A STUDY ON THE KNOWLEDGE AND EXTENT OF ADOPTION OF THE FARMERS ON RECOMMENDED RICE FALLOW BLACKGRAM PRODUCTION TECHNOLOGY IN GUNTUR DISTRICT OF ANDHRA PRADESH

By

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2016

CERTIFICATE

Mr. M. RAGHAVENDRA REDDY has satisfactorily prosecuted the course of research and that the thesis entitled "**A STUDY ON THE KNOWLEDGE AND EXTENT OF ADOPTION OF THE FARMERS ON RECOMMENDED RICE FALLOW BLACKGRAM PRODUCTION TECHNOLOGY IN GUNTUR DISTRICT OF ANDHRA PRADESH"** submitted is the result of original research work and is of sufficiently high standard to warrant its presentation to the examination. I also certify that neither the thesis nor its part thereof has been previously submitted by him for a degree of any university.

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DECLARATION

I**, M.RAGHAVENDRA REDDY,** hereby declare that the thesis entitled, "**A STUDY ON THE KNOWLEDGE AND EXTENT OF ADOPTION OF THE FARMERS ON RECOMMENDED RICE FALLOW BLACKGRAM PRODUCTION TECHNOLOGY IN GUNTUR DISTRICT OF ANDHRA PRADESH"** submitted to the **Acharya N.G. Ranga Agricultural University** for the degree of **Master of Science in Agriculture** in the major field of Agricultural Extension, is the result of original research work done by me. I also declared that no material contained in the thesis has been published earlier in any manner.

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This is to certify that the thesis entitled **"A STUDY ON THE KNOWLEDGE AND EXTENT OF ADOPTION OF THE FARMERS ON RECOMMENDED RICE FALLOW BLACKGRAM PRODUCTION TECHNOLOGY IN GUNTUR DISTRICT OF ANDHRA PRADESH"** submitted in partial fulfilment of the requirements for the degree of **MASTER OF SCIENCE IN AGRICULTURE** of the Acharya N.G. Ranga Agricultural University, Hyderabad is a record of the bonafide original research work carried out by **M.RAGHAVENDRA REDDY** under our guidance and supervision.

No part of the thesis has been submitted by the student for any other degree or diploma. The published part and all 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 SYMBOLS AND ABBREVIATIONS

*	:	Significant
%	:	Percentage
<	:	Less than
>	:	Greater than
a	:	Intercept
$\overline{X}$	:	Arithmetic Mean
σ	:	Standard Deviation
ADA	:	Assistant Director of Agriculture
ANGRAU	:	Acharya N.G. Ranga Agricultural University
AEO	:	Agricultural Extension Officer
ARS	:	Agricultural Research Station
ATMA	:	Agricultural Technology Management Agency
b	:	Regression Co-efficient
DAATTC	:	District Agricultural Advisory and Transfer of Technology Centre
DAP	:	Di Ammonium Phosphate
F	:	Frequency
FYM	:	Farm Yard Manure
et al.	:	and other people
etc	:	and other people/things
F	:	Frequency
Fig.	:	Figure
FFS	:	Farmers Field Schools
FTC	:	Farmers Training Centre
ha	:	Hectare
i.e.,	:	That is
INM	:	Integrated Nutrient Management
IPM	:	Integrated Pest Management
KVK	:	Krishi Vigyana Kendra
m	:	meter

MGNREGS	:	Mahathma Gandhi National Rural Employment Guarantee Scheme
MLR	:	Multiple Linear Regression
MOP	:	Murate of Potash
N	:	Total number of respondents
No.	:	Number
NS	:	Non-Significant
PAC'S	:	Primary Agricultural Cooperative Societies
r	:	Correlation Co-efficient
R^2	:	Coefficient of multiple determination
RARS	:	Regional Agricultural Research Station
Rs.	:	Rupees
RSS	:	Regression Sum of Squares
S.D.	:	Standard Deviati
SHG	:	Self Help Group
S.No.	:	Serial Number
SSP	:	Single Super Phosphate
TSS	:	Total Sum of Squares
viz.,	:	Namely
Vs	:	Against
YMV	:	Yellow Mosaic Virus
ZREAC	:	Zonal Research and Extension Advisory Council

ABSTRACT

Author	:	**M. RAGHAVENDRA REDDY**
Title of the thesis	:	**"A Study on the Knowledge and extent of Adoption of the farmers On Recommended Rice fallow Blackgram Production Technology in Guntur District of Andhra Pradesh"**
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Blackgram is scientifically known as *Phasiolus mungo* and it is commonly known as Urad in India. India is its primary origin and is mainly cultivated in Asian countries including Pakistan, Myanmar and parts of Southern Asia. About 70% of world's blackgram production comes from India. In India, blackgram is grown in 31 lakh hectares with production of 14 lakh tonnes with productivity of 451 kg per hectare. In Andhra Pradesh, blackgram is grown in an area of 3.7 M ha with a production of 3.9 M t with productivity of 968 kg per hectare.

An ex-post facto research design was followed .The study was conducted in Guntur district of Andhra Pradesh state during the year, 2015-16.

Guntur district of Andhra Pradesh was selected, out of 57 mandals, three mandals were selected purposively and four villages were selected from each mandal for the study. Respondents were selected from each village by following proportionate random sampling method. Thus, 120 farmers constituted as sample for the study. Data were collected by pre-tested schedule followed by personal interview method.

For the purpose of statistical analysis of the coded data, appropriate statistical tools were used *viz.*, frequency and percentages, correlation analysis, multiple linear regression analysis and ranking.

The detailed analysis of profile characteristics of blackgram growers indicated that majority of the growers were old aged (40.00%), one fourth with primary school (23.33%), having small land holdings (38.33%), medium farming experience (61.66%), medium extension contact (46.66%), high social participation (38.33%), medium level of mass media exposure (45.00%), medium level of economic motivation (59.16%), medium level of innovativeness (43.33%), medium level of scientific orientation (62.50%), medium level of risk orientation (59.16%), medium level of market orientation (67.50%), medium level of annual income (52.50%), and majority of them (57.50%) with zero trainings.

The detailed analysis of dependent variables indicated that majority of the blackgram growers (65.00%) had medium level of knowledge followed by high (19.16%) and low (15.83%) level of knowledge.

About 65.00 per cent of blackgram growers had medium level of adoption followed by those having low (17.50%) and high (17.50%) adoption levels.

The study revealed that blackgram growers had knowledge on the selected production technology in following aspects viz., recommended method of sowing as broadcasting , recommended time of sowing in the month of November –December , sowing shall be taken up 3-4 days prior to harvest of paddy , variety which is resistant to yellow mosaic , recommended chemical used for seed treatment against seed borne diseases ,duration of rabi blackgram varities grown ranges from , 1-2 irrigations should be given when there are no rains , weeds are dominant problem in rice fallow blackgram.

In case of extent of adoption, that the blackgram growers had fully adopted the selected production technology in the following order viz., The method of sowing is broadcasting, sowing of seed in the months of November-December, drying of harvested crop on threshing floor and later going for threshing by trampling with help of tractors, harvesting of crop is done when most of the pods turn black, following drying of seed after seed treatment, harvesting of crop after 75-95 days after sowing, growing of blackgram in well drained loam soils, sparying of weedicide after 20-25 days after sowing,Sowing of seed prior to 2-3 days of harvest of Paddy.

Out of fourteen selected profile characteristics, nine of them viz., extension contact, social participation, mass media exposure, economic motivation, innovativeness, scientific orientation, risk orientation, market orientation, annual income, showed significant relation with level of knowledge of blackgram growers.But age, education, farm size, farming experience, training received did not show any significant relationship with their level of knowledge.

The multiple linear regression analysis (MLR) indicated that all the fourteen selected profile characteristics put together explained 86.66 per cent of variance in the level of knowledge selected production technology, remaining 13.34 percent is due to the extraneous effect of variables.

Out of fourteen selected profile characteristics namely education, innovativeness, scientific orientation, market orientation, risk orientation, mass media exposure and extension contact showed significant relation with extent of adoption of selected production technology of Rice fallow Blackgram. But age, education, farm size, farming experience, training received did not show any significant relationship with extent of adoption.

The MLR indicated that all the fourteen selected profile characteristics put together contributed 69.07 percent to the total variance in the extent of adoption; remaining 30.03 percent due to the extraneous effect of variables.

The most important constraints encountered by the blackgram growers were, inadequate quantity of seed availability from government agencies, inadequate technical knowledge on usage of foliar sprays, inadequate information on crical stages of irrigation, inadequate availability of sprayers, exploitation by middle men, inadequate financial assistance from the government , non-availability of labour in time, inadequate storage facility, and inadequate technical guidance through training programmes about cultivation practices.

Suggestions made by the blackgram growers to overcome the constraints were, financial assistance from the government at the time of crop losses, timely technical guidance to the farmers, provision of plant protection equipment on subsidy, provision of good marketing facilities, provision of timely credit facility at lower interest, providing support price to blackgram, evolving suitable varieties with YMV and drought resistance, supply of seed adequately and on timely basis. through government agencies.

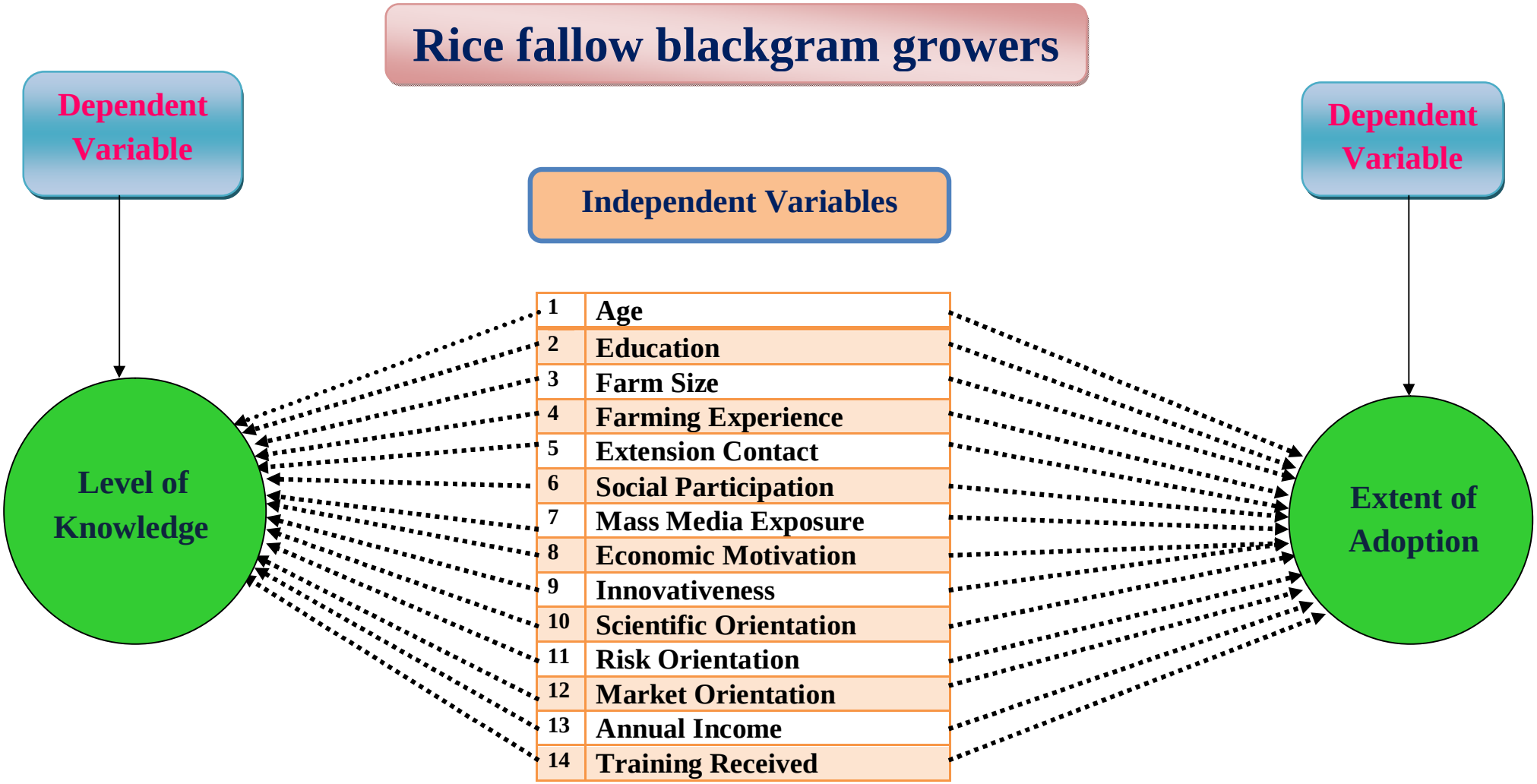

Fig 2.1.Conceptual model of the study

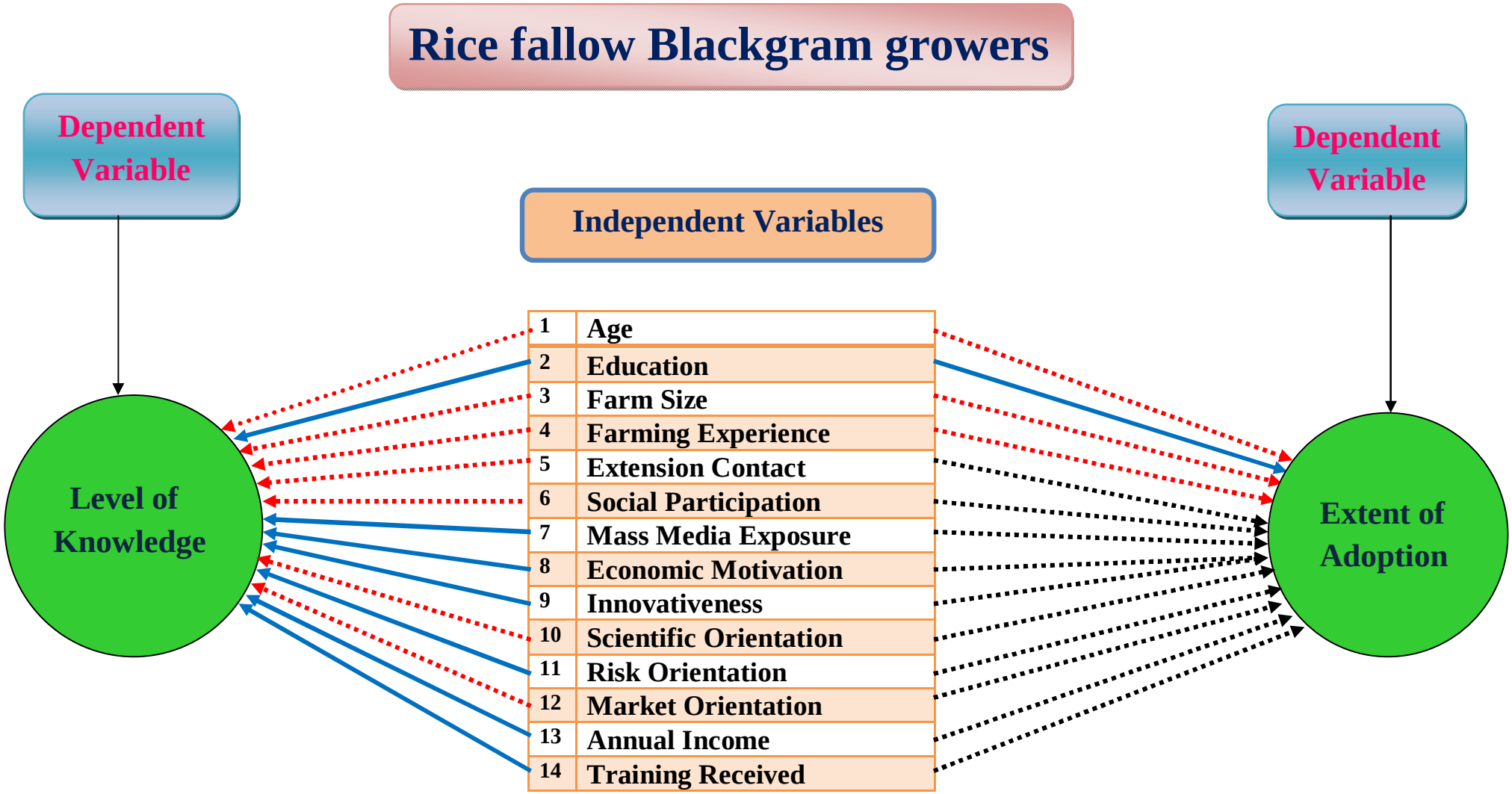

Fig 4.17.Empirical model of the study

Chapter I

INTRODUCTION

Agriculture is an important sector of the Indian economy, accounting for 14% of the nation's GDP, about 11% of its exports. About half of the population still relies on agriculture as its principal source of income and it is a source of raw material for a large number of industries. Agriculture, with its allied sectors, is unquestionably the largest livelihood provider in India. Steady investments in technology development, irrigation infrastructure, emphasis on modern agricultural practices and provision of agricultural credit and subsidies are the major factors contributing to agricultural growth (Tomar *et al.*, 2012).

India is the largest producer of pulses i.e 14.76 million tonnes in the world with the 25 % share in the global production covering an area of about 23.63 million hectare, majority of which fall under rainfed condition where irrigation facilities are inadequate or not available. These include chickpea, groundnut, lentil, mung bean, urd bean, faba bean, lathyrus, peas etc. Pulses are predominantly grown under resource poor and harsh environments frequently prone to drought and other biotic and abiotic stresses. Pulses have excellent source of high quality protein, essential amino acids, fatty acids, minerals and vitamins for millions of Indians. In addition, pulses also play an important role in improving soil health, long term fertility and sustainability of the cropping systems. It meets up to 80% of its nitrogen fixation from air and leaves behind substantial amount of residual nitrogen and organic matter for subsequent crops (Singh *et al*., 1995). Inspite of the fact that pulses are wonderful crops among the food grains, even though they are least preferred by farmers to grow because cereals are more remunerative. Pulses are considered as a high risk crops being neglected since green revolution. As a result, the productivity of the pulses in India is quite low even less than 1 ton per hectare compared to wheat and rice (Johonson *et al.,* 2000). To meet the demand of pulses, India is presently importing about 3 million tons of pulses. To increase the pulse production to the tune of about 18 million tons from existing 15 million tons, rainfed rice fallow lands (RRFL) offer a huge potential niche for pulses production.

Though, India is the world largest producer of pulses but still it imports a large amount of pulses to meet the growing domestic needs. During 2009-10, India imported 3.5 million tons of pulses from the countries like Australia, Canada and Myanmar. Thus, India is the largest importer, producer and consumer of pulses. On the other hand, India is also the largest pulses processor, as pulses exporting countries like Myanmar, Canada and Australia do not have adequate pulses processing facilities (FAOSTAT, 2010).

Black gram is scientifically known as *Phasiolus mungo* and it is commonly known as Urad in India. India is its primary origin and is mainly cultivated in Asian countries including Pakistan, Myanmar and parts of Southern Asia. About 70% of world's black gram production comes from India. In India Blackgram is grown in 3.1 M ha with production of 1.4 M t with productivity of 451 kg per hectare. In Andhra Pradesh, black gram is grown in an area of 3.7 M ha with a production of 3.9 M t.

Black gram, also known as urd bean, mash, black maple etc, is an important short-duration pulse crop grown in many parts of India. This crop is grown in cropping systems as a mixed crop, catch crop, sequential crop besides as sole crop under residual moisture conditions after the harvest of rice and also before and after the harvest of other summer crops under semi-irrigated and dry land conditions. Its seeds are highly nutritious with protein (25-26%), carbohydrates (60%), fat (1.5%), minerals, amino acids and vitamins. Seeds are used in the preparation of many popular Indian dishes suchas dosa, idli, vada etc.besides, it adds about 42 kg Nitrogen per hectare in soil. It is also valued as a green manure crop. Its dry stalks along with pod husk forms a nutritive fodder especially for milch cattle. Black gram possesses deep root system, which binds soil particles and thus prevents soil erosion (Singh *et al.*, 2013).

Thus, there is need to increase production and productivity of pulses in general and blackgram, in particular of our country by more intervensions.

Table 1.1. Area, production and productivity of Rice fallow (Rabi) Blackgram in various Districts of Andhra Pradesh.

S.No.	DISTRICT	AREA (in 000 ha)	PRODUCTION (in 000 tonnes)	PRODUCTIVITY (in kg/ha)
1.	Srikakulam	42	24	563
2.	Vizyanagaram	17	9	537
3.	Vishakapatnam	7	6	786
4.	East Godavari	19	2	129
5.	West Godavari	7	7	1036
6.	Krishna	94	86	912
7.	Guntur	37	40	1090
8.	Prakasam	12	9	824
9.	S.P.S. Nellore	9	8	873
10.	Y.S.R kadapa	3	2	786
11.	Kurnool	0	0	786
12.	Ananthapur	2	2	786
13.	Chitoor	1	1	786
	Total	**250**	**197**	**786**

Source : Directorate of Economics &Statistics (2014) Note: 0 = < 500Ha.

Objectives of the study

1. To study the profile characteristics of blackgram growers.
2. To study the level of knowledge and extent of adoption of blackgram growers on selected production technology.
3. To find out the relationship of profile characteristics of blackgram growers with their level of knowledge and extent of adoption.
4. To analyze the constraints of blackgram growers and to elicit the suggestions of blackgram growers and arrive at the strategy for increasing the production.
5. To present few typical case lets of blackgram growers.

Scope of the study

The present investigation was undertaken to measure the level of knowledge and extent of adoption to arrive at strategy with regard to selected production technology of Rice fallow Blackgram cultivation. Besides this, the

study also focussed to reveal the relationship of profile characterstics of rice fallow blackgram growers with their level of knowledge and extent of adoption on selected production technology and finally an attempt has been made to analyse the constraints and elicit the suggestions of blackgram growers by adopting an ex-post-facto research design.

The findings could be utilized by administrators, planners, researcher, scientists and extension workers to understand the existing status of rice fallow blackgram growers with regard to their level of knowledge and extent of adoption and constraints faced in adoption of selected production technologies which will facilitate in planning and organizing effective educational programmes for increasing blackgram production. The results of the study could be effectively used in other areas where similar conditions exist.

Limitations of the study

1. Being a postgraduate research, the investigation has limitation of time, money and other resources.
2. Since the study was designed as on ex-post-facto type, the memory bias on the part of the Rice fallow Blackgram growers cannot be ruled out.
3. The area of investigation was restricted to eight villages in three mandals. Therefore the implications made in the study may not be generalized for larger areas.

Presentation of the study

The report of the study is presented in six chapters.

i. The first chapter deals with brief “Introduction”, highlights the objectives, scope and limitations of the study.

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

iii. The third chapter deals with the “Material and Methods” giving the details of the ‘Methodology’ used in the process of investigation. It provides the information on location of the study, selection of the

respondents and sampling procedure, selection of variables and their empirical measurements, devices and methods used for collection of data and statistical tools used.

iv. “Results and Discussion” along with illustrations are placed in fourth chapter.

v. The fifth chapter highlights “Summary and Conclusions” with implications of the study.

vi. The “Literature Cited” is presented by following the guidelines of “ANGRAU” on thesis presentation. “Appendices” were provided at the end.

Chapter II

REVIEW OF LITERATURE

The thesis work is concerned with "A STUDY ON THE KNOWLEDGE AND EXTENT OF ADOPTION OF THE FARMERS ON RECOMMENDED RICE FALLOW BLACKGRAM PRODUCTION TECHNOLOGY IN GUNTUR DISTRICT OF ANDHRA PRADESH". Hence, an effort was made to review the related literature, which was found to be meaningful and having direct or indirect bearing on this study and furnished under the following heads, in line with the objectives of the study.

2.1 Profile characteristics of blackgram growers.

2.2 Level of knowledge of blackgram growers on selected production technology.

2.3 Extent of adoption of blackgram growers selected production technology.

2.4 Relationship of the profile characteristics of blackgram growers with their level of knowledge and extent of adoption.

2.5 Constraints of blackgram growers in adoption of selected production technology.

2.6 Suggestions of the blackgram growers and arrive at the strategies for increasing the production.

2.7 Few typical caselets of blackgram growers.

2.8 Hypothesis.

2.9 Conceptual model for the study.

2.1 PROFILE CHARACTERISTICS OF BLACKGRAM GROWERS

2.1.1 Age

Samuel (1993) expressed that less than three fifth of the paddy farmers (58.34%) belonged to the middle aged group followed by those coming under young age (28.33%) and old age (13.33%).

Obaiah (2004) reported that more than half (52.14%) of rice farmers of FFS were medium aged followed by those belonging to young age (26.43%) and old age (21.43%).

Naik (2006) revealed that less than two fifths (39.33%) of the respondents were middle aged followed by those belonging to old age (30.67%) and young age (30.00%) from his study conducted on training needs of groundnut farmers in Anantapur District.

Deshmukh *et al*. (2007) stated that 47.22 per cent of the respondents were middle aged, 34.72 per cent were young aged and only 18.06 per cent of them were old aged.

Krishnamurthy *et al*. (2007) observed that 67.60 per cent of vegetable farmers belonged to the age group of 41-50 years, followed by those with 51 years and above (21.10%) and 30-40 years (11.30%).

Tiwari *et al*. (2007) found that 46.35 per cent of the pea farmers are middle aged, followed by those belonging to young (31.70%) and old (21.95%) age.

Naik and Babu (2010) revealed that less than half (45.00%) of the FFS farmers belonged to middle age followed by the rest belonging to young age (39.16%) and old age (15.84%) categories.

Kalyan *et al*. (2012) observed that majority (52.50%) of the groundnut farmers belonged to middle age category followed by those belonging to young age (25.83%) and old age (21.67%) categories.

Meena *et al*. (2012) found that nearly three fifths (59.50%) of the rice farmers are middle aged, followed by young aged (24.50%) and old aged (16.00%).

Tidke *et al*. (2012) revealed that almost an equal percentage of the pigeon pea farmers found in middle (46.67%) and old age group (43.33%). Only 10.00 per cent of the respondents belonged to young age group.

Choudhary *et al*. (2013) reported that nearly half (47.50%) of mango growers belonged to middle age group, followed by those belonging to old age group (37.50%) and young age group (15.00%).

Kumar *et al.* (2013) found that 42.22 per cent of the chickpea farmers belong to middle age. Whereas, 41.11 per cent of them were old aged and only 16.67 per cent of them were young aged.

Kebeney *et al.* (2015) revealed that 38.00 percent of the sorghum farmers belonged to age group of 38 and 47 years, 24.70 percent of them aged between 28 and 37 years and 20.30 percent of them aged between 48 and 59 years.

Prajapati *et al.* (2015) reported that more than two fifth (42.00%) of the tribal respondents belong to middle age group (36 to 50 years), followed by 37.00 percent and 21.00 per cent to old and young age, respectively.

2.1.2 Education

Dhamodaran and Vasanthakumar (2001) revealed that more than one third (35.83%) of the sugarcane growers had high school education, followed by the rest with middle school (29.50%), primary school (18.67%) and collegiate level (16.00%) education.

Nagabhushanam (2003) observed that less than half (44.44%) of farmers had higher education status, followed by those with medium (41.67%) and low (13.89%) educational status.

Natarajan (2004) found that more than one third (34.44%) of FFS farmers of rice had middle school education, followed by the remaining coming under high school (28.89%), higher secondary (18.89%), primary (16.67%) and illiterate (1.11%) categories.

Gopinath (2005) reported that 28.66 percent of the bengalgram respondents had middle school education followed by those with are functional literacy (23.33%), primary school (20.67%), high school (12.67%), illiterates (8.67%) and those with college level and above (6.00%).

Acharya (2005) observed that (26.66%) of the jute respondents were primary school educated followed by those belonging to literates (20.83%), functionally literate (13.33%), and (17.50%) were middle school educated followed by (14.16%) were high school educated and only (7.50%) were with college education.

Deshmukh *et al*. (2007) revealed that 25.69 per cent of the respondents had higher secondary education, followed by those with secondary level education (24.66%), illiterates (17.01%), primary school (16.66%) and middle school (15.98%) education.

Krishnamurthy *et al*. (2007) stated that one-fourth (25.00%) of vegetable farmers completed primary to middle school (1-7th class). The remaining coming under high school (42.80%), illiterate (20.00%) and graduation (12.20%) categories.

Naik and Babu (2010) revealed that 24.16 per cent of the FFS farmers were educated upto high school level, followed by 20.84 per cent with middle school, 16.67 per cent with illiterates, 13.33 per cent with primary school, 12.50 per cent with intermediate education, 11.67 per cent with graduate education and 0.83 per cent with post graduate education.

Chapke *et al*. (2011) found that majority (60.00%) of the sorghum farmers were illiterate, followed by a few of them educated up to middle school (16.50%), higher secondary (13.50%) and graduate (10.00%) level.

Kalyan *et al*. (2012) concluded less than one fourth (23.34%) of the groundnut farmers were educated up to middle school level followed by those with illiterate (20.00%), functionally literate (13.33%), primary school (13.33%), high school (12.50%), intermediate (10.83%) and only 06.67 per cent were educated up to collegiate level.

Meena *et al*. (2012) observed that majority (57.50%) of the rice farmers were educated upto medium level (medium to high school), followed by those with low (primary) education (24.50%) and high education i.e. above high school (18.00%).

Tidke *et al*. (2012) reported a great (70.00%) of the pigeon pea farmers were educated upto high school level, followed by those educated upto middle school (13.33%), collegiate education and primary school (06.67% each) and only 03.33 per cent of them were illiterates.

Choudhary *et al*. (2013) indicated that 46.25 per cent of the Mango growers were educated up to secondary level followed by those belonging to primary school (26.25%), middle school (11.25%), graduate (07.50%), functionally literate (06.25%) and illiterate (02.50%) categories.

Devi *et al*. (2013) concluded that most (90.83%) of the Sugarcane farmers were educated. Whereas, 04.17 per cent were functionally literate and the rest 05.00 % were illiterates.

Kumar *et al.* (2013) observed that 33.40 per cent of the Chickpea farmers were educated upto middle school, followed by those belonging to primary school (28.22%), functionally literate (22.88%) and illiterate (15.50%) categories.

Prajapati *et al.* (2015) reported that majority (56.00%) of the tribal respondents belonged to illiterate group followed by the remaining with primary education (Up to VII standard- 31.00%) and Secondary education (VIII to XII standard- 10.00%) and collegiate (3.00%) level of education.

2.1.3 Farm Size

Khan *et.al.* (1997) reported that majority (59.85%) of the paddy farmers were medium farmers followed those coming under small farmers (32.57%) and big farmers were (7.58%).

Mallarayudu (1997) concluded that 60.83 per cent of the sunflower farmers had small land holding followed by those with medium (26.67%) and large (12.50%) land holdings.

Yeligar (1997) stated that more than half (53.47%) of the soyabean farmers belonged to small farmers and the remaining belonged to big farmers (46.53%).

Geetha (2002) stated that more than two fifth (40.83%) of the respondents were small farmers, followed by those coming under big farmers (30.00%) and marginal farmers (29.17%) categories.

Kumar (2002) observed that more than two fifth (40.84%) of hybrid Jowar growers had small land holding, followed by those had marginal (30.83%) and big (28.33%) land holding.

Kumar (2004) indicated that almost all (98.00%) of the coconut farmers were marginal farmers, followed by a small fraction coming under small (1.33%) and big (0.67%) farmers.

Tiwari *et al*. (2007) revealed that majority (62.19%) of the Pea farmers were large farmers, followed by remaining coming under medium (30.49%) and small (07.32%) farmer categories.

Farida *et al.* (2011) reported that more than two fifth 40 per cent of paddy growers belonged to 3-4 ha category followed by those with 2-3ha (26.7%),less than one ha (26.7%) category and 1 to 2 ha (6.60%) category.

Kalyan *et al*. (2012) found that majority (58.33%) of the groundnut farmers were small farmers, followed by the remaining coming under marginal farmers (29.17%) and big farmers (12.50%) categories.

Nirmala (2012) observed that majority (55.83 %) of the paddy growers were small farmers followed by those coming under semi medium (30.00%), medium (7.50%), marginal (4.17%) and large (2.50%) .

Tidke *et al*. (2012) concluded that 43.33 per cent of the pigeon pea farmers were medium farmers, whereas, 40.00 per cent were small farmers and only 16.67 per cent of them were large farmers.

Devi *et al.* (2013) revealed that majority (54.17%) of the Sugarcane farmers were small farmers, followed by the rest coming under big (42.50%) and marginal (03.33%) farmers categories.

Kebeney *et al.* (2015) noticed that 39.30% of the farmers had 1.5- 2.0 ha of land, while 32.30% owned between 0.6 and 0.9 ha of land and 28.30% between 0.3 and 0.5ha.

Prajapati *et al.* (2015) reported that majority (54.00%) of the tribal respondents have up to 1.0 ha. land followed by those with 1.1 to 2.0 ha (29.00%) and 2.1 to 3.0 ha. land (17.00%), respectively.

2.1.4 Farming Experience

Mallarayudu (1997) noticed that majority (64.16%) of the sunflower farmers had medium level of farming experience followed by those with high (20.00%) and low (15.84%) level of farming experience.

Mohammed (1999) expressed that a great majority (70.00%) of the rice growers in adopted village of Kondubhatlapalem had medium level of farming experience followed by those with low (16.66%) and high (13.34%) level of farming experience.

Ratnam (2000) indicated that majority (59.21%) of the sunflower growers had medium farming experience followed by those with high (22.37%) and low (18.42%) levels of farming experience.

Dhamodaran and Vasanthakumar (2001) stated that 36.67 per cent of the sugarcane growers had 11-20 years of experience in farming, followed by 33.33 percent who had over 20 years and only 30.00 per cent of the farmers had less than 10 years experience in farming.

Sathyavathy (2001) found that 45.00 per cent of sugarcane farmers had medium farming experience, followed by the remaining with high (30.00%) and low (25.00%) farming experience.

Padmavathi and Reddy (2002) stated that majority (71.11%) of the Mitra Kisans under NWDPRA had medium farming experience, followed by those with low (15.56%) and high (13.33%) farming experience.

Kalyan *et al*. (2012) found that more than three-fifth (65.00%) of the groundnut farmers had medium farming experience, followed by the remaining with high (19.17%) and low (15.83%) levels of farming experience.

Barman *et al.* (2013) reported that majority (45.00%) of the farmers had more than 10 years of farming experience followed by 41.67 per cent with 5-10 years of experience and 13.33 per cent with less than 5 years of farming experience .

Onojah *et al.* (2013) revealed that the majority (71.40%) of the maize farmers had above 10 years of farming experience where as only (29.60%) had up to 10 years of experience.

Meludu *et al.* (2014) revealed that majority (64.70%) of the respondents had between 1–30 years of farming experience while (35.30%) had above 31 years of farming experience.

2.1.5 Extension Contact

Ram (1996) expressed that majority (61.00%) of rice growers had medium extension contact followed by those with low (29.00%) and high (10.00%) extension contact.

Shivaraj (1996) observed that more than two-fifth (43.75%) of redgram growers had low extension contact, followed by those with medium (36.25%) and high (20.00) extension contact.

Ratnam (2000) stated that most(82.90%) of sunflower growers had medium extension contact followed by those with high (14.47%) and low (2.63%) level of extension contact.

Dhamodaran and Vasanthakumar (2001) revealed that majority (52.50%) of the sugarcane growers had low level of extension contact and rest had medium level (47.50%) of extension contact.

Kumar (2002) observed that majority (47.50%) of the hybrid jowar growers had medium extension contact followed by those with low (27.50%) and high (25.00%) level of extension contact.

Gopinath (2005) revealed that less than half (46.00%) of the bengalgram farmers had medium extension contact, followed by those with low (32.67%) and high (21.33%) extension contact.

Kumar (2006) expressed that majority (62.67%) of the rice growers had medium level of contact with extension agency, followed by those with low (21.33%) and high (16.00%) extension contact.

Deshmukh *et al*. (2007) revealed that 79.51 per cent of the respondents had medium extension contact, followed by the with high (13.90%) and low (6.59%) levels of extension contact.

Mahesh *et al.*(2011) revealed that subject matter specalist from KVK were the major source of information among the rice growers (100.00%) followed by pesticide dealers and traders (80.00%), personal experience (76.00%) and neighboring farmers (72.00%) and village level agricultural workers (68.00%).

Kalyan *et al*. (2012) found that majority (56.67%) of the groundnut farmers had medium extension contact, followed by those with low (26.67%) and high (16.66%) levels of extension contact.

Kumar *et al.* (2012) revealed that more than three fifth (63.12%) of the paddy growers belonged to medium extension contact, followed by those with high (24.38%) and low (12.50%) extension contact.

Tidke *et al.* (2012) observed that more than three-fourth (76.67%) of the pigeon pea farmers had medium extension contact, followed by the remaining with low (13.33%) and high (10.00%) levels of extension contact.

Kumar *et al.* (2013) revealed that majority (61.11%) of the Chickpea farmers had low level of extension contact, followed by those with medium (27.78%) and high (11.11%) level of extension contact.

Marbaniang *et al.* (2013) reported that majority (66.67%) of the tribal respondents had medium level of extension contact followed by those with high (17.35%) and low (15.98%) level of extension contact.

Dhanasree *et al.* (2014) revealed that 49.44 per cent of the respondents had medium extension contact followed by the rest with low level (32.78%) and high level (17.78%) of extension contact.

Kebeney *et al.*(2015) identified that majority (61.30%) of the farmers had no contacts with agriculture extension officers and 38.70% did receive agricultural extension services and information, whereas those farmers who had contacts comprised of 28.70% once, 6.70% twice and 3.30% thrice during the crop growing season.

2.1.6 Social Participation

Krishnakumar (1996) stated that 68.00 per cent of the rice farmers had medium level of social participation followed by those with low (18.00%) and high (14.00%) levels of social participation.

Ratnam (2000) indicated that majority (65.79%) of the OFED'S in sunflower farmers had medium social participation followed by those with high (18.42%) and low (15.79%) social participation.

Kumar (2002) observed that majority (59.17%) of hybrid jowar growers had medium level of social participation followed by those with low (25.00%) and high (15.83%) levels of social participation.

Mahalakshmi (2003) indicated that more than two- fifth (41.67%) of the pulse growers had medium level of social participation followed by those with low (32.50%) and high (25.83%) levels of social participation.

Gopinath (2005) reported that more than two thirds (62.00%) of the bengalgram growers had low level of social participation followed by those with medium (23.33%) and high (14.67%) levels of social participation.

Deshmukh *et al*. (2007) revealed that 45.13 per cent of the respondents had medium social participation followed by those with high (38.88%) and low (15.97%) level of social participation.

Saha *et al.* (2010) indicated that 70.08 per cent of the farmers were not linked with any institution. Only 17.92 per cent farmers were office bearer. He also revealed that about 12.00 per cent farmers were associated with one or more organizations.

Gowda *et al.* (2011) observed that more than half (53.33%) of the sugarcane growers belonged to medium social participation category. Whereas, 35.00 per cent and 11.67 per cent of the respondents belonged to low and high social participation categories, respectively.

Tidke *et al*. (2012) found that 76.67 per cent of the pigeon pea farmers had no social participation, 16.67 per cent of them had membership in one organization and only 6.66 per cent of them had membership in more than one organization.

Devi *et al*. (2013) revealed that majority (67.50%) of the sugarcane farmers had medium social participation, followed by the rest with high (20.83%) and low (11.67%) level of social participation.

Kumar *et al.* (2013) stated that nearly two-third (64.44%) of the chickpea farmers had low level of social participation, followed by those with medium (24.45%) and high (11.11%) levels of social participation.

Sriramana (2014) revealed that majority (56..66%) of the cashew farmers had medium social participation, followed by the rest with low (24.17%) and high (19.17%) level of social participation.

2.1.7 Massmedia Exposure

Ram (1996) indicated that 63.00 per cent of the rice farmers had medium level of mass media exposure followed by those with low (21.00%) and high (16.00%) levels of mass media exposure.

Prasad (1997) reported that majority (45.84%) of the respondents of rainfed castor had medium mass media exposure followed by(30.83%) and(23.33%) with high and low mass media exposure.

Ratnam (2000) stated that a great majority (72.37%) of the sunflower growers had medium mass media exposure followed by those with high (15.79%) and low (11.84%) level of mass media exposure.

Kumar (2002) indicated that 50.83 per cent of the hybrid jowar growers had medium mass media exposure followed by those with low (31.67%) and high (17.50%) mass media exposure.

Acharya (2005) indicated that 38.33 per cent of the jute respondents had high mass media exposure where as 33.34 per cent and 28.33 per cent of them had low and medium level of mass media exposure.

Gopinath (2005) inferred that majority (68.00%) of bengalgram farmers had medium level of mass media exposure followed by those with high (17.33%) and low (14.67%) level of mass media exposure.

Begum (2008) revealed that majority (62.50%) of the groundnut farmers had medium level of mass media exposure followed by those with high (21.67%) and low (15.83%) levels of mass media exposure.

Gowda (2009) observed that majority (65.00%) of the sugarcane growers had medium mass media exposure followed by those with low (19.17%) and high (15.83%) levels of mass media exposure.

Arathy (2011) reported that more than(53.33%) of the respondents had medium level of mass media exposure followed by those with high (30.00%) and low (16.67%) level of mass media exposure.

Kalyan (2011) revealed that more than half (53.33%) of the respondents were having medium mass media exposure followed by those with low (27.5%) and high (19.16%) level of mass media exposure.

Devi *et al*. (2013) stated that majority (69.17%) of the sugarcane farmers were medium in mass media exposure, followed by those with high (20.00%) and low (10.83%) level of mass media exposure.

Sriramana (2014) revealed that majority (52.50%) of the cashew growes had medium mass media exposure followed by those with low (25.00%) and high (22.50%) level of mass media exposure.

2.1.8 Economic Motivation

Vijayalayan (2001) found that less than half (45.83%) of the paddy farmers had medium level of economic motivation followed by those with high (28.84%) and low level (25.83%) of economic motivation.

Kumar (2004) concluded that majority two third (62.00%) of the respondents had medium economic motivation followed by those had low (23.33%) and high (14.67%) economic motivation.

Gopinath (2005) reported that majority (67.33%) of the respondents had medium economic motivation followed by those with low (19.33%) and high (13.34%) levels of economic motivation.

Santhi (2006) reported that nearly half (49.17%) of the system of rice intensification farmers had medium level of economic motivation followed by those with high (26.66%) and low (24.17%) level of economic motivation.

Kiran and Shenoy (2010) revealed that most (89.00%) of the rice farmers had medium economic motivation followed by the rest with low (11.00%) level of economic motivation.

Arathy (2011) found that majority (56.67%) of the rice farmers had medium economic motivation followed by those with high (25.83%) and low (17.50%) level of economic motivation.

Gowda *et al.* (2011) indicated that majority (52.50%) of the sugarcane growers had medium economic motivation, followed by the rest with low (27.50%) and high (20.00%) level of economic motivation.

Thiyagarajan (2011) reported that (41.70%) of the system of rice intensification farmers had medium level of economic motivation followed by high (36.60%) and low (21.70%) level of economic motivation.

Kumar *et al.* (2013) revealed that more than half (51.11%) of the chickpea farmers had high level of economic motivation, followed by those with medium (25.22%) and low (23.67%) level of economic motivation.

2.1.9 Innovativeness

Padmavathi and Reddy (2002) inferred that majority (68.89%) of the Mitra Kisans under NWDPRA had medium level of innovativeness, followed by those with low (20.00%) and high (11.11%) level of innovativeness. .

Babu and Venkataramaiah (2004) revealed that majority (58.82%) of the beneficiaries under Indo-Dutch Network Operational Research Project on Drainage and Water Management for salinity control had medium innovativeness followed by the rest with high (23.53%) and low (17.65%) level of innovativeness.

Gopinath (2005) observed that more than half (51.33%) of the bengalgram farmers had medium innovativeness, followed by the remaining with low (31.33%) and high (17.34%) level of innovativeness.

Premavathi (2005) inferred that majority (64.00%) of the farm women had high innovativeness followed by the rest with medium (36.00%) innovativeness.

Asokhan *et al.* (2008) evidenced that nearly half (47.33%) of the SHG members had high level of innovativeness, followed by 43.67 per cent had medium and 09.00 per cent had low level of innovativeness.

