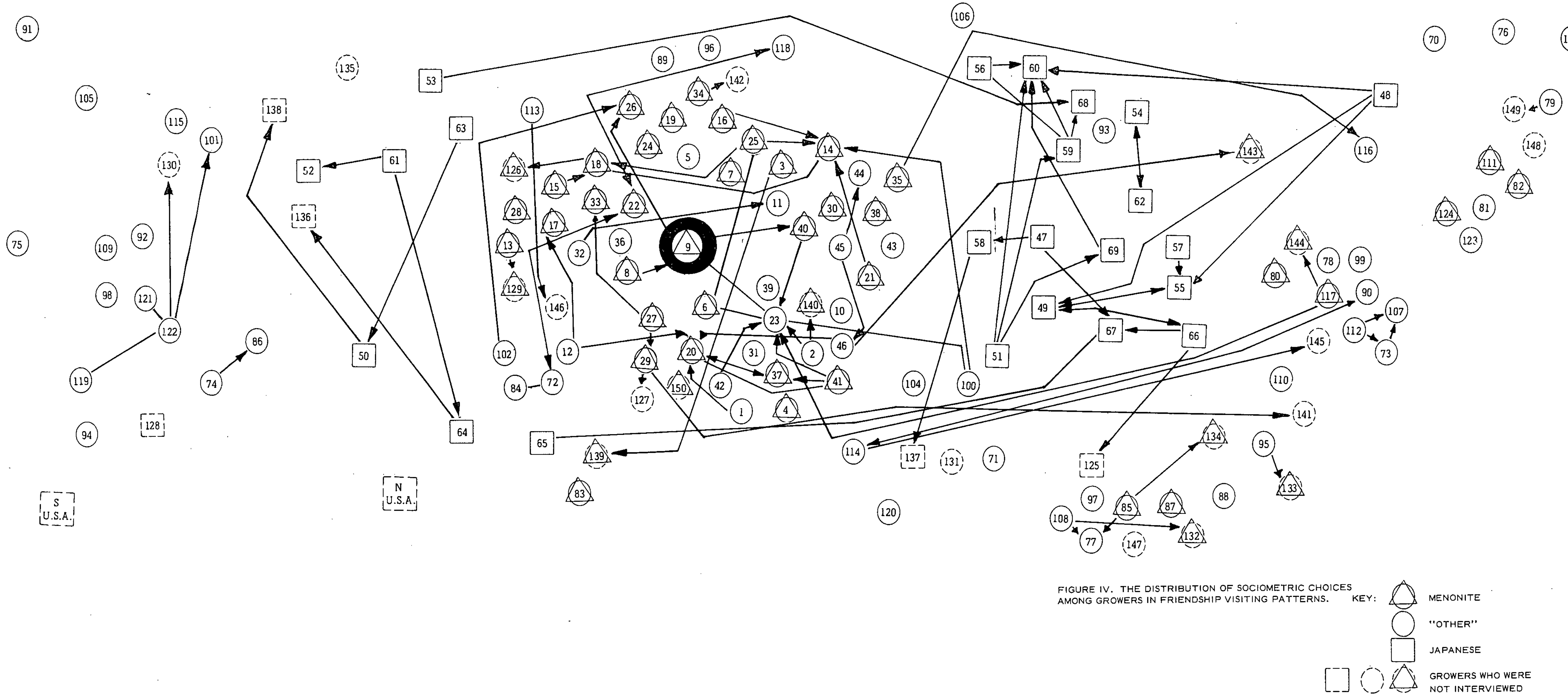

FIGURE IV. THE DISTRIBUTION OF SOCIOMETRIC CHOICES AMONG GROWERS IN FRIENDSHIP VISITING PATTERNS.

grower with no score for advice may appear quite popular in the informal visiting contact behaviour; for example, No. 49 increases from 0 to 3. Similarly No. 55, who is an early adopter-innovator among Japanese growers, was not selected as a source of advice, but his score now increases from 0 to 3. So that, even if an individual is not considered by his friends as a reliable source of advice in a legitimising role, he may have a reputation for being up-to-date; he may fit the role of a "communicator".[19]

While some of the individuals with the highest sociometric scores for advisory dyads did not name any grower as a source of advice, it would seem that they are selective in their visiting patterns, where other growers are concerned. For example No. 9 visits No. 23, an obvious opinion leader in the local cluster area, who is also classified as an early adopter-innovator on the basis of his score. No. 16, another early adopter-innovator, named a foreign grower as a source of advice, but he now visits No. 14 classified as early majority, but who has a high total score, and is obviously an opinion leader. Some individuals make use of both dyadic communication behaviours to benefit from opinion leaders; for example No. 40 names No. 9, an early adopter-innovator like himself, as a source of advice,

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[19] H. F. Lionberger and H. C. Chang, *op. cit.*, p. 6 include in this category "those who communicate farm information to other farmers quite devoid of the innovator and legitimator roles:" they provide "information and not advice." It is conceivable, however, that these individuals may provide advice, even if not at the legitimising level.

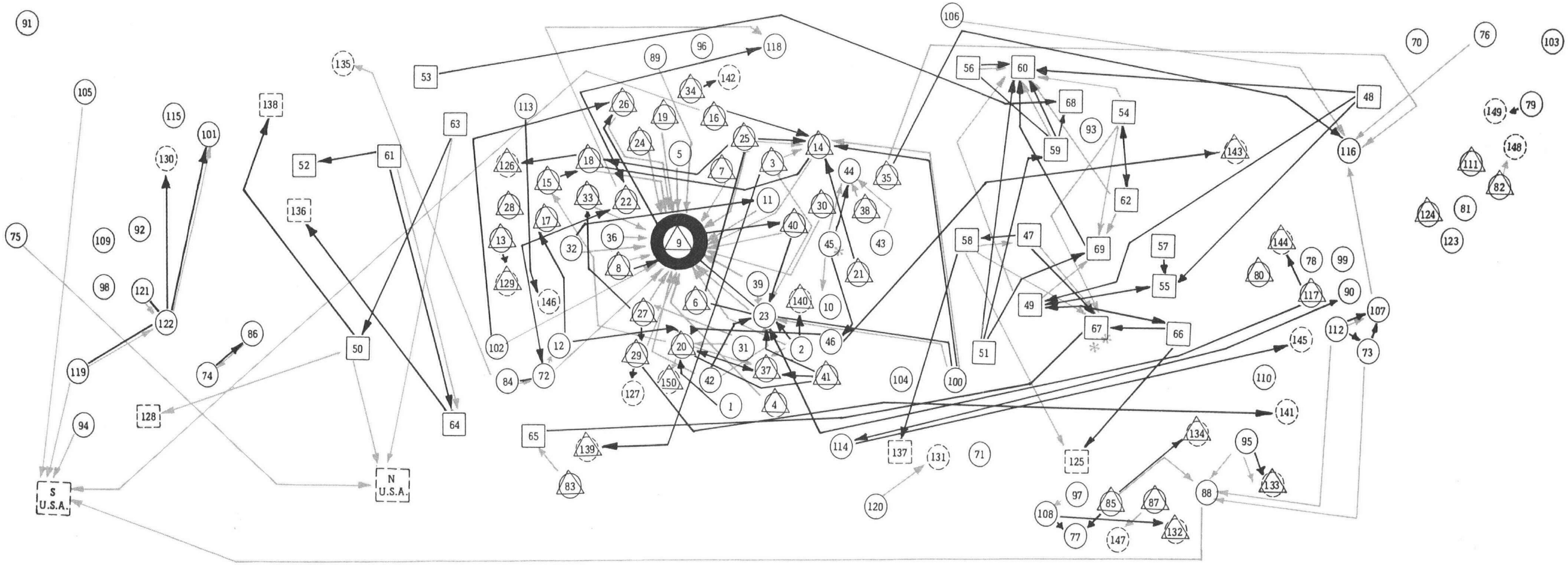

FIGURE V. AN ILLUSTRATION OF THE COMBINED POTENTIAL FOR INTERPERSONAL COMMUNICATION BY SOCIOMETRIC CHOICES RELEVANT TO BOTH ADVICE AND FRIENDSHIP VISITING PATTERNS.

MENONITE

"OTHER"

JAPANESE

GROWERS WHO WERE NOT INTERVIEWED

KEY:

SOCIOMETRIC CHOICE AS A SOURCE OF ADVICE

SOCIOMETRIC CHOICE IN THE FRIENDSHIP VISITING PATTERN

* RESPONDENT NAMED FOREIGN GROWER (NOT PLOTTED) AS A SOURCE OF ADVICE

but he also visits No. 23 in the same adopter category. Besides the fact that friendship patterns may be closely allied to similar innovative behaviour, it would seem that even the most progressive growers keep in touch with the general climate of opinion among growers like themselves.

One of the outstanding features of Figure V is the vivid illustration of the diffusion potential for information transfer, which in most adoption studies receive only descriptive treatment. This potential is evident both within a single community, and even across international boundaries under some circumstances. It must also be remembered that since all known strawberry growers were not interviewed, the fullest potential of the interpersonal network has not been mapped.

It is conceivable that Japanese growers in the Bradner-Mr. Lehman area could obtain information about growers in the State of Washington via No. 67 who visits foreign growers. At the same time, they may obtain information about Japanese growers in the Surrey area, both via No. 53 who visits No. 68, and by indirect transfer since growers in the Surrey area visit those in the United States, for example, No. 50. This transfer of information between ethnic groups may also occur since all three types visit the same foreign grower — S, U.S.A.

In the Peardonville-Clearbrook area, No. 88, an early adopter-innovator, who has both high personal extension contact with the D.H. and access to foreign information sources, is a source of advice to many growers. Information can spread from him via No. 72 to No. 107 (by visiting) and eventually to No. 116, another large scale operator who may well be interested in the farmer's (No. 88) operations, but may not have direct contact with him. Continuing, the chain effect can result in the flow of information back to the Menonite community via No. 35.

Within a smaller area, the diffusion of information in a single community by linkage in sociometric behaviour can be readily observed. In the predominantly Menonite community, information can spread from No. 14 to No. 25 who has dual purpose dyadic contact with the former, then to Nos. 18 and 15 by friendship dyads, thereafter to No. 20 (by advice), and eventually to numerous other growers.

In the predominantly Japanese community, there is a complete link up of every single Japanese grower, plotted in the area, by the total interpersonal network, thus indicating a fairly close-knit community. However, No. 93 a non-Japanese who resides in the midst of the group is completely cut off from this communication network. It would seem that where other growers are concerned, Japanese growers may be relatively isolated from the point of view of both types of dyadic relationships.

In essence, therefore, the combined sociometric network for all responses illustrate with remarkable effectiveness the dyadic relationship with Rogers[20] suggests can be used as the

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[20]E. M. Rogers, op. cit., p. 214.

"main unit of analysis in the diffusion process". In addition, further support is provided for the "multistep flow of communications" proposed by Menzel and Katz[21] as a revision to the earlier classic "two-step flow". These authors suggested a type of staircase ascendancy in opinion leadership in the search for advice within the interpersonal communication framework.

For example, within the cluster of growers, No. 9 is a major channel of communication between the D.H., large commercial growers and the local community. He is also the outstanding opinion leader. Two lower-level outstanding opinion leaders are Nos. 23 and 14, both of whom seek advice from No. 9, and subsequently, obviously provide a source of information and advice for the numerous individuals who converge upon them by both types of dyadic relationships.

VII. SOCIO-ECONOMIC CHARACTERISTICS AND OPINION LEADERSHIP

The agricultural extension change agent must consistently be concerned with maximising returns to the expenditure of time and energy in an effort to promote change. Studies in the adoption-diffusion context have long been concerned with the determination of opinion leaders who act as "energisers" in the diffusion process, thus facilitating the adoption of innovations. The use of sociometric techniques in a particular research study may isolate these important functionaries within the area studied but, it is necessary to examine the outstanding

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[21]H. Menzel and E. Katz, <u>op. cit.</u>, p. 343.

characteristics of these individuals with a view to providing guidelines to extension agents who will then have some basis for identifying such influentials in day-to-day situations.

Twenty-one (60 per cent) of the original 35 opinion leaders qualified for detailed study on the basis of a total choice score of 2 or more. Twelve (57.1 per cent) of this selected group were of the median age for the random sample (45-54 years) or above, while, at least one-third of them were 55 years or more. Thus, opinion leaders tended to be among the older growers, and were definitely above the average for the population in age.

They also had larger farms and larger acreages in strawberry than were typical of the sample studied. While the median size of farm for the sample was from 5 to less than 15 acres, 57.1 per cent of these influentials had 15 or more acres. None of them had holdings in the category of less than 5 acres, which accounted for 17 per cent of the sample. Thirty-eight per cent of the influentials reported less than 5 acres in strawberry, compared to 50 per cent of the sample. Similarly 43 per cent had 10 or more acres, compared to 31 per cent for the sample in the 5-15 acre range.

