A Study on Technological Gap in Recommended Sesame Production Technology among Farmers of Sihora Block of District Jabalpur (M.P.)

THESIS

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Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur

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In

AGRICULTURE
(AGRICULTURE EXTENSION)

CHANDRIKA SHARMA

Department of Extension Education
College of Agriculture, Jabalpur 482004
Jawaharlal Nehru Krishi Vishwa Vidyalaya,
Jabalpur, (MP)

2016

CERTIFICATE- I

This is to certify that the thesis entitled ***"A study on Technological Gap in recommended sesame production technology among the farmers of Sihora block of district Jabalpur (M.P.)"*** *submitted in partial fulfilment of the requirement for the degree of* ***Master of Science in Agriculture in (Agriculture Extension)*** *of Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur is a record of the bonafide research work carried out by* ***Ms.CHANDRIKA SHARMA*** *under my guidance and supervision. The subject of the thesis has been approved by the Student's Advisory Committee and the Director of Instructions.*

All the assistance and help received during the course of the investigation has been acknowledged by her.

Place: Jabalpur

Date:

Dr. A.K. Pande
Chairman of the Advisory Committee

THESIS APPROVED BY THE STUDENT'S ADVISORY COMMITTEE

Committee	Name	Signature
Chairman	Dr. A.K. Pande	_____
Member	Dr. M.K. Dubey	_____
Member	Dr. R.M. Sahu	_____

CERTIFICATE- II

This is to certify that the thesis entitled ***"A study on Technological Gap in recommended sesame production technology among the farmers of Sihora block of district Jabalpur (M.P.)"*** *submitted by* ***Ms.CHANDRIKA SHARMA*** *to the Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur in partial fulfilment for the requirements of the degree of* ***Master of Science in Agriculture (Agriculture Extension)*** *in the Department of* ***Extension Education*** *has been, after evaluation, approved by the External Examiner and by the Student's Advisory Committee after an oral examination on the same.*

Place: Jabalpur

Date:

Dr. A.K. Pande
Chairman of the Advisory Committee

MEMBERS OF THE ADVISORY COMMITTEE

Committee	Name	Signature
Chairman	Dr. A.K. Pande	_____
Member	Dr. M.K. Dubey	_____
Member	Dr. R.M. Sahu	_____
Head of the Department	Dr. N. K. Khare	_____
Director of Instruction	Dr. D. Khare	_____

Declaration and Undertaking by the Candidate

I, Chandrika Sharma, D/o Shri Ashok Kumar Sharma, certify the work embodied in thesis entitled, “A study on Technological Gap in recommended sesame production technology among the farmers of Sihora block of district Jabalpur (M.P.)” is my own first hand bonafide work carried out by me under the guidance of Dr. A.K. Pande at Department of Extension Education, College of Agriculture, JNKVV, Jabalpur during 2016.

The matter embodied in the thesis has not been submitted for the award of any other degree / diploma. Due credit has been made to all the assistance and help.

I, undertake the complete responsibility that any act of misinterpretation, mistakes and errors of fact are entirely of my own.

I, also abide myself with the decision taken by my advisor for the publication of material extracted from the thesis work and subsequent improvement, on mutually beneficial basis, provided the due credit is given, thereof.

Place: Jabalpur

Date : **(Chandrika Sharma)**

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Department	:	Deptt. of Extension Education
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Date:

Place: Jabalpur

Dr. A.K. Pande
(Major Advisor)

Chandrika Sharma
(Student)

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Place: Jabalpur

Date: **(CHANDRIKA SHARMA)**

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INTRODUCTION

Sesame (*Sesame indicum* L.), commonly known as Til, is one of the important edible oilseeds cultivated in India. It is a rich source of oil (50%) and protein (18-20%). A 100g of seed provides 592 calories of energy. Being containing such qualities, it is well known as “poor man’s substitute for ghee” (Singh et al. 2009). Sesame seeds are rich source of food, nutrition, edible oil and bio-medicine. Sesame oil has excellent nutritional, medicinal, cosmetic and cooking qualities for which it is known as the “the queen of oils”. Due to presence of potent antioxidents, sesame seeds are called as “the seeds of immortality” (Rai et al. 2012). It has a vast field of applications such as edible purposes, in industries like paints, pharmaceuticals, insecticides, cosmetics, soap making etc. Sesame is also used as a cattle feed especially for milch animals and as manure due to presence of 6-6.2% N. 2-2.2% P and 1-1.2% K in its cake (Singh et al. 2009).

Sesame is cultivated over an area of 16.73 lakh hectares with a production of about 6.85 lakh tonnes and average yield of 409 kg/ha in India (Anonymous 2012-13). The major sesame growing states are West Bengal, Rajasthan, Madhya Pradesh, Gujarat and Uttar Pradesh.

In Madhya Pradesh sesame is mainly grown in Chhatarpur, Tikamgarh, Sidhi, Shahdol, Morena, Shivpuri, Sagar, Damoh, Jabalpur, Mandala, East Nimar and Seoni districts of the state. The average yield of sesame in M.P. is 387 kg/ha. Being in Central Plateau and Hills region VIII of agro-climatic zone, Jabalpur occupies 1000 ha of area with 530 tonnes of production and 500 kg/ha average yield for this crop (Anonymous, 2012-13).

Reasons for sesame to be selected as crop for study are –

- The productivity of sesame is minimum (375 kg/ha) in the Sihora block of Jabalpur district (Anonymous, 2012-13).
- Oil percentage is maximum in sesame (50%) as compared to groundnut (45%), soybean (40%), mustard (34%) and sunflower (45%).
- Among all oilseeds, sesame costs maximum in terms of export- i.e. Rs. 3583.46 crore, groundnut (Rs. 3212.06 crore) and niger (Rs. 113.61 crore.) (Anonymous, 2014).
- Minimum Support Price for sesame is maximum among all oilseed crops i.e. groundnut, sunflower, niger, soybean and mustard which is Rs.4600, Rs.4000, Rs.3750, Rs.3600, Rs.2500 per quintal, respectively (Anonymous, 2014-15).
- It has more growth rate in last 3 year's Minimum Support Price which is 48% as compared to that of groundnut which is 40% (Anonymous, 2014-15).
- In the world market for sesame, India has a reputation of being a net exporter. The country is one of the largest exporters of sesame, exporting between 5 lakh to 6 lakh metric tonnes of sesame annually. As the production in India is sufficient to satisfy the domestic consumption demand, around 25% of the total production is exported to different countries (Sesame: Economic importance and production-2016).
- Sesame requires minimum seed rate, mostly grown as rainfed crop and takes only 85-90 days to get harvest. It can be taken in zaid season when the land and farmers both are fallow after the harvest of rabi produce.

Area, production and productivity of sesame crop of different blocks of Jabalpur district (2012-13)

Blocks	Area (ha)	Production (quintals)	Productivity (kg/ha)
Sihora	20	75	375
Panagar	50	200	400
Shahpura	200	850	425
Jabalpur	300	1350	450
Kundam	380	1900	500
Patan	25	125	500
Majholi	25	125	500

(Source : Anonymous, 2012-13)

The yield of district is low as compared to its potential yield. Therefore, it is essential to know the technological status of sesame growers for developing strategy for higher production per unit area in the district. It is also noticed by reviewing the research reports and findings of research journals that the package of practices as adopted by the farmers are some what different from what is recommended by the scientists for optimum production.

So, keeping in view the above point of references, the research problem entitled, “A study on technological gap in recommended sesame production technology among farmers of Sihora block, Jabalpur district of Madhya Pradesh” was under taken with the following objectives:-

Objectives:

1. To know the socio-economic, psychological and communication attributes of the farmers.
2. To determine the existing technological gap in recommended sesame production technology.

3. To find out the association between socio-economic, psychological and communication attributes of sesame growers with technology gap.
4. To know the constraints responsible for existing technological gap and suggest the strategy for enhancing sesame production technology.

Limitations of the study:

1. The investigation was conducted in a limited time with the restricted size of sample.
2. The method of data collection in the investigation was mostly confined to personal interview and the results drawn are exclusively based on the verbal expressed opinion and responses provided by the respondents.
3. Implication of the findings of the study will be applicable to the area of investigation and similar situations only.
4. The study is of limited geographical location. So the results may not lead to broader generalization.

Scope of the study:

The present investigation is an effort to identify the gap in the recommended practices of sesame production technology. The study was designed to conceptualize the behaviour of sesame growers in terms of their socio-personal-economic, communicational and psychological factors with reference to their adoption behaviour. The findings of the study are expected to be useful in identifying farm entrepreneurs to improve them in development activities related to agriculture. It is believed that the findings will be very useful in developing suitable training programmes related to agriculture development and also in changing existing form in to better ones.

* * *

REVIEW OF LITERATURE

This chapter presents the findings of the past research works related to the present problem by going through the professional research journals, articles, documents, approved theses, books and magazines in order to keep up-to-date information which are presented in following sub heads:

2.1 Profile of sesame growers.

2.2 Technological gap of improved sesame production technology among the farmers.

2.3 Association between attributes of sesame growers with technological gap.

2.4 Constraints in sesame cultivation and suggestions for the growers.

2.1 Profile of selected farmers:

Age

Asati (2000) found that out of total, 50 per cent of the mustard growers belonged to young age group.

Parey (2000) concluded that majority of the farmers (86%) were of middle age group.

Khaterkar (2004) reported that majority of the soybean growers belonged to old age group.

Rajput (2005) reported that majority of the respondents belonged to middle age group.

Mahoviya (2006) concluded that maximum respondents belonged to middle age group.

Dwivedi (2007) reported that majority of respondents belonged to middle age group.

Education

Rajput (1993) found that 44.00 per cent respondents had education up to middle level.

Asati (2000) concluded that (35.00 %) of the mustard growers had primary level of education.

Parey (2000) reported that majority (57.00 %) of the respondents had up to primary level of education.

Kawale et al. (2003) revealed that majority of respondents were educated up to primary level.

Raghuwansi (2010) concluded that the maximum respondents (30.00 %) were educated up to middle school level.

Chinchmalatpure et al. (2011) reported that an equal per cent of the respondents (28.00 %) were educated up to middle and high school.

Machhar et al. (2015) concluded that majority of the respondents (45.33 %) were educated up to primary level.

Size of land holding

Khobragade et al. (1988) found that majority (41.00 %) of the respondents had marginal land holding.

Daivpuria et al. (1991) revealed that more than 50 per cent of the respondents were having medium size of land holding.

Paikra (2008) concluded that about half of the respondents were having medium size of land holding.

Chinchmalatpure et al. (2011) reported that majority of the respondents (36.00 %) were having small land holding.

Jahagirdar et al. (2012) found that majority (42.00 %) of the respondents had small land holding.

Machhar et al. (2015) concluded that more than half of the growers (54.00 %) were found to have small size of farm.

Area under sesame

Sagar et al. (2004) concluded that majority of the small and marginal farmers are associated with the cultivation of sesame in Saundarbans.

Annual income

Pachouri (1990) reported that 48 per cent of mustard growers had low annual income.

Kawale et al. (2003) found that majority of the respondents belonged to medium annual income group

Mahoviya (2006) found that majority of farmers had low income.

Patidar (2007) found that higher percentage (59.17%) of respondents belonged to medium annual income group.

Raghuwansi (2010) concluded that higher percentage of the soybean growers i.e. 41.67 per cent had medium annual income.

Chinchmalatpure et al. (2011) reported that more than two third of the respondents (68.00 %) fall under low to below poverty line group of annual income.

Jahagirdar et al. (2012) found that majority (41.00 %) of the respondents belonged to high annual income category.

Machhar et al. (2015) concluded that majority of the respondents (56.00 %) were having low annual income.

Extension Participation

Kawale et al. (2003) revealed that majority of mustard growers were having medium extension participation.

Rajput (2005) reported that majority of the respondents had low participation in any social organization.

Aske (2008) found that out of the total respondents growing soybean, 62.22 per cent showed low participation in the extension participation.

Paikra (2008) concluded that maximum percentage of growers (50.00 %) had medium extension participation.

Machhar et al. (2015) concluded that majority of the respondents (84.00 %) had medium extension participation.

Social Participation

Kawale et al. (2003) revealed that majority of the mustard growers were having membership in only one social organization.

Singh (2003) concluded that majority of the mustard growers (80.00 %) had no participation in any social organization.

Rajput (2005) reported that majority of the mustard growers (76.67 %) had low participation in any organization.

Machhar et al. (2015) concluded that majority of the respondents (64.00 %) had no social participation.

Material Possession

Sahi (1994) found that maximum number of contact farmers had low score for the possession of farm material and house articles.

Mahoviya (2006) concluded that maximum (38.38 %) of the respondents had only one pair of bullocks as their farm power.

Mass media exposure

Krishnamurthy and Siddaramaiah (1994) observed that maximum percentage (40.25 %) of the participant farmers belonged to low mass media exposure category.

Belligeri (1996) noticed that radio sets were possessed by majority of the respondents (76.66 %). among them 18.00 per cent were regular listeners of Krishranga programme. Television

was owned by 14.00 per cent and they viewed Krishidarshan. Newspaper was subscribed by 10.00 per cent and none of them subscribed farm magazines.

Rathore (2007) reported that the majority of the lentil growers had medium mass media exposure.

Scientific orientation

Maraddi et al. (2014) reported that nearly half of the respondents possessed lower level of scientific orientation (50.83%) followed by medium (36.67%) and high (12.50%) scientific orientation category.

Knowledge level

Asati (2000) concluded that majority of the mustard growers were having no knowledge about improved varieties, seed treatment, pests and diseases and their control. Farmers had partial knowledge about field preparations, sowing method and seed rate.

Verma et al. (2000) revealed that cent per cent soybean growers had knowledge about improved varieties and 97.22 per cent had interculture operations. The practices like seed treatment and use of rhizobium and PSB culture were known to more than 50 per cent of the farmers, but the major factors responsible for the lower yield were lack of use of quality seed (37.22 %), in imbalanced use of fertilizers (34.44 %) and use of farm yard manure (20.00 %). Besides that poor or less management of diseases (12.77 %), weed control (15.15 %) and insect pest control (31.00 %) were observed.

Meena et al. (2003) reported that 71.33 per cent respondents had knowledge on field preparation, 60.00 per cent on varieties and 10.00 per cent on plant protection in beneficiaries, while 68.66 per cent respondents had knowledge on seed rate, 40.17 per cent had knowledge on varieties and

only 05.00 per cent on plant protection in non-beneficiary respondents.

Singh and Sharma (2005) reported that majority (64.70 %) of the FLD beneficiaries and 74.50 per cent of the non-beneficiaries were having medium level of knowledge regarding improved agricultural practices of mustard production technology.

Mahoviya (2006) concluded that majority of the respondents (53.33 %) were possessing low level of knowledge regarding mustard production technology.

Pare et al. (2006) reported that maximum (59.00 %) of the respondents possessed medium level of knowledge.

Deshmukh et al. (2007) reported that majority of the respondents (97.92 %) belonged to the low level of knowledge, while only 02.08 % respondents had high level of knowledge and no respondent had medium level of knowledge.

Kumar (2009) reported that most of the farmers (50 %) had medium level of knowledge about the recommended cultivation practices of crops studied.

Verma and Yadav (2011) found that majority of groundnut growers had medium knowledge level about the recommended cultivation practices of groundnut.

