

**A STUDY ON ADOPTION OF PIGEON PEA PRODUCTION
RECOMMENDATIONS IN MAHABUBNAGAR DISTRICT
OF ANDHRA PRADESH**

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BY

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B.Sc. (Ag.)

THESIS SUBMITTED TO THE
ANDHRA PRADESH AGRICULTURAL UNIVERSITY
IN PARTIAL FULFILMENT OF THE REQUIREMENTS
FOR THE AWARD OF THE DEGREE OF
MASTER OF SCIENCE
IN THE FACULTY OF AGRICULTURE
(EXTENSION EDUCATION)

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AUGUST, 1993

CERTIFICATE

Mr. B. SURESH REDDY has satisfactorily prosecuted the course of research and that the thesis entitled **A STUDY ON ADOPTION OF PIGEON PEA PRODUCTION RECOMMENDATIONS IN MAHABUBNAGAR DISTRICT OF ANDHRA PRADESH** submitted is a result of the original research work and is of sufficiently high standard to warrant its presentation to the examination. I also certify that the thesis or part thereof has not been previously submitted by him for a degree of any university.

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Chairman, Advisory Committee

CERTIFICATE


This is to certify that the thesis entitled "A STUDY ON ADOPTION OF PIGEON PEA PRODUCTION RECOMMENDATIONS IN MAHABUBNAGAR DISTRICT OF ANDHRA PRADESH" submitted in partial fulfilment of the requirements for the degree of MASTER OF SCIENCE IN AGRICULTURE of the Andhra Pradesh Agricultural University, Hyderabad, is a record of the bonafide research work carried out by Mr. B. SURESH REDDY under my guidance and supervision. The subject of the thesis has been approved by the Student's Advisory Committee.

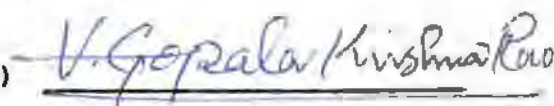
No part of the thesis has been submitted for any other degree or diploma. The published part has been fully acknowledged. All the assistance and help received during the course of the investigation have been duly acknowledged by the author of the thesis.





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LIST OF CONTENTS

CHAPTER	TITLE	PAGE NO.
I.	INTRODUCTION	1
II.	REVIEW OF LITERATURE	8
III.	METHODOLOGY	42
IV.	RESULTS AND DISCUSSION	68
V.	SUMMARY	126
	LITERATURE CITED	134
	APPENDIX	142

LIST OF ILLUSTRATIONS

FIGURE NO.	TITLE	PAGE NO.
1.	Conceptual model	41
2.	Map of Mahabubnagar district showing selected mandals	43
3.	Map of Kodangal mandal showing selected villages	44
4.	Map of Doulatabad mandal showing selected villages	45
5.	Map of Damargidda mandal showing selected villages	46
6.	Percentage distribution of respondents according to their knowledge regarding pigeon pea production recommendations	82
7.	Percentage distribution of respondents according to their adoption of pigeon pea production recommendations	89
8.	Empirical model	125

LIST OF TABLES

TABLE NO.	TITLE	PAGE NO.
1.	Area under pigeon pea cultivation in different districts of Andhra Pradesh during the year 1991-92	48
2.	Area under pigeon pea cultivation in different mandals of Mahabubnagar district during the year 1991-92	49
3.	Details of sampling procedure followed	50
4.	Variables and their measurement	52
5.	Distribution of respondents according to their age	69
6.	Distribution of respondents according to their education	69
7.	Distribution of respondents according to their family size	70
8.	Distribution of respondents according to their social participation	71
9.	Distribution of respondents according to their farm size	72
10.	Distribution of respondents according to their farming experience	72
11.	Distribution of respondents according to their information seeking behaviour	73
12.	Distribution of respondents according to their innovativeness	74
13.	Distribution of respondents according to their risk preference	74
14.	Distribution of respondents according to their economic motivation	75

(contd.)

(contd.)

TABLE NO.	TITLE	PAGE NO.
15.	Distribution of respondents according to their scientific orientation	76
16.	Distribution of respondents according to their management orientation	76
17.	Distribution of respondents according to their knowledge regarding pigeon pea production recommendations	81
18.	Knowledge of respondents on different aspects of pigeon pea production recommendations	83
19.	Distribution of respondents according to their adoption of pigeon pea production recommendations	88
20.	Item analysis of extent of adoption of pigeon pea production recommendations	90
21.	Correlation co-efficient between the knowledge and independent variables of respondents	95
22.	Correlation co-efficient between the adoption and independent variables of respondents	100
23.	Constraints in non adoption of recommended variety	106
24.	Constraints in partial adoption of required seed rate	107
25.	Constraints in partial/non-adoption of seed treatment with Rhizobium	107
26.	Constraints in partial/non-adoption of seed treatment with fungicides	108
27.	Constraints in partial adoption of sowing time	109

(contd.)

(contd.)

TABLE NO.	TITLE	PAGE NO.
28.	Constraints in partial adoption of land preparation	109
29.	Constraints in partial adoption of recommended spacing	110
30.	Constraints in partial/non-adoption of recommended farm yard manure	110
31.	Constraints in partial/non-adoption of recommended fertilizer dose	111
32.	Constraints in non-adoption of recommended time of application of fertilizers	112
33.	Constraints in partial adoption of intercultivation	113
34.	Constraints in non-adoption of supplemental irrigation	113
35.	Constraints in partial/non-adoption of required quantities of chemicals for controlling pod borers, pod fly and plume moth	114
36.	Constraints in non-adoption of recommended variety of wilt	115
37.	Constraints in partial adoption of recommended time of harvesting	116
38.	Suggestions for overcoming the constraints in adoption of pigeon pea production recommendations	123

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(B.SURESH REDDY)

DECLARATION

I, B. SURESH REDDY hereby declare that the thesis entitled A STUDY ON ADOPTION OF PIGEON PEA PRODUCTION RECOMMENDATIONS IN MAHABUBNAGAR DISTRICT OF ANDHRA PRADESH is a result of the original research work done by me. I further declare that the thesis or part thereof has not been published earlier elsewhere in any manner.

Date: 20 - 8 - 1993.



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ABSTRACT

India is the leading pigeon pea producing country accounting for 90-95 per cent of the pigeon pea (3 million hectares) cropped area. The area of pigeon pea in Andhra Pradesh is 3.46 lakh hectares, with a production of 0.74 lakh tonnes and productivity of 214 kg ha⁻¹. Though the area under pigeon pea is more we could not meet the demand of people due to low production and productivity. This is mainly due to the fact that pigeon pea is being mostly grown in the traditional way by the majority of the farmers. There is still a big gap between achievable yields and achieved yields. Higher production could be possible only by understanding the trends of knowledge, adoption and constraints in the adoption of the pigeon pea production recommendations so that the necessary technological gaps could be plugged in desirable direction.

Duly keeping in view the importance of pigeon pea cultivation, this study was undertaken to know the adoption of pigeon pea production recommendations.

An ex-post facto research design was followed. Mahabubnagar district of Andhra Pradesh was purposively selected. Three mandals namely Kodangal, Doulatabad and Damargidda of Mahabubnagar district were also selected purposively. A total of 120 farmers were selected randomly from twelve villages of three selected mandals following proportionate random sampling technique. A pre-tested interview schedule with the measurement of selected variables was used for the collection of the required data. The following findings were emerged out of the study.

Majority of the respondents belonged to middle age group, primary level of education with large family size having

high social participation, big farm size, medium farming experience, had medium level of information seeking behaviour, innovativeness, risk preference, economic motivation, scientific orientation and management orientation.

Majority of the respondents had medium level of knowledge and adoption of pigeon pea production recommendations.

Correlation analysis of independent variables with dependent variables i.e., knowledge and adoption indicated that education, social participation, farm size, farming experience, information seeking behaviour, innovativeness, risk preference, economic motivation, scientific orientation and management orientation had a positive and significant relationship. Whereas age was non-significant with knowledge and negatively significantly correlated with adoption. Family size was non-significant with knowledge and positively significant with adoption.

Constraints in the adoption of pigeon pea production recommendations viz., non availability of varieties in time, involvement of more expenditure, lack of knowledge, lack of technical guidance, non availability of inputs in time, lack of time, non availability of sufficient quantities of FYM, non availability of labour in time, lack of irrigation facilities and high cost of chemicals were expressed by majority of the partial and non-adopters.

Provision of subsidy on different agricultural inputs and credit facilities to the needy farmers, timely technical guidance evolving pest and disease resistant varieties and intensification of extension services by extension staff were some of the suggestions offered by the farmers in overcoming the constraints.

In the light of the above findings there is a need on the part of extension personnel to educate and convince the farmers to adopt all the recommended practices by way of conducting demonstrations, training programmes, field trips and exhibitions etc. In view of the constraints reported by the farmers i.e., early maturing, drought resistant and pest and disease resistant varieties are urgently needed. So the researchers should take these necessary features into account.

LIST OF ABBREVIATIONS

A	:	Agree
DA	:	Disagree
FYM	:	Farm yard manure
Kg ha ⁻¹	:	Kilograms per hectare
SA	:	Strongly agree
S.D.	:	Standard Deviation
SDA	:	Strongly disagree
UD	:	Undecided

INTRODUCTION

CHAPTER I

INTRODUCTION

Food legumes or grain legumes, commonly known as pulses, occupy particularly an important position in meeting protein needs of the people in developing countries like India. The problem of malnutrition associated with the protein gap is closely related to the shortage of food grains. That is, if the food grains production and supply are increased and they are made available to the people, the problem of protein requirement can be solved to a large extent (Singh, 1982)*.

Legumes play an important role in the agricultural economy of the country. In the total area under cultivation, pulses are grown approximately in 24 million hectares, which forms 17 per cent of the total cultivated area and they are next to rice, producing 10-13 million tonnes of seeds valued at over 700 million rupees. Over 10 million rupees are annually earned in the form of foreign exchange by the export of pulses. In the world context India produces about forty per cent of the global production of pulses. Gram and tur are the major pulses constituting 36-42 and 10-13 per cent respectively of the total pulse grown area.

Inspite of the low yields, the pulse crops are extensively cultivated for various reasons. The deep root system enables

* Senior Scientist (Pulses), Department of Plant Breeding, Haryana Agricultural University, Hissar.

them to thrive with little moisture even in the dry season. Because of its drought tolerance, pulse crops find expression in crop mixtures. It is their ability to tolerate drought which makes it possible for the long duration pigeon pea crop to enjoy farmer's preference in low rainfall areas, even though the crop enters the grain development stages, long after the rainy season is over.

Availability of pulses for human consumption

During 1951 to 1961 per capita availability of pulses varied from 59-72 gms, but in general remained above 60 gms reaching a peak availability of 75 gms in 1959. Later however, there has been a steady decline in per capita availability, the lowest figures, 39 gms being reached in 1977 due to low production. The requirement of protein is 84 g/individual/day as per World Health Organisation standards.

Pulse grains are used extensively for human consumption in a variety of forms. In most parts of India pulses form an essential item of the daily diet of the people. Protein being one of the important factors supplying the building material for the body, the importance of pulses in our diet can be easily appreciated. Some of the important pulses grown in India are Bengal gram, Red gram, Green gram, Black gram and Horse gram. The major pulse growing States of the country in the order of their significance are Madhya Pradesh, Rajasthan, Uttar Pradesh, Maharashtra, Orissa, Bihar, Andhra Pradesh, Haryana and Tamilnadu. The other States like West Bengal, Punjab and Gujarat

are also of considerable importance as far as pulse acreage is concerned. The remaining States grow pulses to a limited extent.

Pigeon Pea in India and its importance

India is the leading pigeon pea producing country accounting for 90-95 per cent of the pigeon pea (3 million hectares) cropped area. Pigeon pea is the second most important grain legume after chick pea. It is commonly known as Tur or Arhar and the major production areas are Andhra Pradesh, Bihar, Gujarat, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Tamilnadu and Uttar Pradesh. Pigeon pea has multi purpose uses as food, fodder and fuel and is adoptable to diverse production systems. Consumed as 'dhal' it is considered one of the staple foods of India and represents an important source of protein for millions of people. Well adopted to harsh environment, pigeon pea is particularly well suited to drought prone areas of semi arid tropics. Relative to other crops it performs well under marginal input conditions, a valuable asset to farmers with different cropping strategies and objectives. Average yields have varied with a stable range from about 0.4 ton to 0.8 ton ha⁻¹. Productivity of pigeon pea globally as well as in India is around 700 kg ha⁻¹.

Pigeon Pea in Andhra Pradesh

Pigeon pea is an important Kharif pulse crop grown mainly as an inter crop. It is mostly grown as an intercrop with sorghum in the ratio of 1:3 to 1:8. The area of pigeon pea in

Andhra Pradesh is 3.46 lakh hectares, with a production of 0.74 lakh tonnes and productivity of 214 kg ha⁻¹*.

In Andhra Pradesh it is mainly grown in Mahabubnagar, Adilabad, Karimnagar, Warangal, Khammam, Ranga Reddy and Anantapur districts. Though the area under pigeon pea is more we could not meet the demand of people due to low production and productivity. This is mainly due to the fact that pigeon pea is being mostly grown in the traditional way by the majority of the farmers. Therefore, it is most important task that the farmers must be educated for making them to acquire better knowledge and skill and at the same time their attitude should be changed favourably as a prelude for successful adoption of scientific innovation which inturn will be converted to higher production. This could be possible only by understanding the trends of knowledge, adoption and constraints in the adoption of pigeon pea production recommendations so that the necessary technological gaps could be plugged in desirable direction.

Pigeon pea yields have remained stagnant over a long time. There is still big gap between achievable yields and achieved yields. In Mahabubnagar district pigeon pea is the main Kharif crop and this district has the highest cropped area in Andhra Pradesh. In this district from past five years there had been gradual increase in area but there was not much improvement in production and productivity. Duly keeping in mind the importance of pigeon pea cultivation in Andhra Pradesh, this

* Agriculture Section, Directorate of Economics and Statistics, Hyderabad.

study was undertaken to know the adoption of pigeon pea production recommendations with special reference to Mahabubnagar district. This study was considered to answer some of the questions like what are the personal and socio-psychological characteristics of pigeon pea growing farmers, what was their level of knowledge and extent of adoption of pigeon pea production recommendations, the relationship of independent variables with knowledge and adoption of farmers. Identification of constraints in adoption of pigeon pea production recommendations is also one of the prime intentions of the study.

Keeping these aspects in view, the present study was undertaken with the following specific objectives.

Objectives of the study

- 1) To study the personal, socio-economic and psychological characteristics of pigeon pea farmers.
- 2) To measure the knowledge level of farmers on pigeon pea production recommendations.
- 3) To study the adoption level of Pigeon Pea farmers with reference to production recommendations.
- 4) To study the relationship between personal, socio-economic and psychological characteristics with knowledge and adoption of pigeon pea farmers.
- 5) To identify the constraints in adoption of pigeon pea production recommendations and elucidate the suggestions from the farmers to overcome the same.

Scope of the study

An earnest attempt has been made in this study to explore the knowledge level of the farmers regarding various production recommendations in pigeon pea cultivation and the extent of adoption of these production recommendations by the farmers. Besides this, the study could reveal the relationship of personal and socio-psychological characteristics of farmers with knowledge and adoption and finally an attempt has been made to identify the constraints in adoption of production recommendations in pigeon pea cultivation by farmers individually.

The findings of the study could be gainfully utilized by the administrators, scientists and extension workers to know the existing status of pigeon pea growing farmers and various constraints in adoption of pigeon pea production recommendations. the results of the study could be effectively used in other areas where similar conditions exist with necessary structural changes.

Limitations of the study

The study had the usual limitations of a single student research project, although every attempt has been made to have a thorough investigation into several aspects of the problem.

Since the researcher had limited time and finance at disposal, the locale of this investigation confined to only three mandals of Mahabubnagar district.

The findings of the study are based on expressed opinions or responses and recall mechanism of the respondents

where the subjectivity might not have been completely overcome inspite of the best efforts of the investigator.

The study was restricted to only three mandals with a sample of 120 farmers of Mahabubnagar district where pigeon pea cultivation is practiced in a big way compared to other areas. As such generalisation of the study could be restricted to the areas where similar conditions exist.

Presentation of the study

The study is presented in the following chapters. The first chapter deals with the "Introduction" wherein the statement of the problem, objectives of study, scope of the investigation and limitations of the study are discussed.

The second chapter "Review of Literature" deals with the review of available and related studies in the light of the present investigation.

The third chapters deals with the details of the "Methodology" used in the process of investigation. It includes the locale of the study, sampling procedure followed, variables selected for the study, devices and methods used for collection of data and statistical methods employed etc.

In the fourth chapter "Results and Discussion" of the investigation were presented followed by the fifth chapter which brings the "Summary" of the study. The literature cited and appendix-I are given at the end.

REVIEW OF LITERATURE

CHAPTER II

REVIEW OF LITERATURE

A comprehensive review of literature is an integral part of any investigation, as it not only gives an idea on the work done in the past and assists in delineation of problem area but also provides basis for interpretation and discussion of findings. Till today research on adoption of pigeon pea production recommendations is rather scarce. However, sincere efforts have been made to review the available literature having direct or indirect bearing on this study. The available literature is presented under the following sub-heads.

- 2.1 Personal, Socio-economic and Psychological characteristics of farmers.
- 2.2 Knowledge of farmers on production recommendations.
- 2.3 Extent of adoption of production recommendations.
- 2.4 Relationship between knowledge and selected independent variables.
- 2.5 Relationship between adoption and selected independent variables.
- 2.6 Constraints in adoption of production recommendations.
- 2.7 Suggestions given by the farmers towards adoption of recommended technologies.

2.1 PERSONAL, SOCIO-ECONOMIC AND PSYCHOLOGICAL CHARACTERISTICS OF FARMERS

2.1.1 Age

Rao (1981) in his study on adoption of high yielding varieties of paddy found that majority of the respondents belonged to middle age group followed by young age and old age groups.

Bhoite and Barve (1984) in their study on adoption pattern of cultivation practices of tribal farmers reported that most of the respondents were in the middle age group.

Ramachandran (1988) in his study on adoption of dry land technology concluded that majority (60.83%) of dry land farmers were in old age category followed by middle and young age categories.

Rao (1990) in his study to identify the technological gap and constraints in adoption of improved practices in groundnut cultivation identified that majority (60.00%) of respondents belonged to middle age group followed by young and old age groups.

Jabeen (1991) found that majority (51.10%) of Chilli growing farmers belonged to middle age category followed by young (32.30%) and old age (16.60%) categories.

Reddy (1992) in his study to identify the constraints in adoption of improved mango production technology reported that

majority (57.50%) of the respondents belonged to middle age group followed by young (31.67%) and old age (10.83%) groups.

2.1.2 Education

Manivannan (1980) concluded that 90.00 per cent of the sunflower growers were educated and only a small portion (10.00%) were uneducated.

Rao (1981) in his study on adoption of HYVS of paddy revealed that majority of the respondents studied upto primary level of education followed by illiterate.

Senthil (1983) observed that 94.55 per cent were educated and only a small portion (5.45%) were uneducated.

Bharathi (1988) revealed that 89.00 per cent of groundnut seed growers were educated and small portion (11.00%) were uneducated.

Balabhasker (1991) reported that majority (15.33%) of the rainfed groundnut farmers had primary school level of education.

Reddy (1992) found that 35.83 per cent of the mango growers were found illiterate followed by 25.83 per cent with formal education upto high school, 10.00 per cent upto middle school, 9.17 per cent upto primary school, 7.50 per cent can read only, 6.67 per cent who can read and write and another 5.00 per cent of the respondents were graduates.

2.1.3 Family size

Prabhakar (1971) found that majority of the farmers had their family size of above five members.

Reddy (1973) Concluded that majority of the farmers had their family size of five members.

Deshmukh and Veera Raghavulu (1981) reported that majority of sample farmers were having the family size bigger with more than five members.

Rao (1992) found that 79.67 per cent of the farmers had their family size upto 5 members and 20.31 per cent of them having family size of above 5 members.

2.1.4 Social Participation

Vasant and Sudhakar (1982) in their study on adoption behaviour of small farmers in relation to their personal characteristics reported that only 28.02 per cent of farmers participated in one or more organisations.

Biswas (1990) in his study on the knowledge, attitude and adoption of rice production technology observed that majority (43.34%) of respondents had no social participation where as 32.50 per cent of respondents had membership of one organisation, 10.83 per cent were found as members of more than one organisation, and equal number as office bearers in organisations.

Jabeen (1991) in his study on constraints in adoption of chilli technology found that majority (62.20%) of respondents had low social participation. While 25.60 per cent and 12.2 per cent of them had medium and high social participation respectively.

Reddy (1992) identified that majority (51.66%) of mango growers had no social participation, where as 40.83 per cent of the respondents had membership of one organisation, 4.17 per cent were found as members of more than one organisation, 2.50 per cent were found as office bearers in organisations. The remaining (0.83%) respondents were the public leader with high social participation.

2.1.5 Farm size

Manivannan (1980) reported that 50.84 per cent of the sunflower growers operated medium sized farms.

Senthil (1983) indicated that 51.82 per cent of the hybrid cotton seed growers operated big sized holdings, where as 31.82 per cent of them operated medium sized holdings and 16.30 per cent of them operated small sized holdings.

Reddy (1987) identified that majority of the respondents under village adoption programme of IFFCO operated marginal sized holdings.

Biswas (1990) in his study on the knowledge, Attitude and adoption of rice production technology concluded that

majority of the respondents (76.67%) had medium land holding followed by small (20.00%) and big (3.33%) size land holdings.

Reddy (1992) in his study to identify the constraints in adoption of improved mango technology reported that majority (49.17%) of the respondents had small land holding followed by big (27.50%) and medium (23.33%) size land holdings.

2.1.6 Experience in farming

Biswas (1990) in his study on the knowledge, Attitude and adoption of rice production technology reported that majority (61.67 per cent) of the respondents had medium experience in farming followed by high (22.50%) and low (15.83%) experience.

2.1.7 Information seeking behaviour

Biswas (1990) in his study on the knowledge, attitude and adoption of rice production technology observed that majority of respondents (66.67%) had medium information seeking behaviour followed by low (20.83%) and high information seeking behaviour (12.50%).

2.1.8 Innovativeness

Bharathi (1988) observed that majority of the groundnut seed growers had medium level of innovativeness.

Balabhaskar (1991) in his study on the impact of national oil seed development project on knowledge and adoption behaviour of farmers towards recommended rainfed groundnut

practices found that 53.54 per cent of the respondents had medium level of innovativeness followed by 31.33 per cent with low level of innovativeness and 15.33 per cent with high level of innovativeness.

2.1.9 Risk preference

Satyanarayana (1983) identified that majority of the tribal farmers had medium level of risk orientation towards recommended paddy cultivation practices.

Bharathi (1988) reported that majority (80.00%) of the groundnut seed growers had medium level of risk orientation.

Ramchandran (1988) in his study on adoption of dry land technology observed that majority (73.33%) of the respondents had medium orientation followed by 16.67 and 10.00 per cent in low and high risk orientation respectively.