As would be expected from the relationship already shown between farm size, acreage in strawberry and income, these individuals derived larger incomes from agriculture. Compared to a median income of $5-10,000 for the sample, 71.4

per cent of the influentials reported more than $10,000. Sixty-two per cent reported $5,000 or more from strawberry sales compared to a median of $3-5,000 for the sample. The level of social participation for opinion leaders also exceeded the average for the random sample. The average score was 19.3 compared to a median of 5-14 for the sample.

Influentials were not particularly different from other growers in their experience with strawberry cultivation. They were very similar to the sample studied; 67 per cent had 10 or more years of experience with the crop, compared to 68 per cent for the sample. In any event, there were surely not inexperienced in the sphere in which they extended their influence.

On the other hand, they exhibited a greater tendency to keep up-to-date with new information relevant to their farming enterprise. Sixteen (76.2 per cent) were members of the L.M.H.I.A., with 13 (62 per cent) having attended short courses during the past year, compared to a maximum of 41 per cent having attended in any one year for the sample. They were clearly selective in their choice of sources of information used, especially with reference to the specific innovations studied. Fifty-five per cent of their responses indicated sources which were either government — including agricultural meetings, field days and demonstrations — magazines, short-courses or meetings of the L.M.H.I.A., or foreign.

Eighteen of these individuals (85.7 per cent) reported personal contact with the D.H., compared to 78 per cent for the sample, during the previous year; 15 (71.4 per cent) reported at least two types of personal contact. Among the 5 influentials who received 4 or more sociometric choices as sources of advice (Figure I), 3 reported high frequency contact for all 3 personal contact channels with the D.H. Of the remaining two, one reported high frequency contact by 2 personal contact channels, while the other reported contact by a single channel only, at the low frequency level.

Whenever respondents indicated that they first became aware of an innovation directly through another grower, they frequently could not recall the particular individual, or at times seemed to hesitate in naming the person. However, the importance of some of these influentials as sources of information even at the Awareness stage is indicated. The names of 13 of these higher status growers were mentioned specifically as the source of information at the awareness stage for approximately 15 per cent of the total number of responses.

It must be pointed out, however, that No. 9, the outstanding sociometric star in the predominantly Menonite area, was responsible for 64 per cent of these specific references by name. His own level of local importance as a legitimator is clearly illustrated in Figures I and III. He received 55 per cent of the total dyadic choices as a source of advice from growers in the cluster.

On the basis of adoption performance, 11 (52.4 per cent) of the 21 high status influentials were early majority, 7 (33.3

per cent) were early adopter innovators and 3 (14.3 per cent) were late majority. Of the 5 growers who received more than 4 choices as sources of advice, 4 were early adopter-innovators, and 1 was early majority.

The relationship between practice adoption and opinion leadership supports previous research findings. It has been shown that while opinion leaders are not necessarily innovators, "they are generally more innovative than their followers".[22] Lionberger and Chang[23] reported that "legitimators", in particular, in two Missouri communities were to a large extent characterized by high technological competence, high information receptivity and information-seeking behaviour relative to adult classes, and original sources including the county agent.

This data further supports the established fact that sociometric influence is a fairly widespread phenomenon, even if concentrated in a particular-direction-towards the upper end of the adoption scale. Among the influentials of Japanese ethnic origin, 1 was early adopter-innovator, 1 late majority and 5 early majority. Considering the two other groups together, in view of their overall level of interpersonal communication, 6 of the 14 were early adopter-innovators, 6 were early majority and 2 were late majority. Thus, to some extent, the level of performance, relevant to ethnicity, is reflected in the

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[22]E. M. Rogers, op. cit., p. 243.

[23]H. F. Lionberger and H. C. Chang, op. cit., pp. 54,55.

level of practice adoption of their leaders.

With these general observations on the major characteristics of leaders, it is of interest to take a closer look at those situations in which individuals selected, as a source of advice, others who were classified in a lower adopter category. These relationships, shown in Figure II, are illustrated by examination of the following cases:

Case 1. Farmer No. 14 who was classified in the early majority category was named by growers Nos. 100 and 25, both of whom were classified as early adopter-innovators. No. 14 fell into the early majority category since he is one of the individuals who reported having gone ahead using chemical soil treatment for nematode control without having ever tried the specific practice of soil analysis. He is known to be a progressive grower; one of his neighbours referred to his holding as being of an "experimental" nature. He is in the same age category as No. 100, operates a much larger farm, has a much larger agricultural income, and like No. 100 he also has high frequency contact with the District Horticulturist. No. 25 is his brother.

Case 2. Farmer No. 44, classified as early majority was named by Nos. 38, 43 and 45, all of whom are classified as early adopters-innovators. Nos. 44 and 43 are both immigrants from the same country; the former is much older, has high frequency personal contact (2 channels) with the D.H., has been a strawberry grower for 20 or more years, manages a farm 4 times as large and derives a much larger income from agricultural and

and strawberry sales. On the other hand No. 43 has no personal contact with the D.H., and is generally taken up with a full time job. He no doubt has taken advice from No. 44, and considers himself in the adoption stages for all practices, even though No. 44, himself, may be undecided in one instance.

No. 45 is the son of No. 44; he is less experienced than his father and has less personal contact with the D.H.

No. 38 is the son-in-law of No. 44, he is less experienced, cultivates a much smaller acreage and has much less contact with the District Horticulturist.

Case 3. Farmer No. 122, classified as late majority was named by Nos. 119 and 121, both of whom are early majority respondents. All three individuals live in the same general area. No. 122 is the eldest and the most experienced strawberry grower. He manages a farm much larger than either of these two individuals and would generally be of high prestige status, especially since his total agricultural income is at least 3 times that of either of his followers. His level of social participation is high, but is similar to that of the others, but he differs from them in that he is the only one reporting high level personal contact with the District Horticulturist.

Case 4. Grower No. 69, classified as late majority was named by No. 49, an early majority respondent. Both growers are of the same ethnic origin; No. 69 is younger, he is a much more experienced grower with a larger farm and larger strawberry acreage. Also, he reported high level personal contact with the D.H. by at least 2 channels, while his follower had no high level contact by any personal contact channel. Also No. 49, who is classified as early majority also seeks advice from another grower (No. 60) in the same adopter category.

While these general relationships may not hold in every instance, it would seem, therefore, that it is quite safe to predict that generally farmers will look upward in their search for advice and legitimation. However, there may be other operative factors which occasionally result in an apparent downward turn, especially since the farmer, by his nature is conservative, and places his trust, partly at least, in the safety of experience.

VIII. A SUMMARY ON INTERPERSONAL COMMUNICATION

In this chapter, the analysis is concerned with the study of interpersonal communication among the strawberry growers in the Lower Fraser Valley. The sociometric questions were designed to obtain information relevant to the identification of opinion leadership among the population of growers. In the first instance, sociometric choices were elicited in respect of individuals sought as a source of advice; secondly, sociometric status relevant to friendship visiting patterns was also observed. The primary interest in this aspect of the study centers on advisory dyadic relationships; the analysis takes into consideration general sociometric tendency behaviour, interaction between adopter categories and between different ethnic groups.

Respondents were very conservative in naming other growers in an advisory capacity; 45 per cent of the respondents did not choose anyone. Also, there seems to have been some measure of distrust among individuals concerning the willingness of others to give reliable advice. Late adopters were more likely to name someone for this purpose; while the tendency was indicated for the sample it was not evident within the cluster. In general, however, respondents with high sociometric status either did not name anyone or tended to choose a foreign grower.

Sociometric importance in an advisory capacity was clearly weighted in favour of early adopters. Average combined percentages were 26.1 per cent of the early adopters, compared to only 10.3 per cent of the late adopters. The relationship became more evident when the analysis was focussed on individuals with a score of 2 or more. This general relationship was found in both the sample and the cluster.

The analysis of dyadic interaction between adopter categories only included growers who were interviewed and for whom an adoption score was available. The search for advice and legitimation was largely in the direction of other growers characterized by a higher level of practice adoption. The percentage distribution of choices in an upward direction, or at the same level of practice adoption, were similar for both the sample and the cluster. Sixty-six per cent of the choices among respondents in the sample and 61 per cent of those within the cluster were directed upwards; similarly the percentage of choices at the same level of adoption were 27 and 28 per cent respectively. Among laggards and late majority respondents, at least 75 per cent of all choices were directed upward.

Downward choices were particularly evident among early majority respondents in the sample and early adopter innovators in the cluster; in neither instance, however, did the percentage of choices exceed those in other directions. The chi-square test indicated a significant difference at the .001 level for the distribution of choices between adopter categories.

In relation to ethnicity, patterns of sociometric interaction were concentrated within each ethnic group. Japanese respondents did not name individuals within any other ethnic group as a source of advice. At least approximately 70 per cent of all choices originating from Menonites or the "other" respondents, both in the sample and in the cluster, were directed to growers of similar ethnic background. The cluster of growers was predominantly Menonite and did not include any Japanese. Eighty-seven per cent of the dyads within this locality group were between Menonites.

The lack of contact between Japanese and other growers is further illustrated by the fact that there was only a single instance of a local Japanese grower named by a non-Japanese respondent. Another interesting feature of the sociometric pattern was the general restriction of sociometric choices to immediate locality groups. The chi-square test again indicated a significant difference at the .001 level for the distribution of choices on the basis of ethnicity.

Sociometric friendship visiting patterns suggest a tendency for popularity to be allied with progressive farming behaviour. Also, while many individuals of high advisory sociometric status did not name another grower as a source of advice, it was evident that their choices for friendship interaction were largely relevant to individuals of similar status. The super imposition of advisory and friendship dyads on a single sociogram highlighted real potential for interpersonal communication in the diffusion of information.

The socio-economic characteristics of opinion leaders were examined with reference to individuals with a total choice score of 2 or more for either type of dyad. Opinion leadership was characterized by individuals who were above the average for the population of growers in terms of age, size of farm, acreage in strawberry, farm income and income from strawberry, level of social participation and extension contact with the D.H. In relation to practice adoption, more than one-half of them were early majority, while one-third were early adopter-innovators. In those instances where the opinion leader was classified in a lower adopter category than the seeker of legitimating advice, there was clear evidence of the influence of family relationships, or of the extension of sociometric choices in the direction of growers with more experience, larger commercial operations and a higher level of extension contact with the District Horticulturist.

CHAPTER VIII

SUMMARY AND CONCLUSIONS

This study involves two major aspects of practice adoption among strawberry growers in the Lower Fraser Valley of British Columbia. Six practices were selected as the basis for studying differences among 100 randomly selected respondents in terms of the adoption of innovations. Adoption performance is examined in relation to socio-economic characteristics, ethnicity and the use of information sources. Emphasis is also focused on interpersonal communication patterns, as determined by information elicited in response to specific sociometric questions. An additional number of non-random growers who formed an obvious cluster were interviewed to obtain a more complete picture of the interpersonal network. This chapter summarises the research findings, and states the relevant conclusions.

Socio-economic Characteristics

The median age category for the sample was 45-54 years. Age correlated negatively with adoption; 80 per cent of respondents in the 20-34 age group, compared to 41.6 per cent of respondents 55 years or more were in the combined upper adoption level. Older respondents had larger families, with approximately one-third in the median category of 3-4 children.

Slightly more than half of the respondents had 8 years or less of formal schooling; 42 per cent attended High School, but only 11 per cent completed. Twice as many respondents with 8 or less years of schooling (17 per cent) compared to those with more than 8 years (6.5 per cent) were laggards. On the other hand, 74 per cent of the respondents with more than 8 years of schooling were in the upper adoption level, compared to 47.2 per cent among less educated respondents. Partial correlation analysis did not indicate a significant relationship.

Respondents' wives were generally better educated than their husbands, the median educational level being 9-11 years. Their level of education was positively correlated with adoption, but was only significant at the .05 level; 75 per cent of husbands of better educated wives were in the upper adoption level, compared to 47.2 per cent for less educated spouses.

No more than 7 respondents reported having High School or vocational agricultural courses. One half of the respondents attended agricultural education courses; the majority of participants were early adopter-innovators and early majority respondents. The level of attendance at L.M.H.I.A. short courses was surprisingly low; 41 per cent attended in 1966, and even fewer in 1967. In each instance attendance is positively related with adoption, but the relationship is only significant for attendance in 1967. No more than 10 per cent attended short courses in the State of Washington, U.S.A. in any one year.