Naik and Babu (2010) reported that more than two-fifth (40.84%) of the FFS farmers were having high level of innovativeness, followed by those with medium (39.16%) and low (20.00%) level of innovativeness.

Patil *et al.* (2010) reported that more than half (53.57%) of the organic vegetable growers had high innovativeness, followed by the remaining coming under medium (32.14%) and low (14.19%) level of innovativeness.

Gowda *et al.* (2011) reported that more than two-third (68.33%) of sugarcane growers had medium innovativeness, followed by the rest coming under low (22.50%) and high (9.17%) innovativeness categories.

Kalyan *et al.* (2012) found that nearly three-fifth (59.17%) of the groundnut farmers had medium level of innovativeness, followed by the rest with high (20.83%) and low (20.00%) level of innovativeness.

Tidke *et al.* (2012) revealed that 40.00 per cent of the pigeon pea farmers had medium level of innovativeness and an equal percentage coming under low and high level of innovativeness (30.00% each).

Devi *et al.* (2013) revealed that almost two-third (65.83%) of the sugarcane farmers had medium innovativeness, followed by the remaining with high (17.50%) and low (16.67%) innovativeness.

Kumar *et al.* (2013) concluded that more than two-fifth (43.33%) of the chickpea farmers had medium innovativeness, followed by low (32.22%) and high (24.44%) level of innovativeness.

Sriramana (2014) revealed that nearly two fifth (39.17%) had medium level of innovativeness followed by those with low (35.83%) and high (25.00%) level of innovativeness.

2.1.10 Scientific Orientation

Gopinath (2005) reported that a little more than three fifth (60.67%) of the Bengal gram farmers had medium scientific orientation, followed by those with low (22.00%) and high (17.33%) scientific orientation.

Premavathi (2005) inferred that more than three-fourth (76.00%) of the farm women had medium level of scientific orientation, followed by the remaining with low (18.00%) and high (06.00%) level of scientific orientation.

Khan *et al*. (2007) revealed that majority (60.00%) of the respondents had low level of scientific orientation, followed by those with medium (24.00%) and high (16.00%) level of scientific orientation.

Tiwari *et al.* (2007) revealed that more than two-third (70.75%) of the pea farmers had medium level of scientific orientation, followed by the rest with high (28.04%) and low (01.21%) level of scientific orientation.

Gowda (2009) revealed that little more than two third (70.83%) of the sugarcane growers were having medium scientific orientation, followed by those with low (20.83%) and high (8.34%) scientific orientation

Naik and Babu (2010) stated that more than half (50.84%) of the FFS farmers had medium scientific orientation, followed by the remaining with high (26.66%) and low (22.50%) level of scientific orientation.

Kalyan *et al.* (2012) revealed that 44.17 per cent of the groundnut famers had medium scientific orientation, followed by the rest with low (39.17%) and high (16.66%) level of scientific orientation.

Tidke *et al.* (2012) found that most (83.33%) of the pigeon pea farmers had medium level of scientific orientation, followed by those with low (13.33%) and high (3.33%) level of scientific orientation.

Chouhan *et al.* (2013) concluded that more than two-third (67.50%) of the pea growers had medium scientific orientation followed by those with high (17.50%) and low (15.00%) level of scientific orientation.

Kumar *et al.* (2013) revealed that more than half (53.33%) of the chickpea farmers had high level of scientific orientation, followed by the rest with medium (31.11%) and low (15.56%) level of scientific orientation.

Rathod *et al.* (2013) reported that two fifth (40.00%) of the soybean farmers had high scientific orientation followed by those with medium (36.00%) and low (24.00%) scientific orientation.

Prajapati and Bhatt (2013) reported that majority (64.67%) of tribal dairy farm women had medium scientific orientation followed by the remaining with low (20.00%) and high (15.33%) level of scientific orientation.

Sriramana (2014) concluded majority (57.50%) of cashew growers had medium level of scientific orientation followed by those with low(23.33%) and high (19.17%) level of scientific orientation.

2.1.11 Risk Orientation

Gopinath (2005) found that (67.33%) of the bengal gram farmers had medium level of risk orientation followed by those with low (20.00%) and high (12.67%) level of risk orientation.

Gopiram (2005) found that more than half of the turmeric cultivators fell under medium (58.67%) risk orientation category, followed by those coming under high (28.00%) and low (13.33%) risk orientation categories.

Naik (2006) revealed that (44.67%) of the groundnut farmers had medium risk orientation followed by those with low (31.33%) and medium (24.00%) risk orientation.

Santhi (2006) reported that nearly two-third of the SRI farmers (65.83%) had medium level of risk orientation followed by the remaining with high (19.17%) and low level (15.00%) of risk orientation.

Kiran (2010) reported that most (86.00%) of the rice farmers had medium risk orientation followed by those with low (10.00%) and high (4.00%) level of risk orientation respectively.

Arathy (2011) reported that majority (61.67%) of the respondents had medium risk orientation followed by high (32.50%) and low (5.83%) risk orientation.

Thiyagarajan (2011) found that 43.30 per cent of the SRI farmers had high level of risk orientation, followed by 42.50 per cent with medium and 14.20 per cent with low level of risk orientation.

Gowda *et al.* (2011) revealed that majority (73.33%) of the sugarcane growers had medium risk orientation followed by those with low (18.34%) and high (8.33%) risk orientation.

Kumar (2012) revealed that more than three fourth (78.33%) of vermicompost entrepreneurs belonged to medium risk orientation followed by rest with low (13.34%) and high (8.33%) risk orientation.

Sriramana (2014) revealed that more than two fifth (43.33%) had medium level of risk orientation followed by those with low (31.67%) and high (25.00%) level of risk orientation.

2.1.12 Market Orientation

Atchutaraju (1998) revealed that majority (57.50%) of the beetelvine growers had medium market orientation followed by the rest with high (22.50%) and low (20.00%) market orientation.

Palaniswamy and Sriram (2001) reported that most (84.36%) of the sugarcane growers had medium market orientation followed by 10.88 per cent and 4.76 per cent with high and low market orientation, respectively.

Pallavi (2006) in her study on empowerment of tribal women reported that 58.75 per cent had medium level of market orientation followed by the remaining with high (35.00%) and low (6.25%) market orientation.

Tiwari *et al.* (2007) revealed that majority (58.53%) of the pea farmers had low level of market orientation, followed by those with medium (26.82%) and high (14.65%) level of market orientation.

Prabhugouda (2011) clearly indicated that two-third (66.67%) of Pomegranate growers belonged to the medium market orientation category. Whereas, 22.50 and 10.83 per cent to the high and low market orientation categories.

Mehta and Madhuri (2012) reported that less than three-fourths (72.00%) of mango growers belonged to the medium marketing orientation, followed by rest coming under high (16.00%) and low (12.00%) market orientation.

Ananda and Sahu (2012) reported that 53.75 per cent of the tribal respondents had medium level of market orientation followed by 27.40 per cent and 18.75 per cent of the respondents with low and high level of market orientation, respectively.

Sriramana (2014) revealed that more than two fifth (41.67%) of cashew growers had medium market orientation followed by low (35.00%) and with high (23.33%) level of market orientation.

2.1.13 Annual income

Deshmukh *et al*. (2007) observed that 81.59 per cent of the respondents had medium level of income, followed by the rest with low (7.65%) and high (10.76%) level of income.

Tiwari *et al*. (2007) revealed that majority (58.53%) of pea farmers belonged to low income group, followed by the remaining coming under medium (36.58%) and high (04.89%) income groups.

Meena *et al.* (2012) revealed that a great majority (72.50%) of farmers belonged to middle income group i.e. between 1.50 lakh to 5.75 lakhs per annum. Further, 11.50 and 16.00 per cent farmers to low and high income groups, respectively.

Tidke *et al*. (2012) stated that majority (70.00%) of pigeon pea farmers had medium annual income, followed by those with high (16.67%) and low (13.33%) level of annual income.

Choudhary *et al*. (2013) revealed that 63.75 per cent of the mango growers were found to be with low income and the remaining with high income (36.25%).

Chouhan *et al*. (2013) found that majority (52.50%) of the Pea farmers (52.50%) belonged to middle income group, followed by those with low (34.16%) and high (13.34%) income groups.

Kumar *et al.* (2013) revealed that more than three-fifth (65.00%) of the chickpea farmers had low income level, while, 22.22 per cent of them having medium level of income and only 12.78 per cent were falling in high income group.

Mohanty *et al*. (2013) found that 43.34 per cent of the tribal farmers had low level of annual income, followed by those belonged to medium (34.17%), poor (13.33%) and high (09.16%) level of income categories.

Sriramana (2014) revealed that more than two fifth (43.33%) of cashew growers had low level of annual income followed by those with high (29.17%), and medium (27.50%) levels of annual income.

2.1.14 Training Received

Kumar (2004) revealed that nearly half (48.00%) of the respondents had low level of training undergone followed by those with medium (30.67%) and high (21.33%) level of training under gone.

Naik (2006) reported that 38.67 per cent of the respondents had low training undergone followed by high (31.33%) and medium (30.00%) trainings.

Kiran and Shenoy (2010) concluded that two fifth (40.00%) of the rice farmers had high level of training undergone followed by medium (38.00%) and low (22.00%) level of training under gone.

Arathy (2011) revealed that majority (58.33%) of the respondents had received medium level of training followed by those with low (24.17%) and high (17.50%) level of training undergone.

Thiyagarajan (2011) found that, 40.80 per cent of the SRI farmers had undergone three and above number of trainings, followed by 39.20 per cent who attended only single training and the remaining 20.00 per cent of the respondents participated in two trainings.

Marbaniang *et al.* (2013) reported that majority (55.56%) of the tribal respondents had no training followed by the rest with medium (18.51%), low (14.81%) and high (11.12%) level of training.

Ayyappan (2014) revealed that a great majority (70.00%) of the tribal SHG members selected had few trainings on social development followed by those with very few trainings (30.00%).

2.2 LEVEL OF KNOWLEDGE OF BLACKGRAM GROWERS ON SELECTED PRODUCTION TECHNOLOGY

Choudhary and Khan (1998) observed that majority (66.67%) of the respondents had medium level of knowledge followed by those with high (20.00%) and low (13.33%) level of knowledge regarding improved practices of mothbean cultivation.

Chapke (2000) revealed that more than three-fourth (75.91%) of respondents had moderate knowledge about biocontrol measures whereas, comparatively less per cent of respondents had low (16.05%) and high (8.04%) level of knowledge about biocontrol measures.

Mehta *et al.* (2000) reported that more than three-fifth (62.00%) of the respondents had medium level of knowledge. Whereas, the per cent of the respondents having low and high level of knowledge about post harvest Technology were 22.00 per cent and 16.00 per cent, respectively.

Ganesan and Seethalakshmi (2002) inferred that majority (52.00%) of the women were having high knowledge level, followed by those with medium (37.00%) and low (31.00%) knowledge levels about IPM in Rice.

Seema (2002) found that half (50.00%) of tribal farmers had medium knowledge level followed by the remaining with high (33.33%) and low (16.67%) knowledge about tribal development schemes which improved their livelihood in line with their felt needs.

Raghavendra (2005) found that 61.66 per cent of the cauliflower growers possessed medium level of knowledge followed by 22.50 per cent and 15.84 per cent falling under low and high level of knowledge categories, respectively.

Gopinath (2005) found that 58.00 per cent of the bengalgram respondents had medium knowledge about recommended package of practices followed by those with low (22.00%) and high (20.00%) levels of knowledge.

Gopiram (2005) revealed that more than three fifth of the turmeric growers (60.87%) had medium knowledge about recommended practices followed by the rest with low (20.00%) and high (19.13%) knowledge level.

Tiwari *et al.* (2007) revealed that 47.56 per cent of the pea farmers were having medium knowledge, followed by the remaining with high (26.84%) and low (25.60%) knowledge about recommended practices of pea.

Shakya *et al.* (2008) revealed that most (80.00%) of the chickpea farmers had medium level of knowledge followed by those with high (18.33%) and low (1.67%) level of knowledge about chickpea production technology.

Jiji and Vijayan (2012) reported that half (50.00%) of the tribal respondents had medium knowledge followed by those with low(32.14%) and high (17.86%) level of knowledge on cattle farming.

Swathi (2012) reported that less than half (40.83%) of the tribal respondents had high knowledge on agrobiodiversity followed by those with medium (31.67%) and low (27.50%) knowledge.

Tidke *et al*. (2012) revealed that 46.67 per cent of the pigeon pea farmers having medium knowledge followed by the remaining with high (43.33%) and low (10.00%) levels of knowledge about pod borer controlling practices.

Ambedkar *et al.* (2013b) reported that 41.67 per cent of the bengalgram farmers had medium level of knowledge followed by those with high (35.00%) and low (23.33%) level of knowledge.

Kumar *et al.* (2013) observed that majority (57.90%) of the respondents had medium knowledge followed by the remaining with high (25.44%) and low (16.66%) levels of knowledge on improved practices of chickpea.

Manoj *et al.* (2013) reported that majority (57.50%) of the farmers of KVK adopted villages had medium level of knowledge followed by those with high (32.50%) and low (10.00%) level of knowledge.

Kumar *et al*. (2014) revealed that majority (56.67%) of the rice farmers had medium level of knowledge, followed by those with high (30.83%) and low (12.50%) levels of knowledge in SRI technology.

Sriramana (2014) revealed that majority (53.33%) of cashew growers had medium level of knowledge followed by the remaining with low (26.67%) and high (20.00%) level of knowledge.

2.3 EXTENT OF ADOPTION OF BLACKGRAM GROWERS ON SELECTED PRODUCTION TECHNOLOGY

Sakharkar and Sundarswamy (1997) stated that more than two-third (69.00%) of the soybean farmers having medium adoption followed by the rest with high (16.00%) and low (15.00%) levels of adoption in soybean cultivation practices.

Thyagarajan and Subhashini (1999) concluded that almost half (49.17%) of the tapioca growers were found to have medium level of adoption followed by those with low (40.83%) and high (10.00%) levels of adoption on recommended tapioca production technology.

Pandya and Thumar (2000) revealed that more than two-third (69.05%) of the groundnut growers had medium adoption level followed by the rest with low (15.70%) and high (15.24%) level of adoption.

Ranganatha *et al*. (2001) concluded that almost half (49.00%) of small farmers having higher adoption level followed by the rest with low (30.00%) and medium (21.00%) level of adoption.

Patel *et al*. (2002) indicated that majority (66.82%) of the beneficiaries had medium level of adoption of watershed management technologies followed by those with low (17.05) and high (16.13%) level of adoption.

Singh and Singh (2002) found that half (50.00%) of the rapeseed farmers had medium level of adoption, followed by those with low (27.30%) and high (22.22%) levels of adoption.

Christain (2003) stated that 37.50 per cent of cotton growers fell in low level adoption category followed by those with medium (36.67%) and high (25.83%) levels of adoption in IPM strategy.

Sharma and Sharma (2003) revealed that majority (68.88%) of bajra farmers had medium level of adoption followed by those with high (18.88%) and low (12.22%) levels of adoption.

Kumar (2004) found that 45.33 per cent of coconut farmers had medium level of adoption followed by those with high (28.00%) and low (26.67%) level of adoption.

Gopiram (2005) revealed that 51.33 per cent of turmeric farmers had medium level of adoption followed by the remaining with high (25.34%) and low (23.33%) level of adoption.

Burman *et al.* (2006) revealed that majority (55.62%) of the pulse respondents had medium level of adoption followed by those with low (26.88%) and high (17.50%) level of adoption of improved production technology.

Rath *et al.* (2007) observed that a little more than two fifth (44.00%) of the rice respondents had medium rate of adoption, followed by the rest with high (36.00%) and low (20.00%) adoption.

Singh *et al.* (2011) found that more than half (54.00%) of the vegetable farmers had medium adoption followed by those with high (30.00%) and low (16.00%) adoption.

Tidke *et al*. (2012) revealed that more than half (58.33%) of the pigeon pea farmers having low level of adoption followed by those with medium (25.00%) and high (16.67%) levels of adoption about pod borer controlling practices.

Ambedkar *et al.* (2013) reported that majority of the bengalgram farmers were of medium adoption (44.17%) followed by the rest having high (30.83%) and low (25.00%) adoption.

Kiranmayi (2013) noted that more than half of the chilli farmers had medium adoption **(**53.33%) of recommended package of practices in chilli crop followed by the remaining with low (31.67%) and high (15.00%) adoption.

Kumar *et al.* (2013) observed that three-fourth (75.50%) of the chickpea farmers had medium level of adoption followed by those with high (36.00%) and low (04.50%) levels of adoption.

Kiranmayi (2013) noted that more than half of the chilli farmers had medium adoption **(**53.33%) of recommended package of practices in chilli crop followed by the remaining with low (31.67%) and high (15.00%) adoption.

Manoj *et al.* (2013) reported that majority (62.50%) of the farmers of KVK adopted villages had medium level of adoption followed by the rest with high (27.50%) and low (10.00%) level of adoption.

Sangeetha *et al.* (2013) reported that majority of the tomato farmers had medium (46.36%) level of adoption followed by those having high (35.46%) and low (18.18%) adoption.

Chanu *et al.* (2014) revealed that majority (65.33%) of the Pineapple growers had medium level of adoption followed by those with high level of adoption (24.67%). Only 10.00 per cent of the respondents had low level of adoption.

Sriramana (2014) revealed that majority (62.50%) of the cashew growers had medium level of adoption followed by those with low (20.83%) and (16.67%) high level of adoption.

2.4. RELATIONSHIP OF PROFILE CHARACTERISTICS OF THE BLACKGRAM GROWERS WITH THEIR LEVEL OF KNOWLEDGE AND EXTENT OF ADOPTION

2.4.1 Relationship of profile characteristics of Blackgram growers with their Level of Knowledge.

Relationship	Significant/ Non-significant	Revealed by	Year	Respondents
Age Vs Level of Knowledge				
Positive	Significant	Gangil and Dabas	2005	Livestock farmers
Positive	Significant	Srilatha and Vani	2006	Cotton farmers
Positive	Significant	Prakash and De	2008	Beekeeping farmers
Positive	Non-significant	Meena *et al.*	2009	Dairy farmers
Positive	Non-significant	Naik *et al.*	2009	Organic farmers
Negative	Significant	Sharma *et al.*	2009	Dairy farmers
Positive	Non-significant	Saha *et al.*	2010	Livestock farmers
Positive	Non-significant	Kumar	2012	Vermicompost entrepreneurs
Positive	Non-significant	Sriramana	2014	Cashew growers
Education Vs Level of Knowledge				
Negative	Non-significant	Srilatha and Vani Reddy *et al.*	2006	Cotton farmers
Positive	Significant	Prakash and De	2007	Rice farmers
Positive	Significant	Shakya *et al.*	2008	Beekeeping farmers
Positive	Significant	Naik *et al.*	2008	Chickpea farmers
Positive	Non-significant	Meena *et al.*	2009	Organic farmers
Positive	Non-significant	Sharma *et al.*	2009a	Dairy farmers
Positive	Significant	Ambedkar	2009	Dairy farmers
Positive	Significant	Saha *et al.*	2010	Bengalgram farmers
Negative	Non-significant	Kumar	2010	Livestock farmers
Positive	Significant	Sriramana	2012	Vermicompost entrepreneurs
Positive	Significant		2014	Cashew growers

Farm Size Vs Level of Knowledge				
Positive	Non-significant	Arya *et al.*	2003	Sugarcane farmers
Positive	Significant	Janardhan	2004	Sugarcane growers
Positive	Significant	Gangil and Dabas	2005	Livestock farmers
Positive	Significant	Gopinath	2005	Bengalgram farmers
Positive	Significant	Reddy *et al.*	2007	Rice farmers
Positive	Non-significant	Prakash and De	2008	Beekeeping farmers
Positive	Non-significant	Naik *et al.*	2009	Organic farmers
Positive	Non-significant	Ambedkar	2010	Benga gram farmers
Positive	Non-significant	Kumar	2012	Vermicompost entrepreneurs
Positive	Non-Significant	Sriramana	2014	Cashew growers
Farming Experience Vs Level of Knowledge				
Positive	Non-significant	Gayathri *et al.*	2002	Red gram growers
Negative	Non-significant	Kumar	2002	Jowar growers
Positive	Significant	Janardhan	2004	Sugarcane growers
Positive	Significant	Reddy *et al.*	2007	Rice farmers
Positive	Significant	Ambedkar	2010	Benga gram farmers
Positive	Non-Significant	Sriramana	2014	Cashew growers
Extension Contact Vs Level of Knowledge				
Positive	Non-significant	Gayatri *et al.*	2002	Redgram growers
Positive	Non-significant	Kumar	2002	Hybrid jowar growers
Positive	Significant	Singh *et al.*	2003	Sunflower farmers
Positive	Significant	Arya *et al.*	2003	Sugarcane farmers
Positive	Significant	Janardhan	2004	Sugarcane growers
Positive	Significant	Gopinath	2005	Bengalgram farmers
Positive	Significant	Ambedkar	2010	Bengalgram farmers
Positive	Significant	Sriramana	2014	Cashew growers

Social Participation Vs Level of Knowledge				
Positive	Significant	Vennila *et al.*	2001	Millet growers
Positive	Non-significant	Gayatri *et al.*	2002	Redgram growers
Positive	Significant	Govinda Gowda *et al.*	2002	Dryland farmers
Positive	Significant	Rajendra Kumar	2002	Hybrid Jowar growers
Positive	Non-significant	Janardhan	2004	Sugarcane growers
Positive	Significant	Reddy *et al.*	2007	Rice farmers
Positive	Significant	Shakya *et al.*	2008	Chickpea growers
Positive	Significant	Ambedkar	2010	Bengalgram farmers
Positive	Non-significant	Sriramana	2014	Cashew growers
Mass Media Exposure Vs Level of Knowledge				
Positive	Significant	Gayatri *et al.*	2002	Redgram farmers
Positive	Significant	Gowda *et al.*	2002	Groundnut farmers
Positive	Significant	Kumar	2002	Hybrid jowar growers
Positive	Significant	Prasad	2002	Rice growers
Positive	Significant	Singh *et al.*	2003	Sunflower farmers
Positive	Significant	Arya *et al.*	2003	Sugarcane farmers
Positive	Significant	Gopinath	2005	Bengalgram farmers
Positive	Significant	Shakya *et al.*	2008	Chickpea growers
Positive	Significant	Ambedkar	2010	Bengalgram farmers
Positive	Significant	Sriramana	2014	Cashew growers
Economic Motivation Vs Level of Knowledge				
Positive	Significant	Gopinath	2005	Bengalgram farmers
Positive	Significant	Tripathi *et al.*	2006	Chickpea farmers
Positive	Significant	Reddy *et al.*	2007	Rice farmers
Positive	Significant	Roy *et al.*	2007	Gladiolus farmers
Positive	Significant	Shakya *et al.*	2008	Chickpea farmers
Positive	Significant	Naik *et al.*	2009	Organic farmers
Positive	Significant	Sharma *et al.*	2009	Dairy farmers
Positive	Significant	Ambedkar	2010	Bengalgram farmers
Positive	Significant	Kumar	2012	Vermicompost entrepreneurs
Positive	Non-Significant	Sriramana	2014	Cashew growers

Innovativeness Vs Level of Knowledge				
Positive	Non-significant	Balasubramani *et al.*	2005	Rubber growers
Positive	Significant	Gopinath	2005	Bengalgram farmers
Positive	Significant	Premavathi	2005	Women beneficiaries
Positive	Significant	Rathood	2005	Sugarcane farmers
Positive	Significant	Reddy *et al.*	2007	Rice farmers
Positive	Significant	Naik *et al.*	2009	Organic farmers
Positive	Significant	Ambedkar	2010	Bengal gram farmers
Positive	Significant	Kumar	2012	Vermicompost entrepreneurs
Positive	Significant	Sriramana	2014	Cashew growers
Scientific Orientation Vs Level of Knowledge				
Positive	Significant	Nagaraj *et al.*	2000	Groundnut growers
Positive	Significant	Vennila *et al.*	2001	Millet growers
Positive	Significant	Gayatri *et al.*	2002	Redgram farmers
Positive	Significant	Gowda *et al.*	2002	Dryland farmers
Positive	Significant	Kumar	2002	Hybrid jowar growers
Positive	Significant	Janardhan	2004	Sugarcane farmers
Positive	Significant	Gopinath	2005	Bengalgram growers
Positive	Significant	Shakya *et al.*	2008	Chickpea growers
Positive	Significant	Ambedkar	2010	Bengalgram farmers
Positive	Significant	Sriramana	2014	Cashew growers
Risk Orientation Vs Level of Knowledge				
Positive	Significant	Gopinath	2005	Bengalgram farmers
Positive	Significant	Tripathi *et al.*	2006	Chickpea farmers
Positive	Significant	Roy *et al.*	2007	Gladiolus farmers
Positive	Non-significant	Naik *et al.*	2009	Organic farmers
Positive	Significant	Meena *et al.*	2009a	Dairy farmers
Positive	Significant	Sharma *et al.*	2009	Dairy farmers
Positive	Significant	Ambedkar	2010	Bengalgram farmers
Positive	Significant	Kumar	2012	Vermicompost entrepreneurs
Positive	Significant	Sriramana	2014	Cashew growers

Market Orientation Vs Level of Knowledge				
Positive	Significant	Bandopadhyay	1997	Rabi farmers
Positive	Significant	Kumar	2002	Hybrid jowar growers
Positive	Significant	Raju and Murthy	2002	Betelvine farmers
Positive	Significant	Gopinath	2005	Bengalgram farmers
Positive	Significant	Patel and Chauhan	2009	Tele viewing farmers
Positive	Non-significant	Ambedkar	2010	Bengalgram farmers
Positive	Significant	Kumar	2012	Vermicompost entrepreneurs
Positive	Significant	Sriramana	2014	Cashew growers
Annual Income Vs Level of Knowledge				
Positive	Significant	Kharde	1996	Sugarcane farmers
Positive	Significant	Deshmukh	1997	Groundnut farmers
Positive	Significant	Hanumanaikar *et al.*	1997	Sunflower farmers
Positive	Significant	Meti *et al.*	1997	Groundnut farmers
Positive	Significant	Patil *et al.*	1999	Kagzilime farmers
Positive	Significant	Kalaskar *et al.*	2001	Cotton growers
Positive	Significant	Veeraiah *et al.*	2005	Cotton growers
Positive	Significant	Rao	2011	Bt cotton growers
Positive	Non-significant	Sriramana	2014	Cashew growers
Training Received Vs Level of Knowledge				
Negative	Non-Significant	Aarthy	2011	Rice farmers
Negative	Non-significant	Thiyagarajan	2011	SRI Rice farmers
Positive	Significant	kumar	2012	SRI Rice farmers

2.4.2 Relationship of profile characteristics of Blackgram growers with their Extent of Adoption

Table 2.2 Profile characteristics Vs Extent of Adoption

Age Vs Extent of Adoption				
Positive	Significant	Narkar *et al.*	2004	Kagzilime growers
Positive	Significant	Ghodichor *et al.*	2005	Paddy growers
Positive	Non-significant	Tiwari *et al.*	2007	Pea growers
Positive	Non-significant	Naik *et al.*	2009	FFS farmers
Negative	Non-significant	Dayaram *et al.*	2010	Wheat growers
Negative	Significant	Singh *et al.*	2010b	Vegetable growers
Positive	Non-significant	Singh *et al.*	2012	Livestock owners
Positive	Significant	Kiranmayi	2013	Chilli farmers
Positive	Significant	Sandeep *et al.*	2013	Sugarcane growers
Positive	Significant	Sriramana	2014	Cashew growers
Education Vs Extent of Adoption				
Positive	Non-significant	Kanavi	2000	Sugarcane growers
Positive	Significant	Lakshminarayan *et al.*	2001	Sugarcane farmers
Positive	Significant	Janardhan	2004	Sugarcane growers
Positive	Significant	Gopinath	2005	Bengalgram farmers
Negative	Significant	Raj *et al.*	2006	Rice growers
Positive	Significant	Borah and Debajit	2007	Mustard farmers
Positive	Significant	Maraddi and Kumar	2008	Sugarcane farmers
Positive	Significant	Dayaram *et al.*	2010	Wheat growers
Positive	Significant	Kiranmayi	2013	Chilli farmers
Positive	Significant	Sriramana	2014	Cashew growers

Farm Size Vs Extent of Adoption				
Negative	Non-significant	Damodaran and Vasanthakumar	2001	Sugarcane farmers
Positive	Non-significant	Lakshminarayan *et al.*	2001	Sugarcane farmers
Positive	Non-significant	Janardhan	2004	Sugarcane growers
Positive	Significant	Gopiram	2005	Turmeric farmers
Positive	Significant	Raj *et al.*	2006	Rice growers
Positive	Significant	Borah and Debajit sut	2007	Mustard farmers
Positive	Non-significant	Maraddi and Kumar	2008	Sugarcane farmers
Positive	Non-significant	Ambedkar	2010	Bengalgram growers
Positive	Non-significant	Kiranmayi	2013	Chilli farmers
Positive	Non –significant	Sriramana	2014	Cashew growers
Farming Experience Vs Extent of Adoption				
Positive	Significant	Lakshminarayan *et al.*	2001	Sugarcane farmers
Positive	Significant	Sivasubramanian	2003	Coconut farmers
Positive	Significant	Janardhan	2004	Sugarcane growers
Positive	Significant	Gopinath	2005	Bengalgram farmers
Positive	Non-significant	Gopiram	2005	Turmeric growers
Positive	Significant	Maraddi and Kumar	2008	Sugarcane farmers
Positive	Non-significant	Naik *et al.*	2009	FFS farmers
Positive	Significant	Ambedkar	2010	Bengalgram growers
Positive	Non-significant	Nayak	2010	ATMA respondents
Positive	Non-significant	Kiranmayi	2013	Chilli farmers
Positive	Non-significant	Sriramana	2014	Cashew growers

Extension contact Vs Extent of Adoption				
Positive	Significant	Janardhan	2004	Sugarcane growers
Positive	Significant	Gopiram	2005	Turmeric growers
Positive	Significant	Raj *et al.*	2006	Hybrid rice growers
Positive	Non-significant	Tiwari *et al.*	2007	Pea growers
Positive	Significant	Maraddi and Kumar	2008	Sugarcane farmers
Positive	Non-significant	Naik	2009	FFS farmers
Positive	Significant	Ambedkar	2010	Bengalgramfarmers
Positive	non-significant	Singh *et al.*	2010b	Vegetable farmers
Positive	Significant	Kiranmayi	2013	Chilli farmers
Positive	Significant	Sriramana	2014	Cashew growers
Social Participation Vs Extent of Adoption				
Positive	Non-significant	Gayatri *et al.*	2002	Redgram farmers
Positive	Significant	Gowda *et al.*	2002	Dryland farmers
Positive	Significant	Kumar	2002	Hybrid jowar
Positive	Non-significant	Janardhan	2004	Growers
Positive	Non-significant	Gopinath	2005	Sugarcane growers
Positive	Significant	Ambedkar	2010	Bengalgram farmers
positive	Non-significant	Sriramana	2014	Bengalgram farmers
				Cashew growers
Mass Media Exposure Vs Extent of Adoption				
Positive	Significant	Lakshminarayan *et al.*	2001	Sugarcane farmers
Positive	Significant	umar	2002	Tobacco growers
Positive	Significant	Natarajan	2004	Upland rice growers
Positive	Non-significant	Maraddi and Kumar	2008	Sugarcane farmers
Positive	Significant	Naik	2009	FFS farmers
Positive	Significant	Ambedkar	2010	Bengalgram farmers
Positive	Non-significant	Singh *et al.*	2010b	Vegetable farmers
Positive	Significant	Kiranmayi	2013	Chilli farmers
Positive	Significant	Sriramana	2014	Cashew growers

Economic Motivation Vs Extent of Adoption				
Positive	Significant	Lakshminarayan *et al.*	2001	Sugarcane farmers
Positive	Significant	Gayatri *et al.*	2002	Redgram farmers
Positive	Significant	Gowda *et al.*	2002	Ground nut farmers
Positive	Significant	Kumar	2002	Hybrid jowar growers
Positive	Significant	Raghavendra	2004	Redgram farmers
Positive	Significant	Gopinath	2005	Bengalgram farmers
Positive	Significant	Ambedkar	2010	Bengalgram farmers
Positive	Non-significant	Sriramana	2014	Cashew growers
Innovativeness Vs Extent of Adoption				
Positive	Significant	Kumar	2002	Hybrid jowar growers
Positive	Significant	Gopinath	2005	Bengalgram farmers
Positive	Significant	Rathood	2005	Sugaracane growers
Positive	Significant	Maraddi and Kumar	2008	Sugaracane farmers
Positive	Significant	Ambedkar	2010	Bengalgram farmers
Positive	Significant	Sriramana	2014	Cashew growers
Scientific Orientation Vs Extent of Adoption				
Positive	Significant	Murmu	2003	Aman paddy farmers
Positive	Significant	Janardhan	2004	Sugarcane farmers
Positive	Significant	Gopiram	2005	Turmeric farmers
Positive	Non-significant	Tiwari *et al.*	2007	Pea growers
Positive	Non-significant	Maraddi and Kumar	2008	Sugarcane farmers
Positive	Significant	Naik *et al.*	2009	FFS farmers
Positive	Significant	Ambedkar	2010	Bengalgram farmers
Positive	Significant	Sandeep *et al.*	2013	Sugarcane growers
Positive	Significant	Kiranmayi	2013	Chilli farmers
Positive	Significant	Sriramana	2014	Cashew growers

Risk Orientation Vs Extent of Adoption				
Positive	Non-significant	Nagaraja	2002	Sugarcane growers
Positive	Significant	Kumar	2002	Hybrid jowar growers
Positive	Significant	Madhavilatha	2002	Cotton farmers
Positive	Significant	Murmu	2003	Aman paddy farmers
Positive	Significant	Raghavendra	2004	Redgram farmers
Positive	Non-significant	Rathood	2005	Sugarcane growers
Positive	Significant	Ambedkar	2010	Bengalgram farmers
Positive	Significant	Singh *et al.*	2011	Clusterbean growers
Positive	Significant	Kiranmayi	2013	Chilli farmers
Positive	Significant	Sriramana	2014	Cashew growers
Market Orientation Vs Extent of Adoption				
Positive	Significant	Kumar	2002	Hybrid jowar growers
Positive	Significant	Ahire and Limbat	2002	Cotton growers
Positive	Significant	Gopinath	2005	Bengalgram farmers
Positive	Significant	Tiwari *et al.*	2007	Pea growers
Positive	Non-significant	Varma	2009	Banana farmers
Positive	Significant	Ambedkar	2010	Bengalgram farmers
Positive	Significant	Kiranmayi	2013	Chilli farmers
Positive	Significant	Sriramana	2014	Cashew growers
Annual Income Vs Extent of Adoption				
Positive	Significant	Savitha	2001	Organic farmers
Positive	Significant	Prasad	2002	Dryland farmers
Positive	Significant	Veeraiah *et al.*	2005	Cotton growers
Positive	Significant	Tiwari *et al.*	2007	Pea growers
negative	Significant	Umesh *et al.*	2008	Cotton growers
Positive	Significant	Singh *et al.*	2010	Vegetable growers
Positive	Significant	Rao	2011	Bt cotton growers
Positive	Non-significant	Singh *et al.*	2012	Livestock owners
Positive	Significant	Kiranmayi	2013	Chilli farmers
Positive	Significant	Sandeep *et al.*	2013	Sugarcane growers
Positive	Non-significant	Sriramana	2014	Cashew growers

Training Received Vs Extent of Adoption				
Negative	Non-Significant	Aarthy	2011	Rice farmers
Negative	Non-significant	Thiyagarajan	2011	SRI Rice farmers
Positive	Significant	Kumar	2012	SRI Rice farmers

2.5 CONSTRAINTS OF BLACKGRAM GROWERS

A constraint is a cause of problem and a problem is a resultant of a constraint. A thorough review of various research findings given below will enable the researcher to identify the various constraints. It is a reason, cause or circumstances which compels the respondents in non-adoption or partial adoption of advocated technology which ultimately results in less profit. It is also the stage, quality of sense of being restricted to a given course of action or in action. Some of the related studies reported by different researchers were given as under.

Rathakrishnan *et al.* (1994) observed that majority (58.33%) of the groundnut growers expressed the problem of inadequate supply of inputs as the major problem followed by inadequate knowledge (56.61%), lack of skill (50.00%), lack of conviction (38.33%), insufficient finance (33.33%) and lack of time (20.00%) as the other constraints expressed next in their order of importance.

Marimuthu and Rathakrishnan (2001) concluded that most (80.00%) of the Banana growers expressed the problem of fluctuation in market price followed by heavy damage by winds (62.50%), lack of technical guidance (52.50%), non-availability of quality suckers (41.67%), inadequate credit facilities (37.50%), distant markets (29.17%), inadequate irrigation facilities (17.50%), inadequate supply of inputs (14.17%), damage by dogs (10.00%) and nematode problem (07.50%) as the constraints in the next order of their importance.

Ranganatha *et al*. (2001) stated that major constraint experienced by the famers in organic farming is higher cost and risk involvement in getting organic manure (93.00%) and the other constraints next in their percentage rank order of their importance were; transportation of green manure (91.00%), lack of knowledge on crop rotation (85.00%), water management (80.00%) and biological control of pests and diseases (60.00%).

Bhople and Borkar (2002) revealed that more than half (51.33%) of farmers expressed the major problem as non-availability of biofertilizers and the other important constraints in their percentage rank order of importance were; lack of knowledge about quantity and method of use of sticking agents during seed inoculation (45.33%), non-availability of biofertilizers at appropriate time (12.67%) and lack of guidance about seed inoculation (12.00%).

Nirmala *et al*. (2002) revealed that 79.16 per cent of the respondents facing the problem of inadequacy of irrigation water at the time of biofertilizer application and inability to plan in advance the use of biofertilizers (64.16%), inability to remember the quantity (40.00%), lack of reinforcement (34.16%), delayed land preparation (30.00%) were the other constraints next in their percentage rank order of importance.

Dudhate and Wangikar (2003) concluded that almost (99.16%) cent per cent of the brinjal farmers had expressed the problem of costly fertilizers. Whereas, high cost of seed (77.50%), non-availability of reliable planting material (72.50%), inadequate irrigation supply (67.50%), non-availability of labour (64.16%), difficulty in identification of pests and diseases (34.16%) and inadequate storage facilities (28.33%) were the other constraints expressed next in their percentage rank order of importance.

Satish Kumar *et al*. (2004) mentioned that major constraints experienced by groundnut growers the lack of marketing (98.45%), occurence of pests and diseases (93.29%), lack of irrigation facilities (85.56%) and lack of technical information (47.93%) being the other constraints experienced next in their percentage rank order of importance.

Gopiram (2005) reported the problems encountered by farmers in turmeric cultivation : high cost of fertilizers and manures (62.00%), lack of knowledge about application of recommended doses of manures and fertilizers (55.00%), lack of technical guidance (44.00%), frequent fluctuation in market prices (42.00%) and non-availability of credit facilities (39.00%) in adoption of package of practices of turmeric farmers.

Naik (2006) in a study on groundnut cultivators reported the problems of farmers in groundnut cultivation in percentage rank order of their importance non-availability of improved seed, pest & diseases, non availability of inputs in time, erratic rainfall, high cost of seed, lack of remunerative prices (78.00%), non availability of gypsum, less access to credit facilities (75.00%), insufficient extension activities, lack of training, lack of crop insurance, non availability of manures and organic fertilizers, more cost of labour at harvest (69.00%), and no value addition and processing units (55.00%) as the problems in groundnut cultivation.

Kalyan *et al*. (2011) revealed the major problem faced by groundnut growers as non-availability of improved seed (84.06%) and lack of remunerative price (77.50%), high cost of seed (64.16%), more cost of labour at harvest (55.00%) occurence of pest and diseases (53.33%) and low credit facilities (52.50%) were the other constraints next in their percentage rank order of significance.

Tidke *et al*. (2012) revealed that lack of technical knowledge in pod borer controlling practices of pigeon pea is expressed as severe constraint by 91.67 per cent of the farmers and non-availability of labour (85.00%), non availability of money at the time of input purchase (75.00%), poor extension service (65.00%), high cost of the package (63.33%) and lack of supervision in field (53.33%) being the other constraints next in their percentage rank order of importance.

Peer *et al*. (2014) concluded that slightly more than three-fourth (76.00%) of the respondents reported the non-availability of fertilizers at proper time followed by high cost of fertilizers (61.77%) as the main constraints for non

adoption of recommended fertilization application. The other constraints that hinder the adoption of recommended technology were lack of labour (35.55%) and lack of knowledge about dose and time of application (37.33%).

Sriramana (2014) concluded that majority (78.33%) of the respondents reported high wages of labour followed by high cost of digging wells and bore wells (71.66%), inadequate availability of spraying equipment (65.00%), inadequate knowledge about recommended pesticides and their dosages (46.66%), inadequate technical knowledge on application of manures and fertilizers(20.83%) as important constraints experienced in percentage rank order of their importance.

2.6 SUGGESTIONS ELICITED FROM THE BLACKGRAM GROWERS TO ARRIVE AT THE STRATEGY FOR INCREASING PRODUCTION

Suggestions are the methods of successfully dealing with a problem or difficulty. It is a process of resolving a difficulty or finding the answer to puzzle or question. Here, the farmers had expressed some suggestions to overcome their constraints in day to day situation with regard to selected blackgram production technology.

Nayan (2000) concluded that ber growers suggested for transport facility and knowledge about marketing (68.33%) followed by increase in visits of subject matter specialists for technical guidance (65.00%), continuous supply of capitals (60.00%) and technical guidance in relation to plant protection measures (58.33%). Only 51.66 per cent felt the need for supply of seedlings.

Sharma *et al.* (2001) reported the suggestions to overcome the constraints faced by the farmers in adoption of improved rice production technology as the introduction of low cost technology and timely supply of inputs.

Reddy (2003) found that a little more than two third of tomato farmers suggested for regulations to lower the cost of inputs (68.00%) followed by timely and adequate supply of inputs (60.67%), providing subsidies for critical

inputs (56.67%), constant price support (54.67%), creation of the market facilities (50.00%), provision of credit facilities (47.33%), elimination of middlemen (39.33%), provision of storage facilities (26.67%), training to farmers & extension personnel (22.00%), creation of export facilities (19.33%) and proper weather forecasting (16.67%) as solutions for the farmers problems.

Raja (2004) in a study reported the important suggestions to overcome the constraints in rice crop cultivation perceived by majority of the respondents as provision of good quality seeds, provision of credit facilities and provision of fertilizers on subsidized rates (95.50%) each; followed by supplying effective plant protection chemicals, timely technical guidance (66.67%) each; and exact control measures of pests & diseases and release of drought tolerant varieties (54.54%).

Gopiram (2005) suggested in his study on turmeric farmers that a little more than three fourth (78.00%) of the farmers perceived that supply of manures and fertilizers at standard rates, remunerative prices to the produce and timely technical guidance as temporary guidelines followed by conducting training programmes (75.00%); frequent visits by extension personnel (71.00%); removal of commission charges (69.00%), provision of credit facilities at lowest interest rates (64.00%) and provision of market information (61.00%) as solutions to overcome the barriers in farming.

Kalyan *et al*. (2011) concluded that most (95.00%) of the groundnut farmers suggested for the provision of improved seed at correct time, followed by other suggestions of importance as provision of remunerative price (85.00%), provision of improved seed at subsidized rate (81.66%), development of farm machinery especially for harvest (75.83%) and proper institutional finance and crop insurance (70.00%).

Singh *et al*. (2012) stated that majority (73.33%) of the farmers suggested for the provision of irrigation facility. Whereas, 68.33 per cent farmers suggested for the provision of credit facilities at proper time. While, 63.33, 62.50 and 45.83 per cent farmers suggested for the provision of proper information at proper time, training facility and provision of inputs like seeds, fertilizers, respectively

Ambedkar *et al*. (2013) concluded that most (85.83%) of the bengalgram farmers suggested for the timely provision of seeds and fertilizers on subsidized rates. Whereas, provision of timely credit facility (78.33%), provision of harvesting equipments (72.50%), provision of support price to bengalgram (65.00%), provision of good marketing facilities (58.33%), implementation of crop insurance scheme (54.16%), timely technical guidance (49.16%), organization of training programmes (43.33%), provision of plant protection chemicals (36.66%) and provision of loan at lower interest (30.00%) being the other important suggestions next in their percentage rank order of importance.