Rao (1990) reported that majority (62.78%) of the respondents had medium level of risk orientation followed by 20.00 per cent and 17.22 per cent under low and high risk orientation respectively.

Balabhaskar (1991) found that majority of the respondents had medium level of risk orientation followed by 22.68 per cent and 12.66 per cent in high and low risk orientation categories respectively.

Reddy (1992) found that majority (66.67%) of the respondents had medium risk orientation followed by low (18.33%) and high (15.00%) risk orientation.

2.1.10 Economic motivation

Manivannan (1980) indicated that majority (80.00%) of the sunflower growers had medium level of economic motivation.

Senthil (1983) inferred that majority (79.00%) of hybrid cotton seed growers had medium level of economic motivation followed by 11.82 per cent with low and 9.09 per cent with high level of economic motivation.

Bharathi (1988) revealed that majority (60.00%) of the groundnut seed growers had medium economic motivation followed by 25.00 per cent with high and 15.00 per cent with low level of economic motivation.

Balabhaskar (1991) reported that majority (72.00%) of the rainfed groundnut respondents had medium level of economic motivation followed by 15.33 per cent with low level and 12.67 per cent with high level of economic motivation.

Reddy (1992) found that majority (70.00%) of the mango growing farmers were having medium economic motivation followed by 21.67 per cent and 8.33 per cent with low and high economic motivation respectively.

2.1.11 Scientific orientation

Manivannan (1980) concluded that majority (64.17%) of the sunflower growers had medium level of scientific orientation.

Senthil (1983) observed that majority (82.73%) of hybrid cotton seed growers were under medium level of scientific orientation.

Bharathi (1988) revealed that majority (81.00%) of the groundnut seed growers had medium level of scientific orientation.

Ramchandran (1988) concluded that nearly two third of the respondents had medium level followed by high (20.83%) level of scientific orientation and the rest were in low scientific orientation.

Balabhaskar (1991) reported that majority (57.30%) of the rainfed groundnut farmers had medium level of scientific orientation and 20.70 per cent with high level of scientific orientation.

Reddy (1992) found that majority (67.50%) of the mango growing farmers had medium scientific orientation followed by low (21.67%) and high (10.83%) scientific orientation.

2.1.12 Management orientation

Shanmukhappa (1978) indicated that management orientation ability was directly related to the adoption behaviour of the arecanut growers.

Manjunath (1980) indicated that trained farmers had high management orientation in contrast to untrained farmers of hybrid maize growers of Ghataprabha command area.

Gangadharappa (1981) indicated that management ability was directly related to the knowledge level and adoption behaviour of untrained farmers in Karnataka.

Rao (1990) reported that majority (60.13%) of the groundnut farmers were having medium management orientation followed by low management orientation.

Reddy (1992) reported that majority (60.00%) of mango growers had medium management orientation followed by low and high management orientation.

2.2 KNOWLEDGE OF FARMERS ON PRODUCTION RECOMMENDATIONS

Subramanyam and Viswanatham (1973) observed that all the farmers under irrigated or rainfed condition possessed some amount of knowledge and understanding of NPK fertilizer application.

Sunderraj (1979) reported that majority of farmers both big and small had only medium overall knowledge on growing tomato.

Kantharaj (1980) revealed that majority of sunflower growers had medium level of knowledge while 20.00 per cent had high and 16.00 per cent had low level of knowledge.

Vijayaraghavan and Somasundaram (1981) reported that 72.18 per cent farmers scored medium knowledge followed by 24.70 per cent with low knowledge and only 3.12 per cent with high knowledge on rice Production technology.

Mohiuddin (1983) identified that majority (72.22%) had average knowledge level about improved dryland agricultural technology followed by high (21.12%) and low (6.66%) knowledge categories.

Bhakhri (1985) reported that nearly three fourth of farmers (73.9%) had an average knowledge followed by one fourth (24.4%) with high knowledge and the rest (1.7%) with low level of knowledge on dryland agricultural technology.

Reddy (1986) observed that 44.00 per cent of the farmers were having low level of knowledge about recommended rainfed groundnut cultivation practices.

Patil et al. (1989) revealed that most of the bajra growers had medium knowledge about the recommended improved practices of bajra Cultivation.

Biswas (1990) reported that majority (67.50%) of the respondents had medium knowledge followed by high knowledge (30.83%) and 1.67 per cent with low knowledge about rice production technology.

Balabhaskar (1991) Concluded that majority of repondents had medium knowledge about recommended rainfed groundnut practices.

Jabeen (1991) reported that large farmers had better knowledge than small farmers regarding the different aspects of Chilli technology.

Reddy (1992) found that majority (67.50%) of the respondents had medium knowledge on recommended package of practices of mango followed by high (23.33%) and low knowledge (9.17%).

2.3 EXTENT OF ADOPTION OF PRODUCTION RECOMMENDATIONS

Khan et al. (1976) indicated that cent per cent farmers had adopted improved varieties of Chillies, but none of them had adopted recommended spacing.

Chole et al. (1978) noted that 70.00 per cent of the farmers had adopted improved varieties in which 19.00 per cent of farmers had high, 27.00 per cent had medium level and 24.00 per cent had low level of adoption.

Sarkar (1979) reported that majority of the farmers had fully adopted the recommended practices of rice production technology.

Kantharaj (1980) stated that majority of sunflower growers had adopted all the recommended practices which do not involve high cost.

Bhaskaram and Praveena (1982) found that about 65.00 per cent of the respondents had adopted the general recommended dry land agricultural practices.

Kunmal et al. (1984) concluded that 48.00 per cent of the respondents adopted soil and water conservation practices whereas 56.00 per cent of them adopted improved varieties of sorghum and 24.44 per cent of them used fertilizers and plant protection chemicals.

Patil and Jadhav (1987) observed that majority (48.00%) of onion growers used high doses of organic manures but using of chemical fertilizers was relatively less (22.00%).

Patil et al. (1989) revealed that the adoption was highest in respect of improved seed, seed treatment and recommended seed rate while there was no adoption in case of recommended spacing and control of pests and diseases in bajra crop.

Biswas (1990) revealed that majority (90.00%) of the respondents had medium level of adoption of recommended package of practices of paddy.

Kher (1991) reported that nearly two third (63.00%) of the respondents had medium adoption level, while 15.00 per cent possessed high adoption level.

Reddy (1992) observed that majority (49.17%) of the respondents had medium level of adoption of recommended package of practices of mango cultivation followed by 42.50 per cent with low adoption and remaining 8.33 per cent with high adoption.

2.4 RELATIONSHIP BETWEEN KNOWLEDGE AND SELECTED INDEPENDENT VARIABLES

2.4.1 Age

Zotawna (1987) in his study on the knowledge and attitude of farmers towards high yielding variety of paddy and extent of their adoption reported significant and positive correlation between age and knowledge.

Biswas (1990) in his study on the knowledge, attitude and adoption of rice production technology reported negatively significant correlation between age and knowledge of farmers.

Jabeen (1991) in his study on constraints in adoption of chilli technology reported negative but non significant relationship between age and knowledge.

Reddy (1992) reported that majority of mango growers had negative but non-significant correlation between age and knowledge.

2.4.2 Education

Kantharaj (1980) reported that education was significantly associated with retention of knowledge of the farmers about recommended sunflower cultivation practices.

Narasappa (1981) indicated that there was a positive relationship between education and knowledge of farmers about recommended improved practices of groundnut cultivation.

Yesurathnam (1985) inferred significant association between education and gain in knowledge about recommended groundnut technology among the respondents.

Patel (1985) stated that there was no association between education and knowledge relating to sericulture among the respondents.

Sudheendra (1986) inferred significant association between knowledge and education of sunflower growers.

Reddy (1990) stated that there was a positive and significant relationship between education and knowledge of the farmers about sericulture.

Biswas (1991) revealed that there was a positive and significant relationship between education and knowledge of respondents about rice production technology.

Reddy (1992) inferred that there was a positive and significant relationship between education and knowledge of respondents about mango production technology.

2.4.3 Family size

Umadevi (1992) revealed that there was a non significant relationship between family size and knowledge.

2.4.4 Social participation

Narasappa (1981) found that there was a significant relationship between social participation and knowledge of the

respondents about recommended groundnut cultivation practices.

Yesurathnam (1985) revealed that there was significant relationship between social participation and gain in knowledge about recommended groundnut cultivation practices.

Zotawna (1987) established a positive and significant correlation between social participation and knowledge of the respondents towards high yielding varieties of paddy.

Biswas (1990) revealed that there was a positive and significant relationship between the social participation and the farmers knowledge on package of practices of rice.

Reddy (1990) showed a positive and significant relationship between social participation and knowledge level of the farmers about recommended silk worm rearing practices.

Reddy (1992) revealed that there was a positive and significant relationship between the social participation and the farmers knowledge on mango production technology.

2.4.5 Farm size

Kantharaj (1980) noticed that size of land holding was significantly associated with the knowledge of the respondents about recommended sunflower technology.

Patel (1985) concluded that there was no association between land holding and knowledge of the respondents about sericulture.

Sudheendra (1986) indicated that there was no association between size of the farm and knowledge about recommended sunflower cultivation practices among farmers.

Narayana (1988) stated that there was a positive and significant relationship between the size of land holdings and knowledge about recommended sorghum cultivation practices among the respondents of Krishi Vigyan Kendra.

Biswas (1990) concluded that there was a negative and non significant relationship existing between farm size and the knowledge of farmers with regard to package of practices of rice.

Reddy (1990) revealed that there was a positive and significant relationship between farm size and knowledge of the farmers about recommended silk worm rearing practices.

Reddy (1992) revealed that there was a positive and significant relationship between farm size and knowledge of farmers about mango production technology.

2.4.6 Experience in farming

Patel (1970) in his study on adoption of high yielding varieties concluded that there was non significant relationship between farming experience and knowledge of farmers.

Mundhwa and Patel (1987) observed that there was a positive and significant correlation between farming experience and knowledge of the wheat growers.

Biswas (1990) stated that there was negative but significant relationship between farming experience and knowledge of farmers on rice production technology.

2.4.7 Information seeking behaviour

Biswas (1990) reported that there was positive and significant relationship between information seeking behaviour and knowledge of farmers on rice production technology.

2.4.8 Innovativeness

Padmaiah (1983) inferred that there was no association between innovativeness and knowledge about recommended castor cultivation practices among respondents.

Balabhaskar (1991) found that there was a positive and significant relationship between innovativeness and knowledge level of farmers about recommended rainfed groundnut practices.

2.4.9 Risk preference

Narasappa (1981) concluded that there was a positive and significant association between risk orientation and knowledge of the farmers about recommended groundnut cultivation practices.

Satyanarayana (1983) indicated that gain in knowledge about recommended practices of paddy cultivation was associated significantly with risk orientation of the tribal farmers.

Rao (1988) reported positive and non significant relationship between risk orientation and knowledge of farmers about recommended cotton cultivation practices.

Reddy (1990) noticed a positive and significant relationship between risk orientation and knowledge level of farmers about recommended silk worm rearing practices.

Reddy (1992) observed positive and significant relationship between risk orientation and knowledge level of farmers about mango production technology.

2.4.10 Economic motivation

Narasappa (1981) reported that gain in knowledge about groundnut cultivation practices increased with increase in economic motivation of farmers.

Satyanarayana (1983) concluded that gain in knowledge about recommended package of practices of paddy was associated with economic motivation of the tribal farmers.

Yesurathnam (1985) indicated that economic motivation had a positive and significant relationship with knowledge of the respondents about recommended groundnut cultivation practices.

Devender (1986) noticed a positive and significant relationship between economic motivation of the respondents and knowledge about recommended package of practices of paddy.

Zotawna (1987) revealed a positive and significant relationship between economic motivation and knowledge of the respondents about high yielding varieties of paddy.

Rao (1988) inferred highly significant and positive relationship between economic motivation and knowledge of the tribal farmers about recommended cotton cultivation practices.

Reddy (1990) found that there was a positive and significant relationship between economic motivation and knowledge of the farmers about recommended silk worm rearing practices.

Reddy (1992) indicated that economic motivation had a positive and significant relationship with knowledge of respondents about mango production technology.

2.4.11 Scientific orientation

Narasappa (1981) found that there was a positive and significant relationship between knowledge and scientific orientation among the groundnut growers.

Satyanarayana (1983) observed that gain in knowledge about recommended paddy cultivation practices was associated significantly with the scientific orientation of the tribal farmers.

Zotawna (1987) concluded that there was no significant relationship between scientific orientation and knowledge of the farmers about high yielding varieties of paddy.

Rao (1988) noticed a positive and non significant relationship between scientific orientation and knowledge of the respondents about recommended cotton cultivation practices.

Reddy (1992) concluded that there was a positive and significant relationship between scientific orientation and knowledge of the respondents about mango production technology.

2.4.12 Management orientation

Rao (1992) found that there was no significant relationship between management orientation and knowledge of farmers about diversified farming.

2.5 RELATIONSHIP BETWEEN ADOPTION AND SELECTED INDEPENDENT VARIABLES

2.5.1 Age

Bhatt (1980) in his study on the impact of farmers training on knowledge and adoption behaviour of farmers concluded that there was a positive and significant relationship between age and adoption.

Titus (1981) in his study on adoption of improved practices reported that there was no significant correlation between age with extent of adoption of recommended practices.

Wardkar et al. (1988) in his study on extent of adoption of fertilizers in irrigated and unirrigated areas reported that

there was no significant correlation between age with extent of adoption.

Biswas (1990) concluded that there was no significant correlation between age and adoption of farmers about rice production technology.

Jabeen (1991) reported that there was no significant correlation between age and extent of adoption of recommended practices of chilli technology.

Reddy (1992) observed that age had shown negative but non significant relationship with adoption of recommended mango production technology.

2.5.2 Education

Kantharaj (1980) observed that there was no association between education level of sunflower growers and their adoption level.

Padmaiah (1983) found that the education level of the respondents was significantly associated with their adoption of recommended castor cultivation practices.

Sudheendra (1986) identified a significant association between adoption of recommended sunflower practices and education level of sunflower growers.

Goud (1988) reported that there was no significant association between education and extent of adoption of improved practices of groundnut cultivation by the farmers.

Reddy (1990) observed that there was a positive and significant relationship between education level of the farmers and their adoption of recommended silk worm rearing practices.

2.5.3 Family size

Rao (1990) in his study on technological gaps in diversified farming of small farmers reported that there was no association between family size and adoption.

Umadevi (1992) in her study on an analysis of impact of training and extension on farm women in "WYTEP" reported that there was negative but non significant association between family size and adoption of recommended practices.

2.5.4 Social participation

Pamadi (1980) observed that there was a significant relationship between social participation and adoption of groundnut cultivation practices by the respondents.

Goud (1988) concluded that the adoption behaviour of the farmers towards improved groundnut cultivation practices had a significant association with their social participation.

Biswas (1990) noticed that there was a positive and significant relationship between social participation and adoption of rice production technology by the respondents.

Reddy (1992) reported that there was a positive and significant relationship between social participation and adoption of mango production technology by the respondents.

2.5.5 Farm size

Kantharaj (1980) indicated that size of the farm had no relation with the adoption of improved sunflower cultivation practices by the farmers.

Sudheendra (1986) concluded that land holding was significantly associated with the level of adoption of recommended sunflower cultivation practices by the farmers.

Goud (1988) observed that there was a significant association between the land holding of the farmers and adoption of improved groundnut practices.

Narayana (1988) noticed a positive and non significant association between the farm size and adoption of recommended practices in castor and jowar cultivation by the respondents.

Biswas (1990) reported that there was a negative but non significant relationship between farm size and adoption of rice production technology.

Balabhaskar (1991) noticed a positive and significant relationship between farm size and adoption of rainfed groundnut practices.

Reddy (1992) inferred that there was a positive and significant relationship between land holding and adoption of mango production technology.

2.5.6 Experience in farming

Reddy (1975) reported a positive and significant correlation between experience of farmers in farming with their extent of adoption of rice cultivation practices.

Biswas (1990) found that there was a negative but non significant relationship between experience of farmers in farming with their extent of adoption of rice production technology.

2.5.7 Information seeking behaviour

Biswas (1990) reported that there was a positive and significant relationship between information seeking behaviour and adoption of rice production technology.

2.5.8 Innovativeness

Padmaiah (1983) revealed that innovativeness had no association with the adoption behaviour of the respondents towards recommended castor cultivation practices.

Balabhaskar (1991) concluded that innovativeness had positive and significant relationship with the extent of adoption of recommended rainfed groundnut practices.

2.5.9 Risk orientation

Veeraswamy and Tejbahadur (1979) observed a significant association between the risk orientation and the adoption of improved rice technology by small farmers.

Satyanarayana (1983) stated that the adoption of practices of high yielding varieties of paddy was associated with risk orientation of the tribal farmers.

Bhaskaram and Thampi (1986) reported that risk orientation was non significantly related with adoption of high yielding varieties of paddy by the farmers.

Rao (1988) identified that there was a positive and highly significant association between adoption of recommended cotton practices and risk orientation of the respondents.

Reddy (1990) noticed positive significant relationship between risk orientation and adoption of recommended silk worm rearing practices by the respondents.

Balabhaskar (1991) reported positive and significant relationship between risk orientation and adoption of rainfed groundnut practices.

2.5.10 Economic motivation

Veeraswamy and Tejbahadur (1979) observed that economic motivation was significantly associated with the adoption of improved rice technology by small farmers.

Reddy (1983) revealed that there was no significant relationship between economic motivation of the farmers with the adoption of the recommended jowar cultivation practices.

Satyanarayana (1983) observed that there was a positive and significant association between adoption of recommended

package of practices of rice and the economic motivation of the farmers.

Rao (1988) concluded that the adoption of recommended cotton cultivation practices was positively and significantly correlated with the economic motivation of the respondents.

Reddy (1990) inferred that the adoption of recommended silk worm rearing practices had a positive and significant relationship with economic motivation of the respondents.

Reddy (1992) inferred that the recommended mango production technology was positively and significantly correlated with the economic motivation of respondents.

2.5.11 Scientific orientation

Veeraswamy and Tejbahadur (1979) observed that scientific orientation had a positive and significant relationship with adoption of improved rice technology by small farmers.

Satyanarayana (1983) inferred a positive and significant association between adoption of high yielding varieties of rice and the scientific orientation of the respondents.

Wilson and Chaturvedy (1985) have indicated that scientific orientation had a positive and significant relationship with adoption of improved technology of the cured Virginia tobacco by the farmers.

Rao (1988) observed a positive and non significant association between scientific orientation and adoption of recommended cotton practices by the farmers.

Balabhaskar (1991) observed a positive and significant association between scientific orientation and adoption of rainfed groundnut practices.

Reddy (1992) found that scientific orientation had a positive and significant relationship with the adoption of mango production technology.

2.5.12 Management orientation

Rao (1979) found that management orientation was non significantly associated with adoption of recommended paddy cultivation practices.

Manjunath (1980) indicated that trained farmers had higher management orientation in contrast to untrained farmers of hybrid maize growers of Ghataprabha command area.

Reddy (1983) reported that production orientation and marketing orientation was positively and significantly correlated with the castor adoption behaviour of the farmers.

Mrutyunjayam (1987) concluded that there was association between management orientation and adoption of farmers of maize crop.

2.6 CONSTRAINTS IN ADOPTION OF PRODUCTION RECOMMENDATIONS

Kantharaj (1980) identified that chaffyness followed by pests and diseases, attack of birds and depletion of soil fertility as the major problems faced by the farmers in sunflower cultivation.

Dhankumar (1981) reported that non availability of labour as well as high labour cost, poor prices for the produce, non availability of credit at the proper time and high cost of fertilizer were the four important constraints expressed by the sorghum growers.

Bhaskaram and Praveena (1982) stated that lack of knowledge, lack of guidance, high cost, risks, lack of conviction, unfelt need, poor weather, impracticability, high skill requirement, lack of time and low profits were some of the reasons responsible for non adoption of dry farming practices.

Jaiswal et al. (1985) found that the adoption of the practices by the farmers was poor because of high cost of seed and fertilizers and non availability of adequate credit supply for these inputs.

Reddy (1986) noticed that uncertainty of remunerative returns, high cost of cultivation, lack of knowledge about improved varieties, untimely rains, high cost of inputs, lack of faith on the recommended technology and low degree of cost benefit ratio were the major factors for non adoption of improved rainfed groundnut cultivation practices.

Patil and Jadhav (1987) found that majority of the onion growers lacked correct knowledge of pests and diseases and their control measures and recommended doses of chemical fertilizers.

Goud (1988) quoted that the lack of knowledge regarding pests and diseases, non availability of required finance, no method to cover the risk in the event of crop failure were the important problems for non adoption of improved cultivation practices.

Patil et al. (1989) revealed that due to timely unavailability of inputs like seeds, fertilizers and pesticides majority of the farmers could not adopt improved dry farming practices in bajra and groundnut cultivation, in addition to this lack of improved implements, inadequacy of capital, lack of technical guidance, small and economic holdings were the other reasons for non adoption of improved dry farming practices in bajra and groundnut cultivation.

Shrivastava and Singh (1990) revealed that the three major constraints experienced by farmers were high prices of fertilizers, lack of irrigation facilities and erratic distribution of rainfall in adoption of improved practices.

Kher (1991) revealed that lack of knowledge, non availability of fungicides, insecticides and lack of technical guidance were the major constraints in adoption of plant protection measures.

Reddy (1992) revealed that unaware of the practice, lack of knowledge, lack of technical guidance, non availability of inputs, lack of economic resources, lack of suitable equipments, high cost of inputs, low profitability of the practice and lack of marketing facilities were the major constraints in adoption of different recommended package of practices of mango.

2.7 SUGGESTIONS OF THE FARMERS FOR ADOPTION OF RECOMMENDED TECHNOLOGIES

Nath (1980) found that low interest credit, supply of more inputs and follow up of programmes for the activities and availability of technical help in greater degree were the suggestions given by the farmers for adoption of improved agricultural technology.

Naik (1981) revealed that majority of the farmers felt that regular supervision by higher officials over the village extension officers and Assistant Agricultural officers was necessary in order to make them function regularly and properly. Some of the farmers have suggested that timely supply of seeds, fertilizers and pesticides must be ensured for adoption of improved agricultural practices.

Bhaskaram and Praveena (1982) identified that more field demonstrations, more personal and frequent technical guidance, developing of irrigation wells and tanks, supply of agricultural inputs on subsidy basis, more training programmes and continuous

guidance were the suggestions given by the farmers for future development of dry land agriculture.

Reddy (1983) concluded that timely supply of inputs and loans in time, cost of fertilizers and pesticides to be reduced, seasonal training, timely technical guidance, remunerative prices for agricultural produce, supply of pure seed, regular visits of extension workers, demonstrations to be organised, lab to land programme to be continued, intensive training in plant protection, regular field trips to research stations and providing rigs at subsidized rates were some of the suggestions given by the farmers for effective adoption of dry land agricultural technology.

Rao (1988) revealed that effective transfer of technology, supply of inputs at subsidized rates and effective execution of soil and water conservation works were the suggestions given by the farmers for effective adoption of improved technology.