The majority of growers were established on their farms for fairly long periods; 65 per cent were resident on the same farm for at least 10 years. The older residents were the most experienced farmers, in general, and also the most experienced strawberry growers. Two-thirds of the respondents were in agriculture for 20 years or more, with only 28 per cent having a similar amount of experience with the strawberry crop. Adoption was not significantly related to experience of either kind.

Fifty-four per cent of the growers had holdings of 15 acres or less; 17 per cent reported less than 5 acres, while one-fifth managed holdings of at least 120 acres. Small fruit farming was the major enterprise for the large majority of growers; in other instances the most important farm enterprises included vegetables, dairying or poultry.

Operators with the largest farms also had the largest acreage in strawberry and in other agricultural enterprises. Strawberry cultivation was the major operation of 41 per cent of the growers; one half of all respondents, however, had less than 5 acres of this crop.

The median income category for gross agricultural income was \$5,000-\$10,000, with 45 per cent reporting more than \$10,000, 15 per cent more than \$55,000 and 18 per cent under \$3,000. The predominance of small acreages in strawberry resulted in a lower median income category of \$3,000-\$5,000 for income from strawberry sales. Twenty growers reported no income from other agricultural enterprises besides strawberry; the median category of income from this source was more than \$5,000-\$10,000, with 21 per cent reporting under \$3,000 and 10 per cent more than \$40,000.

There was a considerable range in the amount of labour employed for harvesting operations. More than half the operators (53 per cent) employed less than 25 pickers, while large growers with 50 or more acres in strawberry employed between 200 to 600 pickers.

More than two-thirds (72 per cent) of the respondents were equally distributed in the estimated farm value categories of \$10,000-\$29,000 and \$30,000-\$59,000. Fourteen suggested more than \$150,000. The large operators who were long established on their holdings, also owned the most highly valued farms.

The level of social participation was generally low, with 42 per cent obtaining a score of 14 or less, with as much as 25 per cent having a score of less than 5. The relationships of this distribution is obvious when it is considered that a score of 15 indicates full involvement, including holding office, in a single organization. Educational level of both respondents and their wives were positively and significantly related to the level of social participation.

Voluntary participation in organizations and in adult education courses was generally higher among the longer established growers in the community. Social participation scores were highest among the larger farm operators with large incomes; these respondents were relatively younger, better educated, with better educated wives and were generally characterized by higher levels of practice adoption.

Among the personal and economic characteristics, therefore, factors indicative of the relative socio-economic status of the respondent were most outstanding in relation to adoption. Various indices of the extent of the business operation, including size of farm and acreage in strawberry, estimated farm value, gross agricultural income and gross income from the specific enterprise relative to the innovations, all correlated positively and significantly with adoption performance.

Laggards averaged 35.3 per cent in the 0-4 acre farm size group, compared to only 7.7 per cent for respondents with 30-119 acres. Combined percentages at the upper adoption level increased consistently from 29.4 per cent in the 0-4 acre group to 90.9 per cent for more than 119 acres. Combined percentages for acreage in strawberry ranged from 30.3 per cent (0-3 acres) to 89.5 per cent (30 or more acres).

The significance of gross agricultural income to adoption was most marked between growers reporting either more or less than $5,000 income. Combined percentages for lower adopter categories decreased with increasing income, while those for upper adopter categories increased with increasing income. The trend relationship is similar, but much more outstanding for gross income from strawberries. For example, combined percentages at the lower adoption level decreased from 64.1 per cent in the lowest income group to 8 per cent for respondents reporting more than $5,000. At the upper adoption level, percentages increased from 35.9 to 92 per cent. Likewise, the significant positive relationship with farm value is illustrated by an increasing combined percentage for upper adopter categories as farm value increases.

Sixty per cent of respondents reported no off-farm employment, while 16 per cent were employed full time in off-farm occupations. There was no clear or consistent relationship with adoption. Eighty operators owned their farms, most of the remaining individuals also reported more than half ownership.

Ethnic Influences

Fifty-four per cent of the respondents were immigrants, the majority coming from Eastern Europe, the Russia-Ukraine region and Japan. Within the sample of 100 respondents, there were 32 Menonites and 23 Japanese; the remainder were categorised as "Others". On the basis of the chi-square test, there were significant differences between ethnic groups for 16 socio-economic characteristics and for some types of extension contact.

Japanese respondents owned their farms to a greater extent, compared to all other growers; they were generally the most experienced farmers, but they showed the lowest level of practice adoption and participated least in agricultural adult education activities.

The educational level of Menonites and their wives were the lowest among all ethnic groups; similarly they were the least active in terms of social participation.

The other respondents had the larger, higher valued farms with the largest acreages in strawberry and in other agricultural enterprises. Within the 3-15 acre category however, a large proportion of Japanese respondents reported having other agricultural enterprises. Extension contact was higher among the other respondents and lowest among Japanese; the difference was especially significant for personal type contact by telephone and farm visits.

The observed relationship between extension contact and adoption is further illustrated within the context of ethnicity. Almost twice the percentage of respondents who were neither Japanese or Menonites were in the upper adoption level, compared to Japanese respondents. Menonites showed a higher level of practice adoption compared to Japanese, but were not as good as the third group. Except for the fact that twice the proportion of Menonites, compared to any other group, reported contact by radio, the general relationship remained the same for impersonal type contact.

Extension Contact and Adoption

The level of extension contact reported in this study is exceptionally high, compared to other studies. More than half the respondents reported contact by telephone (63 per cent) or farm visits (56 per cent), but only 43 per cent had contact by office visits. High intensity contact (frequently or very frequently) ranged between 10 per cent (office visits), 12 per cent (farm visits) and 27 per cent (telephone). Slightly less than one half of the growers reported attendance at local meetings, field days or demonstrations.

Impersonal contact by mail (82 per cent) and newspaper articles (64 per cent) was higher than for any personal contact type. Less than one-third of the respondents reported contact by radio or television; thus, the average level of use of impersonal sources (46 per cent) was less than for personal type contact (54 per cent). Also the general intensity of use is lower compared to personal contact, except in the case of mail contact for which 60 per cent reported high intensity use. In comparison with other studies cited, the level of contact is higher for contact by mail and newspaper articles, but lower for T.V. and radio.

Considering the comments of some growers, it would seem that the District Horticulturist could improve the effectiveness of his use of T.V. and radio facilities by informing his clientele well in advance of broadcasts. Also some attempt should be made for radio and T.V. broadcasts within time periods which are more convenient to the growers.

Extension contact of strawberry growers with other agricultural agents was about one-half the level indicated for the D.H. Contact by telephone and farm visits were reported by about one-third of the respondents. This is understandable since more than two-thirds of the sample had at least 3 acres in other agricultural enterprises besides strawberry. Impersonal contact was at the same average level (48 per cent) compared to that indicated for the D.H.

Eleven respondents had no contact whatsoever with the D.H., while 5 per cent reported no contact with any agent. The median number of contacts for the sample was 4 with an average of 3.4 for the sample. Using an extended contact score relevant to all agricultural agents, the median score category, out of a range of 0-56, was 11-20.

The highest correlation coefficients, relevant to adoption, were obtained with this variable. Personal contact showed a higher degree of association; in particular, personal contact with the D.H. was most outstanding. Detailed analysis further illustrated the strength of the relationship between extension contact and adoption. High intensity contact with the D.H. was consistently associated with high adoption performance. Similarly, only respondents in the lower adopter categories reported no impersonal contact.

Extension contact correlated positively and consistently, at the .01 level of significance, with other socio-economic characteristics which were positively associated with adoption. These include farm size and income, and social participation. In particular, larger operators had more frequent contact by telephone and farm visits. Participation in agricultural adult education activities and the educational level of the farm wife correlate positively and significantly with contact by telephone. Also, those who participated in agricultural adult education activities were more likely to have personal contact with the D.H.

These findings on extension contact suggest strongly that purposeful effort by an effective extension agent to increase his level of contact, in particular personal contact, with his client system is a major factor in promoting the desired change. The general findings on the interrelationship between extension contact, ethnicity and adoption further support this suggestion.

Adoption and non-Adoption of the Innovations

The level of adoption performance was quite high, as indicated by an average of 4.12 out of 6 innovations for adoption. Discontinuance was negligible, involving only a single respondent for each of two practices. Unawareness was recorded for 3 innovations, with a maximum of 8 per cent in any one instance. The awareness stage was only relevant to 3 innovations with a maximum of 5 per cent. The interest and evaluation stages were relevant to 5 of the 6 innovations, but involved less than one-third of the respondents in any instance. Some respondents were at the trial stage for all innovations, with a maximum of 14 per cent. Adoption ranged between 33-94 per cent for all adopter categories, besides the early adopter-innovators, who indicated 100 per cent adoption for all innovations.

Generally the percentage of respondents at each stage in the adoption process decreased with improved adoption performance. Five of the 6 innovations were adopted by at least one-half of the respondents. Adoption was highest for those innovations introduced earliest to the growers; these included the change in the cultural system (83 per cent) and certified virus-free plants (94 per cent).

The classification of progress towards adoption by innovation response state, as designed by Verner and Gubbels, was used for further analysis. Relevant to both unawareness and rejection, the percentage of respondents by adopter category decreased with progress towards the upper adoption level. The reverse situation occurred for adoption, but there was no consistency in the trend for continuing with the adoption process.

Rejection was lowest for the innovations introduced earlier, and for those which are vital operations in the economic production of the crop on any commercial scale, such as captan and chemical weed control. On the other hand almost one-half of the growers rejected picking carts.

Reasons for Delay in the Adoption Process and for Rejection

In each instance, the reasons given were classified under two major sub-types as being relevant to characteristics of the innovation-relative advantage, compatibility, complexity, divisibility or communicability — or one of a number of general reasons, including factors related to the particular situation of the respondent. Characteristics of the innovation accounted for almost one-half the reasons for delay, compared to less than one-third of the reasons for rejection. Besides situational factors, the percentage frequencies were largest for relative advantage and communicability.

This finding indicates the importance of successful communication to the farmer of the particular advantages of new innovations while the farmer is continuing in the adoption process. Similarly there is need for extra effort by the change agent when the results of an innovation are not easily transmissible within his target social system.

Situational factors were the most outstanding under general reasons, both for delay in the adoption process and for rejection. To some extent delay is explained by the fact that growers may have been aware of the innovation long before they started operations on their own. In other instances, they may have ceased operations after one of the many periodic freeze outs. Too small an acreage to justify added expenditure or to benefit from the relative advantage of a new practice, compared to one already in use, was also frequently stated. Other situational factors included the unavailability of a particular service, either from a local government agency or from custom operators.

The early adopters indicated situational factors to a greater extent than operators in the lower adoption level. The former, therefore, were less likely to indicate that they were unable to perceive the relative advantage of an innovation or that there was a problem in recognising profitable results. On the other hand, being the first to try new innovations, they were most likely to explain some measure of delay due to the need for more information or the fear of crop damage.

There was a more even distribution of reasons classfied as relative advantage or communicability for rejection. Cost, and fear or evidence of crop damage, accounted for a slightly larger percentage of the general reasons. Some growers were particularly skeptical of the use of chemicals in agricultural production, hence compatibility accounted for one-third of the reasons relevant to chemical weed control. The particular problem involved in respondents seeing the beneficial effects of captan in the increased proportion of marketable fruit, resulted in 42.9 per cent of the reasons classified as communicability. With a few exceptions, situational factors were generally similar to those given for delay in the adoption process.

Sources of Information

Except for the information sources used at the awareness stage for the special innovations, the analysis in this study is based on response elicited in terms of a general pattern of use for all sources available to the respondent. Information sources were classified by Origin, with reference to the initial source, and by Nature of the Activity with emphasis on the instructional process relevant to the learning experience. In the first instance, the four categories were Personal, Government, Commercial and Farm Organization; the second classification also included Personal and, in addition, Mass, Instructional Group and Individual Instructional.

Personal sources, which were the same for either classification, were used to the greatest extent. When classified by origin, government sources were second in importance, and commercial sources were used more than farm organization sources. At the awareness stage, government sources were generally used to the greatest extent for the most recently introduced innovations while personal sources were of greater importance for longer established and less complex practices. This no doubt results to a large extent from increased activity of government agencies in more recent years.

The importance of salesmen especially for innovations involving the use of chemicals, and employees of commercial operations is indicated by the fairly extensive use of commercial sources. The relative position of government and personal types is the same for all adopter categories; the latter however, is used to a greater extent by respondents at the lower adoption level. These relationships, with particular relevance to the Awareness Stage, were generally statistically significant as indicated by the test of a difference between proportions.

When information sources were classified by Nature of the Activity, the individual instructional type was second in importance, after personal sources, and were used to a greater extent at the upper adoption level. Instructional groups were used slightly more than mass sources. For neither classification, however, did the chi-square test indicate significant differences between adopter categories.