Kumar et al. (2012) reported that majority of the growers (62.67 %) were found in medium level of knowledge followed by 20.66 per cent in high and 16.67 per cent in low level.

Adoption level

Veeraih et al. (1998) reported that majority of the farmers had medium level of adoption of recommended improved technology.

Asati (2000) concluded that majority of young age group farmers having high education level and annual income who

utilized greater farm information sources adopted the improved mustard varieties, seed rate, fertilizers, weed control, aphids and white rust control.

Vakaria et al. (2000) found that majority of the respondents (67.00 %) fall under medium adopters category, while 16 and 15.00 % of them were low and high adopters.

Jadhav et al. (2004) found that more than half of total farmers of study area had medium level of adoption of improved agricultural technology for four major crops viz. bajra, mustard, potato and castor.

Rudra (2004) found that the major factors responsible for the low productivity of mustard were use of traditional varieties, late sowing, imbalanced use of fertilizers and improper pest control. Poor level of adoption was observed in backward classes as compared to other classes.

Anonymous (2004-05) concluded that majority of the respondents belonged to medium level of adoption of recommended practices at Parbhani region of Maharashtra.

Sachan et al. (2005) reported that 50.00 per cent respondents were found to be in the medium adoption group. However, in terms of overall adoption of the technology, medium category of farmers had a distinctive edge over the same category. More than 60.00 per cent farmers of the study area adopted the scientific recommendations about time of sowing, manual weeding and irrigation, while majority of farmers adopted preparatory tillage and seed rate more than recommendations. Most of the farmers were not using seed treatment due to lack of knowledge about advantage of seed treatment and plant protection measures due to high cost and non availability of effective fungicides, sprayers and dusters.

Kumar et al. (2012) reported that majority of the growers (62.67 %) were included under medium category of adoption of

recommended technology followed by 20.00 per cent belonging to high adoption category and 17.33 per cent of the farmers had low level of adoption.

Tripathi AK and Singh DK (2012) reported that minimum technology gap existed in fertilizer management component of technology demonstration, while minimum extension gap existed in improved variety component of technology demonstrations.

Hadiya et al. (2014) reported that majority of the respondents (65.83 %) had medium extent of adoption about recommended practices of kharif groundnut. The considerable number (19.17% and 15.00 %) of respondents was in low and high adoption group.

Singh and Jat (2014) reported that majority of the farmers (65.00%) belong to medium level of adoption group followed by low level (22.00%) and high level (10.00%).

Monayem Miah et al. (2015) reported that majority of sesame growers were found to be low adopters of improved sesame varieties.

2.2 Technological gap:

Mahawer et al. (1995) in their study about the technological gap between beneficiaries and non-beneficiaries of scheduled caste research project in Rajasthan revealed that there was a wide gap (68.00%) in knowledge possessed by the beneficiary farmers in respect of plant protection measures, whereas it was 89.34 per cent in case of no beneficiary farmers. The study showed that there was significant difference in the knowledge level of beneficiaries and non-beneficiaries in other areas of wheat production technology viz, use of high yielding varieties, seed rate and seed treatment, fertilizer application, improved agricultural implement and overall knowledge.

Prasad and Singh (1996) found that the high technological gaps existed in seed and seed treatment, water management,

fertilizer management, pest control and disease control among marginal and small farmers. In case of large farmers there was no high technological gap in any of the technological components of mustard cultivation.

Singh (2002) observed high adoption gap in practices like improved varieties, seed treatment and gypsum application, while partial adoption gap was observed in practices like seed rate, fertilizers, weed control, aphids and white rust control.

Dalvi et al. (2004) observed that extent of technological gap experienced by 25.90 per cent farmers was for plant protection measures, 22.58 per cent for use of fertilizers, 18.09 per cent for use of FYM/Compost, 17.33 per cent of seed treatment, 12.07 per cent for seed and sowing and 19.16 per cent had composite technological gap.

Vengatesan et al. (2004) reported that majority of sesame growers (62.50 %) were found to be low adopters. Hence, there seems to be technological gap in the adoption.

Choudhary et al. (2009) reported higher technological gap in sesame and linseed than soybean due to less popularity among the farmers because of non-availability of improved seed and low yield than soybean and gobi sarso.

Choudhary et al. (2009) found variation in improved crop management technology to be the possible reason for greater technological index in the sesame cultivars in the study area.

Dhandhalya and Shiyani (2009) while studying production, yield gaps and research prioritization of production constraints in major oilseed crops of Saurashtra region revealed a wide yield gap in major oilseed crops of Saurashtra region.

2.3 Association between attributes of sesame growers with technological gap:

Age

Kapse et al. (2007) reported that age was positively and significantly correlated with technological gap.

Singh (2007) concluded that age was significantly but positively correlated to technological gap.

Patel et al. (2010) found positively and significantly correlated with the technological gap.

Machhar et al. (2015) reported that age was significantly but positively correlated with the technological gap.

Education

Ranganathan et al. (2001) found that education has significant relation with adoption level of small farmers.

Kapse et al. (2007) reported that education was negatively and significantly correlated with technological gap.

Singh (2007) concluded that education was negatively and significantly correlated to technological gap.

Patel et al. (2010) found that education was negatively and significantly correlated with the technological gap.

Machhar et al. (2015) reported that education was negatively and significantly correlated with the technological gap.

Land holding

Kapse et al. (2007) reported that land was negatively and significantly correlated with technological gap.

Patel et al. (2010) found that land was negatively and significantly correlated with the technological gap.

Annual income

Kapse et al. (2007) reported that annual income was negatively and significantly correlated with technological gap.

Singh (2007) concluded that annual income was negatively and significantly correlated to technological gap.

Social participation

Singh (2007) concluded that social participation negatively and significantly correlated to technological gap.

Patel et al. (2010) found that social participation was negatively and significantly correlated with the technological gap.

Machhar et al. (2015) reported that social participation was negatively and significantly correlated with the technological gap.

Mass media exposure

Ranganathan et al. (2001) found that mass media has significant relation with adoption level of small farmers.

Extension participation

Ranganathan et al. (2001) found that extension participation has relation with adoption level of small farmers.

Patel et al. (2010) found that extension participation was negatively and significantly correlated with the technological gap.

Material possession

Machhar et al. (2015) reported that material possession was negatively and significantly correlated with the technological gap.

Scientific orientation

Ranganathan et al. (2001) found that scientific orientation has significant relation with adoption level of small farmers.

Singh (2007) concluded that scientific orientation was negatively and significantly correlated with technological gap.

Socio-economic status

Patel et al. (2010) found negatively significantly correlation between education and technological gap.

Knowledge

Singh (2007) concluded that knowledge was negatively significantly correlated with technological gap.

Kapse et al. (2007) reported that knowledge was negatively significantly correlated with technological gap.

Patel et al. (2010) found negatively and significantly correlation with knowledge and technological gap.

Machhar et al. (2015) found negatively and significantly correlation between knowledge and technological gap.

2.4 Constraints in sesame cultivation and suggestions for the growers:

Bhople et al. (1991) revealed that 90.40 per cent of the farmers did not adopt the dry land technologies because of lack of knowledge. Non-availability of credit was a major constraint expressed by 85.60 per cent of farmers followed by lack of skill (94.40%), shortage of labour (28.00%), non-availability of improved implements (85.00%).

Amarnath and Jeyalakshmi (1999) conducted the study in North Arcot district of Tamil Nadu and noticed that the lack of expertise, lack of conviction and non-availability of weedicides as the major constraints for not adopting the weedicides in paddy.

Vengatesan et al. (2004) found lack of awareness on integrated nutrient management INM practices in sesame and high cost incurred together with low yield and unawareness to be the main constraints in low adoption of INM practices in sesame.

Singh et al. (2006) reported frequent droughts and floods, low soil fertility, soil erosion and land degradation, poor soil-water conservation practices, low yielding crop varieties, shortage of labour, poor agricultural extension for technology transfer, uncertainity of prices and marketing problems and poor credit facilities and high interest rates by private money lenders as the main reasons for the yield gaps.

Grover DK and Singh JM (2007) reported small farms, biotic (diseases, insect/pest and weeds) and abiotic such as input availability, environmental constraints like drought, rain, temperature, frost and marketing constraints like information related to price and its variability, storage losses, cost on transport etc. as the constraints in sesamum cultivation.

Venkattakumar and Padmaiah (2010) found multiplication of technology transfer, narrow focus of the agricultural extension system, lack of ineffective feedback system, little attention given by the state departments of agriculture in developing cadre of well qualified subject matter specialists SMS with both technical competence and professional skills to disseminate the improved oilseed technologies either to the all oilseeds growers or to the their field staff, no sustained support for the farmers training centers that were established during sixties, non-availability of sufficient operating funds for most of the line departments to carry out routine extension activities and upgrading their human resources and lack of effective research-extension linkage mechanism to be the main constraints in adoption of oilseed technology.

Kumar et al. (2012) reported non-availability and cost effective labour at proper time, non-availability of money at proper time, non-availability of quality seed, non-availability of protective irrigation facilities, lack of information about use of weedicides as major constraints.

Hadiya et al.(2014) reported that lack of godown or store room for storage as well as scarcity of farm labour may lead them for non-adoption of grading and storage and also they may not get sufficient market price for grading product, lack of technical guidance, high price of insecticides/pesticides and fungicides and lack of sufficient rainfall as well as big river and pond facility in studied area. The soil testing laboratory is situated at district level. So, it is difficult to get the soil analysis report in time. Hence, this practice was less adopted by the respondents.

Maraddi et al. (2014) found in their study that lack of timely advisory services about pest and disease management in collaboration with low cost technologies, lack of knowledge about use of bio-fertilizers by the farmers, non-availability and shortage of FYM, non-participation in training programmes, demonstration, of farm trial and innovation and low risk orientation in their enterprise and poor achievement motivation are the factors for the non adoption of recommended practices.

Singh and Jat (2014) reported that the main constraints faced by the farmers were the less, scares and untimely rainfall, availability of input at higher cost, unavailability of input at village level, lack of awareness regarding improved package of practice, lack of electricity by diesel, unavailability of technical knowledge at village level and lack of knowledge.

Perane and Harde (2014) reported that the problems of lodging and boarding during training period followed by the information about various improved technologies is not reaching

in time, non-availability of electronic equipments for getting technical information, lack of continuous two-way flow of information between Agriculture Assistant and Agriculture University and trainings is not according to the local needs.

Raghuwanshi et al. (2014) reported the electricity problem, irregular visits of RAEOs, unavailability of technical information from extension personnel, lack of training regarding production technology, high cost of seed, fertilizers, insecticides and lack of soil testing facility to be the top five constraints among the farmers.

Rai et al. (2014) revealed lack of suitable HYVs, low soil fertility, low technical knowledge followed by wild animals, weed infestation, diseases and insects were the major constraints to sesame production.

Markana et al. (2015) found the lack of well established infrastructure of soil testing laboratory, high cost of tillage operation, poor quality of seed, shortage of FYM, high cost of fertilizer, lack of knowledge about micro nutrients, irregularity of sowing due to uncertainity of rainfall, difficulty of interculturing at appropriate time, high wages of labour, insufficient water for irrigation, more incidences of insects, pest and diseases and non-availability of adequate labour in time were the major constraints faced by kharif groundnut growers in scientific kharif groundnut production technology.

Machhar et al. (2015) found shattering loss in existing varieties, unavailability of sufficient labour in time, lack of technical guidance, high cost of insecticides and weedicides, fluctuating market prices and high cost of fertilizers to be the top five constraints faced by the farmers.

2.5 Suggestions:

Vengatesan et al. (2004) suggested that the extension workers should consider the methods and results of the

demonstrations as a suitable means to transfer the INM technologies. The State Department of Agriculture should gear up for the effective dissemination of INM practices and the sesame farmers need to be trained in the INM practices.

Singh et al. (2006) suggested that inorder to bridge the gap, improved soil, water and nutrient management practices on watershed basis, along with pest management, improved cultivars, use of improved farm machinery and credit facilities to the small and marginal farmers are recommended for increasing the productivity.

Grover and Singh (2007) found that in order to boost the sesame cultivation in the state, two-dimensional efforts viz. technological upgradation and effective market support are required.

Venkattakumar and Padmaiah (2010) suggested bringing in effective public-private partnership for transfer of oilseed technologies in the areas viz, knowledge and capacity building of oilseed growers, participatory technology assessment and refinement, organizing self help groups for management of seed, money participatory seed production and marketing and use of effective information and communication technologies (ICIS) for faster dissemination of information pertaining to improve technologies, storage, processing, marketing and procurements etc., generation and replication of success stories under real farm situations and use of mass media viz. video programmes, print media, radio, television for popularizing the success stories, instead of the technologies alone.

Krishi Gobeshona Foundation (2011) in their Technical Bulletin suggested that use of recommended fertilizer doses, land preparation and other crop management like use of insecticides and fungicides against aphid and alternaria leaf blight is required for healthy crop production.

Kumar et al. (2012) suggested that organising skill oriented trainings which can impart in depth technical knowledge to the farmers by developing self-confidence about the technology.

Singh and Jat (2014) suggested that the farmers may be trained regarding improved technologies of sesame crop through farmers training, field demonstrations and exposure visits etc. and availability of inputs at reasonable cost at village level be insured. Village level institutions may be strengthen more to boost up the production of sesame in arid areas of Rajasthan.

Perane and Harde (2014) suggested that training should be given with the help of audio-visual aids, wide possibility of the recommendations should be made through mass media, during training period lodging and boarding facilities should be provided, information about improved technologies should be given in time and the recommendations should be given in simple and understandable language.

Ambulakar and Dixit (2014) suggested use of scientific method of cultivations can reduce the technological gap to a considering extent, extension agencies in the district need to provide proper technical support to the farmers through different educational and extension methods to reduce the extension gap for better oilseed production in the district.

Hadiya et al.(2014) suggested that in order to increase the adoption of recommended practices, farmers should be facilitated with latest technical know-how and motivated to participate in the extension agencies and input agencies working in the area should make concentrated efforts to organize extension activities such as demonstrations, farmer's day, farmers' training and to persuade them to participate actively in these activities. They should also be advised to participate more actively more actively in the social organizations.

Maraddi et al. (2014) suggested that cost of complex fertilizers should be reduced, conduction of demonstrations/on-farm testing on different improved cultivation practices in groundnut to show their efficacy at farmers field, providing credit at lower interest rate and at required time, organising training programmes on improved technologies, providing pest and disease resistant varieties through research stations/KVKs for increasing the productivity of the crop.

* * *

MATERIALS AND METHODS

This chapter deals with the methods and procedures used for planning and conducting the research work. It consists of following sub-parts:-

3.1 Location,

3.2 Research design,

3.3 Sampling techniques used,

3.4 Variables, their operationalization and measurement,

3.5 Instrument of data collection,

3.6 Statistical methods used, and

3.7 Derivation of hypotheses.

3.1 Location:

The investigation was conducted in Jabalpur district of Madhya Pradesh. The district covers an area of 5,211 km^2 (Anonymous, 2011). In the state, the district is situated in between 23°.10' N Latitude and 79°.59' E Longitude. It has an average elevation of 411 m above sea level. Jabalpur district is surrounded by eight districts. These are Damoh in North-West, Katni in North, Umaria in North-East, Dindori in East, Mandla in South-East, Seoni in South and Narsimhapur in South-West. Jabalpur district comprises of six tehsils namely Jabalpur, Sihora, Majholi, Patan, Shahpura, Kundam. The geographical area of the district is 5,211 km^2 with a population of 24,60,714 out of which 12,78,448 are male and 11,82,266 are female (Anonymous ,2011). The literacy level of the district is 82.50 per cent. The district has 1,499 villages and 528 Gram panchayats and 7 Janpat panchayats.