Vishnumurthy (1990) identified that, evolving alternate intercropping systems suitable for drylands, integrated plant protection measures for control of semilooper in castor and shoot bug in sorghum, evolution of short duration, drought tolerant and high yielding varieties of sorghum of marginal lands, evolution of early red gram varieties for intercropping and invention of suitable bullock drawn equipment for intercultivation were the suggestions given by the farmers for adoption of dry land agricultural technology.

Kher (1991) reported that timely supply of inputs i.e. improved seed, fertilizer, insecticides, fungicides and spray pumps at subsidized rates were the suggestions given by farmers for adoption of improved maize technology.

Reddy (1992) reported that provision of adequate and timely supplies of inputs, evolving resistant varieties for fruit drop and pests and diseases, provision of subsidy on different agricultural inputs, provision of credit facilities to the needy farmers, timely technical guidance to mango growers, provision of good marketing facilities, intensification of extension services by extension staff and providing irrigation facilities were the suggestions given by farmers for adoption of recommended mango technology.

A thorough review of earlier scientific studies conducted in various parts of the country revealed that majority of the farmers were middle aged, literate, with large family size, low social participation, medium farm size, medium farming experience, medium information seeking behaviour, medium level of innovativeness, medium risk orientation, medium economic motivation, medium scientific orientation and medium management orientation. Most of the researchers demonstrated a positive and significant relationship between personal, socio-economic characteristics like education, social participation, farm size, information seeking behaviour, innovativeness, risk orientation, economic motivation, scientific orientation and the dependent variables knowledge and adoption of recommended practices.

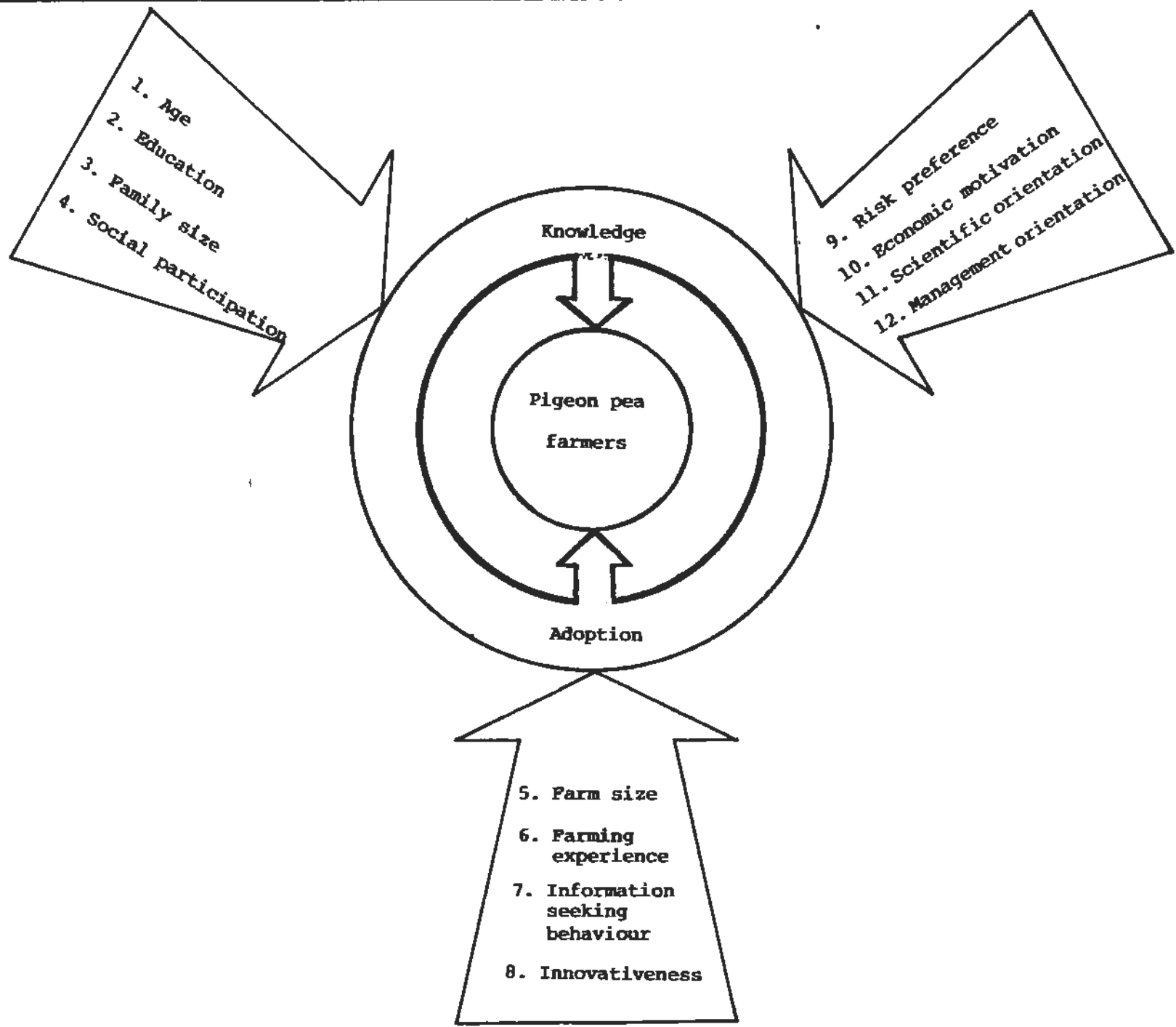


Fig.No.1 : CONCEPTUAL MODEL

METHODOLOGY

CHAPTER III

METHODOLOGY

The present research was carried out with an objective, to study the adoption of pigeon pea production recommendations in Mahabubnagar district of Andhra Pradesh. This chapter deals with the methodology used for investigation. For the sake of clarity and understanding, this chapter is presented under the following sub-heads.

- 3.1 Research design
- 3.2 Locale of the study
- 3.3 Sample and Sampling procedure
- 3.4 Variables and their measurement
- 3.5 Instruments and methods used for data collection
- 3.6 Statistical tests and analytical procedures followed for interpreting the data.

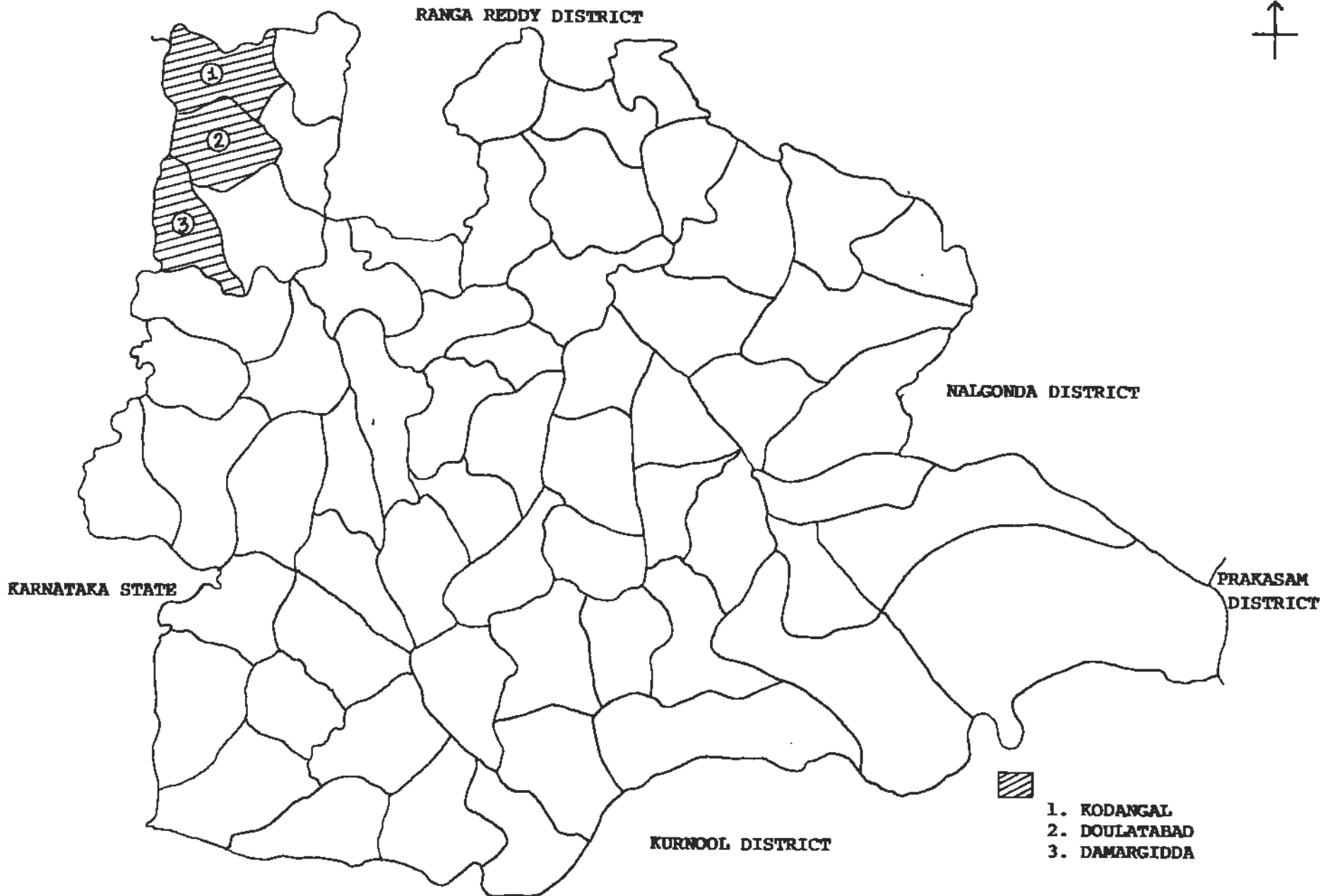
3.1 RESEARCH DESIGN

Ex-post facto research design was used for conducting the study, since the variables chosen have already been occurred.

3.2 LOCALE OF THE STUDY

The State of Andhra Pradesh was chosen for the study purposively as the investigator is familiar with the local

RANGA REDDY DISTRICT



KARNATAKA STATE

NALGONDA DISTRICT

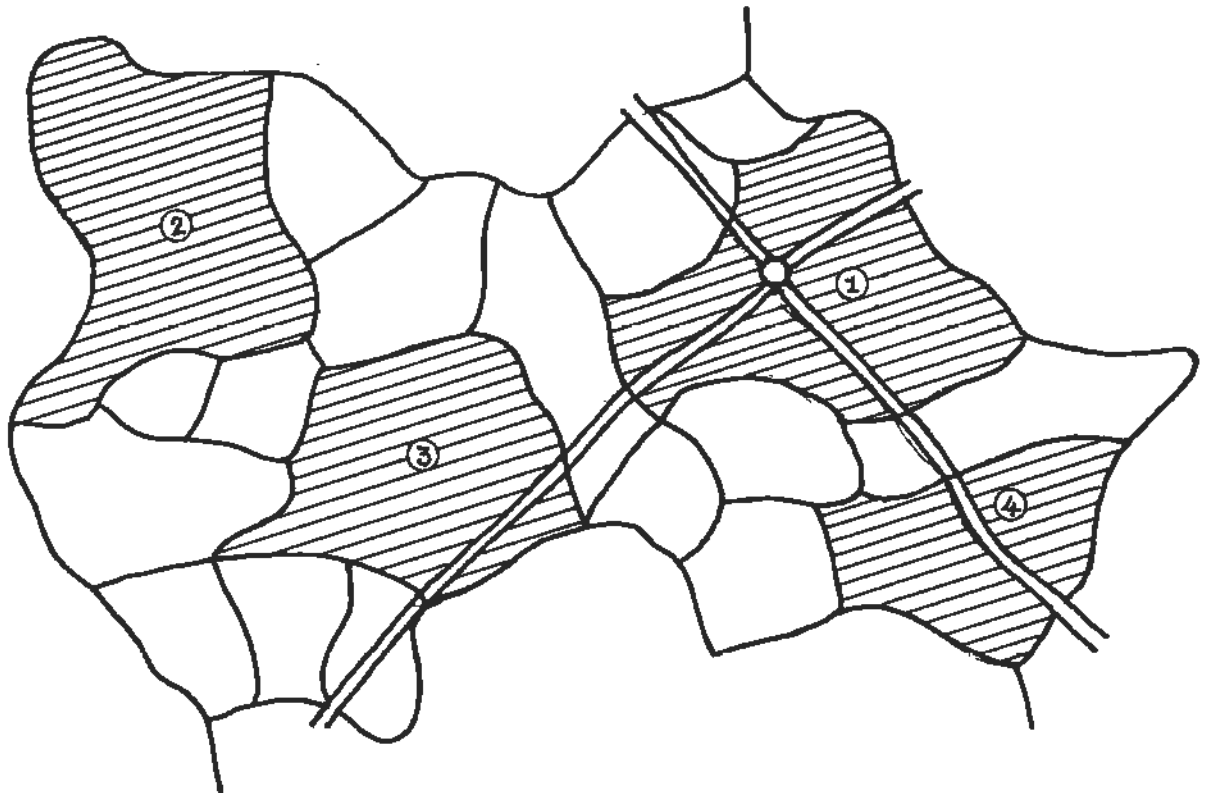
PRAKASAM DISTRICT

KURNOOL DISTRICT



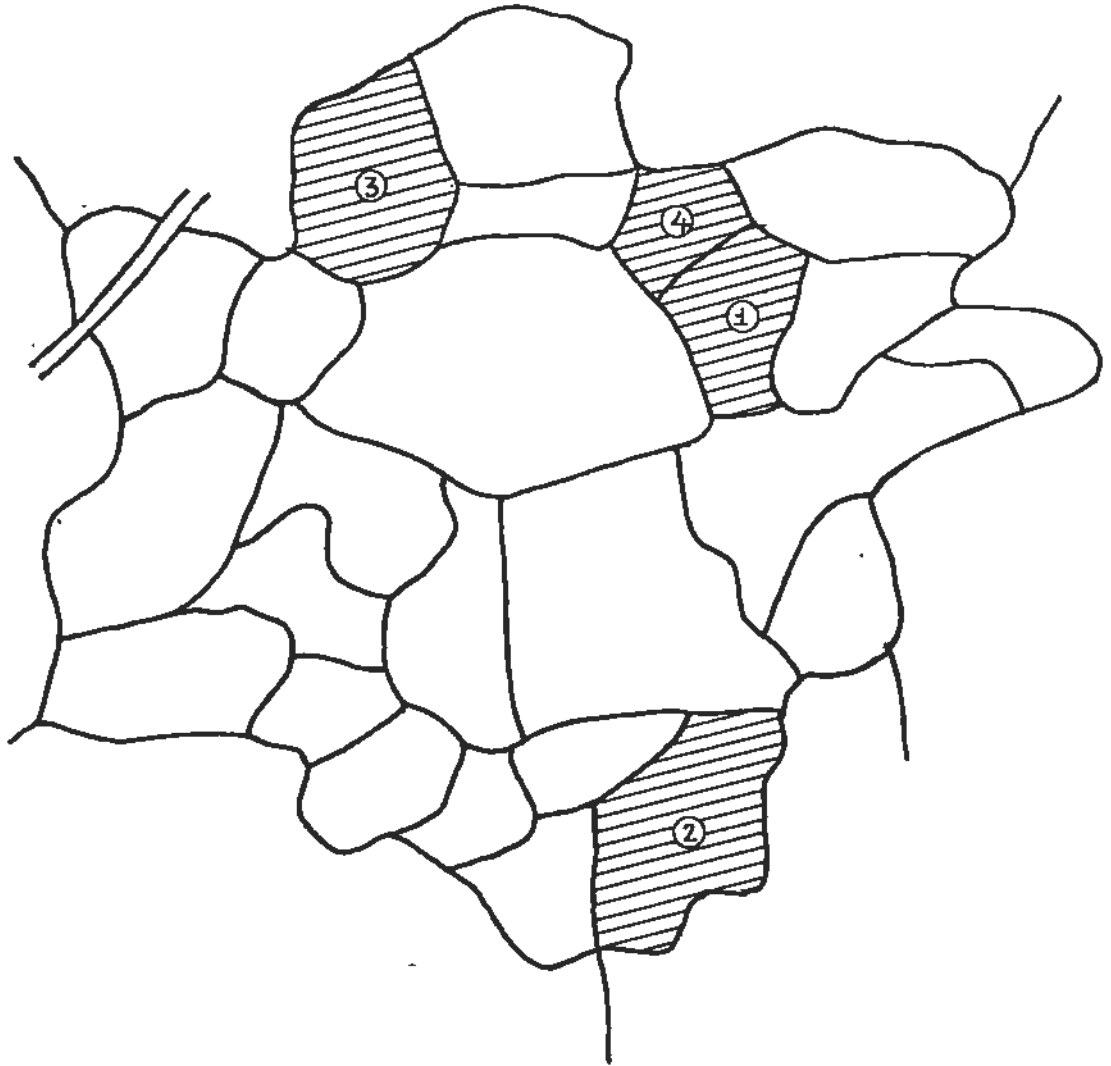
- 1. KODANGAL
- 2. DOULATABAD
- 3. DAMARGIDDA

Fig.No.2 : MAP OF MAHABUBNAGAR DISTRICT SHOWING SELECTED MANDALS



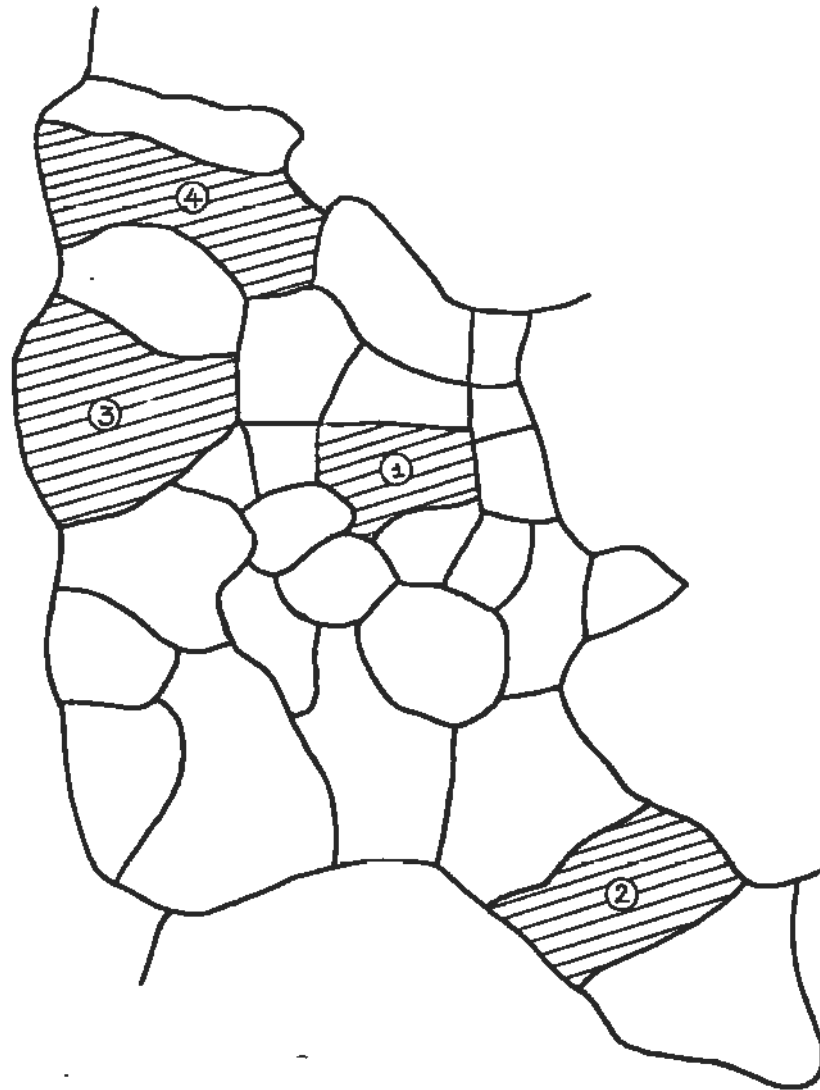
- 1. KODANGAL
- 2. RUDRARAM
- 3. ANGADI RAICHUR
- 4. HASPARAD

Fig.No.3 : MAP OF KODANGAL MANDAL SHOWING SELECTED VILLAGES



- 1. YANKI
- 2. DEVARFASALVAD
- 3. MATURU
- 4. NANDARAM

Fig.No.4 : MAP OF DOULATABAD MANDAL SHOWING SELECTED VILLAGES



1. LOKURTI
2. KAMSANPALLI
3. KANKURTI
4. VITTALAPUR

Fig.No.5 : MAP OF DAMARGIDDA MANDAL SHOWING SELECTED VILLAGES

language, which would help to build quick rapport and also enable indepth study combined with personal observation.

3.2.1 Selection of district

Mahabubnagar district was purposively selected as it has highest area under pigeon pea cultivation among 23 districts of Andhra Pradesh with relatively very less productivity compared to other districts. Further, the investigator is familiar with the local language and culture of the people which helped him in building effective rapport with the respondents. Moreover, no such research work had been done in this district to find out the adoption of pigeon pea production recommendations. Hence Mahabubnagar district was selected purposively.

3.2.2 Selection of mandals

There are sixty four mandals in Mahabubnagar district, out of which three mandal, namely kodangal, doulatabad and Damargidda were selected purposively since they have highest cropped area under pigeon pea.

3.2.3 Selection of villages

The list of pigeon pea growing villages from the selected mandals were alphabetically arranged and serially numbered. Four villages from each mandal were selected randomly. Thus a total of 12 villages were selected for the study.