Sriramana (2014) concluded that 76.66 per cent of the cashew farmers suggested for financial assistance from the government at the time of cyclones followed by provision of timely technical guidance (63.33%), provision of plant protection equipment on subsidy (57.50%), timely provision of fertilizers on subsidy (52.50%), provision of good marketing facilities (47.50%), timely provision of credit facility (45.00%), establishment of cashew research station (35.83%), provision of support price (33.33%), establishment of factories for byproducts of cashew (29.16%), evolving varieties for drought and fog resistance (26.66%), supply of grafts through government nurseries (20.00%) and provision of new varieties that come for blooming throughout the year (12.50%), being the other important suggestions next in their percentage rank order of importance.

2.7 FEW TYPICAL CASELETS OF BLACKGRAM GROWERS

Rosaiah and Rao (2004) reported that negative cash farm incomes of the household due to crop failures resulting from drought, non-availability or irregular water resources, crop management, non-remunerative prices, to borrow huge amounts at high interest rates had contributed to the economic unavailability and financial insolvency of marginal owner-cum-tenant households.

Mahitha (2005) identified the maladies that tend to suicidal deaths of cotton cultivators such as psychological, family maladies, crop production maladies like pest attack, spurious pesticides, dangers of mono-cropping, high

rate of interest, lack of irrigation water etc. and suggested remedies like psychiatric counselling, provision of institutional credit, advance information incidence of pests and diseases and checking the quality of pesticides etc.

Swetha (2006) expressed in the vulnerable situation, the major maladies as perceived by prawn farmers were, physical like locating the prawn ponds near to seashore with under developed mangroves, technical like not following scientific method of construction of prawn ponds; followed by economical like fluctuations in price of prawn due to disease attack and psychological like fearful, panicky, hopeless and depressed, followed by social, cultural and political as other vulnerabilities.

Sriramana (2014) expressed that major problems perceived by cashew growers were incidence of severe pest t-mosquito bug, serious losses due to cyclones, inadequate financial assistance from government, inadequate knowledge about pests and diseases and he suggested remedies like assiastance of government agencies for mitigating severe losses of farmers due to vagaries of monsoon, provison of good marketing facilities and provison of new varities those come for blooming throughout the year.

2.8 HYPOTHESIS

Hypothesis is a guess, hunch or an assumption of the existence of some facts, which serve to explain the connection of facts in a given situation. Hypothesis is a conjectural statement of the relation between two or more variables. Hypotheses is always in declarative sentence form, and relates either generally or specifically variables to variables. These are the statements about the relations between variables. Hypothesis guides the researcher through the jungle of facts, to shift, select and synthesize only those that are relevant to the problem.

2.8.1 Null Hypothesis

There is no relationship between the profile characteristics of rice fallow blackgram growers namely age, education, farm size, farming experience, extension contact, social participation, mass media exposure, economic

motivation, innovativeness, scientific orientation, risk orientation, market orientation, annual income, training received with their level of knowledge and extent of adoption of selected blackgram production technology.

2.8.2 Empirical Hypothesis

There is a relationship between the profile characteristics of rice fallow blackgram growers namely age, education, farm size, farming experience, extension contact, social participation, mass media exposure, economic motivation, innovativeness, scientific orientation, risk orientation, market orientation, annual income, training received with level of knowledge and extent of adoption of selected blackgram production technology.

2.9 CONCEPTUAL MODEL FOR THE STUDY

The Conceptual framework or a systematic model is a diagrammatic representation outlining the dominant elements of a system and their relationship with respect to criterion variables. The conceptual model in Fig. 2.1.contains four major divisions.

1. Rice fallow blackgram growers
2. Independent Variables
3. Dependent variables
    i. Level of Knowledge
    ii. Extent of Adoption

The profile characteristics of rice fallow blackgram growers influence their level of knowledge and extent of adoption. The relationship between the selected profile characteristics i.e., age, education, farm size, farming experience, extension contact, social participation, mass media exposure, economic motivation, innovativeness, scientific orientation, risk orientation, market orientation, annual income, training received and dependent variables i.e., level of knowledge and extent of adoption are indicated by arrows.

Chapter III

MATERIAL AND METHODS

This chapter deals with the research methodology used for present investigation, “A Study on the Knowledge and Extent of Adoption of the farmers on recommended Rice fallow Blackgram Production Technology in Guntur District of Andhra Pradesh”. It was divided into the following five heads.

3.1 Research design

3.2 Sampling procedure

3.3 Operationalization and measurement of the variables

3.4 Instruments used for data collection

3.5 Statistical tools used

3.1 RESEARCH DESIGN

An ex-post facto research design was adopted to achieve the objectives of the study as the variables had already occurred. According to Kerlinger (1983), the ex-post-facto research was systematic empirical enquiry in which the scientist did not have any direct control of independent variables and were not manipulated. Inferences about relations among variables were made without direct interventions from concomitant variation of independent and dependent variables.

3.2 SAMPLING PROCEDURE

3.2.1 Locale of the Study

The state of Andhra Pradesh was chosen for the study purposively as the researcher belonged to this state and well acquainted with the telugu language which would help in building up good rapport and also facilitates in depth study through personal observation and intense probing using well designed schedule.

3.2.2 Selection of District

Guntur district was selected purposively in view of its first position in productivity and second position in both area and production of the rice fallow blackgram in Andhra Pradesh.

3.2.3 Selection of Mandals

After listing out the total number of mandals, where Rice fallow blackgram is under cultivation, in Guntur district, three mandals standing first from the point of their area under cultivation viz., Nagaram, Ponnuru, and Amruthaluru were chosen purposively for the present study.

Table 3.1. Area under rice fallow blackgram (Rabi) in different mandals of Guntur district (2014-15).

S.No.	Name of the Mandal	Area (in ha)
1.	Macherla	0
2.	Veldurthi	0
3.	Durgi	9
4.	Rentachintala	0
5.	Gurazala	0
6.	Dachepalli	0
7.	Karempudi	10
8.	Piduguralla	0
9.	Machavaram	2
10.	Nekarikallu	58
11.	Bollapalli	11
12.	Vinukonda	78
13.	Nuzendla	22
14.	Savalyapuram	372
15.	Ipur	350
16.	Rompicherla	553
17.	Narasaraopeta	142
18.	Nadendla	40
19.	Chilakaluripet	20
20.	Edlapadu	10
21.	Bellamkonda	0

22.	Atchampet	16
23.	Krosuru	20
24.	Amaravathi	200
25.	Thullur	649
26.	Tadepalii	40
27.	Mangalagiri	269
28.	Tadikonda	660
29.	Pedakurapadu	20
30.	Sattenapalli	8
31.	Rajupalem	15
32.	Muppalla	30
33.	Phirangipuram	0
34.	Medikonduru	0
35.	Guntur	130
36.	Pedakakani	750
37.	Vatticherukuru	936
38.	Prathipadu	158
39.	Pedanandipadu	59
40.	Duggirala	452
41.	Kollipara	251
42.	Tenali	96
43.	Chebrolu	156
44.	Kakumanu	283
45.	Ponnuru	**3200**
46.	Tsundur	339
47.	Amarthalur	**3037**
48.	Vemuru	92
49.	Kollur	20
50.	Bhattiprolu	555
51.	Cherukupalli	2084
52.	Pittalavanipalem	2700
53.	Karlapalem	1400
54.	Bapatla	1338
55.	Nizampatnam	1210
56.	Nagaram	**5648**
57.	Repalli	1903
	Total	**30401**

3.2.4 Selection of Villages

From each of the selected mandal, four villages were selected by random sampling procedure.

3.2.5 Selection of Respondents

After listing out the total number of rice fallow blackgram growers, 120 growers were selected by following proportionate random sampling procedure from the villages.

Table 3.2.Particulars of selected mandals, villages and Blackgram growers

S.No.	Name of the Mandal	Name of the Village	Total No.of Blackgram growers	No. of Selected Blackgram growers
1.	Nagaram	Nagarm	1387	12
		Dulipudi	1520	13
		Pudivada	780	9
		Siripudi	620	8
2.	Ponnuru	Mulukuduru	1085	10
		Mannava	520	8
		Vallabaraopalem	745	9
		Nidubrolu	1356	12
3.	Amruthaluru	Amruthalur	2114	14
		Pyaparru	654	7
		Inturu	1158	10
		Yelavarru	752	8
		Total	**12,691**	**120**

3.3. OPERATIONALIZATION AND MEASUREMENT OF THE VARIABLES

The variables for the study were selected based on the relevant review of literature on the subject, in consultation with experts in the field of research and extension, members of advisory committee. The selected variables and their empirical measurement are furnished in Table 3.3

Table 3.3.Variables and their empirical measurement

S. No.	Variables	Instrument used for the study
Dependent Variables		
1.	Knowledge	Knowledge test developed for the study
2.	Adoption	Schedule developed for the study
Independent Variables		
1.	Age	Chronological age of the respondents in completed years
2.	Education	Scaling procedure developed by Trivedi (1963) with suitable modifications.
3.	Farm Size	Scaling procedure developed by Trivedi (1963) with suitable modifications.
4.	Farming Experience	Interval scaling procedure adopted for the study.
5.	Extension contact	Procedure followed by Kalkannavar (1999) with slight modifications.
6.	Social participation	Scaling procedure developed by Trivedi (1963) with suitable modifications.
7.	Mass Media Exposure	Scale developed by Desai (1977) with suitable modifiacations.
8	Economic motivation	Scale developed by Supe (1969) with suitable modifications
9.	Innovativeness	Schedule developed by Natikar (2001) with sslight modifiacations.
10.	Scientific Orientation	Scale developed by Supe (1969) with suitable modifications
11.	Risk Orientation	Scale developed by Supe (1969) with suitable modifications
12.	Market Orientation	Scale developed by Supe (1969) with suitable modifications
13.	Annual Income	Procedure followed by Kalkannavar (1999) with slight modifications.
14.	Training Received	Interval scaling procedure adopted for the study.

3.3.1 Dependent Variables

3.3.1.1 Knowledge

Knowledge includes all those behavior and test situations, which emphasized the remembering either by recognition or recall of ideas, materials or phenomena (Bloom *et al,* 1956). The main objective of the study was to find out the level of knowledge of rice fallow blackgram growers on selected production technology.

Test is an organized succession of stimuli, designed to measure quantitatively or to evaluate qualitatively some material process, trait or characteristic (Bean, 1953). An appropriate knowledge test helps us to know the level of relevant knowledge of the participants from time to time. knowledge test score is also used as a dependent variable to test its relationship with other variables (Ray and Mondal, 2011).

3.3.1.1.1 Construction and Standardization of Knowledge Test

The main intention of the knowledge test was to identify the level of knowledge of rice fallow blackgram growers on selected production technology. The details of the standardization of the items are as follows.

3.3.1.1.2 Collection of Knowledge Items

The content of the test was composed of items asked in the form of questions. The important factors considered for collecting the items for knowledge test was to determine and classify the object to be measured by taking care of the respondents' abilities. Items were collected from different sources like printed literature on package of practices, recommendations of Acharya N G Ranga Agricultural University through ZREAC proceedings of the zone and Vyavasaya Panchangam, package of practices available through printed literature in agricultural information materials of District Agricultural Advisory and Transfer of Technology centre (DAATTC) Guntur, Regional Agricultural Research Station (RARS), Guntur and recommendations of State Department of Agriculture, Farmers Training Centre (FTC) and Agricultural Technology Management Agency (ATMA).

3.3.1.1.3 Judges Rating

The items were given in the form of statements to the judges in relevant field for finding out the degree of relevancy of the items to include in the final schedule or not. The items were selected by adopting weighted mean score method. Crop specialists were selected from RARS, Guntur, Agricultural Officers, DAATTC from the respective district. The scores of each statement was summed up to find out the total score of each statement for all the 20 judges. The statement under most relevant, relevant and least relevant were given weightage 3, 2 and 1, respectively. The mean score assigned to each statement was calculated by using the following formula.

$$\text{Mean score} = \frac{Total\ score\ of\ each\ statement}{Total\ No.of\ judges}$$

After calculating the mean score for all the statements, overall mean score was calculated by adopting the following formula.

$$\text{Over all mean score} = \frac{Total\ score\ of\ all\ the\ statements\ for\ all\ the\ judges}{Total\ No.of\ statements\ X\ Total\ No.of\ judges}$$

The over all mean score was found to be 2.05 . The statements with their mean score values being equal to or higher than 2.05, were selected for the final knowledge test (See Appendix II).

3.3.1.1.4 Selection of Items for Item Analysis

i. The selection of items was done on the basis of the following criteria.

ii. Response to items should promote thinking rather than rote memorization.

iii. They should differentiate the well-informed rice fallow blackgram Growers from the less informed and should have certain difficulty value.

iv. The items included should cover all areas of knowledge about selected production technology of rice fallow blackgram.

It means that the items which are not well understood by the rice fallow blackgram growers and items which can be correctly replied by all or none are not suitable for knowledge test. That is, the item should be able to discriminate the well informed rice fallow blackgram growers from the poorly informed ones.

3.3.1.1.5 Framing of test items

Initially, knowledge items were collected from different sources for developing test after editing carefully. The items were then framed into objective form of questions namely multiple choice, true or false and yes or no and therefore the assessment was objective and impersonal. The particulars on type of questions were furnished in the Appendix II.

3.3.1.1.6 Pre-Testing

The items selected for the knowledge test were pretested separately by administering the items to 30 rice fallow blackgram growers (selected at random). Care was taken to see that 30 rice fallow blackgram growers selected for this purpose were outside the main sample of this study in the non-sampled area.

3.3.1.1.7 Item Analysis

The item analysis was carried out to yield two kinds of information viz., indices of 'Item Difficulty' and 'Item Discrimination'. The index of item difficulty index indicates the extent to which an item was difficult. The latter provides information on how well an item measures or discriminates a well-informed rice fallow blackgram growers from poorly informed rice fallow blackgram growers.

For item analysis, responses obtained by multiple choice, 'true' or 'false' and 'yes' or 'no' questions were arranged with a score of 'One' and 'Zero' for correct and incorrect responses, respectively. After computing the individual total score for 30 rice fallow blackgram growers, they were arranged in descending order based on total score. Then, they were divided into 6 equal groups arranged in descending order of total score obtained by them. These

groups were named as G_1, G_2, G_3, G_4, G_5 and G_6 with 5 rice fallow blackgram growers in each group. For item analysis, the middle 2 groups G_3 and G_4 were eliminated keeping only 4 extreme groups, with high scores namely G_1 and G_2 and low scores namely G_5 and G_6. After getting the four extreme groups for item analysis, the responses for each of the items were subjected to calculate difficulty index, discrimination index and point biserial correlation as shown below.

a. Item Difficulty Index (P)

The item difficulty index was worked out as the percentage of the Rice fallow Blackgram growers answering an item correctly. The assumption of the item statistic of difficulty index was that, the difficulty is linearly related to the level of knowledge of rice fallow blackgram growers on selected production technology. It was computed by the following formula.

$$\text{Difficulty Index} = \frac{\text{No.of Blackgram growers answered correctly}}{\text{Total No.of Blackgram growers}} \text{ x } 100$$

The items with 'P' values ranging from 20 to 80 were considered for the final selection of the knowledge test to avoid the extremely simple and difficult items which distort the required homogeneity and discrimination. The values of the difficulty index for the knowledge items on selected production technology of blackgram are presented in Appendix III.

b. Discrimination Index ($E^{1/3}$)

The item discrimination index ($E^{1/3}$), which indicates the level of discrimination between well informed and poorly informed Rice fallow Blackgram growers, was computed using the formula given below.

$$\text{Discrimination Index } (E^{1/3}) = \frac{(S1+S2)-(S5+S6)}{N/3}$$

Where,

S_1, S_2, S_5 and S_6 are the frequencies of correct answers in groups G_1, G_2, G_5 and G_6, respectively.

N is the total number of rice fallow blackgram growers of the sample selected for the item analysis i.e.30.

The items with $E^{1/3}$ values ranging from 0.20 to 0.80 were selected for the final test (See Appendix III). The value of the discrimination index for the knowledge items on selected production technology of rice fallow blackgram were presented in Appendix III.

c. Point Biserial Correlation

Point Biserial Correlation (rpbis) is the test validation in which the criterion of validity is considered to be internally consistent. That is, the relationship of the total score to a dichotomized response to any given item. In a way, the validity power of the item was computed by the correlation of the individual item of preliminary knowledge test was calculated. An item by item computation of point biserial correlation was calculated by using the following formula suggested by Garret (1966).

$$\text{rpbis} = \frac{\text{MP} - \text{MQ}}{\text{SD}} \text{ X } \sqrt{\text{PQ}}$$

Where,

rpbis = Point biserial correlation

MP = Mean of the total scores of the rice fallow blackgram growers who answered the items correctly

(or)

$$\text{MP} = \frac{\text{Sum of total of XY}}{\text{Total Number of correct answers}}$$

MQ = Mean of the total scores of the rice fallow blackgram growers who answered the items incorrectly

(or)

$$MQ = \frac{Sum\ total\ of\ X - Sum\ total\ of\ XY}{Total\ number\ of\ wrong\ answers}$$

SD = Standard deviation of the entire sample (30Nos)

P = Proportion of the Blackgram growers giving correct answer to the item

(or)

$$P = \frac{Total\ number\ of\ correct\ answers}{Total\ number\ of\ \text{Blackgrm growers}}$$

Q = Proportion of the Blackgram growers giving incorrect answer to the item

(or)

Q = 1-P

X = Total score of the rice fallow blackgram grower for all items

Y = Response of the rice fallow blackgram grower for the specific items

(Correct = 1, Incorrect = 0)

t-test

$$t = \frac{\text{rpbis}\ \sqrt{N-2}}{\sqrt{1-rpbis^2}}$$

Where,

rpbis = Point biserial correlation

N = Total number of rice fallow blackgram growers of the sample selected for the item analysis

3.3.1.1.8 Total Items Selected

Out of items, 30 items were finally selected based on the following criteria.

1. Items with difficulty level indices ranging from 20 to 80.
2. Items with discrimination indices ranging from 0.20 to 0.80.
3. Items with mean score above 2.05.

All important components of the selected production technology of rice fallow blackgram has been covered. The questions were prepared in such a way that no important component has been left out.

The finally selected knowledge test items comprised of three types of questions viz., Multiple choice (17 Nos.), True or False (8 Nos.) and Yes or No (5 Nos.) totaling to 30 items of test battery on knowledge of selected production technology of rice fallow blackgram crop (See Appendix IV).

3.3.1.1.9 Reliability of the Test

Reliability of the items was tested by split half method. The scores obtained by odd numbers of rice fallow blackgram growers were taken as one set of values and the scores of even numbers of rice fallow blackgram growers as the second set of values for calculating the correlation coefficient. The correlation coefficient was highly significant indicating a high degree of dependability of the instrument for measuring knowledge of the rice fallow blackgram growers.

3.3.1.1.10 Validity of the Test

The content validity of the knowledge test was derived from a long list of test items representing the whole universe of recommended package of practices pertaining to rice fallow blackgram collected from various sources as discussed earlier and includes materials from literature, experts opinion, members of advisory committee, findings of past work and discussions with extension workers, officials of the Department of Agriculture and progressive farmers. It was assumed that the score obtained by administering the knowledge test of this

study, measures what was intended to measure. Thus, knowledge test developed in the present study measures the knowledge of selected production technology of rice fallow blackgram growers as it showed a greater degree of reliability and validity.

3.3.1.1.11 Scoring pattern

The selected knowledge test items included four types as multiple choices, fill in the blanks, true or false and yes or no. The correct response to each test item was given a score of '2' and incorrect response a score of '1' that the knowledge score of a rice fallow blackgram grower is the summation of scores of correctly answered items out of total test items. The possible knowledge score ranged from '30' to '60'.

3.3.1.1.12 Administration of the Test

Each item in the knowledge test was read out to the selected rice fallow blackgram growers in translated version (Telugu) by the investigator and the responses in the form of correct or incorrect answers were recorded.

3.3.1.1.13 Categorization

Based on the scores obtained, the rice fallow blackgram growers were classified into the following three categories based on the mean and standard deviation as shown below.

Categorization of blackgram growers according to their knowledge		
S.No.	**Category**	**Score Range**
1.	Low level of Knowledge	< Mean – S.D
2.	Medium level of Knowledge	Mean ± S.D
3.	High level of Knowledge	> Mean + S.D

3.3.1.2 Adoption

It is a decision to make full use of an innovation as a best course of action available (Rogers, 1983).

Adoption is the acceptance and application of one or all the practices pertaining to selected production technology by a rice fallow blackgram grower. All the practices included in selected production technology considered important. Partial adoption refers to deviation from the adoption of a selected production technology. The practice which was not adopted by the rice fallow blackgram growers was considered as non adoption. Over adoption refers to the excess or over use of production technology over and above normal recommendations. A range of adoption was provided for these practices facilitating adjustments based on local conditions.

The extent of adoption of selected production technology by the rice fallow blackgram growers was measured by using a structured schedule developed for rice fallow blackgram growers in consultation with experts, viz., Scientists of RARS, Guntur, Scientists of DAATTC, Officials of Department of Agriculture of Guntur district, Teachers of Department of Entomology, Department of Agronomy, Department of Agricultural Extension, in Agricultural College, Bapatla. Schedule was developed for measuring the extent of adoption of rice fallow blackgram growers.

All the practices pertaining to selected production technology of rice fallow blackgram crop included in the schedule were administered to the blackgram growers after pre-testing and the responses of rice fallow blackgram growers as adopted, partially adopted, and not adopted, over adopted were obtained against each of the recommended practices and weights of 4, 3, 2 and 1 were assigned, respectively.

Thus, the total score on all the practices was computed by summing up the scores of all the items. The maximum and minimum adoption score was 30 and 148, respectively.

Based on the adoption scores obtained, rice fallow black growers were then grouped into three categories as shown below using mean and standard deviation.

Categorization of blackgram growers according to their adoption		
S.No.	**Level of Adoption**	**Score Range**
1	Low	< Mean – S.D
2	Medium	Mean ± S.D
3	High	> Mean + S.D

3.3.2 Independent variables

A total of 14 profile characteristics of rice fallow blackgram growers were identified as independent variables. The selected rice fallow blackgram growers were categorized based on the mean and standard deviation as high, medium and low except in case of age, education, farm holding and annual income. They are operationalized as follows.

3.3.2.1 Age

It was operationalized as the number of years completed by rice fallow blackgram grower at the time of investigation. For categorization of the selected rice fallow blackgram growers on age, the norms of maximum admissible age of the members into youth club or state government job i.e., 35 years and superannuation age for retirement in state government organizations i.e., 58 years were taken as yard stick. The minimum and maximum score were 1 and 3, respectively.

Categorization of blackgram growers according to their age			
S.No.	**Category**	**Age**	**Score**
1.	Young	Up to 35 years	1
2.	Middle	35 to 58 years	2
3.	Old	More than 58 years	3

3.3.2.2 Education

Education of a rice fallow blackgram grower was operationalized as the extent of formal education received at the time of investigation. Scoring was done on the basis of Scale developed by Trivedi (1963) with suitable modifications. The maximum and minimum obtainable scores were 6 and 1, respectively. The selected rice fallow blackgram growers were categorized as given below.

Categorization of blackgram growers according to their education		
S.No.	**Education**	**Scores**
1.	Illiterate	1
2.	Primary School	2
3.	Upper Primary School	3
4.	High School	4
5.	Intermediate education	5
6.	Graduation	6

3.3.2.3 Farm Size

Farm holding was operationalized as the number of standard hectares of land possessed by the selected rice fallow blackgram growers at the time of enquiry. The standard units of farm holding has to be calculated by equating two and half acres of dry land to one acre of garden or one acre of wet land. The information about farm holding may be obtained in terms of acres and converted to hectares by considering one acre equal to 0.405 hectares.

To calculate the individual rice fallow blackgram grower's farm holding, the scoring pattern adopted by Trivedi (1963) was given below.

Categorization of blackgram growers according to their farm size		
S.No.	**Farm Size**	**Score**
1.	Marginal (0.1 to1.0 ha)	1
2.	Small (1.1 to 2.0 ha)	2
3.	Medium (2.1 t0 4.0 ha)	3
4.	Large (>4.0 ha)	4

3.3.2.4 Farming Experience

Number of years of experience of selected rice fallow blackgram growers had in its cultivation was considered for measuring this variable. Scoring was done on the basis of interval scaling procedure. The minimum and maximum scores obtained were one and five, respectively. The score one was given to those rice fallow blackgram growers who had 1-5 years of farming experience. Whereas, those rice fallow blackgram growers had farming experience of 6-10, 11-15, 16-20, more than twenty years of farming experience were given a score of two, three, four and five, respectively.

Based on the scores obtained, the selected rice fallow blackgram growers were classified into three groups by using mean and standard deviation.

Categorization of blackgram growers according to their farming experience		
S.No.	**Farming Experience**	**Score Range**
1.	Low	< Mean – S.D
2.	Medium	Mean ± S.D
3.	High	> Mean + S.D

3.3.2.5 Extension Contact

It refers to the extent of contact that the blackgram grower had maintained with extension agencies or personnel to get information mainly on farm matters. It was quantified as per the measurement developed by Kalkannavar (1999) with suitable modifications and the scores were assigned as given below.

Frequency of Contact

Frequently	3
Occassionally	2
Rarely	1

The scores of each rice fallow blackgram grower based on frequency of contact with various extension personnel were summed up to arrive at total score of individual rice fallow blackgram grower. Thus, the maximum and minimum possible scores for each respondent were ‘33’ and ‘11’, respectively. Based on scores obtained, the blackgram growers were categorized into three groups based on mean and standard deviation.

Categorization of blackgram growers according to their extension contact		
S.No.	**Extension Agency Contact**	**Score Range**
1.	Low	< Mean – S.D
2.	Medium	Mean ± S.D
3.	High	> Mean + S.D

3.3.2.6 Social Participation

It was defined as the degree of involvement of the selected rice fallow blackgram growers in formal organizations either as a member or an office bearer. It was measured by using the Socio-Economic status Scale developed by Trivedi (1963) with suitable modifications. The maximum and minimum score for selected blackgram growers were '6' and '1', respectively.

S.No.	Social Participation Category	Score
1.	Without membership in any organization	1
2.	Membership in one organization	2
3.	Membership in more than one organization	3
4.	Financial contribution to common fund for common work	4
5.	Office bearer in any organization	5
6.	Involvement in community work	6

Based on the scores obtained, the selected rice fallow blackgram growers were classified into three groups by using mean and standard deviation.

Categorization of blackgram growers according to their social participation		
S.No.	**Social Participation**	**Score Range**
1.	Low	< Mean – S.D
2.	Medium	Mean ± S.D
3.	High	> Mean + S.D

3.3.2.7 Mass media exposure

It was operationalized as the extent of exposure of rice fallow blackgram growers to the mass media such as radio, television, news papers, agricultural books, information material, farm magazines *etc*. The schedule developed by Desai (1977) with suitable modifications was used for quantifying this variable. The frequency of exposure was measured as regular, occasional, never with scores of 3, 2 and 1 respectively. By adding the scores of all the items, the individual rice fallow blackgram grower total score was worked out. Thus, the maximum and minimum scores for each respondent were '18' and '6', respectively.

By adding the scores of all items, the individual rice fallow blackgram grower total score was worked out. Based on scores obtained, the rice fallow blackgram growers were categorized into three groups based on mean and standard deviation.

Categorization of blackgram growers according to their mass media exposure

S.No.	Mass Media Exposure	Score Range
1.	Low	< Mean – S.D
2.	Medium	Mean ± S.D
3.	High	> Mean + S.D

3.3.2.8 Economic motivation

It refers to the degree to which rice fallow blackgram grower is motivated towards profit maximization and relative value he places on economic ends. The degree of economic motivation of the rice fallow blackgram grower was measured with the help of economic motivation scale developed by Supe (1969) with suitable modifications. The scale consisted of six statements.

The responses of rice fallow blackgram growers were obtained against each statement in terms of agreement and disagreement with five point continuum. The statements were scored 5, 4, 3, 2, and 1 for Strongly Agree (SA), Agree (A), Undecided (UD), Disagree (DA) and Strongly Disagree (SDA), respectively.

The score obtained on each statement was summed up to get individual rice fallow blackgram grower economic motivation. The maximum and minimum possible score was ‘30’ and ‘6’, respectively. Based on the obtained scores, they were categorized into three groups based on mean and standard deviation.

Categorization of blackgram growers according to their economic motivation		
S.No.	**Economic Motivation**	**Score Range**
1.	Low	< Mean – S.D
2.	Medium	Mean ± S.D
3.	High	> Mean + S.D

3.3.2.9 Innovativeness

Innovativeness was operationalized as the degree to which a rice fallow blackgram grower adopt new ideas relatively earlier than other members in the social system as stated by Rogers (1983).

The scale developed by Natikar (2001) was adopted with suitable modifications in quantifying the variable. The instrument consists of three statements the responses were obtained on five point continuum viz.,Strongly Agree(A),Undecided (UD) , Disagree (DA), The weightage of 3, 2 and 1 were assigned to the response categories.

The total score of the rice fallow blackgram grower in their innovativeness was arrived by summing up the weightage of responses for each statement. The maximum and minimum possible score was ‘24’ and ‘8’, respectively. Based on scores obtained, the selected rice fallow blackgram growers were categorized into three groups based on mean and standard deviation.

Categorization of blackgram growers according to their innovativeness		
S.No.	**Innovativeness**	**Score Range**
1.	Low	< Mean – S.D
2.	Medium	Mean ± S.D
3.	High	> Mean + S.D

3.3.2.10 Scientific Orientation

It refers to the degree to which a rice fallow blackgram grower is oriented to make use of scientific methods to solve problems in blackgram cultivation.

Scale constructed by Supe (1969) with suitable modifications was used to measure the variable. It consisted of six statements, out of which the statement number two alone was negative. The responses of selected rice fallow blackgram growers were obtained against each statement in terms of agreement and disagreement. The positive statements were scored 5, 4, 3, 2, and 1 for Strongly agree (SA), Agree (A), Undecided (UD), Disagree (DA) and Strongly disagree (SDA), respectively. whereas, the scoring system was reversed in case of negative statements.

The score obtained in each statement was summed up to get rice fallow blackgram growers scientific orientation score. The maximum and minimum possible score was '30' and '6', respectively Based on scores obtained, the rice fallow blackgram growers were categorized into three groups based on mean and standard deviation.

Categorization of blackgram growers according to their scientific orientation		
S.No.	**Scientific Orientation**	**Score Range**
1.	Low	< Mean – S.D
2.	Medium	Mean ± S.D
3.	High	> Mean + S.D

3.3.2.11 Risk Orientation

It was operationalized as the degree to which, the rice fallow blackgram growers preferred to take risk and uncertainty in accepting and adopting new farming techniques or ideas in agriculture. This was measured with the help of risk orientation scale developed by Supe (1969) with suitable modifications. The scale consisted of six statements.

The individual rice fallow blackgram growers response was obtained against each statement in terms of agreement or disagreement with three point continuum for each statement i.e., Agree (A), Undecided (UD), and Disagree (DA) with weightages of 3, 2, and 1, respectively.

The score obtained on each statement was summed up to get individual rice fallow blackgram grower risk orientation score. The maximum and minimum possible score was '18' and '6', respectively. Based on the scores obtained, the rice fallow blackgram growers were categorized into three groups based on mean and standard deviation.

Categorization of blackgram growers according to their risk orientation		
S.No.	**Risk Orientation**	**Score Range**
1.	Low	< Mean – S.D
2.	Medium	Mean ± S.D
3.	High	> Mean + S.D

3.3.2.12 Market Orientation

Market Orientation was operationalized as the judgment of rice fallow blackgram grower to sell his produce for better price by analyzing the various prevailing infrastructural and market intelligence. The scale developed by Supe (1969) with suitable modifications was used and it consists of six statements . The individual response was obtained on three point continuum for each statement i.e. Agree (A), Undecided (UD) and Disagree (DA) with weightages of 3, 2 and 1, respectively and was reversed for negative statements.

The score obtained for each statement was summed up to get each rice fallow blackgram grower market orientation score. The maximum and minimum possible score was '18' and '6', respectively. Based on scores obtained, the rice fallow blackgram growers were categorized into three groups based on mean and standard deviation.

Categorization of blackgram growers according to their market orientation		
S.No.	**Market Orientation**	**Score Range**
1.	Low	< Mean – S.D
2.	Medium	Mean ± S.D
3.	High	> Mean + S.D

3.3.2.13 Annual Income

Income earned by all the members of the family of the selected rice fallow blackgram growers from all sources annually. Categorization of annual income was done in accordance with the method adopted by Kalakanavar (1999) with suitable modifications. This was calculated based on maximum and minimum annual income. It was categorized as up to Rs.50,000/- (1), Rs.50,000-80,000/- (2), Rs.80,000-1,10,000/- (3), Rs.1,10,000-1,40,000/- (4), Rs.1,40,000/and above- (5) respectively. The maximum and minimum possible score obtained was 5 and 1 respectively.

Categorization of blackgram growers according to their annual income		
S.No.	**Annual Income Category**	**Score Range**
1.	Low annual income	< Mean – S.D
2.	Medium annual income	Mean ± S.D
3.	High annual income	> Mean + S.D

3.3.2.14 Training Recived

It was operationalised as the total number of trainings received by the blackgram farmer at the time of investigation. Scores of number of the trainings attended were summed up to get the total score for an individual respondent. Based on the total scores obtained by the respondents they were classified in to following categories.

Categorization of blackgram growers according to their training received	
Categorisation	**Score**
Trainings not received	1
1-2 trainings received	2
2-4 trainings received	3
4-6 trainings received	4
6 trainings and above	5

3.4 INSTRUMENTS USED FOR DATA COLLECTION

A well structured interview schedule used as the instrument for data collection. For the preparation of interview schedule, the investigator had a thorough discussion with members of Advisory committee. Keeping in view the objectives, based on relevant literature, discussion with researchers, extension specialists and field level extension functionaries, with regard to selected production technology of rice fallow blackgram, a structured interview schedule was developed. It was made sure that the questions were correctly understood by the rice fallow blackgram growers as a whole. Schedule was translated in Telugu (Appendix-IV) by the investigator prior to actual investigation.

The interview schedule consisted of 5 parts. Part-I consisted of preliminary information and profile characteristic features of rice fallow blackgram growers. Part-II pertaining to level of knowledge on selected rice

fallow blackgram production technologies, Part-III consisted of extent of adoption of selected rice fallow blackgram production technologies. Part-IV related to constraints and Part-V pertaining to suggestions of rice fallow blackgram growers for arriving at the strategy for increasing the production.

3.4.1 Pre-Testing

The pilot study was conducted before the final use of Interview Schedule for data collection. The schedule was pre-tested with 25 per cent of the blackgram growers from the non-sample area.

After analyzing the pre-testing results, necessary modifications were done in the interview schedule regarding the wordings and statements by duly avoiding ambiguous and irrelevant items. The interview schedule was presented in the Appendix-IV. The data collected was coded, classified and tabulated in order to make the findings meaningful. The findings were suitably interpreted and necessary conclusions and inferences were drawn.

3.5 STATISTICAL TOOLS USED

Statistical method is the scientific method of judging collective natural or social phenomena from the results obtained by the analysis of enumerated or collected estimates.

For the purpose of statistical analysis to convert the results into findings, the following statistical tools were used:

1. Arithmetic Mean ($\overline{X}$)
2. Standard Deviation (σ)
3. Frequency and percentage
4. Pearson’s correlation coefficient (r)
5. Multiple Linear Regression (MLR)

3.5.1 Arithmetic Mean ($\overline{X}$)

It is defined as the sum of all values of the observations divided by the total number of observations. Symbolically it is represented as $\overline{X}$

Arithmetic mean ($\overline{X}$) = $\frac{\Sigma xi}{n} = \frac{x_1 + x_2 + ...x_n}{n}$

Where, $\overline{X}$ = Arithmetic mean

xi = Value of ith item of x

Where, i = 1, 2……n

n = Total numbers of rice fallow blackgram growers

3.5.2 Standard Deviation (S.D.)

It is positive square root of the mean of the squared deviations taken from arithmetic mean. It is represented by symbol σ

SD (σ) = $\sqrt{\frac{1}{n}\left[\Sigma x^2 - \frac{(\Sigma x)^2}{n}\right]}$

Σx^2 = Sum of squares of observations

$(\Sigma x)^2$ = Square of sum of 'x' values

n = number of observations.

3.5.3 Frequency and Percentage

Frequency was used to know the distribution pattern of the rice fallow blackgram growers according to the objectives under study.

Percentages were used for standardization of sample size by calculating the number of rice fallow blackgram grower that would be under the given category if the total number of rice fallow blackgram growers were 120.

3.5.4 Pearson's Correlation Coefficient (r)

This test was used to study the relationship between the scores of independent variables and the scores of dependent variables. It measures the degree of relationship between the two sets of variables.

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

r = Correlation coefficient

Σx = Sum of scores of selected independent variable

Σy = Sum of scores of dependent variable

Σx^2 = sum of the squares of scores of an independent variable

Σy^2 = Sum of the squares of scores of a dependent variable

Σxy = The sum of productivity of x and y

n = size of the sample

The calculated 'r' value was verified by using 'r' table value for 5 per cent and 1 per cent level of significance at n–2 degrees of freedom.

3.5.5 Multiple Linear Regression (MLR)

Multiple Linear Regression analysis was used to study the effect of independent variables on dependent variables. The following multiple linear regression equation was fitted to the data having 8 parameters.

$$y = a + b_1 X_1 + b_2 X_2 + \ldots\ldots\ldots + b_8 X_8$$

Where 'a' was the intercept or constant and b_i's are partial regression coefficients.

$$b_i = b_1, b_2, \ldots\ldots\ldots b_8$$

The regression coefficient b_i's were tested for their significance with the following formula.

$$t_{(n-k-1)} = \frac{|b_i|}{S.E(b_i)}$$

Where

n = Number of rice fallow blackgram growers

k = Number of independent variables

S.E (b_i) = standard error of i^{th} partial regression coefficient

b_i = i^{th} Partial regression coefficient

t = Test for significance

df = Degree of freedom

Coefficient of multiple determination (R^2) was given by

$$R^2 = \frac{\text{Regression Sum of squares (RSS)}}{\text{Total Sum of Squares (TSS)}}$$

Where RSS = $b_1\Sigma x_1 y + b_2\Sigma x_2 y + \ldots\ldots\ldots\ldots b_8\Sigma x_8 y$

And TSS = Σy^2

R^2 value is less than unity where it was expressed in percentage. It measures the extent of variation in dependent variable (y), which can be explained by the independent variables (x_i) together.

Chapter IV

RESULTS AND DISCUSSION

Keeping in view the specific objectives, the findings were looked at and interpreted in relation to the relevant findings of the researchers in their investigations. This chapter also contains the conclusions drawn for the studies, which were variously being referred as generalizations, implications, inferences, interpretations, recommendations *etc.* The empirical evidences obtained in terms of factual data through objective research procedures and design developed for the study, data have been analyzed by subjecting them to appropriate statistical tests. The findings of the present investigation on **"A Study on the Knowledge and Extent of Adoption of the Farmers on Recommended Rice Fallow Blackgram Production Technology in Guntur District of Andhra Pradesh"** are presented under the following heads.

4.1 Profile characteristics of blackgram growers.

4.2 Level of knowledge of blackgram growers on selected production technology

4.3 Extent of adoption of blackgram growers on selected production technology

4.4 Relationship of the profile characteristic features of blackgram growers with their level of knowledge and extent of adoption

4.5 Constraints of blackgram growers, suggestions elicited of blackgram growers to arrive at the strategy for increasing the production.

4.6 Presentation of a few typical caselets of blackgram growers

4.7 Empirical model of the study

4.1. PROFILE CHARACTERISTICS OF THE BLACKGRAM GROWERS AT A GLANCE

Table 4.1. Profile characteristics of blackgram growers at a glance

(n=120)

S. No.	Independent variables	Category	Respondents	
			F	P
1.	Age $\overline{X}$ = 2.18 σ =0.77	Young age (< 35years) Middle age (35 to 58years) Old age (>58 years)	28 44 48	23.33 36.66 40.00
2.	Education $\overline{X}$ = 3.01 σ = 1.50	Illerate Primary school Upper Primary school High school Intermediate Education Graduation and above	24 28 23 22 14 9	20.00 23.33 19.16 18.33 11.66 7.50
3.	Farm Size $\overline{X}$ = 2.36 σ = 1.03	Marginal (0.1 to 1.0 ha.) Small (1.1 to 2.0 ha.) Medium (2.1 to 4.0 ha.) Large (> 4.0 ha)	25 46 25 24	20.83 38.33 20.83 20.00
4.	Farming Experience $\overline{X}$ = 3.08 σ = 1.40	Low (< 1.67) Medium (1.67 to 4.48) High (> 4.48)	20 74 26	16.66 61.66 21.66
5.	Extension Contact $\overline{X}$ = 21.13 σ = 2.75	Low (< 18.37) Medium (18.37-21.13) High (> 21.13)	13 56 51	10.83 46.66 42.50
6.	Social Participation $\overline{X}$ = 3.05 σ = 1.72	Low (< 1.32) Medium (1.32-4.77) High (> 4.77)	29 45 46	24.16 37.50 38.33
7.	Mass media Exposure $\overline{X}$ = 12.00 σ = 2.71	Low (< 9.29) Medium (9.29-14.72) High (> 14.72)	28 54 38	23.33 45.00 31.66
8.	Economic Motivation $\overline{X}$ = 18.5 σ = 5.66	Low (<12.83) Medium (12.83 to 24.16) High (> 24.16)	25 71 24	20.83 59.16 20.00
9.	Innovativeness $\overline{X}$ = 9.58 σ = 3.15	Low (< 6.42) Medium (6.42-12.74) High (> 12.74)	29 52 39	24.16 43.33 32.50
10.	Scientific Orientation $\overline{X}$ = 18.61 σ = 6.71	Low (< 11.81) Medium (11.81-25.41) High (> 25.41)	16 75 29	13.33 62.50 24.16
11.	Risk Orientation $\overline{X}$ = 10.23 σ = 3.25	Low (< 6.98) Medium (6.98-13.48) High (> 13.48)	16 71 33	13.33 59.16 27.50
12.	Market Orientation $\overline{X}$ = 11.72 σ = 3.62	Low (< 8.09) Medium (8.09-15.35) High (> 15.35)	16 81 23	13.33 67.50 19.16

S. No.	Independent variables	Category	Respondents	
			F	P
13.	Annual Income $\overline{X}$ = 10.52 σ = 2.56	Low (< 1.42) Medium (1.42-4.29) High (> 4.29)	30 63 27	25.00 52.50 22.50
14.	Training Received $\overline{X}$ = 1.65 σ = 0.82	0 trainings 1-2 trainings 2-4 trainings 4-6 trainings 6 and above	69 39 12 0 0	57.50 32.50 10.00 0.00 0.00

A bird eye view of the Table 4.1. depicted that distribution of the blackgram growers in accordance with selected profile characteristics viz., age, education, farm size, farming experience, extension contact, social participation, mass media exposure, economic motivation, innovativeness, scientific orientation, risk orientation, market orientation, annual income, training recived. Over view of the table indicated that blackgram growers fall in medium category with respect to their profile characteristics.

4.1 PROFILE CHARACTERISTICS OF THE BLACKGRAM GROWERS

To facilate the detailed view to the reader, an attempt has been made to present the distribution of blackgram growers in separate tables with frequency and percentages for interpretation as given below.

4.1.1 Age

Table 4.2. Distribution of blackgram growers according to their age

(n=120)

S. No.	Age	Blackgram growers	
		Frequency	Percentage
1.	Young age (< 35 years)	28	23.33
2.	Middle age (35-58 years)	44	36.67
3.	Old age (>58years)	48	40.00
	Total	120	100.00

It could be inferred from the Table 4.2. and Fig. 4.1. that 40.00 per cent of blackgram growers belonged to old age followed by the rest belonging to middle age (36.67%) and young age (23.33%). This might be due to lack of opportunity

to change their profession among old and middle aged making them to become loyal to their existing profession. Whereas, young age, because of their education not inclined to go for blackgram cultivation in specific and in general, they prefer to migrate to nearby towns and cities for employment.