Some interesting differences in information-seeking behaviour become evident when consideration is given to the percentage use of individual sources of information. The high level of extension contact with the D.H. is indicated by the fact that this source ranked second for all adopter categories, except the laggards. Personal experience was not included at this level for late majority respondents, but was of decreasing importance with increasing adoption performance. Similarly observations on other farms is of relatively greater importance at the lower levels of adoption.

The cosmopolitan behaviour of early adopter-innovators was made particularly evident by the ranking of foreign travel as third in importance, while it was not included for any other adopter category. Many of these progressive operators indicate that they maintained contact with foreign government agencies and private growers.

Interpersonal Communication

A major aspect of the study was the pattern of interpersonal communication and its implication for effective programme planning in the diffusion of innovations. Besides the 100 randomly selected respondents, an additional number of growers in a particular locality area were interviewed in order to examine more closely interpersonal communication on a community basis within the cluster of individuals.

Two sociometric questions were used to elicit information relevant to dyadic "seeker-sought" relationships in the search for advice, and in informal friendship visiting patterns. Sociometric procedures were then used to identify high status individuals relevant to opinion leadership. This characteristic was also analysed in terms of ethnicity and adopter categories.

There was a general caution among respondents in naming other growers as a source of advice, with almost one-half failing to name any one in response to the specific question.

In particular, very few of the individuals with high sociometric status, as indicated by the number of different individuals who named them, named anyone; if they did, it was more likely to be a foreign grower, also of high sociometric status.

Influentials were mostly early majority respondents, followed by early adopter-innovators and late majority respondents. Dyadic relationships were considered as being upward, downward or across in terms of whether the person named was in a higher, lower or the same adopter category, compared to the individual from whom the choice originated. Sociometric choices were clearly biased in the direction of superior practice adoption. More than one-half (56 per cent) of the choices were upward, one-third across and 11 per cent downward.

Sociometric behaviour in the search of advice would seem to be definitely not a random phenomenon. While those seeking advice were likely to reach far upwards beyond their own level of practice adoption, most choices included growers in the same adopter category, or not too far removed. Downward choices never extended beyond a single adopter category; in these cases, a closer look at the detailed circumstances usually indicated specific family relationships or a choice in the direction of experience and prestige.

Analysis within the context of ethnicity indicated that dyadic relationships were largely between individuals of the same ethnic group. The relationship is most outstanding among Menonites and Japanese; in the latter case, not a single respondent named a non-Japanese grower. The chi-square test showed significant differences at the .001 level in the distribution of sociometric dyads both by adopter category and by ethnic origin.

Sociometric data for friendship visiting patterns emphasized the existence of tight-knit community interpersonal network behaviour, especially in the areas where the majority of Menonite and Japanese growers resided. Interpersonal dyads among growers were largely confined to individuals in the same general locality areas.

Two interesting features emerged when dyadic relationships for all responses were imposed on a single sociogram. In the first instance, the limited sociometric status of a number of individuals isolated as sources of advice or "legitimators" in the first instance, increased considerably. Also, it became quite clear that influentials who were not isolated in the first instance, suddenly became evident in the less specific friendship network.

Since the geographical area studied covered a number of sub-regional areas, the potential for information transfer between different communities was also illustrated. In addition, this latter dual-purpose sociogram provided actual evidence of the importance of the "two-step" and "multistep" flow of information within a community.

Outstanding socio-economic characteristics of the most important opinion leaders were examined. Influentials were above average for the random sample relevant to age, size of farm, acreage in strawberry, gross agricultural income, income from strawberry and the level of social participation. However, they were not necessarily more experienced strawberry growers.

A larger percentage were members of the L.M.H.I.A. and attended the annual short courses. Their choice of information sources were also closer to the origin and they were more likely to be in contact with foreign sources. In particular, the high level of extension contact with the District Horticulturist was outstanding. In general, therefore, opinion leaders were the more progressive farmers of higher socio-economic status who were well informed on various aspects of strawberry cultivation. Also, it must be observed that there were opinion leaders for growers at all levels of adoption performance.

Finally, the sociometric data illustrates with considerable clarity that, at least for this population of farmers, the concept of community in programme planning cannot be discarded by extension agents. An alert and efficient extension agent working with the strawberry growers would be forced to take into account the fact that predominant ethnic groups constitute sub-systems of his total target clientele. Different residential areas and the nature of the relationships suggest community group structures. Within each one, there is evidence of an interpersonal network such that if the opinion leaders are correctly influenced the task of information diffusion and the promotion of change could be made considerably easier.

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APPENDIX I

THE INTERVIEW SCHEDULE WITH UNIVARIATE FREQUENCY DISTRIBUTIONS ADDED FOR BASIC SOCIO-ECONOMIC CHARACTERIST-ICS AND STAGES IN THE ADOPTION PROCESS

Ag.Ec./U.B.C./67

INTERVIEW SCHEDULE

A STUDY OF THE ADOPTION OF INNOVATIONS AND THE RELEVANT INFLUENTIAL FACTORS AMONG STRAWBERRY GROWERS IN THE LOWER FRASER VALLEY.

Respondent's Name ______________________________

Address ______________________________

____

Telephone Number ______________

<u>DATA CARD NO. 1</u>

	Col.	Code
Respondent's Code No.	1,3	
	4	1

<u>Record of Visits</u>

Date	Time	Comments

Additional Notes:

Good___________________,

I am a student from the University of British Columbia. We are making a survey of strawberry growers in the Lower Fraser Valley. It is felt that this industry is a very important one, and we hope that our findings would be of benefit to growers like yourself and to the industry as a whole.

I would be happy if you could assist me by answering a few questions about yourself and your farm.

Any information you give to me is STRICTLY CONFIDENTIAL, and will only be used for the purpose of this survey.

A. FIRST OF ALL, A FEW QUESTIONS ABOUT YOURSELF AND YOUR FAMILY.

1. What is your age?		Column	Code	Frequency
1. Under 20	__________	5	1	0
2. 20 - 24			2	1
3. 25 - 34			3	9
4. 35 - 44			4	25
5. 45 - 54			5	29
6. 55 - 64			6	22
7. 65 or over			7	14
				100

2. What is your marital status?			
1. Single	6	1	9
2. Married		2	88
3. Widowed		3	3
4. Separated		4	0
5. Divorced		5	0
6. Not stated		6	0
			100

3. How many children do you have?				
1. None	__________	7	1	14
2. 1 - 2			2	24
3. 3 - 4			3	36
4. 5 or more			4	26
				100

	Column	Code	Frequency
4. What was the highest year you completed in school?			
1. Less than 5	8	1	7
2. 5 - 8		2	46
3. 9 - 11		3	31
4. High school diploma (Grade 12)		4	7
5. Senior matriculation (Grade 13)		5	4
6. Some university		6	3
7. University degree		7	2
8. University graduate work		8	0
9. Graduate degree		9	0
			100
5. Have you taken any agriculture courses in high school?			
1. Yes	9	1	5
2. No		2	95
			100
6. Have you taken any agriculture courses at a vocational school?			
1. Yes	10	1	7
2. No		2	93
			100
7. Have you taken any agriculture courses for credit at university?			
1. Yes	11	1	2
2. No		2	98
			100
8. Have you taken any adult education courses in agriculture?			
1. Yes	12	1	50
2. No		2	50
			100
9. Have you taken any adult education courses in other subjects?			
1. Yes	13	1	29
2. No		2	71
			100

	Column	Code	Frequency
10. What was the highest year completed in school by your wife?			
1. Less than 5	14	1	5
2. 5 - 8		2	35
3. 9 - 11		3	21
4. High school diploma (Grade 12)		4	15
5. Senior matriculation (Grade 13)		5	4
6. Some university		6	4
7. University degree		7	0
8. Not married/Not applicable/No response		8	16
			100
11. How many years have you been working in the agricultural industry?			
1. Less than 5	15	1	3
2. 5 - 9		2	10
3. 10 - 19		3	21
4. 20 or more		4	66
			100
12. How many years have you been in the strawberry industry?			
1. Less than 5	16	1	17
2. 5 - 9		2	15
3. 10 - 19		3	40
4. 20 or more		4	28
			100
13. How many years have you been on this present farm?			
1. Less than 1	17	1	1
2. 2 - 4		2	7
3. 5 - 9		3	29
4. 10 - 19		4	38
5. 20 or more		5	25
			100
14. Where were you born?			
1. British Isles	18	1	1
2. Germany, Austria		2	3
3. Netherlands		3	4
4. Denmark, Norway, Sweden		4	2
5. Ukraine, Russia		5	20

		Column	Code	Frequency
14.	Where were you born? (cont'd)			
	6. Japan		6	8
	7. India		7	1
	8. East Europe		8	11
	9. U.S.A.		9	3
	A. Canada		A	46
	B. Other		B	1
				100
15.	Since you were not born in Canada, when did you migrate to Canada?			
	1. Does not apply	19	1	46
	2. Immigration before 1945		2	31
	3. 1945 to 1949		3	7
	4. 1950 to 1954		4	6
	5. 1955 to 1959		5	8
	6. 1960 to 1964		6	2
	7. After 1966		7	0
				100

SOCIAL PARTICIPATION SCORE

Score	1	2	3	4	5
Organization	Membership	Attendance	Contribution	Committee Membership	Offices Held

TOTALS ________ ________ ________ ________ ________

GRAND TOTAL = ____________ = Social Participation Score

	Column	Code	Frequency
16. Social Participation Score			
1. No score	20	1	16
2. 1 - 4		2	9
3. 5 - 14		3	42
4. 15 - 24		4	15
5. 25 - 49		5	14
6. 50 or more		6	3
7. No response		7	1
			100

B. MY NEXT SET OF QUESTIONS CONCERN YOUR FARM

	Column	Code	Frequency
17. What would you consider to be your major agricultural operation on this farm?			
1. Small fruit production	21	1	80
2. Dairying		2	4
3. Cattle, hogs, sheep (excluding Dairying)		3	2
4. Poultry		4	4
5. Vegetables		5	6
6. Potatoes		6	1
7. Tree fruits		7	0
8. Green-houses, cut flowers and nursery		8	2
9. Mixed		9	0
1A. Seed Production		A	1
			100
18. What is your secondary agricultural activity?			
0. Nil/No response	22	0	46
1. Small fruit production		1	19
2. Dairying		2	5
3. Cattle, hogs, sheep (excluding Dairying)		3	7
4. Poultry		4	5
5. Vegetables		5	10
6. Potatoes		6	5
7. Tree fruits		7	0
8. Green-houses, cut flowers and nursery		8	2
9. Mixed		9	1
			100

		Column	Code	Frequency
19.	What is the total acreage you are farming at present?			
	1. Less than 3 acres ________Acres	23	1	8
	2. 3 to less than 5		2	9
	3. 5 to less than 15		3	37
	4. 15 to less than 30		4	22
	5. 30 to less than 50		5	6
	6. 50 to less than 80		6	5
	7. 80 to less than 120		7	2
	8. 120 to less than 180		8	2
	9. 180 or more (acres)		9	9
				100
20.	How many improved acres are devoted to strawberry production?			
	1. Less than 3 acres _____Acres	24	1	33
	2. 3 to less than 5		2	17
	3. 5 to less than 15		3	31
	4. 15 to less than 30		4	6
	5. 30 to less than 50		5	6
	6. 50 to less than 80		6	4
	7. 80 to less than 120		7	2
	8. 120 to less than 180		8	1
	9. 180 or more (acres)		9	0
				100
21.	CALCULATE: Number of improved acres devoted to all other agricultural operations (i.e. beside strawberry production)			
	1. Less than 3 acres _____Acres	25	1	13
	2. 3 to less than 5		2	16
	3. 5 to less than 15		3	23
	4. 15 to less than 30		4	15
	5. 30 to less than 50		5	4
	6. 50 to less than 80		6	4
	7. 80 to less than 120		7	1
	8. 120 to less than 180		8	3
	9. 180 or more (acres)		9	6
	A. Nil/No response		A	15
				100
22.	What was the gross value of sales from all your agricultural operations last year?			
	1. Under $3,000 $____________	26	1	18
	2. $3,000 to 5,000		2	13
	3. More than 5,000 to 10,000		3	20
	4. More than 10,000 to 15,000		4	11