Table 1 : Area under pigeon pea cultivation in different districts of Andhra Pradesh during the year 1991-92

Sl. No.	District	Area in hectares	Productivity (Yield in kgs/ha)
1.	Srikakulam	1898	289
2.	Vizianagaram	1047	282
3.	Visakhapatnam	6568	279
4.	East Godavari	6239	375
5.	West Godavari	984	287
6.	Krishna	9520	461
7.	Guntur	13380	289
8.	Prakasam	26900	215
9.	Nellore	1626	267
10.	Kurnool	22284	256
11.	Anatapur	24433	172
12.	Cuddapah	9851	158
13.	Chittoor	8356	162
14.	Ranga Reddy	28672	291
15.	Hyderabad	---	---
16.	Nizamabad	2978	207
17.	Medak	12644	176
18.	* Mahabubnagar	52518	152
19.	Nalgonda	21107	157
20.	Warangal	8476	241
21.	Khammam	28746	501
22.	Kharimnagar	4568	207
23.	Adilabad	45398	69

* Selected district for the study

Source : Agriculture Section, Directorate of Economics and Statistics, Government of Andhra Pradesh

Table 2 : Area under pigeon pea cultivation in different mandals of Mahabubnagar district during the year 1991-92

Sl. No.	Mandal	Area in acres	Sl. No.	Mandal	Area in acres
1.	Nagarkurnool	818	33.	Waddepally	616
2.	Thimmajipet	1772	34.	Ieej	1194
3.	Tellaapalli	1508	35.	Ghatt	2004
4.	Bijinepally	1322	36.	Dharur	2108
5.	Gopalpet	1369	37.	Pebbani	1319
6.	Tadur	1691	38.	Itkyal	1306
7.	Kollapur	2641	39.	Maldakal	2091
8.	Peddakothapally	2008	40.	Gadwal	1708
9.	Kodair	1384	41.	Wanaparthy	1513
10.	Pangal	2743	42.	Kothakota	1720
11.	Weepangandla	4027	43.	Ghanapur	663
12.	Achampet	1670	44.	Peddemandadi	1134
13.	Amrabad	1285	45.	Monopad	535
14.	Lingal	1025	46.	Kondurg	1356
15.	Balmoor	1145	47.	Faruqnagar	2137
16.	Uppunuthala	2115	48.	Kothur	1141
17.	* Kodangal	11224	49.	Keshampet	1375
18.	Maddur	6208	50.	Talakondapalli	844
19.	Bomraspet	5086	51.	Amangal	970
20.	* Doulatabad	6772	52.	Madgul	1278
21.	Kosgi	4199	53.	Vangur	1345
22.	* Damargidda	7877	54.	Midgil	957
23.	Makthal	3821	55.	Veldanda	1334
24.	Magnoor	4313	56.	Kalwakurthy	408
25.	Utkoor	2281	57.	Koilkonda	2050
26.	Naryanpet	3831	58.	Hanwada	816
27.	Dhanwada	1061	59.	Nawabpet	444
28.	Atmakur	804	60.	Mahabubnagar	578
29.	Devarkonda	105	61.	Balanagar	2048
30.	C.kunta	720	62.	Jadcherla	1535
31.	Narva	1123	63.	Addakal	311
32.	Alampur	1320	64.	Boothpur	669

* Selected mandals for the study

Source : Agriculture Section, Directorate of Economics and Statistics, Government of Andhra Pradesh

3.3 SAMPLE AND SAMPLING PROCEDURE

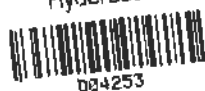
3.3.1 Selection of respondents

The names of the pigeon pea farmers were obtained from the selected villages and alphabetically arranged and serially numbered. proportionate random sampling technique was adopted to select a total of 120 farmers from the twelve selected villages of three mandals. The sample selected from each selected village is furnished in the following table.

Table 3 : Details of sampling procedure followed

S.No	Name of the Mandal	Name of the village	Total No.of Pigeon Pea growing farmers in sample villages	Size of Selected Sample
1.	Kodangal	1. Kodangal	458	12
		2. Rudraram	582	16
		3. Angadi Raichur	179	5
		4. Haspabad	470	13
2.	Doulatabad	5. Yanki	291	8
		6. Devarfasalvad	365	10
		7. Maturu	135	4
		8. Nandaram	525	14
3.	Damargidda	9. Lokurti	217	6
		10.Kamsanpalli	331	9
		11.Kankurti	523	14
		12.Vittalapur	342	9
Total :			4418	120

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3.4 MEASUREMENT OF VARIABLES

Based on the available literature and opinion of experts in the field of extension, the relevant variables were selected for the present study. The selected variables and their empirical measurement is furnished in Table 4.

3.4.1 Independent variables

3.4.1.1 Age

The age of the respondents was operationalised as the number of years completed from the date of birth by the respondent at the time of investigation.

Categorisation

The respondents were grouped into three categories viz., young, middle and old based on their chronological age.

<u>category</u>		<u>Range</u>
1. Young age	-	35 years and below
2. Middle age	-	36 to 55 years
3. Old age	-	56 years and above

3.4.1.2 Education

Education was operationalised as the number of years of formal schooling attended by the respondent. Scoring was done on the basis of socio-economic scale developed by venkatramaiah (1983) and the respondents were categorised as follows.

Table 4 : Variables and their measurement

S.No	Variables	Empirical measurement
INDEPENDENT VARIABLES		
1.	Age	Chronological age of respondents
2.	Education	Scale developed by venkatramaiah (1983) with suitable modifications
3.	Family size	Socio-economic scale developed by Trivedi (1963) with suitable modifications
4.	Social participation	Scale developed by Bawazir and Nandapurkar (1985) with suitable modifications
5.	Farm size	Schedule developed for the study
6.	Experience in farming	Number of years in farming
7.	Information seeking behaviour	Rating schedule developed by Rao (1985)
8.	Innovativeness	Scale developed by Feaston (1968) with suitable modifications
9.	Risk preference	Scale developed by Supe (1969)
10.	Economic motivation	Scale developed by Supe (1969)
11.	Scientific orientation	Scale developed by Supe (1969)
12.	Management orientation	Scale developed by Samanta (1977)
DEPENDENT VARIABLES		
13.	Knowledge	Schedule developed for the study
14.	Adoption	Schedule developed for the study

<u>Categories</u>	<u>Score</u>
a) No schooling/illiterate	0
b) Functionally literate	1
c) Primary school	2
d) Middle school	3
e) High school	4
f) Collegiate education	5

For the purpose of distribution of respondents four categories were evolved as upto primary, middle school, high school and collegiates.

3.4.1.3 Family size

This referred to the total number in the respondents family consisting of husband, wife, children and other working members.

The scale developed by Trivedi (1963) was used in this study. The scoring pattern was as follows.

Size of family

- i) Upto 5 members - 1
- ii) Above 5 members - 2

3.4.1.4 Social participation

Social participation was operationalised as the degree of participation made by the respondents in formal organisations either as a member or an office bearer or a public leader. The

quantification of this variable was done by adopting the procedure developed by Bawajir and Nandapurkar (1985) scoring was done as follows.

<u>Items</u>	<u>Weightage</u>
1. No social participation	0
2. Member of one organisation	1
3. Member of more than one organisation	2
4. Office bearer in the organisation	3
5. Public leader	4

The scores on each item applicable to the respondent was summed up to estimate the social participation score of the respondents. The score range was from 0 to 9.

Categorisation

Based on the social participation the respondents were categorised as follows:

1. Member of one organisation
2. Member of more than one organisation
3. office bearer in organisation
4. Public leader
5. No social participation

3.4.1.5 Farm size

This variable was operationalised as the number of standard* acres possessed by the farmer at the time of enquiry.

* As per section 8, sub-section (1)B of the Andhra Pradesh Land Reforms (Ceiling on Agricultural Holding) Act No.1 of 1973, the section 8(1)B reads as follows :

"..... and the purpose of computing the specified limit in case where holding of any person includes both wet and dryland, 1 hectare of wet land shall be deemed to be equal to 2.5 hectares of dryland"

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Weightage of 1, 2 and 3 was given to small, medium and large holdings, respectively. Based on the scores obtained from land holdings, the respondents were classified into three categories as :

1. Those with holdings upto 5 acres:- Small farmers
2. Those with holdings above 5 acres and upto 10 acres:- Medium farmers
3. Those with holdings above 10 acres:- Big farmers

3.4.1.6 Experience in farming

It was operationalised as the number of years the respondent completed in farming at the time of investigation and a weightage of 'one' was given to each completed year to compute the score. The experience of farmers ranged from 5 to 60.

Categorisation

Based on mean and standard deviation the respondents were categorised into three groups as follows.

- | | |
|----------------------|---------------------------|
| 1. Low experience | Below (Mean - S.D.) |
| 2. Medium experience | Between (Mean \pm S.D.) |
| 3. High experience | Above (Mean + S.D.) |

3.4.1.7 Information seeking behaviour

Information seeking behaviour was operationally defined as the frequency of contact exposure of a farmer to different sources for obtaining farm information.

The information seeking behaviour of a farmer was measured with rating schedule developed by Rao, (1985). The scale contains 16 items and were categorised under three sub-heads namely informal sources, formal sources and mass media. For determining the degree of information seeking by the respondents through these sources, four response categories namely frequently, occasionally, rarely and never were provided with weightage of 3, 2, 1 and '0' respectively.

Based on the score obtained by respondent on information seeking behaviour, they were grouped into three following categories keeping the mean and standard deviation as check.

- i) Low : Below (Mean - SD)
- ii) Medium : Between (Mean \pm SD)
- iii) High : Above (Mean + SD)

3.4.1.8 Innovativeness

Usually, farm practices adopted first in a particular village are rated for innovativeness. In the absence of behaviour denoting the innovativeness the socio-psychological scaling device was used in this study to ascertain the extent to which an individual has acquired an awareness of the need to innovate. Therefore, the farmers who felt the greatest need to change would be first to innovate. Thus the positive attitude towards change was taken to denote innovativeness. This variable was measured by Feaston (1968). This scale consists of 12 items, 8 positive and 4 negative. In the scale each item was

rated on a five-point continuum, i.e. strongly agree, agree, undecided, disagree and strongly disagree. A score of 5, 4, 3, 2 and 1 for positive items and 1, 2, 3, 4 and 5 for negative items was given. The farmers were categorised into 3 groups basing on mean and standard deviation.

- i) Low : Below (Mean - SD)
- ii) Medium : Between (Mean \pm SD)
- iii) High : Above (Mean + SD)

3.4.1.9 Risk preference

This variable was operationalised as the degree to which the farmer was oriented towards risk and uncertainty in adopting new ideas in farming. The scale developed by supe (1969) was used in the present investigation, to measure the risk orientation of the respondents.

The scale contained six statements of which first and fifth statements were negatively keyed and the responses were obtained. The scoring was done as follows :

Response	Agree	undecided	Disagree
For +ve statements	3	2	1
For -ve statements	1	2	3

The scores obtained on each statement were summed up to get individual respondent's risk orientation score. The possible range of score in this scale was from 6 to 18.

Categorisation

The respondents were categorised based on the total obtained score by using mean and standard deviation.

1. Low : Below (Mean - SD)
2. Medium : Between (Mean \pm SD)
3. High : Above (Mean + SD)

3.4.1.10 Economic motivation

Economic motivation was operationalised as the degree to which a farmer was oriented towards profit maximisation in farming and the relative value placed by a farmer on economic ends. It was measured with the help of scale developed by supe (1969). The scale consisted of six statements of which first five were positive while the last was negative. The responses for each statement were rated on a five point continuum which ranged from strongly agree to strongly disagree. the scoring was done as follows.

Response	SA	A	UD	DA	SDA
Scores for positive items	5	4	3	2	1
Scores for negative items	1	2	3	4	5

The maximum score an individual could obtain on this scale was 30 and the minimum score could be five.

Categorisation

The respondents were categorised based on the total obtained score by using mean and standard deviation.

- | | |
|-----------|---------------------------|
| 1. Low | : Below (Mean - SD) |
| 2. Medium | : Between (Mean \pm SD) |
| 3. High | : Above (Mean + SD) |

3.4.1.11 Scientific orientation

This variable was operationalised as the degree to which a farmer was oriented to the use of scientific method of farming and decision making. The scale developed by supe (1969) with suitable modifications was used to measure the scientific orientation of the respondents.

The scale contained six statements of which sixth statement was negatively keyed and the responses were obtained scoring was similar to that of economic motivation.

The respondents were categorised based on the total obtained score by using mean and standard deviation.

- | | |
|-----------|---------------------------|
| 1. Low | : Below (Mean - SD) |
| 2. Medium | : Between (Mean \pm SD) |
| 3. High | : Above (Mean + SD) |

3.4.1.12 Management orientation

It was operationalised as the degree to which a farmer was oriented towards the scientific farm management in pigeon pea cultivation comprising of planning, production and marketing.

The scale developed by Samanta (1977) and used by seshachar (1980) and Lakshmi Reddy (1983) was used for this study. The scale consists of three items as follows.

Planning orientation item consists of six items out of which three positive and three are negative items.

Production orientation item consists of six items, out of which five positive and one negative item. Marketing orientation consists of six items out of which three are positive and three are negative items. The scoring was done as follows :

Response	Agree	undecided	Disagree
For + ve items	3	2	1
For - ve items	1	2	3

The scores obtained for each statement were summed up to get individual respondent's management orientation score. The maximum and minimum possible score was 54 and 21 respectively.

Categorisation

The respondents were categorised based on the total score by using mean and standard deviation.

1. Low : Below (Mean - SD)
2. Medium : Between (Mean \pm SD)
3. High : Above (Mean + SD)

3.4.2 Dependent variables

3.4.2.1 Knowledge

Knowledge is defined as "Those behaviours and test situations which emphasized the remembering either by recognition or by recall of ideas and material on some phenomena" (Bloom et al., 1958).

The knowledge in this context was operationalised as the ability to recall the recommended practices of pigeon pea crop grown by the respondents.

For measuring respondents' knowledge on pigeon pea production recommendations a knowledge schedule was developed by adopting the following procedure:

An items pool of knowledge questions on pigeon pea production recommendations was prepared by consulting relevant literature, university scientists and experienced officials of Agricultural department of Andhra Pradesh. Finally, a thorough scrutiny of the items was made with the assistance of scientists and 33 items covering all the aspects of pigeon pea cultivation were prepared.

All the items of the schedule were grouped into two different types of objective questions namely, "true or false" and "multiple choice" looking into the suitability of bits of knowledge.

The items were presented by administering them to 30 farmers of the study area outside the main sample area of the study and suitable modifications were made.

The translated version (Telugu) of knowledge schedule was administered to the respondents of the sample area. Each test item was read out to the respondent by the investigator and the responses in the form of correct or incorrect answers were

recorded. All correct answers were assigned a weightage of 'one' and 'zero' to the incorrect answers.

Total of all the scores on knowledge items (33) was computed for each respondent was 33 and zero respectively.

Categorisation

Based on the scores obtained and after calculation of the mean and standard deviation, the respondents were classified into the following three categories keeping the mean and standard deviation as check.

- | | |
|-----------|---------------------------|
| 1) Low | : Below (Mean - SD) |
| 2) Medium | : Between (Mean \pm SD) |
| 3) High | : Above (Mean + SD) |

3.4.2.2 Adoption

Adoption was operationalised for the purpose of investigation as practicing of production recommendations by the farmers recommended by department of Agriculture in consultation with the scientists of A.P.A.U. Partial adoption refers to deviation from the adoption of a particular production recommendation. The practice which was not adopted by the farmers was considered as non-adoption. 16 critical production recommendations recommended by scientists were identified.

A schedule consisting of the selected practices were administered to the respondents for measuring the extent of adoption after pre-testing.

All the 16 recommended practices were included in the schedule administered to the respondents and their responses in the form of adopted, partially adopted and not adopted were obtained against recommended practices and weightage of 2, 1 and Zero were assigned respectively. Thus the total score on all the practices was computed by summing up the scores over all the items. The maximum and minimum adoption score was 32 and zero respectively.

Categorisation

Based on the scores obtained and after calculating the mean and standard deviation, the respondents were classified into the following three categories keeping the mean and standard deviation as check.

- | | |
|-----------|---------------------------|
| 1) Low | : Below (Mean - SD) |
| 2) Medium | : Between (Mean \pm SD) |
| 3) High | : Above (Mean + SD) |

3.5 INSTRUMENTS AND METHODS USED FOR COLLELCTION OF DATA

Data were collected from the selected respondents by using the interview schedule developed for the purpose. Mechanics of interview schedule construction were studied before the actual preparation of the schedule. The interview schedule, comprising the measurement of variable was prepared in consultation with the experts in the field of extension, keeping in view the objectives of the study. The interview schedule was

prepared in easy language which could be easily understandable by the respondents. Questions that may lead to ambiguity were avoided. The interview schedule was pretested in Mahabubnagar district with 30 respondents in a identical village outside the present study. In the light of experience gained in the pretesting, suitable modifications were made before finalising the actual instrument. The finalised interview schedule is provided in appendix.

The schedule contained three parts, the part-I deal with the items on personal and socio-psychological variables of the respondents, while the Part-II included knowledge inventory on pigeon pea cultivation and extent of adoption of pigeon pea production recommendations and constraints in adoption of pigeon pea production-recommendations and suggestions by farmers to overcome the same were included in the Part-III.

3.5.1 Establishing necessary rapport

Prior to data collection, sufficient rapport was established with the respondents during first few days of field investigation with the help of extension personnel, progressive farmers and village leaders. The respondents were convinced about the purpose of the study. It was also made clear to them that the study was purely academic purpose. This approach helped in getting desired co-operation valid and reliable information from the respondents.

3.5.2 Method of data collection

Each of the selected respondent was interviewed personally by the investigator and one schedule for each respondent was filled directly with the relevant data.

3.5.3 Preparation of the report

The data collected through interview schedule were coded, classified, tabulated and analysed in order to make the findings meaningful. The findings emerging out of the analysis of data were suitably interpreted and necessary conclusions and inferences were drawn.

3.6 STATISTICAL TESTS AND PROCEDURES

Following statistical tests and analytical procedures were used for analysing the data of the present investigation.

3.6.1 Arithmetic mean (\bar{X})

The arithmetic mean is the Quotient that results when the sum of all the items in scores is divided by the number of items. (n)

$$\bar{X} = \frac{\sum X}{n}$$

\bar{X} = Arithmetic mean

$\sum X$ = The sum of scores

n = number of respondents

3.6.2 Frequency and percentage

Some of the data were subjected to and interpreted in terms of frequency and percentages.

3.6.3 Standard deviation (S.D.)

The standard deviation is the squareroot of the mean of the sum of squares of the deviation taken from the mean of the distribution.

$$\sigma = \sqrt{\Sigma x^2 - \frac{(\Sigma x)^2}{n}}$$

Where,

σ = standard deviation

Σx^2 = summation of squares of each individual items

$(\Sigma x)^2$ = square of summation of all items

n = number of observations

3.6.4 Pearson's correlation coefficient (r)

Pearson's correlation coefficient was used to find out the relationship between the scores of independent variables and the scores of dependent variable.

$$r = \frac{[\Sigma xy - \frac{(\Sigma x)(\Sigma y)}{n}]}{\sqrt{[\Sigma x^2 - \frac{(\Sigma x)^2}{n}] [\Sigma y^2 - \frac{(\Sigma y)^2}{n}]}}$$

Where,

- r = co-efficient of correlation between x and y
- Σx = Sum of scores of variable x
- Σy = Sum of scores of variable y
- Σxy = Sum of product of x and y variables.
- Σx^2 = Sum of the squares of x variables
- Σy^2 = Sum of the squares of y variables
- n = Size of the sample.
-

RESULTS AND DISCUSSION

CHAPTER IV

RESULTS AND DISCUSSION

This chapter presents the findings of the investigation carried out on the objectives formulated for the study. The findings and discussion are presented under the following sub-heads.

- 4.1 Distribution of respondents according to their personal, socio-economic and psychological characteristics.
- 4.2 Knowledge level of farmers on pigeon pea production recommendations.
- 4.3 Extent of adoption of pigeon pea production recommendations.
- 4.4 Relationship between dependent and independent variables.
- 4.5 Constraints in adoption of pigeon pea production recommendations.
- 4.6 Suggestions for overcoming the constraints in the adoption of pigeon pea production recommendations.

4.1 DISTRIBUTION OF RESPONDENTS ACCORDING TO THEIR PERSONAL, SOCIO-ECONOMIC AND PSYCHOLOGICAL CHARACTERISTICS

This section presents the distribution of respondents according to their personal and socio-psychological characteristics namely age, education, family size, Social participation, Farm size, farming experience, Information seeking

behaviour. Innovativeness, Risk preference, economic motivation, Scientific orientation and management orientation.

4.1.1 Age

Table 5 : Distribution of respondents according to their age

N=120

S.No.	Category	Respondents	
		Frequency	Percentage
1.	Young age (up to 35 years)	28	23.33
2.	Middle age (36 to 55 years)	68	56.67
3.	Old age (56 and above)	24	20.00
Total		120	100.00

The age of the respondents of the study ranged from 23 to 78 years. On the basis of their chronological age, the respondents were classified into three groups namely young, middle and old age. From the Table 5 it could be observed that majority of the respondents belonged to middle age group (56.67%) followed by young (23.33%) and old age (20.00%) groups.

4.1.2 Education

Table 6 : Distribution of respondents according to their education

N=120

S.No.	Literacy level	Respondents	
		Frequency	percentage
1.	Upto primary school	58	48.33
2.	Middle school	34	28.33
3.	High school	18	15.00
4.	Collegiate education	10	8.34
Total		120	100.00

It was observed from Table 6 that 48.33 per cent of the respondents had literacy level upto primary, followed by middle school (28.33%), high school (15.00%) and 8.34 per cent collegiate education.

4.1.3 Family size

The respondents were distributed into two categories depending upon the number of members of family constituting its size. This has been incorporated in Table 7.

Table 7 : Distribution of respondents according to their family size

N=120			
S.No	Size of family	Respondents	
		Frequency	Percentage
1.	Upto 5 members (small)	42	35.00
2.	6 members and above (large)	78	65.00
Total		120	100.00

It can be observed from Table 7 that 65 per cent of the respondents belonged to large family size followed by small family size (35%).

4.1.4 Social participation

Table 8 shows the distribution of respondents based on their social participation.

Table 8 : Distribution of respondents according to their social participation.

		N=120	
S.No.	Category	Respondents	
		Frequency	Percentage
1.	Member of one organisation	52	43.33
2.	Member of more than one organisation	6	5.00
3.	Office bearer in organisation	3	2.50
4.	Public leader	9	7.50
5.	No social participation	50	41.67
Total		120	100.00

It can be observed from Table 8 that majority (43.33%) of the respondents had membership of one organisation, where as 41.67 percent of the respondents had no social participation, 7.50 percent were found as public leaders, 5.00 percent were found as member of more than one organisation and remaining 2.50 percent were found as office bearers in an organisation.

4.1.5 Farm size

The farm size of the respondents ranged from 2.5 acres to 34 acres.

Table 9 : Distribution of respondents according to their farm size

		N=120	
S.No.	Category	Respondents	
		Frequency	Percentage
1.	Small farmers (1-5 acres)	24	20.00
2.	Medium farmers (5.1-10acres)	46	38.33
3.	Big farmers (above 10 acres)	50	41.67
Total		120	100.00

It was evident from Table 9 that majority of the respondents (41.67%) had big size land holdings followed by medium (38.33%) and Small (20.00%) size land holdings.

4.1.6 Farming experience

The respondents had experience in farming from 5 to 60 years.

Table 10 : Distribution of respondents according to their experience in farming

		N=120	
S.No.	Category	Respondents	
		Frequency	Percentage
1.	Low experience (below 12 years)	15	12.50
2.	Medium experience (Between 13 to 38 years)	83	69.17
3.	High experience (39 years and above)	22	18.33
Total		120	100.00
Mean = 26.24		S.D = 13.55	

It was evident from Table 10 that majority (69.17%) of the respondents had medium experience in farming followed by high experience (18.33%) and low experience (12.50%)

4.1.7 Information seeking behaviour

Ability of an individual to seek the relevant information contributes to increase in knowledge which is the source of innovation and adoption of new technology. Hence the data processed on information seeking behaviour is tabulated in Table 11.

Table 11 : Distribution of respondents according to their information seeking behaviour.

		N=120	
S.No.	Category	Respondents	
		Frequency	Percentage
1.	Low information seeking behaviour	23	19.17
2.	Medium information seeking behaviour	81	67.50
3.	High information seeking behaviour	16	13.33
Total		120	100.00
Mean = 14.26		S.D = 3.78	

It was evident from Table 11 that majority (67.50%) of the respondents had medium information seeking behaviour followed by low (19.17%) and high (13.33%) information seeking behaviour.