The above findings were not in line with the findings of Samuel (1993), Obaiah (2004), Naik (2006), Deshmukh *et al.* (2007), Krishna Murthy *et al.*(2007), Tiwari *et al.*(2007) and Naik and Babu (2010).

4.1.2 Education

Table 4.3. Distribution of blackgram growers according to their education

(n=120)

S. No.	Education	Blackgram growers	
		Frequency	Percentage
1.	Illerate	24	20.00
2.	Primary school	28	23.33
3.	Upper Primary school	23	19.17
4.	High school	22	18.33
5.	Intermediate Education	14	11.67
6.	Graduation	9	7.50
	Total	120	100.00

A cursory look at Table 4.3 and Fig. 4.2 revealed that majority (23.33%) of the of the blackgram growers belonging to primary school (23.33%), followed by the illerates (20.00%), upper primary school (19.17%), high school (18.33%), college education (11.67%) and graduation and above (7.50%) categories. This might be due to the availabily of better educational facilies in the near by village as well as comfortable position of rice fallow blackgram growers due to low annual income. However, the efforts should be made to educate the illerate and school drop-outs through adult education and functional leracy programmes in villages to increase their level of education.

This finding was not in conformity with the findings of Dhamodaran and Vasanth kumar (2001), Nagabhusanam (2003), Natarajan (2004), Gopinath (2005), Krishna Murthy *et al.*(2007), Naik and Babu (2010), Chapke *et al.* (2011), Meena *et al.*(2012) .

4.1.3 Farm Size

Table 4.4. Distribution of blackgram growers according to their farm holding

(n=120)

S. No.	Farm Size	Blackgram growers	
		Frequency	Percentage
1	Marginal (0.1 to1.0 ha)	25	20.83
2	Small (1.1 to 2.0 ha)	46	38.34
3	Medium (2.1 t0 4.0 ha)	25	20.83
4	Large (>4.0 ha)	24	20.00
	Total	120	100.00

It could be comprehended from Table 4.4 and Fig. 4.3 that nearly two fifth (38.34%) of the blackgram growers had small land holdings, followed by those coming under marginal (20.83%) and medium (20.83%) categories. Whereas, 20.00 per cent belonged to large farmers ,majority of the blackgram growers were having small holdings followed by marginal and medium holdings. This might be due to the fragmentation of land holdings because of separation of families. Hence, there is a need to concentrate on marginal, small and medium blackgram growers in transfer of technology. Efforts also should be made to motivate marginal farmers.

The above findings were in line with the findings of Meena *et al.*(2012) Kalyan *et al.* (2012), Nirmala (2012), Tidke *et al.*(2012) and Prajapati *et al.* (2015).

4.1.4 Farming Experience

Table 4.5. Distribution of blackgram growers according to their farming experience

(n=120)

S. No.	Farming experience	Blackgram growers	
		Frequency	Percentage
1.	Low (< 1.67)	20	16.67
2.	Medium (1.68 to 4.48)	74	61.67
3.	High (> 4.48)	26	21.66
	Total	120	100.00

Mean=3.08 S.D.= 1.40

The above Table 4.5 and Fig. 4.4 illustrated that more than half (61.67%) of the blackgram growers had medium level of farming experience, followed by the rest with high (21.66%) and low (16.67%) level of farming experience. This might be due to the majority of the blackgram growers belonging to old and middle age. Therefore, their experience can be exploited for better adoption of selected technologies to increase blackgram production.

This finding was in line with the findings of Mallarayudu (1997), Ratnam (2000), Satyavathy (2001) and Kalyan *et al.* (2012).

4.1.5 Extension Contact

Table 4.6. Distribution of blackgram growers according to their extension contact

(n=120)

S. No.	Extension Contact	Blackgram growers	
		Frequency	Percentage
1.	Low (< 18.37)	13	10.83
2.	Medium (18.38 to 21.13)	56	46.67
3.	High (> 21.13)	51	42.50
	Total	120	100.00

Mean= 21.13 S.D.= 2.75

An overview of the Table 4.6 and Fig. 4.5 indicated that 46.67 percent of the blackgram growers had medium extension contact, followed by those with high (42.50%) extension contact. Whereas, only 10.83 per cent of the blackgram growers had low extension contact. The probable reasons attributed were that of field visits by extension personnel, extension staff in agricultural department, good attitude of agricultural officers and more interest on noticed farmers.

The above findings are in agreement with the findings of Ratnam (2000), Deshmukh *et.al* (2007), Kumar *et.al* (2012) and Marbaming *et al.*(2013).

4.1.6 Social Participation

Table 4.7. Distribution of blackgram growers according to their social participation (n=120)

S. No.	Social participation	Blackgram growers	
		Frequency	Percentage
1.	Low (< 1.32)	29	24.17
2.	Medium (1.33 to 4.77)	45	37.50
3.	High (> 4.77)	46	38.33
	Total	120	100.00

Mean= 3.05 S.D.= 1.72

It could be comprehended from the Table 4.7. and Fig. 4.6. that a majority (38.33%) of the blackgram growers had high level of social participation, followed by 37.50 per cent of them with medium level and 24.16 per cent of them with low level of social participation. Some of the blackgram growers were the members of agricultural cooperative societies and gram panchayats. For medium and high social participation, keenness of blackgram growers to take advantage of existing social organizations for achieving some improvement in their social status because of their education. For low social participation, the reason might be illeracy which is making them to take no interest in the activities of the organization. Hence, efforts are needed to strengthen social and voluntary institutions to seek blackgram growers participation with improved educational facilies.

The above findings were in agreement with the findings of Ratnam (2000) Deshmukh *et al.*(2000) , Kumar *et al.*(2012) and Marbaniang *et al.*(2013).

4.1.7 Mass Media Exposure

Table 4.8. Distribution of blackgram growers according to their mass media exposure (n=120)

S. No.	Mass Media exposure	Blackgram growers	
		Frequency	Percentage
1.	Low (< 9.29)	28	23.33
2.	Medium (9.30 to 14.72)	54	45.00
3.	High (> 14.72)	38	31.66
	Total	120	100.00

Mean= 12.00 S.D.= 2.71

Results furnished in Table 4.8. and Fig. 4.7. indicated that majority (45.00%) of the rice fallow blackgram growers had medium mass media exposure, followed by 31.66 per cent with high and 23.33 per cent with low mass media exposure. This trend indicative of growing importance of agricultural information in all the print and electronic media i.e. channels of communication. The reason for medium to low mass media exposure is due to increasing educational levels, increasing awareness among blackgram farmers regarding the broadcasting timings, increasing availabily of farm magazines like Annadatha, Vyvasaya Panchangam in remote areas, lack of interest to know new technologies, financial problems and their occupation in other activities and programmes.

This finding was in line with the findings of Prasad (1997), Ratnam (2000), Gopinath (2005), Begum (2008), Arathy (2011) and Devi *et al.*(2013).

4.1.8 Economic Motivation

Table 4.9. Distribution of blackgram growers according to their economic motivation.

(n=120)

S.No.	Economic motivation	Blackgram growers	
		Frequency	Percentage
1.	Low (< 12.83)	25	20.83
2.	Medium (12.84-24.16)	71	59.17
3.	High (> 24.16)	24	20.00
	Total	120	100.00

Mean= 18.5 S.D.=5.66

It was evident from the Table 4.9. and Fig. 4.8. that majority of the blackgram growers (59.17%) had medium economic motivation, followed by those with low (20.83%) and high (20.00%) level of economic motivation. This trend might be due to the fact that majority of the blackgram growers were old to middle aged, illerate educated up to primary school, landless to small farmers with low to medium annual income low to medium social participation, and innovativeness. It may also be due to self contentment of the blackgram growers with the existing technology what they are using. Hence, the Agriculture department need to make every effort to deliver the modern technology at a reasonable cost taking the help of government.

The above findings are in conformity with the findings of Kumar (2002), Gopinath (2005) and Gowda *et al.* (2013).

4.1.9 Innovativeness

Table 4.10. Distribution of blackgram growers according to their innovativeness

(n=120)

S. No.	Innovativeness	Blackgram growers	
		Frequency	Percentage
1.	Low (< 6.42)	29	24.17
2.	Medium (6.43 to 12.74)	52	43.33
3.	High (>12.74)	39	32.50
	Total	120	100

Mean= 9.58 S.D.= 3.15

The results from Table 4.10. and Fig. 4.9. indicated that 43.33 per cent of the blackgram growers had medium level of innovativeness, followed by the rest with high (32.50%) and low (24.17%) level of innovativeness. This might be due to majority of the blackgram growers being old to middle aged with low education, small to medium land holdings, medium to high social participation, medium mass media exposure, scientific orientation, risk orientation and economic motivation.

This finding was in concurrence with the findings of Babu and Venkramaiah (2004), Kalyan *et al.* (2012), and Devi *et al.* (2013).

4.1.10 Scientific Orientation

Table 4.11. Distribution of blackgram growers according to their Scientific orientation (n=120)

S. No.	Scientific Orientation	Blackgram growers	
		Frequency	Percentage
1.	Low (<11.81)	16	13.33
2.	Medium (11.82-25.41)	75	62.50
3.	High (>25.41)	29	24.16
	Total	120	100

Mean= 18.61 S.D.= 6.79

It was evident from the Table 4.11. and Fig. 4.10. that majority of the blackgram growers (62.50%) had medium scientific orientation, followed by those with high (24.17%) and low (13.33%) levels of scientific orientation. This trend might be due to the fact that majority of the blackgram growers were middle aged, illerate to educated up to high school, small to medium farmers with medium to high annual income, medium social participation, and innovativeness. It may also be due to self contentment of the blackgram growers with the existing technology of what they are using. Hence, the Agricultural department need to make every effort to deliver the modern technology at a reasonable cost taking the help of government.

The above findings are in conformity with the findings of Tiwari *et al.* (2007) and Cauhan *et al.* (2013).

4.1.11 Risk Orientation

Table 4.12. Distribution of blackgram growers according to their risk orientation (n=120)

S. No.	Risk Orientation	Blackgram growers	
		Frequency	Percentage
1.	Low (<6.98)	16	13.33
2.	Medium (6.99-13.48)	71	59.17
3.	High (>13.48)	33	27.50
	Total	120	100

Mean= 10.23 S.D.=3.25

A glance at the Table 4.12 and Fig. 4.11 revealed that 59.16 per cent of the blackgram growers had medium level of risk orientation, followed by those with high (27.50%) and low (13.33%) levels of risk orientation. This might be due to majority of the blackgram growers belonging to old to middle age, were illerate to primary school, small to medium farmers with medium annual income, medium to low social participation, and innovativeness categories. Farmers could not venture to take risk in adopting more recommended and improved practices unless demonstrated their performance.

Similar observations were reported by Gopiram (2005), Santhi (2006), Veeraiah *et al*. (2005) and Gowda *et al*. (2011), Arathy (2011) and Sriramana (2014).

4.1.12 Market Oreintation

Table 4.13. Distribution of blackgram growers according to their market orientation

(n=120)

S. No.	Market Orientation	Blackgram Growers	
		Frequency	Percentage
1.	Low (<8.09)	16	13.33
2.	Medium(8.10-15.35)	81	67.50
3.	High (>15.35)	23	19.17
	Total	120	100

Mean= 11.72 S.D.= 3.62

The findings that embellished in Table 4.13 and Fig. 4.12 revealed that 67.50 per cent of the blackgram growers had medium market orientation, followed by remaining with high (19.17%) and low (13.33%) levels of market orientation. The possible reason for this trend might be that majority of blackgram growers with small and medium farm and are coming under medium extension contact and mass media exposure. This may also be due to habitual nature of blackgram growers not to wait for better price to sell their produce immediately after harvesting to meet their day to day expenses and for repaying their debts.

Similar findings were reported by Raju (1998) and Sriramana (2014).

4.1.13 Annual Income

Table 4.14. Distribution of blackgram growers according to their annual income

(n=120)

S. No.	Annual Income	Blackgram growers	
		Frequency	Percentage
1.	Low (<1.42)	29	24.16
2.	Medium (1.43-4.49)	46	38.33
3.	High (> 4.49)	45	37.50
	Total	120	100.00

Mean= 2.85 S.D.= 1.43

An over view of the Table 4.14 and Fig. 4.13 indicated that majority of the blackgram growers (38.33%) had medium level of annual income, followed by the rest with high (37.50%) and low (24.16%) levels of annual income. This might be due to the high returns of blackgram growers as majority being small to high with regard to farm size. But, farmers with high annual income are due to their comparatively good land holding size with additional sources of income as job or business.

These findings were in line with the findings of Tikde *et al.* (2012)

4.1.14 Training Received

Table 4.15. Distribution of blackgram growers according to their training received.

(n=120)

S.No.	Training Received	Blackgram growers	
		Frequency	Percentage
1.	0 trainings	69	57.50
2.	1-2 trainings	39	32.50
3.	2-4 trainings	12	10.00
4.	4-6 trainings	0	0.00
5.	6 and above	0	0.00
	Total	120	100

Mean= 1.65 S.D.= 0.82

An overview of the Table 4.15 and Fig. 4.14 indicated that majority (57.50%) of the blackgram growers had zero trainings, followed by those with 1-2 (32.50%) trainings. Whereas, only 10.00 per cent of the blackgram growers had

undergone 2-4 trainings. There were no growers who had undergone more than four trainings. The probable reasons attributed were that lack of more field visits by extension personnel, inadequate extension staff and lack of appropriate funding.

4.2 LEVEL OF KNOWLEDGE OF BLACKGRAM GROWERS ON SELECTED PRODUCTION TECHNOLOGY

Table 4.16. Distribution of blackgram growers according to their level of knowledge

(n=120)

S. No.	Knowledge	Blackgram growers	
		Frequency	Percentage
1.	Low (<39.93)	19	15.83
2.	Medium (39.94-53.94)	78	65.00
3.	High (>53.94)	23	19.16
	Total	120	100

Mean= 46.94 S.D.=7.00

A glance at the Table 4.16 and Fig. 4.15. showed that majority (65.00%) of the blackgram growers had medium level of knowledge, followed by the rest with high (19.16%) and low (15.83%) level of knowledge.

This trend might be due to their habitual inclination to set pattern of blackgram cultivation over the years using indigenous varieties without any change. This is leading them to have no interest in gaining advanced information. The other reason for this trend could be the small to medium holdings, medium innovativeness, scientific orientation, economic orientation, market orientation, medium mass media exposure and extension contact. The reason for some of blackgram growers with low knowledge is their low social participation and lack of training facilies.

Hence, the Agriculture department should make efforts to conduct training programmes on blackgram cultivation, establish demonstration plots in the farmers fields and inspiring them to have more extension contact, social participation, mass media exposure and conduct study tours to observe the profitable cultivation of blackgram cultivation in other states and districts so that they can have high extent of knowledge on selected blackgram production technology.

Similar findings were reported by Chapke (2000), Mehta *et al.*(2001), Gopinath (2005), Gopiram (2005), Raghavendra (2006) and Sriramana (2014).

Table 4.17. Content analysis of level of knowledge on selected production technology of blackgram growers

(n=120)

S. No.	Particulars*	Knowledge				Rank
		Correct		Incorrect		
		F	%	F	%	
1.	Recommended time of sowing is in the month of November – December.	112	93.33	8	6.66	2
2.	Sowing shall be taken up 3-4 days prior to the harvest of paddy.	108	90.00	12	10.00	3
3.	The suitable variety is LBG - 752	68	56.66	52	63.33	11
4.	The recommended seed rate per acre is 15 – 20 kg	64	53.33	56	66.66	13
5.	The recommended method of sowing is Broadcasting	120	100	-	-	1
6.	The recommended chemical used for seed treatment against seed borne diseases is Captan/ Carbendazim / Mancozeb.	105	87.5	15	12.50	5
7.	The recommended chemicals used for seed treatment against sucking pests is Carbosulfan/ Imidacloprid / Thiamethoxam.	53	44.16	67	75.83	15
8.	Seed treatment with Rhizobium culture helps in increasing yield.	35	29.16	85	70.83	20
9.	1 - 2 irrigations should be given when there are no rains.	92	76.66	28	23.33	7
10.	Spraying of 2% Urea at flowering and pod formation stages is essential.	15	12.50	105	87.50	27
11.	The duration of rabi blackgram varieties grown ranges from 75 - 95 days.	102	85.00	18	15.00	6
12.	Weeds are a dominant problem in rice fallow blackgram.	84	70.00	36	30.00	8
13.	Intensity of dominant weeds can be controlled by spraying of Imazethapyr(Pursuit).	65	54.16	55	45.83	12
14.	Post-emergent weed problem of *Echinochlo colonum* and other grasses can be controlled by spraying of Quizalofop p ethyl(Turga Super)@ 400ml / acre (or) Fenoxoprop p ethy l(Whip Super) @ 250ml / acre.	32	26.66	88	73.33	21

S. No.	Particulars*	Knowledge				Rank
		Correct		Incorrect		
		F	%	F	%	
15.	Thrips can be controlled by spraying of Acephate (Lancer) @ 1g/lre/ Fipronil (Regent) @ 1ml/lre/ (or) Dimethoate (Rogor) @ 2ml/lre.	46	38.33	74	61.66	17
16.	Chemical means of controlling white fly menace is Monocrotophos (Nuvacron) @ 1.6ml/lre/ (or) Methyl demeton (Metasystax) @ 1ml/lre/ (or) Triazophos (Trifos) @ 2ml/lre	76	63.33	44	36.66	9
17.	Tobacco caterpillar eats away the flowers and leaves.	17	14.16	103	85.83	26
18.	Maruca pod borer causes more damage at Flower bud initiation stage, Flowering stage, Pod development stage.	30	25.00	90	75.00	22
19.	Maruca pod borer at the flowering stage can be chemically controlled by spraying Acephate (Lancer) @1.0g/lre/ (or) Quinalophos (Quinguard) @2.5ml/lre/ (or) Thiodicarb(Larvin)@1.5g/ler	37	30.83	83	69.16	19
20.	Addition of Dichlorvos (Nuvan)@1.0ml/lre helps in management of maruca pod borer in case of more number of webbings	11	9.17	109	90.83	29
21.	Severe incidence of Maruca pod borer can be controlled by spraying of Flubendiamide (Fame) @ 0.2ml/lre (or) Spinosad(Tracer)@0.3g/lre (or) Emamectin benzoate(Proclaim) @ 0.4g / lre	27	22.50	93	77.50	23
22.	The chemical control measure for Coreynospera leaf spot is spraying of Mancozeb@2.5g/lre (or)Copperoxychloride(Blox)@3g/lre (or)Hexaconazole (Contaf)@2ml/lre	25	20.83	95	79.16	24
23.	Wilt is a soil borne disease.	60	50.00	60	50.00	14
24.	Anthracnose, Cercospera and Alterneria leaf spot can be controlled by spraying twice @15 days interval using Mancozeb@2.5g/lre/ (or) Hexaconazole (Contaf) @ 2ml/lre/ (or) Copper Oxy Chloride(Blax) @ 3g/lre	14	11.67	106	88.33	28
25.	Powdery mildew disease can be controlled by spraying Carbendazim(Bavistin) @ 1g / lre/ (or) Thiophanate methyl (Topsin-M) @ 1ml / lre/ (or) Copper Oxy Chloride (Blox) @ 3g / lre	49	40.83	71	59.17	16

S. No.	Particulars*	Knowledge				Rank
		Correct		Incorrect		
		F	%	F	%	
26.	Small yellowish spots initially transforming to spindle shaped spots on leaves at flowering stage is the symptom of rust disease.	42	35.00	78	62.5	18
27.	Rust disease can be effectively controlled by spraying with Mancozeb @ 3g / lre along with Dinocap (Karathane) @ 1ml / lre/ Tridemorph (Calixin) @ 1g / lre /Triademefon(Bayleton) @ 1g / lre	18	15.00	102	85.00	25
28.	Whitefly is the causative organism of yellow mosaic disease.	70	58.33	50	41.33	10
29.	Variety which is resistant to yellow mosaic is LBG 752	107	89.17	13	10.83	4
30.	Four rows of maize or jowar grown around the field as trap crop helps in controlling whitefly, thrips and aphids.	8	6.66	112	93.33	30

(*Multiple Response Format)

Results furnished in the table 4.17 revealed the item wise knowledge of blackgram growers over the selected production technology of blackgram in percentage rank order of their decreasing importance are: Recommended method of sowing (100%) -1, recommended time of sowing in the month of November – December (93.33%)-2, sowing shall be taken up 3-4 days prior to harvest of paddy (90.00%)-3, variety that is resistant to yellow mosaic (89.17%)-4, recommended chemical used for seed treatment against seed borne diseases (87.5%)-5,duration of rabi blackgram varities grown ranges from (85.00%)-6, 1-2 irrigations should be given when there are no rains (76.66%)-7, weeds are dominant problem in rice fallow blackgram (70.00%)-8, chemical means of controlling whitefly menace is (63.33%)-9, whitefly is the causative organism of yellow mosaic virus (58.33)-10, the suitable variety is (56.60%)-11, intensity of dominanat weeds can be controlled by spraying of imazethapyr (54.16%)-12, the recommended seed rate per acre is (53.33%)-13, wilt is a soil borne disease (50.00%)-14, the recommended chemical used for seed treatment against sucking pests is (44.16%)-15, powdery mildew disease can be controlled by spraying (40.83%)-16, thrips can be controlled by spraying of (38.33%)-17, small yellowish spots initially transforming to spindle shaped spots on leaves at

flowering stage is the symptom of rust disease (35.00%)-18, maruca pod borer at the flowering stage can be chemically controlled by spraying of (30.83%)-19, seed treatment with rhizobium culture helps in increasing yield (29.16%)-20, post emergent weed problem of echinochola colonum and other grasses can be controlled by spraying of (26.66%)-21, maruca pod borer causes more damage at (25.00%)-22, sevre incidence of maruca pod borer can be controlled can be controlled by spraying of (22.50%)-23, the chemical control measure for coryenospera leaf spot is spraying of (20.83%)-24, rust disease can be effectively controlled by spraying mancozeb along with (18.00%)-25, tobacco caterpillar eats away the flowers and leaves (14.16%)-26, Spraying of 2% Urea at flowering and pod formation stages is essential (12.50%)-27, Anthracnose, Cercospera and Alterneria leaf spot can be controlled by spraying twice @15 days interval using (11.67%)-28, Addition of Dichlorvos (Nuvan) @1.0ml/lre helps in management of maruca pod borer in case of more number of webbings (9.17%)-29, and Four rows of maize or jowar grown around the field as trap crop helps in controlling whitefly, thrips and aphids (6.66%)-30.

4.3 EXTENT OF ADOPTION OF BLACKGRAM GROWERS ON SELECTED PRODUCTION TECHNOLOGY

Table 4.18. Distribution of blackgram growers according to their extent of adoption

(n=120)

S. No.	Adoption	Blackgram growers	
		Frequency	Percentage
1.	Low (< 69.45)	21	17.50
2.	Medium (69.46-125.17)	78	65.00
3.	High (> 125.17)	21	17.50
	Total	120	100

Mean= 97.31 S.D.= 27.85

An overview of Table 4.18. and Fig. 4.16. makes it clear that per cent of blackgram growers are coming under medium (65.00%) extent of adoption followed by those coming under low and high (17.50%) adoption levels with regard to adoption of selected blackgram production technology. The plausible

reasons for medium extent of adoption are medium innovativeness, scientific orientation, risk orientation, economic orientation, market orientation, mass media exposure, extension contact and medium knowledge.

The reasons for low adoption are low level of annual income, low social participation, low extension contact and mass media exposure. Most of them are old and middle aged, nearly twenty per cent of the blackgram growers are illerate and twenty three percent growers are educated below primary education.

Hence, the Government and Agriculture University should organize the orientation programmes about blackgram cultivation to impart knowledge and provision of credit facilies, subsidy on blackgram cultivation, provision of support price will enhance the adoption level of blackgram growers.

The above findings are in conformity with the findings of Choudhary and Khan (1998), Seema (2002), Tiwari *et.al*, (2007), Shakya *et.al* ,(2008), Tidke *et.al*, (2012), Ambedkar *et.al*, (2013) and Kumar *et.al*, (2013).

Table 4.19. Content analysis of extent of adoption of selected production technology of blackgram growers

(n=120)

S. No	Recommended practice*	Extent of Adoption							
		FA		PA		NA		OA	
		F	%	F	%	F	%	F	%
A.	**Soils**								
1.	Growing of blackgram in well drained loam soils.	84	70.00	36	30.00	-	-	-	-
B.	**Varieties**								
2.	Growing of LBG- 648 for the control of rust.	-	-	-	-	120	100.00	-	-
3.	Growing of LBG- 648 for the control of wilt.	--	-	-	-	120	100.00	-	-
4.	Growing of LBG -752 for the control of yellow mosaic virus.	110	91.67	-	-	10	8.33		
5.	Growing of PU-31 for the control of yellow mosaic virus.	10	8.33	-	-	110	91.67	-	-
C.	**Sowing**								
6.	Sowing the seed in the months of November- December.	120	100.00	-	-	-	-	-	-
7.	Sowing of seed prior to 2-3 days of harvest of Paddy.	76	63.33	44	36.67	-	-	-	-

8.	Following the seed rate of 16 kg/ acre.	13	10.90	14	11.60	-	-	93	77.50
9.	Following the method of sowing as broadcasting.	120	100.00	-	-	-	-	-	-
10.	Seed treatment with Thiram (Mancozeb /Dithane M – 45 / Captan) @ 2.5gm / kg of seed	57	47.5	24	20.00	19	15.83	20	16.66
11.	Seed treatment with with Imidacloprid @ 5g / kg of seed against sucking pests.	34	28.33	24	20.00	52	43.33	10	8.33
12.	Seed treatment with Rhizobium Culture @ 250 grams / Kg	-	-	-	-	120	100.00	-	-
13.	Drying of seed after seed treatment.	102	85.00	-	-	18	15.00	-	-
D.	**Nutrient management**								
14.	Foliar Spray of 2% Urea as a remedy to mitigate nutrient stress in rice fallow blackgram.	13	10.83	-	-	107	89.16	-	-
15.	Foliar Spray of 2 % DAP as a remedy to mitigate nutrient stress	-	-	-	-	120	100	-	-
E.	**Irrigation management**								
16.	Irrigating the field at 30 days (Reproductive Stage) and 50 days (Pod Formation Stage) after sowing to improve the yields in rice fallow blackgam.	56	46.67	41	34.16	23	19.17	-	-
F.	**Weed management**								
17.	Spraying of Fenoxiprop Ethyl 9% solution @250 ml. per acre in 200 Lres of water	53	44.1	41	34.10	-	-	26	21.8
18.	Spraying of Quizalopop Ethyl 5% solution @ 400ml. per acre in 200 Lres of water	53	44.1	41	34.10	-	-	26	21.8
19.	Spraying of Weedicides after 20 – 25 days of sowing.	83	69.10	37	30.90	-	-	-	-
G.	**Crop Protection**								
20.	Foliar application of 5% Neem Seed Kernel Extract (NSKE) after as a prophylactic spray to control whitefly that transmits yellow mosaic virus.	-	-	-	-	120	100.00	-	-
21.	Spraying of Chloripyriphos@ 2.5 ml./ Monocrotophos @ 1. 6 ml. / Acephate @1. 0 g. against yellow mosaic virus.	76	63.33	23	11.50	21	17.5	-	-
22.	Spraying Acephate 1.0g / Lre to control Aphids.	39	32.5	17	14.16	64	53.33	-	-

23.	Spraying Novaluron 1.0 ml/ Lre along with Dichlorovas @1. 0 ml. per lre to control Maruca pod borer	42	35.00	19	15.83	61	50.83	-	-
24.	Spraying Mancozeb 2.5g / Lre to control coryenospera leaf spot.	72	60	29	24.16	-	-	19	15.83
25.	Spraying Copper Oxichloride @ 3. 0 g. per lre against Corynospora leaf spot.	60	50.00	22	18.33	24	20.00	14	11.66
26.	Spraying of Hexaconazole at the interval of 10 days @ 2. 0 ml. per lre against Corynospora leafspot.	50	41.66	30	25.00	14	11.66	26	21.66
27.	Collection and destruction of skelotonised leaves along with first instar larvae to control tobacco caterpillar.	-	-	-	-	120	100.00	-	-
28.	Spraying of Mancozeb @ 2. 5 g. / Hexaconazole @3. 0 ml. / Copper Oxichloride @ 3. 0 g. per lre against Anthrocnose	64	53.33	27	22.5	29	24.16	-	-
29.	Spraying of Mancozeb @ 3. 0 g. per lre along with1. 0 ml. Dianocap against rust.	-	-	-	-	120	100.00	-	-
30.	Practicing Spraying critical Stages of 35 - 45 Days, 45 - 50 Days and 60 - 65 days for Pest Management.	32	26.66	-	-	-	-	88	73.33
31.	Growing of Maize or Jowar as border rows to arrest the spread of white fly / thrips / aphids / mites	-	-	-	-	120	100.00	-	-
32.	Erection of pheromone traps to know the incedent of whitefly in the field.	-	-	-	-	120	100.00	-	-
33.	Spraying of Trizophos @1. 25 ml / Acephate @ 2. 0 ml / Metasystoxs @2 .0 ml / Acetomaprid @ 0. 2 g. / Lre against white fly menace.	49	40.83	14	11.66	-	-	57	47.50
H.	**Harvesting**								
34.	Harvesting of crop when most of the pods turn black.	103	85.83	17	14.16	-	-	-	-
35.	Harvesting after 75 to 80 days from the date of sowing.	95	79.16	35	29.16	-	-	-	-
36.	Drying of harvested crop on the threshing floor and later going for threshing.	120	100.00	-	-	-	-	-	-
37.	Threshing manually or trampling by tractors..	120	100.00	-	-	-	-	-	-

(*Multiple Response Format)

Note: FA = Fully Adopted, PA = Partially Adopted, NA = Not Adopted

OA= Over Adopted

Results furnished in the table 4.19 revealed that fully adopted the selected production technology by blackgram growers in percentage rank order of their decreasing importance are; The method of sowing is broadcasting, sowing of seed in the months of November-december, drying of harvested crop on the threshing floor first and later going to threshing, threshing is done by trampling with help of tractors (100%), the variety that is grown for control of yellow mosaic virus in the tract is (91.67%), harvesting of crop is done when most of the pods tun black (85.83%), following drying of seed after seed treatment (85.00%), harvesting of crop after 75-80 days after sowing (79.16%), growing of blackgram in well drained loam soils (70.00%), sparying of weedicide after 20-25 days after sowing (69.10%),Sowing of seed prior to 2-3 days of harvest of Paddy (63.33%), spraying chloropyriphos 2.5 ml/l (or) Monocrotophos 1.6 ml/l for control of YMV (63.33%), spraying of mancozeb 2.5 g/l for control of coryenospera leaf spot (60.00%), spraying of mancozeb 2.5 g/l (or) hexaconazole (or) Copper Oxy Chloride 3.0 g/l for controlling anthracnose (53.33%), spraying of copper oxy chloride 3.0 g/l for control of Coryenospera leaf spot (50.00%), seed treatment for control of seed borne diseases with Thiram/Captan with 3.0 g/kg of seed (47.50%), Irrigating the field at 30 days (Reproductive Stage) and 50 days (Pod Formation Stage) after sowing to improve the yields in rice fallow blackgam (46.67%), spraying of Fenoxiprop Ethyl 9% solution 250 ml. per acre in 200 Lres of water, spraying of Quizalopop Ethyl 5% solution @ 400ml. per acre in 200 Lres of water for controlling weeds in backgram (44.10%), spraying of Hexaconazole at the interval of 10 days with 2.0 ml. per lre against Coryenospora leafspot (41.66%), spraying of Trizophos 1. 25 ml /l Acephate 2. 0 ml /l Metasystoxs 2 .0 ml /l Acetomaprid 0. 2 g. / l against white fly menace (40.83%), spraying Novaluron 1.0 ml/ l along with Dichlorovas 1. 0 ml/l to control Maruca pod borer (35.00%), spraying Acephate 1.5 g/l for control of aphids (32.5%), seed treatment with with Imidacloprid 5g / kg of seed against sucking pests (28.33%), practicing spraying critical Stages of 35 - 45 Days, 45 - 50 Days and 60 - 65 days for pest management (26.66%), following the recommended seed rate for sowing (10.90%), foliar spray of 2% urea as a remedy to mitigate nutrient stress in rice fallow blackgram (10.83%), and growing of P.U-31 variety for control of YMV (8.33%).

It also revealed the partially adopted the selected production technology by blackgram growers in the percentage rank order of their decreasing importance are; Sowing of seed prior to 2-3 days of harvest of Paddy (36.67%), Irrigating the field at 30 days (Reproductive Stage) and 50 days (Pod Formation Stage) after sowing to improve the yields in rice fallow blackgam (34.16%), spraying of fenoxiprop ethyl 9% solution 250 ml. per acre in 200 lres of water (34.10%), spraying of quizalopop ethyl 5% solution 400ml. per acre in 200 litres of water for controlling weeds in backgram (34.10%), sparying of weedicide after 20-25 days after sowing (30.90%), growing of blackgram in well drained loam soils (30.00%), harvesting of crop after 75-80 days after sowing (29.16%), spraying of Hexaconazole at the interval of 10 days with 2.0 ml. per lre against Coryenospora leafspot (25.00%), spraying of Mancozeb 2.5 g/l for control of coryenospera leaf spot (24.16), spraying of Mancozeb 2.5 g/l (or) hexaconazole (or) Copper Oxy Chloride 3.0 g/l for controlling anthracnose (22.50%), following seed treatment for control of seed borne diseases with thiram/captan with 3.0 g/kg of seed (20.00%), seed treatment with with Imidacloprid 5g / kg of seed against sucking pests (20.00%), spraying of copper oxy chloride 3.0 g/l for control of coryenospera leaf spot (18.33%), spraying Novaluron 1.0 ml/ l along with Dichlorovas 1. 0 ml/l to control Maruca pod borer (15.83%), spraying of Acephate 1.0 g/l for control of aphids (14.16), harvesting of crop is done when most of the pods tun black (14.16%), spraying of Trizophos 1. 25 ml /l Acephate 2. 0 ml /l Metasystoxs 2 .0 ml /l Acetomaprid 0. 2 g. / l against white fly menace (11.66%), following recommended seed rate for sowing (11.60%), and spraying chloropyriphos 2.5 ml/l (or), monocrotophos 1.6 ml/l for control of YMV (11.50%).

It also, revealed that selected production technology which is not adopted by the blackgram growers in the percentage order of their decreasing importance are; growing of L.B.G-648 variety for control of leaf spot, wilt, seed treatment with rhizobium culture 250 g/kg of seed, foliar spray of 2% D.A.P, foliar application of 5% Neem Seed Kernel Extract (NSKE) as a prophylactic spray to control whitefly that transmits yellow mosaic virus, collection and destruction of skelotonised leaves along with first instar larvae to control tobacco caterpillar,

spraying of Mancozeb 3.0 g per lre along with 1.0 ml. Dianocap / 1.0 ml/l against rust, erection of pheromone traps to know the intensity of whitefly in the field, growing of four rows of maize (or) jowar crops (100.00%), growing of P.U-31 variety for control of YMV (91.67%), foliar spray of 2% urea as a remedy to mitigate nutrient stress in rice fallow blackgram (89.16%), spraying of Acephate 1.5g/l for control of aphids (53.33%), spraying Novaluron 1.0 ml/ l along with Dichlorovas 1. 0 ml/l to control Maruca pod borer (50.83%), seed treatment with with Imidacloprid 5g / kg of seed against sucking pests (43.33%), spraying of mancozeb 2.5 g/l (or) hexaconazole (or) copper oxy chloride 3.0 g/l for controlling anthracnose (24.16%), spraying of copper oxy chloride 3.0 g/l for control of coryenospera leaf spot (20.00%), Irrigating the field at 30 days (Reproductive Stage) and 50 days (Pod Formation Stage) after sowing to improve the yields in rice fallow blackgam (19.17%), spraying chloropyriphos 2.5 ml/l (or) monocrotophos 1.6 ml/l for control of YMV(17.50%), seed treatment withTthiram/Captan with 3.0 g/kg of seed (15.83%), drying the seed after seed treatment (15.00%), spraying of Hexaconazole at the interval of 10 days with 2.0 ml. per lre against Coryenospora leafspot (11.66%), and growing of L.B.G -752 variety for control of YMV (8.33%).

It further revealed that selected production technology which is over adopted by the blackgram growers in the percentage order of their decreasing importance are; following the seed rate of 16 kg/acre (77.50%), practicing spraying critical Stages of 35 - 45 Days, 45 - 50 Days and 60 - 65 days for pest management (73.33%), spraying of Trizophos 1. 25 ml /l Acephate 2. 0 ml /l Metasystoxs 2 .0 ml /l Acetomaprid 0. 2 g. / l against whitefly menace (47.50%), spraying of Hexaconazole at the interval of 10 days with 2.0 ml. per lre against Coryenospora leafspot (21.66%), spraying of fenoxiprop ethyl 9% solution 250 ml. per acre in 200 lres of water (21.80%), spraying of quizalopop ethyl 5% solution 400ml. per acre in 200 lres of water for controlling weeds in backgram (21.80%), following seed treatment for control of seed borne diseases with thiram/captan with 3.0 g/kg of seed (16.66%), spraying of Mancozeb 3. 0 g. per lre for control of coryenospera leaf spot (15.83%), spraying of copper oxy chloride 3.0g/l for control of coreynospera leaf spot (11.66%), and seed treatment with with Imidacloprid 5g / kg of seed against sucking pests (8.33%).

4.4 RELATIONSHIP OF PROFILE CHARACTERISTICS OF BLACKGRAM GROWERS WITH THEIR LEVEL OF KNOWLEDGE AND EXTENT OF ADOPTION

4.4.1 Relationship of Profile Characteristics of Blackgram Growers with their Level of Knowledge

An attempt has been made to find out if there exists any relationship of the profile characteristics of blackgram growers viz., age, education, farm holding, farming experience, extension contact, social participation, mass media exposure, economic motivation, innovativeness, scientific orientation, risk orientation, market orientation, annual income and training received, with their level of knowledge of selected production technology.

Table 4.20. Correlation coefficient of profile characteristics of blackgram growers with their level of knowledge

(n =120)

S. No.	Profile Characteristics	'r' value
1.	Age	0.094
2.	Education	0.006
3.	Farm Size	0.147
4.	Farming Experience	0.010
5.	Extension Contact	0.304**
6.	Social Participation	0.331**
7.	Mass Media Exposure	0.706**
8.	Economic Motivation	0.843**
9.	Innovativeness	0.781**
10.	Scientific Orientation	0.846**
11.	Risk Orientation	0.810**
12.	Market Oreintation	0.752**
13.	Annual Income	0.455**
14.	Training Received	0.024NS

NS = Non significant ** Significant at 0.01 level of probabily

It is evident from the Table 4.20. that computed ‘r’ values of extension contact, social participation, mass media exposure, economic motivation, innovativeness, scientific orientation, risk orientation, market orientation, annual income, were significant to the extent of knowledge. The other variables such as age, education, farm size, farming experience, training received, did not show any significant relationship with level of knowledge on selected blackgram production technology.

Null Hypothesis

There is no significant relationship of the selected profile characteristics of blackgram growers with their level of knowledge on selected production technology.

Empirical Hypothesis

There will be a significant relationship of the selected profile characteristics of blackgram growers with their level of knowledge on selected production technology.

4.4.1.1 Age Vs Level of Knowledge

From Table 4.20. it is evident that there was positive and non-significant relationship between age and level of knowledge of blackgram growers. From this, it could be inferred that as the age increases, knowledge also increases but non-significant. This might be due to the experience gained by the old and middle age people over the years, at the same time they could not acquire significant knowledge due to their low level of education and decreasing recalling abily.

The above findings are in line with the findings of Meena (2009), Naik *et al*. (2009), Saha *et al*. (20010) and kumar (2012) and Sriramana (2014).

4.4.1.2 Education Vs Level of Knowledge

It is evident from the Table 4.20 that there was a positive and non significant relationship between education and level of knowledge of blackgram growers. From this, it is evident that as the education increases, level of knowledge of blackgram growers also increases but insignificantly. This might be

due to the fact that majority of growers were small and medium farmers and could not go for higher education due to financial problems, non availabily of higher education in rural areas and lack of awareness about education. So, these restricted them to have better access to farm information sources such as farm magazines, farm bulletins, books on agriculture *etc*. and possess better capacity to grasp things and analyze and interpret them in proper ways. Further, this resulted in having no exposure to extension agencies, scientists, and research stations *etc*. which also contribute to knowledge.

This finding is in conformity with the findings of Naik *et al*. (2009) and Saha *et al*. (2010).

4.4.1.3 Farm Size Vs Level of Knowledge

It was evident from the Table 4.20 that there was positive and non-significant relationship between land holding and level of knowledge of blackgram growers. It implied that as the farm holding increases, there is an increase in level of knowledge but non-significantly. This might be due to the fact that the knowledge is the cognitive character, which did not effected by the farm holding. Further, majority of blackgram growers were leasing their lands instead of cultivating themselves. Moreover, the blackgram growers maintaining the farms with similar management techniques irrespective of the land holding.

Similar findings were reported by Naik *et al*. (2009) and Ambedkar (2010), Kumar (2012), and Sriramana (2014).

4.4.1.4 Farming Experience Vs Level of Knowledge

From the Table 4.20. it was quite interesting to note that the farming experience of blackgram growers did not show any significant relationship with their level of knowledge on selected production technology of blackgram. From this, it was clear that as the farming experience increases, level of knowledge on selected production technology increases.

This might be due to the most of the blackgram growers knowledge being experimented because of their inclination to age old traditional practices in blackgram cultivation which are also old.

The finding was in accordance with the findings of Gayathri *et al.* (2002) and Sriramana (2014).

4.4.1.5 Extension Contact Vs Level of Knowledge

The data presented Table 4.20 clearly revealed that there was positive and highly significant relationship between extension contact of blackgram growers and their level of knowledge. This clearly implies that the level of knowledge increases with the increase in extension contact. Extension agencies were considered as best and reliable source of information for the farmers. Extension contact enables the farmer to different kinds of information, inturn enlarge their sphere of knowledge about recent production technology of blackgram. Hence, the above relationship was noticed. This calls for extended efforts of extension agencies.

Similar findings were reported by Singh (2003), Arya *et al*.(2003), Janardhan (2004), Gopinath (2005), Ambedkar (2010), and Sriramana (2014).

4.4.1.6 Social Participation Vs Level of Knowledge

It is clear from Table 4.20. that social participation showed positively and high significant relationship with the level of knowledge of blackgram growers. From this, it could be inferred that Social Participation is having high significant influence on level of knowledge on recommended package of practices. This inferred that who actively participates in social activities through social organizations come across different types of people, exchange one's views and experiences, discuss about problems and solutions and there by gain more and more knowledge,

This finding was in conformity with the findings of by Gowda *et al*. (2002), Kumar (2002), Reddy *et al*. (2007), Shakya *et al.* (20008) and Ambedkar (2010).

4.4.1.7 Mass media exposure Vs Level of Knowledge

Contents of Table 4.20. revealed that there was a positive and highly significant relationship between mass media exposure and level of knowledge of blackgram growers. It can be inferred that as the mass media exposure of

blackgram growers increases, their knowledge would also increase. This might be due to the reason that mass media exposure gives more information. Now a days farmers who keep in touch with mass media like radio, television, information materials, farm journals were considered to be the accelerators of diffusion of agricultural innovations and helps others to improve the level of knowledge on blackgram production technologies. It is quite natural that wherever and whenever a person is exposed to media more frequently, they are entitled to get more information.

This finding was in agreement with the findings of Gayathri *et al*. (2002), Gowda *et al*. (2002), Kumar (2002), Prasad (2002), Singh *et al*.(2003), Arya *et al*. (2003), Gopinath (2005), Ambedkar (2010) and Sriramana (2014).

