

## AXIOMATIC THEORY OF ENTREPRENEURIAL BEHAVIOUR OF FARMERS

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The function of theorizing according to Gudykunst (1983) is (i) to predict, (ii) to explain or (iii) to control the phenomenon under study. The explain - prediction - control view of theory is the characteristics of positivistic approach to theory building. The control aspect of theory has not got dominant place in theory construction. According to Dubin (1969), theories of social and human behaviour address themselves to two distinct goals of science. (i) prediction and (ii) understanding. In the usual case of building theory in the behavioural sciences, understanding and prediction are not often achieved together, and it therefore becomes important to ask why ? According to him prediction is concerned with outcomes and understanding is concerned with interaction among variables (the unit of a theory). Theorizing is necessary in entrepreneurship research because of the need of conceptual frameworks which will give direction to the diverse research effort taking place within it. Theorizing is necessary in entrepreneurship to understand the process of entrepreneurship. Initial goal of theory in entrepreneurship will be understanding rather than prediction or control.

The axiomatic approach to theory building is one of the positive theories which refers to consisting of propositional statements ranging from postulates to hypotheses with a built in logical system for explaining and predicting the human behaviour of an individual. According to Zetterberg (1965), the advantages of axiomatic format over the other theoretical model are (i) the concepts and postulates offer the most parsimonious summary of research findings, (ii) it has the highest plausibility per amount of

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empirical data, (iii) it helps to locate strategic research problems (v) the source of failure of hypotheses is to meet empirical test may be efficiently discerned and (v) it permits clear distinction between propositions which are definitions and those which are hypotheses. Keeping the advantages of axiomatic theory in mind, an attempt has been made to propose axiomatic theory of entrepreneurial behaviour of farmers.

### **Steps Involved in Axiomatic Theory of Entrepreneurial Behaviour**

Different authors (Zetterberg, 1965, Schwirian and Prehn, 1962, Hage, 1977 and Singh 1995) have suggested different steps to be followed for constructing theory in an axiomatic format. The steps followed in the present study for constructing theory in an axiomatic format has been discussed in detail.

In an axiomatic theory building technique, first an idea or social phenomena is selected. By idea or social phenomena to the problem of farmers. Theory then can be started in many ways. The simplest way to begin is to search for some theoretical concepts i.e. variables or characteristic is describe the social phenomena. The theoretical concepts are the foundation of any theory. The first task in constructing a theory, therefore is to find some concept to use the theoretical statements. The most useful kind of theoretical concept is the general variable, a continuum that applies to any culture and at any point of time to societies that have ceased to exist, that presently exist and have to come into existence. The concepts are basic and derived for perceiving phenomena. In an ideal sense concept to be used in a theory should be readily understandable to all other who are familiar with the general perspective of framework. An operational definition of an abstract concept usually consists of procedures explicate the activities to arrive at real world indications. These activities include asking question, observation, sensory perception etc.

The next building block of a theory is the system of proposition. However, much we can describe social phenomenon with a theoretical concept, we cannot use it to explain or predict. To explain we need a theoretical statement a connection between two or more concepts.

Concepts are atoms of any theory and the theoretical statements are the bonds between them.

The next stage is to formulate a certain postulates of the theory. The postulates should be chosen so that all other hypotheses the theorems should be capable of derivation from the postulates. In other words, no postulate should contradict any other and more postulate should follow from other postulate as a theorem / hypotheses.

Then, if one would like to further verify the theory one should select a certain number of proposition to be tested empirically. If the empirical test is favourable and no mistake has been made in the derivation one can claim empirical validity for the whole theory.

With this reasoning, and considering the advantages of axiomatic theory building, the technique has been adopted for theory construction where procedure can be summarily put up as follows : (i) selection of an idea or social phenomenon (ii) selection of variables or theoretical concepts (iii) definition of the concepts (iv) formulation of postulates and hypotheses (v) testing of postulates and hypotheses (vi) validification of the theory.

The above discussed theoretical model has been used in constructing the theory of entrepreneurial behaviour of farmers.

### **Step - 1 : Selection of an idea or social phenomena :**

The theory formulated here is a macro theory of entrepreneurial behaviour. It consists of management orientation, farm decision making, leadership abilities, risk taking ability, knowledge of vegetable farming, achievement motivation, innovativeness, self-confidence and utilization of available assistance. As a substantive domain. It deals with above nine dimensions. A minimally adequate initial theory within the substantive domain of entrepreneurship must treat variable representative of the nine dimensions of entrepreneurial behaviour.

### **Step - 2 : Selection of variables :**

The past studies of entrepreneurial behaviour of farmers have indicated the

following variables related to entrepreneurial behaviour which have been presented in a tabular form below :