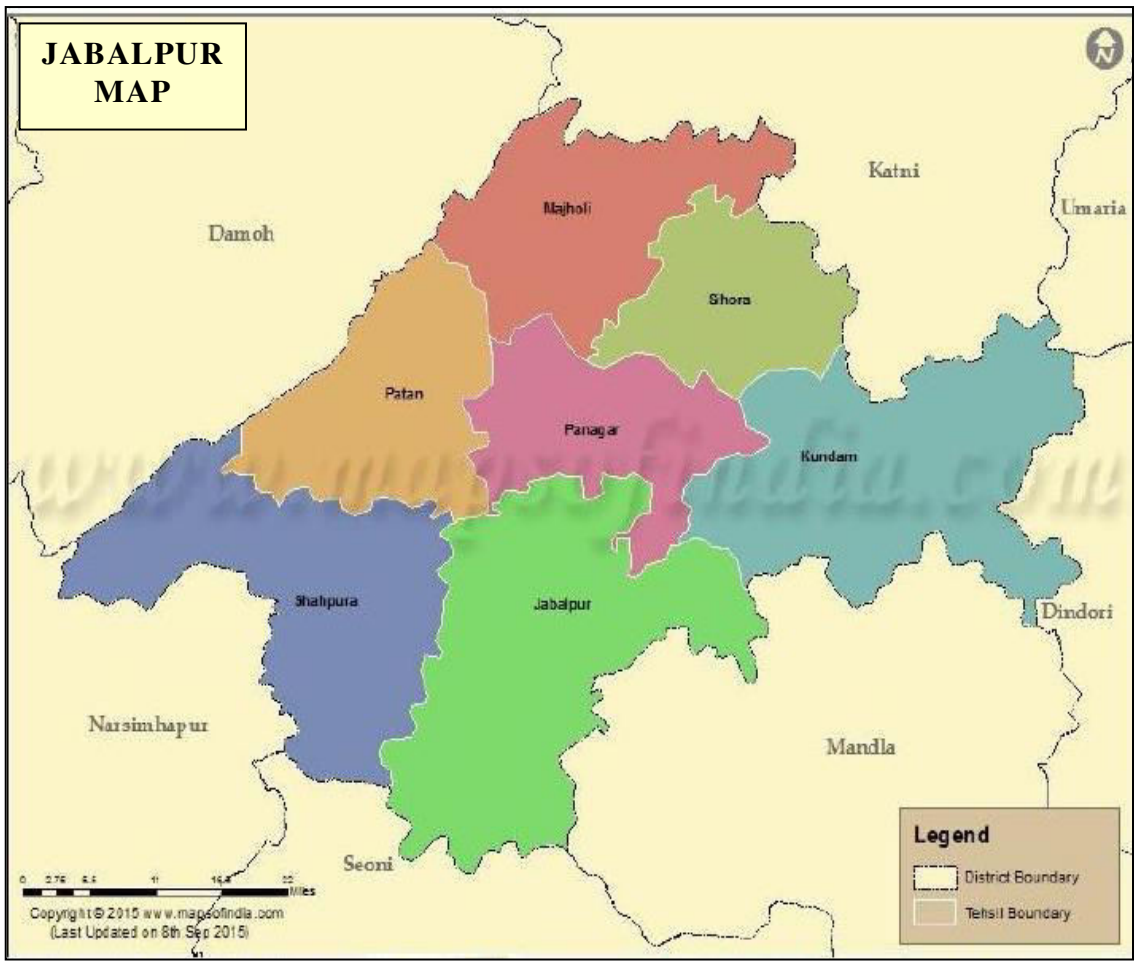


Fig. A :- Jabalpur District Map

The district has been divided into 7 Sub –divisions namely Balaghat, Chhindwara, Jabalpur, Katni, Mandla, Narsinghpur and Seoni and consists of 7 blocks, namely Jabalpur, Sihora, Majholi, Patan, Shahpura, Panagar and Kundam.

The present study was conducted in Sihora block of Jabalpur district. The total geographical area of the block is 49,268 hectares, and net sown area is 28,247 hectares. The cropping intensity of the block is 144 per cent. Sihora is located at 23.29°N 80.09°E. It has an average elevation of 386 metres (1266 feet). It is the biggest tehsil of the state. The population of the block is 1,35,599. The block has 155 villages.

3.2 Research design:

The design of research is the most important and crucial aspect of research methodology. It is the entire process of planning and carrying out the research. To seek the answers of the questions, an ex-post facto design was used in the investigation which gives information after occuring of events.

3.3 Sampling techniques used:

The samples of the study were selected by three stage sampling method. These were –

A) Selection of block,

B) Selection of villages, and

C) Selection of respondents,

A) Selection of block:

The study was undertaken in Jabalpur district. Jabalpur district comprises of seven blocks out of which Sihora block has been selected purposively for the study on account of low productivity of sesame crop as compared to other blocks of the district.

Block-wise Area, Production and Productivity of sesame in Jabalpur District (M.P.) 2012-13

S.No.	Name of block	Area (ha)	Production (tonnes)	Productivity (kg/ha)
1.	Sihora	20	75	375
2.	Patan	25	125	500
3.	Majholi	25	125	500
4.	Panagar	50	200	400
5.	Shahpura	200	850	425
6.	Jabalpur	300	1350	450
7.	Kundam	380	1900	500

(Source : Anonymous, 2012-13)

B) Selection of villages:

Sihora block is comprised of 155 villages. A list of sesame growing villages was prepared with the help of Rural Agriculture Extension officers, out of which 10 villages were selected randomly for the study on the basis of large area under sesame crop.

C) Selection of respondents:

A list of sesame farmers of each selected villages growing sesame was prepared with the help of RAEOs, out of which 10 farmers from each village were selected on the basis of random sampling method. Thus, total 100 farmers (10 farmers from each of 10 villages) were considered as sample size of the study.

3.4 Variables, their operationalization and measurement:

The independent and dependent variables selected for the study, their operationalization and measurement were as follows:-

Variables, their operationalization and measurement

S.No.	Variable	Measurements
A	**Independent variables**	
1	Age	Actual chronological age (years)
2	Education	Self scoring
3	Social participation	Self scoring
4	Material possession	Self scoring
5	Size of land holding	In hectare
6	Area under sesame crop	In hectare
7	Annual income	In rupees
8	Socio-economic status	Scale of Pareek & Trivedi (1963)
9	Knowledge level	Self scoring
10	Mass media exposure	Self scoring
11	Extension participation	Scale of Siddaramaiah & Jalihal (1983)
12	Scientific orientation	Scale of Supe & Singh (1969)
13	Extent of adoption of improved production technology of sesame crop	Self scoring
B.	**Dependent variable**	
1.	Technological gap in sesame	Bhoite (1983)

Operational definition of variables:-

A) Independent Variables:-

1) Age:

It refers to the number of years an individual has completed at the time of investigation and was measured as per actual chronological age of the respondent. The categories formulated were –

S.No.	Categories	Score
1.	Young age group	(up to 35 years)
2.	Middle age group	(36 to 55 years)
3.	Old age group	(56 years and above)

2) Level of education:

It refers to the ability or inability of an individual to read and write and formal education attained and score allocated were as follows:

S.No.	Level of education	Scores
1.	Illiterate	0
2.	First standard passed	1
3.	Second standard passed	2
4.	Third standard passed	3
5.	Fourth standard passed	4
6.	Fifth standard passed	5
7.	Sixth standard passed	6
8.	Seventh standard passed	7
9.	Eighth standard passed	8
10.	Ninth standard passed	9

11.	Tenth standard passed	10
12.	Eleventh standard passed	11
13.	Higher standard passed	12
14.	First year under- graduate	13
15.	Second year under- graduate	14
16.	Bachelor degree holder	15
17.	Previous year post- graduate	16
18.	Post-graduate degree holder	17

3) Size of land holding:

It refers to an area (in hectare) of total land possessed by a respondent for the purpose of cultivation and measured on the basis of allotment of scores. Scores of 1, 2, 3,..... . . . . n were allotted for possession of 1, 2, 3, ... n hectare of land. The categories of size of land holding formulated were –

S. No.	Categories	Scores
1.	Marginal farmers	(Up to 1 ha)
2.	Small farmers	(1.1 to 2 ha)
3.	Medium farmers	(2.1 to 3 ha)
4.	Large farmers	(Above 3 ha)

4) Area under sesame:

It refers to an area (in hectare) of land possessed by a respondent for the purpose of cultivation of sesame crop and is measured on the basis of allotment of scores. Scores of 1, 2, 3,..... . . . . n were allotted for an area of 1, 2, 3, ... n hectare of land under sesame. The categories of land under sesame formulated were –

S. No.	Categories	Scores
1.	Marginal farmers	(Up to 1 ha)
2.	Small farmers	(1.1 to 2 ha)
3.	Medium farmers	(2.1 to 3 ha)
4.	Large farmers	(Above 3 ha)

5) Material possession:

It refers to the total number of materials (domestic, transport, agriculture and communication) possessed by an individual. The variable measured on the basis of self-scoring. A respondent can obtain a minimum of 1 and a maximum of 22 scores. On the basis of range of scores, three categories were developed as –

S.No.	Categories	Scores
1.	Low	(1 to 7 score)
2.	Medium	(8 to 14 score)
3.	High	(15 to 22 score)

6) Social participation:

It refers to the degree of involvement and frequency of participation of an individual in different activities performed by social organizations. The variable was measured on four-point continuum as most often, often, sometimes and never, and the scores 3, 2, 1 and 0 were given, respectively. A respondent can obtain a minimum of 0 and a maximum of 15 scores. On the basis of range of scores, the respondents were placed in four categories namely no participation, low, medium and high.

S.No.	Categories	Scores
1.	No participation	(0 score)
2.	Low	(1 to 5 score)
3.	Medium	(6 to 10 score)
4.	High	(11 to 15 score)

7) Annual income:

It refers to the income earned in rupees by the respondents from agriculture and other occupations. Based on the total annual income, the respondents were categorized into four groups.

S.No.	Categories	Scores
1.	Below poverty line	(Up to Rs. 24,000/-)
2.	Low income	(Rs.24,001 to 50,000/-)
3.	Medium income	(Rs.50,001 to 1,00,000/-)
4.	High income	(Rs.1,00,001 and above)

8) Socio-economic status:

It refers to the position of an individual occupied in a society in comparison to other individuals with respect to the possession of land holding, occupation, level of education, caste, type and number of houses, type and size of family, farm power, material possession and social participation. It was measured with socio-economic status scale developed by Trivedi and Pareek (1963). The theoretical range of score was 1 to 90 score. On the basis of scores, three categories were developed as:

S.No.	Categories	Scores
1	Low	(1 to 30 score)
2	Medium	(31 to 60 score)
3	High	(61 to 90 score)

9) Mass media exposure:

It was operationalised as the degree to which a respondent was exposed to the different improved production technology of sesame crop by different media and was measured by assigning self-score. The responses were recorded on four-point continuum as most often, often, sometimes and never and were given 3, 2, 1 and 0 scores, respectively. An individual can obtain a minimum of 1 and a maximum of 27 scores. The total scores indicated the degree of exposure through mass media. On the basis of range of scores, the categories were formulated as:

S. No.	Categories	Scores
1.	Low	(1 to 9 score)
2.	Medium	(10 to 18 score)
3.	High	(19 to 27 score)

11) Extension participation:

It was operationalised as the degree to which an individual involves in the extension education activities conducted by development agencies and was measured with the help of scale developed by Siddaramaiah and Jalihal (1983). The responses were recorded on four-point continuum as never, once, twice and more than twice and were given 0, 1, 2 and 3 scores, respectively. The theoretical score range was from 1 to 24 scores. The total scores indicated the degree of participation in

extension activities. On the basis of range of scores, three categories were developed as -

S. No.	Categories	Scores
1.	Low	(1 – 8 score)
2.	Medium	(9 – 16 score)
3.	High	(17– 24 score)

12) Scientific orientation:

It was operationalised as the degree to which a farmer was oriented to the use of scientific methods in decision making on farming and also indicated the attitude of a respondent towards science. It was measured with the help of scale developed by Supe and Singh (1969). The scale consisted of six items of which statement number-six was negatively keyed. Responses were recorded on five-point continuum as strongly agree, agree, undecided, disagree and strongly disagree and were given 7, 5, 4, 3 and 1 scores, respectively. Reverse of the scoring was used for negative statements. The theoretical score range was from 6 to 42. The total scores explain the degree of scientific orientation of an individual. On the basis of range of score, three categories were developed as :

S.No.	Categories	Scores
1.	Low	(6 – 17 score)
2.	Medium	(18 – 30 score)
3.	High	(31 – 42 score)

Package and practices of sesame crop:

The production practices of sesame crop like selection and preparation of field, selection of seeds, seed treatment, seed rate and method of sowing, application of manures and chemical

fertilizers, weed control, control of insects and diseases etc. were considered for the study.

14) Level of knowledge:

It refers to the acquisition of information relating to the recommended package of practices of sesame crop and was measured with the help of assigning self-score. The components of each selected practices were made comprehensively with the help of concerned agricultural scientists. The responses were recorded on three-point continuum as complete, partial and no knowledge and were given 2, 1 and 0 scores, respectively. On the basis of range of scores, the respondents were categorized into low, medium and high groups.

S. No.	Categories	Scores
1.	Low	(1 to 12 score)
2.	Medium	(13 to 24 score)
3.	High	(25 to 36 score)

The knowledge level on components of selected practices like seed selection, seed treatment, application of manures and fertilizers, weed control, control of insects and diseases were also worked out separately, adopting the same scoring procedure.

15) Level of adoption:

It was operationalised as the extent to which an individual had actually used the recommended components of sesame package of practices and was measured with the help of assigning self-score. The components of each selected practices were also made comprehensively with the consultation of agricultural scientists. The responses were recorded on three-point continuum as complete, partial and no adoption, and were given scores of 2, 1 and 0, respectively. The theoretical

range of scores was from 1 to 36 in which the minimum possible score of 1 was worked out on the basis of degree of actual use of sesame production practices by an individual. On the basis of range of scores, three categories were made as :

S.No.	Categories	Scores
1.	Low	(1 to 12 score)
2.	Medium	(13 to 24 score)
3.	High	(25 to 36 score)

B. Dependent variable:

Operational definition of dependent variable:

1) Technological gap:

It refers to the gap between recommended technology and technology actually adopted by an individual. It was measured on technological gap index (TGI) developed by Bhoite (1983). A total of six sesame production technology, namely, field preparation, seed and sowing management, fertilizer management, weed management, plant protection management and harvesting management of sesame were considered for determining the technological gap. On the basis of technological gap index scores, the respondents were placed in three categories:-

S.No.	Categories	Scores
1.	Low technological gap	(1 to 33.33)
2.	Medium technological gap	(33.34 to 66.66)
3.	High technological gap	(66.67 to 100)

Formula:

$$\text{Technological gap index (TGI)} = \frac{R - A}{R} \times 100$$

Where,

R = Maximum possible score of adoption that a respondent could get

A = Actual score of adoption of technology by a respondent.