	Column	Code	Frequency
22. What was the gross value of sales from all your agricultural operations last year? (Cont'd)			
5. More than 15,000 to 25,000		5	11
6. More than 25,000 to 40,000		6	7
7. More than 40,000 to 55,000		7	1
8. More than 55,000 to 75,000		8	2
9. More than $75,000		9	13
A. Nil/No response		A	4
			100
23. What was the <u>gross</u> value of strawberries sold in 1966?			
1. Under $3,000 $_________	27	1	35
2. $3,000 to 5,000		2	20
3. More than 5,000 to 10,000		3	16
4. More than 10,000 to 15,000		4	6
5. More than 15,000 to 25,000		5	6
6. More than 25,000 to 40,000		6	2
7. More than 40,000 to 55,000		7	1
8. More than 55,000 to 75,000		8	5
9. More than		9	5
A. Nil/No response		A	4
			100
24. CALCULATE: <u>Gross</u> value of sales from <u>all other</u> agriculture operations (i.e. besides strawberries)			
1. Under $3,000 $_________	28	1	21
2. $3,000 to 5,000		2	10
3. More than 5,000 to 10,000		3	9
4. More than 10,000 to 15,000		4	10
5. More than 15,000 to 25,000		5	7
6. More than 25,000 to 40,000		6	5
7. More than 40,000 to 55,000		7	1
8. More than 55,000 to 75,000		8	3
9. More than 75,000		9	6
A. Nil/No response		A	28
			100
25. Do You:			
1. Own this farm	29	1	80
2. Own more than half and rent the remainder		2	13
3. Own less than half and rent the remainder		3	4
4. Rent it entirely		4	2
5. Manage this farm for someone else		5	1
			100

	Column	Code	Frequency
26. Did you work off your farm last year? <u>If so</u>, how did the amount of time spent working off your farm compare with the amount of time spent working on your farm?			
1. No off-farm work	30	1	60
2. Less than 1/4 off-farm		2	8
3. 1/4 to less than 1/2 off-farm		3	4
4. 1/2 to less than 3/4 off-farm		4	6
5. 3/4 to less than full-time off-farm		5	6
6. Full time		6	16
			100
27. What was the largest number of pickers employed by you for harvesting strawberries at any one time during 1966?			
1. Less than 25	31	1	43
2. 25 to 50		2	15
3. 51 to 100		3	12
4. 101 to 200		4	10
5. 201 to 400		5	7
6. 401 to 600		6	1
7. 601 to 800		7	1
8. 801 to 1,000		8	0
9. 1,001 to 2,000		9	1
A. Nil		A	10
			100
28. How much would you pay for this farm if you were buying it from someone else?			
1. Less than $5,000 $________	32	1	1
2. 5,000 to less than 10,000		2	2
3. 10,000 to less than 30,000		3	36
4. 30,000 to less than 60,000		4	36
5. 60,000 to less than 90,000		5	5
6. 90,000 to less than 120,000		6	4
7. 120,000 to less than 150,000		7	1
8. More than 150,000		8	14
9. No response		9	1
			100

C. WHAT KIND OF CONTACTS HAVE YOU HAD WITH THE DISTRICT HORTICULTURIST <u>DURING THE PAST YEAR?</u>

				Never	Seldom	Occasionally	Frequently	Very Frequently		Total
29.	1.	Visit to his office	Code:	1	2	3	4	5	33	
				57	20	13	4	6		100
		Other Agricultural Agents		1	2	3	4	5	34	
				86	8	3	2	1		100
30.	2.	Telephone		1	2	3	4	5	35	
				37	20	16	15	12		100
		Other Agricultural Agents		1	2	3	4	5	36	
				69	4	16	4	7		100
31.	3.	Visit to your farm		1	2	3	4	5	37	
				44	35	9	4	8		100
		Other Agricultural Agents		1	2	3	4	5	38	
				64	15	6	5	10		100
32.	4.	Read Circular Letters, Bulletins, etc.		1	2	3	4	5	39	
				18	3	19	19	41		100
		Other Agricultural Agents		1	2	3	4	5	40	
				63	3	8	8	18		100
33.	5.	Listened to Radio Announcements		1	2	3	4	5	41	
				73	9	14	2	2		100
		Other Agricultural Agents		1	2	3	4	5	42	
				57	7	21	7	8		100
34.	6.	Looked at Television Programmes		1	2	3	4	5	43	
				90	7	1	2	0		100
		Other Agricultural Agents		1	2	3	4	5	44	
				57	7	28	7	1		100

C. WHAT KIND OF CONTACTS HAVE YOU HAD WITH THE DISTRICT HORTICULTURIST <u>DURING THE PAST YEAR?</u>
(Continued)

			Never	Seldom	Occasionally	Frequently	Very Frequently		Total
35.	7.	<u>Read Newspaper Articles</u>	1	2	3	4	5	46	
			36	18	24	13	9		100
		Other Agricultural Agents	1	2	3	4	5	46	
			31	9	20	23	17		100

		Column	Code	Frequency
36.	Did you attend any meeting of the Lower Mainland Horticultural Improvement Association last year?			
	1. No	47	1	60
	2. One		2	9
	3. 2 - 3		3	25
	4. 4 - 5		4	2
	5. 5 or more		5	4
				100
37.	Have you attended any local meetings, field days or demonstrations sponsored by your District Horticulturist, D.A. or the Horticultural Association?			
	1. No	48	1	52
	2. One		2	17
	3. 2 - 3		3	14
	4. 4 - 5		4	17
				100

	Column	Code	Frequency
38. Did you attend the Growers' Short Course sponsored by the Horticultural Improvement Association <u>last year</u>?			
1. Did not attend	49	1	59
2. One day only		2	16
3. Both days		3	25
			100
39. Did you attend the Growers' Short Course <u>this year</u>?			
1. Did not attend	50	1	71
2. One day only		2	12
3. Both days		3	17
			100
40. Did you attend the Growers' Short Course in Washington <u>last year</u>?			
1. Yes	51	1	10
2. No		2	90
			100
41. <u>This year</u>? (Washington)			
1. Yes	52	1	6
2. No		2	94
			100

I have a few questions concerning how strawberry producers communicate with each other. I would like you to think carefully before answering them.

Also, I would like to assure you again that your answers will be treated with strict confidence.

42. I would like you to tell me the name(s) of any particular grower(s) whose <u>advice</u> you <u>always</u> seek before you decide whether or not to try a new practice on your farm.

	Column	Code	Frequency
1. No response	53	1	1
2. Can't think of any particular one		2	2
3. None of them		3	39
4. Name(s) given		4	48
			100

a) Name____________________

Address____________________

____

b) Name____________________

Address____________________

____

c) Name____________________

Address____________________

____

d) Name____________________

Address____________________

____

e) Name____________________

Address____________________

____

43. Who are the three (3) people with whom you visit socially most often?

1.	No response	54	1	4
2.	No one in particular		2	6
3.	Name(s) given		3	90
				100

a) Name____________________

Address____________________

____

b) Name____________________

Address____________________

____

c) Name ____________________

Address ____________________

____

D. MY NEXT QUESTIONS ARE ABOUT THE SOURCES OF INFORMATION WHICH YOU USE CONCERNING NEW PRACTICES IN STRAWBERRY PRODUCTION.

On this card which I am giving to you (hand respondent the card listing sources of information) there are a number of sources of information from which you may or may not learn about new and improved practices in strawberry production. I want you to give me the numbers or letters of the sources of information which apply to each question I shall ask you.

44. When you hear of a new or improved practice, to what source(s) do you go for further information (i.e. general, how to apply, etc.) before you apply it to your strawberry acreage?

____________ ____________ ____________

____________ ____________ ____________

____________ ____________ ____________

____________ ____________ ____________

(Names/Addresses for Personal Sources)

45. After you have gained enough information about a practice and have perhaps, tried it, which source(s) do you use in deciding whether or not to adopt (i.e. to continue using) the practice?

1. No response

____________ ____________ ____________

____________ ____________ ____________

____________ ____________ ____________

(Names/Addresses for Personal Sources)

E. FINALLY, TO COMPLETE THIS INTERVIEW, I WILL ASK YOU SOME QUESTIONS ABOUT SPECIFIC PRACTICES WHICH APPLY TO STRAWBERRY PRODUCTION. THESE PRACTICES ARE LISTED ON THE OTHER SIDE OF THE CARD.

46. If you are aware of this practice, what progress have you made in regard to it?

1. Not aware	2. Awareness	3. Interest	7. Discontinuance
4. Evaluation	5. Trial	6. Adoption	

47. In what year did you first become aware of this practice?

1955	1956	1957	1958	1959	1960	1961	1962	1963
1	2	3	4	5	6	7	8	9

1964	1965	1966	1967
A	B	C	D

48. From what source did you first learn of this practice? (Select from list of sources of information).

(1)__________ (3)__________ (5)__________

(2)__________ (4)__________ (6)__________

(Names/Addresses for Personal Sources)

49. How did you feel about this practice when you first heard about it?

1. Was not interested)
2. Was interested but had no faith in it)Rejection
3. Unsuitable for a strawberry producer like myself)to 60
4. Applicable to my farm To 50

Question No.	Soil Analysis for Nematode Control (1)			Spraying with Captan for Fruit-Rot Control (2)			Cultural Operation Change from "Hill" to "Matted Row" (3)			Chemical Weed Control (4)			Use of Picking Carts (5)			Use of Virus-free certified plants (6)		
	Column	Code	Frequency	Column	Code	Frequency	Column	Code	Frequency	Column	Code	Frequency	Column	Code	Frequency	Column	Code	Frequency
46.	65	1	8	69	1	1	73	1	0	77	1	0	105	1	5	109	1	0
		2	2		2	0		2	0		2	1		2	5		2	0
		3	8		3	7		3	2		3	5		3	21		3	0
		4	23		4	2		4	4		4	12		4	27		4	0
		5	9		5	14		5	10		5	5		5	9		5	6
		6	50		6	76		6	83		6	76		6	33		6	94
			100			100			100			100			100			100

50. Reasons for feeling that this practice was applicable to your farm when you first heard about it.

	Yes	No.
1. Your family was also interested	1	2
2. Good results obtained by other farmers who had tried it.	1	2
3. It was developed at the research station at Agassiz	1	2
4. Because it was recommended by the Department of Agriculture.	1	2

51. After you heard about this practice, did you feel a need to seek more information?

1. Yes
2. No

52. From what source(s) did you seek this additional information?

(1)__________ (2)__________ (3)__________

(4)__________ (5)__________ (6)__________

(Names/Addresses for Personal Sources)

53. When did you first try this practice on your farm?

1. The same season) To 56
2. The next year)
3. About 2 years later) To 54 - 55
4. More than 2 years later)

54. What would you give as your reasons for taking 2 years or more before <u>actually trying</u> the practice after making the decision to try it?

a) General Reasons

1. Fear of damage to crop
2. Needed some more information
3. Unencouraging results by other farmers
4. Influenced by other farmers who decided not to try the new practice
5. Advice from members of my family
6. Department of Agriculture was not really giving much active encouragement at the time.

55. (b) Reasons relevant to the practice itself

Open ______________________________

____

Classify:

1. Relative advantage
2. Compatibility
3. Complexity
4. Divisibility
5. Communicability
6. Situational factor
7. Cost

56. After this first trial, did you decide definitely to adopt or reject this practice in the future, or did you begin again to evaluate the suitability of this practice to your farm?

Open ______________________________

Classify

1. Evaluation To 57
2. Rejection To 60
3. Adoption: In what year ______ To 66

57. If you were undecided about the practice after your first trial, what would you give as your reasons for this uncertainty?

1. Evidence of crop damage
2. Availability of capital
3. Needed some more information
4. Unencouraging results by other farmers who tried this practice
5. My own results were not very convincing
6. Influence by other farmers who did not try the practice
7. Advice within my immediate family
8. Did not think that the Department of Agriculture was giving enough encouragement.

58. Did you subsequently try this practice again, or did you decide some time afterwards to reject it completely without trial a second time? If you did try it again, when?

1. Subsequently rejected it................To 59 - 60
2. Tried it again the next season).........To 63
3. Tried it 2 years later) 2nd Trial)To 61 - 62 - 63
4. Tried it more than 2 yrs later))

59. You said you rejected it subsequently - 58(1); what would you give as your reasons since you really did not reject the practice immediately after your first trial?

1. Does not apply
2. Unavailability of capital
3. Felt I did not have enough information
4. Unencouraging results by other farmers
5. Influence by other farmers who did not try the practice
6. Advice within my immediate family
7. Did not think that the Department of Agriculture was giving enough active encouragement.

60. After making the decision to reject the practice_____49 (1)-(2);______; 56(2)_______; 58(1)_________; did you ever subsequently consider this practice again? If so, what kind of decision did you make, and how long after your earlier decision to reject?

1. The same year
2. Trial the next season....................To 63
3. Trial 2 years later..........)..........To 61 and 62
4. Trial more than 2 years later)
5. Adoption................................To 64
6. Permanent rejection

61. You said that you subsequently tried this practice (again) ____58(3) - (4)______; 60(3)-(4)_________about 2 years later; what would you give as your reasons for the delay before this SECOND/FIRST trial?