4.4.1.8 Economic Motivation Vs Level of Knowledge

Table 4.20. explains that there was a positive and high significant relationship between the economic motivation and level of knowledge of blackgram growers. It could be inferred that , farmers who possessed more economic motivation had more knowledge than their counter parts. 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.

This finding was in conformity with Gopinath (2005), Tripathi *et al*. (2006), Reddy *et al*. (2007), Roy *et al*. (2007), Naik *et al*. (2009), Sharma *et al*. (2009), Ambedkar (2010) and Sravan kumar (2012).

4.4.1.9 Innovativeness Vs Level of Knowledge

It is clear from Table 4.20. that there was a positive and highly significant relationship between innovativeness and level of knowledge of blackgram growers. This means that the higher innovativeness of the farmer, the more would be the level of knowledge. This trend might be due to the fact that farmers with high innovativeness desire to seek changes in farming techniques and introduce changes in his own operation. This desire make him to acquire innovations directly from scientists in terms of knowledge about recommended practices.

The above findings are in line with the findings of Gopinath (2005), Rathod (2005), Reddy *et al*. (2007), Naik *et al*. (2009), Ambedkar (2010), kumar (2012), and Sriramana (2014).

4.4.1.10 Scientific Orientation Vs Level of Knowledge

A cursory observation of Table 4.20 revealed that there was a positive and high significant relationship between scientific orientation and level of knowledge of blackgram growers. Hence, it could be inferred that the higher the scientific orientation, the more will be the knowledge. The probable reason may be that blackgram growers with progressive and systematic ideas are more receptive to scientific innovations. In this process, they might have high level of knowledge about selected production technology of blackgram.

This finding was in agreement with the findings of Nagaraj *et al*. (2000), Gowda *et al*. (2002), Kumar (2002), Janardhan (2004), Gopinath (2005), Shakya *et al*. (2008) and Ambedkar (2010).

4.4.1.11 Risk Orientation Vs Level of Knowledge

An examination of Table 4.20 points out that there was a positive and highly significant relationship between risk orientation and level of knowledge of blackgram growers. This shows that as the risk orientation increases, level of knowledge also increases. Risk orientation is expressed as the degree to which a farmer is oriented to take risk and to face uncertainties in blackgram cultivation. The risk taking individuals would go out all the way to get the information from different sources in order to acquire more knowledge. Hence, efforts need to be made to increase the risk bearing abily of farmers through credit facily and support price.

This finding got supported by the findings of Gopinath (2005), Tripathi *et al*. (2006), Meena *et al*. (2009), Sharma *et al*. (2009), Ambedkar (2010), and Kumar *et al*. (2013) and Sriramana (2014).

4.4.1.12 Market Orientation Vs Level of Knowledge

Results furnished in the Table 4.20. showed that market orientation had positive and highly significant relationship with level of knowledge of blackgram growers. The more the market orientation, more will be the level of knowledge. Because, blackgram growers who pay attention to market information on prices in order to get high income, they also try to improve their knowledge on blackgram production technology which helps in getting good yields.

These results were in conformity with the findings of Bandopadhay (1997),Kumar (2002), Raju and Murthy (2002), Gopinath (2005), Patel and Chauhan (2009) and Sriramana (2014).

4.4.1.13 Annual Income Vs Level of Knowledge

It is clear from Table 4.20 that the annual income of the blackgram growers showed positive and high significant relationship with their level of knowledge This indicated that as the annual income increased, the extent of knowledge on recommended practices also increased. This inferred that, the respondents with higher level of annual income,the extent of knowledge of recommended practices to a greater extent.

The above finding is in line with the findings of Kharde and Nimbalkar (1996), Deshmukh (1997), Hanumanaikar (1997), Patil *et al*. (1999), Veeraiah *et al*. (2005) and Rao (2011).

4.4.1.14 Training Received Vs Level of Knowledge

A cursory examination of Table 4.22. indicated that there was a positive and non- significant relationship between training received and extent of knowledge of blackgram growers.

This showed that majority of the growers were not undergone any training programmes related to package of practices , undergoing training programmes will enable the farmers to know the new technology and knowledge levels may increased. So there is a need to conduct training programmes to blackgram growers to increase their production.

The above finding was supported with the findings of Arthy (2011) and Thiyagarajan (2011).

4.4.2 Multiple Linear Regression Analysis of Profile Characteristics of Blackgram growers with their Level of Knowledge

An attempt has been made to find out the amount of contribution made by the profile characteristics in explaining the variation in the dependent variable i.e. knowledge towards Blackgram cultivation. The results are presented in Table 4.21.

Table 4.21. Multiple linear regression analysis of profile characteristics of blackgram growers with their level of knowledge

(n =120)

S. No.	Profile Characteristics	Regression coefficient	Standard error	't' value
1.	Age	-0.013	0.363	-0.037
2.	Education	-0.189	0.183	-1.036
3.	Farm Size	0.123	0.264	0.465
4.	Farming Experience	0.232	0.183	1.265
5.	Extension Contact	0.089	0.111	0.794
6.	Social Participation	0.463	0.198	2.334*
7.	Mass Media Exposure	0.297	0.167	1.782
8.	Economic Motivation	0.470	0.083	5.671*
9.	Innovativeness	0.254	0.169	1.505
10.	Scientific Orientation	0.244	0.074	3.281*
11.	Risk Orientation	0.170	0.207	0.822
12.	Market Oreintation	0.291	0.144	2.029*
13.	Annual Income	0.285	0.208	1.372
14.	Training Received	-0.132	0.313	-0.422

a = 21.087 R^2 = 0.866

NS = Non-Significant * Significant at 0.05 level of probabily

From the above table the MLR equation can be fit as $Y = 21.087 + -0.013\ x_1 + 0.189x_2 + 0.123x_3 + 0.232x_4 + 0.089x_5 + 0.4631*x_{6\ +}\ 0.297x_7 + 0.470*x_8 + 0.254x_9 + 0.244*x_{10} + 0.170x_{11} + 0.291*x_{12} + 0.285x_{13} + -0.132x_{14}$

Table 4.21 revealed that the coefficient of determination "$R^{2"}$ value was significant, as the value of "a" was found significant. The "$R^{2"}$ value of 0.866 indicated that all the selected 14 profile characteristics put together, explained about 86.66 per cent variation in the level of knowledge of blackgram growers. Remaining 13.34 per cent is due to the extraneous effects of the other charecterstics. Hence, it could be stated that the variables selected to a large extent explained the variation in level of knowledge of the blackgram growers.

The regression coefficient given in Table 4.21 further revealed that the profile characteristics namely social participation, economic motivation, scientific orientation, and market orientation were found to be positively significant towards extent of knowledge. Remaining variables viz., age, education, farm size, farming experience, extension contact, mass media exposure, innovativeness, risk orientation, annual income, and training recieved are non significant in this analysis.

This implied that social participation, economic motivation, scientific orientation, and market orientation were contributed significantly to the prediction of the variation in the level of knowledge of the blackgram growers about the selected production technology.

4.4.3 Relationship of the profile characteristics of blackgram growers with their extent of adoption

An attempt has been made to find out if there exists any relationship of the profile characteristics namely, age, education, farm size, farming experience, extension contact, mass media exposure, economic motivation, innovativeness, scientific orientation, risk orientation, market orientation, annual income, training recived with their extent of adoption of selected production technology of blackgram.

Table 4.22. Correlation coefficient of profile characteristics of blackgram growers with their extent of adoption

(n =120)

S. No.	Profile Characteristics	'r' value
1.	Age	0.103
2.	Education	0.056
3.	Farm Size	0.068
4.	Farming Experience	0.038
5.	Extension Contact	0.306**
6.	Social Participation	0.372**
7.	Mass Media Exposure	0.643**
8.	Economic Motivation	0.675**
9.	Innovativeness	0.728**
10.	Scientific Orientation	0.759**
11.	Risk Orientation	0.717**
12.	Market Oreintation	0.671**
13.	Annual Income	0.474**
14.	Training Received	0.059NS

NS = Non-Significant ** Significant at 0.01 level of probabily

From the Table 4.22 it could be observed that the computed 'r' values of extension contact, social participation, mass media exposure, economic motivation, innovativeness, scientific orientation, risk orientation, market orientation, and annual income were found to be significant Whereas, computed 'r' values of age, education, farm size, farming experience, training recived, with the extent of adoption of selected production technology were found to be non-significant.

Null Hypothesis

There is no significant relationship of the selected profile characteristics of blackgram growers with their extent of adoption.

Empirical Hypothesis

There will be a significant relationship of the selected profile characteristics of blackgram growers with their extent of adoption.

4.4.3.1 Age Vs Extent of Adoption

The perusal of the Table 4.22. revealed that there was non-significant relationship between age of the blackgram growers and extent of adoption. This means, as the age increases, the adoption of selected blackgram production technology increased even though non-significant. This may be due to the lack of physical strength and abily to grasp latest technology in view of their age problem.

The above findings are in line with the findings of Tiwari *et al*. (2007), Balu Naik *et al*. (2010) and Singh *et al*. (2012).

4.4.3.2 Education Vs Extent of Adoption

It is evident from Table 4.22 that there was a positive and non significant relationship between education of the blackgram growers with their extent of adoption. This indicates that as the education increases, there is a non significant increase in the extent of adoption. This might be due to to the fact that majority of growers were small and medium farmers and could not go for higher education due to financial problems non availabily of higher education in rural areas and lack of awareness about education. So these restricted them to have better access to farm information sources such as farm magazines, farm bulletins, books on agriculture *etc*. and possess better capacity to grasp things and analyze and interpret them in proper ways.

Due to this, blackgram growers have not developed favourable attitude which in turn might have not motivated them for adoption of recommended practices. Hence, the above trend was noticed.

This finding is in agreement with the findings of Kanavi (2000) and Singh *et al*. (2012).

4.4.3.3 Farm Size Vs Extent of Adoption

From the Table 4.22 it was observed that there was positive and non-significant relationship between farm size of blackgram growers and their extent of adoption. It means extent of adoption increased with increase in farm size even though it is non-significant.

The reason might be due to the majority of the blackgram growers being small and marginal. Moreover, in the investigation area, big farmers have leased out their lands. They do not have that much interest about blackgram cultivation. Small and marginal farmers think of their investment and returns expected, before going for adoption of new practices. They don't have interest about the adoption of selected production technology. Hence, the above trend was noticed.

The results were in accordance with the findings of Lakshminarayana *et al*. (2001), Janardhan (2004), Maraddi and Kumar (2008), Ambedkar (2010), Kiranmayi (2013) and Sriramana (2014).

4.4.3.4 Farming Experience Vs Extent of Adoption

It was noticed from Table 4.22. that there was a positive and non-significant relationship between farming experience and extent of adoption of blackgram growers. This indicates that there is an increase in the extent of adoption of blackgram growers with increase in the farming experience inspite of it being non-significant.

This might be due to blackgram growers with more farming experience usually have more belief on traditional methods of farming. They would not try new practices due to uncertainty of returns. As the age progresses, the individual becomes conservative towards the acceptance of new ideas. This might have led to non-significant relationship of farming experience with their extent of adoption of selected production technology.

This finding is in agreement with the findings of Gopiram (2005), Naik *et al*. (2009), Nayak (2010), Kiranmayi (2013) and Sriramana (2014).

4.4.3.5 Extension Contact Vs Extent of Adoption

A cursory examination of Table 4.22. indicated that there was a positive and highly significant relationship between extension contact and extent of adoption of blackgram growers.

This showed that greater the extension contact, greater would be the extent of adoption of selected production technology by blackgram growers. This might be due to the reason for the farmers to approach change agents like AEO, AO, ADA *etc*., when they need solution of problems in adopting selected production technology in blackgram cultivation.

This might be the reason for increased participation of blackgram growers in extension activities that provide them more confidence about technology and it has direct effect on farmers decisions.

This might be due to the fact that blackgram growers with more extension contact are in regular touch with extension officers, acquire more knowledge about advanced developments. It helps the blackgram grower to adopt selected production technology.

The above finding was supported with the findings of Janardhan (2004), Gopiram (2005), Raj *et al*. (2006), Ambedkar (2010), Kiranmayi (2013)and Sriramana (2014).

4.4.3.6 Social Participation Vs Extent of Adoption

It is evident from Table 4.22 that there was positive significant relationship between social participation and extent of adoption of blackgram growers. The reason might be that the blackgram growers were having membership in social organizations and cooperative societies. Some of blackgram growers are the members of PAC'S and Panchayats, discussing about the aspects of blackgram cultivation and had more chance of getting exposed to different sources of agricultural information which lead to adoption of new technology.

This finding was in tune with the findings of Gowda *et al.* (2002), Kumar (2002) and Ambedkar (2010).

4.4.3.7 Mass Media Exposure Vs Extent of Adoption

It is evident from the Table 4.22 that there was a positive and highly significant relationship between mass media exposure and extent of adoption of blackgram growers.

It implied that greater the mass media exposure, greater will be the extent of adoption. The possible reason might be that the farmers of the study area have used mass media as the source of information for getting new ideas regarding the practices in blackgram cultivation.

It is natural that increased mass media exposure broadens the understanding and awareness of recommended practices. Mass media provides enormous opportunities for repeated exposure to new technology, widens the mental horizon of the farmers to accept and adopt the practices, motivating the farmers for further action. Wherever and whenever a person is exposed to media with more frequency they are entitled to get more information and this in turn lead to better adoption of selected production technology by the blackgram growers. Hence, this trend was noticed. Mass media provide reinforcement and adds to the experience of successful blackgram growers.

This finding was in accordance with the findings of Lakshminarayana *et al.* (2001), Kumar (2002), Natarajan (2004), Gopiram (2005), Naik *et al*. (2009), Kiranmayi (2013) and Sriramana (2014).

4.4.3.8 Economic Motivation Vs Extent of Adoption

Results in Table 4.22, revealed that there was a positive and significant relationship between economic motivation and extent of adoption of selected production technology by the blackgram growers. Farmers with more economic motivation would always try to increase the financial background through harvesting more yields from their farms for which adoption of recommended practices become essential. Hence, the above relation was noticed.

This finding was in tune with the findings of Lakshminarayana *et al.* (2001), Gowda *et al*. (2002), Gayathri *et al.* (2002), Kumar (2002), Raghavendra (2004), Gopinth (2005) and Ambedkar (2010).

4.4.3.9 Innovativeness Vs Extent of Adoption

It is clear from Table 4.22 that there was a positive and highly significant relationship between innovativeness and extent of adoption of blackgram growers. This indicates that there is an increase in extent of adoption with increase in innovativeness.

Innovativeness is the individual's earliness in the use of new practices. Therefore, a person, who is more innovative, acquires more information from various sources and adopts the practices without any hesitation and this might be the reason for the above relationship.

The above finding is in agreement with the findings of Kumar (2002), Gopinath (2005), Rathod (2005), Ambedkar (2010) and Sriramana (2014).

4.4.3.10 Scientific Orientation Vs Extent of Adoption

A cursory examination of Table 4.22 showed that there was a positive and highly significant relationship between scientific orientation and extent of adoption of blackgram growers. This indicates that there is an increase in extent of adoption with increase in scientific orientation.

This might be due to the fact that blackgram growers with high level of scientific orientation having evaluated the applicabily and feasibily of recommended blackgram cultivation practices more objectively by following scientific criteria. This might have been the reason for such type of significant relationship between scientific orientation and extent of adoption.

This result was in conformity with the results of Murmu (2003), Janardhan (2004), Gopiram (2005), Naik *et al*. (2009), Ambedkar (2010), Singh *et al*.(2011), Kirammayi (2013) and Sriramana (2014).

4.4.3.11 Risk Orientation Vs Extent of Adoption

It is stated from Table 4.22. that there was a positive and highly significant relationship between risk orientation and extent of adoption of blackgram growers. This leads to the conclusion that extent of adoption of blackgram growers significantly increases with the increase in risk orientation. This might be due to their willingness to take uncertainties in acceptance of new ideas which is making them to adopt more practices.

This finding was in tune with the findings of Kumar (2002), Murmu (2003), Madhavilatha (2002), Raghavendra (2004), Ambedkar (2010), Singh *et al*.(2011), Kirammayi (2013) and Sriramana (2014).

4.4.3.12 Market Orientation Vs Extent of Adoption

From the Table 4.22, it was found that there was a positive and highly significant relationship between market orientation and extent of adoption of blackgram growers. This clearly exhibits that there is an increase in extent of adoption with increase in the market orientation.

Market orientation comprised of production and market function of farm enterprise. Farmers who had this abily would naturally strive hard to get maximum profits by adopting latest technologies and hence the above trend was noticed.

This finding is in confirmation with the findings of Kumar (2002), Ahire and Limbat (2002), Gopinath (2005), Tiwari *et al.* (2007), Ambedkar (2010), Kiranmayi (2013), and Sriramana (2014).

4.4.3.13 Annual Income Vs Extent of Adoption

It is evident from Table 4.22 that there was a positive and significant relationship between annual income and extent of adoption of blackgram growers. This indicates that there is an increase in extent of adoption with increase in annual income. This might be due to the reason that as the annual income increased, the adoption of package of practices also increased. This inferred that the respondents with higher level of annual income adopted package of practices to a great extent.

This observation was substantiated by the findings of Savitha (2001), Prasad (2002), Veeraiah *et al*, (2005), Tiwari *et al*.(2007), Rao (2011) and Kiranmayi (2013) and Sandeep *et al*. (2013).

4.4.3.14 Training Received Vs Extent of Adoption

A cursory examination of Table 4.22 indicated that there was a positive and non- significant relationship between training received and extent of adoption of blackgram growers.

This showed that majority of the growers were not undergone any training programmes related to package of practices , undergoing training programmes will enable the farmers to know the new technology and adoption levels may increased. So there is a need to conduct training programmes to blackgram growers to increase their production.

The above finding was supported by the findings of Arthy (2011), and Thyagarajan (2011).

4.4.4 Multiple Linear Regression Analysis of Profile Characteristics of Blackgram Growers with their Extent of Adoption

An attempt has been made to find out the amount of contribution made by the profile characteristics in explaining the variation in the dependent variable i.e. knowledge towards Blackgram cultivation. The results are presented in Table 4.23

Table 4.23. Multiple linear regression analysis of profile characteristics of blackgram growers with their extent of adoption

(n =120)

S. No.	Profile Characteristics	Regression coefficient	Standard error	't' value
1.	Age	-0.638	2.170	-0.294
2.	Education	-1.442	1.093	-1.319
3.	Farm Size	1.873	1.577	1.188
4.	Farming Experience	-0.552	1.095	-0.504
5.	Extension Contact	0.384	0.667	0.575
6.	Social Participation	0.468	1.186	0.394
7.	Mass Media Exposure	1.326	0.998	1.328
8.	Economic Motivation	0.442	0.496	0.893

9.	Innovativeness	2.375	1.011	2.350 *
10.	Scientific Orientation	1.333	0.445	2.994 *
11.	Risk Orientation	-0.500	1.237	-0.405
12.	Market Oreintation	0.708	0.859	0.824
13.	Annual Income	2.562	1.241	2.064 *
14.	Training Received	-1.555	1.874	-0.830

a = 11.184 R^2 = 0.697

NS = Non significant * Significant at 0.05 level of probabily

From the above table the MLR equation can be fit as $Y = 11.184 + -0.638x_1 + -1.442x_2 + 1.873x_3 + -0.552x_4 + 0.384x_5 + 0.468x_6 + 1.326x_7 + 0.442x_8 + 2.375*x_9 + 1.333*x_{10} +- 0.500x_{11} + 0.708x_{12} + 2.562*x_{13} + -1.555x_{14}$

Table 4.23 revealed that the coefficient of determination "$R^{2"}$ value was significant, as the value of "a" was found significant. The "$R^{2"}$ value of 0.697 indicated that all the selected 14 profile characteristics put together, explained about 69.70 per cent variation in the extent of adoption of selected production technology by the blackgram growers, where as the remaining 30.30 per cent was due to the extraneous effects profile characteristics away from the present study. Hence, it could be stated that the profile characteristics selected to a large extent explained the variation in the extent of adoption of selected production technology by blackgram growers.

The regression coefficient given in Table 4.23. further revealed that the profile characteristics namely innovativeness, scientific orientation, and annual income were found to be positively significant. Remaining profile characteristics viz., age, education, farm size, farming experience, extension contact, social participation, mass media exposure, economic motivation, innovativeness, risk orientation, market orientation and training are non significant.

This implied that innovativeness, scientific orientation and annual income contributed significantly to predict the variation in the extent of adoption of selected production technology of blackgram.

4.5 CONSTRAINTS OF BLACKGRAM GROWERS AND TO ELICIT THE SUGGESTIONS OF BLACKGRAM GROWERS TO ARRIVE AT THE STRATEGY FOR INCREASING THE PRODUCTION

4.5.1 Constraints of Blackgram growers

Table 4.24.Constraints faced by the blackgram growers

(n=120)

S.No.	Constraints*	Frequency	Percentage	Rank
1.	**Sowing**			
a.	Inadequate knowledge about recognized source of seed material.	35	29.16	3
b.	Inadequate knowledge about suitable rice fallow blackgram varieties for the tract	47	39.16	2
c.	Inadequate availabily of good qualy of seed.	28	23.33	4
d.	Inadequate quantity of seed from Gg government agencies.	83	69.16	1
2.	**Fertilizers**			
a.	Inadequate knowledge on micronutrients.	25	20.83	2
b.	High cost of micronutrients.	38	31.66	3
c.	Inadequate technical knowledge on usage of foliar sprays	64	53.33	1
3.	**Irrigation**			
a.	Inadequate power supply	51	42.50	4
b.	Insufficient availabily of water	73	60.83	2
c.	Inadequate information on critical stages of irrigation	84	70.00	1
d.	High cost of digging wells and borewells.	60	50.00	3
4.	**Plant protection**			
a.	Inadequate knowledge about symptoms of pest and diseases.	57	47.5	4
b.	Inadequate knowledge about recommended pesticides and their dosage.	70	58.33	1
c.	Inadequate availabily of pesticides.	23	19.17	6
d.	High cost of pesticides.	46	38.33	5
e.	Inadequate availabily of sprayers.	68	56.67	2
f.	High cost of crop protection equipment.	60	50.00	3

5.	**Marketing**			
a.	Inadequate transportation facilies.	53	44.16	3
b.	Unassured price, and malpractices of Weighment	66	55.00	2
c.	Lack of proper knowledge about market price .	43	35.83	4
d.	Lack of market in the nearby localy.	22	18.33	5
e.	Exploitation by middle men.	92	76.66	1
6.	**Financial constraints**			
a.	Delay in cash payment for the produce.	41	34.16	3
b.	Inadequate financial assistance from the government.	71	59.16	1
c.	High Interest rate and shorter repayment period.	52	43.33	2
7.	**Labour**			
a.	Non-availabily of skilled labour.	41	34.16	3
b.	Non-availabily of labour in time.	81	67.50	2
c.	High wages of labour.	100	83.33	1
8.	**Harvesting and storage**			
a.	Inadequate storage facily.	75	60.83	1
b.	Lack of modern storage facily.	47	39.17	2
9.	**Transfer of Technology**			
a.	Inadequate technical guidance through training programmes about cultivation practices.	98	81.66	1
b.	Low credibily of extension personnel.	42	35.00	2
c.	Apathetic attitude of extension personnel.	40	33.33	3

(*Multiple Response Format)

A quick perusal of Table 4.24 indicated that there were many constraints noticed by blackgram growers in adoption of selected production technology in percentage rank order of their decreasing importance are presented below:

4.5.1.1 Sowing

The data in Table 4.24 reveals that the constraints related to sowing as, inadequate quantity of seed availabily from government agencies (69.16%)-1, inadequate knowledge about suitable rice fallow blackgram varities for the tract (39.16%)-2, inadequate knowledge about recognized source of seed material

((29.16%)-3, inadequate availabily of good qualy of seed and (23.33%)-4. Hence, the Government and Agriculture departments and Agricultural University should plan for supply of good qualy seed, make them aware about the suitable varieties for their area to increase the production.

4.5.1.2 Fertilizers

Constraints related to fertilizer management practices are; inadequate technical knowledge on usage of foliar sprays (53.33%)-1, high cost of micronutrients (31.66%-2), and inadequate knowledge on micronutrients importance (20.83%)-3. Hence, the Government should make every effort to arrange for the and timely supply of micronutrient fertilizers on subsidized basis, and also impart knowledge on time, dosage and method of their application.

4.5.1.3 Irrigation

The irrigation constraints are inadequate information on critical stages of irrigation (70.00%)-1, insufficient availabily of water (60.83%)-2, high cost of digging wells and borewells (50.00%)-3, and inadequate power supply (42.50%)-4. were regarded as important constraints in percentage rank order of their importance. In this regard, Department of Agriculture and Agricultural Universities should make every effort to create awareness on irrigation management.

4.5.1.4 Plant Protection

The plant protection constraints are, inadequate knowledge about recommended pesticides and dosage of pesticides (58.33%)-1, Inadequate availabily of the sprayers (56.67%)-2, followed by high cost of protection equipment (50.00%)-3, insufficient knowledge on symptoms of pests and diseases (47.50%)-4, high cost of pesticides (38.33%)-5 and inadequate availabily of pesticides (19.17%)-6 are the constraints. Hence, the department of Agriculture, and Agricultural Universities should make every effort to impart knowledge to the blackgram growers about dosage, time and method of application of pesticides.

4.5.1.5 Marketing

The marketing constraints are: exploitation by the middle men (76.66%)-1, followed unassured price, malpractices of weighment (55.00%)-2, inadequate transportation facilies (44.16%)-3, lack of proper knowledge about malpractices (35.83%)-4, and lack of market in near by localy (18.33%)-5. In order to overcome the above said constraints, government should provide the favourable support price, establishment of marketing platforms for blackgram and for other pulses, strengthen the farmer factory linkages, eliminate the exploitative middlemen.

4.5.1.6 Financial

The financial constraints are inadequate financial assistance by the government (59.16%)-1, followed by high interest rate and shorter repayment period (43.33%)-2, and delay in cash payment for the produce (34.16%)-3, were the constraints in percentage rank order of their importance. Hence, provision of timely credit at reasonable interest rates, long repayment period, proper exgratia in case of crop failure *etc*. will improve the financial condition of the farmers.

4.5.1.7 Labour

The labour constraints, are: high wages to the labour (83.33%)-1, while non-availabily of the labour in time (67.50%)-2, and absence of skilled labour (34.16%)-3. For this, giving consideration for executing farm activities under MGNREGS by government and arrange training programmes by Department of Agriculture, and Agricultural Universities.

4.5.1.8 Harvesting and Storage

Inadequate storage facily (60.83%)-1, and lack of modern storage facily (39.17%)-2. were the major problems under harvesting and storage. In view of the larger area of pulses, provision of godowns for storing the harvested produce will help in getting the remunerative price.

4.5.1.9 Transfer of Technology

Inadequate technical guidance through training programmes about cultivation practices (81.66%)-1, low credibily of extension personnel (35.00%)-2, and apathetic attitude of extension personnel and Government (33.33%)-3 were the constraints under transfer of technology, expressed by blackgram growers .To solve those constraints, department of Agriculture and agricultural university should strengthen the farmer-extension linkages, arranging timely training programmes to the farmers with the help of scientists and extension personnel and arranging for creation of awareness and provision of advisory services.

4.5.2 Suggestions of Blackgram Growers to arrive at the strategy for increasing Production

Blackgram growers were asked to make suggestions to overcome the problems in adoption of selected production technology. The suggestions along with their ranks are given in Table 4.25

Table 4.25. Suggestions elicited by blackgram growers to arrive at the strategy for increasing production (n=120)

S.No.	Suggestions*	Frequency	Percentage	Rank
1	Evolving varities which are resistant to drought .	24	20.00	9
2	Timely provision of seed.	63	52.50	5
3	Timely technical guidance.	77	64.16	2
4	Financial assistance from the government at the time of crop losses.	87	72.50	1
5	Provision of timely credit facily at lower interest	54	45.00	7
6	Provision of plant protection equipment on subsidy	69	57.50	4
7	Evolving suitable varieties with YMV resistance.	70	58.33	3
8	Provison for conducting training on weed management .	22	18.33	10
9	Provision of good support price to blackgram.	41	34.16	8
10	Provision of good marketing facilies	57	47.50	6

(*Multiple Response Format)

Table 4.25 clearly showed that suggestions elicited from the blackgram growers in percentage rank order of their decreasing importance as: financial assistance from the government at the time of crop losses (72.50%)-1, followed by provision of timely technical guidance (64.16%)-2, evolving suitable varities with YMV resistance (58.33%)-3, provision of plant protection equipment on subsidy (57.50%)-4, timely provison of seed (52.50%)-5, provision of good marketing facilies (47.50%)-6, provision of timely credit facily (45.00%)-7, provison of good support price to blackgram (34.16%)-8, evolving varieties for drought resistance (20.66%)-9, and provison for conducting training on weed management (18.33%)-10 of blackgram growers to arrive at a strategy for increasing production.

From the table 4.25, we can conclude that most of the blackgram growers suggested for increased support from the government in the form of financial assistance at the time of crop losses.

Secondly, they suggested for timely technical guidance from the agricultural department about the pest management viz., YMV, stem fly, thrips attack and trainings on foliar application of fertilizers to mitigate nutrient stresses.

Most of the blackgram growers suugested to evolve YMV resistance varities as whitefly is causing severe damage to blackgram by transmitting YMV which is devastating yields drastically.

Provision of good marketing facily will enable the blackgram growers in getting more money and eliminating the middle men. Even though, there is a presence of more processing industries in this area, there is no proper marketing platform specific to the blackgram.

Timely provision of credit facily will enable the blackgram growers to follow the selected production technology of blackgram and to obtain good yield.

Provision of support price will enable the blackgram grower to develop interest towards the cultivation of the crop as he can get remunerative price for his produce and there by eliminating the middle men.

Evolving suitable drought resistant varieties will helpful to withstand the natural conditions as the crop is grown as fallow crop and the time period may not permit to irrigate the crop due to water scarcity.

Provide training programmes to blackgram growers on weed management as blackgram is grown in fallow conditions and weed infestation is severe problem which is reducing the yields drastically.

Thus, it is the responsibily of the government, extension agency and research institutions to provide the above suggested facilies to the blackgram growers for better adoption of selected production technology of rice fallow blackgram.

4.6 FEW TYPICAL CASELETS OF BLACKGRAM GROWERS

4.6.1 Caselet-I

P. Samba siva rao is one of the progressive farmer of Mulkuduru village of Ponnur mandal, 51 years old and educated. He has studied up tenth class. He has almost 10 acres of land under rice fallow blackgram cultivation. The variety selected for cultivation is LBG - 752 sown in the fortnight of November month before 2-3 days of harvest of paddy. He uses the famers meetings, as a platform to share his experience with blackgram crop. He talks about the technological aspects and how even very poor farmers can suitably use it on their small plots to increase productivity. He answers their queries on pest management *etc*. Various exposure visits to his farm has been organized for farmers groups as a demonstration site for good yield. He is maintaining good contact with department of agriculture.He usually control the serious pest i.e. whitefly by spraying Acetamaprid 1.0 g/ l. He used to irrigate the crop twice at critical stages which usually commences at 30 days and 50 days. He obtained the yield of 6 quintals of yield for one acre.From the entire land holding, he obtained around 54 quintals. He invested an amount of Rs. 2,00,000 for all practices and procured a gross income of Rs.4,50,000/- and net income he had is Rs. 2,50,000 from 10 acres of land by cultivating rice fallow blackgram.

4.6.2 Caselet-II

Mr. K. Sasidhar babu belongs to Amarthalur village of Amarthalur mandal, 48 years old, and completed his degree in B.S.C and he is having land of 24 acres. He is growing L.B.G -752 variety He started cultivation and realized a reasonable income. But, he says “the income and marketing did not prove satisfactory”. He is having more extension contact and social participation and also innovative. He is following foliar spray of 2% urea for the crop to mitigate the nutrient defeciencies. Most of the farmers are doing 7-8 sprays for control of pests and diseases but he is confining to 3-4 sprays and following integrated pest management practices and he is giving two irriagations at flowering stage and pod development stages which are critical stages. He is giving suggestions to other farmers to take up clean cultivation practices to control whitefly and he assured that from next season to use NSKE for controlling whitefly menace which causes YMV. He is getting an yield of 6 quintas per acre and he is investing an amount of 20,000 for one acre for doing management practices.

4.6.3 Caselet-III

Mr. M. Srinivasulu is a 50 years old farmer from Intur village of Amarthalur mandal. The farmer is presently cultivating LBG-752 variety of blackgram in 3 acres of land and able to earn Rs.70,000/- The acreage of cultivation is not a big issue but the price is, “he says and adds, “crops can be in a few cents or many acres. What is really important is immediate sale”. The reason for selecting blackgram according to him is that the surrounding areas are full of rice fallow blackgram fields and he can get additional income after paddy by following some management practices. Regarding pest attacks, the farmer says that YMV caused by White fly, Thrips and Tobacco caterpillar and regarding diseases noticed by him are cercospera leaf spot and rust were noticed and he explained symptoms and management practices . The farmer is in frequent contact with department of agriculture and according to their suggestion, he is following management practices. He is getting an yield of 5.0 quintas per acre and he is getting income of Rs. 70,000 by investing Rs. 35,000.

4.6.4 Caselet-IV

Mr. P. Venkateswarlu of Dulipudi village in Nagram mandal is of 45 years old with 4 acres of land holding. He is growing in 4 acres of land by selecting LBG-752 variety in rice fallow conditions. He had more mass media exposure and extension contact and he is following seed treatment for control of sucking pests using Imadacloprid 5.0g/ kg of seed. He is following the recommended seed rate of 16 kg/acre. For weed management he is doing 1 spray and for control of pests and diseases he is doing 5-6 spryas and he is providing one irrigation at flowering stage. He explained the major pest whitefly which is the causative organism for YMV and he sprays Acetamaprid 1.0g / l and for controlling of leaf spots he uses Mancozeb 1.0 g/ l .He is getting an yield of 4.5 quintas from one acre he explained that due to some water scarcity this year there is reduction in yield he invests Rs.18,000 per acre for undergoing management practices and he explained that by controlling YMV one can get good remunerative prices.

4.7 EMPIRICAL MODEL OF THE STUDY

The Fig.4.17. indicated that the profile characteristics of blackgram growers extension contact, social participation, mass media exposure, economic motivation, innovativeness, scientific orientation, risk orientation, market orientation, annual income showed significant relationship with level of knowledge of recommended practices of blackgram. Therefore, it could be concluded that there is an increase in knowledge of blackgram growers with increase in these characteristics.

The Fig. 4.17. also indicated that there was a significant correlation between extension contact, social participation, mass media exposure, economic motivation, innovativeness, scientific orientation, risk orientation, market orientation, annual income with extent of adoption of recommended practices in blackgram. This clearly showed that there was an increase in extent of adoption with the increase in these characteristics.

So, it could be implied that except age, education, farm size, farming experience, training received, all other variables in the figure significantly associated with level of knowledge and extent of adoption.

Chapter V

SUMMARY AND CONCLUSIONS

This chapter provides brief information on the systematized efforts undertaken for the empirical study with a focus on the emerged findings. It includes summary of the findings, implications of the study and suggestions for further research.

Pulses are one of the important segments of Indian agriculture after cereals. India is the largest producer of pulses *i.e* 14.76 million tonnes in the world with the 25% share in the global production covering an area of about 23.63 million hectare, majority of which falling under rainfed condition where irrigation facilities are inadequate or not available. These include chickpea, groundnut, lentil, mungbean, urdbean, fababean, lathyrus, peas etc.

Black gram is a member of the Asiatic Vigna crop group. It is an annual pulse grown mostly as a fallow crop in rotation with rice. Similar to the other pulses, black gram, being legume, enriches soil nitrogen content and has relatively short (75-90) days maturity.

Black gram is scientifically known as *Phasiolus mungo* and it is commonly known as Urad in India. India is its primary origin and is mainly cultivated in Asian countries including Pakistan, Myanmar and parts of southern Asia. About 70%t of world's black gram production comes from India. In India, Blackgram is grown in 31 lakh hectares with production of 14 lakh tonnes with productivity of 451 Kg per hectare. In Andhra Pradesh black gram is grown in an area of 3,70,000 hectares with a production of 3,09,000 tonnes.

India imports 2 to 3 million tons of pulses annually to meet the domestic consumption requirement. Thus, there is a need to increase production and productivity of pulses, in general and black gram, in particular of country by more intensive interventions.

However, level of knowledge and extent of adoption of any innovation is hampered or hastened mainly by farmer's characteristics and also the environment in which they live. So, it is another vital thing that needs to be given priority after evolution of such technologies. Hence, the study entitled **"A Study on the Knowledge and Extent of Adoption of the Farmers on Recommended Rice Fallow Blackgram Production Technology in Guntur district of Andhra Pradesh"** was proposed to analyze the level of knowledge and extent of adoption by the blackgram growers.

OBJECTIVES OF THE STUDY

1. To study the profile characteristics of blackgram growers.
2. To study the level of knowledge and extent of adoption of blackgram growers on selected production technology.
3. To find out the relationship of profile characteristic of blackgram growers with their level of knowledge and extent of adoption.
4. To analyze the constraints of blackgram growers and to elicit the suggestions of blackgram growers and arrive at the strategy for increasing the production.
5. To present a few typical case-lets of blackgram growers.

After the extensive review of literature, discussion with experts, the independent variables of blackgram growers namely age, education, farm size, farming experience, extension contact, social participation, mass media exposure, economic motivation, innovativeness, scientific orientation, risk orientation, market orientation, annual income, training received were selected. The dependent variables were level of knowledge and extent of adoption.

RESEARCH DESIGN

Ex-post facto research design was used in the present investigation.

SAMPLING PROCEDURE

Guntur District will be purposively selected, as Blackgram is having highest productivity (943 Kgs. per hectare) among all thirteen districts of Andhra Pradesh during the Rabi season of the year, 2013 - 2014. During the same year the area under cultivation of Blackgram for Rabi season is 36,768 hectares with a production 36,768 Tonnes. This crop recorded a continuous decline in the area under cultivation from the 1,65,000 hectares with a production of 1,29,000 Tonnes during the year 2000-2001.

Guntur district in Andhra Pradesh was purposively selected, since it stands in first position from the point of its productivity under the crop among all the districts in Andhra Pradesh state, during the year 2014-2015. Three mandals viz., Ponnuru, Amruthalur, and Nagaram were purposively selected as they have more area under blackgram cultivation in the district and four villages from each mandal thus making a total of twelve villages. From the list of blackgram growers in the selected villages, 120 blackgram growers were selected by following proportionate random sampling procedure.

The primary data were taken from the respondents by personal interview with the help of pre-tested interview schedule covering all aspects of the investigation. Prior to that knowledge test was developed for better understanding of the knowledge items on Blackgram cultivation. To convert the data into meaningful findings, statistical tools such as; inclusive class interval method, Arithmetic Mean ($\overline{X}$), Standard Deviation (σ), Frequency, Percentage (%), correlation (r) and Multiple Linear Regression (MLR) were used.

The summary of the findings were presented as follows.

5.1 PROFILE CHARACTERISTICS OF BLACKGRAM GROWERS

Majority of the Blackgram growers (40.00%) per cent of respondents belonged to old age followed by middle age (36.66%) and young age (23.33%).

One-fourth of the blackgram growers (23.33%) were educated upto primary school, followed by those coming under illiterate (20.00%), upper primary school (19.16%), high school (18.33%), intermediate education (11.66%) and graduation and above (7.50%) categories.

More than (38.33 %) of the black gram growers had small farm size (38.33%), followed by those with medium (20.83%), marginal (20.83%) farm size and (20.00%) of them had large farm size.

Less than (61.66%) two-thirds of the blackgram growers had medium level of farming experience, followed by those with high (21.66%) and low (16.66%) levels of farming experience.

Nearby half (46.66%) of blackgram growers had medium extension contact and (42.50%) of them with high extension contact. Whereas, only (10.83%) of the blackgram growers low high extension contact.

More than one third (38.33%) of the blackgram growers had high level of social participation, followed by the remaining with medium (37.50%) and low (24.16%) levels of social participation.

Less than half (45.00%) of the blackgram growers had medium mass media exposure followed by those with high (31.66%) and Low (23.33%) mass media exposure.

Majority (59.16%) of the blackgram growers had medium economic orientation followed by the rest with low (20.83%) and high (20.00%) levels of economic motivation.

More than two fifths of blackgram growers had medium level of innovativeness followed by the rest with high (32.50%) and low (24.16%) levels of innovativeness.

Majority (62.50%) of the blackgram growers had medium scientific orientation followed by those with high (24.16%) and low (13.33%) levels of scientific orientation.

Majority (59.16%) of the blackgram growers had medium level of risk orientation followed by those with high (27.50%) and low (13.33%) levels of risk orientation.

Majority (67.50%) of the blackgram growers had medium market orientation followed by the remaining with high (19.16%) and low (13.33%) levels of market orientation.

More than half (52.50%) of the blackgram growers had medium level of annual income followed by those with low (25.00%) and high (22.50%) levels of annual income.

More than half (57.50%) of the blackgram growers had undergone zero trainings, followed by 32.50 percent with 1-2 trainings , 10.00 percent with 2-4 trainings and there were no growers who had undergone more than four trainings.

5.2 LEVEL OF KNOWLEDGE AND EXTENT OF ADOPTION OF BLACKGRAM GROWERS ON SELECTED PRODUCTION TECHNOLOGY OF BLACKGRAM

5.2.1 Level of Knowledge

Majority (65.00%) of the blackgram growers had medium level of knowledge, followed by those with high (19.16%) and remaining with low (15.83%) level of knowledge.

5.2.2 Extent of Adoption

Majority (65.00%) of the blackgram growers had medium level of adoption, followed by those having low (17.50%) and high (17.50%) levels of adoption.

5.3 RELATIONSHIP OF PROFILE CHARACTERISTICS OF THE BLACKGRAM GROWERS WITH THEIR LEVEL OF KNOWLEDGE AND EXTENT OF ADOPTION

5.3.1 Relationship between profile characteristics of blackgramgrowers and level of knowledge

Out of fourteen selected profile characteristics nine of them such as extension contact, social participation, mass media exposure, economic motivation, innovativeness, scientific orientation, risk orientation, market orientation, annual income showed significant relation with level of knowledge on

selected production technology of blackgram. But age, education, farm size, farming experience, and training received did not show any significant relationship with the level of knowledge.

5.3.2 Multiple linear regression analysis of selected profile characteristics of Blackgram with level of knowledge

The MLR analysis revealed that the selected profile characteristics put together, explained about 86.66 per cent variation in the level of knowledge of blackgram growers, remaining 13.40 per cent was due to the effect of extraneous characteristics. The independent variables namely social participation, economic motivation, scientific orientation, market orientation were found to be positively significant. Whereas, age, education, farm size farming experience, extension contact, mass media exposure, innovativeness, risk orientation, annual income, training received are non significant in their contribution to the variation in the level of knowledge.

5.3.3 Relationship between selected profile characteristics of blackgram growers and extent of adoption

Out of fourteen selected profile characteristics nine of them such as extension contact, social participation, mass media exposure, economic motivation, innovativeness, scientific orientation, risk orientation, market orientation, annual income showed significant relation with level of adoption on selected production technology of blackgram. But age, education, farm size, farming experience, and training received did not show any significant relationship with the level of adoption.

5.3.4 Multiple linear regression analysis of selected profile characteristics with extent of adoption

The MLR analysis found that the selected profile characteristics put together, explained about 69.70 per cent variation in the extent of adoption of selected production technology of blackgram. Remaining 30.30 per cent was due to the effect of extraneous characteristics. The profile characteristics namely

innovativeness, scientific orientation, annual income, were found to be positively significant. Remaining profile characteristics viz., farm holding, farming experience, extension contact, mass media exposure, economic motivation, risk orientation, market orientation, training received are non significant in their contribution to the variation in the level of adoption..

5.4 CONSTRAINTS OF BLACKGRAM GROWERS AND SUGGESTIONS ELICITED BY BLACKGRAM GROWERS TO ARRIVE AT THE STRATEGY FOR INCREASING PRODUCTION

5.4.1 Constraints of Blackgram Growers

The most important constraints encountered by the blackgram growers are: inadequate quantity of seed availability from government agencies, inadequate technical knowledge on usage of foliar sprays, inadequate information on critical stages of irrigation, inadequate availability of sprayers, exploitation by middle men, inadequate financial assistance from the government , non-availability of labour in time, inadequate storage facility, and inadequate technical guidance through training programmes about cultivation practices.

