FARM INNOVATORS
AN IN-DEPTH STUDY OF THEIR ROLES
AND CHARACTERISTICS FEATURES

A THESIS
SUBMITTED TO THE KURUKSHETRA UNIVERSITY
FOR THE DEGREE OF
Doctor of Philosophy

By
SATYA NARAYAN SINGH
DIVISION OF DAIRY EXTENSION
NATIONAL DAIRY RESEARCH INSTITUTE
(I. C. A. R.)
KARNAL (Haryana) INDIA
1982

Registration No. 76-dk-45
FARM INNOVATORS
AN IN-DEPTH STUDY OF THEIR ROLES
AND CHARACTERISTICS FEATURES

A THESIS
SUBMITTED TO THE KURUKSHETRA UNIVERSITY
FOR THE DEGREE OF
Doctor of Philosophy

By
SATYA NARAYAN SINGH
DIVISION OF DAIRY EXTENSION
NATIONAL DAIRY RESEARCH INSTITUTE
(I. C. A. R.)
KARNAL (Haryana) INDIA
1982

Registration No. 76-dk-45
Dr. O.S. Verma, Senior Scientist
M.Sc (Agri.), M.A.(Public adm.), Ph.D. (IARI),

Division of Dairy Extension
NATIONAL DAIRY RESEARCH INSTITUTE
(Indian Council of Agricultural Research)
Karnal (Haryana)

This is to certify that the dissertation entitled
"Farm Innovators - An In-depth Study of their Roles
and Characteristic Features" submitted in fulfilment
of the degree of Doctor of Philosophy in the Faculty
of Dairying, Animal Husbandry and Agriculture,
Kurukshetra University, by Shri Satya Narayan Singh
embodies the results of bonafide research work carried
out by him under my guidance and supervision. No part
of this study so far has been submitted anywhere for
publication or for other degree or diploma.

Help and assistance rendered by individuals as
well as institutions in the prosecution of the work
has been suitably acknowledged.

Dated: July 9, 1982.

Place: KARNAL (Haryana)

( O.S. VERMA )
ACKNOWLEDGEMENT

It has been a rare privilege and pleasure to work with Dr. O.S. Verma, Senior Scientist who has been my main guide. Without his able guidance and direction, this work would not have yielded the results it has.

Dr. T.S. Sohal, Dr. R.L. Kherde, Dr. P.S. Tomar and Dr. Rajbir Singh, the Advisory Committee have also given me their unlimited assistance. A very special word of thanks is due to all of them.

I am grateful to the Director, National Dairy Research Institute, Karnal for providing me the necessary facilities for this study. Financial help in the form of NDBRI-fellowship is duly acknowledged.

Likewise, I appreciate all the assistance that I received from Karnal ICORP and IADB personnel in collecting data. I am also thankful to Mr. R.L. Sahney for computer programming at Indian Statistical Research Institute, New Delhi.

Words are not enough for me to express a deep sense of gratitude to my wife Smt. Raj Rani and my brothers and sisters without whose kind inspiration, keen interest and sustained encouragement in their endeavour to provide me the best of every thing in life. It is only their unceasing perseverance that has made it possible for me to attain this stage of achievement in life.

All may not be mentioned but none is forgotten.

Satya Narayan Singh

Satya Narayan Singh Girkas
DEDICATED TO MY PARENTS

LT. COL. DILIP SINGH
AND
SMT. SHAKUNTALA DEVI
<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction</td>
<td>1-8</td>
</tr>
<tr>
<td>2</td>
<td>Theoretical Orientation</td>
<td>9-50</td>
</tr>
<tr>
<td>3</td>
<td>Research Methodology</td>
<td>51-77</td>
</tr>
<tr>
<td>4</td>
<td>Characteristics of Farm Innovators.</td>
<td>78-104</td>
</tr>
<tr>
<td>5</td>
<td>Farm Innovators and Attributes of Innovations.</td>
<td>105-116</td>
</tr>
<tr>
<td>6</td>
<td>Prediction Analysis for Farm Innovativeness.</td>
<td>117-132</td>
</tr>
<tr>
<td>7</td>
<td>Farm Innovators and Their Influence Structure.</td>
<td>133-143</td>
</tr>
<tr>
<td>8</td>
<td>Overlapping Farm Innovativeness.</td>
<td>144-157</td>
</tr>
<tr>
<td>9</td>
<td>Summary and Implication</td>
<td>158-164</td>
</tr>
<tr>
<td>10</td>
<td>Bibliography</td>
<td>1-XIV</td>
</tr>
<tr>
<td>11</td>
<td>Appendices</td>
<td>1-xxiii</td>
</tr>
</tbody>
</table>
CHAPTER I

INTRODUCTION
**INTRODUCTION**

It is rightly recognised that extension training is conducive to agricultural production. It is reasoned that at the heart of development is training which is nothing but imparting new knowledge. This knowledge is power which can change things and conditions. However, today the real need is to change the type and content of technological programmes so as to meet the changing needs of rural communities it serves and the innovations it is trying to diffuse.

The problem of technological change is not so simple as it looks. The past experience has shown that in spite of arranging supplies and services all through these years, the desired change in technology could not be accomplished. The reasons for such a state of affairs may be many and varied but the most apparent seems to be the lack of focus on the farmers that too on farm innovators. Their socio-economic and psychological traits play a very important role in the process of technological change.
In most agricultural development programmes, it is implicitly assumed that an agricultural innovation is applicable to all the farmers not withstanding the region. Undoubtedly, some innovations are profitable and relevant to a large section of the population in a social system but many of these innovations are not applicable across the board due to the different political, social, economical and cultural circumstances.

Diffusion researches have long recognised the fact that all individuals in a social system do not adopt innovations at the same time. They generally adopt in a time sequence. Those who adopt innovations at the earliest in their social system are normally called 'Innovators'. Those who follow them as the last persons are called 'Laggards'.

These innovators are venturesome and are individuals who normally help to induce change in the village society. They are, in fact, contact persons for all sorts of action programmes. Therefore, their indepth study is a matter of paramount importance and practical utility.

A great deal of research on how to identify innovators has already been carried out but still an
attempt is called for at this time to find out as to whether a person who is innovator in one arena is also likely to turn up as innovator in another arena of farm innovations. In other words, to what extent there exists an overlapping and clustering of innovators in respect of a number of farm arenas.

Similarly, a lot of researches have been conducted on innovation diffusion processes but strangely the characteristics of innovators in terms of their socio-economic backgrounds and personality traits have not yet been attempted at full length. The characteristic features which make an innovator conducive in adopting a new idea provide an interesting study material to the behavioural scientists.

Characteristics of farm innovations also make a positive dent in influencing a person to adopt a particular innovation at the earliest possible time and thus become an innovator. For instance, it is the economic profitability of the innovation that makes one to lead as innovator in his social system. Similarly, it is the complexity of the innovation that may possibly make one reluctant to become an innovator because technology is difficult to understand and make use of it. In the present study, this idea is put to
test and it is seen as to whether a farmer is innovator because of perceived attributes of the innovation. The study further made an attempt to find out which of the characteristics of innovation are most important in influencing a farmer to become innovator.

Personal influence has been found to be an essential ingredient practically in all sorts of decision making systems. It is an area of communication which involves a direct face to face exchange of words between the communicator and the receiver resulting in changed behaviour on the part of the receiver. Greater the degree of personal influence vested in the communicator, greater are the chances that he can induce greater amount of change in the receiver. If this hypothesis works, it can bring change in the society and will thus lead to modernization. Although innovators are supposed to be on the upper crust of influence structure but an empirical study can only approve this hypothesis. This study, therefore, tried to work out the extent the personal influence is vested in the farm innovators.

Dimension of the Study:

An attempt is made in this research to examine some of the dimensions of the Farm Innovator. Only
three aspects of the system are processed here, i.e., the Personality traits, Socio-economic variables and Perceived attributes of farm innovation.

For this study, Kurnal locale was chosen for the reasons that it is the district in which National Dairy Research Institute is located, the researcher is acquainted with the topography, people of the area and their culture. The dimension chosen for this study deals with

1) Who are the Farm innovators in terms of their social background?
2) What did the respondents perceive from the attributes of innovation?
3) What is their role as influentials in village society?

Objective of the Study:

The following were the objectives explicitly stated for this study:

1. To study different characteristics features of farm innovators in terms of their socio-economic backgrounds and personality traits.
2. To determine as to whether a farmer becomes an innovator because of the perceived attributes of farm technology.
3. To predict which of the socio-economic background, personality trait and characteristic of farm innovations is most responsible for causing a farmer to lead as farm innovator.

4. To work out the degree of personal influence of farm innovators in their village environment.

5. To find out as to whether there exists an overlapping of innovators in respect of different farm innovations.

Scope of the Study:

The very approach and brief statements of objectives given above indicate the practical utility of the research. A distinctly unique significance of the study lies firstly in the academic character. Strangely, the characteristics of innovators in relation to their socio-economic backgrounds and personality traits had not caught the vision of the earlier researcher to make an indepth study; although there is no paucity of literature on all other dimensions of innovation diffusion process. This study will narrow down the gap and thus enrich the existing literature available on this subject.
This study could also be of immense use to the behavioural scientists who might be enriched with necessary information to study the characteristic features which make an innovator conducive in adopting a new idea.

The valuable information which this study promises to provide can be of great help to the extension workers, planners and policy makers in formulation and execution of field programmes down to earth as they will do so in light of the roles and characteristic features of the farm innovators. Thus, the study apart from its academic worth has wide and manifold scope.

Limitations of this Study:

A study to cover all the aspects of innovators would be very desirable but would be beyond the resources of a single researcher. Accordingly, the present study is confined to measurement of a few dimensions of innovators.

The data is based on the expressed responses of the respondents who in the absence of precise records had provided information from their memory.
This study was confined to the District of Karnal. The findings, therefore, would be applicable to similar situations of men, material and environmental conditions.
CHAPTER II

THEORETICAL ORIENTATION
THEORETICAL ORIENTATION

It is proposed to develop a conceptual frame of the study in this chapter. This has been done on the basis of available research studies as also the evidences that have direct bearing upon the subject. Assuming the eloquent use of empirical evidence, while developing the theoretical premise of the study, the need for a separate chapter on review of literature in the thesis has been abandoned.

The conceptual framework of most of the studies assert that farm innovativeness is a dynamic, multi-dimensional process in which people change to adopting new farm technology at the earliest. Despite important differences in approach and methods, most of the studies indicate that farm innovativeness involves emergence of a new behavioural system with certain distinctive characteristics. The change occurs both at individual and social system level.
Weytinsky (1957) says, "To a Western Observer, it appears that main source of India's backwardness and weakness lies in human factor: not in the lack of people of innate abilities or technical skill of people, but lack of initiative, interest in improving their economic status and respect for labour." Hagen (1966) asserts that transition from traditional to modern state takes place because of technological creativity. Innovations and new type of personality. Houssel (1973) emphasized that adoption of innovation should be taken as an indicator of agricultural modernization.

The critical review of above studies indicates that adoption of a technology is based on certain characters of the person adopting it in a given society.

I. FARM INNOVATIVENESS: A DELINQUENT CONCEPTS.

As the study is confined to farm innovators, it is imperative to understand what actually we mean by Farm and Farm innovativeness. Farm is defined as sum total of crops and dairy husbandry for the purpose of this study. The farms in developing and underdeveloped countries is characterised by its traditional nature.
It is difficult to give any precise definition of traditional farm. However, traditional farm may be described as the stage where:

"Production of animals is low. Productivity per unit of land is low. Market surplus is negligible. Using only traditional factor of production, i.e. low adoption of scientific farm technology. Poor capital investment on appliances, housing for animals and livestock (poor herd) which is prerequisite for efficient production. Low psychological inputs for farm as a profitable enterprise".

On the contrary, innovative farms embodies the use of profitable scientific technology based on continuous and sustained research leading to higher productivity, increased returns to investment and rational use of capital resources in the enterprise. Mosher (1969) describes five essentials as transportation, marketing, innovations, access to supplies and incentive to produce for transforming traditional agriculture. The same stands also true for farm innovativeness. But decision making in farm business plays important role in the process of transformation. Thus main characteristics of innovative farm at individual level stands for the adoption of scientific
technology, application of capital input for better farming, rational use of available resources in their respective ways to raise the productivity of resources (farm produce) and higher returns (income) which largely depends upon individual's contribution and initiative for action change at the earliest.

An innovation is an idea, practice, or object perceived as new by an individual in his social system. It matters a little so far as human behaviour is concerned. An idea is "objectively" measured by the lapse of time since its first use or discovery. It is the perceived or subjective newness of the idea for the individual that determines his reaction to it. If the idea seems new to the individual, it is an innovation.

Innovativeness is the degree to which an individual is relatively earlier in adopting new ideas than the other members of his social system. Obviously, the measure of innovativeness and the classification of the system's members into adopter categories are based upon the relative time dimension at which an innovation is adopted. We specify adopter categories as classifications of the members of a social system on the basis of innovativeness:
(1) innovators; (2) early adopters; (3) early majority; (4) late majority; and (5) laggards.

We know more about innovativeness, the degree to which an individual is relatively earlier in adoption new ideas than other members of his social system, than any other concept in diffusion research. Innovativeness is the best single indicator of modernization (Rogers with Svannlng, 1969, p 292). Innovativeness is behaviour change, the ultimate goal of modernization, rather than cognitive or attitudinal change.

The most innovative individuals have been termed as progressivists, high-triers, experimentalists, lighthouses, advance scouts, and ultradopters. Least innovative individuals have been called as drones, prochials, and disharbs. Thus, Farm Innovators are the person who adopts agricultural innovation and dairy innovation at the earliest in comparison to other members of their social system.

II. FACTORS AFFECTING ADOPTION OF FARM INNOVATIONS.

An attempt has been made here to review some of the studies which were considered as relevant in the
context of objectives of this study. The studies related to adoption of innovations have also been incorporated with cognition that adoption of technology is important component of farm innovators. However, attributes of innovation have been pooled for review purpose.

1) Age:

Age of farm operators is one of the most controversial factors where the findings of the past studies have little agreement. It might be hypothesised that older persons would be more consulted than younger. This hypothesis was not found true by Singh and Pareek (1963). They concluded that key communicators and non-communicators do not differ in age. Kerridge (1978) was of the opinion that "older farmer and that too on small farms tended to value farming as a way of life and were not prepared to leave farming even when income was low ".

Chouhan (1979) reported non-significant positive relationship of age with modernity level of milk producers. Rogers (1961), Reddy (1962), Chattopadhyay (1963), Kaul (1964), Gupta (1966), Beal and Sibley (1967), Bhatia (1968), Dhalival (1970), Rajender (1973) and Saini et al. (1977) all have reported negative relationship between the age of farmers and adoption of farm
practices whereas Sinha (1963), Pandit (1964), Patel and Madulla (1974) and Buyukloocak (1978) found positive relationship between these variables.


Generalization: Thus, it can be generalised that there is some association between age and innovativeness; it may be positive or negative.

2) Number of adults in the family:

Chauhan (1979) reported negative non-significant relation of family size of milk producers with their level of individual modernity. Saini et al. (1977) reported negative significant relationship between family size and adoption of dairy production innovations. Sinha (1963) concluded that larger family size was
significantly superior to medium and small size at
awareness and interest stages of adoption. Maulik
and Lokhande (1969) found that perception of successful
farmers did not vary according to the family size.

Chander (1970), Sinha (1971) and Bhutia (1974)
concluded that family size was not significantly
associated with adoption of innovations, whereas
Choubey (1972) observed this relationship as significant.

Ibotambi (1974) found family size to be negatively
associated with adoption. Hundal (1976), Kalse(1976),
Sohi (1978) and Chouhan (1979) reported positive
relationship of family size with adoption of dairy farming
practices.

Generalisation: Thus, it was hypothesised that the
number of adults in a family do play a role in adoption
of farm innovations.

3) Caste:

The caste system is one of the oldest and elaborate
ascriptive system not only in India and world over. In
India, especially at rural base, caste plays an important
role not only at social and cultural level but also
influences mental architecture towards change and adoption
behaviour. These days, it has become important theme of
any discussion on economic and resource development.
Bose (1961) showed that it is higher caste which adopts improved practices more than others. Kivilin et al. (1974) revealed farmers caste status to be related with adoption of farm practices.

Reveli (1973) observed "Upper caste tended to expose themselves more to new and technically accurate information, can better understand and appreciate the focus of change and occupying the strategic location in social net work. Mulay and Ray (1973) stated that support from one's caste group was legitimising force for adoption of improved farm practices. Mudra and Batham (1967) revealed higher acceptance in higher caste and vice versa. Patel and Singh (1970) also found that higher caste farmers were higher adopters of artificial insemination when compared to low caste farmers.

Generalization: It appears to be non-existent to say that higher caste of a farmer makes him farm innovator.

4) Occupation:

It is one of the many different means of livelihood, out of which, one that fetched the largest share of income to the family, has been taken as main occupation.

Singh and Dubey (1973) reported no association between different occupation and feeding of mineral
mixture. Chauhan (1979) reported positive and highly significant correlation between occupation and adoption of dairy technology. Tyagi (1979) found occupation to be significantly related with adoption of dairy farming. Saini (1980) found occupation to be best predictor of modernization.

Generalization: Thus it was hypothesised that farmers are innovators because of the occupation they follow.

5) Education:

Education is generally believed to have the effect on widening the mental horizon of a person and thereby prepare or predispose him to be receptive to new ideas. This premise may be valid only at certain level of education and again depends upon quality of education.

Beal and Sibley (1967) pointed out that the individual's ability to read and write and the amount of formal education will affect the manner in which the individual gathers data and relates himself to his environment. It is, therefore, expected that greater the formal education, greater will be his influentiaity in his society.

Singh and Pareek (1965) found no significant difference between communicators and non-communicators.
Rogers (1964) showed that opinion leaders have more years of formal education in both modern and traditional communities.

Chaudhri (1979) concluded that general education up to secondary level has an impact on diffusion of technology and agricultural productivity in wheat belt of India. According to Rogers and Svening (1969), "Literacy is certainly one of the key antecedent concepts from which numerous modernization concepts flow and the impact of literacy can not be underestimated".

Most of the studies in the field of adoption have found education as one of the most important factor which accelerated the adoption of improved practices. The review presented here clearly shows the influence of education on the extent of adoption of innovations. However, a few studies have also shown that education was not associated with adoption.

Lakshminaryana (1970), Prashad, Shukla and Sohal (1970),
John (1974), Hundal (1976), Gupta (1976), Kapae (1976),
Kumar (1976), Sohi (1978), Malik (1978), Shanker (1979),
Singh (1980) and Sarkar (1981) indicated that educational
level of farmer was positively related with adoption of
improved farm practices.

**Generalization:** Education of farmer leads to the
formation of an innovator.

**6) Family Education Status:**

reported that adoption was independent of education of
farmers. Chander (1970) observed that family education
scores significantly influenced the adoption of
artificial insemination in Key Village schema area of
Karnal. Singh and Singh (1970) found that education of
family significantly contributed in explaining adoption
behaviour of farmers.

Sohi (1978) also reported family education score
to be significantly related with adoption of dairy practices.
Mulya and Ray (1973) reported that farmers with more education in the family had high socio-economic status and participation in formal organisations and mass media. In the present investigation, education level of all the educated members of the family and also that of head have been separately taken into account to explore the effect of each. It can be seen that most of the studies as reviewed above emphasised education as important factor in farm innovativeness. It is also important to note here that most of the developing countries have accepted literacy and education as a goal of national importance.

Generalization: Family education has a role in innovativeness; may or may not be positive.

7) Social Participation:

The new strategy of development which hinges on package of practices would hardly succeed in absence of will, cooperation and participation of farmers. Participation in social organisations plays significant role in adoption as it exposes farmers to secondary group influences where emphasis is placed on scientific and rational decision. As such, those farmers who participate
in general have favourable orientations towards scientific innovations and their adoption.

Vishnoi (1960) reported that those who adopted improved agricultural practices had higher participation in community activities. Sawhney (1967), Reddy (1962), Sinha (1963), Kaul (1964), Chand and Gupta (1966), Reddy and Kivlin (1968), Sinha (1971), Singh (1980) and Sarkar (1981) found that farmers with higher social participation had higher adoption of innovations. Gill (1967) reported that early adopters and innovators had higher level of social participation.


Sidhu (1969), Bhutia (1974), Sahi (1974), and Sohi (1978) reported that social participation had no association with adoption of farm technology, whereas, Dhalwal (1970) and Saini et al. (1977) found social participation to be negatively but non-significantly correlated with adoption of farm technology.
Generalization: Thus, it can be generalized that there is some association between social participation and innovativeness; it may be positive or negative.

8) Farm Size

Farm size refers to land operated by the farmer which may be leased in or rented out. Singh and Pareek (1965) pointed out that key communicators and non-communicators differed significantly in their farm size. Reddy (1965) indicated that leaders tend to have larger farms and non-leaders tend to have small and medium-sized farms. Sandhu and Allana (1974) and Singh (1976) asserted the role of farm size in agricultural modernization as indicated by significant regressive coefficient. Usually, a farmer with larger farm size is considered to be more successful. Sinha (1971) found that farm size was significantly associated with adoption of artificial insemination. Mundel (1976), Gupta (1976), Sohi (1976) and Sani (1980) reported positive relationship between adoption of dairy practices and operational land holding. Singh and Dubey (1978), however, did not find any relationship between land holding and feeding of mineral mixture and green fodder. Similarly, Tyagi (1979) reported farm size as one of the negative significant preindicators of adoption of dairy farming technology.
**Generalization:** Thus, it is hypothesized as if farm size has a role to play in farm innovativeness.

9) **Herd Size**

A very few studies have been carried out in order to find out influence of herd size on adoption of improved farm practices and innovativeness. Sinha (1971) reported that herd size was significantly associated with adoption of artificial insemination. Hundal (1976), Gupta (1976), Kapre (1976), Kumar (1976), Malik (1978), Sohi (1978) and Saini (1980) observed herd size to be positively related with adoption of improved dairy practices, whereas, Saini et al. (1977) reported non-significant relationship.

Chauhan (1979) observed negative significant relationship between herd size and overall modernity of high milk producers. However, it exhibited positive but non-significant relationship in the case of individual milk producers.

From the above studies, it can be concluded that herd size has been found to be significantly associated with adoption of dairy technical know-how and innovativeness. The herd size denotes size of dairy business of a farmer.
Generalization: Therefore, it can be generalized that hard size plays a role in farm innovativeness.

10) Knowledge:

Farm innovativeness implies better and rational decision making by farmers. This would become a reality only when they possess sufficient innovation knowledge. Profitable application of modern methods of dairy farming does presuppose an adequate knowledge and necessary skill. Needless to say that use of technology will depend upon retention of acquired knowledge. Willeneng and Morrison (1963) observed that all types of decision concerning innovations required technical knowledge of farming.

Rogers and Shoemaker (1971) states, "Innovation decision process begins with the knowledge function which commences when the individual is exposed to the innovation existence and gains some understanding of how it functions." According to them, the knowledge of innovations can create motivation for adoption.

Tyagi (1979) found that knowledge of technology yielded significant regression coefficient with adoption of dairy technology. Chouhan (1979) reported knowledge to be significantly related with adoption of dairy
technology and modernity level of milk producers.
Kumar (1976), Sohi (1978) and Singh (1980) also observed
significant relationship between knowledge and adoption
of dairy farming practices.

Rogers (1964) found that opinion leaders have
higher knowledge ability in both modern and traditional
communities. He pointed out the direction of communica-
tion that sociometric choices in a social system go to
more expert rather than less expert individual. Katz and
Lazarsfeld (1955) study suggested that personal influence
is directly related to the competence (what one knows).

Generalization: Knowledge significantly affects
adoption of farm practices and, therefore, plays an
important role in farming systems.