4.1.8 Innovativeness

Table 12 : Distribution of respondents according to their innovativeness.

N=120

S.No.	Category	Respondents	
		Frequency	Percentage
1.	Low innovativeness	19	15.83
2.	Medium innovativeness	72	60.00
3.	High innovativeness	29	24.17
Total		120	100.00
Mean = 46.64		S.D = 7.88	

It was apparent from Table 12 that majority (60.00%) of the respondents had medium innovativeness, followed by high (24.17%) and low (15.83%) innovativeness.

4.1.9 Risk preference

The respondents were categorised into three categories as low, medium and high depending upon their risk preference which is presented in Table 13.

Table 13 : Distribution of respondents according to their risk preference

N=120

S.No.	Category	Respondents	
		Frequency	Percentage
1.	Low risk preference	28	23.33
2.	Medium risk preference	85	70.83
3.	High risk preference	7	5.84
Total		120	100.00
Mean = 13.32		S.D = 2.74	

It was evident from Table 13 that majority (70.83%) of the respondents had medium risk preference followed by low (23.33%) and high (5.84%) risk preference.

4.1.10 Economic motivation

The respondents were distributed into three categories based on their economic motivation as indicated in Table 14.

Table 14 : Distribution of respondents according to their economic motivation.

N= 20

S.No	Category	Respondents	
		Frequency	Percentage
1.	Low economic motivation	24	20.00
2.	Medium economic motivation	79	65.83
3.	High economic motivation	17	14.17
Total		120	100.00
Mean = 21.98		S.D = 2.75	

It was clear from Table 14 that majority (65.83%) of the respondents were having medium economic motivation followed by 20.00 per cent and 14.17 per cent with low and high economic motivation respectively.

4.1.11 Scientific orientation

The respondents were grouped into three categories namely low, medium and high based on their scientific orientation as indicated in Table 15.

Table 15 : Distribution of respondents according to their scientific orientation.

N=120

S.No.	Category	Respondents	
		Frequency	Percentage
1.	Low scientific orientation	22	18.33
2.	Medium scientific orientation	89	74.17
3.	High scientific orientation	9	7.50
Total		120	100.00
Mean = 24.48		S.D = 3.22	

Table 15 indicates that 74.17 per cent of the respondents had medium scientific orientation followed by low (18.33%) and high (7.50%) scientific orientation.

4.1.12 Management orientation

The respondents were grouped into three categories namely low, medium and high based on their management orientation scores keeping mean and S.D. as check.

Table 16 : Distribution of respondents according to their management orientation.

N=120

S.No	Category	Respondents	
		Frequency	Percentage
1.	Low management orientation	19	15.83
2.	Medium management orientation	85	70.83
3.	High management orientation	16	13.34
Total		120	100.00
Mean = 44.93		S.D = 6.35	

On perusal of Table 16 it could be observed that majority (70.83%) of the respondents were having medium management orientation followed by low (15.83%) and high (13.34%) management orientation.

DISCUSSION

On perusal of Table 5 to 16 it was evident that majority of the respondents belonged to middle age group, primary level of education with large family size having high social participation, big farm size, medium farming experience, medium level of information seeking behaviour, innovativeness, risk preference, economic motivation, scientific orientation and management orientation.

Table 5 indicated that majority of the pigeon pea growing farmers were middle aged. These were the farmers who had sufficient farming experience in growing of pigeon pea crop, but it is necessary to motivate the younger age group farmers for growing pigeon pea crop as they are more enthusiastic and the future agriculture will wholly depend on them.

An overview of Table 6 revealed that majority of the (48.33%) respondents were having primary educational level. This might be due to their financial problems and non-availability of educational facilities in the villages for higher education. Therefore, efforts are needed to improve the educational level of farmers by establishing more high schools in the villages.

The findings from Table 7 indicated that majority (65.00%) of the farmers were having large family size whereas 35 per cent of the farmers were having small family size. The probable reason for this might be that as the majority of the farmers who had big farm size might belong to joint families wherein land holdings are big, and united and they can meet the food and other requirements of all these family members easily.

On perusal of Table 8 it was clear that majority (43.33%) of the respondents had high social participation. This might be due to the fact that they were the members of primary agricultural co-operative society (PACS) in which membership is a pre-requisite for them to avail credit facility. Next to them 41.67 per cent of the respondents had no social participation. Therefore efforts are needed to establish some more social voluntary institutions in the villages through which people's participation can be increased further and transfer of technology could be made easy.

It could be inferred from the Table 9 that majority of the respondents (41.67%) belong to category of big farmers with large farm holdings. It is a good sign for pulse production as the increase in area under pulses will result in increased pulse production and inturn earns valuable foreign exchange. Small and medium farmers should also be encouraged as they constitute a large majority in our country.

From Table 10 it was evident that majority (69.17%) of the farmers had medium farming experience. This might be due to

the fact that majority of the farmers belonged to middle age group and obviously they had medium experience in cultivation.

On perusal of Table 11 we can find that majority (67.50%) of the farmers had medium information seeking behaviour. This might be due to the fact that as majority of farmers had educational level of primary standard followed by middle school, high school and collegiate education and with big farm size they felt that not only spending of time in getting livelihood is important but equally important was getting information about the cultivation aspects of pigeon pea crop.

Table 12 illustrated that majority (60.00%) of the respondents belonged to category of medium innovativeness. This might be due to the fact that majority of the respondents are middle aged, with big farm size, high social-participation and medium information seeking behaviour.

Table 13 depicted that majority (70.83%) of the farmers had medium level of risk preference. The possible reason for this might be that as pigeon pea is a rainfed crop mainly grown as an intercrop the farmers could not have afford to take risk in large scale even though they had big farm size, medium-innovativeness because they might not be economically sound. Large scale occurrence of various pests from the time of flowering and lack of assured rainfall during critical period of crop growth might be one of the reasons for medium risk preference.

Table 14 depicted that majority (65.83%) of the farmers had medium economic motivation. This trend might be due to the

fact that majority of the farmers are having big farm size, medium information seeking behaviour, medium risk preference and medium innovativeness. As the majority of the farmers had big farm size they should be encouraged for growing of pigeon pea as a commercial crop rather than subsistence farming by announcing the market price for pigeon pea well in advance i.e., before sowing.

It was apparent from Table 15 that majority of the farmers (74.17%) had medium scientific orientation. This trend might be due to the fact that majority of the farmers had high social participation, with big farm size, medium level of information seeking behaviour, innovativeness and economic motivation.

It was evident from the Table 16 that majority (70.83%) of the respondents had medium management orientation. The probable reason for medium management orientation might be due to lack of knowledge, medium information seeking behaviour, medium risk preference and medium scientific orientation.

4.2 KNOWLEDGE LEVEL OF FARMERS ON PIGEON PEA PRODUCTION RECOMMENDATIONS

An attempt has been made to find out the knowledge level of the respondents regarding the pigeon pea production recommendations.

4.2.1 Distribution of respondents based on their knowledge score on pigeon pea production recommendations

Table 17 : Distribution of respondents according to their knowledge regarding pigeon pea production recommendations

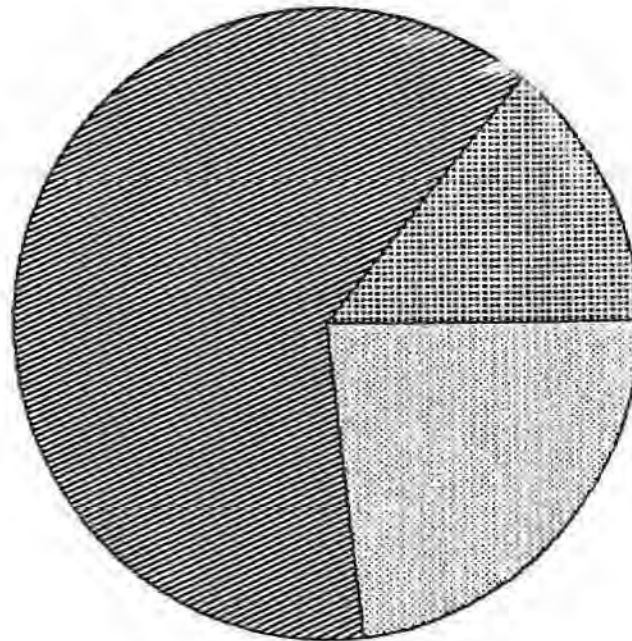
N=120			
S.No.	Category	Respondents	
		Frequency	Percentage
1.	Low knowledge	17	14.17
2.	Medium knowledge	75	62.50
3.	High knowledge	28	23.33
Total		120	100.00
Mean = 23.79		S.D. = 4.98	

It can be observed from the Table 17 that majority (62.50%) of the respondents had medium knowledge on pigeon pea production recommendations followed by high (23.33%) and low (14.17%) knowledge.

4.2.2 Analysis of knowledge items

To gain more insight on the knowledge of the respondents in the production-recommendations of pigeon pea cultivation, an analysis was carried out and the results are furnished in the Table 18.

MEDIUM KNOWLEDGE
(62.50)



LOW KNOWLEDGE
(14.17)

HIGH KNOWLEDGE
(23.33)

Fig.No.6 : PERCENTAGE DISTRIBUTION OF RESPONDENTS ACCORDING TO THEIR
KNOWLEDGE REGARDING PIGEON PEA PRODUCTION RECOMMENDATIONS

Table 18 : Knowledge of respondents on different aspects of pigeon pea production recommendations

Knowledge items	Correct		Incorrect	
	F	%	F	%
1. Recommended varieties	95	79.17	25	20.83
2. Pigeon pea is mainly grown as an inter crop in Kharif	120	100.00	0.00	0.00
3. Pigeon pea cannot be grown in soils subjected to water stagnation	120	100.00	0.00	0.00
4. Seed treatment with Rhizobium culture increases yield by 20-30 per cent in pigeon pea	37	30.83	83	69.17
5. Pigeon pea is grown as an intercrop with sorghum in the ratio of 1:3 to 1:8	95	79.17	25	20.83
6. Spacing for pigeon pea is same in black soils and red soils	73	60.83	47	39.17
7. Intercultivation with harrows (Danthulu) should be done twice during the crop period	110	91.67	10	8.33
8. Plant protection is very important for this crop	120	100.00	0	0.00
9. Sowings of the crop should be taken up by using country seed drill	73	60.83	47	39.17
10. Seed rate required is same for pure crop and inter crop	64	53.33	56	46.67
11. Pigeon pea crop helps in fixing nitrogen in the soil	19	15.83	101	84.17

(contd..)

Table 18 (contd.)

Knowledge items	Correct		Incorrect	
	F	%	F	%
12. 60 X 20 cm is the spacing required for light soils whereas 90 x 20 cm is required for black soils	65	54.17	55	45.83
13. Seed treatment with fungicides is not essential for pigeon pea	71	59.17	49	40.83
14. Pigeon pea is sensitive to weeds upto 30 days after sowing	111	92.50	9	7.50
15. Pod borer is the most important pest of pigeon pea	120	100.00	0	0.00
16. Endosulfan, monocrotophos or quinolphos can be sprayed to control pod borer	120	100.00	0	0.00
17. Harvesting is done when most of the pods are dry	120	100.00	0	0.00
18. Best time of sowing kharif crop	120	100.00	0	0.00
19. Soils in which pigeon pea gives higher yields	91	75.83	29	24.17
20. Depth of soil to be ploughed	93	77.50	27	22.50
21. Recommended quantity of farm yard manure to be applied to the soil before sowing	80	66.67	40	33.33
22. Resistant variety for redgram wilt	49	40.83	71	59.17
23. Recommended chemical to be sprayed for controlling gram caterpillar and pod fly	120	100.00	0	0.00

(contd.)

Table 18 (contd.)

Knowledge items	Correct		Incorrect	
	F	%	F	%
24. Short duration varieties maturity period	36	30.00	84	70.00
25. Yield of pigeon pea in intercropping	100	83.33	20	16.67
26. Time of supplemental irrigation for pigeon pea crop	56	46.67	64	53.33
27. Recommended dose of fertilizer for pigeon pea	75	62.50	45	37.50
28. Required seed rate for pigeon pea when grown as an intercrop with sorghum in the ratio of 1:3	102	85.00	18	15.00
29. Long duration variety maturity period	120	100.00	0	0.00
30. Required number of sprays for controlling pod borer and pod fly with suitable pesticide	66	55.00	54	45.00
31. Time of first spraying to be taken up for controlling pod borer and pod fly	110	91.67	10	8.33
32. Required quantity of endosulphan 35 EC or quinolphos 35 EC for controlling pod borer and pod fly	77	64.17	43	35.83
33. Moderately resistant variety for pod borer	27	22.50	93	77.50

DISCUSSION

The perusal of Table 18 indicates that a large majority of respondents possessed 100 per cent knowledge on cultivation of pigeon pea mainly as an intercrop (100.00%), suitable soils for pigeon pea cultivation (100.00%), importance of plant protection (100.00%), importance of pod borer (100.00%), chemical to control pod borer (100.00%), time of harvesting (100.00%), time of sowing (100.00%), recommended chemical for controlling gram caterpillar and pod fly (100.00%) and maturity period of long duration variety (100.00%). It is a positive sign that all the farmers had 100 per cent knowledge on the above mentioned items which can be utilised for increasing the production and productivity of pigeon pea.

Majority of the respondents had 60 to 80 per cent knowledge on sensitivity of pigeon pea to weeds (92.50%), inter cultivation (91.67%), time of spraying (91.67%), required seed rate for inter crop (85.00%), yield of pigeon pea in inter cropping (83.33%), recommended varieties (79.17%), ratio of pigeon pea and sorghum (79.17%). Ploughing depth of soil (77.50%), comparative yields of pigeon pea in black and red soils (75.83%), recommended quantity of FYM (66.67%), required quantity of chemical (64.17%), recommended dose of fertilizers (62.50%), spacing difference in black and red soils (60.83%) and sowings with country seed drill (60.83%). Efforts are needed to increase

the production and productivity of pigeon pea by concentrating on the above mentioned items of knowledge wherein all the farmers are not having thorough knowledge about recommended practices.

Majority of the farmers had very less knowledge on items like required number of sprays for controlling pod borer and pod fly (55.00%), recommended spacing for black and red soils (54.17%), required seed rate for pure crop and inter crop (53.33%), supplemental irrigation time for pigeon pea (46.67%), resistant variety for pigeon pea wilt (40.83%), increase in yield due to seed treatment with rhizobium culture (30.83%), maturity period of short duration varieties (30.00%), moderately resistant variety for pod borer (22.50%) and nitrogen fixation by pigeon pea (15.83%). The farmers should be given proper guidance for increasing their knowledge on above mentioned items by providing training.

The medium and high knowledge might be due to primary level, middle and high school education, high social participation and medium information seeking behaviour which create awareness and increase knowledge level. Knowledge is the basis to take up any innovation. So it was a good sign that majority of the respondents had medium knowledge. However, there is need to educate the farmers who had low knowledge about pigeon pea crop.

4.3 EXTENT OF ADOPTION OF PIGEON PEA PRODUCTION RECOMMENDATIONS

4.3.1 Distribution of respondents based on their adoption score on pigeon pea production recommendations

The distribution of respondents on their adoption of pigeon pea production recommendations is furnished in Table 19.

Table 19 : Distribution of respondents based on their adoption score on pigeon pea production recommendations

N=120			
S.No.	Category	Respondents	
		Frequency	Percentage
1.	Low Adoption	28	23.33
2.	Medium Adoption	77	64.17
3.	High Adoption	15	12.50
Total		120	100.00
Mean = 20.11		S.D. = 3.087	

Perusal of Table 19 reveals that majority (64.17%) of the respondents had medium level of adoption of pigeon pea production recommendations followed by 23.33 per cent with low adoption and remaining 12.50 per cent with high adoption.

4.3.2 Item analysis of adoption of pigeon pea production recommendations

To probe deeper into the extent of adoption of production recommendations by respondents, item analysis was carried out and the results are furnished in the Table 20.

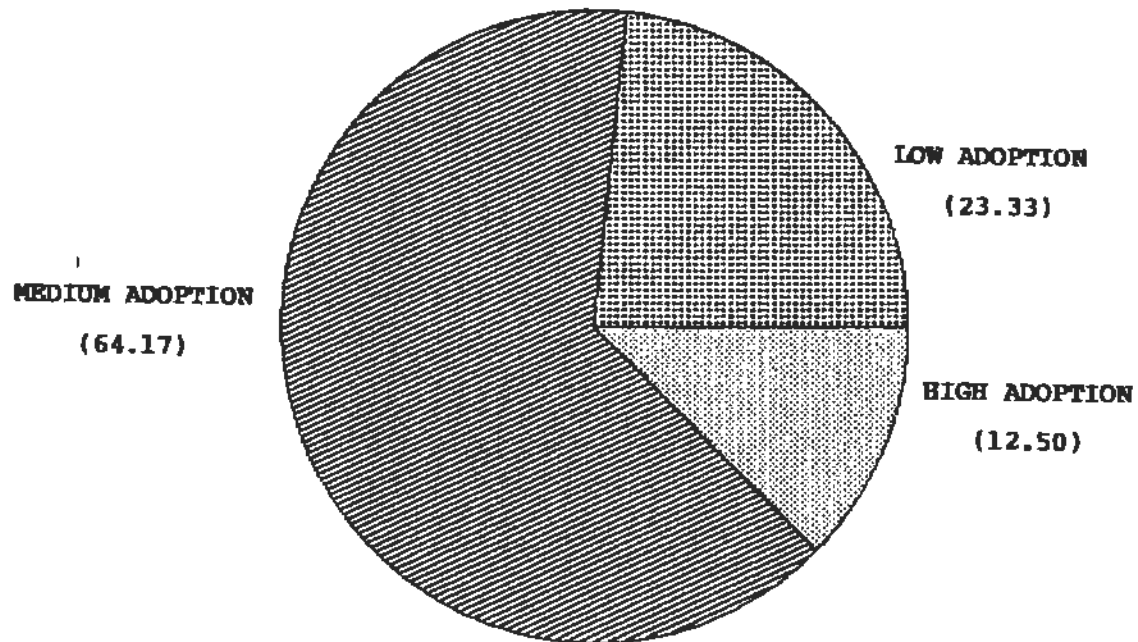


Fig.No.7 : PERCENTAGE DISTRIBUTION OF RESPONDENTS ACCORDING TO THEIR ADOPTION OF PIGEON PEA PRODUCTION RECOMMENDATIONS

Table 20 : Item analysis of extent of adoption of pigeon pea production recommendations

S.No.	Production Recommendations	Adopted		Partially adopted		Not adopted	
		F	%	F	%	F	%
1.	Recommended variety	91	75.83	-	-	29	24.17
2.	Required seed rate	92	76.67	28	23.33	-	-
3.	Seed treatment with Rhizobium	5	4.17	8	6.66	107	89.17
4.	Seed treatment with fungicide	55	45.83	17	14.17	48	40.00
5.	Sowing time	108	90.00	12	10.00	-	-
6.	Suitable soil selection	120	100.00	-	-	-	-
7.	Land preparation	92	76.67	28	23.33	-	-
8.	Recommended spacing	49	40.83	71	59.17	-	-
9.	Recommended Farm Yard Manure	61	50.83	47	39.17	12	10.00
10.	Recommended fertilizer dose	48	40.00	58	48.33	14	11.67
11.	Time of application of fertilizer	106	88.33	-	-	14	11.67
12.	Intercultivation	97	80.83	23	19.17	-	-
13.	Supplemental irrigation	9	7.50	-	-	111	92.50
14.	Required quantity of insecticides for control of pod borer, pod fly & plume moth	66	55.00	38	31.67	16	13.33
15.	Resistant variety of wilt	45	37.50	-	-	75	62.50
16.	Harvesting time	104	86.67	16	13.33	-	-

4.3.2.1 Recommended variety : Majority of the farmers (75.83%) were adopting recommended variety whereas 24.17 per cent had not adopted the recommended variety.

4.3.2.2 Required seed rate : Majority of the farmers (76.67%) had adopted required seed rate whereas 23.33 per cent of the respondents had partially adopted.

4.3.2.3 Seed treatment with Rhizobium : Majority (89.17%) of the respondents did not adopt this practice. This practice was adopted by 4.17 per cent of the respondents whereas 6.66 per cent of respondents adopted it partially.

4.3.2.4 Seed treatment with fungicide : This practice was adopted by majority (45.83%) of the respondents whereas 14.17 per cent had partially adopted and 40.00 per cent of respondents did not adopt the recommended practice.

4.3.2.5 Sowing time : Majority (90.00%) of the farmers are adopting correct sowing time whereas 10.00 per cent of the respondents had partially adopted this practise.

4.3.2.6 Suitable soil selection : This practice was adopted by all the 120 respondents.

4.3.2.7 Land preparation : Majority (76.67%) of the farmers had adopted this practice whereas 23.33 per cent of respondents had partially adopted the recommended practice.

4.3.2.8 Recommended spacing : Majority (59.17%) of the farmers had partially adopted the recommended spacing whereas 40.83 per cent of respondents had adopted it.

4.3.2.9 Recommended Farm Yard Manure : Majority (50.83%) of the respondents had adopted this practice whereas 39.17 per cent of respondents had partially adopted and 10.00 per cent of respondents had not adopted it.

4.3.2.10 Recommended fertilizer dose : Majority (48.33%) of the respondents had partially adopted it whereas 40.00 per cent of the respondents had adopted it and only 11.67 per cent of respondents had not adopted this practice.

4.3.2.11 Time of application of fertilizer : Majority (88.33%) of the respondents had adopted the recommended practice whereas 11.67 per cent of the respondents had not adopted it.

4.3.2.12 Intercultivation : This practice was adopted by the majority (80.83%) of the respondents whereas 19.17 per cent of the respondents had partially adopted it.

4.3.2.13 Supplemental irrigation : Majority (92.50%) of the farmers had not adopted this practice whereas only 7.50 per cent of the respondents had adopted it.

4.3.2.14 Required quantity of insecticides for control of pod borer, pod fly and plume moth : This practice was adopted by majority (55.00%) of the respondents whereas 31.67 per cent of respondents had partially adopted it and 13.33 per cent respondents had not adopted this practice.

4.3.2.15 Resistant variety of wilt : This recommendation was adopted by only 37.50 per cent of the respondents whereas majority (62.50%) had not adopted it.

4.3.2.16 Harvesting time : This practice was adopted by majority (86.67%) of the respondents whereas 13.33 per cent respondents had partially adopted this practice.

DISCUSSION

On perusal of Table 19, it was evident that majority (64.17%) of the farmers were medium adopters of pigeon pea production recommendations followed by low (23.33%) and high (12.50%) adoption.

The practice wise analysis of production recommendations proves that all the respondents have fully adopted the practice suitable soil selection. Majority of the respondents had adopted practices like sowing time (90.00%), time of application of fertilizers (88.33%), harvesting time (86.67%), seed rate (76.67%), intercultivation and land preparation (76.67%), recommended variety (75.53%), seed treatment with Rhizobium culture (45.83%) and supplemental irrigation (7.50%) was adopted by negligible number of respondents.