**Table 1: Number of predictor variables related to entrepreneurial behaviour of farmers**

| Sl. No. | Name of the predictor variables    | No. of studies | No. of studies significant | No. of studies non-significant |
|---------|------------------------------------|----------------|----------------------------|--------------------------------|
| 1.      | Age                                | 5              | 3                          | 2                              |
| 2.      | Education                          | 9              | 8                          | 1                              |
| 3.      | Family size                        | 2              | 2                          | -                              |
| 4.      | Parents                            | 1              | 0                          | 1                              |
| 5.      | Wife                               | 1              | 1                          | -                              |
| 6.      | Friends                            | 1              | 1                          | -                              |
| 7.      | Joint family                       | 1              | 1                          | -                              |
| 8.      | Migration                          | 3              | 2                          | 1                              |
| 9.      | Peer group                         | 1              | -                          | 1                              |
| 10.     | Caste                              | 6              | 4                          | 2                              |
| 11.     | Community                          | 1              | 1                          | -                              |
| 12.     | Socio economic status              | 14             | 11                         | 3                              |
| 13.     | Income                             | 2              | 1                          | 1                              |
| 14.     | Sources of information utilization | 6              | 5                          | 1                              |
| 15.     | Training received                  | 8              | 7                          | 1                              |
| 16.     | Marketing facilities               | 7              | 6                          | 1                              |
| 17.     | Attitude towards farming           | 3              | 2                          | 1                              |
| 18.     | Farm size                          | 3              | 1                          | 2                              |
| 19.     | Experience                         | 4              | 2                          | 2                              |
| 20.     | Availability of material           | 2              | 2                          | -                              |
| 21.     | Family support                     | 2              | 1                          | 1                              |
| 22.     | Community support                  | 1              | -                          | 1                              |
| 23.     | Availability of technology         | 1              | 1                          | -                              |
| 24.     | Social participation               | 7              | 5                          | 2                              |

| Sl. No. | Name of the predictor variables          | No. of studies | No. of studies significant | No. of studies non-significant |
|---------|------------------------------------------|----------------|----------------------------|--------------------------------|
| 25.     | Ability to coordinate farming activities | 6              | 5                          | 1                              |
| 26.     | Economic resources                       | 1              | 1                          | -                              |
| 27.     | Inter-personal competence                | 1              | 1                          | -                              |
| 28.     | Knowledge of results                     | 2              | 1                          | 1                              |
| 29.     | Adaptability                             | 1              | 1                          | -                              |
| 30.     | Birth order                              | 3              | 2                          | 1                              |
| 31.     | Independence                             | 1              | 1                          | -                              |
| 32.     | Cosmopolitaness                          | 4              | 3                          | 1                              |
| 33.     | Adoption                                 | 3              | 2                          | 1                              |
| 34.     | Level of aspiration                      | 1              | 1                          | -                              |
| 35.     | Occupation                               | 3              | 2                          | 1                              |
| 36.     | Financial status of the family           | 5              | 4                          | 1                              |
| 37.     | Value orientation                        | 6              | 4                          | 2                              |
| 38.     | Lack of employment opportunities         | 1              | -                          | 1                              |
| 39.     | Little opportunity for advancement       | 1              | 1                          | -                              |
| 40.     | Cropping intensity                       | 1              | 1                          | -                              |
| 41.     | Irrigation potentiality                  | 1              | 1                          | -                              |

According to Hage (1972), the number of variables within the theoretical system has to be limited and must not go beyond ten variables. Hence, the following criteria were used for selection of the variables.

- All the non-significant variables were rejected.
- All the positively significant variables were selected.
- Definitions of the variables were studied and it appeared that many of the variables could be clubbed together. Through these procedures 22 variables were eliminated and 41 variables remained for final selection.

**Table 2: Dimensions related to entrepreneurial behaviour which has been presented below :**

| Sl. No. | Name of the component/dimension                                | No. of studies | No. of studies significant | No. of studies non-significant |
|---------|----------------------------------------------------------------|----------------|----------------------------|--------------------------------|
| 1.      | Innovativeness                                                 | 9              | 8                          | 1                              |
| 2.      | Not to discourage by failure                                   | 1              | 1                          | -                              |
| 3.      | Future oriented                                                | 3              | 2                          | 1                              |
| 4.      | Hard working                                                   | 1              | 1                          | -                              |
| 5.      | Persistent                                                     | 1              | 1                          | -                              |
| 6.      | Takes personal responsibility                                  | 2              | 2                          | -                              |
| 7.      | Risk taking ability                                            | 8              | 7                          | 1                              |
| 8.      | Sets goals and realistic step by step sub-goals                | 1              | 1                          | -                              |
| 9.      | Drive for power but not excessive                              | 3              | 2                          | 1                              |
| 10.     | Drive for independence                                         | 1              | -                          | 1                              |
| 11.     | Achievement motivation                                         | 14             | 12                         | 2                              |
| 12.     | Desires feed back and learns from experience recognising error | 1              | 1                          | -                              |
| 13.     | Goal oriented                                                  | 2              | 2                          | -                              |
| 14.     | Ability to exploit situation                                   | 4              | 2                          | 2                              |
| 15.     | Willing to learn and does not suffer from complex              | 1              | -                          | 1                              |
| 16.     | Has self - confidence                                          | 7              | 5                          | 2                              |
| 17.     | Constantly under stress                                        | 1              | -                          | 1                              |
| 18.     | Knowledge of farming                                           | 9              | 9                          | -                              |
| 19.     | Person of integrity                                            | 1              | 1                          | -                              |
| 20.     | Like to excell in work                                         | 1              | 1                          | -                              |
| 21.     | plesant personality                                            | 3              | 2                          | 1                              |
| 22.     | Success oriented                                               | 4              | 3                          | 1                              |
| 23.     | Egoist                                                         | 1              | -                          | 1                              |