3.5 Instrument of data collection:

The structured schedule was used as an instrument of data collection, which was prepared on the basis of objectives and various variables considered in the present study. It comprises of three parts:-

1. First part consists of questions related to personal-socio-economic attributes of the respondents.
2. The second part include the questions of level of knowledge and adoption of the components of selected sesame production practices, and
3. The third part consists of the questions related to the constraints faced in adoption of recommended sesame production technology.
4. The structured schedule was pre-tested before its application and was used with the help of interview method. The purpose and objectives of the study were explained to the concerned respondents to record the answers of the questions in a free and friendly manner. The needed secondary data were collected from the research journals, theses, agricultural magazines, reports of state agriculture department, department of statistics and other related departments.

3.6 Statistical methods used:

The collected data were scored, classified, analyzed and presented in the form of frequency count and percentage in the

tables. In order to ascertain the association between two variables, chi-square test was applied.

χ^2 test of independence of two characteristics and its goodness of fit :

This test is widely used in social sciences, generally medical sciences and many other situations when the investigation wishes to test the independence of two qualitative variables called attributes. In social sciences, one may like to test the association between socio-economic characters like age, education, land holding, material possession, annual income, farm power, extension and social participation, scientific orientation, contact with extension agencies etc. likewise in genetics, one may like to test the dependence of sesame production practices in technology gap etc.

Here each of the two characters A and B has several classes. The data can be classified in m x n contingency table. The a_1, a_2 . . . . . a_n are "m" classes of attributes "A" and b_1, b_2, ... b_n are "n" classes of attributes "B". Let Oij be observed frequency of $(ij)^{th}$ cell, where I = 1, 2, ... M and j = 1, 2 ...n, let A_1, A^2 ..... A_m be totals of "m" classes of "A" andB_1, B_2 ..... B^n be totals of "n" classes of B, then –

$$\Sigma\Sigma O_{ij} = \Sigma \; Ai = \Sigma \; Bj = N = \text{total number of observations.}$$

Now, for each of the mn cells, we find expected frequencies using –

$$Eij = \frac{Aj \times Bi}{N} = \frac{\text{Row total} - \text{Column total}}{\text{Grand total}}$$

Now, null and alternate hypotheses are formulated as under:-

Ho = Character A and B are independent

H1 = Characters A and B are not independent and level of significance ∞ is chosen, say 0.05 and 0.01.

If Ho is true, then,

$$\chi^2 \text{ cal.} = \sum_{i=1}^{m} \sum_{j=1}^{n} \frac{(O_{ij} - E_{ij})^2}{E_{ji}}$$

With (r-1) (c-1) degree of freedom

When any of the cell frequency is small (<5), then Yates correlation of contingency was applied:-

$$\chi^2 \text{ cal.} = \sum_{i=1}^{M} \sum_{j=1}^{n} \frac{(O_{ij} - E_{ij}) - ½)^2}{E_{ji}}$$

With (r-1) (c-1) degree of freedom.

Where,

E_{ij} = Expected frequency corresponding to (i, j) cell

O_{ij} = Observed frequency corresponding to (i, j) cell.

r = number of rows

c = Number of columns

χ^2 = Chi-square

Calculated χ^2 value was noted with on the contingency table reference to the χ^2 value at 5% and 1% level of probability appropriate degree of freedom.

Yate's Correction

$$\chi^2 = \frac{\left[(ad-bc)\frac{N}{2}\right]N}{R_1 R_2 C_1 C_2}$$

In case of 2X3 or more than 2X2 contingency table, if any cell frequency was less than 5, then that row or column has been merged with subsidiary row or column maintaining degree of freedom one or more than one, then the calculated value of chi square was compared with table value 0.05 level of probability to know the significance.

Coefficient of contingency:

It measures the degree of association of dependence between the two characters in a contingency table and is given by–

$$\sqrt{\frac{X^2}{X^2 + N}}$$

Obviously, 0 < C < 1 and large is the value of higher is the degree of dependence between two characters.

This property may be used in grading of several characters in respect of their degree of relationship with a common main character under study.

3.7 Derivation of hypotheses:

Relevant hypotheses were formulated on the basis of objectives of the study and were tested in the null form. These were –

General hypothesis: There will be no association between personal-socio-economic characteristics of sesame growers and technological gap of recommended sesame cultivation technology.

Specific hypothesis:

Relevant hypotheses were formulated on the basis of objectives of the study and were tested in the null form, as follows:-

1. There is no significant association between age of the growers and technological gap of recommended sesame cultivation technology.
2. There is no significant association between education of the growers and technological gap of recommended sesame cultivation technology.
3. There is no significant association between land holding of the growers and technological gap of recommended sesame cultivation technology.
4. There is no significant association between land under sesame of the growers and technological gap of recommended sesame cultivation technology.
5. There is no significant association between material possession of the growers and technological gap of recommended sesame cultivation technology.
6. There is no significant association between social participation of the growers and technological gap of recommended sesame cultivation technology.
7. There is no significant association between annual income of the growers and technological gap of recommended sesame cultivation technology.
8. There is no significant association between socio-economic status of the growers and technological gap of recommended sesame cultivation technology.

9. There is no significant association between mass media exposure of the growers and technological gap of recommended sesame cultivation technology.

10. There is no significant association between Extension participation of the growers and technological gap of recommended sesame cultivation technology.

11. There is no significant association between scientific orientation of the growers and technological gap of recommended sesame cultivation technology.

12. There is no significant association between knowledge level of the growers and technological gap of recommended sesame cultivation technology.

13. There is no significant association between adoption level of the growers and technological gap of recommended sesame cultivation technology.

* * *

RESULTS

This chapter deals with the analysis and interpretation of collected data, which were collected from the sample of 100 sesame growers. The data were processed keeping in view of the following objectives as:-

4.1 To know the socio-economic, psychological and communicational attributes of the farmers.

4.2 To determine the technological gap in different practices of sesame cultivation.

4.3 To find out the association between socio-economic, psychological and communicational attributes of sesame farmers with technological gap of improved sesame technology.

4.4 To know the constraints responsible for existing technological gap and suggest the strategy for enhancing sesame production technology.

4.1 Socio-economic, psychological and communicational attributes of sesame farmers:

The variables selected and studied as independent variables were age, education, land holding, land under sesame, material possession, social participation, annual income, socio-economic status, mass media exposure, extension participation, scientific orientation, knowledge level, and adoption level, of sesame production technology are presented here:

1. Age:

Table 4.1: Distribution of sesame farmers according to their age:

S.No.	Categories	Frequency	Percentage
1.	Young age (Up to 35 years)	30	30.00
2.	Middle age (36 to 55 years)	59	59.00
3.	Old age (56 years and above)	11	11.00
Total		100	100.00

The data of the Table 4.1 reveals that out of the total sesame growers 59.00 per cent belonged to middle age group, 30 per cent belonged to young age group and 11.00 per cent belonged to old age group.

Thus, it may be concluded that nearly 60.00 per cent of sesame growers were of middle age group.

2. Education Level:

Table 4.2: Distribution of sesame farmers according to their education level

S.No.	Categories	Frequency	Percentage
1	Illiterate	22	22.00
2.	Primary education	18	18.00
3.	Middle education	25	25.00
5.	Higher secondary education	24	24.00
6.	College education	11	11.00
Total		100	100.00

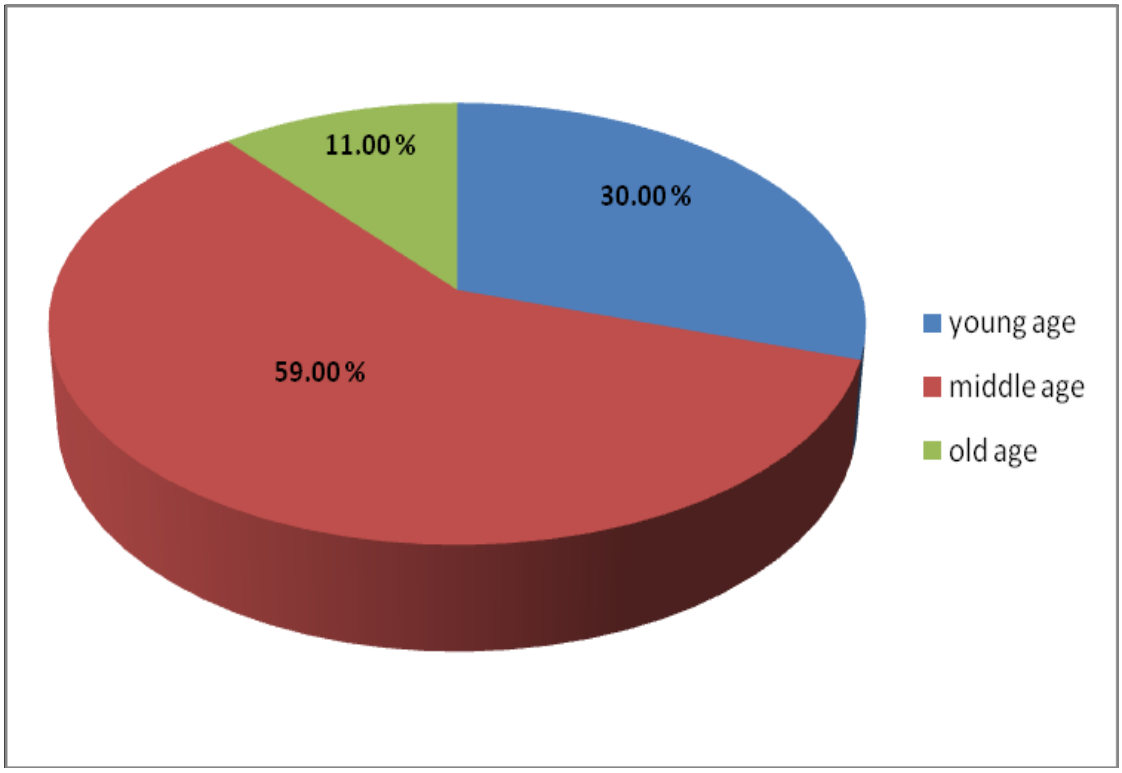
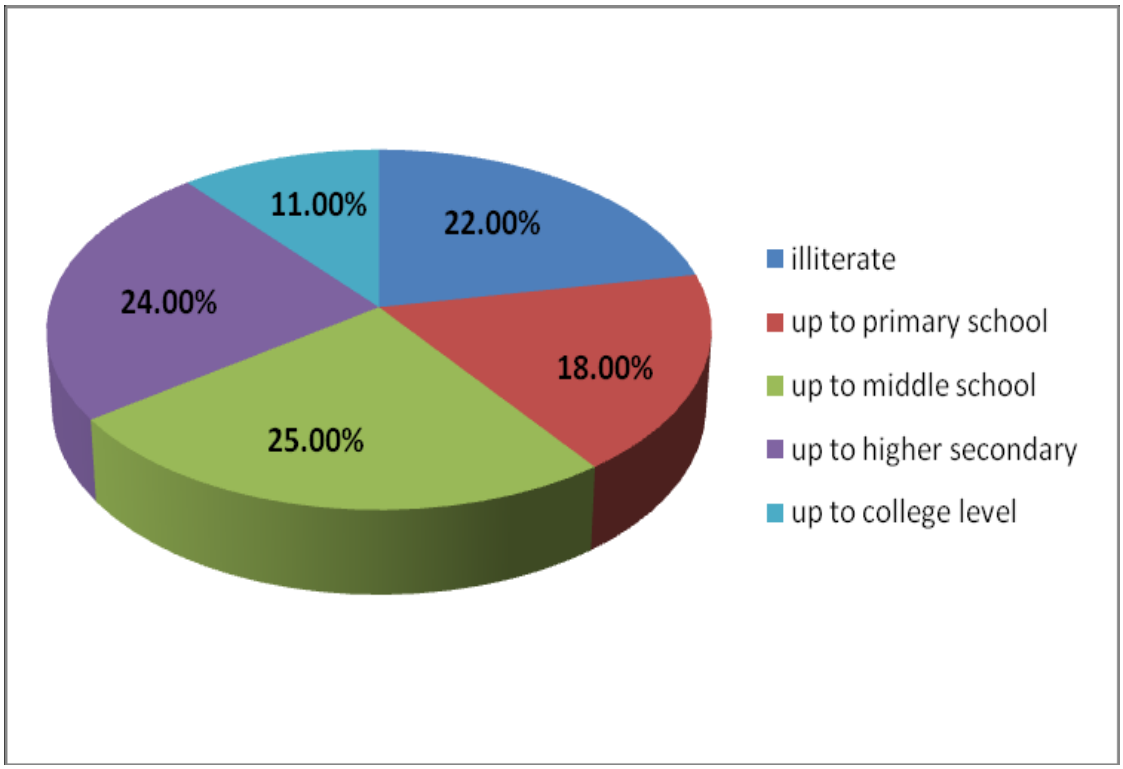


Fig.1: Distribution of sesame farmers according to their age.



The data of the Table 4.2 reveals that out of the total sesame growers, 25.00 per cent of the respondents received education up to middle level, followed by 24.00 per cent up to higher secondary level, 22.00 per cent were illiterate, 18.00 per cent up to primary school level and 11.00 per cent were having education up to college level.

Thus, it can be concluded that the majority of sesame growers (78.00%) were having education, however higher per cent of sesame growers (25.00%) were having education up to middle level.

3. Land holding:

Table 4.3: Distribution of sesame farmers according to their land holding:

S.No.	Categories	Frequency	Percentage
1	Marginal land holding (Up to 1 ha.)	34	34.00
2.	Small land holding (1.1 to 2 ha)	41	41.00
3.	Medium land holding (2.1 to 3 ha)	06	06.00
4.	Large land holding (Above 3 ha)	19	19.00
Total		100	100.00

The data of the Table 4.3 reveals that out of the total, 41.00 per cent growers were having up to small land holding, followed by 34.00 per cent were having marginal size of land

holding, 19.00 per cent were having large land holding and only 06.00 per cent were having medium land holding.

Thus, it may be concluded that majority of (75.00%) growers were having marginal to small land holding.

4. Land under sesame:

Table 4.4: Distribution of sesame farmers according to their land under sesame

S.No.	Categories	Frequency	Percentage
1	Marginal land holding (Up to 1 ha.)	88	88.00
2.	Small land holding (1.1 to 2 ha)	11	11.00
3.	Medium land holding (2.1 to 3 ha)	01	01.00
4.	Large land holding (Above 3 ha)	00	00.00
Total		100	100.00

The data of the Table 4.4 reveals that out of the total, 88.00 per cent sesame growers were having marginal land under sesame, followed by 11.00 per cent were having small land holding and only 01.00 per cent were having medium land holding and none of the farmers had large land holding under sesame.

Thus, it may be concluded that majority of (88.00%) sesame growers were having marginal land holding.