5.4.2 Elicited Suggestions of blackgram Growers to arrive at the strategy for increasing production

Suggestions made by the blackgram growers to overcome the constraints were : financial assistance from the government at the time of crop losses, timely technical guidance to the farmers, provision of plant protection equipment and on subsidy, provision of good marketing facilities, provision of timely credit facility at lower interest, providing support price to blackgram, evolving suitable varieties with YMV and drought resistance, supply of seed adequately and on timely basis. through government agencies.

5.5 IMPLICATIONS OF THE STUDY

The implications of the study brought out several practical implications mostly in the nature of suggesting change in manipulation of profile characteristics. So as to contribute to effective transfer of blackgram production technology to increase the crop yields.

1. Level of knowledge with respect to package of practices of blackgram was found at medium level. Hence, there is a need to increase level of knowledge of blackgram growers by conducting suitable training programmes, demonstrations and organizing regular field visits by extension officers to farmer's fields.

2. The present study revealed that majority of the blackgram growers had medium level of adoption of selected production technology. Most of the blackgram growers were not practicing the selected production technology of rice fallow blackgram. Since, these practices call for additional knowledge and skills. Therefore, the efforts should be made to provide the required knowledge and skills through training programmes and demonstrations. Besides, mass contact methods could be used for wider community adoption. Hence, there is a need on the part of extension personnel to educate and convince the blackgram growers to adopt selected production technology to a large extent by way of conducting demonstrations, field trips, training programmes and exhibitions *etc*.

3. It is observed from the study that majority of the blackgram growers were old aged followed by middle and young age. In order to attract youth into farming, the agriculture should be transformed as a profitable enterprise by the government by organizing the special campaigns.

4. Majority of the blackgram growers are educated upto primary school level only. Education is vital for development. One of the key role of blackgram growers is dissemination of advanced technical knowhow to the fellow blackgram growers in the villages. The job can effectively be performed by blackgram growers with higher education. So the educational levels of present blackgram growers can be increased by organizing the non-formal educational programmes in the villages.

5. Medium level of extension contact was observed among majority of the blackgram growers. This trend should be changed by making regular visits of extension personnel and have to develop good rapport with blackgram growers.

6. Majority of the blackgram growers had medium mass media exposure. They should develop the habit of utilization of mass media, and gain latest recent technical knowledge through mass media.

7. Most of the blackgram growers had medium level of innovativeness and scientific orientation. Innovativeness of blackgram growers may be enhanced by taking them to research stations and demonstration plots frequently and provide the opportunity to interact with scientists viz., training programmes, method demonstrations and field visits.

8. Majority of the blackgram growers had medium level of economic motivation and risk orientation which should be built up by teaching better utilization of inputs and use of low-cost technologies and financial assistance from the government should increase their risk taking ability.

9. Majority of the blackgram growers had medium level of market orientation. This trend should be increased by providing latest market information marketing facilities to them and thereby enhancing the market orientation of the blackgram growers.

10. The variables namely extension contact, social participation, mass media exposure, economic motivation, innovativeness, scientific orientation, risk orientation, market orientation, annual income exhibited positive and significant relationship with the level of knowledge and extent of adoption of the blackgram growers. Keeping this in mind, appropriate extension strategies should be designed to improve the level of knowledge and extent of adoption of respondents in blackgram growing.

11. Findings high lightened many constraints encountered by blackgram growers in adoption of selected production technology of blackgram were; inadequate knowledge about suitable varieties for the tract, inadequate availability of spraying equipment, exploitation by middle men, inadequate financial assistance from government, non-availability of the labour in time and low credibility of

extension personnel were the key constraints. So, extension officers shall arrange demonstrations for imparting techniques, skills of practices to the blackgram growers for adoption of selected production technology.

12.For increasing level of adoption, important suggestions elicited from the blackgram growers were; financial assistance from the government at the time of crop losses, timely technical guidance, timely provision of plant protection equipmenton subsidy, provision of good marketing facilities, provision of timely credit facilities, providing support price to blackgram, evolving suitable varieties with YMV resistance.

5.6 SUGGESTIONS FOR FUTURE RESEARCH

The findings of the present study warrant the need for further investigations in several directions, the following suggestions are made for use of further researchers who undertake studies in this area.

1. The present investigation was confined to the specific area of Guntur district. Similar studies may be undertaken in other districts. The study needs to be conducted in all the blackgram growing areas of Andhra Pradesh. So that inference thereof can be generalized to a greater extent than from present study.
2. The present study confined to twelve villages of three mandals with a total of 120 respondents only. Similar studies may be taken with more mandals and respondents.
3. The present study had considered only few selected profile characteristics in order to find out their relationship with level of knowledge and extent of adoption. A number of other profile characteristics which are likely to affect them may also be studied.
4. The study was conducted according to *Ex-post facto* research design in order to understand the level of knowledge and extent of adoption of farmers. Experimental studies can be lined in order to know the exact impact of such studies in detailed.
5. Separate studies on training needs of blackgram growers and constraint analysis of blackgram growers can also be taken up.

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Note : Literature cited as per the **Thesis Format Guidelines, 2010** of **Acharya N. G. Ranga Agricultural University, Rajendranagar, Hyderabad -500 030.**

PART-III

EXTENT OF ADOPTION OF SELECTED PRODUCTION TECHNOLOGY OF RICE FALLOW BLACKGRAM

S. No.	Recommended Practice	FA (4)	PA (3)	NA (2)	OA (1)	Reasons
A. Soils:						
1.	Growing of blackgram in well drained loam soils.					
B. **Varieties**						
2.	Growing of LBG- 648 for the control of leaf spot.					
3.	Growing of LBG- 648 for the control of wilt.					
4.	Growing of LBG -752 (Polished Variety) for the control of yellow mosaic virus.					
5.	Growing of PU-31 for the control of yellow mosaic virus.					
C. **Sowing**						
6.	Sowing the seed in the months of November- December.					
7.	Sowing of seed prior to 2-3 days of harvest of Paddy.					
8.	Following the seed rate of 16 kg/ acre.					
9.	Following the method of sowing as broadcasting.					
10.	Seed treatment with with Imidacloprid @ 5g / kg of seed against sucking pests.					
11.	Seed treatment with Thiram (Mancozeb /Dithane M – 45 / Captan) @ 2.5gm / kg of seed					
12.	Seed treatment with Rhizobium Culture @ 250 grams / Kg.					
13.	Drying of seed after seed treatment.					
D. Manures and fertilizers:						
14.	Foliar Spray of 2% Urea as a remedy to mitigate nutrient stress in rice fallow blackgram.					
15.	Foliar Spray of 2 % DAP as a remedy to mitigate nutrient stress					
E Irrigation:						
16.	Irrigating the field at 30 days (Reproductive Stage) and 50 days (Pod Formation Stage) after sowing to improve the yields in rice fallow blackgam.					

F. Weed Control						
17.	Spraying of Fenoxiprop Ethyl 9% solution @250 ml. per acre in 200 Litres of wate					
18.	Spraying of Quizaloprop Ethyl 5% solution @ 400ml. per acre in 200 Litres of water.					
19.	Spraying of Weedicides after 20 – 25 days of sowing.					
G. Plant Protection:						
20.	Foliar application of 5% Neem Seed Kernel Extract (NSKE) afte as a prophylactic spray to control whitefly that transmits yellow mosaic virus.					
21.	Spraying of Chloripyriphos@ 2.5 ml./ Monocrotophos @ 1. 6 ml. / Acephate @1. 0 g. against yellow mosaic virus.					
22.	Spraying Acephate 1.0g / Litre to control Aphids.					
23.	Spraying Novaluron 1.0 ml/ Litre along with Dichlorovas @1. 0 ml. per litre to control Maruca pod borer					
24.	Spraying Mancozeb 2.5g / Litre to control coryenospera leaf spot.					
25.	Spraying Copper Oxichloride @ 3. 0 g. per letre against Corynespora leaf spot.					
26.	Spraying of Hexaconazole at the interval of 10 days @ 2. 0 ml. per litre against Corynespora leafspot.					
27.	Collection and destruction of skelotonised leaves along with first instar larvae to control tobacco caterpillar.					
28.	Spraying of Mancozeb @ 2. 5 g. / Hexaconazole @3. 0 ml. / Copper Oxichloride @ 3. 0 g. per litre against Anthrocnose					
29.	Spraying of Mancozeb @ 3. 0 g. per litre along with1. 0 ml. Dianocap / 1. 0 Tridiomarph @ 1. 0 g. against rust.					
30.	Practicing Spraying critical Stages of 35 - 45 Days, 45 - 50 Days and 60 - 65 days for Integrated Pest Management.					
31.	Growing of Maize or Jowar as border rops to arrest the spread of white fly / thrips / aphids / mites					
32.	Keeping pheromone traps here and thee in the field to identify the existence of white fly.					
33.	Spraying of Trizophos @1. 25 ml / Acephate @ 2. 0 ml / Metasystoxs @2 0 ml / Acetomaprid @0. 2 g. / Litre against white fly menace,					

H. Harvesting						
34.	Harvesting he crop when most of the pods turn black.					
35.	Harvesting after 75 to 80 days from the date of sowing.					
36.	Drying of harvested crop on the threshing floor and later going for threshing.					
37.	Threshing manually or trampling by bullocks.					

ACHARYA N.G. RANGA AGRICULTURAL UNIVERSITY

DEPARTMENT OF AGRCULTURAL EXTENSION

AGRICULTURAL COLLEGE, BAPATLA

A STUDY ON THE KNOWLEDGE AND EXTENT OF ADOPTION OF THE FARMERS ON RECOMMENDED RICE FALLOW BLACKGRAM PRODUCTION TECHNOLOGY IN GUNTUR DISTRICT OF ANDHRAPRADESH

INTERVIEW SCHEDULE

PART-I

Respondent No: ☐

GENERAL INFORMATION:

1. Name of the farmer :
2. Village :
3. Mandal :
4. Cell Phone No :

PROFILE CHARACTERISTICS OF THE RICE FALLOW BLACKGRAM GROWERS:

2. Education			**Score**
i.	Illiterate	( )	1
ii.	Primary School	( )	2
iii.	Upper Primary School	( )	3
iv	High School	( )	4
v.	Intermediate Education	( )	5
vi.	Graduation and above	( )	6

3. Farm Size (in hectares):

Marginal (0.1-1.0 ha)	( )	1
Small (1.1-2.0 ha)	( )	2
Medium (2.1-4.0 ha)	( )	3
Large (>4.0 ha)	( )	4

4. Farming Experience:

How many years experience do you have in cultivation of Rice fallow Blackgram?

			Score
a)	1 - 5 Years	( )	1
b)	6 - 10 Years	( )	2
c)	11 - 15 Years	( )	3
d)	16 - 20 Years	( )	4
e)	More than 20 Years	( )	5

5. Extension Contact:

a) Do you have contact with extension worker: YES/NO

b) If yes, whom do you meet?

S.No.	**Source**	**Frequently (3)**	**Occasionally (2)**	**Rarely (1)**
1.	Multi purpose extension officer			
2.	Agricultural Extension Officer			
3.	Mandal Agricultural Officer			
4.	Assistant Director of Agriculture			
5.	JDA/DDA			
6.	Village Secretary			
7.	Scientists			
8.	Friends & Relatives 2. Progressive farmers 3. Input dealers 4. Agri – clinics			
9.	Input Dealers			
10.	Agri – Clinics			
11.	Any Other (please specify)			

6. Social Participation:

i.	Without membership in any organization	( )	1
ii.	Membership in one organization	( )	2
iii.	Membership in more than one organization	( )	3
Iv	Financial contribution to common fund for common work	( )	4
v.	Office bearer in any organization	( )	5
vi.	Involvement in community work	( )	6

7. Mass Media Exposure:

You may be getting information on agricultural technology through various sources. Please tell me which of the following sources you have utilized for getting information on Blackgram production technology and how often?

S. No.	Source	Extent of Exposure		
		Regularly (3)	Occasionally (2)	Never (1)
1.	Radio Programmes			
2.	Television Programmes			
3.	News Paper			
4.	Books on Agriculture			
5.	Exhibitions and Kissan Melas			
6.	Any other (specify)			

8. Economic Motivation :

A set of statements given below represents Economic motivation of the farmers. Please express your feeling about the statements by indicating the degree of your agreement on the five point continuum**.**

S.NO.	Statements	Response Categories				
		SA(5)	A(4)	UD(3)	DA(2)	SDA(1)
1.	A rice fallow blackgram farmer should work towards higher yield and economic gains.					
2.	The most successful farmer is one who makes more profits.					
3.	A farmer should grow high yielding varieties to increase monitory profits than local varieties.					
4.	A farmer should try the new farming ideas, which may earn him more money.					
5.	It is difficult for the farmer's children to make good start unless he provides them with economic assistance.					
6*.	A farmer must cash his living but the most important thing in life cannot be defined in economic terms.					

9. Innovativeness:

The below given statements indicate the degree of innovativeness of the farmers. Please indicate your level of agreement or disagreement to the following statements:

S.No	Statements	Response		
		A (3)	UD(2)	DA(1)
As a Blackgram farmer,				
1.	One should prefer to learn new ways of Black gram cultivation.			
2.	One should show interest in attending the talks on Blackgram Cultivation delivered by extension worker			
*3.	One cannot increase the production of blackgram as it is in the hands of god.			
4.	One should strive for change in the life by increasing the blackgram production			
5.	One should work with profit motto in going for blackgram production			
*6.	One should live happily without worrying for tommarrow.			
*7.	One should not hesitate in making his son a farmer			
8.	One should try to follow new technologies in Blackgram production.			

10.Scientific Orientation:

A set of statements given below represents Scientific Orientation of the farmers. Please express your feeling about the sstatements by indicating the degree of your agreement on the Five Point Continuum**.**

S. NO.	Statements	Response Categories				
		SA(5)	A(4)	UD(3)	DA(2)	SDA(1)
1.	Improved methods of rice fallow blackgram cultivation gives better results than traditional ones.					
2.*	The ways of our forefather's farming is still the best way even today.					
3.	A good farmer experiments with new ideas in order to raise the standard of living.					
4.	One should go for creative and scientific thinking in obtaining good results.					
5.	Even a farmer with lot of experience should use new methods of farming.					
6.	Though it takes time for a farmer to learn new methods in rice fallow blackgram cultivation it is worth the efforts.					

11. Risk Orientation:

A set of statements given below represents Risk Orientation of the farmers. Please express your feeling about the statements by indicating the degree of your agreement on the Three Point Continuum**.**

S.NO.	Statements	Response Categories		
		A(3)	UD(2)	DA(1)
As a Blackgram Farmer,				
1.	One should try an entirely new method even if it involves risk when it is worth while			
2.	One should rather take more of a chance in making a big profit than to be content with smaller, but less risky profits.			
3.	One should exhibit willing to take greater risks if better in financial condition.			
4.	One should take risks when knows his chances of success is fairly high.			
5*.	one should not try new farming methods unless most other farmers have used them with success.			
6*.	One should change his cropping pattern to avoid greater risks.			

12.Market Orientation:

A set of statements given below represents Market orientation of the farmers. Please express your feeling about the statements by indicating the degree of your agreement on the Three Point Continuum**.**

S.NO.	Statements	Response Categories		
		A(3)	UD(2)	DA(1)
As a Blackgram farmer,				
1.	One should strive to get good price by producing good quality produce			
2.	One should grow the variety which is having higher market demand.			
3.	One should store the produce to get a better price for his produce.			
4*.	One should sell his produce to the nearest market irrespective of the prices.			
5*.	One should purchase the inputs from the nearest shop where his neighbors and relatives are purchasing.			
6*.	One should sell his produce through the market traders.			

13. Annual Income:

Income from Agriculture:							
S. No.	**Crops**	**Main Product**			**Bi - Product**		
		Yield (Quintals)	**Per Unit Price**	**Total Returns**	**Yield (Quintals)**	**Per Unit Price**	**Total Returns**
Kharif							
1.	Paddy						
2.							
3.							
4.	Any Other (Specify)						
Rabi							
1.	Paddy						
2.	Blackgram						
3.							
4.	Any Other (Specify)						
Zaid							
1.							
2.							
						Sub - Total:	

Non Agricultural Sources				
S. No	**Activity**	**Wages / Salary per Month**	**Employment Period**	**Total Wages / Salary per Year**
1.	Service			
2.	Business			
3.	Agricultural Labour			
4	Non -Agricultural Labour			
5.	Artesian			
			Sub – Total:	
			Grand – Total:	

14. Training Received:

S. No.	Numbers of Trainings received	Score
1.	0 Trainings	1
2.	1- 2 Trainings	2
3.	2 - 4 Trainings	3
4.	4 - 6 Trainings	4
5.	6 and above Trainings	5

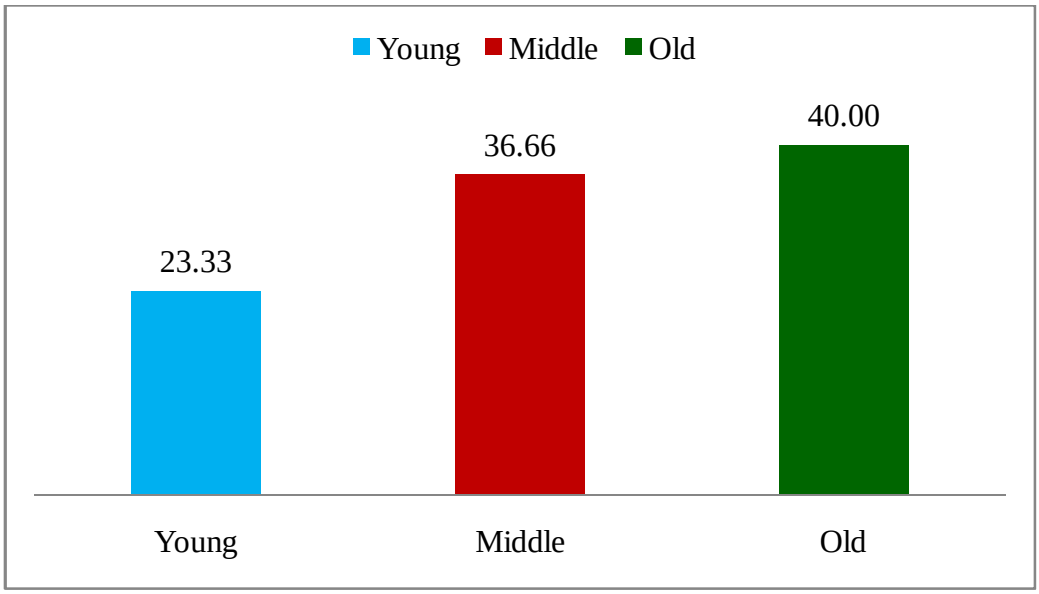


Fig. 4.1. Distribution of blackgram growers according to their age

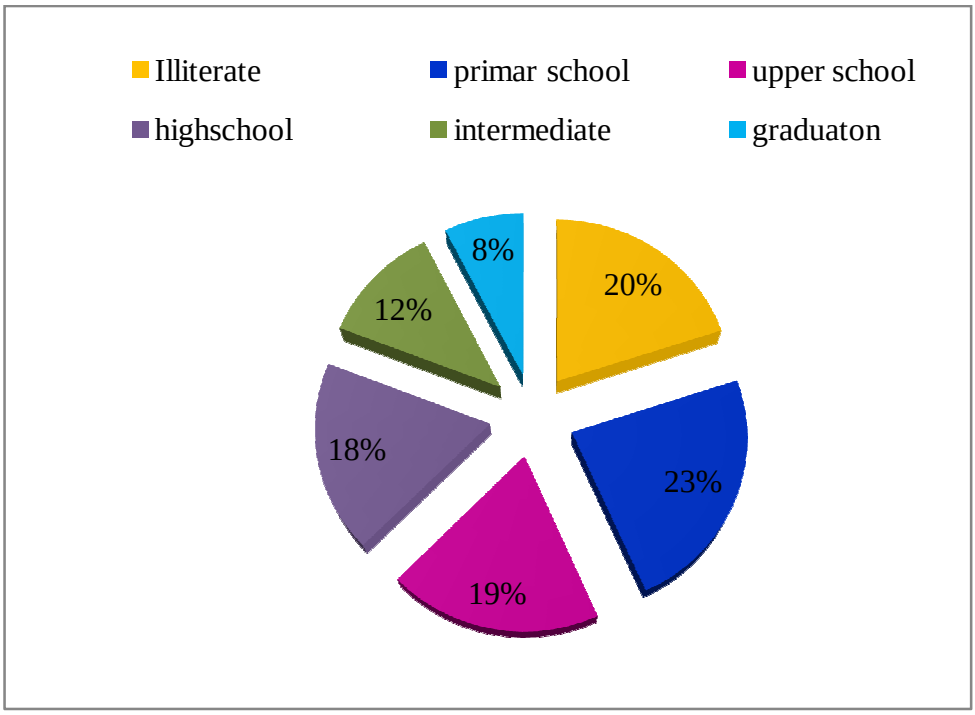
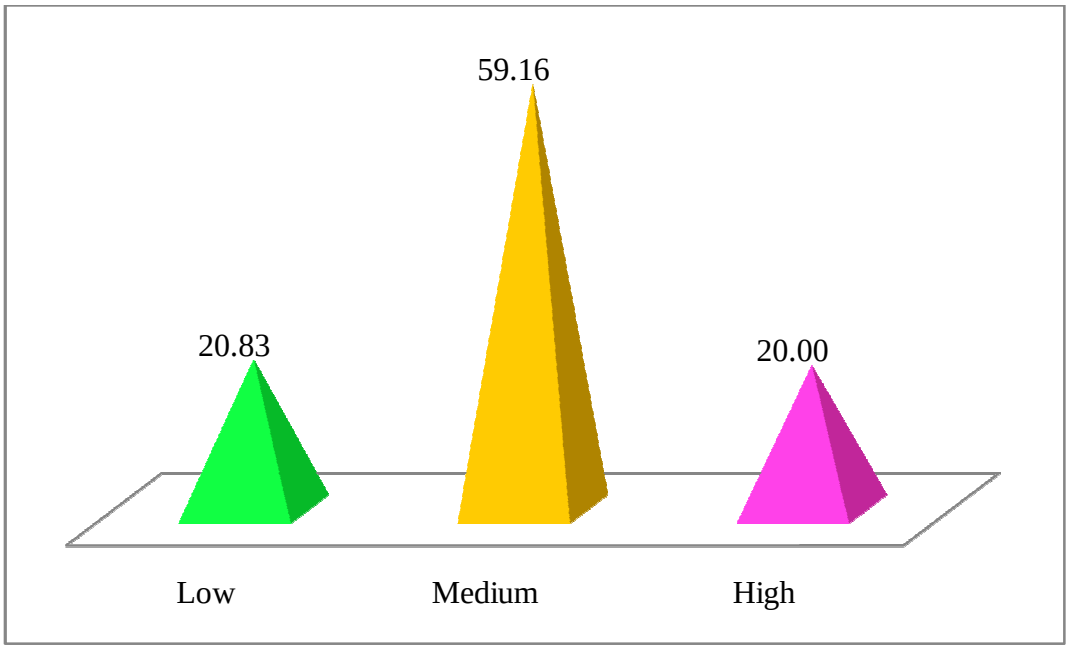
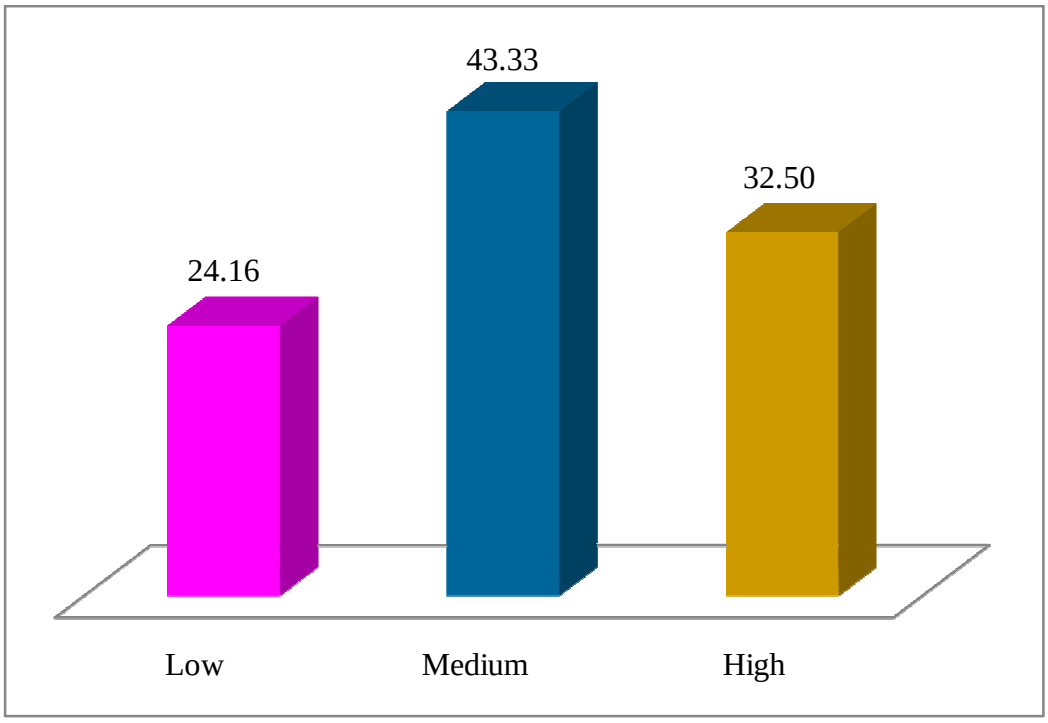


Fig. 4.2. Distribution of blackgram growers according to their education



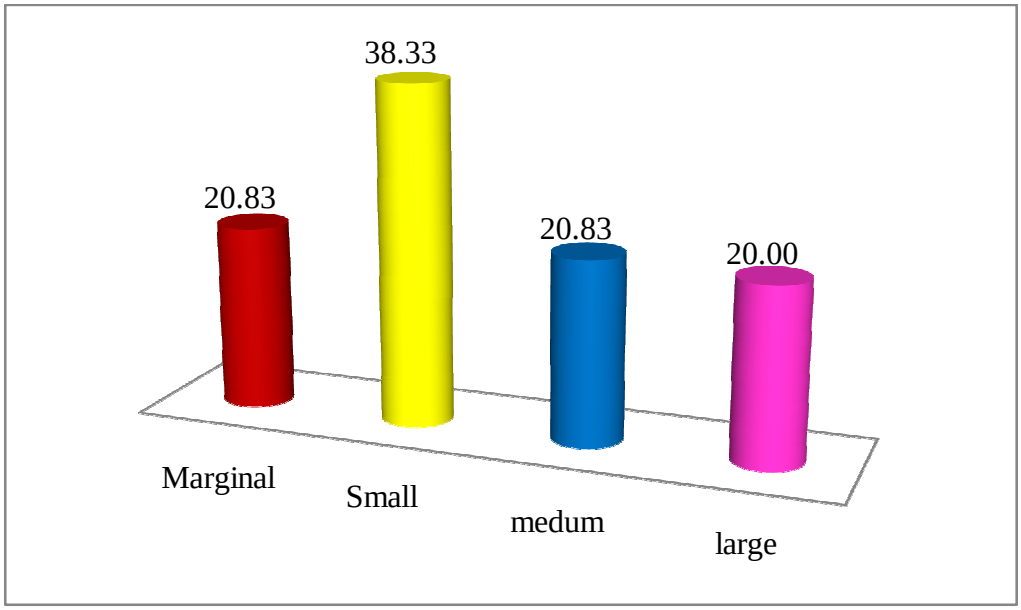
Economic motivation

Fig. 4.8 Distribution of blackgram growers according to their economic motivation



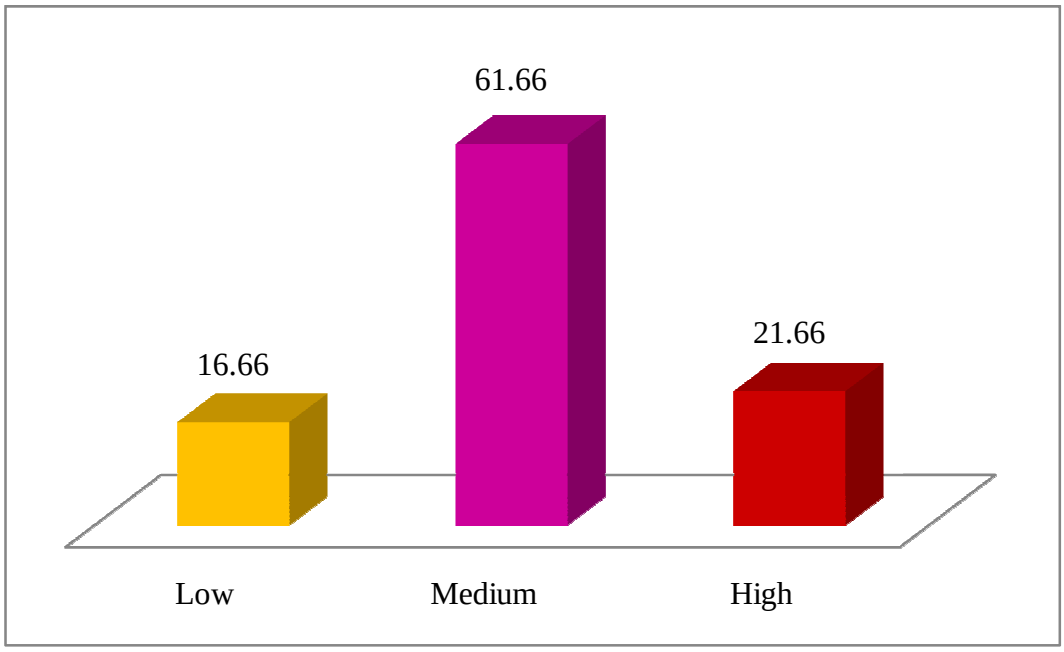
Innovativeness

Fig. 4.9 Distribution of blackgarm growers according to their innovativeness



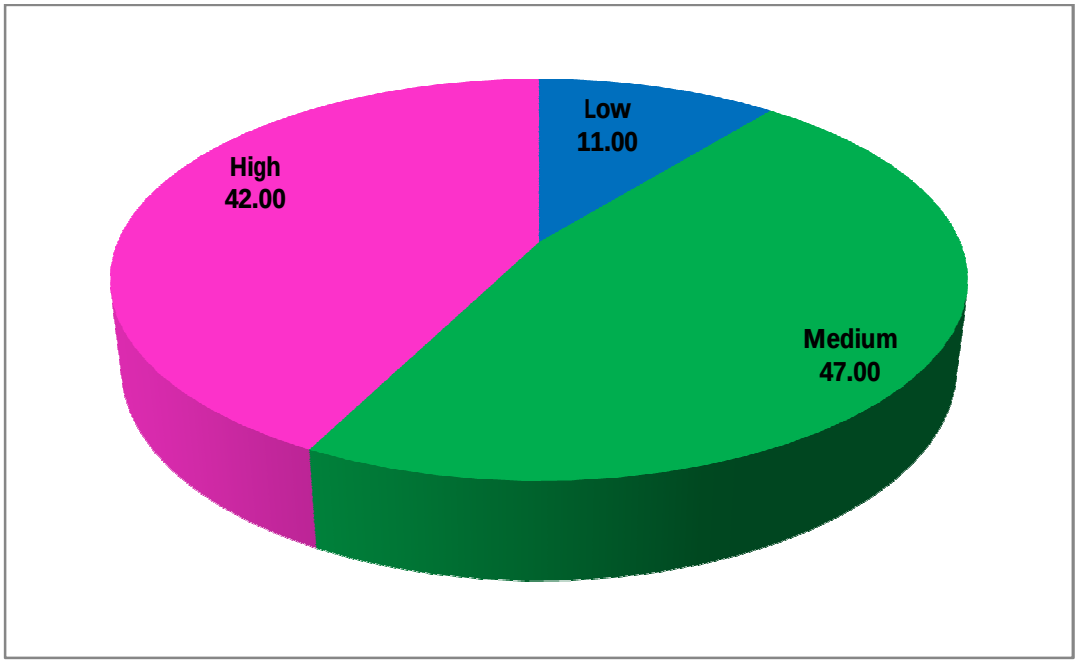
Farm size

Fig. 4.3 Distribution of Blackgram growers according to their farm size



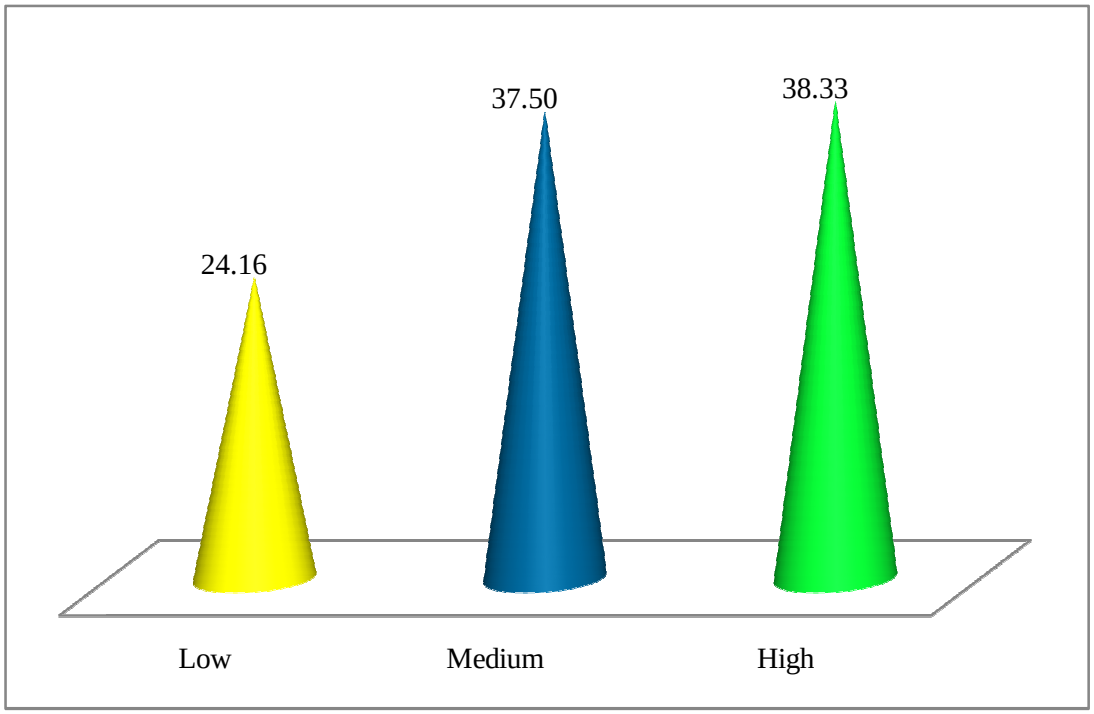
Farming Experience

Fig. 4.4 Distribution of blackgram growers according to their farming experience



Extension Contact

Fig. 4.5 Distribution of blackgram growers according to their extension contact



Social Participation

Fig. 4.10 Distribution of blackgram growers acoording to their social participation

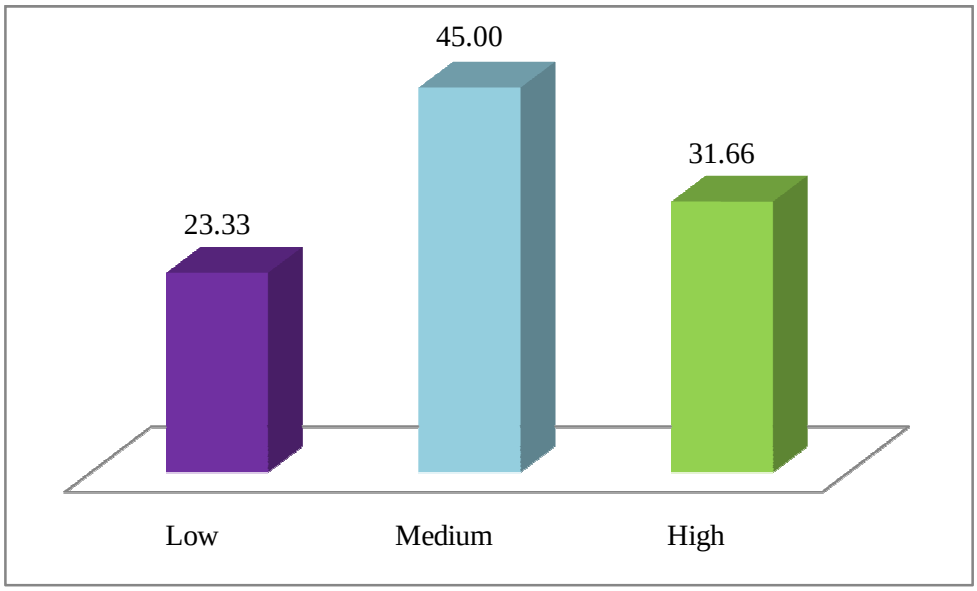
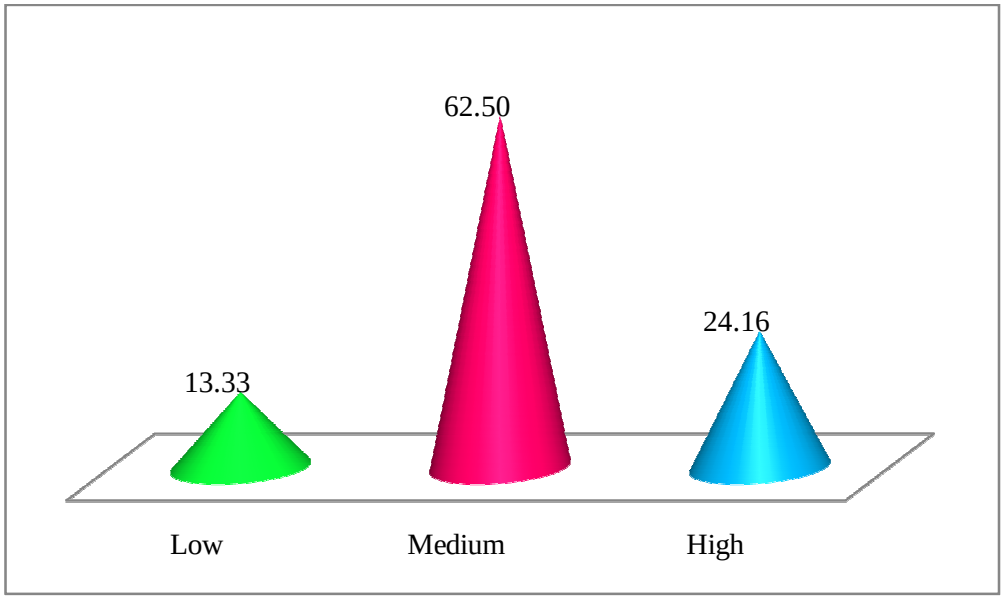
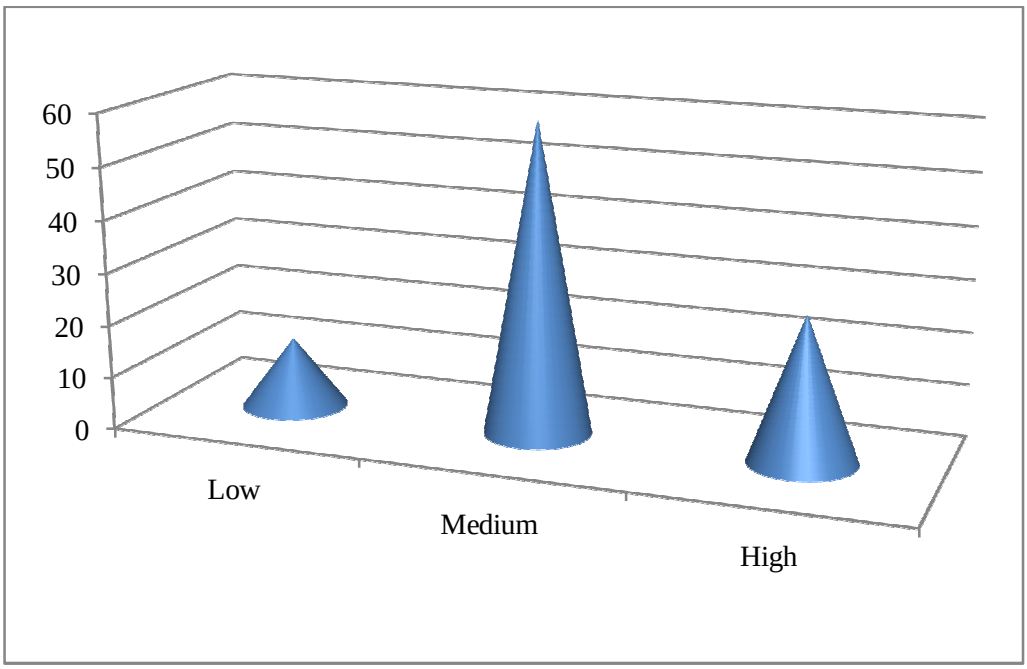


Fig. 4.7 Distribution of blackgram growers according to their mass media exposure



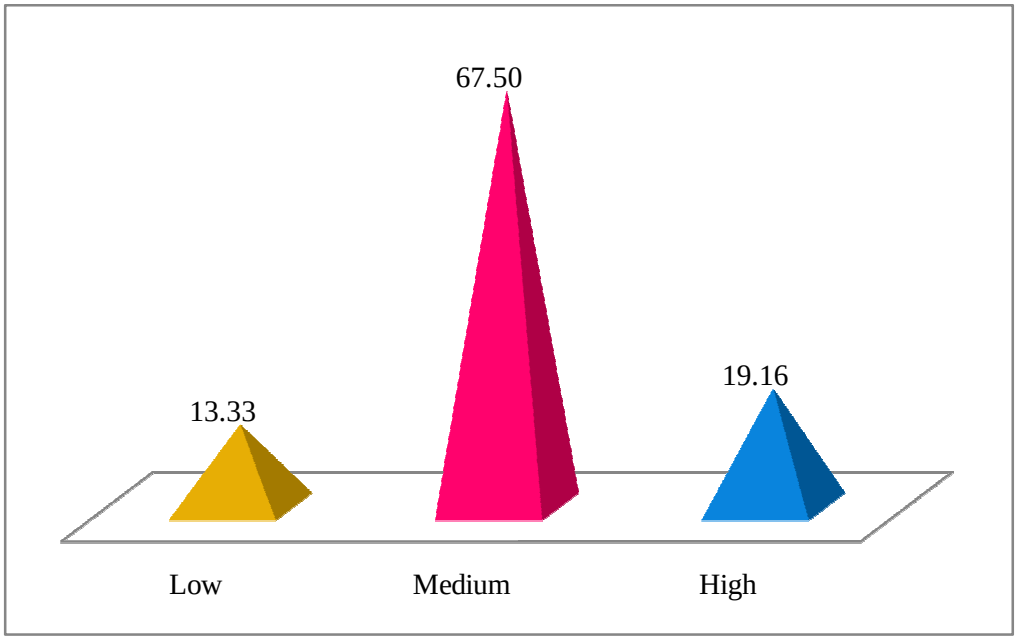
Scientific orientation

Fig. 4.10 Distribution of blackgram growers according to their scientific orientation