11) Attitude towards Dairying / Agriculture:

Majumdar and Majumdar (1967) stated that out of the
psychological factors attitude is the best predictor of
adoption. Narayan (1965) concluded that negative attitude
of farmers were mainly responsible for non adoption of
improved agricultural practices. Similar results has been
reported by Singh (1968). Reddy and Reddy (1972) studied
that, psychological factors influenced the farmers
behaviour in the adoption of new practices. Singh and Singh (1971) statistically showed that there was a positive attitude with the farmers who had large land holding and level of education. A study conducted by Jallal, Channagouda and Sundakaswamy (1973) in District Mandya (Mysore) indicated that majority of farmers had favourable attitude towards high yielding varieties of paddy. Satish (1970) reported that attitude was not so much important factor in the way of adoption. Gupta (1976) observed that a favourable attitude towards dairy farming leads to high adoption. Sohi (1976) showed that socio-economic factors does play a role in forming a favourable attitude to adoption.

People may prefer to associate with those who hold similar opinions and values. The relation between attitude similarity and interpersonal attraction has been the focus of a scores of experiments by Byrne (1961) "that group with attitude scales filled out the same as their over indicated significantly more positive feelings towards the stranger than did the group which received scales indicated dissimilar attitude". Subsequent research of Byrne (1965) demonstrated that the proportion rather than the number of shared attitudes was more critical in
predicting attraction. Byrne (1961), same attitude group significantly more attracted than different attitude group on both criteria.

**Generalization:** Thus it can be postulated that attitude is playing a significant role in the formation of an innovator.

12) **Economic Motivation:**

Economic motivation relates to characteristics of dairy farmers that by doing one's best, dairying can be a source of success. Gupta (1976) indicated that adoption behaviour of dairy farmers was closely affected by economic motivation and it worked as an important predictor of adoption behaviour. Singh (1969), Supe (1969) and Singh and Singh (1970) reported that economic motivation showed a positive and significant relationship with adoption level of respondent. Rao et al. (1971) reported that economic motive was responsible for high percentage of adoption of new dwarf varieties of wheat. Supe and Singh (1972) observed that economic motivation contributed highest to the prediction of rational behaviour. Tyagi (1979) also found positive significant relationship between economic motivation and adoption of dairy farming technology.
Generalization:  By and large, economic motivation has significant bearing upon the adoption of innovations—Farm Innovativeness.

13) Risk Preference:

Risk preference is the degree to which farmer is oriented towards encountering risk and uncertainty in farming enterprise and it stands for individual's orientation by way of positive attitude towards risks and uncertainty and hence the capacity to face problems. The opposite of this orientation is characterized by security orientation, conservatism values and reluctance to take action and decision in situations involving risk and uncertainty.

McClelland (1958) pointed out that one of the striking characteristics of entrepreneurship was their willingness to take calculated risk to innovate in ways that have reasonable chances of success. Sinha (1989) pointed out that reluctance to take risk and general attitude of playing safe proved a stumbling block in the acceptance of farming innovation and certain amount of risk taking formed an integral factor in economic development. In respect of farming situations, positive significant relationship between risk willingness

Choubey (1974) reported, economic development of villages to be significantly related to intermediate risk taking on sample farmers. Dhillon and Scandizzo (1978) found that most of subsistence farmers were averse to risk and indicated that income and other socio-economic variable influenced risk preference level. However, Sachchidananda (1972) reported negative significant correlation between risk preference and adoption. According to him "Indian farmer is largely a subsistence cultivator and cannot afford to take risk". Sohi (1978), Mishra (1979) reported non-significant relationship between risk willingness and adoption behaviour. Chouhan (1979) reported non-significant relationship between risk preference and adoption of dairy farming technology and milk production per day per animal.

**Generalization:** Thus, it can be inferred from the above studies that risk preference is a predictor of farm innovativeness.
14) **Achievement Motivation**

Human motivations have been of great interest to behavioural scientists. There is ample empirical evidence to show that it is tension produced by needs which gives rise to behaviour. Thus, much, if not all, behaviour may be described as tension reducing.

According to Rogers and Swaning (1969), "There is seldom a perfect balance between what an individual wants and what he gets. These states of unfilled desires or motivations are predictors of much of the future human behaviour".

McClelland (1961) asserted that essential ingradient of entrepreneurship leading to economic development was achievement motivation and described it as "the desire to do well not so much for the sake of social recognition or prestige, but to attain an inner feeling of personal accomplishment". According to him, "unsatisfied human needs with their resulting tension inside the human organism serve as motive to arouse and direct behaviour towards goals as satisfying need and thereby reducing the tension".

Atkinson (1966) and Pareek (1968) showed that increase in the level of achievement motivations leads to economic development.
Nail and Rogers (1963) postulated that farmer's achievement motivation leads to individual excellence in farming. They found significant correlation between need for achievement of Ohio State farmers and some of the indicators of excellence in farming such as production man work units, man days of labour on farm, and number of acres in the farm. Rogers and Svanning (1969) concluded that farm production was positively related to achievement motivation. Roy et al. (1968) reported a significant positive correlation between achievement motivation and adoption of agricultural innovations. Singh (1970) and Sinha (1970) concluded that individuals with high achievement motivation were found to be more susceptible to change. Singh (1976) in a study of tribal entrepreneurs reported that achievement motivation to start an enterprise was very high in successful entrepreneurs, whereas, it was found to be low in unsuccessful tribal entrepreneurs.

Mishra (1979) also viewed the personal achievement motivation as an important factor for adoption of the technology. Singh (1978), however, reported that achievement motivation was not associated with farm output.
Gupta (1976) indicated that adoption behaviour in dairying farming technology was significantly related with achievement motivation. However, Sohi (1978), Chouhan (1979) and Saini (1980) reported non-significant relationship between adoption of dairy technology and achievement motivation.

Generalization: An overall view of researches indicates that achievement motivation has been perceived as an important component of economic development and it may, therefore, have an important bearing on farm innovativeness.

15) **Fatalism - Scienticism:**

According to Marxist framework, religious ideas emerge as a consequence of the attempt of manipulating the environment to "make out a living". He emphasizes, "The infinite desire of powerful who invoke the name of God to sanction distribution of system, the religion which is opium of masses". According to Rogers and Svenning (1969), "Fatalism is a matter of personality adjustment which allows individual on the traditional range of the modernization ladder to cope with his daily tension and frustration and is the degree to which an individual perceives lack of ability to control his future."
Rogers (1961) reported agricultural magic (which was antithetical to scientism) to have highly significant negative correlation with adoption of farm practices. Chattopadhyaya (1963), and Arora and Deb (1973) found fatalism-scientism to be highly associated with adoption behaviour. Singh (1967) found scientism to be the lowest ranked positive value in adoption of improved farm practices.

Sen (1969) reported that secularly-oriented farmers were more amenable to modernize their farm procedure. Maulik and Lokhande (1968) reported that more the farmer was with scientific values, the more he adopted farm practices. According to Singh (1971) fatalism-scientism was not significantly associated with adoption of dairy production innovations. Zimulkarie et al. (1974) concluded a strong negative relationship between fatalism on the farmers and their adoption of fertilizer. Supa (1969) revealed positive association between scientific orientation of farmer and their rationality in decision making and adoption behaviour. Singh and Sohal (1974) reported fatalism to be negatively related to farm mechanization which constituted a barrier to development.
Generalization: The studies reviewed above explicitly revealed that orientation towards science could be a factor for adoption of practices which is ultimately producing innovators.

16) Empathy:

It is the psychological mechanism by which modern man experiences an expanding mental horizon. In earlier days capacity for empathy could enlarge only through physical and or social mobility. But in modern times, greatly enlarged empathic capacity is possible through experience with mass communication. It is the ability associated with modern orientation by which an individual can take another role and can describe what he can do in that capacity. Lerner (1958) described empathy as individual's ability to identify with others role, especially with those who are different from one's self. According to him, the theory of empathy rests on the assumption that one's similarity to others forms the foundation of understanding between them. Empathy helps people to be flexible and adjustable in a situation of change by making aware of alternative norms and roles. It is expected that high empathic person will be more amenable to change and modern as he got ability to
conceive of himself performing a role apart from his normal mode of behaviour.

**Generalization:** Thus higher a person is placed on the empathic scale higher are the chances of his becoming an innovator.

17) **Complexity:**

The speed with which adoption will take place is partly dependent upon the nature of the practice itself. Broadly speaking, the more complex a practice, and the more change it requires in existing operations the more slowly will it be adopted. A committee of rural sociologists has classified practices in terms of their complexity which roughly represents the speed with which acceptance may be expected to occur the gradient is as follows:

1) **Change in material and equipment only, without a change in techniques or operations** (e.g. new variety of seed).

2) **Change in existing operations with or without a change in materials or equipment** (e.g. change in rotation of crops).

3) **Change involving new techniques or operations** (e.g. Contour cropping).
iv) Change in total enterprise (e.g. from crop to livestock farming).

These changes that a practice requires for its adoption influence farmers' decisions to adopt or not to adopt.

Wilkening (1953) found that slower adoption of permanent pastures was related to the nature of the innovative itself, where the change involved operations and materials new to the farmers.

Nicholas (1954) reported that the nature of innovation i.e. simple to use and understand was one of the reasons for successful adoption of hybrid corn.

Graham (1956) in the field of Industrial Innovation found that complexity of an innovation significantly affected, its rate of adoption.

Kivlin (1960) found that with the exception of relative advantage, the complexity of farm innovations was highly related (in a negative direction) to their rate of adoption than any other characteristics of the innovation.

Rogers (1971) has indicated that new ideas that are relatively simple to use and understand will generally be accepted more quickly than ideas that will be more complex.
Fliegel and Kivilin (1962) observed that innovations rated least complex tended to be adopted more rapidly than those rated more complex.

According to Sohonu (1963), Roy (1966) and Singh (1975), the nature of a practice has been found to be associated with its adoption. They have further pointed out that these practices will be adopted earlier which do not involve major changes, which are simple to work with, which do not need technical guidance and much skill in management compared to those which are complex in nature.

**Generalization:** Simple technology is more conducive to innovativeness than the complex one.

13) **Communicability:**

The results of some innovations are easily observed and communicated to others, while some innovation are difficult to demonstrate and describe. The communicability of an innovation, as perceived by members of a social system, affects its rate of adoption.

Agburn (1922) claimed that material innovations diffused and were adopted more readily than non-material ideas.
According to Linton (1936) one reason for this cultural lag (of non-material behind material innovations) is greater visibility and communicability of material ideas. He further stated, "The material techniques and their products are probably the only elements of culture which can be completely communicated, and it is significant that it is usually these elements which are accepted most readily."

Nicholas (1953) stated that a practice would easily be accepted if its utility could be shown easily. According to Loinberger (1960) an easily demonstrable practice may be more quickly adopted. The killing effect of a new insecticide can easily, understandably and convincingly be demonstrated; the influence of a change in grade of fertilizer much less so, and the benefits of a selective breeding programme even less.

Erasmus (1961) reported that the visibility of an innovation was particularly influential on its rate of adoption in a less developed, praliterate society.

Rogers (1960) reported that sprinkler irrigation was adopted more quickly than warfarin rat poison. The results of the former were readily visible while the efficiency of warfarin was not so easily demonstrable due to difficulty in keeping counts of dead rats.
In an investigation on the role of demonstration farmer in diffusing new ideas in German Villages, Hruschka (1961) rated farm innovation into four categories of observability. The ideas which were rated more communicable were found to be diffused more speedily and readily from the demonstration farmers to surrounding villagers. Example, villagers were more aware of a new hay-making technique than of keeping farm records.

**Generalization:** Communicability has significant bearing on farm innovativeness; may be in positive direction.

10) **Profitability:**

Wilson *et al.* (1931) have reported that adoption and continuation of any improved farm practices, largely if not entirely, are dependent upon the economic returns resulting from them.

Barnett (1953), Bertrand (1958) and Shah (1958) have pointed out that even if an idea is acceptable and has important implications but the decisions of farmers are made primarily within the contexts of cost and added returns.

Griliches (1957) indicated that perception of profit from the innovation was highly related to the rate and extent of adoption.
Bertrand (1958) stated that the greater the efficiency of new technology in producing returns in the form of economic or consumption of goals or satisfaction, the greater the likelihood of its adoption.

Tiwari (1959) has reported that if the income obtained from the adoption of a practice is more as compared to the income from the traditional practice, it will be adopted quickly even if the initial investment is high.

According to Rogers (1960) if a new practice is viewed as a major improvement over existing ones in matters of economic gain, it is likely to be adopted rapidly.

Wilkening (1960) found that Australian farmers perceived the relative advantages of innovative differently depending on their personal characteristics. Havens and Rogers (1961) pointed out that what really determined the rate of adoption of an innovation was the adopter's perception of profitability and not the objective profitability.

Wilkening, Joan and Hartley (1962) observed that certain practices were perceived as negatively affecting production and profits and hence were not adopted.
Sohoni (1963), Singh (1976) and Raj (1977) have stated that farmer's decision in adopting a practice is greatly influenced by the returns they expect to gain as compared to the investment made.

**Generalization:** Larger the profit generating capacity of an innovation greater are the chances that it will fall into the hands of farm innovators.

20) **Physical Compatibility:**

It is the degree to which an innovation is in conformity with the existing farming resources of the community such as soil type, irrigation facilities, cropping pattern, quality of animal power etc.

Chowdhari (1957) reported that irrigation practices were not adopted by the farmers due to the unsuitability of soil as deep cracks were formed with the application of irrigation water in soil as a result of which most of the irrigation water was wasted.

In support of findings of Chowdhari (1957), Hafer et al. (1958) stated that the unfavourable attitude of farmers towards a particular practice was shown because they thought that the practice would not be successful with the kind of soil they had.
Shah (1958) in his report stated various reasons that accounted for non-adoption of improved practices. Non-applicability and unsuitability of improved seeds in a particular tract, inadequate availability of dung and land for preparing compost and digging compost pits unsuitability of chemical fertilizers due to their peculiar chemical properties in an area where there is no irrigation facilities, lack of sufficient bullock power and small fragments of land holdings were some of the reasons in relation to physical compatibility for non-adoption of improved practices like improved seeds, compost making, use of chemical fertilizers and improved agricultural implements.

Ray (1959) attributed one of the reasons that accounted for the non-adoption of Japanese method of paddy cultivation by farmers of East Bihar Village was lack of proper and sufficient irrigation facilities as this practice would not be successful in such condition.

Openfeld and Liberaro (1962) pointed out that besides many basic difficulties like lack of material supply and services, lack of proper physical facilities were one of the reasons for non-adoption of practices.
Sohoni (1963) reported that if farmers were made convinced of the potentialities of improved practices and if suitable physical facilities and demanded by different practices were made available to them they would easily adopt the practices even if they had to make small changes here and there in their farm operation and in farming situations.

Generalization: Farm innovativeness is greatly affected by the suitability of physical facilities such as soil type, irrigation potentiality, and cropping pattern.

21) Cultural Compatibility:

Compatibility is the degree to which an innovation is consistent with existing values, pattern of living, needs, habits, cultural norms and past experiences of the adopters. A farmer's attitudes and values towards a new idea are often affected by his past experiences with related ideas. Most of the research workers have found that an idea that is not compatible with the cultural norms of a social system and past experiences will not be adopted so rapidly as an idea that is compatible.

According to Barnett (1953) agreement between old and new idea is necessary and is the sufficient requirement
for the acceptance of a novelty. New things, ideas and
behaviours are evaluated not only with reference to
their intrinsic merits or demerits but also by comparison
with existing usages which can be measured on the same
scale.

Nicholas (1953) reported that a practice would
successfully accepted if it was compatible with other
elements of rural culture. He further pointed out the
failure of such innovation which deviated from traditional
ones.

Parish (1954) found that Australian farmers adopted
mechanical innovations more rapidly than on-mechanical
innovations. This was mainly due to the fact that
farmer's values tended to be more compatible with
mechanical innovations.

Graham (1956) while studying the adoption of
television, found that compatibility of the innovation
with social class values on types of recreation partly
determined its rate of adoption.

Bittner and Nicolson (1958) reported that acceptance
of the economically very promising practices appeared to
be low due to the fairly drastic shift in habit and
custom needed for their adoption.
Dharma (1958) stated that habit also stood in the way of acceptance of change. Polished rice for example, was not so easily given up for unpolished rice due to traditional habits.

Dubey (1958) observed that improved wheat varieties could not find ready acceptance because of difficulties expressed by women folk and the 'flat taste' of the new variety. He further reported that the lack of a suitable substitute to cattle dung cake for cooking and hooka fuel thwarted the adoption of composting for which cattle dung was needed. Similarly, putting compost pits outside the village failed to attain recognition as the 'filling up' of the pits was considered a women's job while the women would not go out for this job. Likewise, competition among families was also at the back of acceptance of many programmes.

Lindstrom (1958) reported one of the reasons for non adoption of an improved practice was due to its not being in agreement with custom.

Hoffer and Stangland (1959) have indicated that a farmer is likely to adopt new ideas if he values efficiency, progress, science, achievement and material comfort.
Griliches (1960) reported that both profitability and compatibility were key variables in the adoption of hybrid sorghum.

Loinberger (1980) has found that practices which are compatible with existing ideas and beliefs are most likely to be adopted quickly.

Rogers (1960), on the basis of research works done in the field of education, agriculture, anthropology and medical sociology by Graham (1956), Yarasasie (1961), Santepole (1961) and Howey (1946) have indicated that compatibility or the degree to which an innovation is consistent with existing values and past experiences of the adopters may retard or speed up the rate of adoption.

Rogers (1960) indicated that a farmer who had already adopted hybrid seed corn was familiar with the concept of hybrid vigour and was more likely to adopt hybrid hogs and hybrid chickens.

Santepole (1961) reported difficulty encountered by Kentucky county agents in convincing farmers to switch from tobacco-growing to "pickle raising". Even though the latter crop was more profitable, it was not adopted because cucumbers were perceived by farmers
as a feminine type of enterprise. On the other hand raising tobacco was supposed to increase the prestige of the farmer.

Fliege (1962), Roy (1966) and Singh (1975), concluded that family characteristics which reflected traditional orientation might serve as obstacles to change.

**Generalization:** Farm innovativeness is greatly affected by the cultural values, existing norms and past experiences of the farmers.

22) **Divisibility:**

Nicholas (1954) reported that one of the reasons for successful adoption of "Hybrid corn" was such that the potential adopters could try out the techniques on very small scale and thus was not forced to make an economically serious decision in trying out the new type of seed.

Kivilin (1960), found a correlation between divisibility and rate of adoption for 43 farm innovations that was not significant but in the expected direction.
Tucker (1961) who analysed the data from one Ohio county found that divisibility and other characteristics of innovations were not significantly related to rate of adoption although they were in the expected direction.

Fliegel and Kivlin (1962) reported that divisibility for trial was not significantly associated with rate of adoption.

Rogers (1962) who analysed the investigations made by Gross (1942), Ryan (1948), Kivlin (1960), Katz (1961), Roy (1966), Singh (1975) and Raj (1980) reported that relatively earlier adopters perceived divisibility as more important than later adopters and he further suggested a generalization that a practice that is divisible for trial will generally be adopted more rapidly than a practice that is not.

**Generalization:** Innovations which can easily be put to test in part are more apt to innovativeness than the ones which are difficult to divide for trial at a smaller scale.
III. CONCEPTUAL MODEL.

The conceptual model of the study portrays three sets of correlates such as socio-economic characteristics, personality traits, and attributes of innovation. In all, they constitute a set of twenty-two independent variables which are tentatively assumed to have some relationship with farm innovativeness - the dependent variable. Different variable included in the model explain the variation in farm innovativeness. This inference is drawn from the foregoing analysis. The whole functional relationship is illustrated in figure 1.

The farm innovativeness and adoption of farm technology will lead to developmental changes in and around individual farmers. The totality of changes, therefore, seems to be an endowment of scientific farm technology at grassroots level. This will, in turn, help the developmental process at broader perspective. However, the focus of present study is at individual level of determinant considered important for national or macro development.
PERSONAL - CHARACTERISTICS
1. AGE
2. ADULT FAMILY - SIZE
3. CASTE
4. OCCUPATION
5. EDUCATION
6. FAMILY EDUCATION STATUS
7. SOCIAL PARTICIPATION
8. FARM - SIZE
9. HERD - SIZE
10. KNOWLEDGE IN DAIRYING & AGRICULTURE

PSYCHOLOGICAL - TRAITS
11. ATTITUDE TOWARDS DAIRYING & AGRICULTURE
12. RISK PREFERENCE
13. EMPATHY
14. ECONOMIC MOTIVATION (AGRI. & DAIRY)
15. ACHIEVEMENT MOTIVATION
16. FATALISM - SCIENTIFICISM

ATTRIBUTES OF INNOVATION
17. SIMPLICITY
18. COMMUNICABILITY
19. PROFITABILITY
20. PHYSICAL COMPATIBILITY
21. CULTURAL COMPATIBILITY
22. DIVISIBILITY

INDEX
--- - TENTATIVE RELATIONSHIP
---- - TRANSITIONAL RELATIONSHIP
------ - SUBSTANTIVE RELATIONSHIP

FIG. 1. PARADIGM SHOWING CONCEPTUAL RELATIONSHIP BETWEEN FARM INNOVATIVENESS AND 2 SETS OF 22 INDEPENDENT VARIABLES
CHAPTER III

RESEARCH METHODOLOGY
RESEARCH METHODOLOGY

This chapter is detailed into the following headings:

1) The setting.
2) Selection of villages.
3) Selection of respondents.
4) Selection of innovations.
5) Identification of innovators.
6) Characteristics of respondents affecting innovativeness.
7) Operationalization of variables and their measurement.
8) Pretesting of measuring instruments.
9) Statistical measures.
10) Reliability.
11) Validity of instrument.

(1) The Setting:

For the conduct of this study, District Karnal was purposively selected for the reasons stated earlier.
All the 8 Community Development Blocks of the district were covered by way of collecting data from sixteen villages selected randomly. Reasons for choosing the setting were (a) Better and wider applicability of results; (b) Well acquaintance of the culture by the researcher; (c) Proximity to National Dairy Research Institute, Karnal; (d) Need to conduct a study in State of Haryana; (e) The district was most easily approachable to the researcher; and (f) The area was neither specially well developed nor backward.

(2) Selection of Villages:

Selection of villages was done in consultation with the Block Officials. Sixteen villages were thus selected representing all the eight blocks of the district. Two villages from each block were chosen for the study. One village from the proximity and another from the remote area of the block.

(3) Selection of Respondents:

A list was prepared after consulting Surpanch of the village and the Panchyat Secretary. It was not necessarily considered a strict criterion that the respondent should be the Head of the family and/ or
owner of the land. But the person who was wholly and solely responsible in the family was taken as respondent. All farmers who were present in the village on the days of investigation were taken as respondents. A total of two thousand and eight farmer respondents were consulted in the first phase of the study, i.e., for identification of innovators. Table 3 gives the distribution.

**Selection of Innovators**

The number of farmers selected were asked to respond to fifty questions pertaining to fifty innovations in terms of the time they have been adopting a particular practice or innovation.