| Sl. No. | Name of the component/dimension                    | No. of studies | No. of studies significant | No. of studies non-significant |
|---------|----------------------------------------------------|----------------|----------------------------|--------------------------------|
| 24.     | Competitive                                        | 2              | 2                          | -                              |
| 25.     | Dreamer                                            | 1              | -                          | 1                              |
| 26.     | Time is important                                  | 3              | 2                          | 1                              |
| 27.     | Imagination                                        | 1              | 1                          | -                              |
| 28.     | Courageous                                         | 1              | 1                          | -                              |
| 29.     | Self starter                                       | 2              | 1                          | 1                              |
| 30.     | Failure as step towards success                    | 2              | 1                          | 1                              |
| 31.     | Individualist                                      | 1              | -                          | 1                              |
| 32.     | Multifaceted interests                             | 3              | 2                          | 1                              |
| 33.     | Likes challenges                                   | 3              | 3                          | -                              |
| 34.     | Dynamic                                            | 5              | 4                          | 1                              |
| 35.     | Leadership ability                                 | 7              | 7                          | -                              |
| 36.     | Takes initiative                                   | 4              | 3                          | 1                              |
| 37.     | Higher energy level                                | 1              | 1                          | -                              |
| 38.     | Easily boarded / impatient                         | 1              | 1                          | -                              |
| 39.     | Sensitive and perceptive to people and environment | 2              | 2                          | -                              |
| 40.     | There's always better way                          | 1              | 1                          | -                              |
| 41.     | High tolerance and ambiguities                     | 2              | 2                          | -                              |
| 42.     | Good communication with people                     | 6              | 5                          | 1                              |
| 43.     | Mentally hyper active                              | 4              | 3                          | 1                              |
| 44.     | Intutive                                           | 1              | -                          | 1                              |
| 45.     | Ability to grasp quickly                           | 2              | 2                          | -                              |
| 46.     | Belief in god                                      | 3              | 3                          | -                              |
| 47.     | Enjoys living, work and play                       | 1              | 1                          | -                              |
| 48.     | Dissatisfied with general situation                | 4              | 2                          | 2                              |
| 49.     | Atleast average intellig-ence                      | 5              | 3                          | 2                              |
| 50.     | Want to make lot of money                          | 4              | 3                          | 1                              |
| 51.     | Personal resource fullness                         | 1              | 1                          | -                              |

| Sl. No. | Name of the component/dimension               | No. of studies | No. of studies significant | No. of studies non-significant |
|---------|-----------------------------------------------|----------------|----------------------------|--------------------------------|
| 52.     | Originality                                   | 1              | 1                          | -                              |
| 53.     | Task result oriented                          | 3              | 3                          | -                              |
| 54.     | Utilization of available assistance           | 6              | 5                          | 1                              |
| 55.     | Management orientation                        | 4              | 3                          | 1                              |
| 56.     | Ability of organisation and administration    | 3              | 2                          | 1                              |
| 57.     | Searching environment and time bound planning | 4              | 4                          | -                              |
| 58.     | Hopeful about future                          | 7              | 6                          | 1                              |
| 59.     | Is good sales man of idea                     | 2              | 2                          | -                              |
| 60.     | Strategic vision                              | 1              | 1                          | -                              |
| 61.     | Likes to excell in his work                   | 1              | 1                          | -                              |
| 62.     | Managerial competence                         | 2              | 2                          | -                              |
| 63.     | Tactful                                       | 1              | 1                          | -                              |
| 64.     | Farm decision making                          | 14             | 12                         | 2                              |
| 65.     | Progressivism                                 | 2              | 2                          | -                              |
| 66.     | Creative                                      | 6              | 5                          | 1                              |
| 67.     | Locus control                                 | 2              | 1                          | 1                              |
| 68.     | Tolerance of ambiguity                        | 2              | 1                          | 1                              |

- d. Finally the variables have been categorised through Q sort technique. The variables selected named as predictor variables were (i) Education (ii) Socio-economic status (iii) Caste (iv) Training received (v) Sources of information utilization (vi) Marketing facilities (vii) Ability to co-ordinate farming activities (viii) Value orientation (ix) Experience in farming and entrepreneurial behaviour is the response variable. The selected dimensions / components of entrepreneurial behaviour as follows : (1) Management orientation (2) Farm decision making (3) Leadership abilities (4) Risk taking ability (5) Knowledge of vegetable farming (6) Achievement motivation (7) Innovativeness (8) Self-confidence (9) Utilization of available assistance.

The basic concepts, assumptions and derived concepts of the axiomatic theory of entrepreneurial behaviour are as under (Formed in line with Schwirian and Prehn, 1962).

| Basic Concepts       | Assumptions                                                                                                             | Derived Concepts                                                                                         |
|----------------------|-------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| 1. Geographical area | 1. Human individual exists in Geographical area.                                                                        | 1. Geographical unit (Guntur district derived from basic concept 1 and assumption 6)                     |
| 2. Human individual  | 2. Human individual possesses a finite number of characteristics.                                                       | 2. Education                                                                                             |
| 3. Characteristic    | 3. Human individual possesses similar type of characteristics.                                                          | 3. Socio-economic status                                                                                 |
|                      | 4. Characteristics of one human individual differ in degree and manifestation from those of any other human individuals | 4. Caste                                                                                                 |
|                      | 5. Some characteristics of human individuals can be known.                                                              | 5. Training received                                                                                     |
|                      | 6. Geographical area can be arbitrarily bounded and then boundaries can be known.                                       | 6. Sources of information utilization.                                                                   |
|                      | 7. That which can be known, can be observed either directly or indirectly.                                              | 7. Marketing facilities                                                                                  |
|                      | 8. Some of what is observable can be measured.                                                                          | 8. Ability to co-ordinate the farming activities                                                         |
|                      | 9. That which can be measured is subject to statistical analysis.                                                       | 9. Value orientation.                                                                                    |
|                      |                                                                                                                         | 10. Experience in farming (2 to 10 derived from basic concepts 2 and 3 and assumption 1, 2, 3, 4 and 5). |
|                      |                                                                                                                         | 11. Farmer (derived from basic concept 2).                                                               |