15(a) General Reasons:

1. Fear/Evidence of crop damage
2. Needed some more information
3. Unencouraging results by other farmers
4. Influenced by other farmers who decided not to try the new practice
5. Advice within my immediate family
6. Did not think that the Department of Agriculture was giving enough active encouragement

62. Reasons relevant to the practice itself:

Open: ____

____

Classify:

1. Relative advantage
2. Compatibility
3. Complexity
4. Divisibility
5. Communicability
6. Situational factor
7. Cost (capital)

63. What decision did you make concerning the practice after this first/second trial?

1. Does not apply
2. Continued trial...........To 65
3. Rejection
4. Adoption (in what year)...To 64

64. You decided to ADOPT the practice--56(3)_____; 60(5)______ 63(4)_____after the second trial; what reasons would you give for this decision?

1. Does not apply
2. Availability of capital
3. Very encouraging results after trial
4. Encouraging results of other farmers
5. Simply because many other farmers had adopted it
6. Advice within my immediate family
7. Active encouragement from Department of Agriculture

To 66

65. Since you never really decided to adopt the practice on your farm, what reasons would you give for your continued trial?

1. Not applicable
2. Cannot really give any reason
3. Limited evidence of economic profit
4. My neighbours were using the practice
5. The good farmers in the community were using the practice
6. Because it was recommended by the Department of Agriculture
7. Because I had already purchased equipment and materials
8. I felt that eventually I would get better results

66. After ADOPTION of this practice in _____(year), did you subsequently <u>discontinue</u> the practice? If so, when?

1. Does not apply - still in adoption stage
2. Discontinuance in _______(year).........To 67

67. What were the reasons for discontinuance?

Open: ______________________________

____

____

Classify

1. Relative advantage
2. Compatibility
3. Complexity
4. Communicability
5. Situational factor
6. Cost
7. Influence of neighbours and friends
8. Influence of family

APPENDIX II

SOURCES OF INFORMATION

1. General farm magazines
2. Special horticultural magazines
3. British Columbia Department of Agriculture publications
4. Federal Department of Agriculture publications
5. Radio
6. Television
7. Newspapers
8. Agriculture field days and demonstrations
9. Agriculture meetings
10. Meetings of the Horticultural Improvement Association
11. Growers' Short Courses sponsored by the L.M.H.I.A.
12. Other Adult Education courses
13. Vocational agriculture courses
14. University courses in agriculture
15. Personal visit to the Experimental station or to the University of British Columbia.
16. District Horticulturist (or Assistant District Horticulturist)
17. District Agriculturist
18. Neighbours and friends
19. Wife, children and relatives
20. Salesmen and dealers
21. Your farm employees
22. Veterans' Land Act representative

SOURCES OF INFORMATION (continued)

23. Farm Credit Corporation
24. Observation on other farms
25. Foreign travel or foreign publications
26. Personal experience or ideas
27. Manager or employees of the processing plant
28. Growers' Short Courses in Washington
29. Abbotsford Growers Co-op
30. Meetings of the Matsqui-Aldergrove Berry Growers' Association
31. Meetings of the Pacific Cooperative Union
32. News-letters of the Pacific Cooperative Union
33. Fraser Valley Fruit and Vegetable Growers' Association.

APPENDIX III

BIVARIATE TABLES OF SOCIO-ECONOMIC CHARACTERISTICS VERSUS ETHNIC ORIGIN

TABLE XXXV

PERCENTAGE DISTRIBUTION OF ETHNIC GROUP
BY AGRICULTURAL ADULT EDUCATION

	Attendance at Agricultural Adult Education Courses		
Ethnic Group	Did not attend courses	Attended Courses	
	%	%	Total
Menonites	50.0	50.0	100.0
Japanese	69.6	30.4	100.0
Others	41.2	58.8	100.0

TABLE XXXVI

PERCENTAGE DISTRIBUTION OF ETHNIC GROUP
BY EDUCATIONAL LEVEL

	Educational Level			
Ethnic Group	8 years or less	9 - 11 years	more than 11 years	Total
	%	%	%	%
Menonites	73.1	15.4	11.5	100.0
Japanese	43.5	39.1	17.4	100.0
Others	47.1	35.3	17.6	100.0

TABLE XXXVII

PERCENTAGE DISTRIBUTION OF ETHNIC GROUP
BY VOCATIONAL AGRICULTURAL EDUCATION

	Vocational agricultural education		
Ethnic Group	Received training	Did not receive training	Total
	%	%	%
Menonite	15.4	84.6	100.0
Japanese	0.0	100.0	100.0
Others	5.9	94.1	100.0

TABLE XXXVIII

PERCENTAGE DISTRIBUTION OF ETHNIC GROUP
BY EDUCATIONAL LEVEL OF WIFE

Ethnic group	Educational level of wife			
	8 years or less	9 - 11 years	12 years or more	Total
	%	%	%	%
Menonites	73.9	13.0	13.1	100.0
Japanese	29.4	23.5	47.1	100.0
Others	40.9	31.8	27.3	100.0

TABLE XXXIX

PERCENTAGE DISTRIBUTION OF ETHNIC GROUP
BY YEARS OF EXPERIENCE IN STRAWBERRY

Ethnic group	Years of experience in strawberry			
	9 years or less	10 - 19 years	20 or more years	Total
	%	%	%	%
Menonites	30.8	30.8	38.4	100.0
Japanese	13.0	65.2	21.8	100.0
Others	41.2	33.3	25.5	100.0

TABLC XL

PERCENTAGE DISTRIBUTION OF ETHNIC GROUP
BY YEARS ON PRESENT FARM

Ethnic group	Years on present farm			
	9 years or less	10-19 years	20 or more years	Total
	%	%	%	%
Menonites	46.2	26.9	26.9	100.0
Japanese	17.4	78.3	4.3	100.0
Others	41.2	25.5	33.3	100.0

TABLE XLI

PERCENTAGE DISTRIBUTION OF ETHNIC GROUP
BY SOCIAL PARTICIPATION

Ethnic group	Social participation score: 4 or less	5 - 14	more than 14	Total
	%	%	%	%
Menonites	38.5	46.2	15.3	100.0
Japanese	21.7	34.8	43.5	100.0
Others	21.6	43.1	35.3	100.0

TABLE XLII

PERCENTAGE DISTRIBUTION OF ETHNIC GROUP
BY SIZE OF FARM

Ethnic Group	Size of farm: less than 5 acres	5 to less than 15 acres	15 or more acres	Total
	%	%	%	%
Menonites	23.1	42.3	34.6	100.0
Japanese	21.7	43.5	34.8	100.0
Others	11.8	31.4	56.8	100.0

TABLE XLIII

PERCENTAGE DISTRIBUTION OF ETHNIC GROUP
BY ACREAGE IN STRAWBERRY

Ethnic group	Acreage in strawberry: less than 3 acres	3 to less than 15 acres	5 or more acres	Total
	%	%	%	%
Menonites	34.6	19.2	46.2	100.0
Japanese	47.8	30.4	21.8	100.0
Others	25.5	9.8	64.7	100.0

TABLE XLIV

PERCENTAGE DISTRIBUTION OF ETHNIC GROUP BY ACREAGE IN OTHER AGRICULTURAL ENTERPRISES

Ethnic group	Acreage in other Agricultural Enterprises			
	less than 3 acres	3 to less than 15 acres	15 or more acres	Total
	%	%	%	%
Menonites	46.2	30.8	23.0	100.0
Japanese	21.7	65.3	13.0	100.0
Others	21.6	31.4	47.0	100.0

TABLE XLV

PERCENTAGE DISTRIBUTION OF ETHNIC GROUP BY GROSS TOTAL AGRICULTURAL SALES

Ethnic group	Gross Total Agricultural Sales			
	$5,000 or less	more than $5,000 to $15,000	more than $15,000	Total
	%	%	%	%
Menonites	57.7	23.1	19.2	100.0
Japanese	26.1	47.8	26.1	100.0
Others	27.5	27.5	45.0	100.0

TABLE XLVI

PERCENTAGE DISTRIBUTION OF ETHNIC GROUP BY GROSS SALES FROM STRAWBERRY

Ethnic group	Gross sales from strawberry			
	less than $3,000	$3,000 - $10,000	more than $10,000	Total
	%	%	%	%
Menonites	53.8	23.1	23.1	100.0
Japanese	39.1	56.5	4.4	100.0
Others	31.4	33.3	35.3	100.0

TABLE XLVII

PERCENTAGE DISTRIBUTION OF ETHNIC GROUP
BY GROSS SALES FROM OTHER AGRICULTURAL ENTERPRISES

Ethnic group	Gross sales from other agricultural enterprises			
	No sales or less than $3000	$3000-$5000	more than $5000	Total
	%	%	%	%
Menonites	50.0	26.9	23.1	100.0
Japanese	8.7	26.1	65.2	100.0
Others	25.5	15.7	58.8	100.0

TABLE XLVIII

PERCENTAGE DISTRIBUTION OF ETHNIC GROUP
BY TENURE

Ethnic group	Tenure		
	owned the farm	did not own the farm	Total
	%	%	%
Menonites	80.8	19.2	100.0
Japanese	95.7	4.3	100.0
Others	72.6	27.4	100.0

TABLE XLIX

PERCENTAGE DISTRIBUTION OF ETHNIC GROUP
BY EXTENT OF OFF-FARM WORK

Ethnic group	Extent of off-farm work		
	No off-farm work	Did off-farm work	Total
	%	%	%
Menonites	46.2	53.8	100.0
Japanese	73.9	26.1	100.0
Others	60.8	39.2	100.0

TABLE L

PERCENTAGE DISTRIBUTION OF ETHNIC GROUP
BY ESTIMATED FARM VALUE

Ethnic group	Estimated farm value: less than $30,000	$30,000 to less than $60,000	$60,000 or more	Total
	%	%	%	%
Menonites	57.7	30.8	11.5	100.0
Japanese	45.5	40.9	13.6	100.0
Others	27.5	37.3	35.3	100.0

TABLE LI

PERCENTAGE DISTRIBUTION OF ETHNIC GROUP BY EXTENT OF CONTACT
WITH THE DISTRICT HORTICULTURIST THROUGH TELEPHONE

Ethnic group	Telephone contact with the District Horticulturist: No contact	seldom or occasionally	frequently or very frequently	Total
	%	%	%	%
Menonite	46.2	23.1	30.7	100.0
Japanese	56.5	26.1	17.4	100.0
Others	23.5	47.1	29.4	100.0

TABLE LII

PERCENTAGE DISTRIBUTION OF ETHNIC GROUP BY EXTENT OF CONTACT
WITH THE DISTRICT HORTICULTURIST THROUGH FARM VISITS

Ethnic group	Extent of contact with the District Horticulturis: No contact	seldom or occasionally	frequently or very frequently	Total
	%	%	%	%
Menonites	50.0	34.6	15.4	100.0
Japanese	69.6	30.4	0.0	100.0
Others	29.4	54.9	15.7	100.0

TABLE LIII

PERCENTAGE DISTRIBUTION OF ETHNIC GROUP BY EXTENT OF CONTACT WITH THE DISTRICT HORTICULTURIST THROUGH MAIL

Ethnic group	Extent of contact with the District Horticulturist			
	No contact	seldom or occasionally	frequently or very frequently	Total
	%	%	%	%
Menonites	26.9	23.1	50.0	100.0
Japanese	30.4	17.4	52.2	100.0
Others	7.9	23.5	68.6	100.0

TABLE LIV

PERCENTAGE DISTRIBUTION OF ETHNIC GROUP BY EXTENT OF CONTACT WITH THE DISTRICT HORTICULTURIST THROUGH RADIO

Ethnic group	Extent of contact with the District Horticulturist		
	No contact	Contact by radio	Total
	%	%	%
Menonite	57.7	42.3	100.0
Japanese	87.0	13.0	100.0
Others	74.5	25.5	100.0

TABLE LV

PERCENTAGE DISTRIBUTION OF ETHNIC GROUP BY EXTENT OF CONTACT WITH THE DISTRICT HORTICULTURIST THROUGH NEWSPAPER ARTICLES

Ethnic group	no contact	seldom or occasionally	frequently or very frequently	Total
	%	%	%	%
Menonites	46.2	42.3	11.5	100.0
Japanese	47.8	21.7	30.5	100.0
Others	25.5	51.0	23.5	100.0

TABLE LVI

PERCENTAGE DISTRIBUTION OF ETHNIC GROUP BY ATTENDANCE AT L.M.H.I.A. SHORT COURSE (1966)