The responses were first converted into Z-scores (Standard Scores) and then these scores were summed up and divided by the number of innovations a respondent had reacted to. This formed the innovation score as follows:

\[
\text{Farm Innovativeness} = \frac{\text{Total score in years}}{\text{Total no. of Innovations Responded}}
\]

This score was used to identify the innovators. According to Rogers (1971), innovators are those persons who fall on curve with mean minus two standard deviation when plotted on time dimension.
### Table 3: Distribution of Farm Innovators in different villages.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of Block</th>
<th>Name of Villages</th>
<th>No. of Respondents</th>
<th>No. of selected as Innovators</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kerala</td>
<td>Bazida Jattan</td>
<td>98</td>
<td>2</td>
<td>2.04</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Naval</td>
<td>157</td>
<td>4</td>
<td>2.54</td>
</tr>
<tr>
<td>3</td>
<td>Seraunda</td>
<td>Begampur</td>
<td>70</td>
<td>2</td>
<td>2.36</td>
</tr>
<tr>
<td>4</td>
<td>Seraunda</td>
<td>Raipur Jattan</td>
<td>106</td>
<td>3</td>
<td>2.93</td>
</tr>
<tr>
<td></td>
<td>Kerala</td>
<td>Resalu</td>
<td>135</td>
<td>4</td>
<td>2.96</td>
</tr>
<tr>
<td>6</td>
<td>Seraunda</td>
<td>Seraunda</td>
<td>120</td>
<td>3</td>
<td>2.50</td>
</tr>
<tr>
<td></td>
<td>Samalkha</td>
<td>Bhandh</td>
<td>158</td>
<td>4</td>
<td>2.53</td>
</tr>
<tr>
<td>8</td>
<td>Samalkha</td>
<td>Gapra</td>
<td>141</td>
<td>4</td>
<td>2.84</td>
</tr>
<tr>
<td>9</td>
<td>Mediloda</td>
<td>Kavi</td>
<td>147</td>
<td>4</td>
<td>2.72</td>
</tr>
<tr>
<td>10</td>
<td>Mediloda</td>
<td>Kard</td>
<td>125</td>
<td>3</td>
<td>2.38</td>
</tr>
<tr>
<td>11</td>
<td>Ashand</td>
<td>Rhatak</td>
<td>150</td>
<td>4</td>
<td>2.66</td>
</tr>
<tr>
<td>12</td>
<td>Ashand</td>
<td>Jasengpur</td>
<td>142</td>
<td>4</td>
<td>2.82</td>
</tr>
<tr>
<td>13</td>
<td>Nisang</td>
<td>Chiro</td>
<td>102</td>
<td>3</td>
<td>2.94</td>
</tr>
<tr>
<td>14</td>
<td>Nisang</td>
<td>Jani</td>
<td>112</td>
<td>3</td>
<td>2.68</td>
</tr>
<tr>
<td></td>
<td>Nilokheri</td>
<td>Shekapura</td>
<td>126</td>
<td>3</td>
<td>2.38</td>
</tr>
<tr>
<td>16</td>
<td>Nilokheri</td>
<td>Puja</td>
<td>119</td>
<td>3</td>
<td>2.54</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>Sixteen</strong></td>
<td><strong>2008</strong></td>
<td><strong>53</strong></td>
<td><strong>2.63</strong></td>
</tr>
</tbody>
</table>
The data presented in table 3 clearly show that there has been a normality of distribution as the proportion under the curve for innovators is almost within the limits at 2.5 per cent as stipulated by Rogers (1971). Data, therefore, confirm the theory of Rogers (1971). Categorisation of adopters particularly with respect to Innovators who are supposed to be 2.5 per cent of the total population in a social system. This pattern is found almost uniform in all the 16 villages (social systems) studied in the present endeavour.

(4) Selection of Innovations

A complete list of recommended dairy practices under five broad categories, viz., Breeding, Feeding, Management, Animal Health Cover and Marketing was prepared. Similarly, another list of recommended Agricultural practices under five broad categories, viz., seed and seeding, fertilization, irrigation, plant protection and miscellaneous items was prepared. These lists were cross-checked by dairy professionals, and field staff including their advisers and supervisors. The list so revised was then subjected to a group of experts from N.D.R.I., so as to classify listed practices into three groups on the basis of their
suitability, i.e. most suitable, somewhat suitable and least suitable. This way, 25 innovations were finally selected for Dairying and 25 for Agriculture which obtained highest mean judgemental score. The question of application of practices in the area were always kept in view. As per this procedure the following practices were finally delineated:

I: Dairy Innovations

A) Breeding
   i) Heat Symptoms in animals;
   ii) Artificial Insemination;
   iii) Time of insemination;
   iv) Pregnancy Diagnosis;
   v) Drying-off;

B) Feeding
   i) Leguminous Green Fodder;
   ii) Concentrates;
   iii) Mineral Mixture;
   iv) Hay;
   v) Urea Molasses;

C) Management
   i) Identification;
   ii) Artificial let down;
   iii) Dehorning;
   iv) Loose housing;
   v) Zero-grazing;
D) Health Care:
  i) Vaccination in animals;
  ii) First Aid Treatment in Animals;
  iii) Control of Lice and Ticks;
  iv) Deworming;
  v) Detection of mastitis;

E) Marketing:
  i) Sale of milk;
  ii) Testing of milk fat;
  iii) Heifer sale/purchase;
  iv) Animals sale/purchase;
  v) Cattle feed purchase;

II: Agricultural Innovations:

A) Seed and Seedling:
  i) Variety sown;
  ii) Seed treatment;
  iii) Seed rate;
  iv) Time of sowing;
  v) Method of sowing;

B) Fertilization:
  i) Amount of nitrogen;
  ii) Amount of Phosphorus;
  iii) Amount of Potash;
  iv) Amount of Zinc;
  v) Method of fertilization;

C) Irrigation:
  i) Number of irrigation;
  ii) Depth of irrigation;
  iii) Stage of irrigation;
  iv) Method of irrigation;
  v) Time of irrigation;
D) **Plant Protection:**
   i) Stem rot in paddy;
   ii) Yellow Rust in Wheat;
   iii) Loose smut in Wheat;
   iv) Pest control;
   v) Weed control;

E) **Miscellaneous:**
   i) Harvesting through machine;
   ii) Threshing through machine;
   iii) Sale procedure;
   iv) Inclusion of Legumes in Rotation;
   v) Cropping intensity.

**Standard Score:**

The current trend is to make use of standard score which are most satisfying type for transferring scores from many point of view. (Anastogi, 1961). These express the individual's distance from mean in terms of standard deviation of the distribution. The main question in assigning a standard score was to decide the various classes and to define the precise nature of scores.

The data were collected against items listed in the Appendix - I. Since the items were having a large difference between the high and low values for the
particular item, the raw scores were converted into standard scores i.e. (Z) scores by using the formula as follows:

\[
(\cdot) \text{Score} = \frac{\text{Raw Score} - \text{Mean}}{\text{Standard Deviation}}
\]

(5) **Identification of Innovators:**

The innovators were identified by the method adopted by Roger's (1971). Thus, adopters of improved farm practices were grouped in adopter categories on a time scale developed by Rogers (1971). Adopters were classified into five categories, i.e., innovators, early adopters, early majority, late majority, and laggards on the basis of relative time of adoption of innovations. Adopter distribution as a normal distribution has two parameters, the mean and standard deviation which may be used to divide the distribution into five portions. These five areas under the normal curve are labeled as innovators, individuals included in the area lying to the left of \(X - 2\ SD\), early adopters are those individuals who are included in the area between \(X - 2SD\) and \(X - SD\), individuals included in early
majority category are those who occupied the area between $\bar{x} - \text{SD}$ and $\bar{x}$, late majority are those who occupied the area on the right side of $\bar{x}$ and in between $\bar{x}$ and $\bar{x} + \text{SD}$ and individuals included in the remaining area to the right side beyond the $\bar{x} + \text{SD}$ are Laggards.

Innovators = (Mean) - 2(Standard Deviation)

(6) **Characteristics Farm Innovativeness of the Respondents:**

Some of the characters identified for the purpose of this study have been taken from the reviews of past studies as given in Chapter two.

1. **Personal Characteristics:**
   1. Age of the respondents;
   2. Number of adults in the family;
   3. Caste;
   4. Occupation;
   5. Education;
   6. Family Education status;
   7. Social participation;
   8. Farm size;
   9. Herd size;
   10. Knowledge in Dairying/ Agriculture.
II. Psychological Traits:

11. Attitude towards Dairying/Agriculture;
12. Economic motivation in Dairying/Agriculture;
13. Risk preference;
14. Achievement motivation;
15. Scientism;
16. Empathy

III. Attributes of Farm Innovations:

17. Simplicity/complexity;
18. Communicability/Observability;
19. Profitability;
20. Physical compatibility;
21. Cultural compatibility;
22. Divisibility/Trialability.

(7) Operationalization of Variables and their measurement:

The details of operationalization of variables are as follows:

1) Age:

It refers to chronological age of the respondents rounded to nearest whole number at the time of investigation. Operationally, age is that which is measured in number of years one's life has completed so far by asking an open ended question. Each year was given one score.
2) **Number of Adults in the Family:**

The total number of adult persons in the family above 18 years of age classified as adult were taken. Each person above 18 years of age was given one score.

3) **Caste:**

It denotes hierarchical status conferred upon a number in a society from time immemorial according to law of Manu. It was measured by direct questioning. The clan and kinship throw light to one's caste.

It can be defined as hereditary, endogamous, usually localised group having a traditional association with an occupation. For this classification scoring has been done as follows:

<table>
<thead>
<tr>
<th>Caste</th>
<th>Category</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jat, Jat Sikh,</td>
<td>High</td>
<td>3</td>
</tr>
<tr>
<td>Brahmin and</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Saniya.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nai, Carpenter,</td>
<td>Medium</td>
<td>2</td>
</tr>
<tr>
<td>Luhar, Jhomer.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teli, Chamar,</td>
<td>Low</td>
<td>1</td>
</tr>
<tr>
<td>Shangi</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4) **Occupation:**

It is one of the many different means of livelihood, out of which, one that fetched the largest share of income to the family has been taken as main occupation.
5) **Education**

Education refers to the scholarly education one has achieved. Education was operationalized as an academic achievement attained by respondent through school or college. The variable was measured with the help of socio-economic status (S.E.S.) scale developed by Trivedi and Pareek (1963). The respondents were assigned score of 0, 1, 2, 3, 4, 5, 6 and 7 to illiterate, can read only, can read and write, upto primary, upto middle, upto high school, graduates, and post-graduate respectively.

6) **Family Education Status**

It refers to educational status of farm family which was measured by procedure developed by Mulay and Ray (1973).

\[
\text{Index of family education status} = \frac{\text{Total education score}}{\text{Effective family size}} \times 100
\]

Where,

- Total Education Score = Sum of educational achievement of each member of family as suggested by Trivedi (1963) S.E.S. Scale.
Effective Family = Number of eligible members in the family (above 6 years).

7) Social Participation:

For the purpose of the study, social participation is the voluntary sharing in person to person and group to group relationship beyond the immediate household. Social participation here interpreted as including both formal and informal group activities. It refers to participation and involvement of the respondent in a social institution as a member or office bearer. The variable was measured with the help of S.E.S. scale of Trivedi (1963), 1, 2, 3, 6 scores were assigned to member of one organization, member of more than one organization, office holders and wider public leader.

8) Farm Size:

The actual number of acres of land under cultivation by the respondent has been treated as farm size. One score to every acre of farm area was assigned for the purpose of analysis.

9) Herd Size:

It refers to total number of adult units of cattle and buffaloes with the farmer. Each unit was given one score for the purpose of analysis. A unit is
an adult animal which, has attained, a breedable age as per their breed.

10) Knowledge in Dairying / Agriculture:

English and English (1958) defined "knowledge as a body of understood information possessed by an individual or by a culture". They further explained that "knowledge is that part of a person's information which is in accord with established fact". Block et al. (1956) considered knowledge as "those behaviours and test situations which emphasized the remembering either by recognition, or recall of ideas, material, or phenomena". Knowledge in agriculture in the present study was measured by a knowledge test as developed by Moulid (1965). This knowledge score was computed by counting the number of items on which his responses were correct. Theoretically, the scores ranged from zero to 35.

Knowledge in Dairying was measured by scale developed by John (1975). Each correct response was given a score of one and incorrect response a score of zero. All such scores were totalled up in the case of particular respondent which yielded knowledge score. Theoretically, score ranged from zero to 19.
11) **Attitude towards Dairying/Agriculture**

Thurstone (1946) defined attitude as the degree of positive or negative effect associated with some psychological object like symbol, phrase, slogan, person, institution, ideal or idea towards which people can differ in varying degrees. Attitude towards agriculture was measured by scale developed by Suec (1969). The scale consisted of twelve items on a five-point continuum: strongly agree, agree, undecided, disagree, and strongly disagree. The positive statements were given 5, 4, 3, 2, and 1 score respectively, whereas, pattern of scoring was reversed for negative statements. The items number 1, 3, 6, 7, 10, and 12 were positive while 2, 4, 5, 8, 9, and 11 were negative. Thus, expected score could range from 12 to 60.

It is an important psychological ingredient of dairying and agriculture. An attitude is a personal disposition common to individuals, but possessed in different degrees, which impel them to react to objects, situations in ways that can be called favourable. It was measured by scale developed by Gupta (1975) for attitude towards Dairy Farming. The responses were obtained on three-point continuum of agree, undecided, and disagree. The positive statements were given 3, 2, 1, scores respectively, whereas, pattern of scoring was
reversed for negative statements. The item number
1, 3, 5 and 6 were positive, while 2, 4, 7 and 8 were
negative. Thus, expected score could range from 8 to 24.

12) Economic Motivation in Dairying/agriculture:

Economic motivation is defined in terms of profit
maximization and relative value placed by a farmer on
economic ends. Economic motivation in agriculture was
measured by a scale developed by Suba (1969). The scale
consisted of six items on five point continuum ranging
from strongly agree to strongly disagree. The positive
items were scored as 7, 5, 3, 2 and 1 for strongly agree,
agree, undecided, disagree, and strongly disagree
respectively, whereas, the pattern of scoring was reversed
for negative items. The expected score could range from
6 to 42.

Economic motivation in dairying relates to economic
gains, which means that individual is oriented towards
achievement of maximum economic ends such as maximization
of farm profits. Economic motivation towards dairying
was measured by scale developed by Gupta (1976) which
consisted of three items on three point continuum.
Scoring was done as discussed in achievement motivation
scale. Thus, the expected range of score varied from
3 to 9.
13) **Risk Preference**

It is the degree to which a farmer is entering into risks and face the problems of farming. It is the degree to which a farmer is oriented towards risks and uncertainty and has courage to take risks and face the problems of farming. It was measured by the scale developed by Supe (1969). The scale consisted of six items on five point continuum ranging from strongly agree to strongly disagree. The item No.1, 2, 5 and 6 of value orientation aspect of the schedule were positive while 3, 4 were negative items. The positive items were scored as 7, 5, 3, 2 and 1 for strongly agree, agree, undecided, disagree and strongly disagree respectively, whereas, the pattern of scoring was reversed for negative items. The expected score of value orientation could range from 5 to 42.

14) **Achievement Motivation**

It relates to characteristics of farmers as perceived by him in a fashion that by doing one's best, farming can be a source of success. It was measured by the scale developed by Gupta (1976). Responses were obtained on three point continuum of agree, undecided, and disagree. The positive statements were given 3, 2, 1 score whereas pattern of scoring was reversed for negative
statements. The item number 2,3 were positive in nature, while 1 was negative. Thus, expected score could range from 3 to 9.

15) Fatalism - Scienticism:

Fatalism is defined as belief that human situation and acts predetermined by some super natural power and can never be influenced by individual violation, or by the act of anyone else. Scienticism, on the other hand, is defined as a belief that the human situations are the results of a natural and/or social force which can be understood and changed by human violation or by human action. The fatalism-scienticism dimension of value orientation of the respondents was studied with the help of scale developed by Chattopadhyaya (1963). This scale consisted of six items. In the present study, however, one item which read as "there cannot be any real relationship between massive Chinese attack and congregation of eight planets in the same year" was omitted as it was not considered to be very relevant in the present context. Thus, only five items were used in the scale. The respondents were asked to indicate their degree of agreement or disagreement with each statement at four point continuum ranging from strongly agree to strongly
disagree. Items at serial No. 1 and 4 were positive items, whereas, items 2, 3 and 5 were negative. On the positive items, scores were given as 4, 3, 2 and 1 for strongly agree, agree, disagree, and strongly disagree respectively, whereas, the pattern of scoring was reversed for negative items. The expected score on this value dimension could range from 5 to 20.

16) Empathy

In the present context it has been operationalized as the ability of farmers to assume imaginatively the role of village leader, extension agent, a local elected leader, state minister of agriculture and animal husbandry and the Prime Minister of India. It was measured by scale developed by Tyagi (1979). The responses were scored as under:—

<table>
<thead>
<tr>
<th>Classification</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Empathy — poor answer or a response completely unrelated to question.</td>
<td>1</td>
</tr>
<tr>
<td>Medium Empathy — a general non-specific answer but with some relevance to question asked.</td>
<td>2</td>
</tr>
<tr>
<td>High Empathy — a specific and relevant answer showing ability to take the role indicated.</td>
<td>3</td>
</tr>
</tbody>
</table>

The final empathy score were worked out by pooling individuals score for each item of empathy. Thus, score for empathy did vary from 0 to 15.
17) **Simplicity/Complexity:**
   is the degree to which an innovation may be perceived as relatively difficult/or easy to understand and use.

18) **Physical Compatibility:**
   is the degree to which an innovation is perceived as consistent with the need/or situation of the adopters.

19) **Cultural Compatibility:**
   is the degree to which an innovation is perceived as consistent with the existing values of the adopters.

20) **Communicability/Observability:**
   is the degree to which the results of an innovation are visible to others.

21) **Profitability:**
   is the adopters perception of profit accruing from the adoption of innovation.

22) **Divisibility/Trialability:**
   is the degree to which an innovation may be experimented with, on a limited basis. The scale developed by Roy (1966) was used to score attributes of innovations.
The scoring was done on the basis of scores assigned on the 5 point continuum as 5, 4, 3, 2 and 1 (from the one point at the extreme left to the fifth point at the extreme right) respectively for all characteristics except divisibility as shown in the appendix.

In case of divisibility the responses being dichotomous as divisible and not divisible, the scores assigned were 2 and 1 respectively as indicated in the appendix.

(8) Pretesting of Measuring Instruments:

The major variables and measurement tools were examined by the eminent scientists and later revised in the light of the suggestions given by them. Then the first draft of structural interview schedule was used for pre-testing in the village which were different from the sample. The pretesting observations were tabulated and analysed on the basis of which the schedules and questionnaires were edited and finalised for the final data collection.

The interview schedule was put to pretesting in villages other than the selected villages of Karnal.
This was done to obviate any possible residual effect on the actual respondents. The pretesting helped in standardizing explanations and procedure for filling the schedule. The interview schedule was revised in the light of the pretest.

After pretesting, final data were collected in structured interview schedule covering all aspects of this study. Researcher himself established rapport with each respondent at his house or farm or wherever he could be available at ease. The purpose of data collection was clearly explained. Data were gathered in early May, 1980 to February 1981 and end August 1981 to end of October, 1981 in two stages.

(9) Statistical Measures:

Parametric statistical techniques were used to provide a basis for accepting or rejecting the empirical hypotheses. Associated with every statistical test is a model and measurement requirement. Sometimes, we need to test as to whether the condition(s) of a particular statistical model are met. Quite often, we have to assume that they are met. The conditions that are associated with the statistical model and measurement requirement
underlying the parametric tests as given by Siegel (1965) are (a) observations must be independent; (b) the observations must be drawn from the normally distributed population; (c) the population must have the same variances; (d) the quantitative measurement must be of a internal scale.

The selection of the samples by random method satisfies the first condition. Though the normality of the distribution and the variances of the populations were not tested, it was assumed that the population satisfies these conditions. Efforts were made in the operationalisation of variables and in the procedure adopted for their empirical measurement to satisfy the condition of measurement.

Zero order correlation used in testing the relationship between farm innovativeness and social, psychological and other independent variables. Multiple correlation analysis was used in predicting the variation in farm innovativeness contributed by the social psychological variables. Besides these statistical tests, some other statistics such as mean, standard deviation and percentage etc. were also used. The details of each statistic have
been integrated into the relevant parts of this dissertation. In testing the significance of each test, 5 per cent probability level was considered as satisfactory. In case of overlapping, it was however at 1 per cent probability level.

(10) **Reliability**

Reliability is the accuracy or precision of instrument and can be defined as relative absence of errors in a measuring instrument (Klinger (1958): 443). An instrument is said to be reliable if it gives same measurement or results in similar conditions. The reliability of index was found by split half and test-retest technique.

For, the instrument was administered to 20 respondents with an interval of 15 days to the same group. The reliability coefficient as worked out at 0.846 (p = 0.01) was highly significant. It apparently testifies the reliability of index. By split half method, the coefficient correlation between two set of scores was 0.871 (p = 0.01) which further confirmed the reliability and internal consistency of innovative index.

(11) **Validity of the Instrument**

The most important classification of validity prepared
by Joint Committee of American Psychological Association, the American Educational Research Association and the National Council of Measurement in Education is content validity and criterion related validity. Both were tested in the present study.

Content validity is the representativeness or sampling adequacy of contents - the substance, the matter, the topic of measuring instrument which consists essentially by means of judgement (Kerlinger (1953)). The content validity of the instrument was born out by method of collecting items from the universe. The universe of the concepts were covered widely and sampled through critical discussion and interviews with Scientists, Experts, Dairy Farmers and Dairy Extension Personnel. This, obviously, sufficed the purpose of content validity.

Criterion validity as the name indicates is studied by comparing test or scale scores with one or more variables or criteria known to measure the attribute under study (Kerlinger 1953: 459). The local Agricultural Development Officer, Field Worker, and Panchayat Secretaries were asked to select two farmers in a village to rank them top (Innovator) and bottom (Laggard). The
ranking by Agricultural Development Officer was taken as external criterion. The individual concerned for this validity study were only those in respect of whom there were unanimity of judgement.

The scores obtained by the farm innovators and laggards by Agricultural Development Officer (External Criteria) has been given in Table 3.2.

These values showed very high validity of index demonstrating its sensitivity and predictiveness to discriminate between innovators and laggards.

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Village</th>
<th>Score</th>
<th>Farm Innovators</th>
<th>Farm Laggards</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Bazida Jattan</td>
<td>94.05</td>
<td>16.22</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Ne Walsh</td>
<td>84.54</td>
<td>14.22</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Bogampur</td>
<td>82.95</td>
<td>18.62</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Raipur Jattan</td>
<td>89.14</td>
<td>21.16</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Reke</td>
<td>89.96</td>
<td>21.24</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Bherampur</td>
<td>89.14</td>
<td>15.62</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Bhandh</td>
<td>91.36</td>
<td>21.69</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Bhapra</td>
<td>81.22</td>
<td>26.22</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Kavi</td>
<td>83.89</td>
<td>18.22</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Kard</td>
<td>93.92</td>
<td>15.44</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Rake</td>
<td>79.76</td>
<td>12.22</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>Jaisinghpur</td>
<td>85.54</td>
<td>19.66</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>Chiraw</td>
<td>79.74</td>
<td>14.95</td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>Jani</td>
<td>79.96</td>
<td>8.77</td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>Shekpura</td>
<td>91.77</td>
<td>16.22</td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>Pujjam</td>
<td>86.54</td>
<td>16.72</td>
<td></td>
</tr>
</tbody>
</table>
CHAPTER IV

CHARACTERISTICS OF FARM INNOVATORS
CHARACTERISTICS OF FARM INNOVATORS

Here, an attempt is made to describe briefly the personal, economic and psychological traits of farm innovators.

(4) PERSONAL PROFILE:

A large number of farm innovators were middle aged (62 per cent), had agriculture as main occupation, (89 per cent) and almost 95 per cent of them belonged to upper caste. Their social participation and knowledge pertaining to dairy as well as agriculture is at a low profile. An overwhelming majority of the farm innovators possessed medium education status. An apparent improvement in the educational score of a member of families when all of them taken together was explainable by the fact that the facilities of education are becoming available in the rural areas as also universalization of education which is making it possible for the younger generation to come up with higher education. If the elderly persons in
the family missed the opportunity of schooling due to inadequacy of schools during their younger age, they did not want the new generation to be deprived of this opportunity.

The study indicates that Agriculture has emerged as a main occupation. However, considerable importance has also been placed in services as their supplementary occupation. A large number of Farm Innovators are found having low knowledge of Dairying as compared to Agriculture. It clearly emphasise the need of educating dairy farmers who have yet to go a long way. The extension educators and development agencies have to strive hard to communicate scientific knowledge so that it is accepted and utilized by all section of the rural society. It is, therefore, suggested that efforts should be made with farm community to improve their knowledge level with regards to dairy innovations so that they may participate in dairy development programmes for their own upliftment with better understanding and in a purposeful manner.