Majority of the respondents had medium level of adoption. The probable reason for this might be the fact that majority of respondents had primary level, middle school and high school education, with big farm size, medium information seeking

behaviour, innovativeness, economic motivation, scientific orientation and management orientation.

4.4 RELATIONSHIP BETWEEN DEPENDENT AND INDEPENDENT VARIABLES

This section gives the nature of relationship of selected independent variables with that of dependent variables namely knowledge and adoption of pigeon pea production recommendations. In order to study the nature of relationship, correlation co-efficients (r) were computed. The values of correlation co-efficients were then tested for their statistical significance and the findings are presented in the section.

4.4.1 Relationship between knowledge and the selected independent variables of respondents

The relationship between knowledge and their independent variables found by correlation co-efficients are presented in Table 21. The relationship between the knowledge scores and the scores on the selected personal and socio-psychological variables of the farmers were tested by relevant null and empirical hypothesis.

Null hypothesis : There will be no relationship between the scores on selected personal and socio-psychological variables and the scores on knowledge of respondents.

Empirical hypothesis : There will be relationship between the scores on selected personal and socio-psychological variables and the scores on knowledge of respondents.

Table 21 : Correlation coefficient between the knowledge and independent variables of respondents

S.No.	Independent variables	'r' values
X ₁	Age	0.00695 NS
X ₂	Education	0.61430**
X ₃	Family size	0.14564 NS
X ₄	Social participation	0.41820**
X ₅	Farm size	0.56558**
X ₆	Farming experience	0.17918*
X ₇	Information seeking behaviour	0.79498**
X ₈	Innovativeness	0.78326**
X ₉	Risk preference	0.75793**
X ₁₀	Economic motivation	0.65328**
X ₁₁	Scientific orientation	0.64993**
X ₁₂	Management orientation	0.78764**

* Significant at 0.05 probability level

** Significant at 0.01 probability level

NS Non Significant

The computed 'r' values of education, social participation, farm size, farming experience, information seeking behaviour, innovativeness, risk preference, economic motivation, scientific orientation, and management orientation with the knowledge found to be positively significant at 0.01 level of probability. Hence, the null hypothesis was rejected accepting the empirical hypothesis. Whereas computed 'r' value of age and family size was found non-significant. Hence, the null hypothesis was accepted rejecting the empirical hypothesis.

DISCUSSION

The findings relating to the association between knowledge and personal and socio-psychological factors revealed that education, social participation, farm size, farming experience, information seeking behaviour, innovativeness, risk preference, economic motivation, scientific orientation and management orientation had a positive and significant relationship with knowledge, whereas age was found to be non significant.

Age was found to have a non significant relationship with knowledge indicating that age was not a character which influences the knowledge level of farmers. So all the age group of farmers irrespective of their age were more or less alike in their knowledge level.

Educational status and knowledge level of farmers had positive and significant association with one another at one per cent level of probability. This indicated more the education, higher could be the knowledge of the farmers. Because of higher education, such farmers had better capacity to understand new ideas, besides having access to different kinds of print media and other mass media. Hence there was a significant positive relationship between education and knowledge level of farmers.

Family size was found to have a non significant relationship with knowledge level of farmers.

Social participation was found to have a positive and significant relationship with knowledge level of farmers at one per cent level of probability. The social participation among the farmers might have enabled them to exchange ideas and views with other members and obtained more information about pigeon pea production recommendations. The farmers with high social participation will have touch with latest information by sharing their ideas with other members. This might be the probable reason for the positive and significant relationship between social participation and knowledge on pigeon pea production recommendations.

Farm size was positive and significantly related with knowledge of the farmers at one per cent level of probability. Relatively greater economic security of big farmers will permit them to adopt more innovations. For this naturally they seek more information about new technologies which enhances their knowledge. This might be the possible reason for having significant relationship.

Farming experience and knowledge level of farmers had shown positive and significant relationship at five per cent level of probability. The possible reason for this might be as the experience of farmers increases in cultivation of a crop they will gather complete information about that crop and thereby increases their knowledge.

Information seeking behaviour and knowledge level of farmers had shown positive and significant relationship at one

per cent level of probability. It is expected that the farmers actively search for and seek information on innovations with regard to seeds, improved practices, inputs and extension advice to enable them to adopt and maximise the profits on their farms.

Innovativeness was found to have positive and significant relationship with knowledge level of farmers at one per cent level of probability. Farmers with innovative bent of mind have got the tendency to seek more information about latest technology and increase their knowledge.

Risk preference was found to have a positive and significant relationship with knowledge level of farmers at one per cent level of probability. Risk preference is expressed as the degree to which a farmer is oriented to take risk and has courage to face uncertainties in pigeon pea cultivation. A farmer who is having this particular trait normally will have better knowledge. This might be the probable reason for the existence of this type of relationship

Economic motivation was found positively and significantly related to knowledge at one per cent level of probability indicating that farmers who possessed more economic motivation had more knowledge than their counterparts. These farmers always want to get maximum yields and to improve their income level, they have to know about latest agricultural practices. Thus economic motivation among them acts as an initiating factor for acquiring knowledge about improved technologies, hence this type of trend was noticed.

Scientific orientation was positive and significantly related with the knowledge at one per cent level of probability. Farmers having good scientific orientation will naturally prefer to know advanced technology in Agriculture. Therefore, they are likely to evince keen interest in trying to know about latest agricultural practices. In this process they might have acquired more knowledge, hence the significant relationship was noticed.

Management orientation showed positive and significant relationship with knowledge at one per cent level of probability. Farmer needs knowledge of how to plan, how much to produce and what price to get for his produce. For this he should have management orientation which increases his knowledge. That is the reason why results showed a significant relationship between management orientation and knowledge.

4.4.2 Relationship between adoption and selected independent variables

The relationship between adoption and their independent variables found by correlation co-efficients are presented in Table 22.

The relationship between the adoption scores and the scores on the selected personal and socio-psychological variables of the farmers were tested by relevant null and empirical hypothesis.

Null hypothesis : There will be no relationship between the scores on selected personal and socio-psychological variables and the scores on adoption of respondents.

Empirical hypothesis : There will be significant relationship between the scores on selected and socio-psychological variables and the scores on adoption of respondents.

Table 22 : Correlation coefficient between the adoption and independent variables of respondents

S.No.	Independent variables	'r' values
X ₁	Age	-0.13953 NS
X ₂	Education	0.60806**
X ₃	Family size	0.17569*
X ₄	Social participation	0.46321**
X ₅	Farm size	0.61070**
X ₆	Farming experience	0.20411*
X ₇	Information seeking behaviour	0.74955**
X ₈	Innovativeness	0.69349**
X ₉	Risk preference	0.65717**
X ₁₀	Economic motivation	0.69863**
X ₁₁	Scientific orientation	0.59497**
X ₁₂	Management orientation	0.70788**

* Significant at 0.05 probability level

** Significant at 0.01 probability level

NS Non Significant

The computed 'r' values of education, social participation, farm size, information seeking behaviour, innovativeness, risk preference, economic motivation, scientific orientation and management orientation with adoption were found positively significant at one per cent level of probability,

while family size and farming experience were found positively significant at five per cent level of probability. Hence, the null hypothesis was rejected accepting the empirical hypothesis.

Whereas the computed 'r' value of age was found negatively non significant. Hence, the null hypothesis was accepted rejecting the empirical hypothesis.

DISCUSSION

A positive and significant relationship was observed between adoption behaviour of the farmers and the education, family size, social participation, farm size, farming experience, information seeking behaviour, innovativeness, risk preference, economic motivation, scientific orientation and management orientation. On the other hand, age was found negatively and non significantly correlated with adoption behaviour of farmers.

Age and adoption were negatively correlated but relationship was non significant indicating that as the age increases adoption decreases as the farmer loses interest in farming.

Education and adoption level of farmers had shown positive and significant relation at one per cent level of probability. The possible reasons for this trend might be that education will provide an opportunity to an individual to expose himself to print media, which ensures the study flow of information. The information gained through such exposures might have made them better aware of the recent advances in pigeon pea

cultivation. Due to this, farmers have developed more favourable attitude which in turn might have motivated them for adoption of recommended practices, hence the above trend was noticed.

Family size has shown positive and significant relationship with adoption at five per cent level of probability. The probable reason for this might be that as the number of members in the family are more they do not need much labour and these family members will engage themselves in farm operations where by adoption might have increased. One more possible reason might be that with the increase in family size the farmers are interested to adopt the practice so as to increase their food production to meet the food requirements of family members and also to meet the demand of market.

Social participation was positively and significantly related with adoption at one per cent level of probability. It was quite natural that farmers having membership in social organisations had more chance of getting exposed to different sources of agricultural information which inturn might led to adoption of new technology. This could be the probable reason for positive and significant relationship between social participation and adoption.

Farm size and adoption level of farmers had shown a positive and significant relationship at one per cent level of probability with each other. In general big farmers are economically sound. They will have willingness to take risk and adopt any number of recommendations in his farm regardless of

cost. Whereas small and medium farmers due to limited resources cannot afford to adopt costly innovations. This might be the possible reason for the significant relationship.

Experience in farming had shown a positive and significant relationship with adoption at five per cent level of probability. The probable reason for this might be the fact that as the farmer gains knowledge through his experience in farming he will try to adopt more.

Information seeking behaviour and adoption of farmers had shown a positive and significant relationship with each other at one per cent level of probability. As the pigeon pea in a rainfed crop involving lot of risk in the form of pests and diseases during its crop growth the farmer seeks more information on short duration varieties, improved practices, drought resistant varieties, pests and disease resistant varieties, pest control measures and extension advises. This increases the knowledge of the farmer on different cultivation aspects of pigeon pea. Once the farmer acquires knowledge he tries to adopt it. This might be the probable reason for positive and significant relation between these two variables.

A positive and significant relationship was observed between innovativeness and adoption level of farmers at one per cent level of probability. The probable reason for this might be the fact that the innovative farmers always seek information from various sources, thereby increase the knowledge and finally they adopt.

A positive and significant relationship was observed between risk preference and adoption at one per cent level of probability. Risk preference is expressed as the degree to which a farmer is oriented to take risk and has courage to face uncertainties in pigeon pea cultivation. A farmer who is having this particular trait will naturally adopt the recommended practice. This might be the probable reason for positive significant relationship.

A positive and significant relationship was observed between economic motivation and adoption at one per cent level of probability. In general, the farmers want to get maximum yields to get higher income from their fields. To get better yields and to increase their level of income they have to adopt certain recommended improved practices. The economic-motivation among them acts as an initiating factor for obtaining information regarding recommended practices and make them to adopt in their field, hence this type of trend was identified.

Scientific orientation and adoption level of farmers had shown positive and significant relationship with one another at one per cent level of probability. Farmers having scientific orientation will be motivated to know more information about improved agricultural technology. Due to this farmers might have developed favourable attitude which inturn lead them for adoption of improved agricultural technology, hence this type of trend might be observed.

Management orientation had shown positive and significant relationship with adoption at one per cent level of probability. Majority of the farmers had medium management orientation and might have approached various information sources to get himself acquainted with the latest technology. The farmer who plans his farm activity for the future keeping in view the marketing of his produce is apt to take the improved practices in his land and that could be the possible reason for such positive and significant relation between management orientation and adoption of practices. Higher the management orientation greater would be the adoption of recommended practices.

4.5 CONSTRAINTS IN THE ADOPTION OF PIGEON PEA PRODUCTION RECOMMENDATIONS

An attempt was made to find out the specific constraints in partial and non-adoption of each production recommendation. The partial adopters and non-adopters were asked to express the constraints they encountered in adopting various pigeon pea production recommendations. Their responses were tabulated, frequencies and percentages were calculated. Constraints for suitable soil selection were not studied as there was 100 per cent adoption regarding that practice. The practice wise constraints encountered in partial and non-adoption are as follows :

4.5.1 Recommended varieties

Table 23 : Constraints in non-adoption of recommended variety

N = 29

S.No.	Constraints	Respondents	
		Frequency	Percentage
1.	Lack of knowledge	16	55.17
2.	Lack of technical guidance	13	44.82
3.	Non-availability of varieties in time at local place	24	82.75
4.	No guarantee of getting more yield	9	31.03
5.	Satisfied with existing varieties	7	24.13

The Table 23 indicates that considerable number of farmers encountered constraints in adoption of recommended varieties of pigeon pea. Majority (82.75%) expressed that non-availability of varieties in time at local places, followed by lack of knowledge (55.17%), lack of technical guidance (44.82%), no guarantee of getting more yield (31.03%) and satisfied with existing varieties (24.13%).

4.5.2 Required seed rate

Table 24 : Constraints in partial adoption of required seed rate

N = 28

S.No.	Constraints	Respondents	
		Frequency	Percentage
1.	Lack of knowledge	13	46.42
2.	Lack of technical guidance	4	14.28
3.	Involvement of more expenditure	27	96.42
4.	Low fertility status of soil	18	64.28
5.	Don't want to take risk	9	32.14
6.	Lack of credit facilities	15	53.57

The Table 24 shows that majority of the respondents were not adopting the recommended seed rate due to involvement of more expenditure (96.42%), followed by low fertility status of soil (64.28%), lack of credit facilities (53.57%), lack of knowledge (46.42%), Don't want to take risk (32.14%) and lack of technical guidance (14.28%).

4.5.3 Seed treatment with Rhizobium

Table 25 : Constraints in partial/non-adoption of seed treatment with Rhizobium

N = 115

S.No.	Constraints	Respondents	
		Frequency	Percentage
1.	Lack of knowledge	83	72.17
2.	Lack of technical guidance	14	12.17
3.	Non availability of Rhizobium culture in time at local place	36	31.30
4.	No guarantee of getting more yield	33	28.69

From the Table 25 it could be inferred that majority of the farmers felt that the constraints in adoption of seed treatment with Rhizobium were lack of knowledge (72.17%), followed by non availability of Rhizobium culture in time at local place (31.30%), no guarantee of getting more yield (28.69%) and lack of technical guidance (12.17%).

4.5.4 Seed treatment with fungicide

Table 26 : Constraints in partial/non adoption of seed treatment with fungicides

		N = 65	
S.No.	Constraints	Respondents	
		Frequency	Percentage
1.	Lack of knowledge	49	75.38
2.	Lack of technical guidance	22	33.84
3.	Non availability of chemicals in time at local place	63	96.92
4.	No guarantee of getting more yield	41	63.07

From Table 26 it was apparent that majority (96.92%) of farmers reported that lack of technical guidance, lack of knowledge (75.38%), no guarantee of getting more yield (63.07%) and non availability of chemicals in time at local place (33.84%) were the main constraints in adoption of recommended seed treatment with fungicide.

4.5.5 Sowing time

Table 27 : Constraints in partial adoption of sowing time

N = 12

S.No.	Constraints	Respondents	
		Frequency	Percentage
1.	Non availability of inputs in time	11	91.66
2.	Labour problem	6	41.66
3.	Lack of sufficient rainfall in time	10	83.33

It was evident from Table 27 that majority (91.66%) of farmers reported that non-availability of inputs in time as the major constraint followed by lack of sufficient rainfall in time (83.33%) and labour problem (41.66%).

4.5.6 Land preparation

Table 28 : Constraints in partial adoption of land preparation

N = 28

S.No.	Constraints	Respondents	
		Frequency	Percentage
1.	Lack of knowledge	16	57.14
2.	Lack of sufficient labour	21	75.00
3.	Lack of time	26	92.85

Table 28 shows that majority (92.85%) of the farmers felt that lack of time was the main constraint in thorough

preparation of land followed by lack of sufficient labour (75.00%) and lack of knowledge (57.14%).

4.5.7 Recommended spacing

Table 29 : Constraints in partial adoption of recommended spacing

N = 71

S.No.	Constraints	Respondents	
		Frequency	Percentage
1.	Lack of knowledge	55	77.46
2.	Consumes more labour and time	35	49.29
3.	Type of soil	41	57.74
4.	Lack of technical guidance	53	74.64

Table 29 shows that majority (77.46%) of the farmers perceived that lack of knowledge was the important constraint in adoption of recommended spacing followed by lack of technical guidance (74.64%), type of soil (57.74%) and consumption of more labour and time (49.29%).

4.5.8 Recommended Farm Yard Manure

Table 30 : Constraints in partial/non adoption of recommended farm yard manure

N = 59

S.No.	Constraints	Respondents	
		Frequency	Percentage
1.	Lack of knowledge	19	32.20
2.	Lack of technical guidance	11	18.64
3.	Needs more labour	6	10.16

(Contd.)

Table 30 (contd.)

S.No.	Constraints	Respondents	
		Frequency	Percentage
4.	Use of manures to other crops	42	71.18
5.	There is no difference in yield	14	23.72
6.	Non availability of sufficient quantities of farm yard manure	52	88.13

Table 30 indicates that the most important constraint in application of recommended farm yard manure was non availability of sufficient quantities of farm yard manure as perceived by the majority (88.13%) of the respondents followed by use of manures to other crops (71.18%), lack of knowledge (32.20%), no difference in yield (23.73%), lack of technical guidance and needs more labour (10.16%).

4.5.9 Recommended fertilizer dose

Table 31 : Constraints in partial/non adoption of recommended fertilizer dose

N = 72

S.No.	Constraints	Respondents	
		Frequency	Percentage
1.	Lack of knowledge	35	48.60
2.	Lack of technical guidance	48	66.66
3.	High cost of fertilizers	63	87.50
4.	Non availability of credit	70	97.22
5.	Non availability of fertilizers in time	31	43.05

Table 31 indicates that majority (97.22%) of the farmers constraint was non availability of credit followed by high cost of fertilizers (87.50%), lack of technical guidance (66.66%), lack of knowledge (48.60%) and non availability of fertilizers in time (43.05%).

4.5.10 Time of application of fertilizers

Table 32 : Constraints in non adoption of recommended time of application of fertilizers

N = 14

S.No.	Constraints	Respondents	
		Frequency	Percentage
1.	Lack of knowledge	8	57.14
2.	Non availability of credit	13	92.85
3.	Lack of technical guidance	11	78.57
4.	Non availability of fertilizers in time	6	42.85

Table 32 indicates that the majority (92.85%) of the farmers constraint was non availability of credit followed by lack of technical guidance (78.57%), lack of knowledge (57.14%) and non availability of fertilizers in time (42.85%).

4.5.11 Intercultivation

Table 33 : Constraint in partial adoption of intercultivation

N = 23

S.No.	Constraints	Respondents	
		Frequency	Percentage
1.	Lack of knowledge	7	30.43
2.	Non availability of labour in time	23	100.00
3.	Lack of credit facilities	20	86.95
4.	Lack of technical guidance	12	52.17

Table 33 shows that majority (100.00%) of the farmers felt that non availability of labour in time was the main constraint in adoption of intercultivation practices followed by lack of credit facilities (86.95%), lack of technical guidance (52.17%) and lack of knowledge (30.43%).

4.5.12 Supplemental irrigation

Table 34 : Constraints in non adoption of supplemental irrigation

N = 111

S.No.	Constraints	Respondents	
		Frequency	Percentage
1.	Lack of knowledge	13	11.71
2.	Lack of irrigation facilities	109	98.19
3.	Lack of technical guidance	19	17.11
4.	Lack of credit facilities	86	77.47

Table 34 shows that majority (98.19%) of the farmers perceived that lack of irrigation facilities was the important constraint in adoption of supplemental irrigation followed by lack of credit facilities (77.47%), lack of technical guidance (17.11%) and lack of knowledge (11.71%).

4.5.13 Required quantities of pesticides

Table 35 : Constraints in partial/non adoption of required quantities of chemicals for controlling pod borers, pod fly and plume moth.

N = 54

S.No.	Constraints	Respondents	
		Frequency	Percentage
1.	Lack of knowledge	32	59.25
2.	Lack of technical guidance	27	50.00
3.	Lack of credit facilities	34	62.96
4.	High cost of chemicals	49	90.74
5.	Non availability of good quality chemicals	24	44.44
6.	High cost of labour to carry out the operations	13	24.07
7.	Non availability of suitable equipments	11	20.37
8.	Adoption of chemical feels complicated and dangerous	22	40.74

Table 35 shows the majority (90.74%) of farmers perceived that high cost of chemicals followed by lack of credit facilities (62.96%), lack of knowledge (59.25%), lack of

technical guidance (50.00%), non availability of good quality chemicals (44.44%), adoption of chemicals feels complicated and dangerous (40.74%), high cost of labour to carryout the operations (24.07%) and non availability of suitable equipments (20.37%).

4.5.14 Resistant variety of wilt

Table 36 : Constraints in non adoption of recommended variety of wilt

N = 75

S.No.	Constraints	Respondents	
		Frequency	Percentage
1.	Lack of knowledge	70	93.33
2.	Non availability of varieties	53	70.66
3.	No guarantee of getting more yield	17	22.66
4.	Satisfied with existing varieties	12	16.00

Table 36 indicates that the most important constraint in adoption of wilt resistant variety was lack of knowledge as perceived by the majority (98.33%) of the respondents followed by non-availability of varieties (70.66%), no guarantee of getting more yield (22.66%) and satisfied with existing varieties (16.00%).

4.5.15 Harvesting time

Table 37 : Constraints in partial adoption of recommended time of harvesting

N = 16

S.No.	Constraints	Respondents	
		Frequency	Percentage
1.	Lack of technical guidance	12	75.00
2.	Lack of labour at the time of harvesting	16	100.00
3.	Changes in climate	7	43.75

Table 37 shows that majority (100.00%) of the farmers perceived the lack of labour at the time of harvesting, followed by lack of technical guidance (75.00%), changes in climate (43.75%) and lack of knowledge (31.25%) as the constraints in adoption of recommended harvesting time.

DISCUSSION

From the above tables it can be observed that several constraints namely lack of knowledge, non-availability of inputs, non-availability of varieties in time at local place, non-availability of sufficient quantities of farm yard manure, lack of time, lack of technical guidance, involvement of more expenditure and lack of sufficient labour were perceived by the respondents in adoption of different pigeon pea production recommendations advocated by scientists and extension officials.

The following discussion would point out the constraints in adoption of practice wise recommendations of pigeon pea cultivation.

Recommended varieties

Non availability of varieties in time at local place was one of the major constraint reported by majority of farmers in non adoption of recommended varieties, followed by lack of knowledge and lack of technical guidance to a considerable extent. Farmer should be supplied with the recommended seed varieties in time so that he can adopt it.

Required seed rate

Involvement of more expenditure was one of the major constraint expressed by majority of farmers in partial adoption of required seed rate, followed by low fertility status of soil, lack of credit facilities, lack of knowledge, don't want to take risk and lack of technical guidance. Farmers should be provided credit facilities and seed should be supplied to them on subsidized rate by government to increase the adoption of required seed rate.

Seed treatment with Rhizobium

Lack of knowledge was one of the major constraint reported by majority of the farmers followed by non availability of rhizobium culture in time at local place, no guarantee of getting more yield, and lack of technical guidance. But

knowledge is essential to any farmer to adopt the new technology. Hence, the field extension workers should put in greater efforts in educating and motivating the farmers by imparting required knowledge to adopt the recommended quantities of Rhizobium culture.