	Attendance at L.M.H.I.A. Short Course (1966)		
Ethnic group	Did not attend	Did attend	Total
	%	%	%
Menonites	69.2	30.8	100.0
Japanese	82.6	17.4	100.0
Others	43.1	56.9	100.0

TABLE LVII

PERCENTAGE DISTRIBUTION OF ETHNIC GROUP BY ATTENDANCE AT L.M.H.I.A. SHORT COURSE (1967)

	Attendance at L.M.H.I.A. Short Course (1967)		
Ethnic group	Did not attend	Did attend	Total
	%	%	%
Menonites	73.1	26.9	100.0
Japanese	95.7	4.3	100.0
Others	58.9	41.1	100.0

APPENDIX IV

BIVARIATE TABLES OF SOCIO-ECONOMIC CHARACTERISTICS VERSUS ADOPTER CATEGORY

TABLE LVIII

PERCENTAGE DISTRIBUTION OF RESPONDENTS BY

ADOPTER CATEGORY AND BY AGE GROUP

Adopter category	Age			
	20-34 years old	35-54 years old	55 or more years old	Number of Respondent
	%	%	%	
Laggard	10.0	5.6	22.2	12
Late majority	10.0	25.9	36.2	28
Early majority	70.0	44.4	33.3	43
Early adopter-innovator	10.0	24.1	8.3	17
Total	100.0	100.0	100.0	100

TABLE LIX

PERCENTAGE DISTRIBUTION OF RESPONDENTS BY

ADOPTER CATEGORY AND BY SIZE OF FAMILY

Adopter category	Number of children		
	0 - 2 children	3 or more children	Number of Respondents
	%	%	
Laggard	13.2	11.3	12
Late majority	23.7	30.6	28
Early majority	57.8	33.9	43
Early adopter-innovator	5.3	24.2	17
Total	100.0	100.0	100

TABLE LX

PERCENTAGE DISTRIBUTION OF RESPONDENTS BY ADOPTER CATEGORY AND BY LEVEL OF EDUCATION

Adopter category	Years of schooling: 8 years or less %	Years of schooling: more than 8 years %	Number of Respondents
Laggard	17.0	6.5	12
Late majority	35.8	19.4	28
Early majority	26.4	58.1	43
Early adopter-innovator	20.8	16.0	17
Total	100.0	100.0	100

TABLE LXI

PERCENTAGE DISTRIBUTION OF RESPONDENTS BY ADOPTER CATEGORY AND BY EDUCATIONAL LEVEL OF WIFE

Adopter category	Educational level of wife: 8 years or less %	Educational level of wife: more than 8 years %	Number of Respondents
Laggard	15.0	6.8	9
Late majority	37.5	18.2	23
Early majority	32.5	50.0	35
Early adopter-innovator	15.0	25.0	17
Total	100.0	100.0	84

TABLE LXII

PERCENTAGE DISTRIBUTION OF RESPONDENTS BY ADOPTER CATEGORY AND BY AGRICULTURE COURSES IN HIGH SCHOOL

Adopter category	Agriculture courses in High School		
	Took courses %	Did not take courses %	Number of respondents
Laggard	0.0	12.8	12
Late majority	20.0	27.7	27
Early majority	80.0	41.5	43
Early adopter-innovator	0.0	18.0	17
Total	100.0	100.0	99

TABLE LXIII

PERCENTAGE DISTRIBUTION OF RESPONDENTS BY ADOPTER CATEGORY AND BY AGRICULTURE COURSES AT VOCATIONAL SCHOOL

Adopter category	Agriculture courses in vocational school		
	Took courses %	Did not take courses %	Number of respondents
Laggard	0.0	12.9	12
Late majority	28.6	28.0	28
Early majority	28.6	44.1	43
Early adopter-innovator	42.8	15.0	17
Total	100.0	100.0	100

TABLE LXIV

PERCENTAGE DISTRIBUTION OF RESPONDENTS BY ADOPTER CATEGORY AND BY AGRICULTURAL ADULT EDUCATION

Adopter category	Agricultural adult education		
	Attended courses	Did not attend courses	Number of respondents
	%	%	
Laggard	12.0	12.0	12
Late majority	20.0	36.0	28
Early majority	44.0	42.0	43
Early adopter-innovator	24.0	10.0	17
Total	100.0	100.0	100

TABLE LXV

PERCENTAGE DISTRIBUTION OF RESPONDENTS BY ADOPTER CATEGORY AND BY ATTENDANCE AT THE 1966 ANNUAL SHORT COURSE (L.M.H.I.A.)

Adopter category	Attendance at 1966 annual short course			
	did not attend	one day only	both days	Number of respondents
	%	%	%	
Laggard	13.6	6.3	12.0	12
Late majority	37.3	25.0	8.0	28
Early majority	37.3	50.0	52.0	43
Early adopter-innovator	11.8	18.7	28.0	17
Total	100.0	100.0	100.0	100

TABLE LXVI

PERCENTAGE DISTRIBUTION OF RESPONDENTS BY ADOPTER CATEGORY AND BY ATTENDANCE AT THE 1967 ANNUAL SHORT COURSE (L.M.H.I.A.)

Adopter category	Attendance at 1967 annual short course: did not attend	one day only	both days	Number of respondents
	%	%	%	
Laggard	15.5	0.0	5.9	12
Late majority	35.2	25.0	0.0	28
Early majority	38.0	50.0	58.8	43
Early adopter-innovator	11.3	25.0	35.3	17
Total	100.0	100.0	100.0	100

TABLE LXVII

PERCENTAGE DISTRIBUTION OF RESPONDENTS BY ADOPTER CATEGORY AND BY ATTENDANCE AT THE 1966 ANNUAL SHORT COURSE IN WASHINGTON, U.S.A.

Adopter category	Attendance at the 1966 annual short course in Washington, U.S.A.: Attended	Did not attend	Number of respondents
	%	%	
Laggard	10.0	12.2	12
Late majority	10.0	30.0	28
Early majority	50.0	42.2	43
Early adopter-innovator	30.0	15.6	17
Total	100.0	100.0	100

TABLE LXVIII

PERCENTAGE DISTRIBUTION OF RESPONDENTS BY ADOPTER CATEGORY AND BY ATTENDANCE AT THE 1967 ANNUAL SHORT COURSE IN WASHINGTON, U.S.A.

Adopter category	Attendance at the 1967 annual short course in Washington, U.S.A.		
	Attended	Did not attend	Number of respondents
	%	%	
Laggard	16.7	11.7	12
Late majority	16.7	28.7	28
Early majority	33.3	43.6	43
Early adopter-innovator	33.3	16.0	17
Total	100.0	100.0	100

TABLE LXIX

PERCENTAGE DISTRIBUTION OF RESPONDENTS BY ADOPTER CATEGORY AND BY NUMBER OF YEARS OF FARMING EXPERIENCE

Adopter category	Number of years of farming experience			
	9 or less years	10 - 19 years	20 or more years	Number of respondents
	%	%	%	
Laggards	15.4	9.5	12.1	12
Late majority	15.4	28.6	30.3	28
Early majority	69.2	42.9	37.9	43
Early adopter-innovator	0.0	19.0	19.7	17
Total	100.0	100.0	100.0	100

TABLE LXX

PERCENTAGE DISTRIBUTION OF RESPONDENTS BY ADOPTER CATEGORY AND BY NUMBER OF YEARS IN STRAWBERRY

Adopter category	Number of years in strawberry: Less than 5 years	5 - 9 years	10 - 19 years	20 or more years	Number of respondents
	%	%	%	%	
Laggard	5.9	6.7	15.0	14.3	12
Late majority	35.3	6.7	35.0	25.0	28
Early majority	52.9	60.0	37.5	35.7	43
Early adopter-innovator	5.9	26.6	12.5	25.0	17
Total	100.0	100.0	100.0	100.0	100

TABLE LXXI

PERCENTAGE DISTRIBUTION OF RESPONDENTS BY ADOPTER CATEGORY AND BY NUMBER OF YEARS ON PRESENT FARM

Adopter category	Number of years on present farm: 4 years or less	5 - 9 years	10 - 19 years	20 or more years	Number of respondents
	%	%	%	%	
Laggard	12.5	6.9	21.1	4.0	12
Late majority	37.5	20.7	31.6	28.0	28
Early majority	25.0	44.8	39.5	52.0	42
Early adopter-innovator	25.0	27.6	7.9	16.0	17
Total	100.0	100.0	100.0	100.0	100

TABLE LXXII

PERCENTAGE DISTRIBUTION OF RESPONDENTS BY ADOPTER CATEGORY AND BY ETHNIC ORIGIN

Adopter Category	Ethnic origin			
	Number of Menonites	Number of Japanese	Number of "others"	Number of respondents
	%	%	%	
Laggard	11.5	17.4	9.8	12
Late majority	34.6	43.5	17.7	28
Early majority	30.8	34.8	52.9	43
Early adopter-innovator	23.1	4.3	19.6	17
Total	100.0	100.0	100.0	100

TABLE LXXIII

PERCENTAGE DISTRIBUTION OF RESPONDENTS BY ADOPTER CATEGORY AND BY SOCIAL PARTICIPATION

Adopter category	Social participation score				
	nil	1 - 14	1 5 - 24	more than 24	Number of respondents
	%	%	%	%	
Laggard	37.5	9.8	0.0	5.9	12
Late majority	47.7	31.4	26.7	11.8	28
Early majority	22.7	39.2	53.3	64.7	42
Early adopter-innovator	4.6	19.6	20.0	17.6	17
Total	100.0	100.0	100.0	100.0	99

TABLE LXXIV

PERCENTAGE DISTRIBUTION OF RESPONDENTS BY ADOPTER CATEGORY AND BY SIZE OF FARM

Adopter category	Total acreage farmed: 0 - 4 acres	5 - 29 acres	30 - 119 acres	more than 119 acres	Number of respondents
	%	%	%	%	
Laggard	35.3	8.5	7.7	0.0	12
Late majority	35.3	30.5	23.1	9.1	28
Early majority	17.6	45.8	46.2	63.6	43
Early adopter-innovator	11.8	15.2	23.0	27.3	17
Total	100.0	100.0	100.0	100.0	100

TABLE LXXV

PERCENTAGE DISTRIBUTION OF RESPONDENTS BY ADOPTER CATEGORY AND BY ACREAGE IN STRAWBERRY

Adopter category	Acreage in strawberry: Less than 3 acres	3 - 29 acres	30 or more acres	Number of respondents
	%	%	%	
Laggard	27.3	6.2	0.0	12
Late majority	42.4	25.0	10.5	28
Early majority	24.2	48.0	63.2	43
Early adopter-innovator	6.1	20.8	26.3	17
Total	100.0	100.0	100.0	100

TABLE LXXVI

PERCENTAGE DISTRIBUTION OF RESPONDENTS BY ADOPTER CATEGORY AND BY ACREAGE IN OTHER AGRICULTURAL ENTERPRISES

Adopter category	Acreage in other agricultural enterprises			
	0 - 2 acres %	3 - 14 acres %	15 or more acres %	Number of respondents
Laggard	21.4	10.3	6.1	12
Late majority	17.8	41.0	21.2	28
Early majority	35.8	35.9	57.6	43
Early adopter-innovator	25.0	12.8	15.0	17
Total	100.0	100.0	100.0	100

TABLE LXXVII

PERCENTAGE DISTRIBUTION OF RESPONDENTS BY ADOPTER CATEGORY AND BY GROSS TOTAL SALES FROM AGRICULTURE

Adopter category	Gross total sales from agriculture			
	Nil to less than $5000 %	$5000 to $25,000 %	more than $25,000 %	Number of respondents
Laggard	28.6	2.4	4.3	12
Late majority	40.0	23.8	17.5	28
Early majority	22.8	57.1	47.8	43
Early adopter-innovator	8.6	16.7	30.4	17
Total	100.0	100.0	100.0	100

TABLE LXXVIII

PERCENTAGE DISTRIBUTION OF RESPONDENTS BY ADOPTER CATEGORY AND BY GROSS SALES FROM STRAWBERRY

Adopter category	Gross sales from strawberry: Nil to less than $3000	$3000 to $5000	More than $5000	Number of respondents
	%	%	%	
Laggard	25.6	5.6	0.0	12
Late majority	38.5	30.6	8.0	28
Early majority	28.2	44.4	64.0	43
Early adopter-innovator	7.7	19.4	28.0	17
Total	100.0	100.0	100.0	100

TABLE LXXIX

PERCENTAGE DISTRIBUTION OF RESPONDENTS BY ADOPTER CATEGORY AND BY GROSS SALES FROM OTHER AGRICULTURAL ENTERPRISES

Adopter category	Gross sales from other agricultural enterprises: Nil to less than $3000	$3000 to $15,000	More than $15,000	Number of respondents
	%	%	%	
Laggard	18.4	6.9	4.5	12
Late majority	28.6	34.5	18.2	28
Early majority	34.7	51.7	50.0	43
Early adopter-innovator	18.3	6.9	27.3	17
Total	100.0	100.0	100.0	100