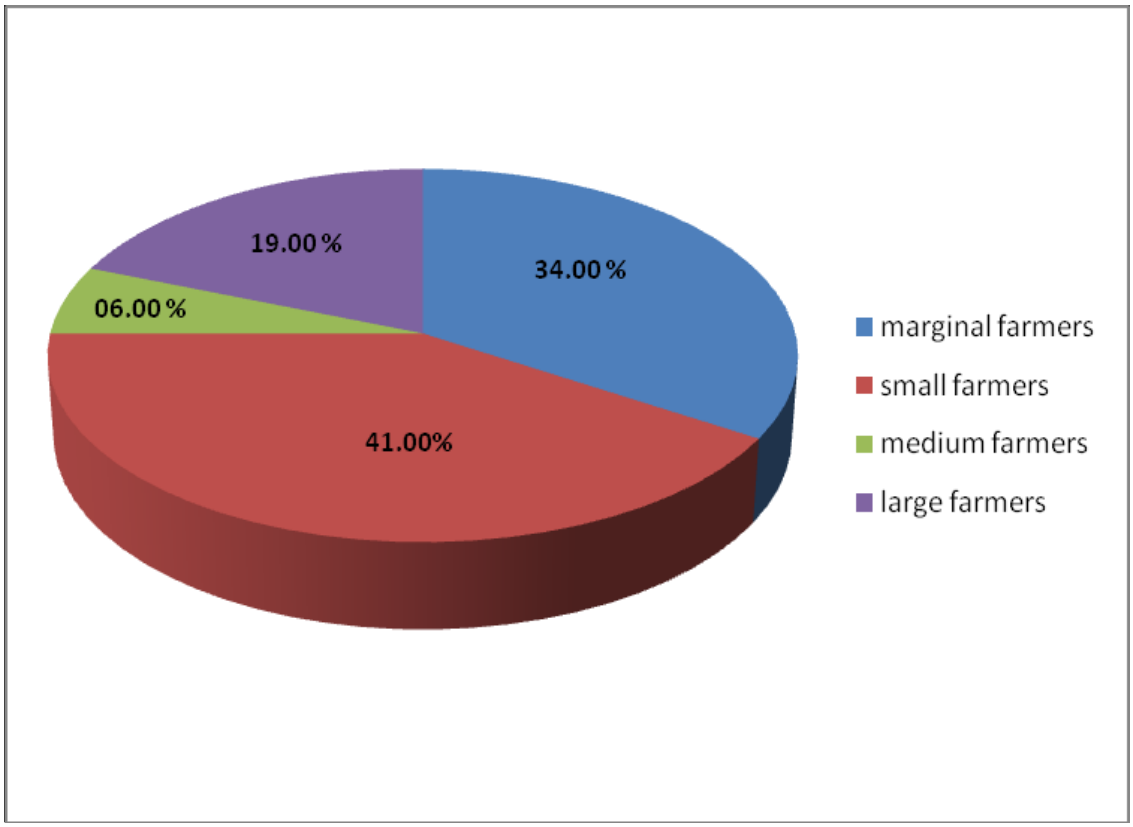


Fig. 3: Distribution of sesame farmers according to their land holding.

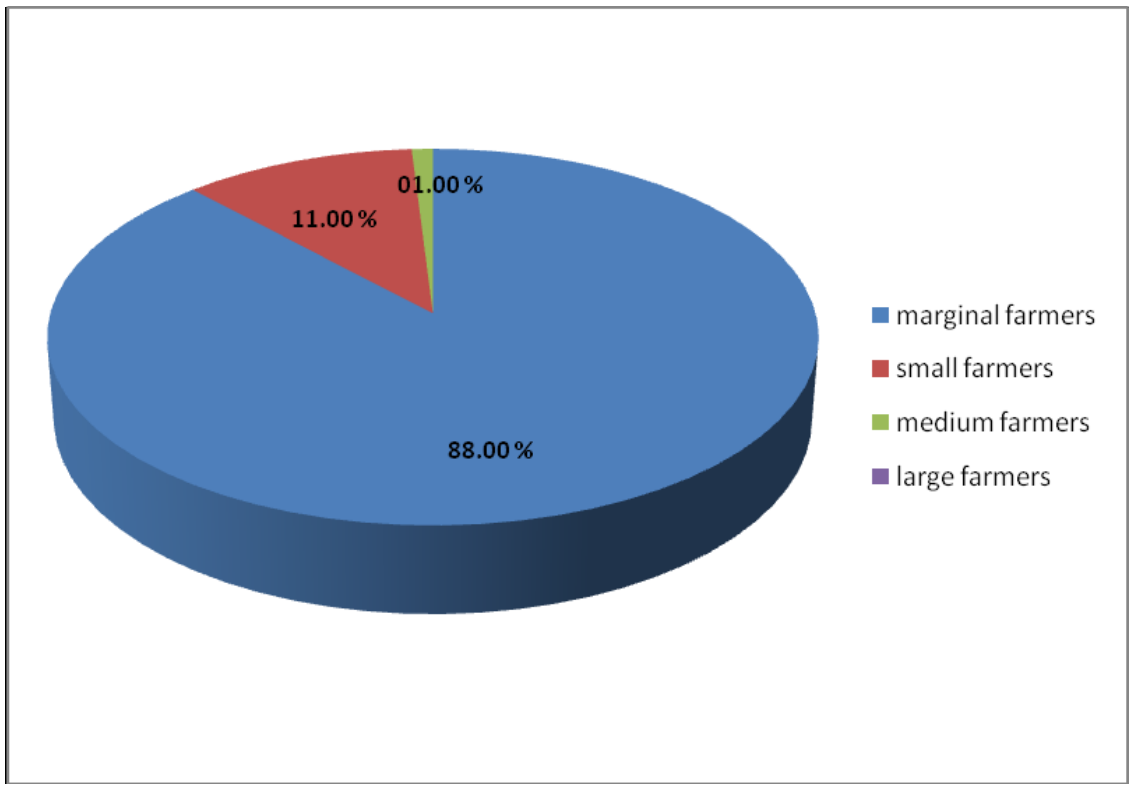


Fig. 4: Distribution of sesame farmers according to their land under sesame cultivation.

5. Material Possession:

Table 4.5: Distribution of sesame farmers according to their material possession

S.No.	Categories	Frequency	Percentage
1.	Low (1 to 7 score)	67	67.00
2.	Medium (8 to14 score)	32	32.00
3.	High (15 to 22 score)	01	01.00
Total		100	100.00

The data of Table 4.5 shows that out of the total sesame growers, 67.00 per cent belonged to low category of material possession, followed by 32.00 per cent to medium category of material possession and only 01.00 per cent belonged to high category of material possession.

Thus, it may be concluded that the huge majority of sesame growers (99.00%) were having low to medium level of material possession.

6. Social Participation:

Table 4.6: Distribution of sesame farmers according to their social participation:-

S.No.	Categories	Frequency	Percentage
1.	No participation	88	88.00
2.	Low (1 to 5 score)	11	11.00
3.	Medium (6 to 10 score)	01	01.00
4.	High (11 to 15 score)	00	00.00
Total		100	100.00

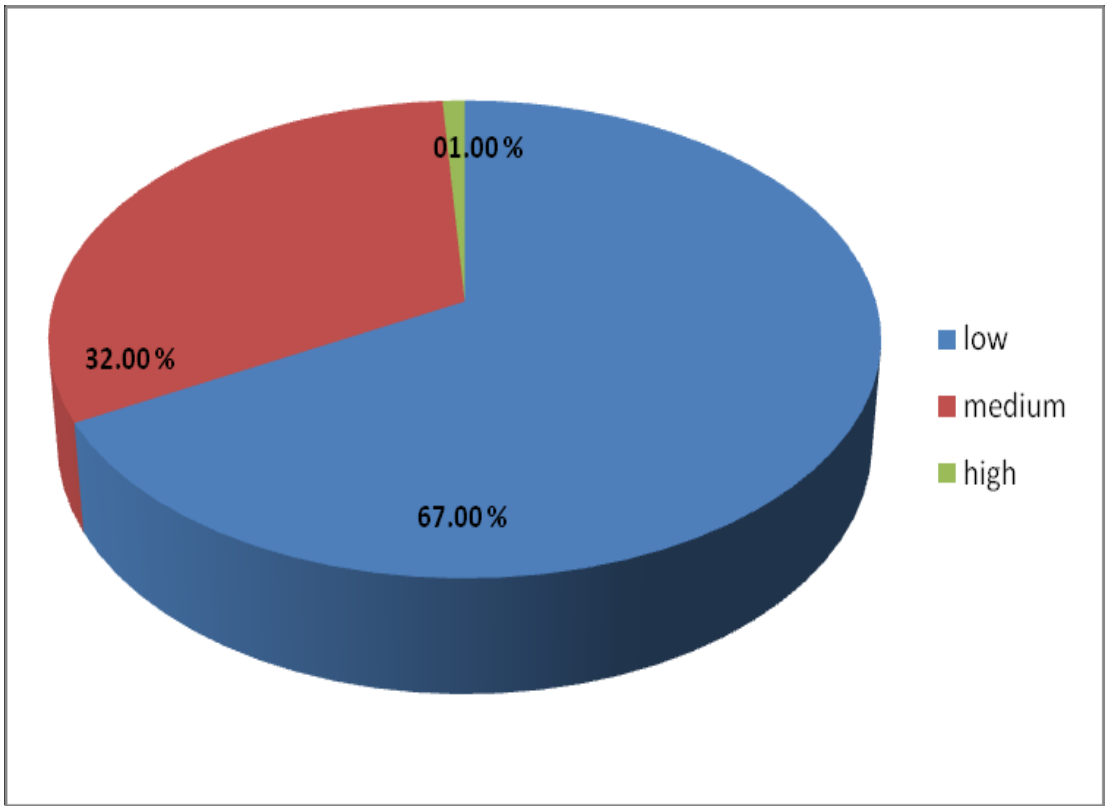


Fig. 5: Distribution of sesame farmers according to their material possession.

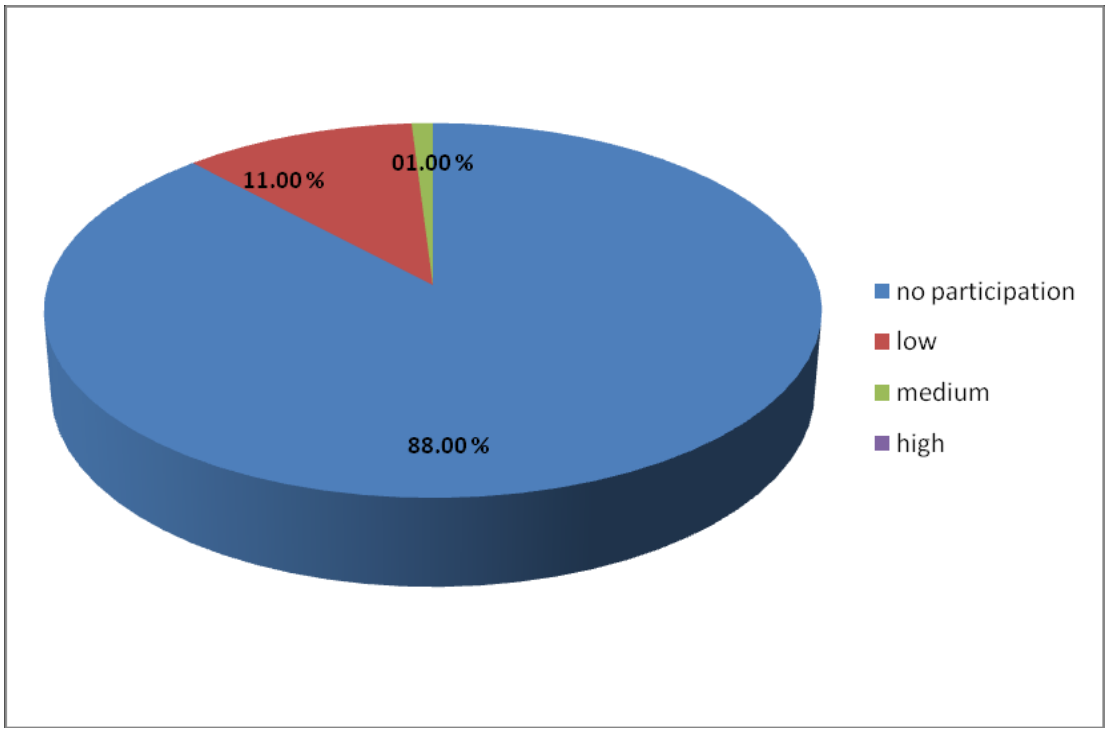


Fig.6: Distribution of sesame farmers according to their social participation.

The data of the Table 4.6 shows that out of the total sesame growers, 88.00 per cent had no participation, 11.00 per cent had low level of participation, only 01.00 per cent of respondents had medium level of participation and no grower had high level of participation in the activities of different social organizations.

Thus, it may be concluded that the majority of (88.00%) of sesame growers were having no social participation.

7. Annual income:

Table 4.7: Distribution of sesame farmers according to their annual income

S.No.	Categories	Frequency	Percentage
1.	Below Poverty Line (up to Rs.24,000/-)	02	02.00
2.	Low annual income (Rs.24,001/- to 50,000/-)	21	21.00
3.	Medium annual income (Rs.50,001/- to1,00,000/-)	47	47.00
4	High annual income (Rs.1,00,001 and above)	30	30.00
Total		100	100.00

The data of Table 4.7 reveals that, out of the total sesame growers, 47.00 per cent had medium annual income (Rs. 50,001/- to 1,00,000/-) followed by 30.00 per cent had high annual income (Rs. 1, 00,001 to 1,50,000/-), 21.00 per cent had low annual income (Rs.24,001/- to 50,000/-) and only 02.00 per cent came under below poverty line (Below Rs. 24,000/-).

Thus, it may be concluded that out of the total sesame growers, more than 65 per cent of the growers (68.00%) were in medium to low annual income group.

8. Socio-economic status:

Table 4.8: Distribution of sesame farmers according to their socio-economic status

S.No.	Categories	Frequency	Percentage
1.	Low (1 to 30 score)	61	61.00
2.	Medium (31 to 60 score)	39	39.00
3.	High (61 to 90 score)	00	00.00
Total		100	100.00

The data of Table 4.8 reveals that out of total sesame growers, 61.00 per cent had low socio-economic status and 39.00 per cent had medium socio-economic status. None of the growers had high socio-economic status.

Thus, it may be concluded that more than 60.00 per cent of the growers (61.00%) were observed in low socio-economic status group.