Seed treatment with fungicide

Lack of technical guidance was one of the major constraint expressed by the majority of the respondents in partial/non adoption of seed treatment with fungicide followed by lack of knowledge, no guarantee of getting more yield and non availability of chemicals in time at local place. Proper technical guidance should be given to farmers by scientists and extension personnel; skill and method demonstration should be conducted on seed treatment with fungicide to increase the knowledge of farmers and there by increase their adoption.

Sowing time

Non availability of inputs in time was one of the major constraint reported by the majority of farmers in partial adoption of recommended sowing time, followed by lack of sufficient rainfall in time and labour problem. Adequate arrangements should be made to supply the required inputs in time to the farmers to increase their adoption.

Land preparation

Lack of time was one of the major constraint reported by the majority of farmers in partial adoption of land preparation

followed by lack of sufficient labour and lack of knowledge. Farmers should be educated and motivated to take up proper land preparation which will increase his crop yields.

Recommended spacing

Lack of knowledge was one of the major constraint reported by the majority of farmers in partial adoption of recommended spacing, followed by lack of technical guidance, type of soil and consumes more labour and time. Extension personnel should educate the farmers regarding the benefits of adopting recommended spacing. Adoption of recommended spacing will facilitate better crop growth and increased yields.

Recommended Farm Yard Manure

Non-availability of sufficient quantities of FYM was one of the major constraint expressed by the farmers in partial/non adoption of recommended farm yard manure, followed by use of manures to other crops, lack of knowledge, there is no difference in yield, lack of technical guidance and needs more labour. Extension personnel should educate and motivate the farmers for taking up green manure crops in their field before actually growing pigeon pea. Green manure crop acts as substitute to farm yard manure and thereby meet the requirements of soil and maintains its fertility.

Recommended fertilizer dose

Non availability of credit was one of the major constraint reported by the farmers in partial/non adoption of

recommended fertilizer dose followed by high cost of fertilizers, lack of technical guidance, lack of knowledge and non availability of fertilizers in time. Generally majority of the farmers had poor economic status. Hence, the administration has to take policy decisions to provide short term credit facilities by different government agencies and banking institutions before season. This will help the farmer to purchase the required quantities of fertilizers in time.

Time of application of fertilizers

Non availability of credit was one of the major constraint reported by the farmers in non adoption of recommended time of application of fertilizers, followed by lack of technical guidance, lack of knowledge and non availability of fertilizers in time. Hence the credit facilities should be provided to farmers through cooperative institutions and banks.

Intercultivation

Non availability of labour in time was one of the major constraint reported by majority of the farmers in partial adoption of intercultivation practices, followed by lack of credit facilities, lack of technical guidance and lack of knowledge. Department of Agriculture should supply mechanical weed hoe to farmers to combat labour problem.

Supplemental irrigation

Lack of irrigation facilities was one of the major constraint expressed by majority of the farmers in non adoption

of supplemental irrigation. Government should help the farmers by sanctioning loans to take up bore wells in their fields.

Required quantities of pesticides

High cost of chemicals was one of the major constraint reported by majority of the farmers in partial/non adoption of required quantities of pesticides followed by lack of credit facilities, lack of knowledge, lack of technical guidance, non availability of good quality chemicals. Adoption of chemical feels complicated and dangerous, high cost of labour to carry out the operations and non-availability of suitable equipments. Plant protection chemicals and suitable spraying equipment should be supplied by the government at subsidized rates to the farmers. Government should see that unadulterated chemicals are made available to the farmers.

Resistant variety of wilt

Lack of knowledge was one of the major constraint reported by the majority of respondents in non adoption of resistant variety of wilt followed by non-availability of varieties, no guarantee of getting more yield and satisfied with existing varieties. Farmers should be educated so that they will increase their knowledge regarding varieties and their advantages. Resistant varieties should be made available to the farmers before sowing season.

Harvesting time

Lack of labour at the time of harvesting was one of the major constraint reported by majority of the farmers followed by lack of technical guidance and changes in climate. Farmers must be encouraged to take up timely sowings so that harvesting can be done without any delay and difficulty.

From the above, it can be concluded that various constraints were responsible for lower adoption of pigeon pea production recommendations. All the identified constraints which were responsible for low level of adoption of pigeon pea production recommendations do not act separately. They interact with each other and act as barriers for adoption. Hence, any programme and transfer of pigeon pea production recommendations must take into consideration of all the identified constraints stated above for promoting pigeon pea production recommendations under farmer's conditions.

4.6 SUGGESTIONS FOR OVERCOMING THE CONSTRAINTS IN ADOPTION OF PIGEON PEA PRODUCTION RECOMMENDATIONS

The data pertaining to this aspect was collected from farmers and presented in Table 38.

Table 38 reveals the suggestions given by farmers for increasing the yields of pigeon pea.

The suggestions made by the farmers for increasing the pigeon pea yields were provision of adequate and timely supplies

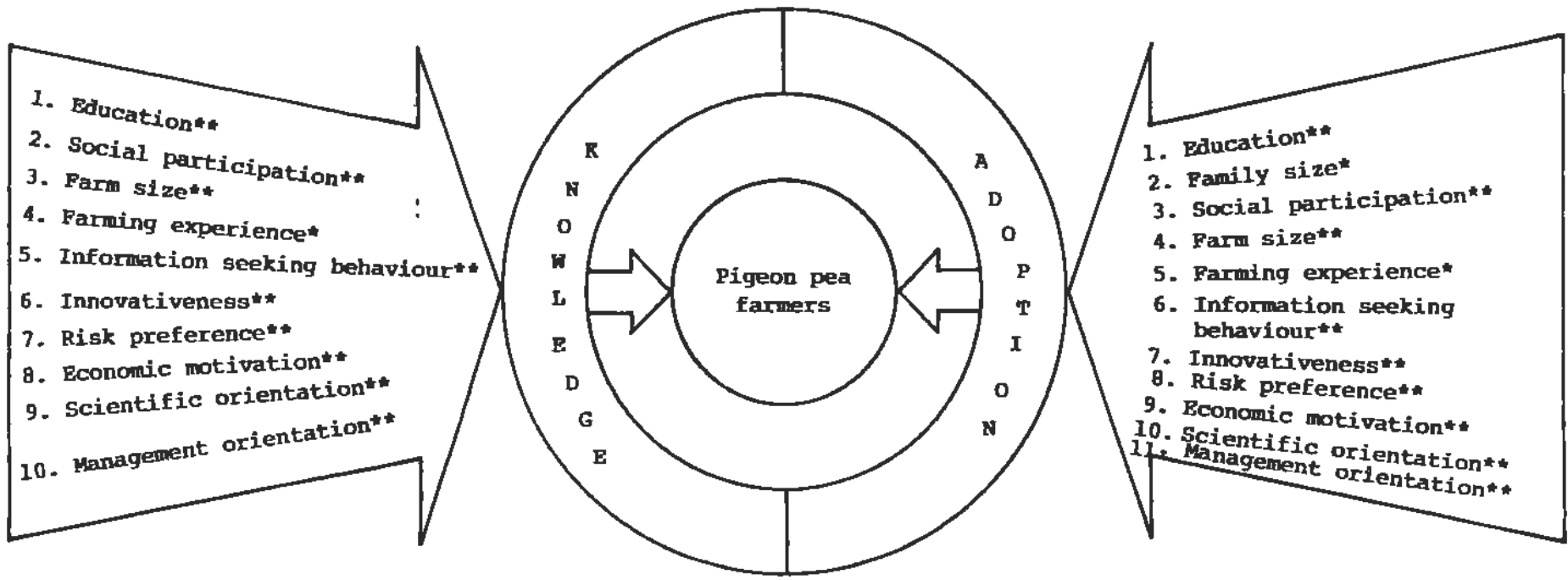
Table 3B : Suggestions for overcoming the constraints in adoption of pigeon pea production recommendations

N = 120

S.No.	Suggestion	Respondents	
		F	%
1.	Provision of subsidy on different agricultural inputs	96	80.00
2.	Provision of adequate and timely supplies of inputs	116	96.67
3.	Provision of credit facilities to the needy farmers	102	85.00
4.	Evolving pest and disease resistant varieties	73	60.83
5.	Evolving of high yielding varieties and short duration varieties	108	90.00
6.	Evolving drought tolerant varieties	84	70.00
7.	Intensification of extension services by extension staff	76	63.33
8.	Organisation of training programme on various aspects of pigeon pea cultivation	86	71.66
9.	Timely technical guidance to the pigeon pea farmers	81	67.50
10.	Provision of good quality plant protection chemicals	98	81.67
11.	Provision of good marketing facilities	88	73.33
12.	Implementation of crop insurance scheme	25	20.83

of inputs (96.67%), evolving of high yielding varieties and short duration varieties (90.00%), provision of good quality plant protection chemicals (81.67%), provision of subsidy on different agricultural inputs (80.00%), provision of credit facilities to the needy farmers (85.00%), provision of good marketing facilities (73.33%), organisation of training programme on various aspects of pigeon pea cultivation (71.66%), evolving drought tolerant varieties (70.00%), timely technical guidance (67.50%), intensification of extension services by extension staff (63.33%), evolving pest and disease resistant varieties (60.83%) and implementation of crop insurance scheme (20.83%).

Thus, it is the responsibility of the Government, extension agency and research institutions to provide the above suggested facilities to the farmers for better adoption of pigeon pea production recommendations.



* Significant at 0.05 probability level
 ** Significant at 0.01 probability level

Fig.No.8 : EMPIRICAL MODEL

SUMMARY

CHAPTER V

SUMMARY

India is the leading pigeon pea producing country accounting for 90-95 per cent of the pigeon pea (3 million hectares) cropped area. The area of pigeon pea in Andhra Pradesh is 3.46 lakh hectares, with a production of 0.74 lakh tonnes and productivity of 214 kg ha⁻¹. Though the area under pigeon pea is more we could not meet the demand of people due to low production and productivity. This is mainly due to the fact that pigeon pea is being mostly grown in the traditional way by the majority of the farmers. Pigeon pea yields have remained stagnant over a long time. There is still big gap between achievable yields and achieved yields. By understanding the trends of knowledge, adoption and constraints in the adoption of the pigeon pea production recommendations the necessary technological gaps could be plugged in desirable direction.

Duly keeping in mind the importance of pigeon pea cultivation in Andhra Pradesh, this study entitled "A study on adoption of pigeon pea production recommendations in Mahabubnagar district of Andhra Pradesh" was designed with the following specific objectives.

1. To study the personal, Socio-economic and psychological characteristics of pigeon pea farmers.

2. To measure the knowledge level of farmers on pigeon pea production recommendations.
3. To study the adoption level of pigeon pea farmers with reference to production recommendations.
4. To study the relationship between personal Socio-economic and psychological characteristics with knowledge and adoption of pigeon pea farmers.
5. To identify the constraints in adoption of pigeon pea production recommendations and elucidate the suggestions from the farmers to overcome the same.

Keeping in view the above objectives, the relevant literature on pigeon pea production recommendations was reviewed and personal and Socio-psychological factors were selected with the help of experts in the field of agricultural extension.

One hundred and twenty respondents belonging to twelve randomly selected villages of kodangal, Doulatabad and, Damargidda mandals of Mahabubnagar district were administered with interview schedule to collect the needed data. Both independent and dependent variables were measured by using appropriate instruments developed by the researcher and also adopting already existing useful tools so as to meet the requirements in the present investigation. The parametric statistical tests were used to analyse the data.

The following are the findings emerged out of the investigation.

5.1 DISTRIBUTION OF RESPONDENTS BASED ON THEIR PERSONAL,
 SOCIO-ECONOMIC AND PSYCHOLOGICAL CHARACTERISTICS

Majority of the respondents belonged to middle age group, primary level of education with large family size having high social participation, Big farm size, medium farming experince, medium level of inforamtion seeking behaviour, innovativeness, risk preference , economic motivation, Scientific orientation and management orientation.

5.2 KNOWLEDGE LEVEL OF FARMER ON PIGEON PEA PRODUCTION
 RECOMMENDATIONS

Majority (62.50%) of the respondents had medium level of knowledge on pigeon pea production recommendations.

Majority of the respondents possessed 100 per cent knowledge on cultivation of pigeon pea mainly as an intercrop, suitable soils for pigeon pea cultivation, importance of plant protection, importance of pod borer, chemical to control pod borer, time of harvesting, time of sowing, recommended chemical for controlling gram caterpillar and podfly and maturity period of long duration variety. On the other hand, majority of the respondents had very less knowledge on items like required number of sprays for controlling pod borer and podfly, recommended spacing for black and red soils, required seed rate for pure crop and intercrop, supplemental irrigation time for pigeon pea, resistant variety for pigeon pea wilt, increase in yield due to rhizobium culture, maturity period of short duration varieties,

moderately resistant variety for pod borer and nitrogen fixation by pigeon pea.

5.3 EXTENT OF ADOPTION OF PIGEON PEA PRODUCTION RECOMMENDATIONS

Majority (64.17%) of the respondents had medium level of adoption in respect of pigeon pea production recommendations.

The practice wise analysis of production recommendations proves that all the respondents have fully adopted the practice, suitable soil selection. Majority of the respondents had adopted practices like sowing time, time of application of fertilizers, harvesting time, seed rate, intercultivation and land preparation and recommended variety. Seed treatment with Rhizobium culture and supplemental irrigation was adopted by negligible number of respondents.

5.4 RELATIONSHIP OF SELECTED PERSONAL, SOCIO-ECONOMIC AND PSYCHOLOGICAL CHARACTERISTICS OF RESPONDENTS WITH THEIR KNOWLEDGE AND ADOPTION OF PIGEON PEA PRODUCTION RECOMMENDATIONS

Correlation analysis of independent variables with dependent variables i.e knowledge and adoption indicated that education, social participation, farm size, farming experience, information seeking behaviour, innovativeness, Risk preference, economic motivation, scientific orientation and management

orientation had a positive and significant relationship where as age was negatively and non significantly correlated with dependent variables, family size had shown positively significant relationship with adoption where as non significant relationship was seen with knowledge.

5.5 CONSTRAINTS IN THE ADOPTION OF PIGEON PEA PRODUCTION RECOMMENDATIONS

Constraints in the adoption of pigeon pea production recommendations viz., non availability of varieties in time, involvement of more expenditure, lack of knowledge, lack of technical guidance, non availability of inputs in time, lack of time, non availability of sufficient quantities of farm yard manure, non availability of credit, non availability of labour in time, lack of irrigation facilities and high cost of chemicals were expressed by majority of the partial and non-adopters.

5.6 SUGGESTIONS FOR OVER COMING THE CONSTRAINTS IN ADOPTION OF PIGEON PEA PRODUCTION RECOMMENDATIONS

Suggestions made by the farmers in over coming the constraints were provision of subsidy on different agricultural inputs, provision of credit facilities to the needy farmers, evolving pest and disease resistant varieties, evolving short duration, drought tolerant and high yielding varieties, intensification of extension services by extension staff, timely technical guidance, provision of good quality plant protection

chemicals, implementation of crop insurance scheme and provision of good marketing facilities.

Implications of the study

1. The findings of the study inferred that majority of the respondents had medium level of adoption of pigeon pea production recommendations. Hence there is a need on the part of extension personnel to educate and convince the farmers to adopt all the recommended practices by way of conducting demonstrations, training programmes, field trips and exhibitions etc.
2. Developing varieties which can counter the problems faced by the pigeon pea growing farmers in general, is a basic challenge to the researchers. In view of the constraints reported by the farmers i.e early maturing, drought resistant and pest and disease resistant varieties are urgently needed. So the researchers should take these necessary features into account.
3. The results indicated that the majority of the respondents had medium level of information seeking behaviour. There is need for increasing opportunities to the farmers to seek information through several sources by multiplying channels of information like mass media and inter personal communication channels through

available institutions so that every farmer has access to information. The extension personnel should provide need based, relevant information, timely help and build-up new avenues for farmers for exchange and discuss latest relevant information with each other and to promote the information seeking habits of these farmers.

4. The major obstacle for adoption of production recommendations is non-availability of inputs in time. This warrants the administration to increase the number of sale points to ensure timely and adequate supply of inputs to farmers in their nearest vicinity. To eliminate the weakness of the present input system the government could introduce a mixed marketing system in which private, public and co-operative systems co exist.
5. There are many bottle necks in the flow of credit to the needy farmers. So vigorous action has to be taken by banking and finance agencies to remove these bottle necks.
6. Remunerative price for the produce is an incentive for higher production. Since the price policy enunciated is not conducive to the interest of growers and there is a need to formulate production oriented price policy.

Suggestions for future research

1. The present investigation was confined to one district, and twelve villages of three mandals only. The study needs to be replicated on larger samples covering all the pigeon pea growing areas of Andhra Pradesh. So that the inferences drawn can be generalised to a greater extent that is warranted from the present study.

2. The present study focussed on only one pulse crop, that is pigeon pea, for accessing the adoption of production recommendations. Similar studies may also be taken up on other important pulse crops.

LITERATURE CITED

LITERATURE CITED

- Balabhaskar K' 1991 A study on the impact of national oil seeds development project on knowledge and adoption behaviour of farmers towards recommended rainfed groundnut practices in chittoor district of Andhra Pradesh. M.Sc (Ag) Thesis, Andhra Pradesh Agricultural University, Hyderabad.
- Bawajir S M and Nandapurkar G G 1985 Development and standardisation of socio-economic status scale to measure the socio-economic status of the farmers. Maharashtra Journal of Extension Education 4 : 89-97.
- Bhakri V K 1985 Impact of recommended dryland agricultural technology on attitude, knowledge and adoption of farmers in Jammu district (Jammu and Kashmir state). M.Sc (Ag) Thesis, Andhra Pradesh Agricultural University, Hyderabad.
- Bharathi G 1988 Communication behaviour of seed growers in groundnut seed production technology in chittoor district of Andhra Pradesh M.Sc (Ag) Thesis, Andhra Pradesh Agricultural University, Hyderabad.
- Bhaskaram and Praveena 1982 Adoption of improved dryland agricultural technology in an Integrated Dryland Agricultural Development Project in Andhra Pradesh. Indian Journal of Extension Education 18 : 32-39.
- Bhaskaram S and Thampi A N 1986 Progressiveness of farmers and their socio-economic characteristics in adoption of high yielding varieties of paddy. Agricultural Research Journal of Kerala 24 : 47-51.
- Bhatt N D 1980 A study on the impact of farmers training on knowledge and adoption behaviour of farmers in Malaprabha command area of Karnataka. M.Sc. (Ag) Thesis, Dharwar.
- Bhoite H S and Barve N K 1984 Adoption pattern of cultivation practices of tribal farmers. Maharashtra Journal of Extension Education 3 : 125-127.
- Biswas M 1990 A study on the knowledge, attitude and adoption of rice production technology by the farmers in Andaman district. M.Sc. (Ag) Thesis, Andhra Pradesh Agricultural University, Hyderabad.
- Bloom B S, Engelhart M D, Furest E J, Hill W H and Krathwhold D R 1958 Taxonomy of educational objectives. The classification of educational goals. David Mckay, New York.

- Chole R R Sangle G K and Choukidar L B 1978 use of information sources and adoption of improved wheat varieties. Research Bulletin Marthwada Agricultural University 20 :15-17.
- Deshmukh R 1981 " Credit Behaviour of Farmers " (A study in drought prone area) unpublished M.Sc. Thesis E.E.I, Andhra Pradesh Agricultural University, Rajendranagar, Hyderabad.
- Devender K 1986 A study on the impact of institutional training programme on the knowledge and adoption of package of practices of paddy. M.Sc (Ag) Thesis, Andhra Pradesh Agricultural University, Hyderabad.
- Dhankumar V G 1981 An evaluation of beneficiaries of integrated dryland agricultural development in respect of dryland technology. Department of Agricultural Extension and Rural Sociology Centre for Agriculture and Rural Development studies, Madhurai.
- Feaston J G 1968 Measurement and determinants of innovativeness among primitive agriculturists. Rural Sociology 23 : 339-348.
- Gangadharappa N R 1981 A critical analysis of knowledge level and adoption behaviour of trained and untrained farmers in Malaprabha command area of Karnataka state. Thesis Abstract 7(9) :102.
- Goud P S 1988 A study on awareness of national oil seeds development project and extent of adoption of improved practices among groundnut growing farmers in Bellary district. M.Sc (Ag) Thesis, University of Agricultural Sciences, Bangalore.
- Jabeen S 1991 A study on constraints in adoption of chilli technology in Pulwama district of Jammu and Kashmir. M.Sc (Ag) Thesis, Andhra Pradesh Agricultural University, Hyderabad.
- Jaiswal N K, Purandare A P and Jaiswal A K 1985 People's participation in watershed management. A case study. Journal of Rural Development 4 : 405-465.
- Kantharaj S 1980 A study on knowledge, extent of adoption and appropriateness of sunflower technology among growers. M.Sc (Ag) Thesis, University of Agricultural Sciences, Bangalore.

- Khan M M, Aswanthaiah B, Krishna K S, Nanja Reddy and Hanumappa P
1976 Adoption pattern of improved agronomic practices of
chilli cultivation in kolar district. Mysore Journal of
Agricultural Sciences 10 :705-713.
- Kher S K 1991 Adoption behaviour of rainfed maize growers.
Maharashtra Journal of Extension Education Vol X No. 2 :271-
273.
- Kunnal L B, Itnal C J and Krishna Swami M K 1984 Adoption of
new technologies in dryland sorghum crop production. Indian
Journal of Extension Education 20 : 60-62.
- Manivannan N 1980 A study on the knowledge and extent of
adoption of sunflower growers. M.Sc. (Ag) Thesis, Tamilnadu
Agricultural University, Coimbatore.
- Manjunath L 1980 A co-operative study on the knowledge level
and adoption behaviour of the trained and untrained farmers
in Ghataprabha command area, Karnataka state. M.Sc. (Ag)
Thesis, Department of Agricultural Extension, University of
Agricultural Sciences, Bangalore.
- Mohiuddin 1983 A study of some factors contributing to
communication fidelity with reference to transfer of improved
dryland agricultural technology in Ranga Reddy district of
Andhra Pradesh. M.Sc (Ag) Thesis, Andhra Pradesh
Agricultural University, Hyderabad.
- Mrutyunjayam N 1987 A critical analysis of farm telecast
programme. An experimental study. Ph.D. Thesis, Andhra
Pradesh Agricultural University, Hyderabad.
- Mundhwa A B and Patel H L 1987 A study of rainfed wheat growers
knowledge about the rainfed wheat in Bhal area of Gujarat
state. Maharashtra Journal of Extension Education 7 : 111-
115.
- Naik M B 1981 Awareness and attitude of farmers and extension
workers towards intensive agricultural extension system (T&V
system) in Andhra Pradesh. M.Sc. (Ag) Thesis, Andhra Pradesh
Agricultural University, Hyderabad.