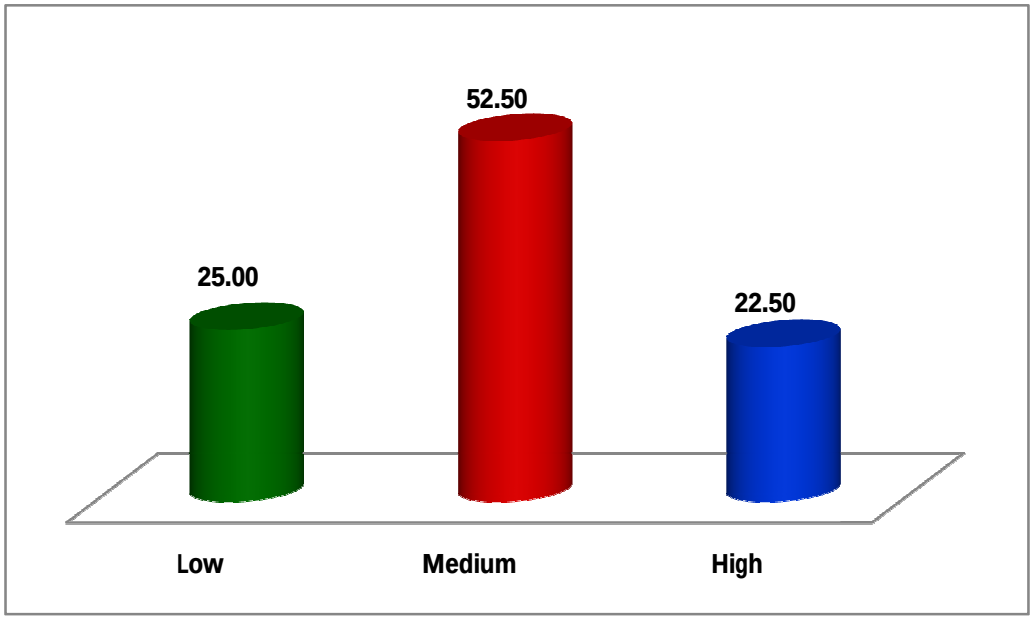
Risk orientation

Fig. 4.11. Distribution of blackgram growers according to their risk orientation



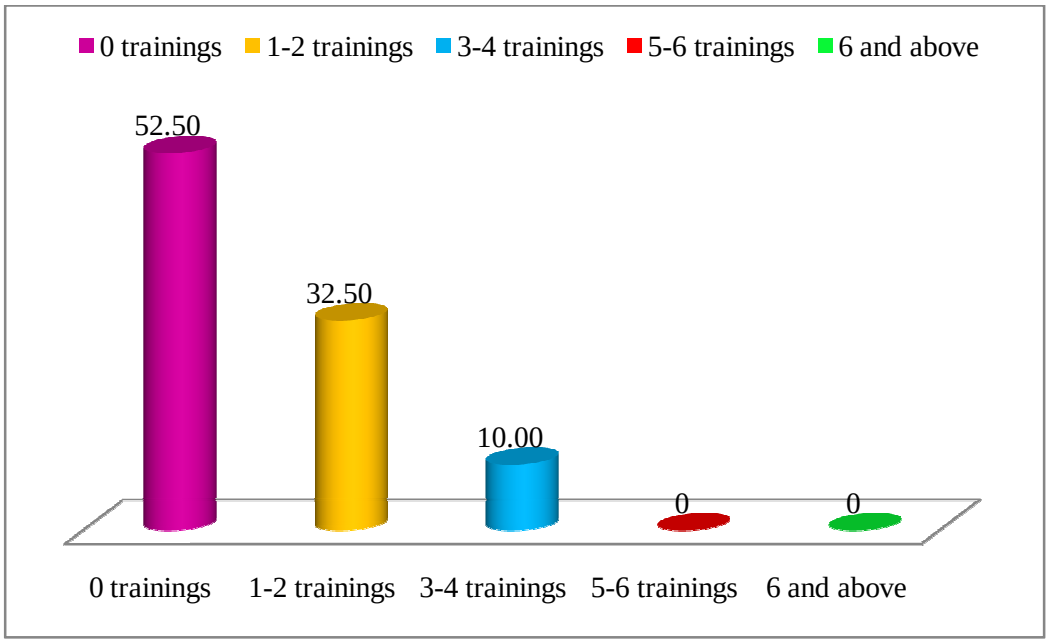
Market orientation

Fig. 4.12 Distribution of blackgram growers according to their market orientation



Annual income

Fig. 4.13 Distribution of blackgram growers according to their Annual income



Training received

Fig. 4.14 Distribution of blackgram growers according to their Training received

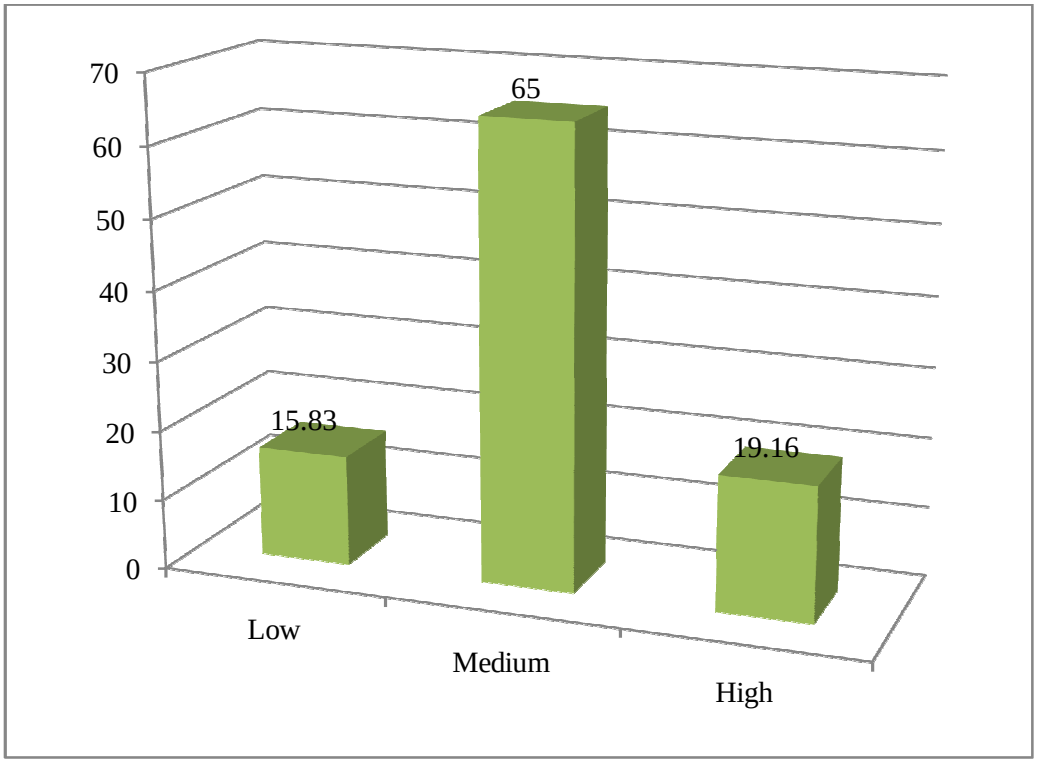


Fig. 4.15. Distribution of blackgram growers according to their level of knowledge

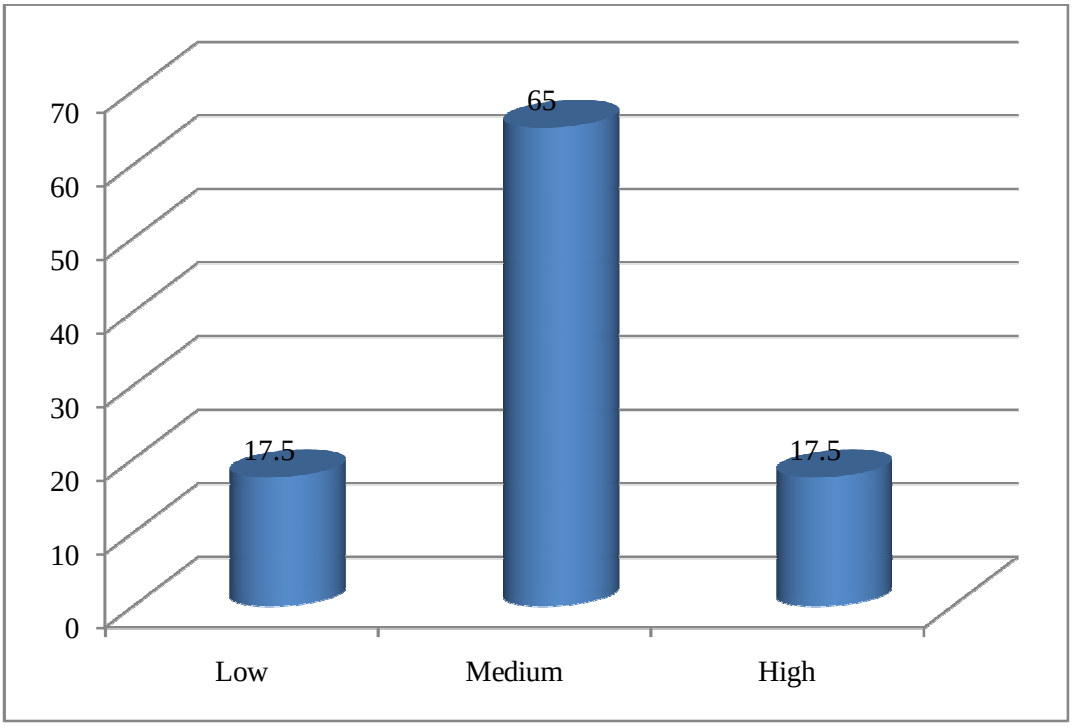


Fig. 4.16. Distribution of blackgram growers according to their extent of adoption

Please indicate problems in rice fallow blackgram cultivation

1.

2.

3.

4.

5.

6.

7.

Please mention suggestions to overcome the above problems

1.

2.

3.

4.

5.

6.

7.

SCHEDULE ON KNOWLEDGE TEST ITEMS / STATEMENTS PERTAINING TO PRODUCTION TECHNOLOGY OF RICE FALLOW BLACKGRAM

Please indicate your response by putting Tick (√) Mark in the appropriate column indicating the degree of relevancy of Knowledge Test items under consideration to be incorporated in the final schedule (LR = Least Relevant, R = Relevant and MR = Most Relevant). Further, you are also requested add, delete, and refine the test items as it may deemed to be essential.

S. No.	Knowledge Item / Statement	Correctness of Statement	Degree of Relevancy		
			LR	R	MR
In Rice Fallow Blackgram,					
1.	One need to carryout land preparation.	True / **False**			
2.	One need to go for sowing in the month of November – December.	**True** / False			
3.	Sowing shall be taken up 3-4 days prior to the harvest of paddy.	**True** / False			
4.	One should select such varieties which have quick vegetative growth.	**True** / False			
5.	The suitable variety is a) LBG - 752 b) LBG - 645 c) LBG - 685 d) All of these	(d)			
6.	The recommended seed rate per acre is a) 5 - 10kg b) 10 - 15kg c) 15 - 20kg d) 20 - 25kg	(d)			
7.	The recommended method of sowing is a) Broadcasting b) Line sowing c) Dibbling d) None of these.	(a)			
8.	Sowings should be done when there is standing water in the field.	True / **False**			
9.	The recommended chemical used for seed treatment against seed borne diseases is a) Captan b) Carbendazim c) Mancozeb d) All of these	(d)			
10.	The recommended chemicals used for seed treatment against sucking pests is a) Carbosulfan b) Imidacloprid c) Thiamethoxam d) All of these	(d)			
11.	Seed treatment against sucking pests safeguards the crop up to a) 20 days b) 30 days c) 40 days d) 50 days	(a)			

12.	Seed treatment should be done first with insecticide followed by fungicide.	**True** / False			
13.	Seed treatment with Rhizobium culture helps in increasing yield.	**Yes** / No			
14.	The amount of Rhizobium culture used for seed treatment is 250 ml per 20-25 kg of seed.	**Yes** / No			
15.	Rhizobium application helps in providing 20 - 25 kg required Nitrogen.	**Yes** / No			
16.	1 - 2 irrigations should be given when there are no rains.	**Yes** / No			
17.	Irrigation after 30 days and 55 days of planting helps in securing more yields.	**True** / False			
18.	Spraying of 2% Urea at flowering and pod formation stages is essential.	**True** / False			
19.	Ideal plant population is 50 plants / square meter.	**True** / False			
20.	Irrigation should be followed by hoeing for promoting better aeration.	**True** / False			
21.	The polished variety of blackgram is a) LBG 645 b) LBG 22 c) LBG 611 d) LBG 402	(a)			
22.	The blackgram variety which is resistant to wilt is a) LBG 645 b) LBG 22 c) LBG 611 d) All of these.	(d)			
23.	The duration of rabi blackgram varieties grown ranges from a) 55 - 75 days b) 75 - 95 days c) 95 - 115 days d) 115 - 135 days.	(b)			
24.	Rabi blackgram variety with trichomes on pods is a) LBG 645 b) LBG 685 c) a & b d) None of these	(c)			
25.	Weeds are dominant problem in rice fallow blackgram.	**True** / False			
26.	Intensity of dominant weeds can be controlled by spraying of Imazethapyr(Pursuit).	**True** / False			
27.	Pre-emergent weed problem of *Echinochloa colonum* and other annual grasses can be controlled by spraying a) Pendimethalin (Stomp) @ 1-1.5 litre/acre b) Alachlor (Lasso) @ 1 litre / acre c) a & b d) a or b	(d)			
28.	Intercultivation with Gorru after 20 - 25 days is of no help in weed management.	Yes / **No**			

29.	Post-emergent weed problem of *Echinochloa colonum* and other grasses can be controlled by spraying of a) Quizalofop p ethyl(Turga Super)@ 400ml / acre b) Fenoxoprop p ethy l(Whip Super) @ 250ml / acre. c) a & b d) a orb	(d)			
30.	Stem fly incidence is more in rainy season.	**Yes** / No			
31.	Distinct tunnel of stem split open and death of plant or branches are the symptoms of stem fly.	**True** / False			
32.	Stem fly can be controlled by twice at weekly interval spraying of a)Acephate (Lancer) @ 1g/litre b)Dimethoate (Rogor) @ 2ml/litre c)Monocrotophos (Nuvacron) @ 1.6ml/litre d)Any one of these.	(d)			
33.	Severe incidence of flea beetle can be controlled by spraying of a) Quinolophos (Quinguard) @ 2ml/litre b) Acephate (Lancer) @ 1g/litre c) Monocrotophos(Nuvacron) @ 1.6ml/litre d) Any one of these	(d)			
34.	Thrips suck sap from under surface of the leaves during initial stages of leaf development.				
35.	Thrips can be controlled by spraying of a) Acephate (Lancer) @ 1g/litre b) Fipronil (Regent) @ 1ml/litre c) Dimethoate (Rogor) @ 2ml/litre d) Any one of these.	(d)			
36.	White fly meanance can be controlled biologically by spraying of a) 5% NSKE b) Neem Oil c) a or b d) a & b	(c)			
37.	Chemical means of controlling white fly menace is a) Monocrotophos (Nuvacron) @ 1.6ml/litre b) Methyl demeton (Metasystax) @ 1ml/litre c) Triazophos (Trifos) @ 2ml/litre d) Any one of these	(d)			
38.	Tobacco caterpillar skeletonises the leaves.	**Yes** / No			
39.	Tobacco caterpillar eats away the flowers and leaves.	**Yes** / No			
40.	Tobacco caterpillar attacks more during day time.	Yes / **No**			
41.	Mechanical control of tobacco caterpillar is possible through picking of egg masses.	**Yes** / No			
42.	Collection and destruction of skeletonised leaves helps in managing tobacco caterpillar	Yes / **No**			

43.	Biological control of tobacco caterpillar can be done by leaving 30,000 *Trichogramma* eggs twice at one week interval.	**True** / False			
44.	Erection of pheromone traps @ 4 / acre helps in knowing the threshold level.	**Yes** / No			
45.	Spraying NPV @ 200 LE / acre for controlling tobacco caterpillar.	**Yes** / No			
46.	Spraying of *B.t* formulation @ 400 ml / acre thrice at weekly interval in evenings in winter.				
47.	Poison baits for tobacco caterpillar can be prepared by using rice bran, jaggery and insecticide(Carbaryl / Chloropyriphos / Monocrotophos) in the ratio of a) 8:1:1 b)10:1:1 c) 8:2:2 d) 10:2:2	(b)			
48.	Poison baits for tobacco caterpillar can be applied in the a) Morning hours b) Afternoon hours c) Evening hours d) All of these	(c)			
49.	Maruca pod borer causes more damage at a) Flower bud initiation stage b) Flowering stage c) Pod development stage d) All of these	(d)			
50.	Egg laying by maruca adults before flower bud initiation stage can be avoided by spraying a) 5%NSKE b) Neem oil c) a or b d) a &b	(c)			
51.	Maruca pod borer at the flowering stage can be chemically controlled by spraying a) Acephate(Lancer)@1.0g/litre b) Quinalophos(Quinguard)@2.5ml/litre c) Thiodicarb(Larvin)@1.5g/liter d) Any of these	(d)			
52.	Addition of Dichlorvos (Nuvan)@1.0ml/litre helps in management of maruca pod borer in case of more number of webbings	**Yes** / No			
53.	Severe incidence of Maruca pod borer can be controlled by spraying of a) Flubendiamide(Fame)@0.2ml/litre b) Spinosad(Tracer)@0.3g/litre c) Emamectin benzoate(Proclaim) @ 0.4g / litre d)Any one of these	(d)			
54.	Formation of small round wheatish spots is the symptom of wilt.	True / **False**			
55.	Premature defoliation and malformation of pods is the symptom of Cercospera leaf spot	**True** / False			

56.	The chemical control measure for Coreynospera leaf spot is spraying of a) Mancozeb@2.5g/litre b) Copper oxy chloride(Blitox)@3g/litre c) Hexaconazole (Contaf)@2ml/litre d) Any one of these	(d)			
57.	LBG 648 variety is resistant to Coryenospera leaf spot.	**True** / False			
58.	Crop on the bunds should be sprayed with fungicides immediately for controlling Coryenospera leaf spot.	**True** / False			
59.	Corynespora leaf spot occurs after 35-40 days after sowing.	**True**/False			
60.	Wilt is a Bacterial disease.	True / **False**			
61.	Wilt is a soil borne disease.	**True** / False			
62.	Prevention of wilt can be achieved through practicing crop rotation.	**True** / False			
63.	Stagnation of water should be prevented for control of wilt.	True / False			
64.	Varieties which are resistant to wilt are a) LBG - 685 b) LBG - 402 c) LBG – 611 d) All of these	(d)			
65.	Wheatish brown spots with yellowish border on infected leaves is a symptom of Alternaria leaf spot.	True / **False**			
66.	Anthracnose, Cercospera and Alterneria leaf spot can be controlled by spraying twice @15 days interval using a) Mancozeb()@2.5g/litre b) Hexaconazole (Contaf) @ 2ml/litre c) Copper Oxy Chloride(Blitax) @ 3g/litre d) Any one of these	(d)			
67.	Powdery mildew occurs 45 - 50 days after sowing.	**True** / False			
68.	Powdery mildew disease can be controlled by spraying a) Carbendazim(Bavistin) @ 1g / litre b) Thiophanate methyl (Topsin-M) @ 1ml / litre c) Copper Oxy Chloride (Blitox) @ 3g / litre d) Any one of these	(d)			
69.	Humidity is the contributing factor for powdery mildew.	**True** / False			
70.	Small yellowish spots initially transforming to spindle shaped spots on leaves at flowering stage is the symptom of rust disease.	**True** / False			

71.	Rust disease can be effectively controlled by spraying with Mancozeb @ 3g / litre along with a) Dinocap (Karathane) @ 1ml / litre b) Tridemorph (Calixin) @ 1g / litre c) Triademefon(Bayleton) @ 1g / litre d) Any one of these.	(d)			
72.	Whitefly is the causative organism of yellow mosaic disease.	**True** / False			
73.	Variety which is resistant to yellow mosaic is a) LBG 752 b) PU 31 c) a & b d) None	(c)			
74.	Stunted growth with no flowering is the symptom of a) Rust b) Leaf crinkle c)Yellow mosaic d)Wilt	(c)			
75.	Yellow mosaic infected plant should be removed from field and destroyed.	**Yes** / No			
76.	Four rows of maize or jowar grown around the field as trap crop helps in controlling whitefly, thrips and aphids.	**Yes** / No			
77.	Placing of yellow sticky traps here and there in the fields helps in knowing the prevalence and intensity of Maruca pod borer.	True / **False**			
78.	Aphids incidence leads to poor pod development	**True** / False			
79.	Aphids spread the leaf crinkle virus from infected plants to healthy plants.	True / **False**			
80.	Leaf crinkle infected plants should be uprooted and burned.	**Yes** / No			

S.NO	Statement	Mean score
1.	One need to carryout land preparation.	1.95
2.	One need to go for sowing in the month of November – December.	2.30*
3.	Sowing shall be taken up 3-4 days prior to the harvest of paddy.	2.20*
4.	One should select such varieties which have quick vegetative growth.	1.95
5.	The suitable variety is a) LBG - 752 b) LBG - 645 c) LBG - 685 d) All of these	2.60*
6.	The recommended seed rate per acre is a) 5 - 10kg b) 10 - 15kg c) 15 - 20kg d) 20 - 25kg	2.25*
7.	The recommended method of sowing is a) Broadcasting b) Line sowing c) Dibbling d) None of these.	2.25*
8.	Sowings should be done when there is standing water in the field.	1.90
9.	The recommended chemical used for seed treatment against seed borne diseases is a) Captan b) Carbendazim c) Mancozeb d) All of these	2.60*
10.	The recommended chemicals used for seed treatment against sucking pests is a) Carbosulfan b) Imidacloprid c) Thiamethoxam d) All of these	2.55*
11.	Seed treatment against sucking pests safeguards the crop up to a) 20 days b) 30 days c) 40 days d) 50 days	1.95
12.	Seed treatment should be done first with insecticide followed by fungicide.	1.85
13.	Seed treatment with Rhizobium culture helps in increasing yield.	2.15*
14.	The amount of Rhizobium culture used for seed treatment is 250 ml per 20-25 kg of seed.	1.90
15.	Rhizobium application helps in providing 20 - 25 kg required Nitrogen.	1.80
16.	1 - 2 irrigations should be given when there are no rains.	2.15*
17.	Irrigation after 30 days and 55 days of planting helps in securing more yields.	1.90
18.	Spraying of 2% Urea at flowering and pod formation stages is essential.	2.25*
19.	Ideal plant population is 50 plants / square meter.	1.95
20.	Irrigation should be followed by hoeing for promoting better aeration.	1.75
21.	The polished variety of blackgram is a) LBG 645 b) LBG 22 c) LBG 611 d) LBG 402	1.80
22.	The blackgram variety which is resistant to wilt is a) LBG 645 b) LBG 22 c) LBG 611 d) All of these.	1.85
23.	The duration of rabi blackgram varieties grown ranges from a) 55 - 75 days b) 75 - 95 days c) 95 - 115 days d) 115 - 135 days.	2.35*
24.	Rabi blackgram variety with trichomes on pods is a) LBG 645 b) LBG 685 c) a & b d) None of these	1.75
25.	Weeds are dominant problem in rice fallow blackgram.	2.35*

26.	Intensity of dominant weeds can be controlled by spraying of Imazethapyr(Pursuit).	2.05*
27.	Pre-emergent weed problem of *Echinochloa colonum* and other annual grasses can be controlled by spraying a) Pendimethalin (Stomp) @ 1-1.5 litre/acre b) Alachlor (Lasso) @ 1 litre / acre c) a & b d) a or b	1.70
28.	Intercultivation with Gorru after 20 - 25 days is of no help in weed management.	1.80
29.	Post-emergent weed problem of *Echinochloa colonum* and other grasses can be controlled by spraying of a) Quizalofop p ethyl(Turga Super)@ 400ml / acre b) Fenoxoprop p ethy l(Whip Super) @ 250ml / acre. c) a & b d) a orb	2.10*
30.	Stem fly incidence is more in rainy season.	1.95
31.	Distinct tunnel of stem split open and death of plant or branches are the symptoms of stem fly.	1.80
32.	Stem fly can be controlled by twice at weekly interval spraying of a)Acephate (Lancer) @ 1g/litre b)Dimethoate (Rogor) @ 2ml/litre c)Monocrotophos (Nuvacron) @ 1.6ml/litre d)Any one of these.	1.60
33.	Severe incidence of flea beetle can be controlled by spraying of a) Quinolophos (Quinguard) @ 2ml/litre b) Acephate (Lancer) @ 1g/litre c) Monocrotophos(Nuvacron) @ 1.6ml/litre d) Any one of these	1.90
34.	Thrips suck sap from under surface of the leaves during initial stages of leaf development.	1.65
35.	Thrips can be controlled by spraying of a) Acephate (Lancer) @ 1g/litre b) Fipronil (Regent) @ 1ml/litre c) Dimethoate (Rogor) @ 2ml/litre d) Any one of these.	2.20*
36.	White fly meanance can be controlled biologically by spraying of a) 5% NSKE b) Neem Oil c) a or b d) a & b	1.75
37.	Chemical means of controlling white fly menace is a) Monocrotophos (Nuvacron) @ 1.6ml/litre b) Methyl demeton (Metasystax) @ 1ml/litre c) Triazophos (Trifos) @ 2ml/litre d) Any one of these	2.40*
38.	Tobacco caterpillar skeletonises the leaves.	1.80
39.	Tobacco caterpillar eats away the flowers and leaves.	2.10*
40.	Tobacco caterpillar attacks more during day time.	1.85
41.	Mechanical control of tobacco caterpillar is possible through picking of egg masses.	1.95
42.	Collection and destruction of skeletonised leaves helps in managing tobacco caterpillar	1.75
43.	Biological control of tobacco caterpillar can be done by leaving 30,000 *Trichogramma* eggs twice at one week interval.	1.75

44.	Erection of pheromone traps @ 4 / acre helps in knowing the threshold level.	1.90
45.	Spraying NPV @ 200 LE / acre for controlling tobacco caterpillar.	1.85
46.	Spraying of *B.t* formulation @ 400 ml / acre thrice at weekly interval in evenings in winter.	1.60
47.	Poison baits for tobacco caterpillar can be prepared by using rice bran, jaggery and insecticide(Carbaryl / Chloropyriphos / Monocrotophos) in the ratio of a) 8:1:1 b)10:1:1 c) 8:2:2 d) 10:2:2	1.45
48.	Poison baits for tobacco caterpillar can be applied in the a) Morning hours b) Afternoon hours c) Evening hours d) All of these	1.60
49.	Maruca pod borer causes more damage at a) Flower bud initiation stage b) Flowering stage c) Pod development stage d) All of these	2.30*
50.	Egg laying by maruca adults before flower bud initiation stage can be avoided by spraying a) 5%NSKE b) Neem oil c) a or b d) a &b	1.80
51.	Maruca pod borer at the flowering stage can be chemically controlled by spraying a) Acephate(Lancer)@1.0g/litre b) Quinalophos(Quinguard)@2.5ml/litre c) Thiodicarb(Larvin)@1.5g/liter d) Any of these	2.05*
52.	Addition of Dichlorvos (Nuvan)@1.0ml/litre helps in management of maruca pod borer in case of more number of webbings	2.20*
53.	Severe incidence of Maruca pod borer can be controlled by spraying of a) Flubendiamide(Fame)@0.2ml/litre b) Spinosad(Tracer)@0.3g/litre c) Emamectin benzoate(Proclaim) @ 0.4g / litre d)Any one of these	2.35*
54.	Formation of small round wheatish spots is the symptom of wilt.	1.60
55.	Premature defoliation and malformation of pods is the symptom of Cercospera leaf spot	1.90
56.	The chemical control measure for Coreynospera leaf spot is spraying of a) Mancozeb@2.5g/litre b) Copper oxy chloride(Blitox)@3g/litre c) Hexaconazole (Contaf)@2ml/litre d) Any one of these	2.05*
57.	LBG 648 variety is resistant to Coryenospera leaf spot.	1.95
58.	Crop on the bunds should be sprayed with fungicides immediately for controlling Coryenospera leaf spot.	1.80
59.	Corynespora leaf spot occurs after 35-40 days after sowing.	1.85
60.	Wilt is a Bacterial disease.	1.90
61.	Wilt is a soil borne disease.	2.15*
62.	Prevention of wilt can be achieved through practicing crop rotation.	1.75
63.	Stagnation of water should be prevented for control of wilt.	1.90

64.	Varieties which are resistant to wilt are a) LBG - 685 b) LBG - 402 c) LBG – 611 d) All of these	1.95
65.	Wheatish brown spots with yellowish border on infected leaves is a symptom of Alternaria leaf spot.	1.90
66.	Anthracnose, Cercospera and Alterneria leaf spot can be controlled by spraying twice @15 days interval using a) Mancozeb()@2.5g/litre b) Hexaconazole (Contaf) @ 2ml/litre c) Copper Oxy Chloride(Blitax) @ 3g/litre d) Any one of these	2.25*
67.	Powdery mildew occurs 45 - 50 days after sowing.	1.80
68.	Powdery mildew disease can be controlled by spraying a) Carbendazim(Bavistin) @ 1g / litre b) Thiophanate methyl (Topsin-M) @ 1ml / litre c) Copper Oxy Chloride (Blitox) @ 3g / litre d) Any one of these	2.15*
69.	Humidity is the contributing factor for powdery mildew.	1.75
70.	Small yellowish spots initially transforming to spindle shaped spots on leaves at flowering stage is the symptom of rust disease.	2.20*
71.	Rust disease can be effectively controlled by spraying with Mancozeb @ 3g / litre along with a) Dinocap (Karathane) @ 1ml / litre b) Tridemorph (Calixin) @ 1g / litre c) Triademefon(Bayleton) @ 1g / litre d) Any one of these.	2.10*
72.	Whitefly is the causative organism of yellow mosaic disease.	2.30*
73.	Variety which is resistant to yellow mosaic is a) LBG 752 b) PU 31 c) a & b d) None	2.05*
74.	Stunted growth with no flowering is the symptom of a) Rust b) Leaf crinkle c)Yellow mosaic d)Wilt	1.95
75.	Yellow mosaic infected plant should be removed from field and destroyed.	1.80
76.	Four rows of maize or jowar grown around the field as trap crop helps in controlling whitefly, thrips and aphids.	2.35*
77.	Placing of yellow sticky traps here and there in the fields helps in knowing the prevalence and intensity of Maruca pod borer.	1.90
78.	Aphids incidence leads to poor pod development	1.60
79.	Aphids spread the leaf crinkle virus from infected plants to healthy plants.	1.65
80.	Leaf crinkle infected plants should be uprooted and burned.	1.50

Appendix - III

Item No.	Frequency of correct answers in the groups G1, G2, G5 and G6				Total frequencies of Correct answers by all Six groups	Difficulty Index	Discrimination Index ($E^{1/3}$)	Point Biserial Correlation (rpbis)	't' Values
	S1	S2	S5	S6					
1.	3	3	2	4	16	0.53	0.00	-0.075	-0.3979NS
2.	4	2	0	1	12	0.40	0.50	0.563	3.6046**
3.	3	1	1	0	9	0.30	0.30	0.567	3.6423**
4.	3	4	5	1	21	0.70	0.10	0.153	0.8192NS
5.	5	3	0	3	14	0.46	0.50	0.382	2.1872*
6.	3	5	2	0	16	0.53	0.60	0.491	2.9823*
7.	4	4	3	2	21	0.70	0.30	0.452	2.6664*
8.	4	1	3	1	12	0.40	0.10	0.151	0.8082NS
9.	5	2	3	1	13	0.43	0.30	0.356	2.0158*
10.	2	3	1	2	14	0.46	0.20	0.369	2.1008*
11.	4	1	2	3	13	0.43	0.00	0.015	0.0793NS
12.	4	3	4	3	22	0.73	0.00	0.096	0.5103NS
13.	4	4	1	1	14	0.46	0.60	0.567	3.6423**
14.	0	1	0	0	3	0.10	0.10	0.097	0.5157NS
15.	3	2	3	1	15	0.50	0.10	0.036	0.1906NS
16.	3	4	0	2	14	0.46	0.50	0.364	2.0679*
17.	4	4	3	4	22	0.73	0.10	-0.012	-0.0635NS
18.	5	4	3	3	24	0.80	0.30	0.387	2.2208*
19.	5	5	4	4	27	0.90	0.20	0.278	1.5314NS
20.	5	4	4	4	24	0.80	0.10	0.135	0.7209NS
21.	4	5	3	4	20	0.66	0.20	0.202	1.0913NS
22.	4	3	5	4	22	0.73	-0.20	-0.222	-1.2047NS
23.	5	3	2	3	20	0.66	0.30	0.411	2.3856*
24.	3	4	1	5	17	0.56	0.10	-0.085	-0.4514NS
25.	4	3	2	2	13	0.43	0.30	0.426	2.4915*
26.	5	1	2	1	13	0.43	0.30	0.374	2.1338*
27.	2	2	1	0	7	0.23	0.30	0.321	1.7934NS
28.	5	5	4	5	26	0.86	0.10	0.142	0.7590NS
29.	5	4	4	3	24	0.80	0.20	0.417	2.4277*
30.	5	4	4	4	26	0.86	0.10	0.135	0.7209NS
31.	4	2	3	4	18	0.60	-0.10	-0.031	-0.1641NS
32.	5	5	5	4	27	0.90	0.10	0.285	1.5733NS
33.	2	1	2	1	11	0.36	0.00	-0.077	-0.4086NS
34.	4	4	3	3	21	0.70	0.20	0.107	0.5694NS
35.	4	5	2	3	22	0.73	0.40	0.464	2.7716**
36.	4	3	5	4	23	0.76	-0.20	-0.133	-0.7100NS
37.	5	4	4	1	20	0.66	0.40	0.453	2.6887**
38.	5	3	5	4	24	0.80	-0.10	-0.039	-0.2065NS
39.	4	3	1	2	17	0.56	0.40	0.415	2.4136*
40.	5	5	5	5	29	0.96	0.00	0.019	0.1005NS
41.	5	5	5	3	25	0.83	0.20	0.348	1.9642NS
42.	5	3	4	3	22	0.73	0.10	0.216	1.1705NS

43.	5	5	5	4	27	0.90	0.10	0.285	1.5733NS
44.	4	5	5	4	26	0.86	0.00	0.036	0.1906NS
45.	4	4	5	2	23	0.76	0.10	0.083	0.4407NS
46.	4	4	3	4	21	0.70	0.10	0.072	0.3819NS
47.	5	5	4	3	26	0.86	0.30	0.344	1.9385NS
48.	2	3	1	2	11	0.36	0.20	0.197	1.0632NS
49.	4	5	4	1	21	0.70	0.40	0.512	3.1540**
50.	5	4	5	4	27	0.90	0.00	0.088	0.4674NS
51.	4	5	2	2	19	0.63	0.50	0.453	2.6887**
52.	5	5	1	3	23	0.76	0.60	0.547	3.4575**
53.	4	2	1	2	14	0.46	0.30	0.372	2.1206*
54.	4	5	3	2	22	0.73	0.40	0.315	1.7562NS
55.	5	5	3	2	23	0.76	0.50	0.279	1.5373NS
56.	5	4	4	1	21	0.70	0.40	0.465	2.7793**
57.	3	3	3	0	10	0.33	0.30	0.331	1.8561NS
58.	4	3	2	4	20	0.66	0.10	0.099	0.5264NS
59.	5	4	3	4	21	0.70	0.20	0.228	1.2390NS
60.	4	5	4	3	26	0.86	0.20	0.111	0.5910NS
61.	4	3	1	2	13	0.43	0.40	0.405	2.3438*
62.	5	5	4	5	29	0.96	0.10	0.118	0.6287NS
63.	3	2	4	1	13	0.43	0.00	0.15	0.8028NS
64.	5	4	4	3	24	0.80	0.20	0.228	1.2390NS
65.	4	3	4	3	23	0.76	0.00	0.119	0.6341NS
66.	5	4	3	1	19	0.63	0.50	0.363	2.0614*
67.	4	3	4	2	21	0.70	0.10	0.208	1.1252NS
68.	5	2	1	3	16	0.53	0.30	0.466	2.7869**
69.	5	4	5	3	23	0.76	0.10	0.222	1.2047NS
70.	4	2	2	1	16	0.53	0.30	0.521	3.2298**
71.	4	4	1	2	17	0.56	0.50	0.448	2.5927*
72.	5	5	1	2	18	0.60	0.70	0.613	4.1055**
73.	4	2	1	2	14	0.46	0.30	0.372	2.1206*
74.	3	4	2	2	17	0.56	0.30	0.205	1.1082NS
75.	5	5	5	3	27	0.90	0.20	0.334	1.8750NS
76.	4	3	1	1	14	0.46	0.50	0.378	2.1604*
77.	4	5	4	2	25	0.83	0.30	0.149	0.7973NS
78.	5	5	5	4	29	0.96	0.10	0.213	1.1535NS
79.	5	5	3	5	27	0.90	0.20	0.209	1.1308NS
80.	4	2	3	1	17	0.56	0.20	0.312	1.7376NS