9. Mass media exposure:

Table 4.9: Distribution of sesame farmers according to their mass media exposure

S.No.	Categories	Frequency	Percentage
1.	Low (1 to 9 score)	77	77.00
2.	Medium (10 to 18 score)	21	21.00
3.	High (19 to 27 score)	02	02.00
Total		100	100.00

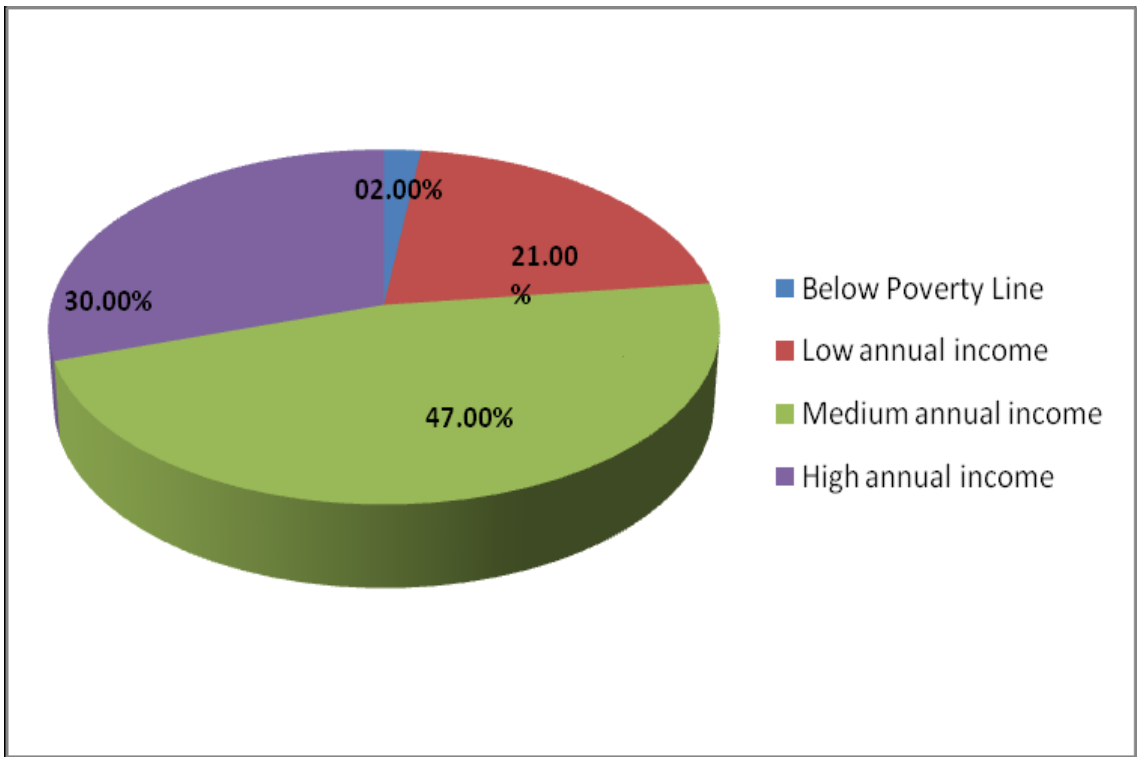


Fig. 7:Distribution of sesame farmers according to their annual income.

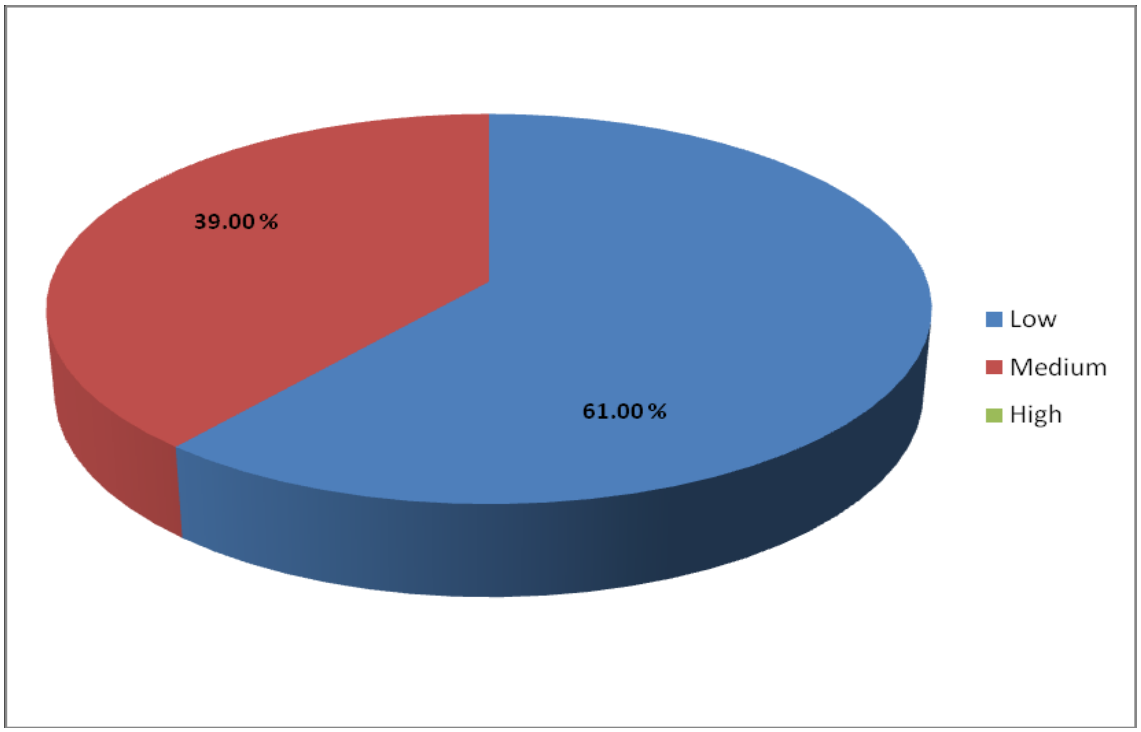


Fig.8: Distribution of sesame farmers according to their socio-economic status.

The data of Table 4.9 indicates that out of total sesame growers, 77.00 per cent were in the category of low mass media exposure, followed by 21.00 per cent had medium mass media exposure, and only 02.00 per cent growers were found in high mass media exposure.

Thus, it may be concluded that the huge majority of the total growers (77.00%) had low exposure to mass media.

10. Extension Participation:

Table 4.10: Distribution of sesame farmers according to their extension participation

S.No.	Categories	Frequency	Percentage
1.	Low (1 to 8 score)	69	69.00
2.	Medium (9 to 16 score)	26	26.00
3.	High (17 to 24 score)	05	05.00
Total		100	100.00

The data of Table 4.10 reveals that out of total sesame growers, 69.00 per cent of growers had low extension participation, followed by 26.00 per cent of growers had medium and only 05.00 per cent of sesame growers had high extension participation.

Thus, it may be concluded that majority (69.00%) of sesame growers had low extension participation.

11. Scientific orientation:

The data of Table 4.11 reveals that out of total sesame growers, 66.00 per cent had high scientific orientation and 34.00 per cent had medium whereas none of the growers had low scientific orientation.

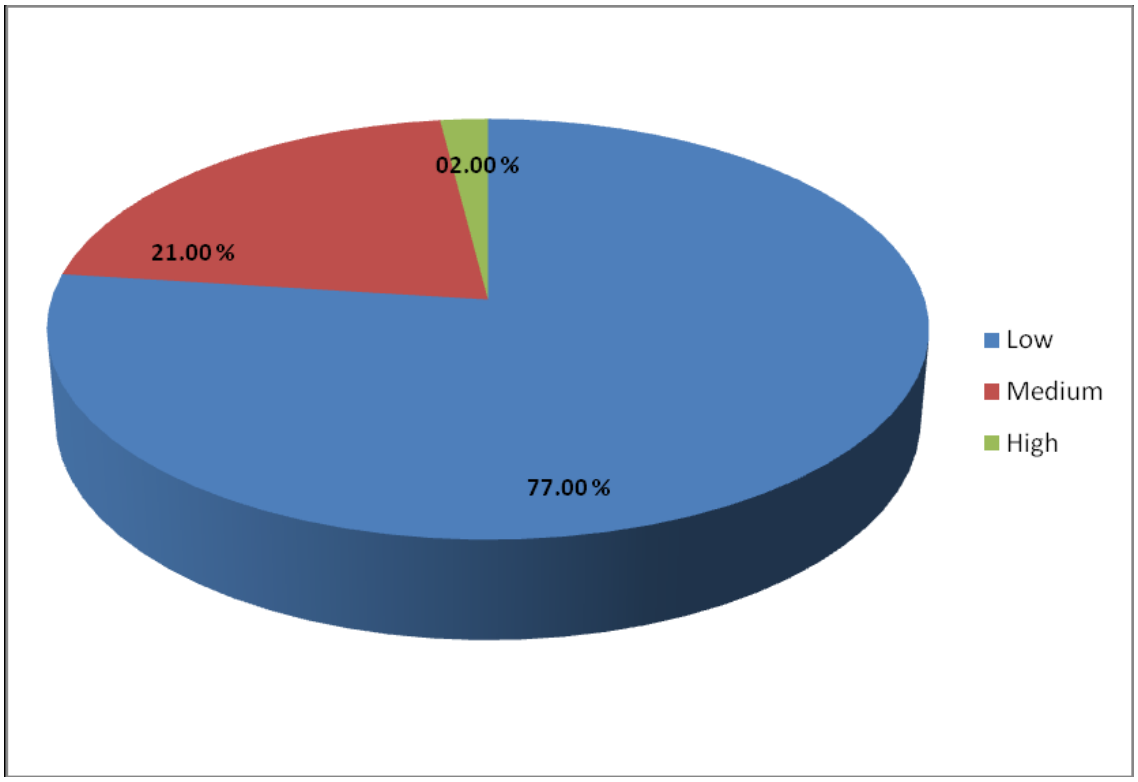


Fig. 9: Distribution of sesame farmers according to their mass media exposure.

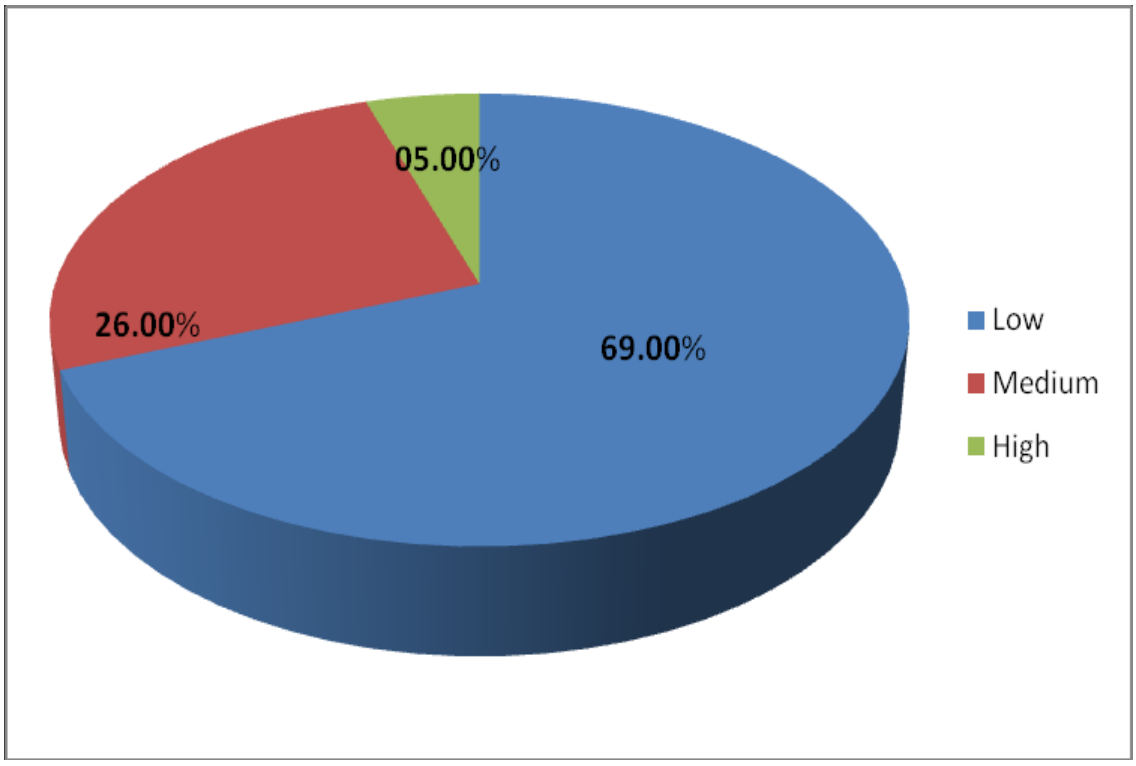


Fig. 10: Distribution of sesame farmers according to their extension participation.

Table 4.11: Distribution of sesame farmers according to their scientific orientation

S.No.	Categories	Frequency	Percentage
1.	Low (6 to 17 score)	00	00.00
2.	Medium(18 to 30 score)	34	34.00
3.	High (31 to 42 score)	66	66.00
Total		100	100.00

Thus, it may be concluded that majority (66.00%) of sesame growers had high scientific orientation.

12. Knowledge level:

Table 4.12: Distribution of sesame farmers according to their knowledge level

S.No.	Categories	Frequency	Percentage
1	Low (1 to 12 score)	09	09.00
2	Medium (13 to 24 score)	53	53.00
3	High (25 to 36 score)	38	38.00
Total		100	100.00

The data of the Table 4.12 shows that out of total sesame growers, 53.00 per cent sesame growers had medium knowledge level, followed by 38.00 per cent had high knowledge level and only 09.00 per cent were found in the low knowledge level of sesame cultivation.

Thus, it may be concluded that more than fifty per cent of sesame growers (53.00%) had medium knowledge level.

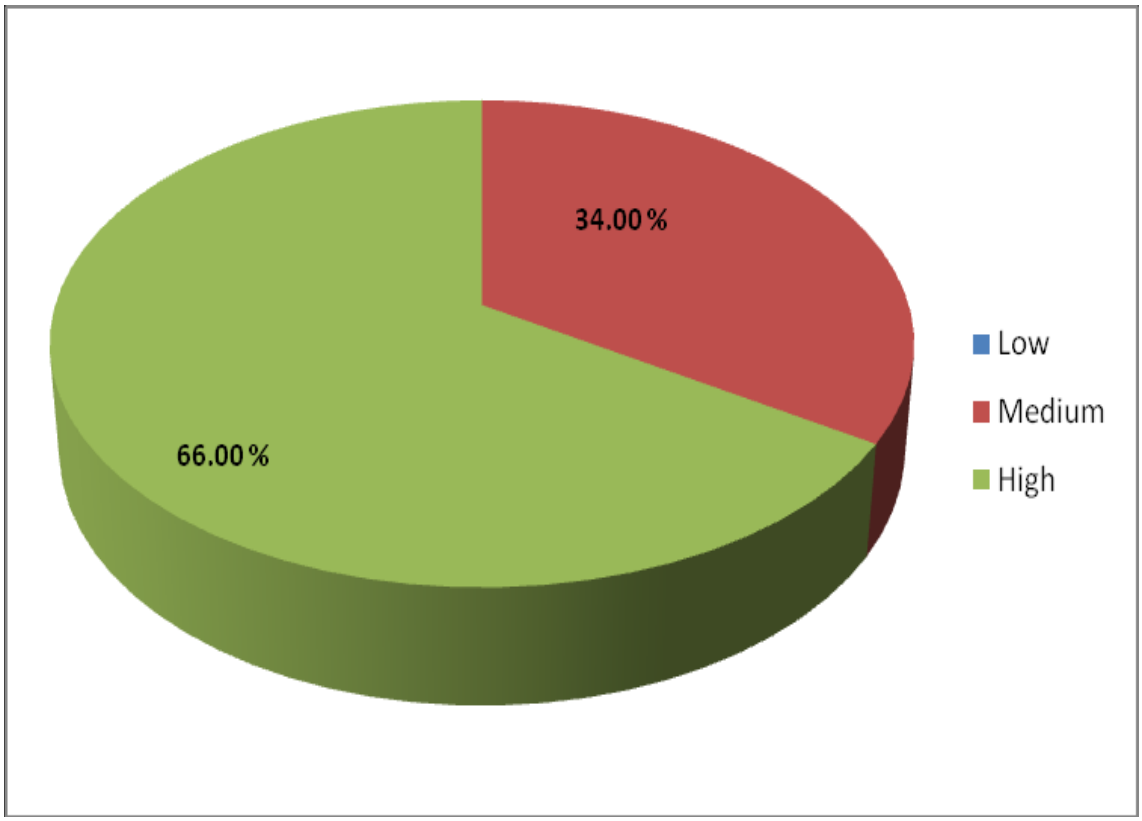


Fig. 11: Distribution of sesame farmers according to their scientific orientation