This has been presented in diagrammatic form (fig 1)

**Step - 3 : Definition of the concepts :**

As already stated, a clear concept offers the same meaning to all those who use it. It is essential to define the theoretical concepts of the above mentioned variables. The operational definition have been given in the Step - 5 i.e. testing of postulates and hypotheses.

**Education :** It refers to the number of years of formal education attended by the individual or it is the process through which an individual is able to comprehend the group relationship between facts and ideas, and between one idea and another, to place facts and ideas in a system of values and to see their relevance to one's own life and to his society.

**Socio Economic Status :** It refers to the position of a farmer occupies in comparison to other with respect to possession of land, education, type of house, material possession, farm power and social participation.

**Caste :** Categories of persons arranged in levels according to their social status in the society by birth is called caste.

**Training Received :** It is defined as the number of days an individual receiving training.

**Marketing Facilities :** It refers to the proximity of the market centre and the facilities available there.

**Ability to Coordinate the Farming Activities :** It is defined as in farm business, farmers has to harmonize and synchronies the various farm activities in order to complete the work in stipulated time.

**Value Orientation :** It refers to those aspects of the actor's orientation which commit him to the observance of certain norms, standards, criteria of selection, whenever he is in a contingent situation which allow (and requires) him to make a choice. Valuing is not in terms of absolute quantum, that is to say, the preferences are not based on discrete units in an 'all' or 'none' fashion. Individual may prefer a particular value among alternatives but even in that particular value, he may have degree of preference which he values most. Thus, value can be thought of as discussion, each involving a continuum on which

the individual locates himself at suitable points. These points establish his value orientation.

**Experience in Vegetable Farming :** It refers to the duration in number of completed years since individuals involvement in vegetable farming.

**Entrepreneurial Behaviour :** Defined as package of personality characteristics and environmental factors related to dynamic agent of change for transforming physical, natural and human resources into corresponding production possibilities.

**Dimensions of Entrepreneurial Behaviour :** The general theoretical concepts of each of the dimension are presented below

**Management orientation** Refers to the degree to which the individuals are oriented towards managing their income generating activities regarding planning, production and marketing functions.

**Farm Decision Making :** Defined as the degree to which an individual justifies his selection most efficient means from among the available alternatives on the basis of scientific criteria for achieving maximum economic profits.

**Leadership Abilities :** Refers to the degree to which an individual initiates or motivates the action of the other fellows.

**Risk Taking Ability :** Refers to the degree to which the individual is oriented towards risk and uncertainty and has a course to face the problem in running an enterprise.

**Knowledge of Vegetable Farming :** Knowledge has been defined as the awareness, extent and manner of the use of improved agricultural practices.

**Achievement Motivation :** Refers to the desire for excellence to attain a sense of personal accomplishment.

**Innovativeness :** Defined as individuals who have an interest in and a desire to seek changes in farming techniques and to introduce such changes into their own operations when practical and feasible.

**Self Confidence :** Defined as the belief in one's own abilities. Self assurance and self reliance are synonyms of self confidence.

**Utilization of Available Assistance :** Defined as the degree of utilization of assistance for farming by farmers rendered the institutions and organizations with in the local infrastructure.

**Step - 4 : Formulation of postulates and hypotheses :**

The axiomatic technique functions to generate hypotheses and it develops a relatively complex system of hypotheses. The next step followed for theory construction is the formulation of postulates and hypotheses.

A fundamental principle of an axiomatic technique is that given  $(n-1)$  postulates where 'n' equals the number of variables and given that all variables appear in atleast one of the  $(n-1)$  hypotheses then all other hypotheses within the theoretical system may be derived. The total number of postulates and hypotheses is therefore,  $n(n-1) / 2$ . Thus, in the present study with nine predictor variables and one response variable, there will be 9 postulates and 36 hypotheses to be tested  $10 (10-1) / 2 = 45$ .

**Postulates :**

Postulates of the axiomatic technique are those assertions of relationships between the variables of the system which are chosen on the basis of existing empirical knowledge, or some justifiable deductive process. The postulates are chosen and stated in such a manner that all the logical possibilities of relationship among all of the variables in the system may be deduced from them. Also, the postulates must be such that no one postulate could be deduced from a combination of any two other postulates (Zetterberg, 1965).