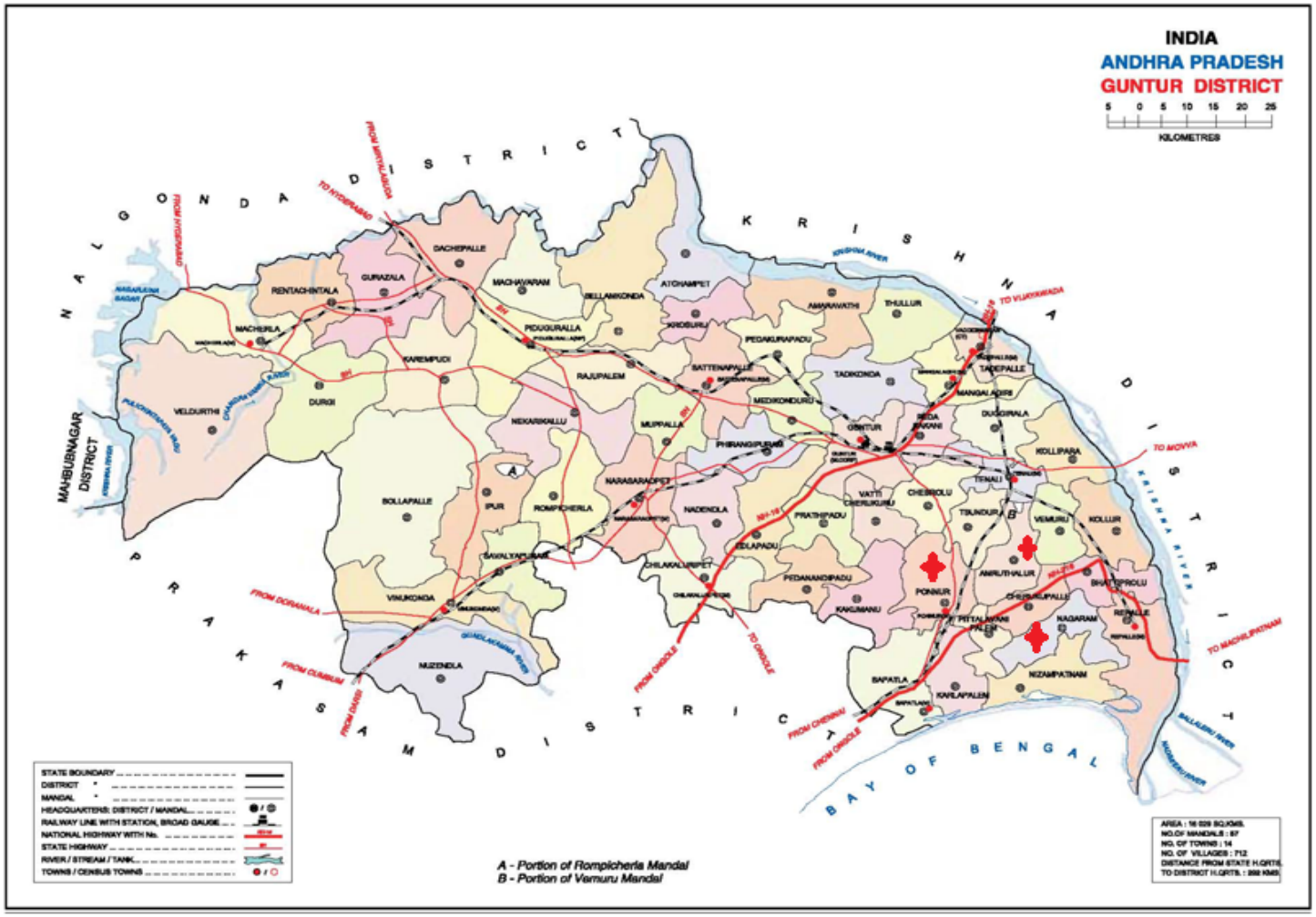


Fig. 3.2 Map showing selected mandals Guntur district

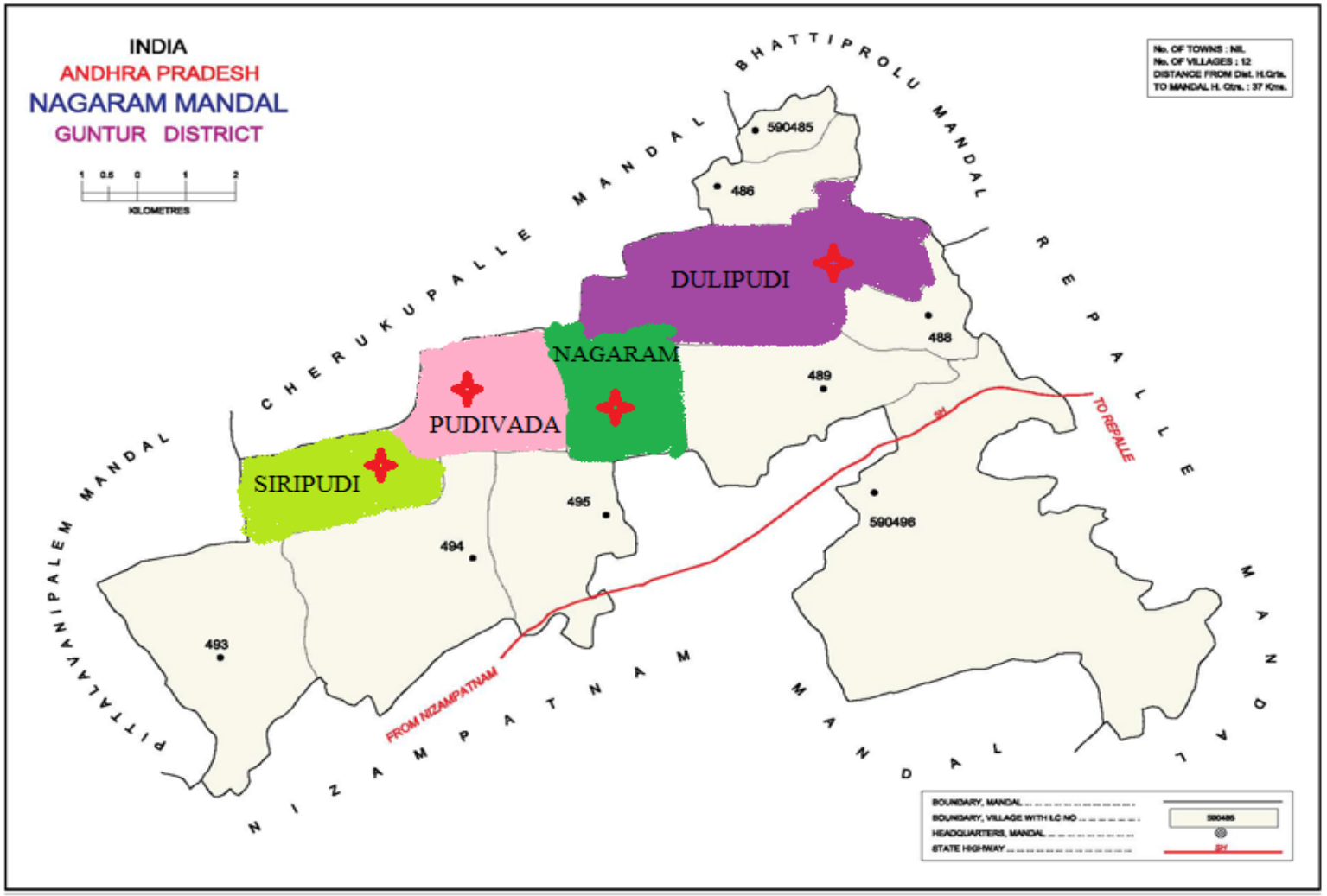


Fig. 3.5 Map showing selected villages of Nagaram mandal

Fig. 3.1 Map showing Guntur district of Andhrapradesh

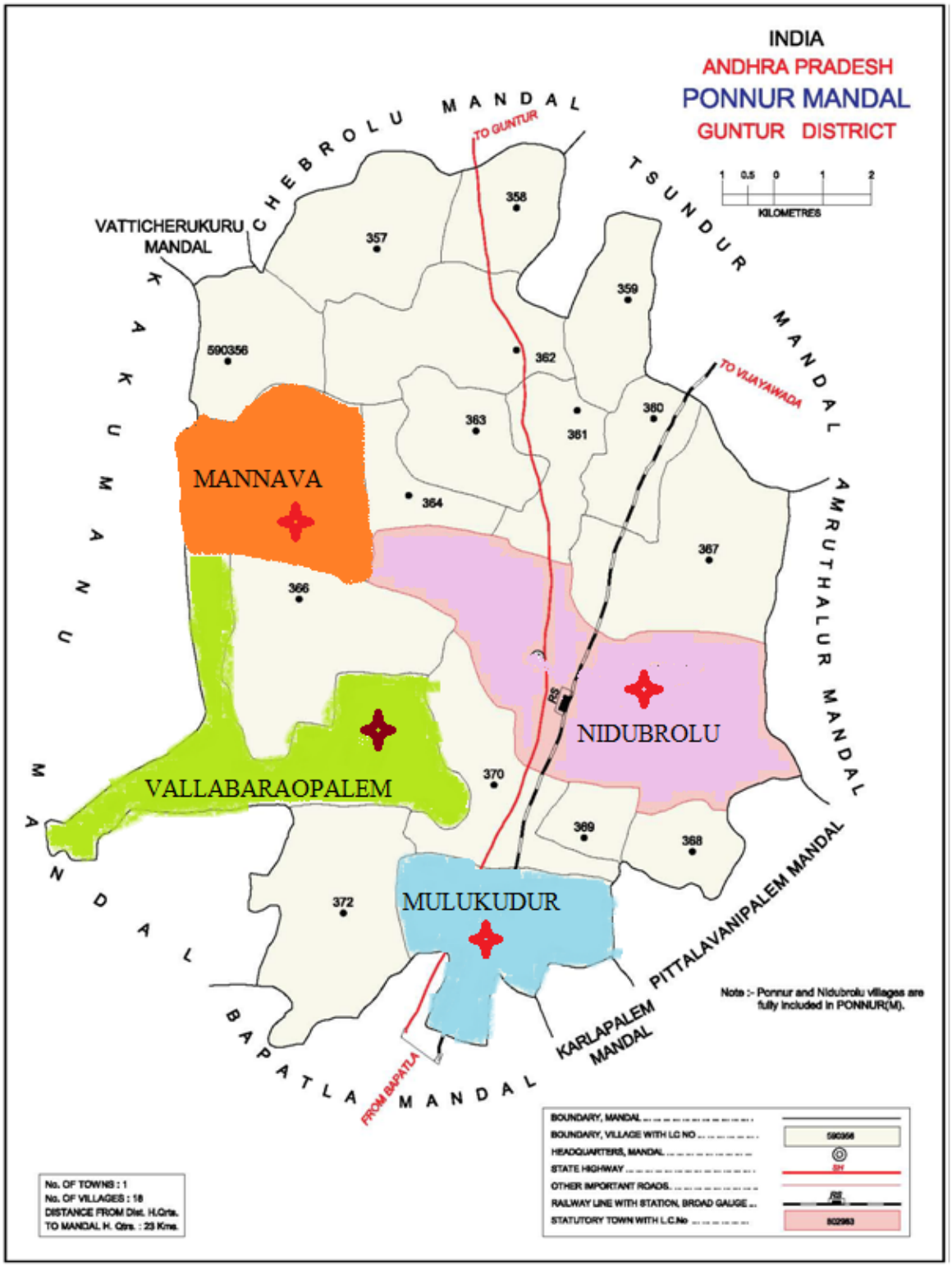


Fig. 3.3 Map showing selected villages of Ponnuru mandal

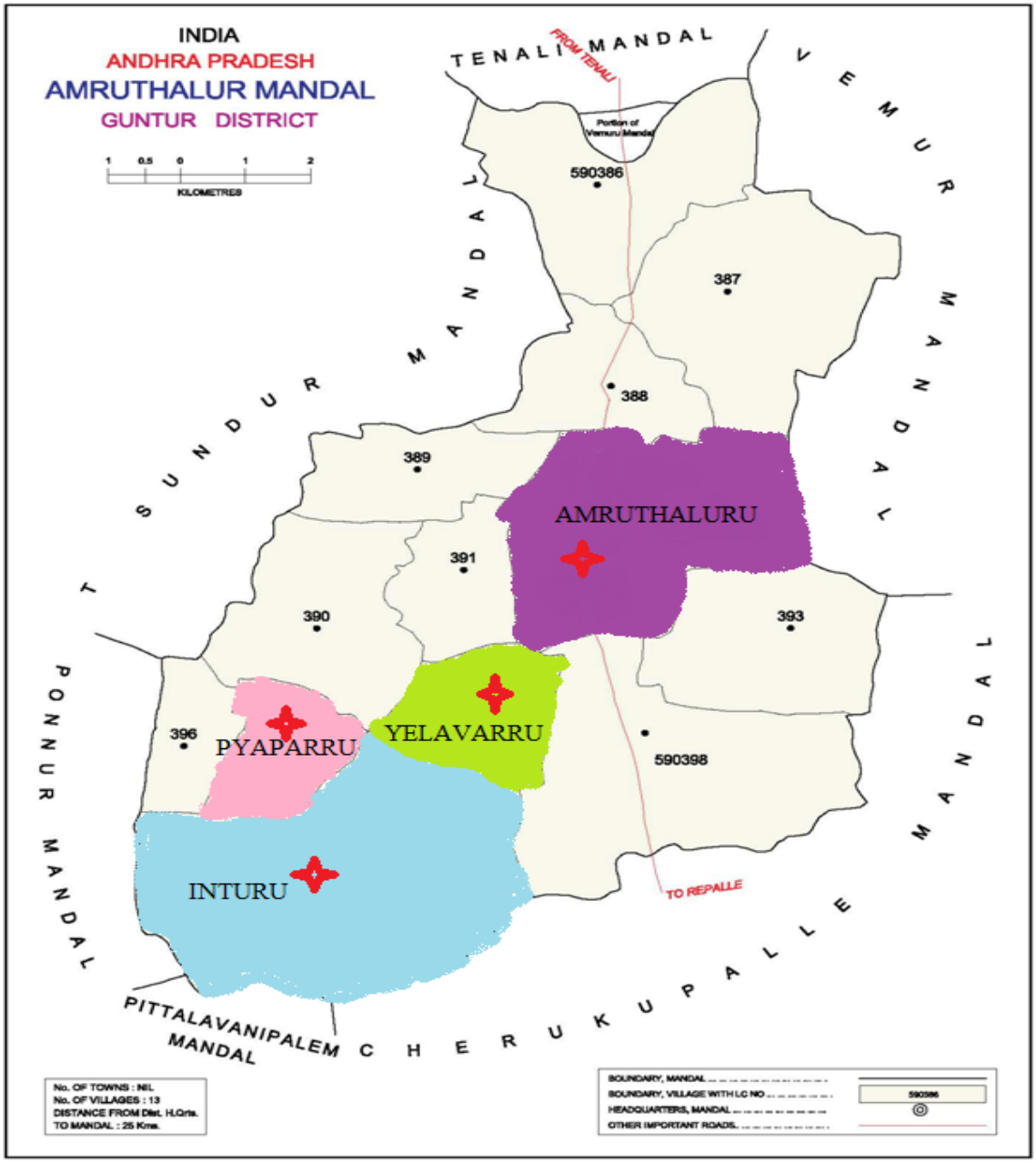


Fig. 3.4 Map showing selected villages of Amruthalur mandal

అనుబంధం

ఆచార్య ఎన్.జి. రంగా వ్యవసాయ విశ్వవిద్యాలయము

వ్యవసాయ విస్తరణ విద్యా విభాగము

వ్యవసాయ కళాశాల, బాపట్ల - 522 101

పరిశోధన అంశం : గుంటూరు జిల్లాలో వరి మాగాణులలో మినుము సాగుపై రైతుల పరిజ్ఞానం మరియు ఆచరణపై అధ్యయనం

మౌఖిక ప్రశ్నావళి

భాగము -1

జవాబుదారుని సంఖ్య : ☐

సాధారణ సమాచారము :

రైతు పేరు :

గ్రామము :

మండలము :

చరవాణి నెం. :

1) **వయస్సు :** (పూర్తి అయిన సంవత్సరములలో)

2) **విద్య :**

1. నిరక్షరాస్యత - - - (1)
2. ప్రాథమిక విద్య - - - (2)
3. మాధ్యమిక విద్య - - - (3)
4. ఉన్నత పాఠశాల విద్య - - - (4)
5. కళాశాల విద్య - - - (5)
6. పట్టభద్రులు మరియు ఆ పైన - - - (6)

3) క్షేత్ర పరిమాణం (ఎకరాలలో) :

1. సన్నకారు (1)
2. చిన్నకారు (2)
3. మధ్యస్థ (3)
4. పెద్దకారు (4)

4) వ్యవసాయ అనుభవం :

అ. వరి మాగాణులలో మినుము సాగులో మీకు ఎన్ని సంవత్సరముల అనుభవం ఉంది ? -------

1) 1 నుండి 5 సం॥ల క్షేత్ర అనుభవం (1)
2) 6 నుండి 10 సం॥ల క్షేత్ర అనుభవం (2)
3) 11 నుండి 15 సం॥ల క్షేత్ర అనుభవం (3)
4) 16 నుండి 20 సం॥ల క్షేత్ర అనుభవం (4)
5) 20 సం॥లు , ఆ పైబడిన క్షేత్ర అనుభవం (5)

5) విస్తరణ సంబంధం :

1) మీకు విస్తరణ అధికారులతో సంబంధాలు ఉన్నాయా?

2) ఉన్నట్లయితే ఎవరిని మీరు కలుస్తారు? దయచేసి మూడంకెల క్రమానుసారణిపై మీ స్పందనను వ్యక్తపరచండి.

క్రసం.	వర్గము	స్పందన		
		తరచుగా (3)	సందర్భానుసారంగా (2)	అరుదుగా (1)
1.	బహుళ ప్రయోజన విస్తరణ అధికారి			
2.	వ్యవసాయ విస్తరణ అధికారి			
3.	మండల వ్యవసాయ అధికారి			
4.	వ్యవసాయ సహాయ సంచాలకులు			
5.	పరిశోధనా స్థానాల శాస్త్రవేత్తలు 1. కృషి విజ్ఞాన కేంద్రం 2. ఏరువాక 3. వ్యవసాయ పరిశోధన స్థానం			
6.	ప్రభుత్వేతర సంస్థలు			
7.	స్నేహితులు, బంధువులు			
8.	ఆదర్శ రైతులు			
9.	ఇన్‌పుట్ డీలర్స్			
10.	అగ్రిక్లినిక్కులు			
11.	ఇతరములు (దయచేసి పేర్కొనండి) 1. 2. 3.			

6) సామాజిక పాత్ర :

అ. ఏ సంస్థ నందు సభ్యత్వము లేదు (1)

ఆ. ఒక సంస్థలో సభ్యత్వం (2)

ఇ. ఒకటి కంటే ఎక్కువ సంస్థల్లో సభ్యత్వం (3)

ఈ. ప్రజా పనులకు ధన సహాయము (4)

ఉ. ఏదైనా సంస్థలో కార్యాలయ నిర్వాహకుడు (5)

ఊ. సంఘ సేవలో పాల్గొనుట (6)

7) వార్తా సాధనాలను సంప్రదించుట :

మీరు వ్యవసాయ సాంకేతిక సమాచారాన్ని వివిధ సాధనాల ద్వారా పొందుచున్నట్లయితే దయచేసి ఈ క్రింద ఇవ్వబడిన సాధనాలలో ఏ సాధనాన్ని వరి మాగాణి మినుము సాగులో సాంకేతిక సమచారాన్ని పొందడానికి ఉపయోగించే స్థాయిని మూడంకెల క్రమానుసారిణిపై వ్యక్తపరచండి.

క్రసం.	వివరము	సంప్రదింపుల తీరు / విధానము		
		తరచుగా (3)	సందర్భానుసారం (2)	ఎన్నడూ లేదు (1)
1.	రేడియో కార్యక్రమాలు			
2.	టెలివిజన్ కార్యక్రమాలు			
3.	దిన పత్రికలు			
4.	వ్యవసాయ సంబంధిత పుస్తకములు			
5.	వ్యవసాయ ప్రదర్శనలు మరియు కిసాన్ మేళాలు			
6.	ఇతరములు (దయచేసి పేర్కొనండి) 1. 2.			

8) ఆర్థిక ప్రేరణ :

ఈ క్రింద పొందుపరచబడిన వాక్యాలు రైతు యొక్క ఆర్థిక ప్రేరణను ప్రతిబింబిస్తాయి. దయచేసి ఐదంకెల క్రమానుసారిణిపై మీ స్పందనను వ్యక్తపరచండి.

క్ర.సం.	వివరము	స్పందన				
		గట్టిగా ఏకీభవించడం (5)	ఏకీభవిస్తాను (4)	నిర్ణయించలేను (3)	ఏకీభవించను (2)	గట్టిగా ఏకీభవించను (1)
1.	వరి మాగాణుల్లో మినుము వేసే రైతు అధిక దిగుబడులు, లాభాల దిశగా పనిచేయవలెను.					
2.	ఎవరైతే వరి మాగాణుల్లో మినుము సాగు చేసి అధిక లాభాలను పొందేవారే విజయవంతమైన రైతు.					
3.	రైతు లాభాలను పెంచుకొనుట కొరకు స్థానిక రకాలకంటే అధిక దిగుబడులనిచ్చే వంగడాలను పండించవలెను.					
4.	ప్రతి రైతు అతనికి మరింత డబ్బు సంపాదించడానికి దోహదపడే కొత్త వ్యవసాయ ఆలోచనలను అందిపుచ్చుకోవాలి.					
5.	రైతు ఆర్థిక సహాయం లేకుండా వారి పిల్లలు పురోభివృద్ధి చెందడం కష్టతరం.					
6.	ప్రతి రైతు జీవించుట కొరకై సంపాదించ వలసిందేగానీ ఆర్థికపరమైన అంశాలతో జీవితాన్ని నిర్వచించలేము.					

9) నూతన ఆలోచన తీరు :

ఈ క్రింద పొందుపరచబడ్డ వాక్యాలు రైతు యొక్క నూతన ఆలోచన తీరును ప్రతిబింబిస్తాయి. దయచేసి పై వాక్యాలపై మీ యొక్క స్పందనను ఐదంకెల క్రమానుసారిణిపై వ్యక్తపరచండి.

క్రసం.	వివరము	స్పందన		
		ఏకీభవిస్తాను (3)	నిర్ణయించలేను (2)	ఏకీభవించను (1)
	మినుము సాగు చేయు రైతుగా			
1.	ప్రతి వ్యక్తి నూతన సాగు విధానాలను నేర్చుకోవడానికి ప్రయత్నించాలి			
2.	ప్రతి వ్యక్తి మినుము సాగుపై ఏర్పాటుచేయబడిన సంభాషణ కార్యక్రమాలకు హాజరుకావడానికి ఆసక్తి కనపరచాలి			
3.	మినుములో అధిక దిగుబడులు సాధించడమనేది దైవానుగ్రహం కాబట్టి ప్రతి వ్యక్తికి ఇది సాధ్యమయ్యే విషయం కాదు			
4.	మినుములో అధిక ఉత్పత్తి పొందే నిశ్చయంతో లాభాలను సాధించడానికి ప్రతి రైతు కృషి చేయాలి			
5.	నూనత ఆర్థిక కార్యకలాపాలకు పాల్పడి ఎక్కువ డబ్బు సంపాదించాలని కోరుతున్నారా			
6.	రేపటి గురించి చింతించకుండా ప్రతి వ్యక్తి సంతోషంగా ఉండాలి			
7.	ప్రతి రైతు తమ పిల్లల్ని రైతులుగా చూడటానికి సంశయించరాదు			
8.	ప్రతి రైతు ఆధునిక పద్ధతులను అవలంబించడానికి ప్రయత్నించాలి			

10) శాస్త్రీయ దృక్పథం :

ఈ క్రింద పొందుపరచబడిన వాక్యాలు రైతు యొక్క శాస్త్రీయ దృక్పథాన్ని ప్రతిబింబిస్తాయి. దయచేసి ఐదంకెల క్రమానుసారిణిపై మీ స్పందనను వ్యక్తపరచండి.

క్రసం.	వివరము	స్పందన				
		గట్టిగా ఏకీభవిస్తాను	ఏకీభవిస్తాను	నిర్ణయించలేను	ఏకీభవించను	గట్టిగా ఏకీభవించను
1.	అభివృద్ధి చెందిన మినుము సాగు పద్ధతులు పురాతనమైన వాటి కంటే మెరుగైన ఫలితాలనిస్తాయి.					
2.	మన పూర్వీకులు అవలంబించిన సాగు పద్ధతులే ఈనాటికీ ఉత్తమమైనవి.					
3.	మంచి రైతు తన జీవన ప్రమాణాలను మెరుగుపరుచుకోవడానికి కొత్త ఆలోచనలను ప్రయోగాత్మకంగా చేపడుతూ ఉంటాడు.					
4.	ప్రతి రైతు మంచి ఫలితాలను పొందాలంటే సృజనాత్మక శాస్త్రీయ ఆలోచనలు చేయాలి.					
5.	ఎంతో అనుభవమున్న రైతు అయినా కూడా నూతన సాగు పద్ధతులను ఆచరించాలి.					
6.	రైతుకు మినుములో నూతన సాగు పద్ధతులను నేర్చుకోడానికి సమయం పట్టినప్పటికీ శ్రమకు తగ్గ ఫలితాన్నే ఇస్తాయి					

11) తెగింపు దృక్పథం :

ఈ క్రింద ఇవ్వబడిన వాక్యాలు రైతు యొక్క తెగింపు దృక్పథాన్ని ప్రతిబింబిస్తాయి. దయచేసి మూడంకెల క్రమానుసారిణిపై మీ స్పందనను వ్యక్తపరచండి.

క్రసం.	వివరము	స్పందన		
		ఏకీభవిస్తాను (3)	నిర్ణయించలేను (2)	ఏకీభవించను (1)
1.	కొత్త పద్ధతి లాభదాయకమైనప్పుడు ప్రతి వారు తెగింపుతో ప్రయత్నించాలి.			
2.	ప్రతి రైతు తక్కువ కష్టాల లేమితో కూడిన లాభాలతో తృప్తిపడేకంటే అధిక లాభాలు పొందడానికి ప్రయత్నించాలి.			
3.	మంచి ఆర్థిక స్థితిలో ఉన్న ప్రతి రైతు ఎక్కువ తెగువ చూపటానికి చొరవ చూపాలి.			
4.	ప్రతి రైతు తనకు అధిక విజయావకాశాలు ఉన్నాయని తెలిసిన తరువాతనే తెగింపు చేయుట మంచిది.			
5.	ఇతర రైతులు నవ్య సేద్య పద్ధతులను అవలంబించి విజయం సాధించిన తరువాత మాత్రమే ప్రతి రైతు అటువంటి పద్ధతులకై ప్రయత్నించాలి.			
6.	రైతు పలు రకాల పంటలు పండించుట వలన ఒకటి లేదా రెండు పంటలు పండించడంలో ఉన్న అపాయాన్ని తగ్గించవచ్చు.			

12) విపణి దృక్పథం :

ఈ క్రింద ఇవ్వబడిన వాక్యాలు రైతు యొక్క విపణి దృక్పథాన్ని ప్రతిబింబిస్తాయి. దయచేసి మూడంకెల క్రమానుసారిణిపై మీ స్పందనను వ్యక్తపరచండి.

క్రసం.	వివరము	స్పందన		
		ఏకీభవిస్తాను (3)	నిర్ణయించలేను (2)	ఏకీభవించను (1)
1.	ప్రతి రైతు తన ఉత్పత్తికి మంచి ధర పొందటానికై కృషి చేయాలి.			
2.	ప్రతి రైతు విపణిలో అధిక వినియోగం కలిగిన రకాలను పండించాలి.			
3.	ప్రతి రైతు తన ఉత్పత్తిని నిల్వచేయడం ద్వారా మంచి ధరను పొందవచ్చు.			
4.	ప్రతి రైతు ధరతో సంబంధం లేకుండా తన దగ్గరున్న మార్కెట్‌లో ఉత్పత్తిని విక్రయించాలి.			
5.	ప్రతి రైతు తనకు కావలసిన ముడిసరుకులను దగ్గరలో ఉన్న తన బంధుమిత్రులు కొన్న దుకాణాలలో కొనవలెను.			
6.	ప్రతి రైతు తన ఉత్పత్తిని మధ్యవర్తుల ద్వారా విక్రయించాలి.			

13) వార్షికాదాయం :

క్ర.సం.	పంటలు	ప్రాథమిక ఉత్పత్తి			ద్వితీయ ఉత్పత్తి		
		దిగుబడి	ధర	మొత్తం ఆదాయం	దిగుబడి	ధర	మొత్తం ఆదాయం
అ)	ఖరీఫ్						
1.							
2.							
3.							
ఆ)	రబి						
1.							
2.							
3.							
	మొత్తం :						

గట్టిగా ఏకీభవించడం (5)

14) పొందిన శిక్షణ వివరములు :

వ.సం.	పొందిన శిక్షణల సంఖ్య	
1.	శిక్షణలు లేవు	(1)
2.	1 నుండి 2 శిక్షణలు	(2)
3.	2 నుండి 4 శిక్షణలు	(3)
4.	4 నుండి 6 శిక్షణలు	(4)
5.	ఆరు, ఆ పైన శిక్షణలు	(5)

భాగము -2

ఎంపిక చేయబడిన సాంకేతిక పరిజ్ఞానంపై రైతు యొక్క పరిజ్ఞానం స్థాయి :

అ. ఈ క్రింది వానిలో సరియైన సమాధానాన్ని ఎంపిక చేయండి.

వరి మాగాణిలో పండించే మినుములో ....

1) వరి మాగాణులలో మినుము అనువైన రకాలు ( )

అ) ఎల్.బి.జి. 752 ఆ) ఎల్.బి.జి. 645

ఇ) ఎల్.బి.జి. 685 ఈ) పైవన్నీ

2) ఎకరాకు సిఫారసు చేయబడిన విత్తన మోతాదు ( )

అ) 5-10 కేజీలు ఆ) 10-15 కేజీలు ఇ) 15-20 కేజీలు ఈ) 20-25 కేజీలు

3) సిఫారసు చేయబడిన విత్తే పద్ధతి ( )

అ) వెదజల్లడం ఆ) నాటే పద్ధతి ఇ) విత్తనం పాతిపెట్టే పద్ధతి ఈ) ఏవీ కావు

4) విత్తనం ద్వారా ఆశించే తెగుళ్ళ శుద్ధికి సిఫారసు చేయబడిన రసాయనం ( )

అ) కాప్టాన్ ఆ) కార్బెండిజమ్

ఇ) మాంకోజెబ్ ఈ) పైవన్నీ

5) రసం పీల్చే పురుగుల నివారణకు సిఫారసు చేయబడిన రసాయనం ( )

అ) కార్బోసల్ఫాన్ ఆ) ఇమడాక్లోప్రిడ్

ఇ) థయామిదాక్సాన్ ఈ) పైవన్నీ

6) రబి మినుము రకాల పంట కాలం ( )

అ) 5-75 రోజులు ఆ) 75-95 రోజులు ఇ) 95-115 రోజులు ఈ) 115-135 రోజులు

7) పంట విత్తిన తర్వాత ఆశించే ఎకినోక్లోవా కొలోనమ్ మరియు మిగతా గడ్డి జాతి కలుపు మొక్కలను అదుపులో ఉంచడానికి పిచికారి చేయవలసిన రసాయనము ( )

అ) క్విజాలాఫాఫ్ పి. ఇథైల్ @ 400 మి.లీ. ఆ) ఫెనాక్స్ ప్రాప్ పి. ఇథైల్ @ 250 మి.లీ.

ఇ) అ మరియు ఆ ఈ) అ లేదా ఆ

8) తామర పురుగులను ఈ రసాయనాల పిచికారి వలన నివారించవచ్చు. ( )

అ) ఎసిఫేట్ @ 1 గ్రా/లీ. ఆ) పిప్రోనిల్ @ 1 మి.లీ.

ఇ) డైమిథోయేట్ @ 2 మి.లీ. ఈ) పైవన్నీ

9) తెల్ల దోమ నివారణకు వాడే రసాయనం ( )

అ) మోనోక్రోటోఫాస్ @ 1.6 మి.లీ. ఆ) మిథైల్ డైమెటాన్ @ 1 మి.లీ.

ఇ) ట్రైజోఫాస్ @ 2 మి.లీ. ఈ) పైవన్నీ

10) మారుకా మచ్చల పురుగు ఎక్కువగా నష్టపరిచేది ఏ దశలో ( )

అ) పూమొగ్గ దశ ఆ) పూవు దశ

ఇ) కాయ అభివృద్ధి చెందే దశ ఈ) పైవన్నీ

11) పంట పూ దశలో ఉన్నప్పుడు మారుకా మచ్చల పురుగును ఈ రసాయనమును ఉపయోగించి పిచికారి చేయడం ద్వారా దాని ఉధృతిని తగ్గించుకోవచ్చు. ( )

అ) ఎసిఫేట్ @ 1 గ్రా/లీ. ఆ) క్వినాలిఫాస్ @ 2.5 మి.లీ.

ఇ) థయాడికార్బ్ @ 1.5 మి.లీ. ఈ) పైవన్నీ

12) మారుకా మచ్చల పురుగు అధిక ఉధృతిని దీని పిచికారి ద్వారా అరికట్టవచ్చు. ( )

అ) ఫ్లూబెండిమైడ్ @ 0.2 మి.లీ. ఆ) స్పైనోసాడ్ @ 0.3 గ్రా.

ఇ) ఇమామిట్ బెంజోయేట్ @ 0.4 గ్రా. ఈ) పైవన్నీ

13) సెర్కోస్పారా ఆకుమచ్చ తెగులును ఈ రసాయనాన్ని పిచికారి చేయడం ద్వారా అరికట్టవచ్చు.( )

అ) మాంకోజెబ్ @ 2.5 గ్రా./లీ. ఆ) కాపర్ ఆక్సీక్లోరైడ్ @ 3 గ్రా/లీ.

ఇ) హెక్సాకొనజోల్ @ 2 మి.లీ/లీ. ఈ) పైవన్నీ

14) పక్షి కన్ను తెగులు, సర్కోస్పారా మరియు ఆల్టర్నేరియా ఆకుమచ్చ తెగులుకు ప్రతి 15 రోజుల వ్యవధిలో ఈ రసాయనమును పిచికారి చేయవలెను. ( )

అ) మాంకోజెబ్ @ 2.5 గ్రా./లీ. ఆ) కాపర్ ఆక్సీక్లోరైడ్ @ 3 గ్రా/లీ.

ఇ) హెక్సాకొనజోల్ @ 2 మి.లీ/లీ. ఈ) పైవన్నీ

15) బూడిద తెగులు నివారణకు ఈ మందును పిచికారి చేయాలి. ( )

అ) కార్బండిజమ్ @ 1 గ్రా./లీ. ఆ) కాపర్ ఆక్సీక్లోరైడ్ @ 3 గ్రా/లీ.

ఇ) థయోఫానేట్ మిథైల్ @ 1 మి.లీ/లీ. ఈ) పైవన్నీ

16) తుప్ప తెగులును సమర్ధవంతంగా నివారించడానికి మాంకోజెబ్ @ 3 గ్రా./లీ. ని దీనితో కలిపి పిచికారి చేయాలి. ( )

అ) డైనోకాఫ్ @ 1 మి.లీ/లీ. ఆ) ట్రైడియోమార్ఫ్ @ 3 గ్రా/లీ.

ఇ) ట్రైడిమోఫిన్ @ 1 గ్రా/లీ. ఈ) పైవన్నీ

17) పల్లాకు తెగులును తట్టుకునే రకం ( )

అ) ఎల్.బి.జి. 752 ఆ) పి.యు. 31

ఇ) అ మరియు ఆ ఈ) పైవేమీ కావు

ఈ క్రింది వాక్యాలలో తప్పొప్పులను నిర్ణయించండి.

18) వరి పంట కోసే 3 నుండి 4 రోజుల నుండి మినుము విత్తుకోవాలి. ఒప్పు/తప్పు

19) నవంబర్-డిసెంబర్ నెలల్లో వరి మాగాణుల్లో మినుమును విత్తుకోవాలి. ఒప్పు/తప్పు

20) 2% యూరియా పిచికారి పుష్పదశలో మరియు కాయ ఏర్పడే దశలో తప్పనిసరి. ఒప్పు/తప్పు

21) వరి మాగాణి మినుములో అధికంగా కలుపు మొక్కలు ఆశించే అవకాశం ఉంది. ఒప్పు/తప్పు

22) కలుపు మొక్కల సాంద్రతను ఇమేజితాపైర్ పిచికారి చేయడం వలన తగ్గించుకోవచ్చు. ఒప్పు/తప్పు

23) ఎండుతెగులు నేల ద్వారా సంక్రమిస్తుంది. ఒప్పు/తప్పు

24) పైరు పూత దశలో ఆకు ఉపరితలంపై లేత పసుపు వర్ణంగల గుడ్రని చిన్న మచ్చలేర్పడిన పిమ్మట కుంభాకృతితో కూడిన గుండ్రని మచ్చలు ఏర్పడడం తుప్ప తెగులు లక్షణం. ఒప్పు/తప్పు

25) పల్లాకు తెగులు కారకం తెల్లదోమ. ఒప్పు/తప్పు

ఈ క్రింది వాక్యాలలో అవును/కాదు లను నిర్ణయించండి.

26) రైజోబియం కల్చర్‌తో విత్తనశుద్ధి చేయడం వలన దిగుబడి పెరుగుతుంది. అవును/కాదు

27) వర్షాలు లేనప్పుడు 1 నుండి 2 నీటి తడులను ఇవ్వాలి. అవును/కాదు

28) పొగాకు లద్ది పురుగు పప్పులు మరియు ఆకులన్నిటినీ తినివేస్తుంది. అవును/కాదు

29) అధికంగా ఆకులను బూడులుగా మార్చే మారుకా మచ్చల పురుగు నివారణకు డైక్లోరోవాస్ @ 1 మి.లీ./లీ. ఉపయోగపడుతుంది. అవును/కాదు

30) నాలుగు వరసల మొక్కజొన్న లేదా జొన్న మినుము పంట చుట్టూ ఎర పంటగా పెంచడం వలన తెల్ల దోమ, తామర పురుగు, పేనుబంక ఉధృతిని తగ్గించవచ్చు. అవును/కాదు

భాగము - 3

ఆచరించుట

ఎంపిక చేయబడిన వరి మాగాణుల్లో మినుము సాగు సాంకేతిక పరిజ్ఞానం యొక్కరైతు అవలంబన స్థాయి.

క్ర.సం.	సేద్యపు పద్ధతులు	అవలంబించే స్థాయి				
		పూర్తిస్థాయి (4)	పరిమిత స్థాయి (3)	అసలు లేదు (2)	అధిక స్థాయి (1)	కారణాలు
	అ. నేలలు :					
1.	సరైన మురుగు నీటి యాజమాన్యం కలిగిన నేలల్లో మినుమును పెంచుట					
	ఆ. రకాలు :					
2.	ఆకుమచ్చ తెగులును నివారించుటకు ఎల్.వి.జి.-648 రకమును పెంచుట					
3.	వడలు తెగులును తట్టుకునే ఎల్.వి.జి.-648 రకమును పెంచుట					
4.	పల్లాకు తెగులును తట్టుకునే ఎల్.వి.జి.-752 రకమును పెంచుట					
5.	పల్లాకు తెగులును తట్టుకునే పి.యు.-31 (సాధారణ రకము) ను పెంచుట					
	ఇ) విత్తుట :					
6.	నవంబర్-డిసెంబర్ నెలల్లో విత్తనాలు విత్తుట					
7.	వరి కోసిన 2-3 రోజుల ముందు విత్తుట					
8.	ఎకరానికి 16 కేజీలు ఉపయోగించుట					
9.	వెదజల్లే పద్ధతిలో విత్తనాలు విత్తుట.					
10.	థైరమ్/కాప్టాన్ 5 గ్రా. ఒక కేజీ విత్తనానికి విత్తనశుద్ధి చేయుట					

క్ర.సం.	సేద్యపు పద్ధతులు	అవలంబించే స్థాయి				
		పూర్తిస్థాయి (4)	పరిమిత స్థాయి (3)	అసలు లేదు (2)	అధిక స్థాయి (1)	కారణాలు
11.	రసం పీల్చే పురుగునివారణకు ఇమిడాక్లోప్రిడ్ @ 5 గ్రా./1 కేజీతో విత్తనశుద్ధి చేయుట					
12.	250 గ్రా. ఒక కేజీ విత్తనానికి కలిపి విత్తనశుద్ధి చేయుట					
13.	విత్తనశుద్ధి చేసిన తరువాత విత్తనాన్ని ఎండబెట్టుట/ఆరబెట్టుట					
	ఈ. ఎరువుల యాజమాన్యం :					
14.	సూక్ష్మ పోషక లోప నివారణకు 2 % యూరియాను వరి తరువాత మినుము వేసినపుడు పిచికారి చేయుట					
15.	పోషక లోప నివారణకు 2% డి.ఎ.పి.ని పిచికారి చేయుట					
	ఉ. నీటి యాజమాన్యం :					
16.	వరి తరువాత మినుము వేసినపుడు బాగా దిగుబడి కొరకు 30 రోజులు మరియు 50 రోజులలో (అనగా చిరుపొట్ట దశ మరియు గింజ/కాయ తయారేయ్య దశ)లో నీటిని అందించుట					
	ఊ. కలుపు యాజమాన్యం :					
17.	ఒక ఎకరాకి 250 మి.లీ./ఒక లీ.కు ఫెర్నాక్సిప్రాప్ ఇథైల్ 9% ద్రావణం పిచికారి చేయుట					
18.	ఒక ఎకరానికి 400 మి.లీ./1లీ.కు క్విజాలోఫాప్ ఇథైల్ 5% ద్రావణం పిచికారా చేయుట					
19.	విత్తిన/నాటిన 20-25 రోజులకు కలుపు మందులను పిచాకారి చేయుట					
	ఋ. సస్య రక్షణ :					
20.	తెల్ల దోమ వలన సోకే/వ్యాపించే పల్లాకు తెగులు నివారణకు 5% వేప కషాయాన్ని పిచికారి చేయుట					
21.	పల్లాకు తెగులు నివారణకు క్లోరోపైరిఫాస్ 2.5 మి.లీ. మోనోక్రోటోఫాస్ 1.6 మి.లీ. లేదా ఎసిఫేట్ 1.0 గ్రా. పిచికారి చేయుట					
22.	ఎఫిడ్స్ (పేనుబంక) పురుగు నివారణకు 1.0 గ్రా. ఎసిఫేట్ పిచికారి చేయుట					

క్రసం.	సేద్యపు పద్ధతులు	అవలంబించే స్థాయి				
		పూర్తిస్థాయి (4)	పరిమిత స్థాయి (3)	అసలు లేదు (2)	అధిక స్థాయి (1)	కారణాలు
23.	మారుకా మచ్చల పురుగు/కాయ తొలుచు పురుగు నివారణకు 1 మి.లీ. నీవాల్యురాన్ మరియు డైక్లోర్‌వాస్ 1 మి.లీ. ఒక లీటరు నీటికి కలిపి పిచికారి చేయుట					
24.	కొరినోస్పోరా ఆకుమచ్చ తెగులు నివారణకు మాంగోజెక్ 2.5 గ్రా. పిచికారి చేయుట					
25.	కొరినోస్పోరా ఆకుమచ్చ తెగులు నివారణకు 3 గ్రా. కాపర్ ఆక్సీక్లోరైడ్‌ను పిచికారి చేయుట					
26.	కొరినోస్పోరా ఆకుమచ్చ తెగులు నివారణకు 10 రోజుల వ్యవధిలో 2 మి.లీ. హెక్సాకొనజోల్ 1 లీటరు నీటికి కలిపి పిచికారి చేయుట					
27.	పాగాకు లద్దె పురుగు ఆశించిన మరియు నష్టపరిచిన జల్లెడ వంటి ఆకులను ఏరి నాశనం చేయుట					
28.	ఆంత్రాక్నోస్ (పక్షి కన్ను) తెగులు నివారణకు మాంగోజెబ్ 2.5 గ్రా. లేదా హెక్సాకొనజోల్ లేదా కాపర్ ఆక్సీక్లోరైడ్‌ను 3 మి.లీ. ఒక లీటరు నీటికి కలిపి పిచికారి చేయుట					
29.	తుప్ప తెగులు నివారణకు మాంగోజెబ్ 3 గ్రా. మరియు 1 మి.లీ. డయనోక్యాప్ కలిపి పిచికారి చేయుట					
30.	పంట సున్నిత దశలు అనగా 35-40 రోజులు, 45-50 రోజులు మరియు 60-65 రోజులు వ్యవధిలో సమగ్ర సస్యరక్షణ చర్యలు పాటించుట.					
31.	రసం పీల్చే పురుగుల నివారణకు పంట చుట్టూ జొన్న లేదా మొక్కజొన్న పైరును పెంచుట					
32.	తెల్ల దోమ ఉధృతిని తెలుసుకొనుటకు లింగాకర్షక బుట్టలను పంట పొలంలో ఏర్పరచుట					
33.	తెల్ల దోమ ఉధృతిని నివారణకు ట్రైజోఫాస్ 1.25 మి.లీ. లేదా ఎసిఫేట్ 2 మి.లీ. లేదా ఎసిటమాప్రిడ్ 2 మి.లీ.ను 1 లీటరు నీటిలో కలిపి పిచికారి చేయుట.					

క్ర.సం.	సేద్యపు పద్ధతులు	అవలంబించే స్థాయి				
		పూర్తిస్థాయి (4)	పరిమిత స్థాయి (3)	అసలు లేదు (2)	అధిక స్థాయి (1)	కారణాలు
	ఐ. కోత కోయుట :					
34.	కాయలు నల్లగా మారిన తరువాత పంట కోత కోయుట.					
35.	విత్తిన 75-80 రోజుల తర్వాత పంటను కోయుట.					
36.	కోసిన పంటను నూర్పిడి నేల మీద ఎండబెట్టి తరువాత నూర్పిడి చేయాలి.					
37.	నూర్పిడిని శారీరక శక్తితోగానీ ట్రాక్టరుతో తొక్కించే పద్ధతులను అనుసరించుట.					

రైతుల యొక్క సమస్యలు/అవరోధకాలు మరియు సలహాలు :

వరి మాగాణి మినుము సాగులో మీరు ఎదుర్కొంటున్న సమస్యలను దయచేసి తెలుపండి.

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పైన చెప్పిన సమస్యలను అధిగమించుటకు మీ సలహాలను పేర్కొనండి.

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PART-II

LEVEL OF KNOWLEDGE OF BLACKGRAM GROWERSON THE SELECTED PRODUCTION TECHNOLOGY

A. Please choose the appropriate answer for the following questions from the alternatives given below

1. The suitable variety is

a) LBG - 752 b) LBG - 645

c) LBG - 685 **d) All of these**

2. The recommended seed rate per acre is

a) 5 - 10kg b) 10 - 15kg **c) 15 - 20kg** d) 20 - 25kg

3. The recommended method of sowing is

a) Broadcasting b) Line sowing

c) Dibbling d) None of these.

4. The recommended chemical used for seed treatment against seed borne diseases is

a) Captan b) Carbendazim

c) Mancozeb **d) All of these**

5. The recommended chemicals used for seed treatment against sucking pests is

a) Carbosulfan b) Imidacloprid

c) Thiamethoxam **d) All of these**

6. The duration of rabi blackgram varieties grown ranges from

a) 55 - 75 days **b) 75 - 95 days**

c) 95 - 115 days d) 115 - 135 days.

7. Post-emergent weed problem of *Echinochloa colonum* and other grasses can be controlled by spraying of

a) Quizalofop p ethyl(Turga Super)@ 400ml / acre

b) Fenoxoprop p ethy l(Whip Super) @ 250ml / acre.

c) a & b d) a orb

8. Thrips can be controlled by spraying of

a) Acephate (Lancer) @ 1g/litre

b) Fipronil (Regent) @ 1ml/litre

c) Dimethoate (Rogor) @ 2ml/litre

d) Any one of these.

9. Chemical means of controlling white fly menace is

a) Monocrotophos (Nuvacron) @ 1.6ml/litre

b) Methyl demeton (Metasystax) @ 1ml/litre

c) Triazophos (Trifos) @ 2ml/litre

d) Any one of these

10. Maruca pod borer causes more damage at

a) Flower bud initiation stage

b) Flowering stage

c) Pod development stage **d) All of these**

11. Maruca pod borer at the flowering stage can be chemically controlled by spraying

a) Acephate(Lancer)@1.0g/litre

b) Quinalophos(Quinguard)@2.5ml/litre

c) Thiodicarb(Larvin)@1.5g/liter

d) Any of these

12. Severe incidence of Maruca pod borer can be controlled by spraying of

a) Flubendiamide(Fame)@0.2ml/litre

b) Spinosad(Tracer)@0.3g/litre

c) Emamectin benzoate(Proclaim) @ 0.4g / litre

d)Any one of these

13. The chemical control measure for Coreynospera leaf spot is spraying of

a) Mancozeb@2.5g/litre

b) Copper oxy chloride(Blitox)@3g/litre

c) Hexaconazole (Contaf)@2ml/litre

d) Any one of these

14. Anthracnose, Cercospera and Alterneria leaf spot can be controlled by spraying twice @15 days interval using

a) Mancozeb@2.5g/litre

b) Hexaconazole (Contaf) @ 2ml/litre

c) Copper Oxy Chloride(Blitax) @ 3g/litre

d) Any one of these

15. Powdery mildew disease can be controlled by spraying

a) Carbendazim(Bavistin) @ 1g / litre

b) Thiophanate methyl (Topsin-M) 1ml / litre

c) Copper Oxy Chloride (Blitox) @ 3g / litre

d) Any one of these

16. Rust disease can be effectively controlled by spraying with Mancozeb @ 3g / litre along with

a) Dinocap (Karathane) @ 1ml / litre

b) Tridemorph (Calixin) @ 1g / litre

c) Triademefon(Bayleton) @ 1g / litre

d) Any one of these.

17. Variety which is resistant to yellow mosaic is

a) LBG 752 b) PU 31 **c) a & b** d) None

B. Please indicate your answer by underlining True/False for the following statements.

18. Sowing shall be taken up 3-4 days prior to the harvest of paddy. **True/False**
19. One need to go for sowing in the month of November – December. **True/False**
20. Spraying of 2% Urea at flowering and pod formation stages is essential. **True/False**
21. Weeds are dominant problem in rice fallow blackgram. **True/False**
22. Intensity of dominant weeds can be controlled by spraying of Imazethapyr(Pursuit). **True/False**
23. Wilt is a soil borne disease. **True/False**
24. Small yellowish spots initially transforming to spindle shaped spots on leaves at flowering stage is the symptom of rust disease. **True/False**
25. Whitefly is the causative organism of yellow mosaic disease. **True/False**

C. Please indicate your answer by underlining Yes/No for the following statements.

26. Seed treatment with Rhizobium culture helps in increasing yield. **Yes/No**
27. 1 - 2 irrigations should be given when there are no rains. **Yes/No**
28. Tobacco caterpillar eats away the flowers and leaves. **Yes/No**
29. Addition of Dichlorvos (Nuvan)@1.0ml/litre helps in management of maruca pod borer in case of more number of webbings. **Yes/No**
30. Four rows of maize or jowar grown around the field as trap crop helps in controlling whitefly, thrips and aphids. **Yes/No**

Investigator collecting information from farmers of Inturu village

Investigator collecting information from farmers of Siripudi village

Investigator collecting information from farmers of Amarthaluru village

Investigator collecting information from farmers of Mannava village