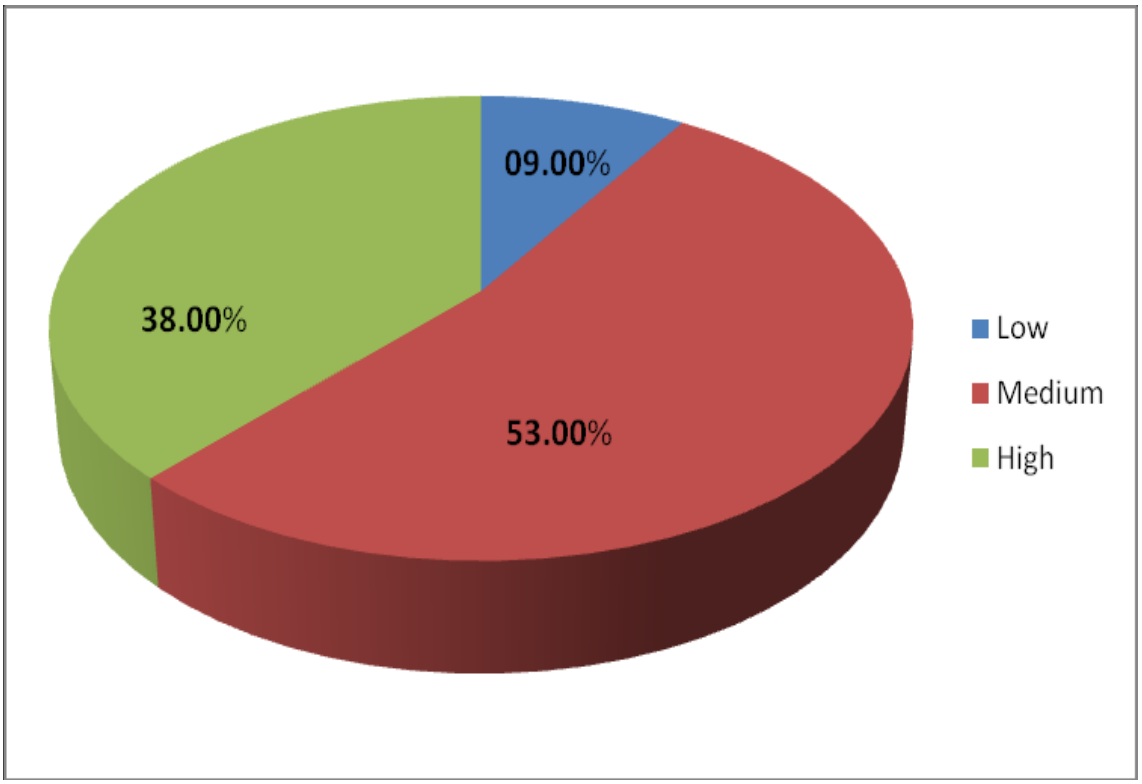


Fig. 12: Distribution of sesame farmers according to their knowledge level.

Table 4.13: Distribution of sesame farmers according to their knowledge level in different package of practices

S.No	Package of practices	Level of knowledge		
		No	Partial	Complete
1	**Field preparation**			
1.1	Type of soil	-	-	100
1.2	Ploughing	12	30	58
1.3	Farm Yard Manure	60	09	31
2	**Seed and sowing management**			
2.1	High Vielding Varieties	47	09	44
2.2	Seed rate	40	28	32
2.3	Seed treatment	33	07	60
3	**Fertilizer management**			
3.1	NPK	39	18	43
3.2	Sulphur	51	07	42
3.3	Biofertilizer	63	07	30
4	**Weed management**	46	09	45
5	**Plant protection management**			
5.1	Insect identification	04	02	94
5.2	Insect control	37	13	50
5.3	Disease identification	63	05	32
5.4	Disease control	65	05	30
6	**Harvesting**			
6.1	Crop duration	-	03	97
6.2	Method of harvesting	-	-	100
6.3	Threshing and winnowing	-	-	100

The data of the Table 4.13 shows that in field preparation practice, 100.00 per cent respondents had complete knowledge of type of soil, 58.00 per cent had complete knowledge of ploughing and only 31.00 per cent had complete knowledge of farm yard manure. With respect to seed and sowing management, 44.00 per cent had complete knowledge of high yielding varieties, 32.00 per cent had complete knowledge of seed rate, while 60.00 per cent had complete knowledge of seed treatment. In case of fertilizer management, 43.00 per cent had complete knowledge of NPK, 42.00 per cent had complete knowledge of sulphur application and 30.00 per cent had complete knowledge of biofertilizers. In weed management practice, 46.00 per cent had no knowledge and 45.00 per cent had complete knowledge. With respect to plant protection practice, a huge majority (94.00%) had complete knowledge of insect identification, 50.00 per cent had complete knowledge of insect control, 63.00 per cent had no knowledge of disease identification and 65.00 per cent had no knowledge of disease control. In the harvesting practice, a huge majority of the respondents (97.0%) had complete knowledge about crop duration and cent per cent respondents had complete knowledge of method of harvesting, threshing and winnowing.

13. Adoption level:

Table 4.14: Distribution of sesame farmers according to their adoption level in sesame cultivation

S.No.	Categories	Frequency	Percentage
1	Low (1 to 12 score)	27	27.00
2	Medium (13 to 24 score)	46	46.00
3	High (25 to 36 score)	27	27.00
Total		100	100.00

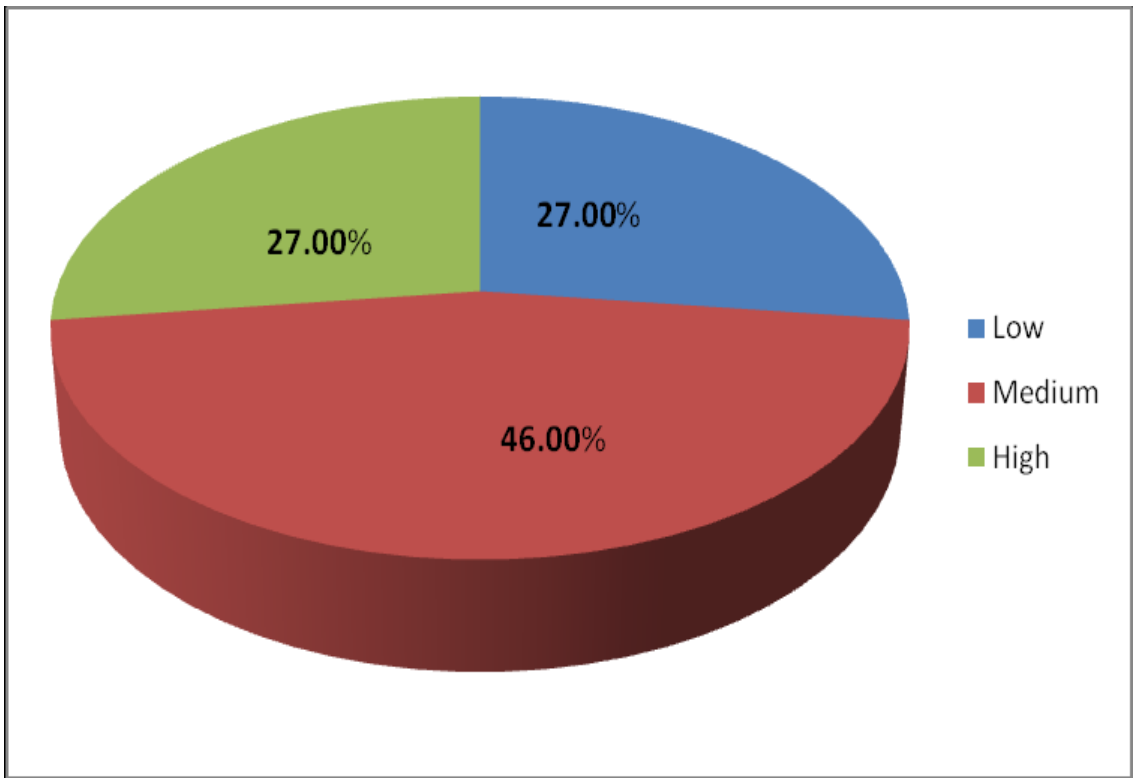


Fig. 13: Distribution of sesame farmers according to there Adoption level in sesame cultivation.

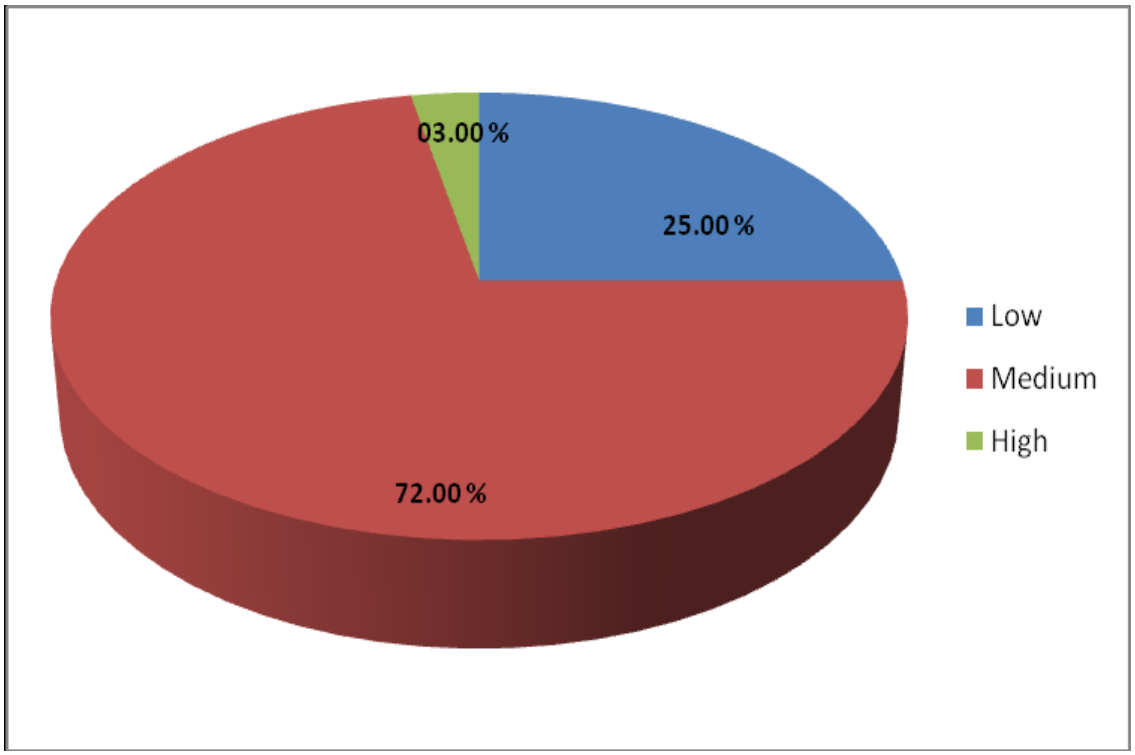


Fig.14: Distribution of sesame farmers according to their technological gap in sesame cultivation.

The data of the Table 4.13 reveals that out of total sesame growers, 46.00 per cent of sesame growers had medium level of adoption, followed by 27.00 per cent had low and 27.00 per cent had high level of adoption.

Thus, it may be concluded that higher percentage of sesame growers (46.00%) had medium level of adoption.

Table 4.15: Distribution of sesame farmers according to their adoption level in different sesame cultivation practices

S.No.	Package of practices	Level of adoption		
		No	Partial	Complete
1	**Field preparation**			
1.1	Type of soil	-	01	99
1.2	Ploughing	37	20	43
1.3	Farm Yard Manure	100	-	-
2	**Seed and sowing management**			
2.1	High Vielding Varieties	50	-	50
2.2	Seed rate	53	17	30
2.3	Seed treatment	56	-	44
3	Fertilizer management			
3.1	NPK	80	-	20
3.2	Sulphur	80	-	20
3.3	Biofertilizer	100	-	-
4	**Weed management**	66	-	-
5	**Plant protection management**			
5.1	Insect identification	06	01	93
5.2	Insect control	53	-	47
5.3	Disease identification	74	01	25
5.4	Disease control	76	-	24
6	**Harvesting**			
6.1	Duration	-	-	100
6.2	Method of harvesting	-	-	100
6.3	Threshing and winnowing	-	-	100

Table 4.15 shows that in field preparation practise, 99.00 per cent had completely adopted type of soil, 43.00 per cent adopted ploughing practice and cent per cent respondents had not adopted farm yard manure. In seed and sowing management, 50.00 per cent had completely adopted while remaining 50.00 per cent had not adopted high yielding varieties. Only 44.00 per cent had completely adopted seed treatment practices. With respect to fertilizer management, a huge majority had not adopted NPK (80.00%), sulphur application (80.00%) and biofertilizer practise (100.00%). Similarly majority of growers (66.00%) had not adopted weed management practice. In plant protection management a huge majority (93.00%) had complete adoption of insect identification, but 53.00 per cent had no adoption of insect control. As regard to disease majority of growers (74.00%) didn't identify diseases whereas majority of growers (76.00%) had no adoption of disease control practice. With respect to harvesting, cent per cent of growers had complete adoption of crop duration, method of harvesting, threshing and winnowing.

4.2 To determine the technological gap in different practices of sesame cultivation

Table 4.16: Distribution of sesame farmers according to their technological gap in sesame cultivation

S.No.	Categories	Frequency	Percentage
1.	Low (1 to 33.33 score)	25	25.00
2.	Medium (33.34 to 66.66 score)	72	72.00
3.	High (66.67 to 100 score)	03	03.00
Total		100	100.00

The data of the Table 4.15 reveals that out of total sesame growers, 72.00 per cent had medium technological gap, followed by 25.00 per cent had low technological gap and 03.00 per cent had high technological gap in cultivation of sesame.

Thus, it can be concluded that the majority (72.00 %) of respondents were having medium technological gap.