(1) Age:

The data in Table 4 reveal that mean age of farmers was around 49 years which ranged from 23 to 76 years. This indicates that farming as a profession was mastered
<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Characteristic</th>
<th>Categories</th>
<th>Score</th>
<th>Frequency</th>
<th>Percentage</th>
<th>&quot;r&quot; value with Innovativeness</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Age</td>
<td>Young</td>
<td>23-35</td>
<td>12</td>
<td>24.64</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Middle</td>
<td>36-50</td>
<td>33</td>
<td>62.26</td>
<td>-.371**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Old</td>
<td>61-70</td>
<td>8</td>
<td>15.09</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Occupation</td>
<td>Agri. As Main</td>
<td>-</td>
<td>47</td>
<td>88.68</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>occupation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Service as main</td>
<td>-</td>
<td>6</td>
<td>11.32</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>occupation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Caste</td>
<td>Schedule</td>
<td>1</td>
<td>2</td>
<td>3.77</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Backward</td>
<td>2</td>
<td>1</td>
<td>1.89</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Upper</td>
<td>3</td>
<td>50</td>
<td>94.34</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Education</td>
<td>Illiterate</td>
<td>0</td>
<td>5</td>
<td>9.43</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Upto Primary</td>
<td>1-3</td>
<td>8</td>
<td>15.09</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Upto Hr.Sec.</td>
<td>4-5</td>
<td>18</td>
<td>33.96</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Graduate and above</td>
<td>6</td>
<td>22</td>
<td>41.51</td>
<td></td>
</tr>
</tbody>
</table>

...cont
<table>
<thead>
<tr>
<th></th>
<th>2.</th>
<th>3.</th>
<th>4.</th>
<th>5.</th>
<th>6.</th>
<th>7.</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Family Education status.</td>
<td>Illiterate</td>
<td>0</td>
<td>5</td>
<td>9.43</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Moderately literate</td>
<td>112-282</td>
<td>5</td>
<td>9.43</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Literate</td>
<td>202-617</td>
<td>34</td>
<td>64.15</td>
<td>.361##</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Highly literate</td>
<td>672-1000</td>
<td>9</td>
<td>16.99</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. No. of Adults.</td>
<td>Small</td>
<td>2.0-3.28</td>
<td>12</td>
<td>22.64</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>3.92-7.50</td>
<td>35</td>
<td>66.04</td>
<td>-.369##</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Large</td>
<td>7.59-11.0</td>
<td>6</td>
<td>11.32</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Social participation.</td>
<td>Low</td>
<td>1-2</td>
<td>35</td>
<td>66.04</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>3-4</td>
<td>7</td>
<td>13.21</td>
<td>.205</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>5-6</td>
<td>11</td>
<td>20.75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Knowledge in dairying.</td>
<td>Low</td>
<td>5-12</td>
<td>9</td>
<td>16.98</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>13-16</td>
<td>39</td>
<td>73.58</td>
<td>.278#</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>17-18</td>
<td>5</td>
<td>9.43</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>26-32</td>
<td>31</td>
<td>58.49</td>
<td>.298#</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>33-35</td>
<td>13</td>
<td>24.52</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

...cont
(Table 4 continued)

<table>
<thead>
<tr>
<th></th>
<th>1.</th>
<th>2.</th>
<th>3.</th>
<th>4.</th>
<th>5.</th>
<th>6.</th>
<th>7.</th>
</tr>
</thead>
<tbody>
<tr>
<td>10. Herd size</td>
<td>Small</td>
<td>1.5 - 5.31</td>
<td>5</td>
<td>9.43</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>5.32 - 11.72</td>
<td>41</td>
<td>77.36</td>
<td>.274*</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Large</td>
<td>11.73 - 16.50</td>
<td>7</td>
<td>13.21</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Operational Farm size</td>
<td>Small</td>
<td>2.0 - 6.0</td>
<td>3</td>
<td>5.66</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>7.0 - 08.0</td>
<td>47</td>
<td>88.68</td>
<td>.278*</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Large</td>
<td>49.0 - 120.0</td>
<td>3</td>
<td>5.66</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Achievement Motivation</td>
<td>Low</td>
<td>3 - 4</td>
<td>9</td>
<td>16.98</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>5 - 7</td>
<td>20</td>
<td>37.73</td>
<td>.198</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>8 - 9</td>
<td>24</td>
<td>45.28</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Economic Motivation in Dairying</td>
<td>Low</td>
<td>3 - 4</td>
<td>9</td>
<td>16.98</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>5 - 7</td>
<td>40</td>
<td>75.47</td>
<td>.279*</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>8 - 9</td>
<td>4</td>
<td>7.55</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. Economic Motivation in Agriculture</td>
<td>Low</td>
<td>5.6 - 6.51</td>
<td>5</td>
<td>9.43</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>6.52 - 9.49</td>
<td>41</td>
<td>77.36</td>
<td>.288*</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>8.50 - 9.00</td>
<td>7</td>
<td>13.21</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Risk Preference</td>
<td>Low</td>
<td>27 - 32</td>
<td>11</td>
<td>20.73</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>33 - 39</td>
<td>32</td>
<td>60.38</td>
<td>.293*</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>40 - 42</td>
<td>10</td>
<td>18.87</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.</td>
<td>2.</td>
<td>3.</td>
<td>4.</td>
<td>5.</td>
<td>6.</td>
<td>7.</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>16. <strong>Fatalism—Scientificism.</strong></td>
<td>Fatalistic</td>
<td>5 - 9</td>
<td>5</td>
<td>9.43</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Transitional</td>
<td>10 - 15</td>
<td>43</td>
<td>91.13</td>
<td></td>
<td></td>
<td>.273*</td>
</tr>
<tr>
<td></td>
<td>Scientific</td>
<td>16 - 19</td>
<td>5</td>
<td>9.43</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 17. **Attitude towards Da
rising.** | Low | 8 - 12 | 11 | 20.75 | | | |
|   | Medium | 13 - 18 | 29 | 54.72 | | | .217 |
|   | High | 19 - 24 | 13 | 24.53 | | | |
| 18. **Attitude towards Agri
culture.** | Low | 5 - 23 | 3 | 5.66 | | | |
|   | Medium | 24 - 39 | 46 | 85.79 | | | .234 |
|   | High | 40 - 60 | 4 | 7.55 | | | |
| 19. **Empathy** | Low | 0 - 4 | 6 | 11.32 | | | |
|   | Medium | 5 - 9 | 30 | 73.58 | | | .176 |
|   | High | 10 - 15 | 8 | 15.09 | | | |

**Note:** Occupation, Castes and Education variables were not run for working out the correlation.

* Indicates significant at 0.05 level of probability.

** Indicates significant at 0.01 level of probability.
by middle aged farmers. Since farming demands a good deal of managerial skill coupled with physical fitness, it suited the middle aged farmers. It may be due to the fact that those who are young may be too immature and those who are elderly may be too weak to patronise farming.

Farming like any other occupation involve people of various age groups. It is said that old age people are conservative to younger ones and younger generation is generally associated with receptivity to change. The present study has indicated negative highly significant relationship between age of the farmer and farm innovativeness. However, the result of regression analysis as shown in Table 6.1 indicates negative significant regression coefficients (p < 0.01) of the farm innovators. The premise that younger farmers are comparatively more innovative, progressive and receptive to new ideas than older ones is due to the reason that the elders usually find it difficult to change from age old traditions as they are probably less proactive and more ethical in their attitudes and values.

In consonance with these findings, Kerridge (1978) reported that older farmers on small farms tended to be value farming as a way of life and were not prepared to
leave farming even when the income was low. Chauhan (1979) found negative non-significant regression coefficient between age and modernity level of milk producers. There is a great range of diversity of relationship between age and adoption as there are many studies reported for and against the relationship of age to adoption. The exact influence of age on adoption is, therefore, still a field that needs greater and wider explorations.

(2) Occupation

The perusal of Table 4 reveals that almost 89 per cent of the respondents have agriculture as their main occupation which accounted for their main source of livelihood. However, remaining 11 per cent innovators are found to have wage employment as their main occupation who view farming as an avocation.

It is, thus, evidently clear that occupation of the respondents as such has greatest bearing on Farm Innovativeness. This may be due to the fact that the nature of occupation is certainly the result of predispositions and initiative of the farmer which leads in excellency of enterprise and innovativeness.

Chauhan (1979) reported positive and highly significant relationship between occupation and adoption of dairy farming technology and milk production days in
a year. Tyagi (1979), likewise, reported occupation to be significantly related with adoption of dairy technology. These studies, therefore, extend their support to the present findings.

(3) Caste

The table 4 clearly shows that farm innovators normally come from upper caste group. Only 3.77 per cent schedule castes were found to be innovators and 1.88 per cent backward caste farmers. It may be due to the fact that such respondents preferred to remain in traditional caste occupation as labourers.

The caste is one of the oldest and elaborate ascriptive system in the world. The rural social system is inconceivable without caste. It is most important institution which influences most of the aspects of life. It is one of the important themes in any discussion on economic resource development and growth. The caste undoubtedly is an important aspect of traditional social structure of Indian villages (Shrinivas, 1962).

Hundal (1976), and Sohi (1978) found high correlation between caste and adoption of improved dairy practices. Similarly, Bose (1961) and Trivedi (1963) found that farmer's caste is positively related with adoption of improved farm
practices. The findings of this study, therefore, are no exception on account of caste.

(4) **Education**

It can be observed from table 4 that a large percentage of respondents i.e. 49 per cent were educated up to Higher Secondary level. It is noteworthy to mention that farm innovators in general are from educated class of rural society as 90 per cent of them were found to be literate.

Education is generally believed to have the effect on widening the mental horizon of a person and thereby proposes him to be receptive to new ideas. The results as presented in table 4 reveal positive and highly significant relationship between education level of farmers and their innovativeness. It may be due to the reason that complex process of farm adoption assumes a series of interpretations and interdependent transformation at the level of personality. Education is important facilitation of innovativeness as it seeks to promote knowledge and develop skill, both of which seem to be essential for furtherance of goals of adoption. At the same time, some of the indirect consequences such as building up associational capacity, sharpening problem
solving abilities, values change and economic rationality are also not without significance in their relationship with education. By enlarging cognitive map, education redefines and resets economic and cultural goals which is necessary and functional for adoption process.

The contemporary education has emerged as an agent of innovativeness because its contents are liberal and exotic which are consent in modern scientific world, which leads to mobilization of farmers aspirations. The "Adult Education Programme" has been started by the Government of India with an objective that literacy is key to national development.

Rogers and Svenning (1969) reported functional literacy to be related to modernization variables. Most of the studies in the field of adoption asserted education as one of the most important factors which accelerated adoption of scientific farm practices.

However, Nachmias (1977) and Chouhan (1979) reported no association between modernity and education. Absence of such an influence of education on modernity as reported by Nachmias (1977) and Chouhan (1979) appears at the first sight as paradoxical. Whereas Sandhu and Allans (1974), and Singh (1976) found education to be
significantly related to agricultural modernization (Innovativeness).

(5) Family Education Status:

It is not enough to take into account the education status of the head of a family, who of course, is definitely the main decision maker. Rather, a fuller and more accurate passport of the influence of education on innovativeness can be had, if the education status of the family is taken into account. It is conceivable because it is quite a familiar phenomenon in the present day rural scene in India where head of the family may be completely illiterate but there may be several moderately or even highly educated members in the family. The influence of these educated members of a family on the decision making process is a foregone conclusion. Accordingly, therefore, the data were collected for the education status of the entire members of the respondent families.

Like education level of farmers as head of the family, his family education score also showed a consistent significant correlation table 4 with farm innovativeness ($p < 0.05$). It may be due to the fact that farming is, more or less, a family enterprise and hence increased
family education status leads to enhanced capacity of the family to obtain knowledge through their access to printed words.

Choukidar and George (1972) found family education score to be positively related to adoption score. Muley and Roy (1973) reported that farmers with more education in the family had high socio-economic status and participation in mass media and formal organization. These studies substantiate the present investigation.

(6) Number of Adults in a Family:

On an average, family size as per the number of adults a farmer had is approximately of five members with a range of 2 to 11. Hardly 11 per cent were found to have number of adults in a family of more than 8 members.

It is believed that number of adults in a family hold a place of significance in rural Indian society as a unit of social action and agricultural operations. It was seen by negative highly significant correlation and regression coefficients indicating lesser the number of adults in a family higher is the innovativeness.

The feeling that more hands may be helpful in farming may be true but the belief that it would also lead to
innovative behaviour is not supported by the present study. The scrutiny of studies in the field of adoption shows no consistency about exact nature of interplay between family size and adoption of improved farm practices. It can, therefore, be concluded that larger family need not lead to higher innovativeness.

(7) **Social Participation**

The social participation of the farm innovators was found to be low as indicated by mean value of 1.438. Majority of respondents, i.e., 66.03 per cent are found to share with a low social participation. About 20.75 per cent being on high social contact reveals a particular characteristic of farmers to be innovative. However, social participation is worked out to have been in a positive relationship with innovativeness as is evident by the \( r \) - value (0.205), but not significant.

It is believed that farmer's participation in activities of formal organizations exposes him to secondary group atmosphere where emphasis is placed on science and rational decisions. These institutions are meant for better harnessing the community resources in order to solve problems pertaining to modern times. As such those farmers who participate more in such
institutions and organizations develop favourable and liberal value orientations towards improved ideas and scientific innovations.

The present finding is in consonance with that of Alos (1971) who found significant relationship between social participation and adoption of farm practices. There are some seventeen studies which reveal significant relationship between social participation and adoption of practices. Nevertheless, there are some studies, to quote a few, Dhaliwal (1970), Bhtia (1974) and Sohi (1978) wherein social participation has somehow not been found to be associated by adoption.

(8 & 9): Knowledge about Dairying and Agriculture:

The majority of farmers (73.58 per cent) acquired only a sort of medium knowledge pertaining to Scientific Dairy Farming practices. The mean knowledge score was found to be 14.83 ranging from 5 to 18. Since innovators are supposed to be on the upper crust of information receiving system, this study found only 9.43 per cent of this trend in dairying.

The farmers were, however, better informed about agricultural technology than the dairying. As was expected, knowledge component of farming technology
recorded positive and significant correlation and
regression coefficient with farm innovativeness. It
can, therefore, safely be inferred that increase in
knowledge of innovation may lead to higher level of
adoption. - The Innovators.

In adoption studies, Kumar (1975), Singh (1976),
Rath (1977), Tyagi (1979) and Chouhan (1979) have
also reported significant relationship between knowledge
and adoption of farm technology.

(b) Economic Profile:

Economic characteristics play significant role as
they indicate farm setting and economic viability of
farmer. It was observed in the present study that
farm innovators possessed a herd size of twelve milk
animals and operational land holding of 7 acres to
46 acres.

Gill and Gill (1974) in an analysis of economic
and social changes through dairying in I.C.D.P.
Ludhiana observed that average number of milk animals
with small farmers were five. Chouhan (1979) found that
80 per cent of milk producers were keeping one to five
animals. Desai and Patil (1974) also reported that
more than one-third of sample of primary milk producers in Kaira District and one-fourth of sample from Mehsana District were small farmers.

(10) **Herd Size**

It was observed that majority of the farmers (77.367 per cent) had medium herd size consisting of five to six milch animals. The average milch animals of respondents were 8 but it ranged from 1.5 - 16. Only about 13.20 per cent farmers had more than 11 milch animals.

The amount of milk production is directly related not only to number of milch animals but also to their breed and other attributes. Herd size has shown positive and significant relationship with Dairy Innovators. The reason for this phenomenon of relatively higher innovativeness among respondents of bigger herd size is explainable by the logic that those who own larger herd would be in a better position to utilize the newer innovations to a larger extent than those who own similar number of milch animals.

In adoption studies, Prashad, Shukla and Sohal (1970), Sinha (1970), Hundal (1976), Gupta (1976), Kapoo (1976),
Kumar (1976), Malik (1978), Sohi (1978) and Singh (1980) found hard size to be positively related with adoption of dairy practices.

(11) Operational Farm Size:

In case of operational farm size, 83.679 per cent of farmers had medium operational area, followed by 5.660 and 5.66 per cent of farmers with small and larger operational area respectively. The mean operational area was 27.53 acres with a range of (2 - 120 acres).

In brief, it can be said that farming as a profession has been patronised by those who had medium hard size and medium operational holding.

Developing agricultural land has esteem value as unit of farm production. However, there are conflicting results regarding its relationship with farm innovativeness. The findings expressed that land resources significantly play an important role in farm innovativeness especially when crop production is the main occupation of farm innovators.

The adoption studies in dairying also present overlapping results. Hundal (1976) and Gupta (1976) reported
positive significant relationship between farm size and adoption of dairy practices, whereas, Chander (1970) indicated negative relationship. However, Saini et al. (1977) revealed non-significant relationship.

(C) PSYCHOLOGICAL PROFILE:

Although the success of planned change through science and technology seeks to alleviate human suffering, eradicate poverty and ignorance among masses in general and weaker section in particular, yet it considerably depends upon several psychological and social factors rather than economic factors alone. Rostow (1960), Leiris (1962), and Mydral (1968) agreed to the fact that planning for economic development in under-developed countries must consider several psychological factors operating within individual and the group.

It was observed in this study that a large number of respondents had high achievement Motivation followed with Economic Orientation. This obviously indicates that necessary psychological input and atmosphere lacked among these farmers for taking up challenging tasks for economic rationality as a source of high economic gains. Gupta (1976) found satisfactory level for economic and
achievement motivation in milk producers of I.C.R.P., Karnal.

The mean values of fatalism - scienticism and risk preference indicate that bulk of the farmers have medium risk taking potentials and are passing through a transitional phase from fatalism to scienticism. They are partly fatalistic and partly scientific. The mediocre risk preference is due to the realization that risk of innovations is high particularly on small farm unit and that too at early stages of commercialization of dairying.

The additional cash cost involved may seem quite small but in the context of operation, where few production inputs have been purchased in the past, these may seem very large which lead to poor risk preference by them. The lower psycho-characteristics of farmers emphasised a need for educational strategy to create a sound consciousness in the form of these psycho inputs at individual level (system) which may inculcate a desire for better life accompanied by desire for personal and social efficacy and standard of excellence in preference through change. The farmers with low concern for standard in life and poor psychological orientation are likely to
run away from challenges and thus may in turn to be inhibitor for development.

(12) **Achievement motivation**

The data presented in table 4 clearly indicate that 45.28 percent of farmers had high achievement motivation. The mean score (7.64) falls in high category which showed a trend of having good deal of predisposition to achieve something excellent in relation to dairy and agriculture business. About 16.98 percent of farmers had low achievement motivation for dairy and agricultural enterprise.

Achievement motivation was found to have positive relationship with farm innovativeness (table 4). The farmer with high intensity of achievement motivation is not necessarily more gifted than other farmers who are low in this trait of achievement motivation but it is his attitude and orientation that enables him to make more effective use of his abilities to try and use new ideas. The achievement motivation is such a trait which is easily susceptible to manipulation. It is now claimed that it can safely be incorporated through appropriate training, McClelland (1961).
The present finding is in agreement with that of Neil and Rogers (1963) who postulated that farmer's achievement motivation leads to individual excellence in farming. The studies in adoption of farm practices as reported by Pareek (1968), Roy et al. (1968), Rogers and Svenning (1979), McClelland and Winter (1969), Singh (1970), Sinha (1970), Gupta (1976), and Mishra (1979) have also yielded similar results.

(13 & 14) Economic Motivation:

The distribution pattern of scores on economic motivation suggests that majority of innovators had mediocre motivation for economic gains in agriculture as also in dairy profession. The mean and range values further indicate at least some good sprouting trend among the farmers for economic gains in farm enterprises.

A significant correlation ($r = 0.05$) was recorded between economic motivation and farm innovativeness (Table 4). It may be due to the fact that innovator high on economic motivation would have more willingness and propensity for the investment of available resources in farming.

The present study is in agreement with that of Singh (1969), Supe (1969), Singh & Sohal (1970), Gupta (1976),
Rao et al. (1971), Tyagi (1979) and Singh (1980) who consistently reported significant relationship between economic motivation and adoption of practices.

(15) **Risk Preference**

The maximum percentage of respondents (60.33 per cent) was found to have mediocre risk willingness potential. The mean 35.79 indicates that majority of the respondents fall under medium risk taking orientation.

The risk preference has shown significant positive relationship (P 0.05) with innovativeness (Table 4). The underlying reasons for this relationship is not difficult to locate. Innovativeness is not a simple matter for farmer who are long accustomed to perform operations strictly by traditional ways. Further, old ways practised for generations are likely to be considered invincible. Belief about their rightness is taken as much for granted as the "air people breath". Innovativeness, in a way, is a distinct departure from routine and age old ways of doing the things, for, it involves risk taking, reliance on change agents, careful planning, systematic work and capacity for organization. There is thus nothing surprising if risk preference score of the respondents has shown a highly significant correlation with innovativeness.
The present finding stands in conformity with several adoption studies which observed that risk willingness is related to adoption behaviour as asserted by Jaiswal (1965), Ram Chandran (1969), Singh (1969), Singh and Sohal (1970), Jaiswal et al. (1971), Choubey (1974), Singh (1980) and Sarkar (1981). However, it is contrary to the findings of Sachchidananda (1972) who reported negative significant relationship between risk preference and adoption.

(16) Fatalism - Scienticism

The fatalistic belief was found to be less among dairy farmers as only 9.43 per cent of them fall in this category. The striking feature of this variable study is that 81.13 per cent innovators are in transitional phase. Equally, 9.43 per cent of them on scientific orientation. The mean (10.62) indicates that majority of the farmers are lying in transitional orientation from fatalism to scienticism.

There was positive relationship (P 0.05) between fatalism-scienticism and level of innovativeness table 4. It can, therefore, be stated that higher the scientific orientation, higher is the possibility of his being innovative. Generally speaking, scientific orientation develops a favourable mental antidote for dogmas and superstitions. It is frequently observed with average
Indian Farmer. Scientifically oriented mind of an innovator makes use of more diversified sources of information which equips him with the detailed know-how of an innovation. On the contrary, fatalistic individual believes that events of their lives are predetermined and preordained by fate or super natural power which acts as a barrier to adoption of innovation. Theoretically speaking, the belief in fate reduces initiative and innovativeness and thus serves as dysfunctional to the efforts for progress.


(17 & 18) **Attitude Orientation towards Agriculture and Dairying**

A close look of the data in table 4 indicates that majority of the farmers have built a mediocre type of attitude towards Dairying and Agriculture as a profession. However, positive orientation of attitude towards agriculture is pronounced more as compared to dairying.
Substantial proportion of farm innovators is still low on building favourable attitude towards dairying. It clearly shows that we need to concentrate more on dairy aspect of farm enterprise so that farm innovator could favourably take interest in it too.

The results of the investigation have revealed that favourable attitude towards farm enterprises has significant influence on adoption and the relative strength of all the variables under study. A favourable attitude leads relatively to high adoption as well as high strength of recognition, economism, scienticism, affiliation and achievement and lower strength of security. It is, therefore, concluded that by manipulating the attitude towards farming, the level of adoption can be increased among the farmers.

The results are in line with the findings of Chaukidar and George (1975) who reported that farmers held favourable attitude towards the consumption of high yielding varieties. Similarly, Arvind Chandra et al. (1975) noted that there were significant differences among the students in their attitude towards various positive and negative aspects of family planning. Sohi (1978) who concluded that farmer had favourable attitude towards adoption of dairy practices.
(19) **Empathy**

The data in Table 4 reveal that approximately 89.00 per cent a majority of innovators had the capacity to project themselves in other man's shoe. It is surely a character to be reckoned with where an innovator can play other man's role with substantial perfection. It, therefore, can be inferred that farm innovators have a projecting potential for predicting other's behaviour.

The results are in agreement with Hundal (1976), Sohi (1978) and Tyagi (1979).
CHAPTER V

FARM INNOVATORS AND ATTRIBUTES OF INNOVATIONS
FARM INNOVATORS AND ATTRIBUTES OF INNOVATIONS

All innovations can not be regarded as similar or equivalent in their capacity to induce change in the potential adopting units. Any given innovation or technology in some manner includes ideational attributes with or without material or artifactual component (Barnett, 1953 and Coughenour, 1965). Therefore, it should not be assumed, as has often been done in the past that all innovations are equivalent units of analysis. This is a gross over simplification cautioned Rogers (1973). Based on the theoretical construct, it was postulated in the frame work of this study that Farm Innovators are the function of Attributes of Innovations.