TABLE LXXX

PERCENTAGE DISTRIBUTION OF RESPONDENTS BY ADOPTER CATEGORY AND BY AMOUNT OF TIME SPENT IN OFF-FARM WORK

Adopter category	Amount of time spent in off-farm work			
	Nil	Less than one-quarter to less than one-half	one-half or more	Number of respondents
	%	%	%	
Laggard	16.7	0.0	7.2	12
Late majority	21.7	50.0	32.1	28
Early majority	51.6	25.0	32.1	43
Early adopter-innovator	10.0	25.0	28.6	17
Total	100.0	100.0	100.0	100

TABLE LXXXI

PERCENTAGE DISTRIBUTION OF RESPONDENTS BY ADOPTER CATEGORY AND BY ESTIMATED FARM VALUE

Adopter category	Estimated farm value			
	less than \$30,000	\$30,000 to less than \$90,000	\$90,000 or more	Number of respondents
	%	%	%	
Laggard	17.9	7.3	5.3	11
Late majority	41.1	22.0	15.8	28
Early majority	33.3	48.7	52.6	43
Early adopter-innovator	7.7	22.0	26.3	17
Total	100.0	100.0	100.0	99

TABLE LXXII

PERCENTAGE DISTRIBUTION OF RESPONDENTS BY ADOPTER CATEGORY AND BY EXTENSION CONTACT WITH THE DISTRICT HORTICULTURIST THROUGH OFFICE VISITS

Adopter category	Frequency of contact with D.H. by visits to his office			
	No contact	seldom or occasionally	frequently or very frequently	Number of respondents
	%	%	%	
Laggard	14.0	12.1	0.0	12
Late majority	31.6	27.3	10.0	28
Early majority	45.6	42.4	30.0	43
Early adopter-innovator	8.8	18.2	60.0	17
Total	100.0	100.0	100.0	100

TABLE LXXXIII

PERCENTAGE DISTRIBUTION OF RESPONDENTS BY ADOPTER CATEGORY AND BY EXTENSION CONTACT WITH THE DISTRICT HORTICULTURIST THROUGH TELEPHONE

Adopter category	Frequency of contact with D.H. by telephone			
	No contact	seldom or occasionally	frequently or very frequently	Number of respondent
	%	%	%	
Laggard	24.3	8.3	0.0	12
Late majority	43.3	19.4	18.6	28
Early majority	29.7	58.3	40.7	43
Early adopter-innovator	2.7	13.9	40.7	17
Total	100.0	100.0	100.0	100

TABLE LXXXIV

PERCENTAGE DISTRIBUTION OF RESPONDENTS BY ADOPTER CATEGORY AND BY EXTENSION CONTACT WITH THE DISTRICT HORTICULTURIST THROUGH FARM VISITS

Adopter category	Frequency of contact with D.H. by farm visits			
	No contact	seldom or occasionally	frequently or very frequently	Number of respondents
	%	%	%	
Laggard	25.0	2.3	0.0	12
Late majority	47.7	13.6	8.3	28
Early majority	22.7	63.6	41.7	43
Early adopter-innovator	4.6	20.5	50.0	17
Total	100.0	100.0	100.0	100

TABLE LXXXV

PERCENTAGE DISTRIBUTION OF RESPONDENTS BY ADOPTER CATEGORY AND BY EXTENSION CONTACT WITH THE DISTRICT HORTICULTURIST THROUGH MAIL

Adopter category	Frequency of contact with D.H. by mail			
	No contact	seldom or occasionally	frequently or very frequently	Number of respondents
	%	%	%	
Laggard	38.9	9.1	5.0	12
Late majority	44.4	18.2	26.7	28
Early majority	5.6	54.5	50.0	43
Early adopter-innovator	11.1	18.2	18.3	17
Total	100.0	100.0	100.0	100

TABLE LXXXVI

PERCENTAGE DISTRIBUTION OF RESPONDENTS BY ADOPTER CATEGORY AND BY EXTENSION CONTACT WITH THE DISTRICT HORTICULTURIST THROUGH RADIO ANNOUNCEMENTS

Adopter category	Frequency of contact with D.H. by radio announcement			
	No contact	seldom or occasionally	frequently or very frequently	Number of respondents
	%	%	%	
Laggard	17.5	7.1	0.0	12
Late majority	29.8	28.6	20.0	28
Early majority	43.9	46.4	33.3	43
Early adopter-innovator	8.8	17.9	46.7	17
Total	100.0	100.0	100.0	100

TABLE LXXXVII

PERCENTAGE DISTRIBUTION OF RESPONDENTS BY ADOPTER CATEGORY AND BY EXTENSION CONTACT WITH THE DISTRICT HORTICULTURIST THROUGH TELEVISION

Adopter category	Frequency of contact with D.H. by television		
	No contact	Contact used	Number of respondents
	%	%	
Laggard	12.4	10.0	12
Late majority	29.2	20.0	28
Early majority	43.8	30.0	42
Early adopter-innovator	14.6	40.0	17
Total	100.0	100.0	99

TABLE LXXXVIII

PERCENTAGE DISTRIBUTION OF RESPONDENTS BY ADOPTER CATEGORY AND BY EXTENSION CONTACT WITH THE DISTRICT HORTICULTURIST THROUGH NEWSPAPER ARTICLES

Adopter category	Frequency of contact with the D.H. through newspaper articles: No contact %	seldom or occasionally %	frequently or very frequently %	Number of respondents
Laggard	30.6	2.4	0.0	12
Late majority	30.6	28.6	22.7	28
Early majority	30.6	50.0	50.0	43
Early adopter-innovator	8.2	19.0	27.3	17
Total	100.0	100.0	100.0	100

TABLE LXXXIX

PERCENTAGE DISTRIBUTION OF RESPONDENTS BY ADOPTER CATEGORY AND BY ATTENDANCE AT DEMONSTRATIONS, FIELD DAYS AND LOCAL MEETINGS

Adopter category	Attendance at demonstrations, field days and local meetings: Did not attend any %	Attended one only %	Attended more than one %	Number of respondents
Laggard	13.5	5.9	12.9	12
Late majority	36.5	29.4	12.9	28
Early majority	34.6	52.9	51.6	43
Early adopter-innovator	15.4	11.8	22.6	17
Total	100.0	100.0	100.0	100

TABLE XC

PERCENTAGE DISTRIBUTION OF RESPONDENTS BY ADOPTER CATEGORY AND BY ATTENDANCE AT MEETINGS OF THE L.M.H.I.A.*

Adopter Category	Attendance at meetings of the L.M.H.I.A. Did not attend	Attended one meeting	Attended more than one meeting	Number of respondents
	%	%	%	
Laggard	16.7	11.1	3.2	12
Late majority	36.7	22.2	12.9	28
Early majority	33.3	55.6	58.1	43
Early adopter-innovator	13.3	11.1	25.8	17
Total	100.0	100.0	100.0	100

*Lower Mainland Horticultural Improvement Association

TABLE XCI

PERCENTAGE DISTRIBUTION OF RESPONDENTS BY ADOPTER CATEGORY AND BY NUMBER OF CONTACTS WITH THE DISTRICT HORTICULTURIST

Adopter category	Number of extension contacts with the D.H. 1 or no contact	2 - 4 contacts	5 - 7 contacts	Number of respondents
	%	%	%	
Laggard	38.9	8.7	2.8	12
Late majority	38.9	34.8	13.9	28
Early majority	16.7	50.0	47.2	43
Early adopter-innovator	5.5	6.5	36.1	17
Total	100.0	100.0	100.0	100

TABLE XCII

PERCENTAGE DISTRIBUTION OF RESPONDENTS BY ADOPTER CATEGORY AND BY ALL EXTENSION CONTACTS

Adopter category	Extension contact score; D.H. and other agents: 10 or less	Extension contact score; D.H. and other agents: 11 or more	Number of respondents
	%	%	
Laggard	25.0	4.8	12
Late majority	41.7	19.0	27
Early majority	27.8	52.4	43
Early adopter-innovator	5.5	23.8	17
Total	100.0	100.0	99

APPENDIX V

DETAILED ANALYSIS OF THE INNOVATION RESPONSE STATES

TABLE XCIII

PERCENTAGE DISTRIBUTION OF RESPONDENTS UNAWARE OF THE INNOVATION, BY ADOPTER CATEGORY AND BY INNOVATION

Innovation	Adopter Category: Laggard	Late Majority	Early Majority	Early Adopter-Innovator
	%	%	%	%
Soil Analysis for nematode control	58.3	3.6	-	-
Spraying with Captan for fruit-rot control	8.3	-	-	-
Change from Hill to Matted Row	-	-	-	-
Chemical Weed Control	-	-	-	-
Use of Picking Carts	41.7	-	-	-
Use of Virus-free Certified Plants	-	-	-	-
Average	18.0	0.6	0.0	0.0

TABLE XCIV

PERCENTAGE DISTRIBUTION OF RESPONDENTS CONTINUING THE ADOPTION PROCESS, BY ADOPTER CATEGORY AND BY INNOVATION

Innovation	Adopter Category: Laggard	Late Majority	Early Majority	Early Adopter-Innovator
	%	%	%	%
Soil Analysis for nematode control	16.7	46.4	25.6	-
Spraying with Captan for fruit-rot control	25.0	28.6	9.3	-
Change from Hill to Matted Row	25.0	17.9	4.6	-
Chemical Weed Control	50.0	17.9	2.3	-
Use of Picking Carts	8.3	25.0	27.9	-
Use of Virus-free Certified Plants	8.3	7.1	4.6	-
Average	22.2	23.8	12.4	0.0

TABLE XCV

PERCENTAGE DISTRIBUTION OF RESPONDENTS WHO HAD ADOPTED THE INNOVATION, BY ADOPTER CATEGORY AND BY INNOVATION

Innovation	Adopter Category			
	Laggard	Late majority	Early majority	Early Adopter-Innovator
	%	%	%	%
Soil Analysis for nematode control	8.3	17.9	62.8	100.0
Spraying with Captan for fruit-rot control	33.3	60.7	88.4	100.0
Change from Hill to Matted Row	41.7	71.4*	95.4	100.0
Chemical Weed Control	16.7	57.1*	95.4	100.0
Use of Picking Carts	-	17.9	25.6	100.0
Use of Virus-free certified plants	83.3	92.9	95.4	100.0
Average	30.6	53.0	77.2	100.0

*1 respondent (3.6 per cent) accounted for by Discontinuance

TABLE XCVI

PERCENTAGE DISTRIBUTION OF RESPONDENTS WHO HAD REJECTED THE INNOVATION, BY ADOPTER CATEGORY AND BY INNOVATION

Innovation	Adopter Category			
	Laggard	Late majority	Early majority	Early Adopter-Innovator
	%	%	%	%
Soil Analysis for nematode control	16.7	35.7	11.6	-
Spraying with Captan for fruit-rot control	33.3	10.7	2.3	-
Change from Hill to Matted Row	33.3	3.6	-	-
Chemical Weed Control	33.3	21.4	2.3	-
Use of Picking Carts	50.0	57.1	46.5	-
Use of virus-free Certified Plants	8.3	-	-	-
Average	29.2	21.4	10.5	0.0

APPENDIX VI

PROCEDURE FOR COMPUTING Z VALUES IN DETERMINING SIGNIFICANT DIFFERENCES BETWEEN TWO PROPORTIONS

NOTE: 1. The test of significance of the difference between two proportions was used with the null hypothesis that there was no difference in the use of an information source at the awareness stage between different innovations at the .05 level of significance. The criterion used to test the null hypothesis was to reject it if $Z < -1.96$ or $Z > 1.96$, and to accept it if $-1.96 \leq Z \leq 1.96$ where:

$$Z = \frac{\frac{x_1}{n_1} - \frac{x_2}{n_2}}{\sqrt{P\ (1-P)\ \frac{1}{n_1} + \frac{1}{n_2}}}$$

x_1 = percentage use of an information source for one innovation; x_2 = percentage use of the same source for another innovation: n = 100 per cent

$$P = \frac{x_1}{n_1} + \frac{x_2}{n_2}$$

2. Where "*" indicates significance at the .01 level within the tables, the critical values used to test the null hypothesis were: reject the null hypothesis if $Z < -2.58$ or $Z > 2.58$, and accept it if $-2.58 \leq Z \leq 2.58$.

3. Negative Z values indicate that the innovation listed in the row has a lower percentage use of an information source than the innovation listed in the column.