**Postulates :**

$(n-1)$  = 9 postulates As the fundamental principle of formulating postulates stated in the formula  $(n-1)$  where  $n$  = number of variables. Formulated postulaes are

$P_1$  = Higher the education, higher the socio economic status;

$P_2$  = Higher the socio-economic status, higher the marketing facilities;

$P_3$  = Higher the marketing facilities, higher the value orientation;

### **Hypotheses :**

By applying the deductive technique for formulating the hypotheses from postulates stated above all the logical possible relationship between the variables in the system are deduced a few of which are as followed

- Ho1 = Higher the education, higher the marketing facilities.
- Ho2 = Higher the education, higher the value orientation.
- Ho3 = Higher the education, higher the entrepreneurial behaviour
- Ho4 = Higher the socio-economic status, higher the value orientation.

These hypotheses are syllogistically deduced from postulates. Together the postulates and hypotheses are the propositions of the theory which are subjected to empirical tests.

### **Step - 5 : Testing of postulates and hypotheses :**

To test the developed postulates and hypotheses an ex post facto research technique was followed. The study was conducted in the state of Andhra Pradesh. There are 24 districts in Andhra Pradesh, out of 24 districts Guntur district was selected purposively. Guntur district comprises 59 mandals, out of 59 mandals four mandals namely Chebrolu, Mangalagiri, Tadepalli and Tulluru were selected by random sampling technique. A list of villages was obtained from the above selected four mandals. Three villages from each mandal on the basis of cultivable area of vegetable crops were selected. A total of 12 villages were selected namely Narakoduru, Chebrolu, Vazendla, Nutakki, Naluru, Padavadla Pudi, TadePalli, Gundemeda, Vippatam, Mandapam, Pada Parimi and Venkata Palem. A complete list of vegetables growing farmers from selected 12 villages were prepared with the help of village level workers. From above 12 villages. 10 farmers were selected from each village comprising 120 respondents were finally selected by random sampling technique. The head of the family who was actually engaged in cultivation, was taken as the unit of analysis of this study.

### **Measurement of response and predictor variables :**

**Response variable - Entrepreneurial behaviour :** For measuring the

entrepreneurial behaviour of vegetable growers the scales already developed by different authors namely Samanta, (1977 Management orientation), Nanda Purkar, (1980 Farm decision making), Nanda Purkar, (1980 Leadership abilities), Supe, (1969 Risk taking ability), Ramaiah, (1991 Knowledge of vegetable farming), Visweswaram, (1969 Achievement motivation), Rogers and Svenning, (1969 Innovativeness), Basavanna, (1971 Self-confidence) and Rao, (1985 Utilization of available assistance) were used with suitable modifications. The score obtained from above nine dimensions were added and the total was treated as a score of entrepreneurial behaviour (Response variable).

### **Predictor Variables :**

**Education :** Scores of different educational levels were given according to the S.E.S. scale of Ramaiah (1983).

**Socio-Economic Status :** It was measured with the help of a scale developed by Ramaiah (1983).

**Caste :** The quantification of this variable was done with the help of a caste scale developed by Murthy (1974).

**Training Received :** It was measured with the schedule developed for the study.

**Sources of Informaton Utilized :** It was measured by the scale developed by Nanda Purkar (1980).

**Marketing Facilities :** It was measured with the schedule developed for the study.

**Ability to Co-ordinate the Farming Activities :** It was measured in line with the scale developed by Nanda Purkar (1980).

**Value Orientation :** Value orientation of the respondents were measured with the help of the scale developed by Kittur (1976).

**Experience in Farming :** It was measured with the schedule developed for the study.

The data were collected with the help of a schedule specially constructed for the study purpose. The statistical methods employed for testing postulates and hypotheses were namely correlation and regression. The level of probability of the acceptance or rejection of postulates and hypotheses was on 0.01 and 0.05.

Relationship among the variables were tested with the help of zero order correlation. The inter correlation matrix has been given below.

**Table 3: Inter-correlation matrix.**

| Sl. No. | Variables                                    | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8     | 9     | 10     |
|---------|----------------------------------------------|--------|--------|--------|--------|--------|--------|--------|-------|-------|--------|
| 1.      | Education                                    | 1.000  |        |        |        |        |        |        |       |       |        |
| 2.      | Socio economic status                        | 0.8831 | 1.000  |        |        |        |        |        |       |       |        |
| 3.      | Caste                                        | 0.8745 | 0.9090 | 1.000  |        |        |        |        |       |       |        |
| 4.      | Training received                            | 0.6906 | 0.6665 | 0.6759 | 1.000  |        |        |        |       |       |        |
| 5.      | Sources of information utilization           | 0.4315 | 0.4245 | 0.4180 | 0.444  | 1.000  |        |        |       |       |        |
| 6.      | Marketing facilities                         | 0.8818 | 0.8388 | 0.8521 | 0.6672 | 0.5084 | 1.000  |        |       |       |        |
| 7.      | Ability to coordinate the farming activities | 0.8880 | 0.7962 | 0.8009 | 0.6288 | 0.4050 | 0.8634 | 1.000  |       |       |        |
| 8.      | Value orientation                            | 0.8236 | 0.7975 | 0.7951 | 0.5830 | 0.3575 | 0.7979 | 0.8552 | 1.000 |       |        |
| 9.      | Experience in farming                        | 0.9032 | 0.8385 | 0.8095 | 0.6379 | 0.4675 | 0.8590 | 0.8390 | 0.813 | 1.000 |        |
| 10.     | Entrepreneurial Behaviour                    | 0.157  | 0.1443 | 0.1155 | 0.1235 | 0.1993 | 0.1183 | 0.1293 | 0.160 | 0.157 | 1.000  |
|         | Multiple R <sup>2</sup>                      | 0.779  | 0.7646 | 0.476  | 0.1862 | 0.777  | 0.78   | 0.678  | 0.815 | 0.02  | 0.9094 |