Throughout this chapter we shall emphasis that it is the receivers' perceptions of the attributes of innovations and not attributes as classified by experts or change agents.
Characteristics of farm innovations, therefore, make a positive dent in influencing a person to adopt a particular innovation at the earliest possible time and thus become an innovator. For instance, it is the economic profitability of the innovation that makes one to lead as innovator in his social system. Similarly, it is complexity of the innovation that may possibly make one reluctant to become an innovator because the technology is difficult to understand and make use of it. In the present study, this idea was put to test and it was seen as to whether a farmer is innovator because of perceived attributes of the innovation. The study further made an attempt to find out which of the characteristics of innovation is most important in influencing a farmer to become innovator.

Six different attributes of innovations are described. Each of these is somewhat empirically interrelated with each other; although they are conceptually distinct. Selection of these six characteristics is based on past researches. What is needed is a comprehensive set of characteristics of innovations which are mutually exclusive and as universally relevant as possible. The six attributes of innovations are:
1. Simplicity / Complexity.
2. Communicability/ Observability.
3. Profitability.
4. Physical Compatibility.
5. Cultural Compatibility.
6. Divisibility /Trialability.

Each of these attributes have been discussed in detail in the following section of this chapter.

(1) Simplicity/Complexity:

It is the degree to which an innovation is perceived as relatively complex or simple to understand and use. Any new idea may therefore be classified on complexity/simplicity continuum. Some innovations are clear in their meaning to potential adopters, other are not. Some of them may be easy to use as they involve simple change. There are others which may be difficult to use as they require changes in the skill and operations etc.

The simplicity of an innovation was measured by the scale developed by Roy (1966) presented in the (Appendix III). The table 5.1 reveals that majority of (67.92 per cent) of the innovators perceived innovation neither easy nor difficult.

As is evident from table 5.2 in case of dairy innovations, there is positive relationship with farm
innovativeness whereas in agriculture the relationship is negative non significant between simplicity and farm innovativeness. Thus, it indicates that agricultural innovations have been perceived as complex than dairying may be because of advancement in agricultural technology and vast scientific development in Agriculture.

(2) Communicability/Observability:

It is the degree to which the results of an innovation are visible. The results of some ideas are easily observed and communicated to others, whereas some innovations are difficult to describe to others. There are some practices which show spectacular results, i.e., their beneficial responses are most apparent visible and evaluable.

The observability of an innovation was measured on a five point continuum scale developed by Roy (1966), Scale is given in the (Appendix III). The table 5.2 reveals that majority of (64.15 per cent) of the innovators perceived the innovations as communicable having no problem of special nature. However, the Dairy innovations have been perceived better than agricultural innovations as indicated by higher frequency of occurrence.
It can, therefore, be generalized that farm innovators are those who are able to receive or perceive the innovation at the earliest and thus whose results are visible.

The results of coefficient correlation with the farm innovativeness indicate a significant relationship with communicability as a variable in both Dairying and Agriculture at 5 per cent level of significance. This indicates that greater the innovation being communicable greater is the chance that a person becomes innovator as is indicated by the r-value being 0.299 significant at 5 per cent level of probability.

<table>
<thead>
<tr>
<th>Attributes</th>
<th>Innovations</th>
<th>Dairying</th>
<th>Agriculture</th>
<th>Pooled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complexity/ Simplicity.</td>
<td>0.0150</td>
<td>-0.0764</td>
<td>-0.0459</td>
<td></td>
</tr>
<tr>
<td>Communicability/ Observability.</td>
<td>0.2890*</td>
<td>0.2819*</td>
<td>0.2997*</td>
<td></td>
</tr>
<tr>
<td>Profitability</td>
<td>0.1891</td>
<td>0.3127*</td>
<td>0.2913*</td>
<td></td>
</tr>
<tr>
<td>Physical Compatibility.</td>
<td>0.1231</td>
<td>0.0624</td>
<td>0.0674</td>
<td></td>
</tr>
<tr>
<td>Cultural Compatibility.</td>
<td>0.0284</td>
<td>0.0657</td>
<td>0.0532</td>
<td></td>
</tr>
<tr>
<td>Trialability/ Divisibility.</td>
<td>0.289*</td>
<td>0.1965</td>
<td>0.2728*</td>
<td></td>
</tr>
</tbody>
</table>

*Indicates significant at 5 per cent level.
(3) **Profitability**

It is the degree to which an innovation is perceived as profitable than the one it supersedes. By profitability we mean the additional gain in terms of yield and/or money which one gets in using an improved practice over traditional one. Considering from this point of view, profitability was measured by the scale developed by Roy (1966) given in the appendix III.

The scores were categorised into high, medium and low by using mean and standard deviation. It was noted that farm innovators' perceived the profitable dimension of an innovation more easily as compared to communicability as indicated by higher percentage of responses in table 5.1.

The correlation value of farm innovativeness with profitability by zero-order correlation is 0.2915 which is significant at 5 per cent level of probability. It indicates that in general farm innovativeness is a function of profitability of an innovation. However, it is further seen that profitability with farm innovativeness in Dairying does not have a significant relationship whereas it is highly significant in case of Agriculture. It indicates a clear preference of agriculture
over dairying. In profitability terms, agriculture innovations are perceived to be more profitable while superseding the old idea by new one. This trend, however, does not come true in dairying.

(4) **Physical Compatibility:**

It is the degree to which an innovation is perceived as consistent with the need and the situation of adopters. Physical compatibility ensures greater security and less risk to the receiver and makes the new idea more consistent with the needs of innovators. It was measured on a five point continuum scale developed by Roy (1966) given in the appendix III.

The coefficient of correlation between farm innovativeness and physical compatibility indicates a very low value i.e. 0.067. This indicates a non-significant relationship of physical compatibility with dairying and agricultural innovation with farm innovativeness. Thus, it shows that physical compatibility of an innovation did not play any role in the creation of the innovators. This is in agreement with the finding of Singh (1976).

(5) **Cultural Compatibility:**

It is the degree to which an innovation is perceived as consistent with the existing values, past experiences,
and needs of the receivers. An idea that is not compatible with the salient characteristics of a social system will not be adopted so rapidly as an idea that is compatible. An innovation may be compatible (1) with socio-cultural values and beliefs (2) with previously introduced ideas, and (3) with client need for innovation.

It was attempted in the present study to see as to whether innovators cultural values play any role in the adoption of farm innovations. The cultural compatibility of an innovation was measured on a five point continuum scale developed by Roy (1966) given in the appendix III.

The data in the table 5.2 indicate that (67, 92 per cent) of the innovators perceived the innovation as culturally compatible to use and adoption. The compatible of innovation paves the way for later less compatible innovation.

An innovation may be compatible not only with deeply imbeded cultural values but also with previously adopted ideas. Compatibility of an innovation with a preceding idea can either speed up or retard its rate of adoption. Old ideas are the main tools with which new ideas are assessed. One can not deal with an innovation except on the basis of the familiar and old fashioned.
The coefficient of correlation between farm innovativeness and cultural compatibility of an innovation shows a non significant positive relationship, as is evident from table 5.1. It means cultural compatibility plays no role in making a farmer as innovator. As is also supported by Singh (1976).

(6) Divisibility/ Trialbility:

It is the degree to which an innovation may be experimented on a limited scale. New ideas that can be tried on instalment plan will generally be adopted more rapidly than innovations that are not divisible to use. An innovation that is triable is less risky for the adopters. Some innovations are more difficult than others to divide for trial.

The more innovative individuals have no precedent to follow at the time they adopt, while the later adopters are surrounded by peers who have already adopted the innovations. These peers may act as a psychological or vicarious trial for the late adopters and hence the actual trial of a new idea is of less significance for them.

The results of the table 5.2 indicate that 90.57 per cent of innovators first try the innovation before
actual adoption. It is also evident by the positive significant values of coefficient of correlation between farm innovativeness and trialability as indicated in table 5.1.

Although the positive relationship is well established in both agriculture and dairying yet it is only in the field of dairying where trialability is exercised the most as the resultant value of \( r = 0.289 \) is significant enough. It may be because dairy innovations require heavier capital investment involving risk element. This trend, however, cannot be established in agriculture as the \( r = 0.1965 \) is not significant.

The data of table 5.1 give us a concluding finding that all the six attributes of innovation do not make significant dent in influencing a person to adopt a particular innovation at an earliest possible time. On the contrary, in general, there are only three characteristics of innovation, i.e. observability, profitability, and trialability which can be reported as determinant for one to become an innovator. In other words, these three characteristics are mainly responsible for making a farmer to play role of an innovator in the village society.

However, this generality is not true in case of dairy innovators that tee with profitability of
innovation. It means profitability of innovation does not play any role in making a dairy farmer to become innovator. Similarly, in case of agriculture, triability carries no importance in making a person agricultural innovator. It means even if agricultural innovation is fit for experimentation on instalment basis, it does not account for leading a farmer towards innovativeness.

We can, therefore, safely say that it is only "observability" of innovation which mainly causes a person to play the role of farm innovator in rural social systems. In other words, if the results of an innovation are observable and quickly communicable, then it becomes an instant motive force for the farmers to adopt it within no time.

Roy (1966) concluded that more simple, less costly and more profitable, more communicable, more copatible, more labour saving a practice perceived by the farmers higher and quicker is the likelihood of its adoption. Singh (1976) concluded that the best characteristics perceived by the farmers was divisibility and cost of innovation. These studies are in agreement with the present findings.
Table 5.2: Distribution of Farm Innovators with Respect to Different Attributes of Innovations.

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Attribute</th>
<th>Category</th>
<th>Dairying</th>
<th>Agriculture</th>
<th>Pooled Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Complexity</td>
<td>Highly complex</td>
<td>8 (15.09)</td>
<td>7 (13.21)</td>
<td>14.15</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Complex</td>
<td>34 (64.15)</td>
<td>33 (71.70)</td>
<td>67.92</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Least Complex</td>
<td>11 (20.75)</td>
<td>8 (15.09)</td>
<td>17.92</td>
</tr>
<tr>
<td>2.</td>
<td>Observability</td>
<td>Most visible</td>
<td>8 (15.09)</td>
<td>11 (20.75)</td>
<td>17.92</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Visible</td>
<td>37 (69.81)</td>
<td>31 (58.49)</td>
<td>64.15</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Least visible</td>
<td>8 (15.09)</td>
<td>11 (20.75)</td>
<td>17.92</td>
</tr>
<tr>
<td>3.</td>
<td>Profitability</td>
<td>Highly profitable</td>
<td>10 (13.87)</td>
<td>10 (18.87)</td>
<td>18.87</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Profitable</td>
<td>33 (62.26)</td>
<td>37 (69.81)</td>
<td>66.04</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Least profitable</td>
<td>10 (13.87)</td>
<td>6 (11.32)</td>
<td>15.09</td>
</tr>
<tr>
<td>4.</td>
<td>Physical Compatibility</td>
<td>Most suitable</td>
<td>7 (13.21)</td>
<td>9 (16.98)</td>
<td>15.09</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Suitable</td>
<td>42 (79.25)</td>
<td>37 (69.81)</td>
<td>74.53</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Least suitable</td>
<td>4 ( 7.55)</td>
<td>7 (17.21)</td>
<td>10.38</td>
</tr>
<tr>
<td>5.</td>
<td>Cultural Compatibility</td>
<td>Most compatible</td>
<td>6 (11.32)</td>
<td>10 (18.87)</td>
<td>15.09</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Compatible</td>
<td>37 (69.81)</td>
<td>35 (66.04)</td>
<td>67.92</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Least compatible</td>
<td>10 (13.87)</td>
<td>8 (15.09)</td>
<td>15.09</td>
</tr>
<tr>
<td>6.</td>
<td>Trialability</td>
<td>Divisible to use</td>
<td>48 (90.57)</td>
<td>48 (90.57)</td>
<td>90.57</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Not divisible to</td>
<td>5 ( 9.43)</td>
<td>5 ( 9.43)</td>
<td>9.43</td>
</tr>
<tr>
<td></td>
<td></td>
<td>use.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figures in bracket indicates percentages
CHAPTER VI

PREDICTION ANALYSIS FOR FARM INNOVATIVENESS
In the previous chapter, each independent variable has shown an amount of independent effect on the farm innovativeness. The relationship has been expressed by correlation coefficient. The effect, however, is not attributed by anyone of these variables but by all of them as a part of interdependent system through reciprocal and interactive relationships. Multiple correlation is often used as one method of predicting this type of relationship. The goal of multiple correlation is to explain a maximum of the variation in Dependent Variable - Farm Innovativeness. It also determines the relative contribution of each independent variable for causing effect in dependent variable through regression analysis. The degree of relationship between independent variables and dependent one was determined by using the following prediction equation:

\[ y = a + b_1 x_1 + b_2 x_2 \ldots \ldots \ldots \ldots b_n x_n \]

where,

\[ y = \text{Dependent variable - Farm Innovativeness.} \]
\[ a = \text{Constant} \]
\[ n = \text{Number of independent variables.} \]
\[ b_1 x_1 + b_2 x_2 + \cdots + b_n x_n = \text{the coefficient which appears in the equation representing the amount of change in 'y' that can be associated with a given change in one of the 'x's, while remaining independent variable held fixed.} \]
\[ x_1 = \text{Age} \]
\[ x_2 = \text{Number of adults in a family.} \]
\[ x_3 = \text{Farm size.} \]
\[ x_4 = \text{Education status.} \]
\[ x_5 = \text{Social participation.} \]
\[ x_6 = \text{House size.} \]
\[ x_7 = \text{Attitude towards dairying.} \]
\[ x_8 = \text{Attitude towards agriculture.} \]
\[ x_9 = \text{Knowledge in agriculture.} \]
\[ x_{10} = \text{Knowledge in Dairying.} \]
\[ x_{11} = \text{Economic motivation in Dairying.} \]
\[ x_{12} = \text{Economic motivation in agriculture.} \]
\[ x_{13} = \text{Achievement motivation.} \]
\[ x_{14} = \text{Scientism.} \]
\[ x_{15} = \text{Risk preference.} \]
\[ x_{16} = \text{Empathy.} \]
\[ x_{17} = \text{Simplicity.} \]
\[ x_{18} = \text{Observability.} \]
\[ x_{19} = \text{Profitability.} \]
\[ x_{20} = \text{Physical compatibility.} \]
\[ x_{21} = \text{Cultural compatibility.} \]
\[ x_{22} = \text{Divisibility.} \]

The prediction power of the Multiple Regression Equation was evaluated with the help of multiple correlation coefficient \( \hat{R} \) and square of multiple correlation coefficient \( R^2 \). Multiple correlation coefficient \( \hat{R} \) represents the zero-order correlation between actual innovativeness score and predicted innovativeness score obtained from independent variables under study. If the predicted score for each innovator would correspond exactly to his actual score, the multiple correlation coefficient would be unity, i.e., one. The square \( R \) represents the proportion of total variation explained by the independent variables in the regression equation taken together.
In order to find out relative importance of independent variables, statistical significance of each of the partial coefficients was determined; if it was significantly different from zero. Each partial regression coefficient which was found to be statistically significant was contributing more to the prediction of farm innovativeness than would be expected to result from chance variation. In this process, the respective independent variable which contributed the most to the prediction of farm innovativeness was determined. The formula used for testing the significance was as under:

$$ t = \frac{b_1}{\text{S.E. of } b_1} $$

where,

- $b_1$ = Partial regression coefficient.
- S.E. = Standard Error of that partial regression coefficient.

Regression equation was derived by including all the twenty two independent variables with a view to see the predictability of all the variables together. The resultant values are presented in table 6.1.
The computed $R^2 = 0.58$ indicates that when all the twenty-two variables taken together they explained variation to the extent of 58 per cent. In other words, these twenty-two independent variables are responsible for causing effect on the farm innovativeness to the extent of 58 per cent. It means that there is still 42 per cent variation left which is caused by some other variables not traced in this study.

The multiple $R = 0.76$ ($\sqrt{0.58}$) expresses the zero-order correlation. This value obtained from prediction of innovativeness scores from 22 independent variables was tested for significance by Analysis of Variance Value "$F$" as follows:

$$F_k,(n-k)-1 = \frac{R^2}{1-R^2} \times \frac{(n-k)-1}{k}$$

where,

$F$ = Analysis of Variance value.

$k$ = Number of independent variables.

$n$ = Number of respondents in the sample.

$$F_{22,(53-22)-1} = \frac{0.58}{1-0.58} \times \frac{(53-22)-1}{22}$$

$= 1.88$
The tabular value of $F$ with 20 and 30 degrees of freedom was 1.78. It meant that the calculated value of $F = 1.88$ is significant and hence supports the proposition that all these 22 independent variables explain significant amount of variation in farm innovativeness. The significance of $F$ value suggests the desirability of analysing the partial coefficient obtained in regression analysis. For this purpose, partial coefficients which were significant as tested by $t$-test were taken to explain the variation.

The results of $t$-values as shown in Table 6.1 indicate that out of 22 variables there are only 8 independent variables which are found significant. These are: $x_1 =$ Age, $x_2 =$ Family size of adult men, $x_5 =$ Social participation, $x_{11}$ and $x_{12} =$ Economic motivation, $x_{15} =$ Risk preference, $x_{18} =$ Observability, $x_{19} =$ Profitability, $x_{22} =$ Divisibility. The $t$-values of all these variables is more than tabular value of $t = 2.00$ ($P = 0.05$).

According to $t$-test, these variables contribute most to the prediction of farm innovativeness. It means the farm innovators role can be predicted by having high role in these 8 variables. In other words, younger age, smaller size of adulthood family, greater participation in social activities, high risk taking
orientation, and high economic motivation factors are mainly responsible for making a farmer as innovator in his social system.

In addition, there are three attributes of innovations, i.e., observability, profitability and divisibility which show significant contribution when taken together along with rest of the 19 variables. It means a farmer becomes innovator because his perception of these attributes of innovations is a positive orientation.

Broadly speaking, if the innovations communicability is relatively easy and quicker, if innovation is profitable than it supersedes, and if innovation can easily be put to trial on experimental basis then these attributes are pushing factors for a farmer to play the role of farm innovator in his village. These characteristics of farm innovations cause a farmer to become innovator. It, therefore, says that if we want to see that our innovations should be adopted and diffused at a faster rate, then it is imperative that these innovations should command observability, profitability and divisibility characteristics.

Based on these findings drawn through prediction analysis, a model is constructed for theory building.
Table 6.1: Multiple Regression Analysis of Independent Variables of Farm Innovators with Innovativeness.

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Independent Variables</th>
<th>Regression Coefficient</th>
<th>Standard error</th>
<th>t-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intercept Constant</td>
<td>338.7236</td>
<td>5.0301</td>
<td></td>
</tr>
<tr>
<td>x1</td>
<td>Age</td>
<td>-0.6109</td>
<td>0.2575</td>
<td>2.3726**</td>
</tr>
<tr>
<td>x2</td>
<td>No. of adults</td>
<td>-1.6009</td>
<td>0.7622</td>
<td>2.0995**</td>
</tr>
<tr>
<td>x3</td>
<td>Farm size</td>
<td>0.0520</td>
<td>0.0313</td>
<td>1.6899</td>
</tr>
<tr>
<td>x4</td>
<td>Education status</td>
<td>0.0007</td>
<td>0.0137</td>
<td>0.0490</td>
</tr>
<tr>
<td>x5</td>
<td>Social participation</td>
<td>2.2536</td>
<td>1.1006</td>
<td>2.0476**</td>
</tr>
<tr>
<td>x6</td>
<td>Hard size</td>
<td>-1.0055</td>
<td>0.9823</td>
<td>1.0236</td>
</tr>
<tr>
<td>x7</td>
<td>Attitude towards dairying</td>
<td>0.2579</td>
<td>0.5409</td>
<td>0.4767</td>
</tr>
<tr>
<td>x8</td>
<td>Attitude towards agriculture</td>
<td>0.0380</td>
<td>0.0621</td>
<td>0.6128</td>
</tr>
<tr>
<td>x9</td>
<td>Knowledge in Dairying</td>
<td>1.2950</td>
<td>2.1263</td>
<td>0.6090</td>
</tr>
<tr>
<td>x10</td>
<td>Knowledge in Agriculture</td>
<td>0.6142</td>
<td>1.0137</td>
<td>0.6039</td>
</tr>
<tr>
<td>x11</td>
<td>Economic motivation in Dairying</td>
<td>1.3547</td>
<td>0.6466</td>
<td>2.0951**</td>
</tr>
<tr>
<td>x12</td>
<td>Economic motivation in Agriculture</td>
<td>4.5733</td>
<td>1.9025</td>
<td>2.4040**</td>
</tr>
<tr>
<td>x13</td>
<td>Achievement motivation</td>
<td>-0.4959</td>
<td>0.7670</td>
<td>0.6465</td>
</tr>
<tr>
<td>x14</td>
<td>Scientism</td>
<td>0.2784</td>
<td>1.3664</td>
<td>0.2038</td>
</tr>
<tr>
<td>x15</td>
<td>Risk preference</td>
<td>1.5915</td>
<td>0.6703</td>
<td>2.3741**</td>
</tr>
<tr>
<td>x16</td>
<td>Empathy</td>
<td>1.1981</td>
<td>1.2245</td>
<td>0.9784</td>
</tr>
<tr>
<td>x17</td>
<td>Simplicity</td>
<td>0.2581</td>
<td>0.3931</td>
<td>0.6566</td>
</tr>
</tbody>
</table>

...cont
(Table 6.1 continued)

<table>
<thead>
<tr>
<th>No.</th>
<th>Independent Variables</th>
<th>Regression Coefficient</th>
<th>Standard Error</th>
<th>t-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>Observability</td>
<td>0.2415</td>
<td>0.1160</td>
<td>0.0812**</td>
</tr>
<tr>
<td>19</td>
<td>Profitability</td>
<td>0.2220</td>
<td>0.1077</td>
<td>2.0602**</td>
</tr>
<tr>
<td>20</td>
<td>Physical compatibility</td>
<td>0.4774</td>
<td>0.4053</td>
<td>1.778</td>
</tr>
<tr>
<td>21</td>
<td>Cultural compatibility</td>
<td>0.3088</td>
<td>0.3395</td>
<td>0.9095</td>
</tr>
<tr>
<td>22</td>
<td>Divisibility</td>
<td>0.0918</td>
<td>0.0407</td>
<td>2.2526**</td>
</tr>
</tbody>
</table>

\[ r^2 = 0.5841 \]

\[ F \text{ value} = 1.90** (22,30) \]

Multicollinearity = 3.1638

** Indicates Significant at 0.05 level of probability.

It is depicted in figure -2. In this paradigm, it is shown that there are only 8 variables which show substantial relationship with farm innovativeness. These 8 variables can predict 'who is supposed to be the farm innovator'. A farmer who is placed with higher value in these variables is definitely a farm innovator.
However, this prediction is true to the extent of 58 per cent; 42 per cent predicting ability is still left untraced. This may be infused in managerial ability, inputs availability, training factors and other psychological correlates which could not be delineated in this study.

**Relational Analysis of Correlates of Farm Innovativeness.**

It discusses the relationship between the antecedent and dependent variable of the study in accordance with the foregoing analysis.

**Age and Farm Innovativeness.**

Farming like any other occupation involves people of various age groups. It is said that old age people are conservative to younger one and younger generation is generally associated with receptivity to change. The present study has indicated negative significant relationship between age of farmer and farm innovativeness (Table 6.1). However, this is also being supported by the results of regression analysis as shown in Table 6.1. Thus the premise, that younger farmers are comparatively more innovative, progressive and receptive to new ideas.
and change than older ones is due to the reason that the elders usually find it difficult to change from age old traditions as they are probably less neoteric and more ethical in their attitude and values.

In consonance with these findings, Henridge (1978) reported that older farmers on small farms tended to value farming as a way of their life and were not prepared to leave farming even when the income was low. However, Lerner (1958), Singh (1976) and Chouhan (1979), found negative non significant regression coefficient.

Similarly there are about sixteen and ten studies as reported in Chapter 2, which have shown even negative and positive relationship respectively.

**Number of Adults in the Family:**

It is believed that family, as a unit, holds a place of significance in rural Indian society as a unit of social action and agricultural operations. But family size did seem to affect farm innovativeness as shown by negative significant correlation and regression coefficients.