- Narasappa G 1981 Impact of farmers institutional training on knowledge and adoption of improved practices of rainfed groundnut in Ananthapur district of Andhra Pradesh. M.Sc. (Ag) Thesis, Andhra Pradesh agricultural University, Hyderabad.
- Narayana K 1988 A study on the effectiveness of training programmes organised by Krishi Vigyan Kendra in Ranga Reddy district of Andhra Pradesh. M.Sc (Ag) Thesis, Andhra Pradesh Agricultural University, Hyderabad.
- Nath B S (1980) Impact of dryland demonstrations conducted under drought prone area programme on the farmers. M.Sc.(Ag) Thesis, Andhra Pradesh Agricultural University, Hyderabad.
- Padmaiah M 1983 Impact of Integrated Rural Development programme on rural families. M.Sc. (Ag) Thesis, Andhra Pradesh Agricultural University, Hyderabad.
- Pamadi B M 1980 A study on adoption behaviour of groundnut growers in Dharwar district of karnataka M.Sc.(Ag) Thesis, University of Agricultural Sciences, Bangalore.
- Patel B T 1970 A Critical study of adoption of high yielding variety IR-8 in Anand Taluk of Gujarat. M.Sc (Ag) Thesis, College of Agriculture, Anand.
- Patel G P D 1985 A Study on knowledge level and training needs of Sericulturists. M.Sc. (Ag) Thesis, University of Agricultural Sciences, Bangalore.
- Patil P S and Jadhav D R 1987 Adoption of cultivation practices of onion in North East Maharashtra. Maharashtra Journal of Extension Education Vol VI: 153-157.
- Patil P S, Kebey M B and Desai B R 1989 A study on adoption of dryland agricultural technology recommended for bajra and groundnut. Maharashtra Journal of Extension Education 8 : 59-62.
- Prabhakar K 1971 Impact of Commercial bank credit on agricultural development. M.Sc (Ag) Thesis, Andhra Pradesh Agricultural University, Hyderabad.

- Ramachandran P 1988 Adoption of dryland technology a constraint analysis. M.Sc. (Ag) Thesis, Tamilnadu Agricultural University, coimbatore.
- Rao K V 1979 An evaluation study on the impact of intensive agricultural extension system (T&V) in Andhra Pradesh. M.Sc (Ag) Thesis, Andhra Pradesh Agricultural University, Hyderabad.
- Rao K V 1981 Effect of some personal, social and psychological factors in adoption of HYV'S paddy by small and marginal farmers in Nizamabad district. M.Sc (Ag) Thesis, Andhra Pradesh Agricultural University, Hyderabad.
- Rao V G K 1985 A prediction analysis of farming performance through their entrepreneurial behavioural factors Ph.D. Thesis, Andhra Pradesh Agricultural University, Hyderabad.
- Rao S 1988 Impact of improved dryland agricultural technology in Chevella and Pothalaboduga Model watershed Development Project in Jogipet taluk of Medak district of Andhra Pradesh. M.Sc. (Ag) Thesis, Andhra Pradesh Agricultural University, Hyderabad.
- Rao N Nireekshana 1990 A study to identify the technological gap and constraints in adoption of improved practices in groundnut cultivation in Guntur district of Andhra Pradesh. M.Sc (Ag) Thesis, Andhra Pradesh Agricultural University, Hyderabad.
- Rao V A 1992 A study on technological gaps in diversified farming of small farmers in Krishna district of Andhra Pradesh. Ph.D. Thesis Andhra Pradesh Agricultural University, Hyderabad.
- Reddy R S 1973 Role of some factors influencing effective utilisation of crop loan. M.Sc. (Ag) Thesis Andhra Pradesh Agricultural University, Hyderabad.
- Reddy M S K 1975 A study on adoption of improved agricultural practices as function of some Socio-economic factors and sources of information. M.Sc (Ag) Thesis, Indian Agricultural Research Institute, New Delhi.

- Reddy B L 1983 Transfer of dryland agricultural technology and behaviour changes among the farmers. Ph.D. Thesis, Andhra Pradesh Agricultural University, Hyderabad.
- Reddy D R 1986 Study of knowledge and adoption of rainfed groundnut growers in Chittoor district of Andhra Pradesh. M.Sc.(Ag) Thesis, Andhra Pradesh Agricultural University, Hyderabad.
- Reddy R V 1987 A study on the impact of village adoption programme of IFFCO in knowledge and adoption behaviour of farmers in Cuddapah district of Andhra Pradesh. M.Sc. (Ag) Thesis, Andhra Pradesh Agricultural University, Hyderabad.
- Reddy K G 1990 A study on knowledge and adoption of recommended silkworm rearing practices by sericulturists in Chittoor district of Andhra Pradesh. M.Sc (Ag) Thesis, Andhra Pradesh Agricultural University, Hyderabad.
- Reddy C E V 1992 A study to identify the constraints in adoption of improved mango production technology in Khammam district of Andhra Pradesh. M.Sc. (Ag.) Thesis, Andhra Pradesh Agricultural University, Hyderabad.
- Samanta R K 1977 A study on some agro-economic socio-psychological and communication variables associated with repayment behaviour of agricultural credit users of nationalised banks. Ph.D. Thesis, Bidhanchandra Krishi Mahavidyalaya, Nadia, West Bengal.
- Sarkar A B 1979 A study on the impact of intensive agricultural extension system (T&V) in West Bengal. M.Sc. (Ag) Thesis, Andhra Pradesh Agricultural University, Hyderabad.
- Satyanarayana M 1983 A study on the effectiveness of institutional training programme on tribal farmers of Visakhapatnam district of Andhra Pradesh. M.Sc. (Ag) Thesis, Andhra Pradesh Agricultural University, Hyderabad.
- Senthil D 1983 A critical analysis of hybrid cotton seed growers. M.Sc (Ag) Thesis, Tamilnadu Agricultural University, ~~Hyderabad~~ (Coimbatore)

- Seshachar 1980 A study on adoption behaviour, consultancy pattern and value orientation of chilli cultivation in Dharwar district of Karnataka. M.Sc.(Ag.) Thesis, Andhra Pradesh Agricultural University, Hyderabad.
- Shanmukhappa S 1978 A study on the adoption behaviour and value orientation of arecanut growers of Shimoga district of Karnataka state. M.Sc. (Ag) Thesis, Directorate of Agricultural Extension, College of Agriculture, Dharwar.
- Shrivastava S N and Singh R P 1990 Identification of constraints in paddy production under rainfed condition. Indian Journal of Extension Education Vol X VI Nos. 324 : 77-99.
- Singh V P 1982 Self sufficiency in the production of pulses - proceedings of symposium on increasing pulse production in India - Constraints and opportunities, October, 1982, New Delhi, India p.81.
- Subramanyam Y S and Viswanathan N 1973 A study on the factors influencing farmers in the adoption of improved agricultural practices for groundnut in irrigated and rainfed lands. Research Project No.203. Tamilnadu Agricultural University, Coimbatore.
- Sudheendra M 1986 A study on knowledge, perception and adoption pattern by farmers about sunflower crop in selected taluks of chitradurga district. M.Sc. (Ag) Thesis, University of Agricultural Sciences, Bangalore.
- Sunderraj 1979 A study on knowledge and adoption behaviour of small and big farmers growing tomato in Bangalore district. M.Sc (Ag) Thesis, University of Agricultural Sciences, Bangalore.
- Supe S V 1969 Factors related to different degrees of reasonability in decision making among farmers. Ph.D. Thesis, Indian Agricultural Research Institute, New Delhi.
- Titus O O G 1980 Adoption of improved practices -A choice under uncertainty. Indian Journal of Extension Education 17 : 32-34.
- Trivedi G 1963 Measurement and analysis of socio-economic status of rural families. Kanjha wala Block, unpublished Ph.D. Thesis, IARI, New Delhi.
- Umadevi B K 1992 An analysis of impact of training and extension on farm women in 'WYTEP' in Karnataka. M.Sc.(Ag) Thesis, Andhra Pradesh Agricultural University, Hyderabad.

- Vasant G S and Sudhakar S 1982 Adoption behaviour of small farmers in relation to their personal characteristics. Indian Journal of Extension Education Vol X I NO. (142).
- Veeraswamy S and Tejbahadur L 1977 Impact of small farmers development agency credit on small farmers in South Arcot of Tamilnadu, Behavioural Science and Community Development 2 : 47-61.
- Venkataramaiah P 1983 Rev. 1990 Development of a socio-economic status scale for farm families. Ph.D. Thesis, University of Agricultural Sciences, Bangalore.
- Vijayaraghavan P and Somasundaram D 1981 Factors associated with knowledge of the high yielding variety of paddy by marginal farmers. Indian Journal of Extension Education 15 : 77-81.
- Vishnumurthy T 1990 Consolidated report of operational research project on dryland Agriculture held at Orissa University of Agriculture and Technology, Bhubanesher.
- Wardakar D B, Bhilagaonkar M G and Venkaria R S 1988 A comparative study of extent of adoption of fertilizers in irrigated and unirrigated areas of Maharashtra State. Maharashtra Journal of Extension Education 7 : 271-273.
- Wilson M J and Chaturvedi J 1985 Adoption of improved technology of flue-cured virginia (FCV) tobacco in Andhra Pradesh. Indian Journal of Extension Education 21 : 108-109.
- Yesurathnam 1985 Impact of farmers peripaletic training programmes on the knowledge of the members of rural youth clubs-An experimental study in Chittoor district of Andhra Pradesh. M.Sc. (Ag) Thesis, Andhra Pradesh Agricultural University.
- Zotawna 1987 A study on the knowledge and attitude of farmers towards high yielding variety of paddy and extent of their adoption in Aizwal west district of Mizoram. M.Sc (Ag) Thesis, Andhra Pradesh Agricultural University, Hyderabad.
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APPENDIX

APPENDIX

INTERVIEW SCHEDULE

Name :
Village :
Mandal :

PART - I

PERSONAL, SOCIO-ECONOMIC AND PSYCHOLOGICAL CHARACTERISTICS
OF PIGEON PEA FARMERS

1. Age (in completed years) :
2. Education () :

Standard	Score
No schooling/illiterate	0
Functionally literate	1
Primary School	2
Middle School	3
High School	4
Collegiate education	5

3. Family size Score
 - i) Upto 5 members 1
 - ii) Above 5 members 2

4. Social participation : ()
 - i) Member of one organisation 1
 - ii) Member of more than one organisation 2
 - iii) Office bearer in organisation 3
 - iv) Public leader 4
 - v) No social participation 0

5. Farm size : () Scores
 - i) Small farmers 1
 - ii) Medium farmers 2
 - iii) Big farmers 3

6. Experience in farming : _____ years

7. Information seeking behaviour

Here are some of the information sources listed. Please indicate how often you contact them for getting information pertaining to farming.

Information sources	Degree of contact			
	Frequently	Occasionally	Rarely	Never
I. Information sources	---	---	---	---
1. Family members	---	---	---	---
2. Friends/Relatives	---	---	---	---
3. Neighbours	---	---	---	---
4. Progressive farmers	---	---	---	---
II. Formal sources				
5. Sarpanch	---	---	---	---
6. Village development officer/Agricultural officer	---	---	---	---
7. Mandal Development officer	---	---	---	---
8. Assistant Director of Agriculture	---	---	---	---
9. Scientists from APAU	---	---	---	---
10. Bank official	---	---	---	---
III. Mass Media				
11. Newspapers	---	---	---	---
12. Radio	---	---	---	---
13. Television	---	---	---	---
14. Farm literature	---	---	---	---
15. Film shows	---	---	---	---
16. Others (specify)	---	---	---	---

8. Innovativeness

Give your opinion about the following statements

S.No.	Statements	SA	A	UD	DA	SDA
1.	Do you want to learn new ways of farming	--	--	--	--	--
2.	If the farm demonstrator gives a talk would you attend	--	--	--	--	--
3.	If your government would help you to establish a 20 acres farm elsewhere would you move	--	--	--	--	--

(Contd..)

8. (Contd.)

S.No.	Statements	SA	A	UD	DA	SDA
4.	Would you like to own the land	--	--	--	--	--
5.	Can a man usually better himself by hard work.	--	--	--	--	--
6.	Do you think it is wise to borrow money	--	--	--	--	--
7.	Do you want a change in your life	--	--	--	--	--
8.	Do you think you live better in future	--	--	--	--	--
9.	A farmer should try to farm the way his parents did	--	--	--	--	--
10.	Do you want your son to be farmer	--	--	--	--	--
11.	It is better to enjoy to-day let tomorrow take care of itself	--	--	--	--	--
12.	A man's future is in the hand of god	--	--	--	--	--

9. Risk preference :

Please indicate whether you agree or disagree or undecided with the following six statements.

S.No.	Statement	Agree	Disagree	Undecided
1.	A farmer should grow large number of crops to avoid greater risk involved in growing one or two crops	--	--	---
2.	A farmer should rather take more of a chance in making a big profit than to be content with a smaller, but less risky profits	--	--	---
3.	A farmer who is willing to take greater risks than the average farmer usually does better financially	--	--	---
4.	It is not good for a farmer to take risk when he knows his change or success is fairly high	--	--	---

(contd..)

9. (contd.)

S.No.	Statement	Agree	Disagree	Undecided
5.	It is better for a farmer not to try new farming methods unless most others have used them with success	--	--	---
6.	Trying an entirely new method in farming by a farmer involved risk but it is worth	--	--	---

10. Economic motivation

A set of statements are given below, representing the economic motivation of farmers. Please express your feeling about these statements by indicating degree of your agreement or disagreement on the five point continuum.

S.No.	Statement	SA	A	UD	DA	SDA
1.	A farmer should work towards more yields and greater profits	--	--	--	--	--
2.	The most successful farmer is one who derives greater benefit out of the available resources	--	--	--	--	--
3.	A farmer should try new technology in farming which may earn him money	--	--	--	--	--
4.	A farmer should grow crops to increase monetary profits in comparison to growing of crops for home consumption	--	--	--	--	--
5.	It is difficult for 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	--	--	--	--	--

11. Scientific Orientation

A set of statements are given below, representing the scientific orientation of farmers. Please express your feeling about these statements by indicating degree of your agreement or disagreement on the five point continuum.

S.No.	Statement	SA	A	UD	DA	SDA
1.	Improved methods of pigeon pea cultivation gives better results to a farmer than traditional ones	--	--	--	--	--
2.	Even a farmer with a lot of experience should use new methods of pigeon pea cultivation as recommended	--	--	--	--	--
3.	Though it takes time for a farmer to learn new methods of pigeon pea cultivation, it is worth the efforts	--	--	--	--	--
4.	A good farmer experiences with new ideas of farming	--	--	--	--	--
5.	Traditional methods of farming have to be changed in order to raise the standard of living of a farmer	--	--	--	--	--
6.	The way of farmers' fore-fathers followed is still the best way to follow today	--	--	--	--	--

12. Management Orientation

A set of statements representing the management orientation of the farmers are given below. Please indicate whether you AGREE (A) or DISAGREE (DA) or UNDECIDED (UD) with each of the statements

A) Planning Orientation

S.No.	Item	A	UD	DA
1.	Every year one should think afresh about the crops to be cultivated in each type of land	--	--	--

(contd..)

12 (A) (Contd.)

S.No.	Item	A	UD	DA
2.	It is not necessary to make prior decisions about the variety of crops to be cultivated in the land	--	--	--
3.	The amount of inputs such as seeds, fertilizers and plant protection chemicals needed for raising of a crop should be assessed before cultivation.	--	--	--
4.	It is not necessary to think ahead of the cost involved in raising the crop	--	--	--
5.	One need not consult agricultural experts for crop planning	--	--	--
6.	With low moisture rates one should use as much irrigation water as available.	--	--	--

B. Production orientation

S.No.	Item	A	UD	DA
1.	Timely planting of crop ensures good yield	--	--	--
2.	One should use as much of fertilizer as one likes	--	--	--
3.	Determining fertilizer dose by soil testing saves money	--	--	--
4.	Seed rates should be adopted as recommended by specialists	--	--	--
5.	For timely weed control one should use suitable herbicides	--	--	--
6.	With low moisture rates one should use as much irrigation water as available	--	--	--

C. Marketing Orientation

S.No.	Item	A	UD	DA
1.	Market news is not so much useful to a farmer	--	--	--
2.	A farmer can get good price by grading his produce	--	--	--
3.	Warehouses can help the farmer to get better price for his produce	--	--	--
4.	One should sell his produce to the nearest market irrespective of price	--	--	--
5.	One should sell his produce to nearest shop where his other relatives purchase	--	--	--
6.	One should grow those crops which have more market demand	--	--	--

PART - II

KNOWLEDGE OF RESPONDENTS ON PIGEON PEA PRODUCTION RECOMMENDATIONS

1. Please indicate whether each statement is true or false

S.No.	Knowledge item	Response	
		Correct	Incorrect
1.	Name three pigeon pea varieties recommended to your area	---	---
2.	Pigeon pea is mainly grown as intercrop in kharif	---	---
3.	Pigeon pea cannot be grown in soils subjected to water stagnation	---	---
4.	Seed treatment with Rhizobium culture increases yield by 20-30 per cent in pigeon pea	---	---

(contd.)

1. (contd.)

S.No.	Knowledge item	Response	
		Correct	Incorrect
5.	Pigeon pea is grown as an intercrop with sorghum in the ratio of 1:3 to 1:8	---	---
6.	Spacing for pigeon pea crop is same in black and red soils	---	---
7.	Intercultivation with harrows (Danthulu) should be done twice during the crop period	---	---
8.	Plant protection is very important for this crop	---	---
9.	Sowings of the crop should be taken up by using country seed drill	---	---
10.	Seed rate required is same for pure crop and intercrop	---	---
11.	Pigeon pea crop helps in fixing nitrogen in the soil	---	---
12.	60 X 20 cm is the spacing required for light soils whereas 90 x 20 cm is required for black soils	---	---
13.	Seed treatment with fungicides is not essential for pigeon pea	---	---
14.	Pigeon pea is sensitive to weeds upto 30 days after sowing	---	---
15.	Pod borer is the most important pest of pigeon pea	---	---
16.	Endosulfan, monocrotophos or Quinolphos can be sprayed to control pod borer	---	---
17.	Harvesting is done when most of the pods are dry	---	---

- II. Please indicate the most appropriate answer from alternatives given under each of the following statements
18. Best time of sowing kharif crop is
 - a) 15th June to 15th July
 - b) 15th July to 15th August
 - c) 15th August to 15th Sept.
 19. In which of the following soils pigeon pea gives higher yields.
 - a) Saline soil
 - b) Red soil
 - c) Black-cotton soil
 20. Soil should be ploughed to a depth of
 - a) 5-10 cms
 - b) 10-15 cms
 - c) 15-20 cms
 21. Recommended quantity of farm yard manure to be applied to the soil before sowing is
 - a) 4000 kg/ha
 - b) 4500 kg/ha
 - c) 5000 kg/ha
 22. Name the resistant variety for pigeon pea wilt
 - a) Palnadu
 - b) ST-1
 - c) PDM-1
 23. Gram caterpillar, podfly can be controlled by spraying recommended doses of following chemical.
 - a) Endosulphan
 - b) Dithane M-45
 - c) Hinson
 24. Short duration varieties mature in
 - a) 130 days
 - b) 150 days
 - c) 200 days
 25. In intercropping yield of pigeon pea ranges between
 - a) 200-300 kg/ha
 - b) 400-600 kg/ha
 - c) 800-1000 kgs.
 26. Basically pigeon pea is a rainfed crop, but one irrigation can be given to increase the yields at the time of
 - a) 10-20 DAS
 - b) 30-35 DAS
 - c) 50-60 DAS

(DAS - Days After Sowing)
 27. The required doses of fertilizer for pigeon pea crop is
 - a) 20 kg N + 50 kg P_2O_5
 - b) 10 kg N + 30 kg P_2O_5
 - c) 60 kg N + 90 kg P_2O_5

29. Seed rate required for pigeon pea when grown as an intercrop with sorghum in the ratio of 1:3 is
 a) 12-15 kg/ha b) 8-10 kg/ha c) 4-5 kg/ha
29. Long duration pigeon pea variety matures in
 a) 180-200 days b) 150-160 days c) 170-180 days
30. Pod borer and podfly can be controlled by taking up following number of sprays by suitable pesticides.
 a) 3 sprays b) 5 sprays c) 6 sprays
31. First spraying is taken up to control the pod borer and pod fly at the time of
 a) Before flowering b) At the time of flowering
 c) At pod formation
32. Pod borer and podfly can be controlled by using the following quantity of endosulphan 35 EC or Quinolphos 25 EC
 a) 1000 ml/ha b) 1250 ml/ha c) 1500 ml/ha
33. Name the variety which is moderately resistant to pod borer
 a) LRG-30 b) ICPL-332 c) ICPL-87119

2. Extent of adoption of pigeon pea production recommendations

S.No.	Practice	Adopted	Parti-ally adopted	Not adopted	Constraint in partial/non-adoption
1.	Recommended variety	---	---	---	---
2.	Seed rate/hectare	---	---	---	---
3.	Seed treatment with Rhizobium culture	---	---	---	---
4.	Seed treatment with fungicide	---	---	---	---
5.	Sowing time	---	---	---	---
6.	Suitable soil selection	---	---	---	---

(Contd..)

2. (contd.)

S.No.	Practice	Adopted	Parti-ally adopted	Not adopted	Constraint in partial/non-adoption
7.	Land preparation	---	---	---	---
8.	Recommended spacing	---	---	---	---
9.	Use of farm yard manure/compost	---	---	---	---
10.	Recommended dose of fertilizer	---	---	---	---
11.	Time of application of fertilizer	---	---	---	---
12.	Intercultivation	---	---	---	---
13.	Supplemental irrigation	---	---	---	---
14.	Required quantity of insecticides for control of podborer, podfly and plume moth	---	---	---	---
15.	Resistant variety of wilt	---	---	---	---
16.	Harvesting time	---	---	---	---

PART - III

Please give suggestions for overcoming the constraints in adoption of pigeon pea production recommendations

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.

Constraints in partial/non-adoption (key for investigator)

1. Lack of knowledge
2. Non-availability of varieties in time at local place
3. Satisfied with existing varieties
4. Practice requires special skills to adopt
5. Involvement of more expenditure
6. Lack of credit facilities
7. Maintenance cost is more
8. Lack of technical guidance
9. No guarantee of getting more yield
10. Susceptible to pests and diseases
11. Don't want to take risk
12. Non-availability of Rhizobium culture in time at local place
13. Low fertility status of soil
14. Lack of remunerative price for the produce
15. Non-availability of inputs in time
16. Non-availability of chemicals in time at local place
17. Labour problem
18. Not convinced of the merit of the practice
19. Lack of time
20. Lack of sufficient rainfall in time
21. Labour requirement is high
22. Type of soil
23. Duration is more
24. High cost of fertilizers
25. There is no difference in yield
26. Non availability of fertilizers in time
27. Practice is difficult to adopt
29. Non-availability of sufficient quantities of FYM
30. Lack of irrigation facilities
31. Cooking quality is poor
32. High cost of chemicals
33. Non-availability of suitable equipments
34. Practice is not suitable
35. Non-availability of good quality chemicals
36. Recommended practice is not compatible with existing culture of people
37. Adoption of chemical feels complicated and dangerous
38. Labour is costly to carryout operations
39. Changes in climate
40. Any other

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