The data had rejected two postulates 6 hypotheses and accepted 7 postulates and 30 hypotheses. Accepted postulates and hypotheses are as follows:

**Postulates :**

- P<sub>1</sub> = The higher the education, the higher the S.E.S;
- P<sub>2</sub> = The higher the S.E.S., the higher the caste;
- P<sub>3</sub> = The higher the caste, the higher the training received;
- P<sub>4</sub> = The higher the training received, the higher the sources of information utilization;
- P<sub>5</sub> = The higher the sources of information utilization, the higher the marketing facilities;
- P<sub>6</sub> = The higher the marketing facilities, the higher the ability to coordinate the farming activities;
- P<sub>7</sub> = The higher the ability to coordinate the farming activities, the higher the value orientation.
- \*P<sub>8</sub> = The higher the value orientation, the higher the experience in farming;
- \*P<sub>9</sub> = The higher the experience in farming, the higher the entrepreneurial behaviour.

(\* Rejected Postulates)

**Hypotheses :**

- Ho 1 = The higher the education, the higher the caste.
- Ho 2 = The higher the education, the higher the training received.
- Ho 3 = The higher the education, the higher the sources of information utilization.
- Ho4 = The higher the education, the higher the marketing facilities.
- Ho 5 = The higher the education, the higher the ability to coordinate the farming activities.
- Ho 6 = The higher the education, the higher the value orientation.

- \*Ho 7 = The higher the education, the higher the experience in farming.
- Ho 8 = The higher the education, the higher the entrepreneurial behaviour.
- Ho 9 = The higher the SES, the higher the training received.
- Ho 10 = The higher the SES, the higher the sources of information utilization.
- Ho 11 = The higher the SES, the higher the marketing facilities.
- Ho 12 = The higher the SES, the higher the ability to coordinate the farming activities.
- Ho 13 = The higher the SES, the higher the value orientation.
- \*Ho 14 = The higher the SES, the higher the experience in farming.
- Ho 15 = The higher the SES, the higher the entrepreneurial behaviour.
- Ho 16 = The higher the caste, the higher the sources of information utilization.
- Ho 17 = The higher the caste, the higher the marketing facilities.
- Ho 18 = The higher the caste, the higher the ability to coordinate the farming activities.
- Ho 19 = The higher the caste, the higher the value orientation.
- \*Ho 20 = The higher the caste, the higher the experience in farming.
- Ho 21 = The higher the caste, the higher the entrepreneurial behaviour.
- Ho 22 = The higher the training received, the higher the marketing facilities.
- Ho 23 = The higher the training received, the higher the ability to coordinate the farming activities.
- Ho 24 = The higher the training received, the higher the value orientation.
- Ho25 = The higher the training received, the higher the experience in farming.

- Ho 26 = The higher the training received, the higher the entrepreneurial behaviour.
- Ho 27 = The higher the sources of information utilization, the higher the ability to coordinate the farming activities.
- Ho 28 = The higher the sources of information utilization, the higher the value orientation.
- \*Ho 29 = The higher the sources of information utilization, the higher the experience in farming.
- Ho 30 = The higher the sources of information utilization, the higher the entrepreneurial behaviour.
- Ho 31 = The higher the marketing facilities, the higher the value orientation.
- \*Ho 32 = The higher the marketing facilities, the higher the experience in farming.
- Ho 33 = The higher the marketing facilities, the higher the entrepreneurial behaviour.
- \*Ho 34 = The higher the ability to coordinate the farming activities, the higher the experience in farming.
- Ho 35 = The higher the ability to coordinate the farming activities, the higher the entrepreneurial behaviour.
- Ho 36 = The higher the value orientation, the higher the entrepreneurial behaviour.

(\* Rejected Hypotheses)

To develop predictive axiomatic theory, the technique of multiple regression was used. This technique was used to determine the effect of the predictor variables on response variable i.e. entrepreneurial behaviour. The findings have been presented in the table.

**Table 4: Multiple regression analysis of nine predictor variables with the response variable entrepreneurial behaviour.**

| Sl. No. | Predictor Variables                          | $\beta$ (Std. b) | $\beta \times R$ | b-value regression coefficient (RC) | S.E. of b | t value for b       |
|---------|----------------------------------------------|------------------|------------------|-------------------------------------|-----------|---------------------|
| 1.      | Education                                    | 0.174            | 16.891           | 6.331                               | 2.802     | 2.259*              |
| 2.      | Socio economic status                        | 0.155            | 14.865           | 0.457                               | 0.227     | 2.013*              |
| 3.      | Caste                                        | 0.064            | 4.851            | 2.491                               | 1.606     | 1.552 <sup>NS</sup> |
| 4.      | Training received                            | - 0.36           | -1.690           | -1.034                              | 1.010     | 1.024 <sup>NS</sup> |
| 5.      | Sources of information utilization           | 0.079            | 7.627            | 1.207                               | 1.143     | 1.056 <sup>NS</sup> |
| 6.      | Marketing facilities                         | 0.294            | 28.673           | 4.635                               | 1.100     | 4.214**             |
| 7.      | Ability to coordinate the farming activities | -0.048           | -4.353           | -1.530                              | 1.963     | 0.789 <sup>NS</sup> |
| 8.      | Value orientation                            | 0.330            | 32.746           | 4.384                               | 0.887     | 4.945**             |
| 9.      | Experience in farming                        | 0.023            | 0.391            | 0.8                                 | 1.052     | 0.760 <sup>NS</sup> |

Multiple R = 0.9536

Multiple  $R^2 = 0.9094$ , Adjusted  $R^2 = 0.9020$

F value for R = 122.66\*\* with 9 and 110 dfs

Intercept constant = 66.56, S.E. of intercept = 9.73.