The feeling that more hands may be helpful in farming may be true, but, the belief that it would also lead to
farm innovativeness is not supported by the present study. The scrutiny of studies presented in Chapter 2 in the field of adoption show no consistency about the exact nature of interplay between family size and adoption of improved farm practices. It can therefore be concluded that smaller size of family adults would lead to farm innovativeness.

Social Participation and Farm Innovativeness

Social participation has reported positive and highly significant correlation and regression coefficients with farm innovativeness (Table 4.1 and 5.1). It may be due to the fact that farmer's participation in activities of formal organizations express them to secondary group atmosphere where emphasis is placed on science and rational decisions. These institutions are meant for better harnessing of community resources in order to solve problems pertaining to modern times. As such those farmers who participate more in such institutions and organizations develop favourable and liberal value orientations towards improved ideas, scientific innovations and adoption.

The present finding is in consonance with that of Aloa (1971) who found significant relationship between
social participation and modernization of agriculture.
In adoption, seventeen studies as presented in Chapter 2, revealed significant relationship between social participation and adoption of farm practices. Nevertheless, there are some studies to quote a few, of Sidhu (1969), Dhaliwal (1970), Bhutia (1974), Saini et al. (1977) and Sohi (1978), wherein social participation has somehow not been found to be associated by adoption.

**Psychological Correlates:**

It is obvious that success of planned change through science and technology, which seeks to alleviate human sufferings, eradicates poverty and ignorance among masses in general. In the process of planned change, a number of psychological correlates play very important role.

**Economic Motivation:**

A significant correlation and regression ($P < 0.05$) was recorded between economic motivation and farm innovativeness (Table 4.1 and 6.4). It may be due to the fact that farmer high on economic motivation would have more willingness and propensity for the investment of available resources in farming and lay greater emphasis
on monetary gains from farm enterprises. The present finding is in agreement with that of Singh (1969), Supe (1969), Singh and Sohal (1970), Gupta (1976), Rao et al. (1971) and Tyagi (1979), who consistently reported significant relationship between economic motivation and adoption of practices.

**Risk Preference and Farm Innovativeness**

The risk preference of the farm innovators had showed significant positive correlation and regression relationship with farm innovativeness (table 4.1, 6.1). The underlying reason for this relationship is not difficult to locate. Farm innovativeness in a way, is a distinct departure from routine and age old ways of doing things, for it involves risk taking, reliance on change agents, careful planning, systematic work and capacity for organization. The present study stands in conformity with several adoption studies which observed that risk willingness to be related to adoption behaviour as asserted by Jaiswal (1965), Ram Chandran (1969), Singh (1969), Singh and Sohal (1970), Jaiswal et al. (1971), and Choubey (1974), Dhillon and Scandizzo (1978) also showed that most of the subsistence farmers were risk averse.
Observability:

Observability has reported positive significant relationship with farm innovativeness (Table 5.1, 6.1). It may be due to the fact the farmer's perception or acceptance of an innovation is because of the visible results of the innovations taken up in the study.

The present finding is in consonance with that of Ray (1966), Singh (1976) and Raj S. and Night, Johan, J. (1977) who reported significant relationship between observability and adoption of practices. However we may consider this as a indirect support.

Profitability:

Profitability of an innovation has reported positive significant relationship with farm innovativeness which stand in confirmation with Tiwari (1959), Rogers (1960), Sohoni (1963), Ray (1966) and Singh (1976) who reported that increase in income from adoption of practice as compared to income from the traditional practice lead to quick adoption of practice.

Disdivisibility:

The Divisibility aspect of the innovation has been found to have a significant relationship with farm
innovativeness thus, suggests that those innovations which can be tried easily at a small place are adopted quickly.

This study stands in agreement with that of Rogers (1962), Kivilin (1960), Roy (1966), Ray (1977) and Singh (1976) who suggested that a practice which is divisible for trial will generally be adopted more rapidly than a practice that is not.
FIG. 2: EMPIRICAL MODEL SHOWING PERCENTAGE CONTRIBUTION OF SIGNIFICANT VARIABLES TO FARM INNOVATIVENESS.
CHAPTER VII

FARM INNOVATORS AND THEIR INFLUENCE STRUCTURE
FARM INNOVATORS AND THEIR INFLUENCE STRUCTURE

In the past, different methods have been used in the study of influence structure. However, in this chapter the farm innovators influence structure has been worked out by Sociometric technique. It consists of asking group members about persons to whom they go in for advice and information about an idea or practice. In other words, who in a group influences them the most in making their decisions.

Sociometry was first described by Moreno (1934) and since then many studies used this technique for different purposes. Northway (1959) summarized the measuring of sociometry as "a sociometric test is meant for determining the degree to which individuals are accepted in a group for discovering the relationship which exists among these individuals and for disclosing the structure of group itself."

At the first step, ten sociometric questions regarding Dairying and Agriculture were developed to
ascertain the interpersonal influence of farmers (Appendix II). These sociometric questions were pretested and later finalized in the light of the pretesting. At the time of data collection, these sociometric questions were read to all the respondents of the sample in their local language. The replies latter were transferred to the interpersonal influence tabulation sheet (sociometric matrix) for each respondent in respect of both Dairying and Agriculture. In this matrix, "who influenced to whom and or who received from whom" was clearly shown with respect to each area. Rather to say the influentials and their influences were clearly plotted in the matrix separately for all the sixteen villages. In the matrix, influentials were noted down in columns and their respective receivers in rows. Thus, this matrix showed a complete picture of interpersonal influence structure in a village system.

In the present study, the data were obtained by the sociometric method as the primary measure of working out the influence structure in village societies. An index developed by Verma (1970) was used for further analysis for influence structure of innovators in the villages. All the respondents were asked sociometric
questions (Appendix II) regarding Dairying and Agricultural practices separately. In each sociometric question, three preferential choices were noted. These three choices were fixed on the basis of the suggestions as given by Jennings (1950), Northway (1959), Lindsey and Borgata (1954). They suggested that in preferring the sociometric tests it is desirable to specify the number of choices to be made. In their opinion when choices are limited, it is conventional to specify three. Each preferential choice was weighted on the basis of Campbell (1960) rationale for weighing first, second, and third sociometric choices. He suggested the scoring procedure as three points to first choice, two points to second choice, and one point to third choice. On this basis, total influence power of a person was calculated which was termed as influence score.

This influence score thus calculated were converted into standard scores by making use of Z-score.

\[ Z(\text{score}) = \frac{\text{Raw Score} - \text{Mean}}{\text{Standard Deviation}} \]

**Innovators Influence Structure in Dairying and Agriculture.**

As per the methodology enunciated above, influence score of all the 53 innovators (identified earlier in
this study) were independently worked out separately for both agriculture and dairying with a view to see as to whether influence pattern varies between these two arena of the science. In order to test the difference, rank order correlation coefficient was worked out. The data are presented in Table 7.1.

As the resulting \( r_k = 0.963 \) is very high that too highly significant in positive direction, we conclude that there is no difference in the influence structure in so far as two arena of dairying and agriculture is concerned.

All the innovators show uniform trend of their influence in both the fields. Hence, the score of both can be added together for subsequent analysis of influence structure in village environment.

**Farm Innovators and their Influence Structure in Village Social System.**

Personal influence has been found to be an essential ingredient practically in all sorts of decisions. Greater the degree of personal influence vested in a person, greater are the chances that he will induce greater amount of change in the receivers and subsequently will lead to a change in entire village social system. This role is expected to be inserted in the farm innovators.
<table>
<thead>
<tr>
<th>No.</th>
<th>Dairying Innovators</th>
<th>Agriculture Innovators</th>
<th>$D_{xy}$</th>
<th>$D_{z}^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>105 (1)</td>
<td>L</td>
<td>150</td>
<td>L</td>
</tr>
<tr>
<td>2.</td>
<td>630 (6.5)</td>
<td>H</td>
<td>675</td>
<td>H</td>
</tr>
<tr>
<td>3.</td>
<td>990 (19)</td>
<td>H</td>
<td>945</td>
<td>H</td>
</tr>
<tr>
<td>4.</td>
<td>910 (10)</td>
<td>H</td>
<td>955</td>
<td>H</td>
</tr>
<tr>
<td>5.</td>
<td>960 (14)</td>
<td>H</td>
<td>975</td>
<td>H</td>
</tr>
<tr>
<td>6.</td>
<td>795 (9)</td>
<td>H</td>
<td>955</td>
<td>H</td>
</tr>
<tr>
<td>7.</td>
<td>630 (6.5)</td>
<td>H</td>
<td>690</td>
<td>H</td>
</tr>
<tr>
<td>8.</td>
<td>615 (5)</td>
<td>H</td>
<td>675</td>
<td>H</td>
</tr>
<tr>
<td>9.</td>
<td>975 (16)</td>
<td>H</td>
<td>990</td>
<td>H</td>
</tr>
<tr>
<td>10.</td>
<td>990 (19)</td>
<td>H</td>
<td>945</td>
<td>H</td>
</tr>
<tr>
<td>11.</td>
<td>570 (4)</td>
<td>H</td>
<td>585</td>
<td>H</td>
</tr>
<tr>
<td>12.</td>
<td>1455 (49)</td>
<td>H</td>
<td>1615</td>
<td>H</td>
</tr>
<tr>
<td>13.</td>
<td>1470 (51)</td>
<td>H</td>
<td>1500</td>
<td>H</td>
</tr>
<tr>
<td>14.</td>
<td>1515 (51)</td>
<td>H</td>
<td>1590</td>
<td>H</td>
</tr>
<tr>
<td>15.</td>
<td>735 (8)</td>
<td>H</td>
<td>750</td>
<td>H</td>
</tr>
<tr>
<td>16.</td>
<td>1065 (27)</td>
<td>H</td>
<td>1095</td>
<td>H</td>
</tr>
<tr>
<td>17.</td>
<td>1170 (37)</td>
<td>H</td>
<td>1185</td>
<td>H</td>
</tr>
<tr>
<td>18.</td>
<td>1140 (35)</td>
<td>H</td>
<td>1200</td>
<td>H</td>
</tr>
<tr>
<td>19.</td>
<td>1200 (39.5)</td>
<td>H</td>
<td>1290</td>
<td>H</td>
</tr>
<tr>
<td>20.</td>
<td>1105 (31)</td>
<td>H</td>
<td>1195</td>
<td>H</td>
</tr>
<tr>
<td>21.</td>
<td>1080 (29.5)</td>
<td>H</td>
<td>1200</td>
<td>H</td>
</tr>
<tr>
<td>22.</td>
<td>1110 (32.5)</td>
<td>H</td>
<td>1200</td>
<td>H</td>
</tr>
<tr>
<td>23.</td>
<td>1215 (41.5)</td>
<td>H</td>
<td>1200</td>
<td>H</td>
</tr>
<tr>
<td>24.</td>
<td>1305 (45)</td>
<td>H</td>
<td>1305</td>
<td>H</td>
</tr>
<tr>
<td>25.</td>
<td>1200 (39.5)</td>
<td>H</td>
<td>1200</td>
<td>H</td>
</tr>
</tbody>
</table>

...cont
<table>
<thead>
<tr>
<th>1.</th>
<th>2.</th>
<th>3.</th>
<th>4.</th>
<th>5.</th>
<th>6.</th>
<th>7.</th>
<th>8.</th>
<th>9.</th>
</tr>
</thead>
<tbody>
<tr>
<td>26.1140</td>
<td>(35.0)</td>
<td>H</td>
<td>1140</td>
<td>H</td>
<td>(31.0)</td>
<td>4.0</td>
<td>16.00</td>
<td></td>
</tr>
<tr>
<td>27.1215</td>
<td>(41.5)</td>
<td>H</td>
<td>1245</td>
<td>H</td>
<td>(40.5)</td>
<td>1.0</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>28.1365</td>
<td>(46.0)</td>
<td>H</td>
<td>1395</td>
<td>H</td>
<td>(46.5)</td>
<td>-0.5</td>
<td>0.25</td>
<td></td>
</tr>
<tr>
<td>29.975</td>
<td>(16.0)</td>
<td>H</td>
<td>990</td>
<td>H</td>
<td>(21.5)</td>
<td>-5.5</td>
<td>30.25</td>
<td></td>
</tr>
<tr>
<td>30.945</td>
<td>(13.0)</td>
<td>H</td>
<td>960</td>
<td>H</td>
<td>(16.0)</td>
<td>-3.0</td>
<td>9.00</td>
<td></td>
</tr>
<tr>
<td>31.1230</td>
<td>(43.0)</td>
<td>H</td>
<td>1245</td>
<td>H</td>
<td>(49.5)</td>
<td>2.5</td>
<td>6.25</td>
<td></td>
</tr>
<tr>
<td>32.975</td>
<td>(16.0)</td>
<td>H</td>
<td>900</td>
<td>H</td>
<td>(12.5)</td>
<td>3.5</td>
<td>12.25</td>
<td></td>
</tr>
<tr>
<td>33.990</td>
<td>(19.0)</td>
<td>H</td>
<td>975</td>
<td>H</td>
<td>(13.5)</td>
<td>0.5</td>
<td>0.25</td>
<td></td>
</tr>
<tr>
<td>34.1300</td>
<td>(47.0)</td>
<td>H</td>
<td>1440</td>
<td>H</td>
<td>(47.0)</td>
<td>0.0</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>35.1410</td>
<td>(49.0)</td>
<td>H</td>
<td>1305</td>
<td>H</td>
<td>(44.5)</td>
<td>3.5</td>
<td>12.25</td>
<td></td>
</tr>
<tr>
<td>36.1080</td>
<td>(29.5)</td>
<td>H</td>
<td>1170</td>
<td>H</td>
<td>(32.0)</td>
<td>-7.5</td>
<td>6.25</td>
<td></td>
</tr>
<tr>
<td>37.1110</td>
<td>(32.5)</td>
<td>H</td>
<td>975</td>
<td>H</td>
<td>(18.5)</td>
<td>14.0</td>
<td>196.00</td>
<td></td>
</tr>
<tr>
<td>38.1140</td>
<td>(35.0)</td>
<td>H</td>
<td>1200</td>
<td>H</td>
<td>(37.0)</td>
<td>-2.0</td>
<td>4.00</td>
<td></td>
</tr>
<tr>
<td>39.1065</td>
<td>(27.0)</td>
<td>H</td>
<td>1110</td>
<td>H</td>
<td>(27.5)</td>
<td>-0.5</td>
<td>0.25</td>
<td></td>
</tr>
<tr>
<td>40.415</td>
<td>( 2.0)</td>
<td>H</td>
<td>465</td>
<td>M</td>
<td>( 2.0)</td>
<td>0.0</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>41.495</td>
<td>( 3.0)</td>
<td>H</td>
<td>535</td>
<td>M</td>
<td>( 3.5)</td>
<td>-0.5</td>
<td>0.25</td>
<td></td>
</tr>
<tr>
<td>42.825</td>
<td>(11.0)</td>
<td>H</td>
<td>885</td>
<td>H</td>
<td>(11.5)</td>
<td>0.0</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>43.840</td>
<td>(12.0)</td>
<td>H</td>
<td>900</td>
<td>H</td>
<td>(12.5)</td>
<td>0.5</td>
<td>0.25</td>
<td></td>
</tr>
<tr>
<td>44.1650</td>
<td>(53.0)</td>
<td>H</td>
<td>1695</td>
<td>H</td>
<td>(53.0)</td>
<td>0.0</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>45.1569</td>
<td>(52.0)</td>
<td>H</td>
<td>1530</td>
<td>H</td>
<td>(51.0)</td>
<td>1.0</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>46.1130</td>
<td>(38.0)</td>
<td>H</td>
<td>1120</td>
<td>H</td>
<td>(29.0)</td>
<td>0.0</td>
<td>81.00</td>
<td></td>
</tr>
<tr>
<td>47.1265</td>
<td>(44.0)</td>
<td>H</td>
<td>1500</td>
<td>H</td>
<td>(48.5)</td>
<td>4.5</td>
<td>29.25</td>
<td></td>
</tr>
<tr>
<td>48.1065</td>
<td>(27.0)</td>
<td>H</td>
<td>1095</td>
<td>H</td>
<td>(25.0)</td>
<td>2.0</td>
<td>4.00</td>
<td></td>
</tr>
<tr>
<td>49.1065</td>
<td>(21.5)</td>
<td>H</td>
<td>1110</td>
<td>H</td>
<td>(27.5)</td>
<td>0.0</td>
<td>39.00</td>
<td></td>
</tr>
<tr>
<td>50.1035</td>
<td>(24.0)</td>
<td>H</td>
<td>1095</td>
<td>H</td>
<td>(25.0)</td>
<td>-1.0</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>51.1030</td>
<td>(25.0)</td>
<td>H</td>
<td>975</td>
<td>H</td>
<td>(18.5)</td>
<td>6.5</td>
<td>42.25</td>
<td></td>
</tr>
<tr>
<td>52.1020</td>
<td>(23.0)</td>
<td>H</td>
<td>1125</td>
<td>H</td>
<td>(30.0)</td>
<td>-7.0</td>
<td>49.00</td>
<td></td>
</tr>
<tr>
<td>53.1005</td>
<td>(21.5)</td>
<td>H</td>
<td>1060</td>
<td>H</td>
<td>(23)</td>
<td>1.5</td>
<td>2.25</td>
<td></td>
</tr>
</tbody>
</table>

\[ D^2 = 036.50 \]
\[ r^k = 1 - \frac{1}{6(2 + \frac{1}{12}(m - m))} \frac{r^k}{m(n^2 - 1)} \]

Rank Correlation = 0.963 Highly Significant.

Here,

\( m \) = the number of items having common rank in one group.

Similarly if there are 3 groups having common ranks, the term \( 1/12(m^3 - m) \) is added three times and so on.

\( r^k = 1 \) implies the ranking of the two series exactly coincide.

Here,

\( r^k \) = rank correlation co-efficient.

\( D \) = difference of ranks between the paired items in the two series.

<table>
<thead>
<tr>
<th></th>
<th>Influentials</th>
<th>Non-influentials</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>715</td>
<td>1293</td>
</tr>
<tr>
<td>Percentage</td>
<td>(35.59)</td>
<td>(64.41)</td>
</tr>
</tbody>
</table>

\[ \begin{array}{ccc} \hline \text{High} & \text{Medium} & \text{Low} \\ \hline 1. \text{Influential Innovators (N=53)} & 94.33 & 3.77 & 1.85 \\ \hline 2. \text{Influential Non-Innovators (N=662)} & 17.22 & 36.25 & 45.52 \\ \hline \end{array} \]

Figures in bracket indicate frequency.
A close look of the Table 7.2 reveals that the entire influence of a social system is vested in 35.59 (per cent) of the sampled respondents. These influentials include the Innovators as well as non-innovators. All the innovators are found influentials in their villages as is evident by the distribution.

Almost all innovators are found high influential with a rare exception when they are rated as low influential. But non-innovators influentials, on the contrary, are on the low side of influence structure in a village society. As is evident from Table 7.2, non-innovators to be high influential is a scarce phenomenon. The data show that almost 50 per cent non-innovators have got a very poor quality of influence while on the other side 95 per cent of innovators have earned a prestige of high influential men in the rural environment. This finding, therefore, confirms a hypothesis that farm innovators are not only innovators but also equally high on influence continuum in villages. They exercise the most influential power in village affairs. This gives us an idea that farm innovators are effective opinion leaders in our Indian villages social systems that too in a varied field of activities not only in agriculture but also in social welfare sphere.
<table>
<thead>
<tr>
<th>S.No.</th>
<th>Name of Village</th>
<th>Total Influence score of village</th>
<th>Per Innovator</th>
<th>Per-Non-Innovator</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Personal Influence score</td>
<td>Percentage to total Influence</td>
</tr>
<tr>
<td>1.</td>
<td>Ward</td>
<td>7560</td>
<td>1052.50</td>
<td>15.92</td>
</tr>
<tr>
<td></td>
<td>N = 126</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Javi</td>
<td>6620</td>
<td>1126.85</td>
<td>12.88</td>
</tr>
<tr>
<td></td>
<td>N = 142</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>N = 142</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Katak</td>
<td>9000</td>
<td>1230.00</td>
<td>13.66</td>
</tr>
<tr>
<td></td>
<td>N = 139</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Bepra</td>
<td>8460</td>
<td>1163.75</td>
<td>13.99</td>
</tr>
<tr>
<td></td>
<td>N = 141</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Arki</td>
<td>9460</td>
<td>1213.12</td>
<td>12.79</td>
</tr>
<tr>
<td></td>
<td>N = 158</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Idsala</td>
<td>8100</td>
<td>1516.25</td>
<td>16.25</td>
</tr>
<tr>
<td></td>
<td>N = 139</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Shoraspur</td>
<td>7200</td>
<td>1142.52</td>
<td>15.87</td>
</tr>
<tr>
<td></td>
<td>N = 120</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>N = 106</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Beopmpur</td>
<td>6200</td>
<td>596.00</td>
<td>9.28</td>
</tr>
<tr>
<td></td>
<td>N = 70</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>Chirow</td>
<td>6120</td>
<td>755.00</td>
<td>12.33</td>
</tr>
<tr>
<td></td>
<td>N = 102</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>Jami</td>
<td>5920</td>
<td>902.50</td>
<td>15.42</td>
</tr>
<tr>
<td></td>
<td>N = 112</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>Besidajattan</td>
<td>5800</td>
<td>652.50</td>
<td>11.09</td>
</tr>
<tr>
<td></td>
<td>N = 98</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>N = 157</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>Fajjan</td>
<td>7080</td>
<td>1037.50</td>
<td>14.65</td>
</tr>
<tr>
<td></td>
<td>N = 118</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td>Shakpur</td>
<td>7560</td>
<td>1067.50</td>
<td>14.12</td>
</tr>
<tr>
<td></td>
<td>N = 126</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>7537</td>
<td>1021.82</td>
<td>13.42</td>
<td>317.33</td>
</tr>
</tbody>
</table>
On seeing table 7.3, it is further clarified that per innovator personal influence status is more than three times the influence status of non-innovators. On an average, it comes to around 1021.82 scoring per innovator whereas non-innovator's personal influence score is only 317.33 out of 7537 total influence expected in a social system. It means, on an average, 13.42 per cent influence of the total influence structure is vested in one innovator while in case of non-innovators it is only 4.11 per cent. It clearly shows that farm innovators are much more influential persons than the rest of the population in village structure. In all the 15 villages covered under the study, this trend is found almost uniform.

It is further a striking point of finding that out of a total sample population of 2008 farmers, only 53 are found to be innovators, i.e., 2.63 per cent of a larger social system. These 2.63 per cent farmers claim personal influence to the extent of 76.30 per cent whereas the rest 97.37 (N = 1955) per cent farmers account for only 23.70 per cent personal influence out of a total influence power vested in the entire village environment.
These figures clearly show that influence power is highly concentrated into a few hands. These few hands are no other persons but the farm innovators only. We can thus interpret this finding that in our village societies the personal influence power is highly centralised; although theoretically it should have been decentralised in developing countries like India which are wedded with the concept of democracy. Indian Farming Communities, by and large, according to this finding are, therefore, diffused type rather than the diffraction.

This approves the comparative thought of Rigg (1957) on Agrarian Societies to have dominance of asscriptive pattern with differential stratification system most prevalent. His thought as elaborated further that agrarian societies are moving unidirectional towards industrial societies appears to be not true in this finding. Even after 35 years of independence, Indian rural societies are still dominated by farm innovators who are, in fact, affluent farmers. We can at the most accept that Indian Villages are the Societies of "Transitia" which are characterised by "Mixed Societies". It means we are still branded as "Prismatic" in our farming system.
CHAPTER VIII

OVERLAPPING FARM INNOVATIVENESS
OVERLAPPING FARM INNOVATIVENESS
Polymorphic Innovators.

Operationally, a farmer who is innovator in one arena is also likely to turn up as innovator in another arena. It means a farmer who is innovator in Dairying practices can also be innovator in agricultural practices. If so, then he is called as "Polymorphic Innovator". Because of this analogy, there happens to be overlapping of a number of practices in which a farmer plays the role of Innovativeness. He is practically earliest in adopting all innovations of whatever the field pertinent to him and his social system. This multiplicity of a farmer's role is called "Overlapping Innovativeness".

This national interpretation gives us an understanding that in our farming communities "General Innovator Type" character is most prevalent. In other words, farmer's inclination to innovativeness stems from personality characteristics such that he has relatively high potential for innovativeness in any
area of his life. In short, when one speaks about an innovator in various fields, he is speaking about the same person all the time.

This orientation of the theoretical base was tested under the present investigation. The proposition was, therefore, postulated "Farm innovators are almost polymorphic in character", i.e., generalized farm innovative factor is at work.

In exaggerated form, the assumption which underlies, general innovator type are that (1) there are certain traits or attributes which are generally required for an innovator, (2) In any group or in any situation, those who embody these traits to the greatest extent emerge as 'Polymorphic Innovator'. If these assumptions hold valid, then the following should also be true:

"Those people who are found to be innovators in anyone area should more likely than others to be innovators in other areas as well because being innovator in any one area means that he should have, in significant measures, those traits or characteristics required for innovativeness in other areas too."

One can test this hypothesis by using a single statistical procedure "the extent to which overlapping
of innovator role is greater than the overlapping one would expect as a result of chance. The chance probability of joining occurrence; so by multiplying the proportion of innovators in two or more areas, one will be able to say what degree of overlapping of innovators would be produced by chance alone. For example, if 10 per cent of all the respondents are innovator in one area and 20 per cent in another, and if innovativeness in these two areas is mutually independent; i.e., the chance alone produced whatever overlapping is observed, then the proportion of all respondents who are innovator in both areas would be 2 per cent (.10 times .20).

In the present study, the proportions of overlapping innovativeness were computed for 10 innovations drawn five from Agriculture and five from dairying. Actual proportions of overlapping as also hypothetical proportions were worked out for testing the difference between the two. If the actual proportions turn up significantly greater than the hypothetical ones, then one will be correct to conclude that there seems to be a 'generalised innovative' factor at work. On the contrary, if
they are not significantly greater, one can assume that chance alone is operative. In that case, evidence does not support the hypothesis that innovator in one area is more likely to emerge as innovator in another area as well. The significance of the difference between two proportions was tested by t-test as follows:

\[
t = \frac{p - p}{\sqrt{\frac{pq}{N}}}
\]

where,

\(p\) = Actual proportions.

\(\hat{p}\) = Hypothetical proportions which were computed by applying the chance probability theorem, i.e., proportions which should be expected to result from chance.

\(q\) = \((1-p)\)

\(N\) = Total number of respondents in the sample multiplied by number of innovations.

Actual proportions, hypothetical proportions and observed t-value, all these figures are shown in Table 9.1.
Table 8.1: Distribution of Polymorphic Farm Innovators—Overlapping Innovativeness.

<table>
<thead>
<tr>
<th>Area</th>
<th>Innovators</th>
<th>Non Innovators</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(A) DAIRYING:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) Breeding</td>
<td>40</td>
<td>1968</td>
<td>2008</td>
</tr>
<tr>
<td>2) Feeding</td>
<td>31</td>
<td>1977</td>
<td>2008</td>
</tr>
<tr>
<td>3) Management</td>
<td>32</td>
<td>1976</td>
<td>2008</td>
</tr>
<tr>
<td>4) Health care</td>
<td>40</td>
<td>1968</td>
<td>2008</td>
</tr>
<tr>
<td>5) Marketing</td>
<td>51</td>
<td>1957</td>
<td>2008</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>194</strong></td>
<td><strong>9846</strong></td>
<td><strong>10040</strong></td>
</tr>
<tr>
<td>(B) AGRICULTURE:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) Seed &amp; Seeding</td>
<td>42</td>
<td>1966</td>
<td>2008</td>
</tr>
<tr>
<td>2) Fertilization</td>
<td>53</td>
<td>1955</td>
<td>2008</td>
</tr>
<tr>
<td>3) Irrigation</td>
<td>42</td>
<td>1966</td>
<td>2008</td>
</tr>
<tr>
<td>4) Plant Protection</td>
<td>50</td>
<td>1958</td>
<td>2008</td>
</tr>
<tr>
<td>5) Miscellaneous</td>
<td>47</td>
<td>1961</td>
<td>2008</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>234</strong></td>
<td><strong>9806</strong></td>
<td><strong>10040</strong></td>
</tr>
</tbody>
</table>

(A) Actual Proportions:

1. DAIRYING:
   \[
   \frac{194}{10,040} = 0.019
   \]

2. AGRICULTURE:
   \[
   \frac{234}{10,040} = 0.023
   \]
(a) **Hypothetical Proportions**

1. **Dairying**
   
   \[
   \begin{align*}
   40/2008 &= 0.02 \\
   31/2008 &= 0.01 \\
   32/2008 &= 0.01 \\
   40/2008 &= 0.02 \\
   51/2008 &= 0.02 \\
   \text{Hypothetical proportion} &= 0.02 \times 0.01 \times 0.02 \times 0.02 \\
   &= 0.0000000008
   \end{align*}
   \]

2. **Agriculture**
   
   \[
   \begin{align*}
   42/2008 &= 0.02 \\
   53/2008 &= 0.03 \\
   42/2008 &= 0.02 \\
   50/2008 &= 0.02 \\
   47/2008 &= 0.02 \\
   \text{Hypothetical proportion} &= 0.02 \times 0.03 \times 0.02 \times 0.02 \times 0.02 \\
   &= 0.000000048
   \end{align*}
   \]

\[
\begin{align*}
\text{t(Dairying)} &= \frac{p\bar{p}}{\sqrt{p(1-p)/n}} = \frac{0.019 - 0.0000000008}{\sqrt{0.000000008 \times 0.999999992}} \\
&= 61.04^*
\end{align*}
\]

\[
\begin{align*}
\text{t(Agriculture)} &= \frac{0.023 - 0.000000048}{\sqrt{0.000000049 \times 0.999999952}} \\
&= 104.97^*
\end{align*}
\]

Table \(t = 2.67 (p = 0.01) \) *Highly significant*
### Table 8.2 Overlapping of Innovators - Correlation Coefficient by Rank Correlations

<table>
<thead>
<tr>
<th>Innovator No.</th>
<th>X Rank</th>
<th>Y Rank</th>
<th>D</th>
<th>D²</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>16</td>
<td>20</td>
<td>52.5</td>
<td>0.0</td>
</tr>
<tr>
<td>2.</td>
<td>18</td>
<td>21</td>
<td>35.5</td>
<td>41.0</td>
</tr>
<tr>
<td>3.</td>
<td>19</td>
<td>22</td>
<td>13.0</td>
<td>23.0</td>
</tr>
<tr>
<td>4.</td>
<td>18</td>
<td>21</td>
<td>35.5</td>
<td>41.0</td>
</tr>
<tr>
<td>5.</td>
<td>19</td>
<td>23</td>
<td>13.0</td>
<td>13.0</td>
</tr>
<tr>
<td>6.</td>
<td>19</td>
<td>23</td>
<td>13.0</td>
<td>13.0</td>
</tr>
<tr>
<td>7.</td>
<td>16</td>
<td>20</td>
<td>52.5</td>
<td>52.5</td>
</tr>
<tr>
<td>8.</td>
<td>19</td>
<td>23</td>
<td>13.0</td>
<td>13.0</td>
</tr>
<tr>
<td>9.</td>
<td>18</td>
<td>21</td>
<td>35.5</td>
<td>41.0</td>
</tr>
<tr>
<td>10.</td>
<td>18</td>
<td>21</td>
<td>35.5</td>
<td>41.0</td>
</tr>
<tr>
<td>11.</td>
<td>17</td>
<td>21</td>
<td>48.5</td>
<td>41.0</td>
</tr>
<tr>
<td>12.</td>
<td>17</td>
<td>21</td>
<td>48.5</td>
<td>41.0</td>
</tr>
<tr>
<td>13.</td>
<td>19</td>
<td>22</td>
<td>13.0</td>
<td>23.0</td>
</tr>
<tr>
<td>14.</td>
<td>18</td>
<td>21</td>
<td>35.5</td>
<td>41.0</td>
</tr>
<tr>
<td>15.</td>
<td>19</td>
<td>23</td>
<td>13.0</td>
<td>13.0</td>
</tr>
<tr>
<td>16.</td>
<td>19</td>
<td>23</td>
<td>13.0</td>
<td>13.0</td>
</tr>
<tr>
<td>17.</td>
<td>17</td>
<td>21</td>
<td>48.5</td>
<td>41.0</td>
</tr>
<tr>
<td>18.</td>
<td>18</td>
<td>21</td>
<td>35.5</td>
<td>41.0</td>
</tr>
<tr>
<td>19.</td>
<td>19</td>
<td>23</td>
<td>13.0</td>
<td>13.0</td>
</tr>
<tr>
<td>20.</td>
<td>18</td>
<td>21</td>
<td>35.5</td>
<td>41.0</td>
</tr>
<tr>
<td>21.</td>
<td>19</td>
<td>23</td>
<td>13.0</td>
<td>13.0</td>
</tr>
<tr>
<td>22.</td>
<td>17</td>
<td>21</td>
<td>48.5</td>
<td>41.0</td>
</tr>
<tr>
<td>23.</td>
<td>18</td>
<td>21</td>
<td>35.5</td>
<td>41.0</td>
</tr>
<tr>
<td>24.</td>
<td>17</td>
<td>21</td>
<td>48.5</td>
<td>41.0</td>
</tr>
<tr>
<td>25.</td>
<td>19</td>
<td>23</td>
<td>13.0</td>
<td>13.0</td>
</tr>
<tr>
<td>26.</td>
<td>17</td>
<td>21</td>
<td>48.5</td>
<td>41.0</td>
</tr>
</tbody>
</table>

cont
<table>
<thead>
<tr>
<th>27</th>
<th>28</th>
<th>29</th>
<th>30</th>
<th>31</th>
<th>32</th>
<th>33</th>
<th>34</th>
<th>35</th>
<th>36</th>
<th>37</th>
<th>38</th>
<th>39</th>
<th>40</th>
<th>41</th>
<th>42</th>
<th>43</th>
<th>44</th>
<th>45</th>
<th>46</th>
<th>47</th>
<th>48</th>
<th>49</th>
<th>50</th>
<th>51</th>
<th>52</th>
<th>53</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>18</td>
<td>19</td>
<td>18</td>
<td>18</td>
<td>19</td>
<td>18</td>
<td>18</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>18</td>
<td>18</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>35.5</td>
<td>35.5</td>
<td>13.0</td>
<td>35.5</td>
<td>35.5</td>
<td>13.0</td>
<td>35.5</td>
<td>35.5</td>
<td>13.0</td>
<td>13.0</td>
<td>13.0</td>
<td>13.0</td>
<td>13.0</td>
<td>13.0</td>
<td>13.0</td>
<td>35.5</td>
<td>35.5</td>
<td>13.0</td>
<td>13.0</td>
<td>13.0</td>
<td>13.0</td>
<td>13.0</td>
<td>13.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>21</td>
<td>23</td>
<td>21</td>
<td>21</td>
<td>23</td>
<td>21</td>
<td>21</td>
<td>23</td>
<td>23</td>
<td>23</td>
<td>23</td>
<td>22</td>
<td>22</td>
<td>23</td>
<td>22</td>
<td>23</td>
<td>23</td>
<td>23</td>
<td>23</td>
<td>23</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>41.0</td>
<td>41.0</td>
<td>13.0</td>
<td>41.0</td>
<td>41.0</td>
<td>13.0</td>
<td>41.0</td>
<td>41.0</td>
<td>13.0</td>
<td>13.0</td>
<td>13.0</td>
<td>13.0</td>
<td>28.0</td>
<td>28.0</td>
<td>13.0</td>
<td>28.0</td>
<td>13.0</td>
<td>13.0</td>
<td>13.0</td>
<td>13.0</td>
<td>13.0</td>
<td>13.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-5.5</td>
<td>-5.5</td>
<td>0.0</td>
<td>-5.5</td>
<td>-5.5</td>
<td>0.0</td>
<td>-5.5</td>
<td>-5.5</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>15.0</td>
<td>15.0</td>
<td>0.0</td>
<td>7.5</td>
<td>22.5</td>
<td>22.5</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30.25</td>
<td>30.25</td>
<td>0.00</td>
<td>30.25</td>
<td>30.25</td>
<td>0.00</td>
<td>30.25</td>
<td>30.25</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>225.00</td>
<td>225.00</td>
<td>0.00</td>
<td>56.25</td>
<td>506.25</td>
<td>506.25</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\[ r^k = 0.791^{**} \text{ Highly Significant} \]
The resulting t-value of both Dairying = 61.04 and Agriculture = 104.97 respectively are highly significant as both these figures are much higher than the table value of $t = 2.67 \ (p = 0.01)$. It indicates that in both the cases, actual proportions are significantly greater than the hypothetical proportions. It approve our original notion that by and large there is a "Generalised Innovative Character" at work in our rural society.

It, therefore, draws a revelation that farm innovators are not only in one field of activity but at the same time in a number of activities of the farm. They play 'multiple role' as innovator in their village environment. This is what we have called them "Polymorphic Farm Innovators". Katz and Lazarsfield (1963) have designated them "Multiple Area Leader" in their influentionality studies. Similarly, Verma (1970) has called them, 'Multiple Area Communicator' in his study of Interpersonal Communication in Progressive and non-progressive profiles of Indian Villages. In fact, the term "Polymorphic" was coined by Merton(1957) in his opinion leadership study. He found that in farming communities, polymorphic opinion leadership
is largely established. Rogers (1964) also in his opinion leadership study found a high degree of interrelationship among the responses to six sociometric questions that made up total sociometric score.

The foregoing analysis places before us a clear cut evidence to say that the overlapping of farm innovativeness is largely established in our Indian villages. This is found true in all activities pertaining to agriculture and dairying. However, this does not say which of these two fields of the farm is more pronounced in this pattern of farm innovativeness, that is, to say whether agriculture or the dairying carries greater overlapping role. For this, the difference of both fields of the farm were tested by proportional t-test as follows:

\[
t = \frac{p_1 - p_2}{\sqrt{pq \left( \frac{1}{N_1} - \frac{1}{N_2} \right)}}
\]

where,

\[p_1 = \text{actual proportions of overlapping of farm innovativeness in agriculture.}\]

\[p_2 = \text{actual proportions in dairying.}\]
\[ Q = 1 - p \]
\[ p = \frac{N_1 p_2 - N_2 p_2}{N_1 - N_2} \]

\[ N = \text{Total number of respondents in the sample} \]
\[ t = \frac{2.30 - 1.93}{\sqrt{74.30 \times 25.70(1/2008-1/2008)}} \]
\[ = 0.37 \]

Table \( t = 2.67 \) (\( P = 0.01 \))

The calculated value of \( t = 0.37 \) is highly insignificant as the tabular value of \( t = 2.67 \) \( (P = 0.01) \) is much higher. It indicates that there is no difference in overlapping of farm innovativeness in both fields of farm activities. Thus, we can say that polymorphic farm innovators have the multiple role as innovator in agriculture as well as in dairying.

No difference between the two was further tested by rank correlation coefficient. Here the ranks were given to the innovators who played the role of innovativeness according to the number of practices in both agriculture and dairying. The data are presented in Table 8.2. As the \( r_k = 0.79 \) value is highly correlated and highly significant \( (P = 0.01) \), it
confirms that there is a strong association between dairying and agriculture in so far as multiple role of farm innovators is concerned.

Although both these tests approve the notion that by and large there are 'polymorphic farm innovators' in our villages yet these test do not tell us upto what extent this notion is true in varied field of farm activities. In other words, upto what extent the overlapping of farm innovativeness is found uniform in both agriculture and dairying. This idea is analysed through the data shown in Table 8.3.

<table>
<thead>
<tr>
<th>No. of practises</th>
<th>Percentage of Innovators Agriculture</th>
<th>Dairying</th>
<th>(2) - (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>25</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>24</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>23</td>
<td>42.64(23)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>22</td>
<td>51.45(30)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>21</td>
<td>91.64(51)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>20</td>
<td>100.00(53)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>19</td>
<td>100.00</td>
<td>39.72(25)</td>
<td>60.28</td>
</tr>
<tr>
<td>18</td>
<td>100.00</td>
<td>75.47(45)</td>
<td>24.53</td>
</tr>
<tr>
<td>17</td>
<td>100.00</td>
<td>90.56(51)</td>
<td>9.44</td>
</tr>
<tr>
<td>16</td>
<td>100.00</td>
<td>100.00(53)</td>
<td>0.00</td>
</tr>
<tr>
<td>15</td>
<td>100.00</td>
<td>100.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Figures in brackets indicate total number of innovators.
It is evident from the data of table 8.3 that up to 16 innovative practices overlapping role is played by all innovators in both dairying and agriculture. It means that 100 per cent innovators are found playing uniform role up to 16 practices out of a total of 25 innovations. However, this role diminishes gradually in dairying as the number of practices go up. Whereas there is 100 per cent innovators are found playing overlapping role in Agriculture up to 17 practices in dairying it is 90.56 per cent. It means overlapping of innovativeness in agriculture is 9.44 per cent more than dairying. Similarly, when overlapping role is analysed in 18 and 19 practices, agriculture innovativeness is found 24.53 per cent and 60.28 per cent respectively more than dairying. In more than 19 practices, overlapping of innovativeness is nil in dairying while in agriculture it is still 100 per cent. Even up to 20 practices, it is 100 per cent. It is then reduced to 91.64 per cent, 51.45 per cent and 42.64 per cent in 21, 22, and 23 practices respectively. It means, in agriculture, overlapping of innovativeness is found maximum in 23 practices to the extent of 42.64 per cent of the innovators.
This analysis clearly suggests that the degree of overlapping of farm innovativeness is more in agriculture than dairying. However, no innovator is found "Ideal Innovator" as none turned up to have acquired multiple role to the extent of 100 per cent, i.e. to say no innovator played innovative role in all the 25 practices studied in this investigation, neither in agriculture nor in dairying.
CHAPTER IX

SUMMARY AND IMPLICATIONS
SUMMARY AND IMPLICATIONS

The introduction of Scientific crop farming seems to have added new dimensions in Indian Farming System for rural poor in the recent years. Dairy and crop husbandry as an instrument of socio-economic change for all sections of rural society is well established which has resulted in the formulation of many policies and development programmes for the rural society. The present study portrays the prevailing situation. It is now well accepted that planned development is a function of not only of material availability but also of human resources. The main purpose of the present investigation was, therefore, to examine the central premise of individual resources in the form of innovativeness. The specific objectives of the study were formulated as under:

1) To study differential characteristic features of farm innovators in terms of their socio-economic backgrounds and personality traits.
2) To determine as to whether a farmer becomes innovator because of the perceived attributes of farm innovation.

3) To predict which of the socio-economic background, personality trait and characteristics of farm innovations is most responsible for causing a farmer to lead as farm innovator.

4) To work out the degree of personal influence of farm innovators in their village environment.

5) To find out as to whether there exists an overlapping of innovators in respect of different farm innovations.

Based on extensive review of literature and expert opinion, variables like age, number of adults in the family, education, family education status, operational farm size, herd size, occupation, caste, social participation, knowledge, economic motivation, achievement motivation, fatalism-scienticism, risk preference and attitude towards dairy/agriculture were selected and a conceptual model was developed to analyse the farm innovativeness of the farmers.
The random sampling technique was adopted to select villages and innovators were selected on the normal distribution curve as suggested by Rogers (1970). The study was conducted in sixteen villages of Karnal District. Fifty three innovators formed the sample of the study. The data for dependant and independent variables were collected with the help of structured schedule by interviewing the respondents personally.

The data so collected were treated by both parametric and non-parametric statistical tools like mean, standard deviation, range, correlation, t-test, F-test and regression analysis. The salient findings of the study are briefly summarised as under:

1. A large number of farm innovators are found of middle age group having agriculture as their main occupation. They come from upper castes having a medium to small adult family size. Majority of farm innovators is found with a low level of social participation and mediocre in knowledge about agricultural and dairying practices with a medium family education score. Their achievement motivation, risk preference, fatalism, empathy, economic motivation and attitude towards agriculture and dairying
is found to be only transitional i.e., mediocre stage between traditionality and modernity.

2) The innovators' perception of farm innovations have been found to be in favour of certain attributes like observability, profitability and trialability. Compatibility and complexity characteristics of innovations have no bearing upon a farmer in bringing about a motive force for adoption.

3) The farm innovativeness is a function of younger age, small adulthood and family norm, high social participation, and high economic motivation with high risk taking capabilities.

4) The farm innovators are those farmers who have high influentiality status in their village system. It has been found that the personal influence power is highly concentrated into a few hands of innovators.

5) It is also a striking revelation that farm innovators play multiple role of farm innovativeness in their village society. Overlapping role of farm innovators is found 100 per cent upto 16 practices out of 23 innovations undertook for this study.
Theoretical and Practical Implications of the Study

The present study has both fundamental and applied implications. It is fundamental in the sense that an attempt has been made to explore the area of farm innovativeness with deep insight embracing all the possible perceived attributes which would help future researchers to probe further and deeper into the problems and extend the boundaries of studies in the field of Farm Innovativeness. Its applied nature lies in its utility for understanding the process and correlates of farm innovativeness. This is eventually of great importance for the extension personnel engaged in development. The specific implications of this study can be stated as under:

1) An effective extension educational and developmental strategy is needed at the grass root level for the development of farmers.

2) The young and middle aged farmers should be more extensively involved in disseminating the innovations.

3) An attempt should be made to improve the psycho-inputs of farmers by removing inherent and circumstantial inabilities. Training should also be imparted to develop in them
psychological correlates.

The positive highly significant relationship of correlates like family education status, knowledge in agriculture, ability to take risk, economic motivation in agriculture, economic motivation in dairying, knowledge in dairying, farm size, herd-size and scientism with farm innovativeness suggest that development programmes can be greatly stimulated provided the psycho human aspects are given due attention and integrated with technological part of programmes.

Future Research Avenues:

1. In the present investigation, an attempt has been made to identify maximum number of correlates of farm innovativeness. However, there is still a further scope to explore the correlates related to situational, economic, administrative and psychological aspects.

2. Source utilization pattern and the credibility of different sources of information may be
explored at different levels of adoption. This may in turn help to formulate suitable extension strategy for rural development.

3. Innovators' study was limited to farm innovations only. Their role in non-farm innovations like family welfare, election, village disputes, and rural local government should also be studied and compared whether they are alike farm innovations.

4. Efforts should be made to find out rural women innovators and their characteristics as compared to their men folk.

5. A study should be initiated to work out the degree of participation and involvement of farm innovators in planning, formulation and implementation of Rural Development Programmes.
 CHAPTER X

 BIBLIOGRAPHY


75. Mudra, S.N. and Botham, K.N. "Impact of Caste on Adoption of Improved Farm Practices" *Indian Journal of Extension Education* 3(3) 1967:143.


92. Ring "Agraria and Industria towards a Typology of Comparative Administration". Toward the Comparative Study of Public Administration(Ed) by William J. Sivrini, Bloomington, Indian University Press, 1957.


Cross References Cited from Roy (1966)


Oppenfeld, H. and Liberero, F. Results of a study of adoption of better farm practices in the Philippines. Ind. J. Agric. Econ. 17, 1962; 23-32.


Sohoni, A.W. "Farm Practices attributes as associated with adoption and non adoption of practices. M.Sc Thesis Nagpur University.


Tucker, C.F. "Prediction of rate of adoption from characteristics of farm innovation". M.Sc Thesis Columbus, Ohio state University, 1961.