$\beta \times R$  = Gives contribution of the character to  $R^2$  value

\* = Significant at 0.05 level of probability.

\*\* = Significant at 0.01 level of probability.

NS = Non-significant.

The regression equation which included education, socio-economic status, caste, training received, sources of information utilized, marketing facilities, ability to co-ordinate the farming activities, value orientation and experience in farming explain to the extent of 90.94 per cent variation in entrepreneurial behaviour of farmers. The respective 'F' value (significant at 1 per cent level) at degree of freedom given in the parenthesis was 122.66 (9, 10). Thus, the results implied that all the nine predictor variables would account for a highly significant amount of variation in the entrepreneurial behaviour of farmers. From the above observation 't' test of significance indicates that the co-efficient of regression (b value) are found significant

in case of value orientation (x8), marketing facilities (x6), socio economic status (x2) and education (x1). It is also evident from the table that the variables caste (x3), training received (x4), sources of information utilized (x5), ability to co-ordinate the farming activities (x7) and experience in farming (x9) have got negative regression co-efficients. Negative regression co-efficient for variables caste (x3), training received (x4), sources of information utilized (x5), ability to co-ordinate the farming activities (x7), and experience in farming (x9) (through statistically non-significant) are contrary and unaccountable or unexpected. However, from the correlation matrix it very clear that these predictor variables 1 to 9 are highly correlated with each other. The high correlation among the variables introduce the effect of multi-collinearity.

To remove the effect of multi-collinearity by dropping non-significant variables a step down regression analysis was carried out which finally resulted in the regression education x8 value orientation, x6 marketing facilities, x2 socio-economic status, and x1 education, predictor variables are included in the final multiple regression is set 2.

**Set 2 :** Multiple regression equation with significant predictor variables related to entrepreneurial behaviour.

The entrepreneurial behaviour of farmers has been assessed by the significant variables from set 1 which have been incorporated in table 5.

The table reveals that a multiple regression equation with four predictor variables explained to the extent of 90 per cent variation in entrepreneurial behaviour of farmers. The 'F' value was 274.78 at 4 and 115 degrees of freedom which was significant at 0.01 level of probability. The contribution of predictor variables towards  $R^2$  value was 18.06 per cent by education, 17.7 per cent by socio-economic status, 30 per cent by marketing facilities and 34.1 per cent by value orientation. The contribution of value orientation towards  $R^2$  value is highest, followed by marketing facilities, education and socio-economic status. This reveals that value orientation, marketing facilities, education and socio-economic status are equally important for explaining the entrepreneurial behaviour of farmers.

**Table 5: Multiple regression equation with significant predictor variables related to entrepreneurial behaviour of farmers.**

| Sl. No. | Predictor Variables   | $\beta$ (Std. b) | $\beta \times R$ | b-value regression coefficient (RC) | S.E. of b | t value for b |
|---------|-----------------------|------------------|------------------|-------------------------------------|-----------|---------------|
| 1.      | Education             | 0.185187         | 18.065           | 6.740143                            | 2.766     | 2.436*        |
| 2.      | Socio economic status | 0.183973         | 17.771           | 0.544296                            | 0.21439   | 2.539*        |
| 3.      | Marketing facilities  | 0.306296         | 30.045           | 4.835270                            | 0.90213   | 5.360**       |
| 4.      | Value orientation     | 0.341989         | 34.119           | 4.546917                            | 0.82121   | 5.537**       |

Multiple R = 0.95146

Multiple  $R^2$  = 0.90528, Adjusted  $R^2$  = 0.9020

F value for R = 274.78\*\* with 4 and 115 dfs

Intercept constant = 69.05, S.E. of intercept = 8.52.

$\beta \times R$  = Gives contribution of the character to  $R^2$  value

\* = Significant at 0.05 level of probability.

\*\* = Significant at 0.01 level of probability.

Comparison between table 4 and 5 shows that there is no much difference in the values of percentage of variation explained by the regression equation.

The prediction analysis brought out the important predictor variables, viz, value orientation, marketing facilities, education and socio-economic status in relation to the response variable, i.e. entrepreneurial behaviour of farmers.

Thus, it could be inferred that the entrepreneurial behaviour of farmers can be predicted from the value orientation, marketing facilities, education and socio-economic status.

### **Step - 6 : Validification of the theory :**

The conditions for the validification of the theory are that i) empirical test must be favourable and ii) no mistake has to be made in the derivation while formulating postulates and hypotheses in the present study. All the above mentioned conditions were fulfilled and it can be claimed as an empirical

validity for the whole theory. Therefore, we can propose an axiomatic theory based on empirical verification and validation of the whole theory.

**Reformulated theory :** Higher the value orientation, marketing facilities, education and socio-economic status lead to higher entrepreneurial behaviour of farmers in the social system. Reformulated axiomatic theory has been presented in a diagrammatic form (fig. 2).