CHAPTER XI

APPENDICES
SCHEDULE FOR IDENTIFYING FARM INNOVATORS

General Information:
Name of the District: KAROL
Block Village Date
Name of Household
Father's Name:
Occupation:
Caste:

DAILY INNOVATIONS:

1. Practices Since when

4. BREEDING
1. Heat symptoms.
3. Time of Insemination.
4. Pregnancy Diagnosis.
5. Drying off.

3. FEEDING
1. Leguminous Green Fodder
2. Concentrate.
4. Hay.
5. Urea Molasses.

C. MANAGEMENT
1. Identification
3. Dehorning.
4. Loose Housing.
5. Zero Grazing.
### D. Health Cover

<table>
<thead>
<tr>
<th>Practice</th>
<th>Since when</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaccination</td>
<td></td>
</tr>
<tr>
<td>First Aid Treatment</td>
<td></td>
</tr>
<tr>
<td>Control of Lice &amp; Ticks</td>
<td></td>
</tr>
<tr>
<td>Deworming</td>
<td></td>
</tr>
<tr>
<td>Detection of Mastitis</td>
<td></td>
</tr>
</tbody>
</table>

### E. Marketing

<table>
<thead>
<tr>
<th>Practice</th>
<th>Since when</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sale of Milk</td>
<td></td>
</tr>
<tr>
<td>Testing of Milk Fat</td>
<td></td>
</tr>
<tr>
<td>Raising and selling of Heifers</td>
<td></td>
</tr>
<tr>
<td>Purchase of good animals</td>
<td></td>
</tr>
<tr>
<td>Purchase of cattle feed</td>
<td></td>
</tr>
</tbody>
</table>

### Agriculture Innovations:

<table>
<thead>
<tr>
<th>Practice</th>
<th>Since when</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seed and Seeding</td>
<td></td>
</tr>
<tr>
<td>Variety sown</td>
<td></td>
</tr>
<tr>
<td>Seed treatment</td>
<td></td>
</tr>
<tr>
<td>Time of sowing</td>
<td></td>
</tr>
<tr>
<td>Seed rate</td>
<td></td>
</tr>
<tr>
<td>Method of sowing</td>
<td></td>
</tr>
</tbody>
</table>

### F. Fertilization

<table>
<thead>
<tr>
<th>Practice</th>
<th>Since when</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount of Nitrogen</td>
<td></td>
</tr>
<tr>
<td>Amount of Phosphorus</td>
<td></td>
</tr>
<tr>
<td>Amount of Potash</td>
<td></td>
</tr>
<tr>
<td>Amount of Zinc</td>
<td></td>
</tr>
<tr>
<td>Method of Fertilization</td>
<td></td>
</tr>
<tr>
<td>Practices</td>
<td>Since when</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>C. <strong>IRRIGATION</strong></td>
<td></td>
</tr>
<tr>
<td>1. No. of Irrigation</td>
<td></td>
</tr>
<tr>
<td>2. Depth of Irrigation</td>
<td></td>
</tr>
<tr>
<td>3. Stage of Irrigation</td>
<td></td>
</tr>
<tr>
<td>4. Method of Irrigation</td>
<td></td>
</tr>
<tr>
<td>5. Time of Irrigation</td>
<td></td>
</tr>
<tr>
<td>D. <strong>PLANT PROTECTION</strong></td>
<td></td>
</tr>
<tr>
<td>1. Stem rot in paddy</td>
<td></td>
</tr>
<tr>
<td>2. Yellow Rust in Wheat</td>
<td></td>
</tr>
<tr>
<td>3. Loose Smut in Wheat</td>
<td></td>
</tr>
<tr>
<td>4. Pest control</td>
<td></td>
</tr>
<tr>
<td>5. Weed control</td>
<td></td>
</tr>
<tr>
<td>E. <strong>MISCELLANEOUS</strong></td>
<td></td>
</tr>
<tr>
<td>1. Harvesting through machine</td>
<td></td>
</tr>
<tr>
<td>2. Threshing through machine</td>
<td></td>
</tr>
<tr>
<td>3. Sale procedure</td>
<td></td>
</tr>
<tr>
<td>4. Inclusion of legumes in rotation.</td>
<td></td>
</tr>
<tr>
<td>5. Cropping Intensity</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX II

SCHEDULE FOR SOCIO-MATRIC QUESTIONS FOR PERSONAL INFLUENCE

DAIRY

1. In order to detect heat symptoms, to do artificial insemination, to know proper time of insemination, drying off and pregnancy diagnosis of your cattle, from whom you normally seek advice within your village? Beside your own knowledge and judgement, whose opinion would you seek in the village? Please mention three names in order of priority.

1. Shri __________________ s/o __________________
2. Shri __________________ s/o __________________
3. Shri __________________ s/o __________________

2. When you give balanced ration to your animals, sometimes you need to consult your fellow-farmers regarding green fodder, concentrates, mineral mixture, hay and urea-molasses etc.? In order to obtain this information who are the farmers with whom you usually associate yourself? Please mention three names in order of priority.

1. Shri __________________ s/o __________________
2. Shri __________________ s/o __________________
3. Shri __________________ s/o __________________

3. As you know, cattle management is very vital for the success of Dairy Enterprise? It includes zero grazing, loose housing, identification, dehorning and artificial-lot down which you may or may not be aware? In case you are required to collect full information, who are the farmers whom you would choose to take or consult from your village? Please mention names in order of preference.

1. Shri __________________ s/o __________________
2. Shri __________________ s/o __________________
3. Shri __________________ s/o __________________
4. Quite often, your cattle fall sick. Normally, sick animals are treated by the qualified V.A.S. in Veterinary Dispensary. Nevertheless, sometimes you consult one in your village itself. Formal veterinary aid is provided. Who are these farmers to whom you normally go for seeking such advice regarding your sick animals? Please mention three names in order of preference:

1. Shri____________________ s/o____________________
2. Shri____________________ s/o____________________
3. Shri____________________ s/o____________________

5. Before buying or selling the milk animals people often consult with their close associates. Similar is the case when you buy or sell the milk or milk products. To whom you normally go for such consultations in your village? Please give three names in order of preference:

1. Shri____________________ s/o____________________
2. Shri____________________ s/o____________________
3. Shri____________________ s/o____________________

AGRICULTURE

6. For wheat and paddy cultivation you require a number of informations on seed and seeding such as recommended variety, seed rate, time of sowing, seed treatment and method of sowing. To whom you would like to go for seeking such informations? Give three names beside you in order of preference:

1. Shri____________________ s/o____________________
2. Shri____________________ s/o____________________
3. Shri____________________ s/o____________________

7. With introduction of N.P.K., the requirement of artificial fertilizers has substantially increased especially of N.P.K. and Zinc. However, their application requires an exact know-how which you may not be well equipped with. In that case, who do you think can provide you the exact know-how of N.P.K. and Zinc fertilization in wheat as also in paddy crops? Suggest three names in order of preference:

1. Shri____________________ s/o____________________
2. Shri____________________ s/o____________________
3. Shri____________________ s/o____________________
8. Irrigation is itself an important input of crop programme. For a successful farmer it is therefore, very significant that he must know the number of irrigation, depth of irrigation, stage of irrigation, method of irrigation and time of irrigation in paddy and wheat crops. Suppose, you don't know such details, and if you are asked to seek them from your village, to whom would you go for? Give three names in order of preference:

1. Shri s/o Shri 
2. Shri s/o Shri 
3. Shri s/o Shri 

9. Quite often, your crops are damaged by insect, pest, disease and weeds. These are to be controlled by all means. But their control measures are often difficult that you are not expected to be fully aware of. Suppose you have to obtain information from your fellow-farmers of your village regarding this. In your opinion who are these farmers to whom you will go for such information? Give three names in order of preference:

1. Shri s/o 
2. Shri s/o 
3. Shri s/o 

10. In order to obtain miscellaneous information on crop rotation, machine harvesting-threshing and planned marketing of your farm produce, suggest three names from your village who can furnish you with such information:

1. Shri s/o 
2. Shri s/o 
3. Shri s/o
APPENDIX - III
Schedule - Phase II

Name of Village: ____________  Block: ________

1. Name of the respondent: __________________________

2. Father's name: _________________________________

3. (a) Age of the person: ________
   (b) No. of other adults in the family: _________

4. Operational Farm size: Owned:__________
   Leased in:__________
   Leased out:__________
   Total:________________

5. Educational level and Education status of the family:

   Total members of the family above 6 years:

   Member of the family Head 1 2 3 4 5 6 7 8 9 10
   Educational level/
   literacy level: _____________________________

   i) Illiterate
   ii) Can read only
   iii) Can read & write
   iv) Primary
   v) Middle
   vi) High School
   vii) Graduate
   viii) Post-graduate

   Total:

   G. Caste: Khandani:
7. Occupation

Main Subsidiary

a. Agriculture
b. Dairying
c. Agriculture Labour
d. Caste occupation
e. Business
f. Service

9. Social Participation:

Name of the organization Member Office bearer Distinc-
tive.

Pre-Past Pre-Past Pre-Past
sent sent sent sent

1. Milk Cooperative
   Society.
2. Another Cooperative
   Society.
3. Panchyat
4. Panchyat Samities
5. Farmers' Association
6. Rural Youth Club
7. Rural Cultural Or-
ganization.
8. Religious Committee
9. Village Water Committee
10. Block Committee
11. Zilla Parishad
12. School Management
    Committee.
13. Political Organiza-
tion.
9. **Hard Size:**

   No. of milch animals: 

   Cows: 
   Buffalo: 
   Cross-breds: 
   Calves: 

<table>
<thead>
<tr>
<th>Male</th>
<th>(age)</th>
<th>Female</th>
<th>(age)</th>
</tr>
</thead>
</table>

10. **Attitude, Achievement Motivation and Economic Motivation of Farmers:**

Below are some statements made about Dairy Farming, you will probably agree with some of them and disagree and undecided with others. I will read each statement for your please indicate your feeling about them:

<table>
<thead>
<tr>
<th>Statement</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>Undecided</td>
</tr>
<tr>
<td>-------------------------------------------------</td>
<td>-----------</td>
</tr>
<tr>
<td>In dairy farming Artificial Insemination is a good breeding practice.</td>
<td>3 2 1</td>
</tr>
<tr>
<td>In dairy farming, animals in dry period can be neglected in matter of their feed.</td>
<td>1 2 3</td>
</tr>
<tr>
<td>Through scientific feeding milk production of dairy animals can be increased.</td>
<td>3 2 1</td>
</tr>
<tr>
<td>Vaccination against contagious disease (R.P. &amp; H.S.) is not regularly needed.</td>
<td>1 2 3</td>
</tr>
<tr>
<td>In dairy farming drenching of crossbred animals for stomach worm every year is a good practice.</td>
<td>3 2 1</td>
</tr>
</tbody>
</table>
6. In dairy farming, it is good to keep the animals loose in enclosures.

3 2 1

7. Milk animals do not necessarily need green fodder to their full.

1 2 3

8. In dairy farming, crossbred cows are not better than buffaloes.

1 2 3

(b) Attitude towards Agriculture:

You will probably agree with some of the following statement of opinion about the use of nitrogenous fertilizers, and disagree with others. Please indicate your own feeling about each of them, as I read them. If you strongly agree or disagree with a statement say it accordingly. This is not an examination; there are no right or wrong answers; it is a request for your own frank opinion.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Strongly Agree</th>
<th>Undecided</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
</table>

---

1. The food problem of the country can be solved by using nitrogenous fertilizers in the crops (6.5)

5 4 3 2 1

2. The use of nitrogenous fertilizers might be a good practice, but the results shown are not always encouraging (5.5).

1 2 3 4 5

3. If my neighbour seeks my opinion as to which practice he would adopt for increasing his farm-income I will definitely advise him to adopt the practice of use of nitrogenous fertilizers (8.5)

5 4 3 2 1
4. The use of nitrogenous fertilizers is a time consuming practice (5.0).

5. The use of nitrogenous fertilizers is not the only practice to increase farm income (3.5).

6. If the neighbouring farmers want to form a cooperative society to utilize the practice of nitrogenous fertilizer use in the village effectively, I would be the first man to join the cooperative society (6.0).

7. Most farmers in this area should use the nitrogenous fertilizers (7.5).

8. Though the use of nitrogenous fertilizers is a good practice, the economic situation of most farmers do not permit the use of it (4.0).

9. The use of nitrogenous fertilizers is said to be a good practice, but trials have to be made to prove its worth before its adoption (4.5).

10. The use of nitrogenous fertilizers is a new practice & so I am reluctant to adopt it (3.0).

11. The use of nitrogenous fertilizers is a practically useful practice (8.0).

12. The use of nitrogenous fertilizers results in further improvement in farming (7.0).
11. Knowledge test in Dairying:

i) Do you know the relative merits of crossbred over non-descript of local cows? Yes/No

If yes, state:
2. Early age at first calving.
3. More lactation days.
4. Fetches more price.

ii) Do you know how to reduce the cost of milk production? Yes/No

If yes, state:
5. High milk producing cows.

iii) Do you know the commercial cattle feeds available in the market? Yes/No

If yes, state why:
6. Hafed Cattle Feed.
7. Other

iv) What is the floor space required for an adult cow? Yes/No

If yes, state:
8. A minimum of 3 x 5 ft.

v) Should the feed of a calf be supplemented with concentrates in addition to mother's milk? Yes/No.

If yes, state why
9. A calf needs nutrients addition to the milk feeding.

vi) It is necessary to give bath for a cow to clean its body? Yes/No

If yes, state how often
10. Daily in Summer.
vii) What are the important symptoms of worm trouble in a calf? Yes/No
If yes, state
11. Mud eating.
12. Weak body or anaemic condition.

viii) Do you know the deworming medicines? Yes/No
If yes, state
13. Antepar, Joral, Dormex

ix) Could you state the dose of Antepar for a calf of 2 months? Yes/No
If yes, state
14. It is 0.5 to 1 ounce approx. 30 gms.

x) Do you know the disease that a cow could get? Yes/No
If yes, state
15. Mastitis
16. Foot and Mouth disease.

xi) Do you know the disease that called Mastitis? Yes/No
If yes, state the symptoms:
17. The colour of milk is abnormal.
18. The udder is swollen.

xii) What is Foot and Mouth disease? Yes/No
If yes, state the symptoms:
19. It is lemoness of leg mainly.

11(b) Knowledge Test for Agriculture:

Items

1) Have you heard the names of the following fertilizers? Yes/No
   1. Ammonium Sulphate?
   2. Calcium Nitrate?
   3. Urea?
ii) Please tell the prices of the following fertilizers:

4. Ammonium Sulphate? Correct Incorrect
5. Calcium Ammonium Nitrate? Correct Incorrect
6. Urea? Correct Incorrect

iii) What will be the equivalent doses of cow dung or farm yard manure in 1 acre of wheat crop for the above mentioned fertilizers? When no fertilizer is used in the crop? Correct Incorrect

iv) Please tell how do the following fertilizers structurally look like:

7. Calcium Ammonium Nitrate? Correct Incorrect
8. Urea? Correct Incorrect

v) Suppose you have applied nitrogenous fertilizers this year in a wheat crop; you are growing some other crop in the same field after harvesting the wheat crop and this time you don't apply any nitrogenous fertilizer in this later crop?

9. Can you tell whether the nitrogenous fertilizers applied in the wheat crop will have some effects on the subsequent crop? Correct Incorrect

10. Do the food value of the wheat grains increase by the use of Yes / No nitrogenous fertilizers.

11. Will the yield of straw and grain be increase the amount of nitrogenous fertilizer application sufficiently in the wheat crop? Yes / No

12. If 'yes' in the above question, whether straw increase more than grain or grain increase more than straw? Correct Incorrect
vi) What are the colours of the following fertilizers?

13. Calcium Ammonium Nitrate? Correct Incorrect
14. Urea? Correct Incorrect

vii) Please tell the recommended doses of the following fertilizers for one acre of wheat crop:

15. Ammonium Sulphate? Correct Incorrect
16. Calcium Ammonium Nitrate? Correct Incorrect
17. Urea? Correct Incorrect

viii) There are different methods of applying nitrogenous fertilizers. Have you heard of the following methods?

18. Dribbling? Yes No
19. Applying with irrigation water? Yes No
20. Please tell, whether dribbling is more effective than broadcasting of nitrogenous fertilizers. Correct Incorrect
21. Sometimes nitrogenous fertilizers are mixed with sand, soil, or seeds before application to the soil, which among the following reasons, do you think, is the most appropriate?

a) to improve the soil quality
b) to minimise the bad effects of fertilizers.
c) to make an even distribution in the field.
d) to ensure the germination of the seeds.
e) any other or don’t know.

ix) Do all crops require the same dose of nitrogenous fertilizers per acre? Correct Incorrect

x) Do the requirements of nitrogenous fertilizers vary with the variation of the fertility levels of the soils?
xi) Nitrogenous fertilizers can be applied in the following ways. Which one of them do you think is more effective for crop yields?

a) Applying the whole of the required amount during the land preparation.  
Correct  Incorrect

b) Split application (half the amount during the land preparation and the other half at some suitable intervals of crop growth).  
Correct  Incorrect

xii) If you apply nitrogenous fertilizers just a week before tillering of wheat crop, what will be the effect on the number of tillers?

Correct  Incorrect

xiii) If you apply nitrogenous fertilizers to a wheat crop just 5 to 6 days before flowering, what will be the effect on the wheat yield?

Correct  Incorrect

xiv) Suppose, there is sufficient irrigation and all other facilities for a wheat field. How much maximum amount of the following fertilizers you can apply per acre without any bad effect on the crop yield?

22. Ammonium Sulphate?  
Correct  Incorrect

23. Calcium Ammonium Nitrate?  
Correct  Incorrect

24. Urea?  
Correct  Incorrect

xv) Does the overdose of nitrogenous fertilizers application delay in the maturity of crop?

Yes  No

xvi) Do the crops where nitrogenous fertilizers are applied are more susceptible to the insect pest attacks than the crops where nitrogenous fertilizers are not applied?

Yes  No
xvii) If 'yes' in the above question, what is the most appropriate reason, do you think, among the following?

a) because crop becomes sweet in taste  Correct Incorrect
b) because crop becomes succulent  Correct Incorrect
c) because crop emits certain sweet smell  Correct Incorrect

xviii) Leaves of wheat plants have become yellowish with stunted growth, sufficient irrigation is given, but without any remedy. Do you think that this wheat crop will regain its green colour and vigour if nitrogenous fertilizers are applied? Yes No

xix) If you apply recommended dose of nitrogenous fertilizers in one acre of wheat crop, how much increase in yield can you expect under normal conditions of crop growth?

---

12(a) Economic Motivation for Dairy farming

Agree Un- Disagree
decided

1. Traditional dairy methods give good income.
2. A small farmer can get more from his farm through dairy farming than grain farming.
3. Dairy farming pays the farmer more than his investment.

12(b) Economic Motivation for Agricultural

Strongly Agree Un- dis- Strongly disagree
against

1. A farmer should work towards larger yields and economic profits.
2. A most successful farmer is the one who makes the most profit.

3. A farmer should try any new farming idea which may earn him more money.

4. A farmer should grow cash crops to increase monetary profits in comparison to growing of food crops for home consumption.

5. It is difficult for the farmer's children to make good start unless he provides them with economic assistance.

6. A farmer must earn his living but the most important thing in life cannot be defined in economic terms.

13. **Achievement Motivation**

   Agree Un- deci- agree
   ____________
   ____________

1. Every event in man's life has already been settled by his fate so it is of no use to put extra efforts in dairy farming.

2. A good Dairy Farmer wants to add a crossbred cow to his herd.

3. For good dairy farming, knowledge a modern method of disease control among dairy animals is very important.

14. **Scienticism**

   Strong- Agree Dis- Stronglydisagree
   ____________
   ____________

1. It is better to disbelieve in what is not proved or tested, but when proved it is to be relied on.

2. Mantras have no reaching effect. If one can chant and recite accurately right mantras on right occasion he can produce miraculous effects.
3. The basic human tendency is that man proposes but God disposes.

4. Those who say that they have seen ghosts, whether distort the truth or tell a lie.

5. Every event in man’s life has already been settled and determined by his fate.

15. Risk Preferences:

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
</table>

1. A farmer should rather take more of a chance in making a big profit than to be content with a smaller, but less risky profit.

2. A farmer who is willing to take greater risks than the average farmer usually does will be better financially.

3. A farmer should grow larger no. of crops to avoid greater risks involved in growing one or two crops.

4. It is better for a farmer not to try new farming methods unless most other farmers have used them with success.

5. Trying certainly new method in farming by a farmer involves risk but it is worth it.

6. It is good for a farmer to take risks when he knows his chances of success are fairly high.
16. Empathy:

1) If you were Sarpanch of Gram Panchayat what would you do next year?

2) If you were Dairy Extension Worker, what would you do to improve the price of milk in the village?

3) If you were Chairman of Municipal Committee of the town, what would you do to improve the health of village community?

4) If you were Minister of Agriculture and Animal Husbandry, what would you do for the agriculturist and Dairymen of your State?

5) If you were Prime Minister of the Republic, what would you do to check the price rise of the essential commodities?

Attributes of Innovation

17. Simplicity/Complexity:

A good number of practices have been recommended to you for use in increase crop yield. Some of these may be easy to use as they involve little changes. There are others which may be difficult to use as they require changes in skill, operations etc. Taking these into consideration please give your opinion about each of the following practices regarding the extent to which they can be practised with ease and/or difficulty?

<table>
<thead>
<tr>
<th>Practices</th>
<th>Very Easy to Use</th>
<th>Neither Difficult</th>
<th>Very Difficult</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>easy</td>
<td>easy nor difficult</td>
<td>difficult</td>
</tr>
<tr>
<td></td>
<td>task</td>
<td>to use</td>
<td>to use</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A. Dairy Innovations:
As in Appendix I

B. Agricultural Innovations:
As in Appendix I
18. Communicability:

There are some practices which show spectacular results i.e., their beneficial responses are most apparently visible and evaluable. For example, B.H.C. dusting against crop pests. On the other hand there are other practices whose results are not quite observable and evaluable. In the light of this consideration please give your opinion against each practice in the column you feel appropriate?

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Practices</th>
<th>Results</th>
<th>Results</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Visi-</td>
<td>some-</td>
<td>least</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ble.</td>
<td>what</td>
<td>visi-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>visi-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

According to your opinion, the results are

5, 4, 3, 2, 1

A: Dairy Innovations:
As in Appendix I

B: Agricultural Innovations
As in Appendix I

19. Profitability:

By profitability we mean the additional gain in terms of yield and/or money which one gets in using an improved practice over local one. Considering from this point of view, to what extent do you consider the following practices being profitable in your farming situation? Please give your opinion against each practice in the column you feel appropriate?

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Practices</th>
<th>Most Profit-</th>
<th>Somewhat Profit-</th>
<th>Least Profit-</th>
<th>Not Profit-</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>able.</td>
<td>profit- able.</td>
<td>profit- able.</td>
<td>profit- able.</td>
</tr>
</tbody>
</table>

A: Dairy Innovations:
As in Appendix I

B: Agricultural Innovations:
As in Appendix I
20. **Physical Compatibility:**

Keeping in view the farming resources available at your disposal such as type of soil, human and bullock labour, source of irrigation etc., to what extent do you consider the following practices suitable in your farming situation?

<table>
<thead>
<tr>
<th>No.</th>
<th>Practices</th>
<th>Most suitable</th>
<th>Somewhat suitable</th>
<th>Least suitable</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td></td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

A: **Dairy Innovations:**

As in Appendix I

B: **Agricultural Innovations:**

As in Appendix I

---

31. **Cultural Compatibility:**

There are some practices which may not be considered compatible since they are not found in line with the existing benefits and habits for example poultry farming. Contrary to these, there are others which fit in with our existing beliefs and habits. In the light of the above considerations, please rate the following practices giving their respective positions in the appropriate columns?

<table>
<thead>
<tr>
<th>No.</th>
<th>Practices</th>
<th>Most compatible</th>
<th>Quite compatible</th>
<th>Somewhat compatible</th>
<th>Least compatible</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td></td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

A: **Dairy Innovations:**

As in Appendix I

B: **Agricultural Innovations:**

As in Appendix I
22. **Divisibility (Trialability)**

There are some practices which are divisible to use i.e. which can be divided into small quantities and still be used. For example, Jowar seeds, or single superphosphate. On the contrary there are others which are not divisible i.e. which cannot be used on a fractional basis, for example oilseed thresher or any improved implements. In the light of above consideration, what do you consider the following practices, give your opinion against each practice?

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Practices</th>
<th>Divisible to use</th>
<th>Not divisible to use</th>
</tr>
</thead>
</table>

A: **Dairy Innovations:**

As in appendix I

B: **Agricultural Innovations:**

As in appendix I