## **Discussion**

The findings have been able to bring about the causal effect of different predictor variables on response variable. It has been adequately observed that value orientation, marketing facilities, socio-economic status and education are important predictor variables in the sphere of entrepreneurial behaviour. No doubt, in agricultural sphere farmers economic motivation and willingness to take risk effect their standard of judgement from most traditional to scientific type in order to maximise the production. Therefore, their values may bound to affect the family environment which ultimately will lead to accept the new ways in their farms. Farmers who are having adequate transport facilities, good and quick communication within and outside the rural areas, adequate marketing linkages, market research and marketing facilities at the right place and at the right time. Hence, it is quite natural that these variables have exercised a conspicuous role in the entrepreneurial behaviour of farmers.

An educated man turns to be rational in his thinking and imagination which in turn develops entrepreneurial behaviour skills. Education gives shape and provides directions to the thinking process of the individual. Higher socio-economic status easily signifies bigger farm size, better education, higher social participation, cosmopolitaness, strong financial background, dare to take immediate decisions etc. All these factors provide the farmers a favourable environment due to alertness and receptivity towards change proness or scientific technical enterprises.

Conclusion can be drawn from the prediction analysis that value orientation, marketing facilities, education and socio-economic status are the most

contributing factors for the entrepreneurial behaviour of farmers. Therefore, the four predictor variables viz. value orientation, marketing facilities, education and socio-economic status are the Sine Quo non in entrepreneurial behaviour of farmers.

## Summary

An attempt has been made to formulate a macro theory of entrepreneurial behaviour through the use of axiomatic technique. A macro theory of entrepreneurial behaviour must treat variables representative of the nine dimensions of the domain of entrepreneurial behaviour. These dimensions are management orientation farm decision making, leadership abilities, risk taking ability, knowledge of farming achievement motivation, innovativeness, self-confidence and utilization of available assistance. Nine variables representative of nine dimensions were included within the theoretical system. The selected variables were based on past resources and through the use of Q-sort technique. The variables are education, socio-economic status, caste training received, sources of information utilized, marketing facilities, ability to co-ordinate the farming activities, value orientation and experience in farming. One feature of an axiomatic technique is that given (n) number of variables and the total number of postulates and hypotheses within the system is  $n(n-1)/2$ . Thus with nine predictor and one response variable the total number of postulates and hypotheses within the system was 45 out of which 9 postulates and 36 was hypotheses.

The postulates were selected on the basis of already established empirical findings and they were deduced from the conceptualization of entrepreneurial behaviour. The postulates function to specify valid relationship between certain pairs of variables within the system. From the postulates all other within the system are deduced. Predictive analysis revealed that 4 variables namely value orientation, marketing facilities, education and socio-economic status are the Sine Quo non in the system. Finally, the system was reformulated and the reformulated theory was more compact than the initially stated theory.

## References

- Basavanna, M, 1971. A study of self-confidence as an attitude of self concept. Ph.D. thesis (unpublished), Srivenkateswara University, Tirupathi, India.
- Dubin, R, 1969. Theory building. Free Press, New York.
- Gudykunst, W.B, 1983. Intercultural communication theory : current perspective. Sage Publications, London, New Delhi. p. 13-20.
- Hage, J, 1972. Techniques and problems of theory construction in sociology. Wiley inter Science Publication, John Wiley & Sons, New York.
- Kittur, M.M, 1976. A study of adoption behaviour of marginal farmers in relation to their characteristics and value orientation in Bizapur district of Karnataka state. M. Sc. (Ag.). thesis. Division of Agricultural Extension, U.A.S., Dharwad.
- Murthy, A.S, 1979. Communication behaviour of farmers, New heights, New Delhi.
- Nandapurkar, G.G, 1980. A study of the entrepreneurial behaviour of small farmers. Ph.D. thesis. U.A.S., Bangalore.
- Ramaiah, P. V, 1983. Development of Socio-economic status scale for rural areas. Ph.D. thesis. University of Agricultural Sciences, Bangalore.
- Rao, V.G.K, 1985. A prediction analysis of farming performance of farmers through their entrepreneurial behaviour factors. Ph.D. thesis, Andhra Pradesh Agricultural University, Rajendra Nagar, Hyderabad.
- Rogers, E.M and Svenning, L, 1969. Modernization among peasants : The impact of communication. Holt, Rinehart and winston, New York.
- Samanta, R.K, 1977. A study of some agro-economic, socio-psychological and communication variables associated with repayment behaviour of agricultural credit users of nationalised banks. Ph.D. thesis, Bidan Chandra Krishi Vidyalaya, Nadia, West Bengal.

- Schwirian, K.P and Prehn, J.W, 1962. An axiomatic theory of urbanization. *American sociological review*, Vol. 27, p. 812-815.
- Singh, B.K, 1975. Theory and theory construction in applied social sciences. *I.J.E.E.*, Vol. 11, No (3 & 4), p. 54-62.
- Supe, S.V, 1969. Factors related to different degrees of rationality in decision making among farmer in Buldana district. Ph.D. thesis. Division of Agricultural Extension, I.A.R.I., New Delhi.
- Zetterberg, H.L, 1965. On theory and verification in sociology. Totowa, N.J. Bediminister Press, New Jersey. P10.