4.2.1 Technological gap in different practices of sesame cultivation

Table 4.17: Technological gap of sesame growers according to their different package of practices

S.No.	Technological components	Mean	Rank	Overall Mean	Overall Rank
1.	**Field preparation**			**47.99**	**IV**
1.1	Type of soil	00.50	III		
1.2	Ploughing	45.00	II		
1.3	Farm Yard Manure	99.00	I		
2.	**Seed and sowing management**			**43.66**	**V**
2.1	High Yielding Varieties	50.00	II		
2.2	Seed rate	32.00	III		
2.3	Seed treatment	56.00	I		
3.	**Fertilizer management**			**85.66**	**I**
3.1	NPK	79.00	II		
3.2	Sulphur	79.00	III		
3.3	Biofertilizer	99.00	I		
4.	**Weed management**			**65.00**	**II**
5.	**Plant protection management**			**51.50**	**III**
5.1	Insect identification	06.50	IV		
5.2	Insect control	52.00	III		
5.3	Disease identification	74.50	II		
5.4	Disease control	76.00	I		
6.	**Harvesting**			**08.75**	**VI**
6.1	Duration	-	-		
6.2	Method of harvesting	-	-		
6.3	Threshing and winnowing	-	-		

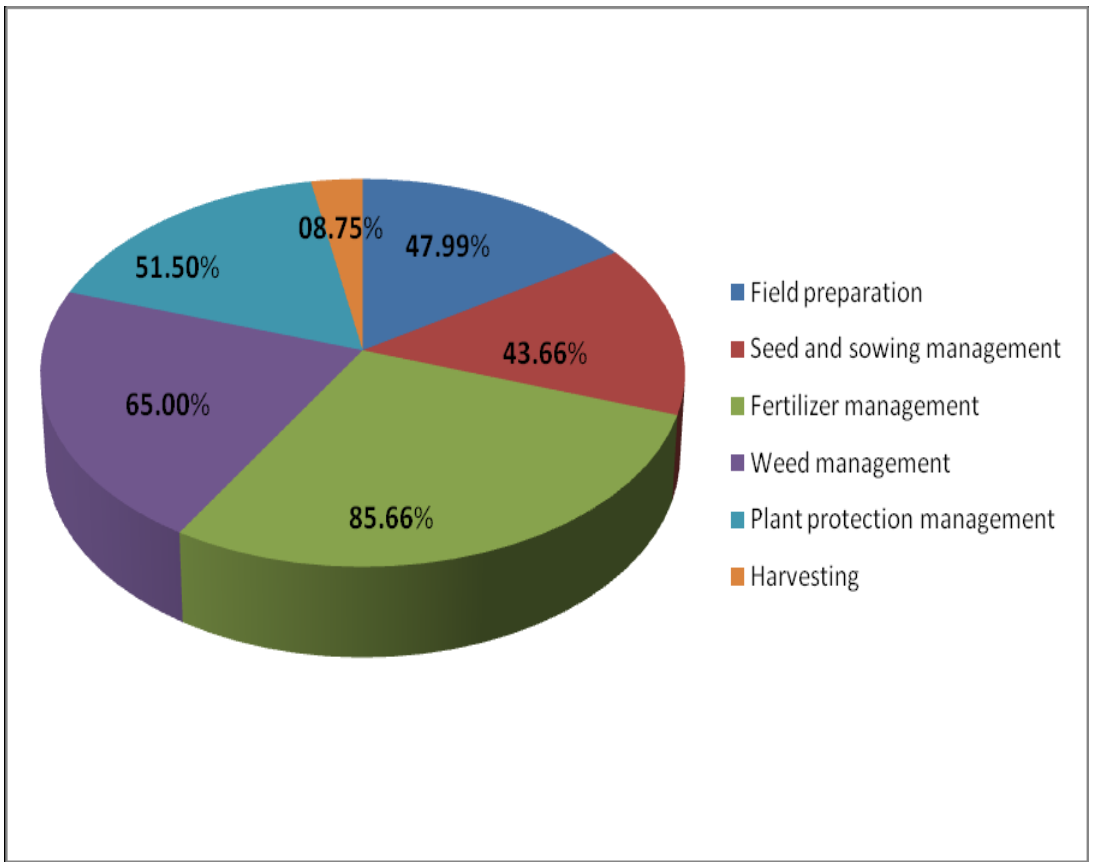


Fig. 15: Technological gap of sesame growers according to their different package of practices.

The data of the Table 4.17 shows the distribution of sesame farmers according to the technological gap of different package of practices with their mean and rank order. The important package of practices on which they were having high technological gap were fertilizer management (85.66%), followed by weed management (65.00%), plant protection management (51.50%), field preparation (47.99%), seed and sowing management (43.66%) and harvesting (08.75%).

Thus, it can be concluded that majority of the sesame farmers were having high technological gap with respect to fertilizer management (85.66 %) followed by weed management (65.00 %), plant protection (51.50 %), field preparation (47.99 %), seed and sowing management (43.66 %) and harvesting (08.75%).

4.3 Association between technological gap and characteristics of sesame growers:

Table 4.18: Association between technological gap and age of sesame growers

S.No.	Age	Technological gap			Total
		Low	Medium	High	
1	Young Age group (25 to 35 years)	07 (23.34)	23 (76.66)	00 (00.00)	30 (100.00)
2	Middle age group (36 to 55 years)	17 (28.82)	41 (69.49)	01 (1.69)	59 (100.00)
3	Old age group (56 years and above)	02 (18.10)	09 (81.82)	00 (00.00)	11 (100.00)
Total		26	73	01	100

(Figures in parentheses indicate percentage)

As the cell frequency were less than five; therefore, it was pooled for the purpose of calculating chi-square test and table be as follows :-

S.No.	Age	Technological Gap		Total
		Low	Medium + High	
1	Young	07	23	30
2	Middle + Old	19	51	70
Total		26	74	100

χ^2 = 0.158, Non-significant at 0.05 level of probability with 1 d.f. Table value = 3.841

Table 4.18 shows the association between age of sesame growers and their technological gap of improved sesame production technology. It is clear from the above data that out of the total 30 young age sesame growers, 23.34 per cent had low technological gap, 76.66 per cent medium and none had high technological gap in sesame cultivation. Whereas in middle age group of sesame growers, 28.82 per cent had low technological gap, 69.49 per cent had medium and only 01.69 per cent had high technological gap. In case of old age group, 18.18 per cent had low technological gap, 81.82 per cent medium and none had high technological gap of improved sesame production technology.

The chi-square value is 0.158 was found Non-significant at 0.05 level of probability Hence, it can be concluded that there is no significant association between age of growers and their technological gap in sesame cultivation.

Table 4.19: Association between education of sesame growers and technological gap in sesame cultivation

S.No.	Education	Technological Gap			Total
		Low	Medium	High	
1	Illiterate	02 (09.10)	19 (86.40)	01 (04.50)	22 (100.00)
2	Up to Primary education	04 (22.22)	14 (77.78)	00 (00.00)	18 (100)
3	Up to Middle education	08 (32.00)	17 (68.00)	00 (00.00)	25 (100.00)
4	Up to Higher secondary education	07 (29.17)	17 (70.83)	00 (00.00)	24 (100.00)
5	Up to College education	05 (45.45)	06 (54.55)	00 (00.00)	11 (100.00)
Total		26	73	01	100

(Figures in parentheses indicate percentage)

As the cell frequency were less than five; therefore, it was pooled for the purpose of calculating chi-square test and table be as follows :-

S.No.	Education	Technological Gap		Total
		Low	Medium + High	
1	Illiterate + Primary	06	34	40
2	Middle	08	17	25
3	Higher secondary	07	17	24
4	College level	05	06	11
Total		26	74	100

χ^2 = 8.272, Significant at 0.05 level of probability with 3 d. f. Table value = 7.815

Table 4.19 reveals that out of 22 sesame growers who were illiterate 09.10 per cent had low technological gap, 86.40 per cent had medium and 04.50 per cent had with high

technological gap. Out of 18 sesame growers who were educated up to primary level, 22.22 per cent had low technological gap, 77.78 per cent had medium and 00.00 per cent had high technological gap. Whereas out of 25 sesame growers who were educated up to middle school level, 32.00 per cent had low technological gap, 68.00 per cent had medium and 00.00 per cent had high technological gap. Out of 24 sesame growers who were educated up to higher secondary school, 29.17 per cent had low, 70.83 per cent had medium technological gap, while out of 11 sesame growers who were educated up to college level, 45.45 per cent had low, 54.55 per cent had medium and 00.00 per cent was found in high technological gap of improved sesame production technology.

The chi-square test was applied to know the association between education and technological gap of sesame growers. The calculated chi-square value 8.272 which is significant at 0.05 level of probability with 1 degree of freedom. Hence, it can be calculated that there is significant association between education level and technological gap of sesame growers.

Table 4.20: Association between size of land holding of sesame growers and technological gap

S.No.	Land Holding	Technological Gap			Total
		Low	Medium	High	
1	Marginal (Up to 1 ha)	02 (05.88)	32 (94.12)	00 (00.00)	34 (100.00)
2	Small (1.1 to 2 ha)	12 (29.27)	28 (68.29)	01 (02.44)	41 (100.00)
3	Medium (2.1 to 3 ha)	02 (33.33)	04 (66.67)	00 (00.00)	06 (100.00)
4	Large (above 3 ha)	10 (52.63)	09 (47.37)	00 (00.00)	19 (100.00)
Total		26	73	01	100

(Figures in parentheses indicate percentage)

As the cell frequency were less than five; therefore, it was pooled for the purpose of calculating chi-square test and table be as follows :-

S.No.	Land Holding	Technological Gap		Total
		Low	Medium + High	
1	Marginal + Small	14	61	75
2	Medium + Large	12	13	25
Total		26	74	100

χ^2 = 8.385, Significant at 0.05 level of probability with 1d.f. Table value = 3.841

Table 4.20 reveals that out of 34 sesame growers having marginal land holding, 05.88 per cent had low technological gap, 94.12 per cent had medium and 00.00 per cent had high technological gap. While out of 41 sesame growers having small land holding, 29.27 per cent had low, 68.29 per cent had medium and 02.44 per cent had high technological gap. Whereas out of 06 sesame growers having medium land holding, 33.00 per cent had low, 66.67 per cent had medium and 00.00 per cent had high technological gap. Out of 19 sesame growers having large land holding, 52.63 per cent had low, 47.37 per cent had medium and 00.00 per cent had high technological gap towards improved sesame production technology.

The chi-square value 8.385 was found significant at 0.05 level of probability with 1 degree of freedom hence, it can be concluded that there was significant association between size of land holding and technological gap in sesame cultivation.

Table 4.21: Association between land under sesame of sesame growers and technological gap in sesame cultivation

S.No.	Area under sesame	Technological Gap			Total
		Low	Medium	High	
1	Marginal (Up to 1 ha)	64 (72.73)	23 (26.14)	01 (01.13)	88 (100.00)
2	Small (1.1 to 2 ha)	05 (45.45)	06 (54.55)	00 (00.00)	11 (100.00)
3	Medium (2.1 to 3 ha)	00 (00.00)	01 (100.00)	00 (00.00)	01 (100.00)
4	Large (above 3 ha)	00 (00.00)	00 (00.00)	00 (00.00)	00 (00.00)
Total		69	30	01	100

(Figures in parentheses indicate percentage)

As the cell frequency were less than five; therefore, it was pooled for the purpose of calculating chi-square test and table be as follows :-

S.No.	Land Holding	Technological Gap		Total
		Low	Medium + High	
1	Marginal	64	24	88
2	Small + Medium + Large	05	07	12
Total		69	31	100

χ^2 = 4.763, Significant at 0.05 level of probability with 1 d.f. Table value = 3.841

Table 4.21 reveals the association between land under sesame crop of growers and technological gap in sesame

cultivation. It is clear from the data of the table that out of 88 sesame growers who were having marginal land holding, 72.73 per cent had low technological gap, 26.14 per cent had medium and 01.13 per cent had high technological gap. While out of 11 sesame growers having small land holding, 45.45 per cent had low, 54.55 per cent had medium and none had high technological gap. Whereas out of 01 sesame grower having medium land holding, 100 per cent had medium technological gap.

The chi-square value 4.763 was found significant at 0.05 level of probability with 1 degree of freedom hence, it can be concluded that there was significant association between land under sesame crop and technological gap in sesame cultivation

Table 4.22: Association between material possession of growers and technological gap in sesame cultivation

S.No.	Material Possession	Technological Gap			Total
		Low	Medium	High	
1	Low (1 to 7 score)	15 (22.39)	51 (76.12)	01 (01.49)	67 (100.00)
2	Medium (8 to 14 score)	11 (34.38)	21 (65.62)	00 (00.00)	32 (100.00)
3	High (15 to 22 score)	00 (00.00)	01 (100.00)	00 (00.00)	01 (100.00)
Total		26	73	01	100

(Figures in parentheses indicate percentage)

As the cell frequency were less than five; therefore, it was pooled for the purpose of calculating chi-square test and table be as follows :-

S.No.	Material Possession	Technological Gap		Total
		Low	Medium + High	
1	Low	15	52	67
2	Medium + High	11	22	32
	Total	26	74	100

χ^2 = 1.377 Non-significant at 0.05 level of probability with 1d.f. Table value= 3.841

Table 4.22 shows the association between material possession of growers and technological gap in sesame cultivation. It is clear from the data in the table that out of 67 sesame growers, who had low material possession, 22.39 per cent had low technological gap followed by 76.12 per cent medium and 01.49 per cent had high technological gap in sesame cultivation. While out of 32 sesame growers who had medium material possession, 34.38 per cent had low technological gap followed by 65.62 per cent medium and none had high technological gap. Similarly out of 01 sesame grower, who had high material possession, 100 per cent had medium and 06.67 per cent had high technological gap in sesame cultivation.

The chi-square value 1.377 was found non-significant at 0.05 level of probability with 1 degree of freedom. Hence, it can be concluded that there was no significant association between material possession of growers and technological gap in sesame cultivation.

Table 4.23: Association between social participation of growers and technological gap in sesame cultivation

S.No.	Social Participation	Technological Gap			Total
		Low	Medium	High	
1	No participation (0 score)	18 (20.45)	69 (78.41)	01 (01.14)	88 (100.00)
2	Low (1 to 5 score)	06 (54.54)	05 (45.46)	00 (00.00)	11 (100.00)
3	Medium (6 to 10 score)	01 (100.00)	00 (00.00)	00 (00.00)	01 (100.00)
4	High (11 to 15 score)	00.00 (00.00)	00.00 (00.00)	00.00 (00.00)	00.00 (00.00)
Total		25	74	01	100

(Figures in parentheses indicate percentage)

As the cell frequency were less than five; therefore, it was pooled for the purpose of calculating chi-square test and table be as follows:-

S.No	Social Participation	Technological Gap		Total
		Low	Medium + High	
1	No	18	70	88
2	Low + Medium + High	07	05	12
	Total	25	75	100

χ^2 = 8.081, Significant at 0.01 level of probability with 1d.f. Table value= 3.841

Table 4.23 shows the association between social participation of sesame growers and technological gap in sesame cultivation. It is clear from the data of the table that out of 88 sesame growers who had no social participation, 20.45 per cent had low technological gap followed by 78.41 percent had medium and 01.14 percent had high technological gap .While out of 11 sesame growers who had low social participation, 54.54 per cent had low technological gap followed by 45.46 per cent medium and 00.00 per cent had high technological gap. While out of 01 sesame grower who had high medium social participation, 100 per cent had low technological gap in sesame cultivation.

The chi-square value was found 8.081 significant at 0.01 level of probability and 1 degree of freedom. Hence, it can be concluded that there was significant association between social participation of growers and technological gap in sesame cultivation.

Table 4.24: Association between annual income of growers and technological gap

S.No.	Annual income	Technological gap			Total
		Low	Medium	High	
1	Below Poverty Line	00 (00.00)	02 (100.00)	00 (00.00)	02 (100.00)
2	Low	00.00 (00.00)	21 (100.00)	00.00 (00.00)	21 (100.00)
3	Medium	15 (31.91)	31 (65.96)	01 (02.13)	47 (100.00)
4	High	11 (36.67)	19 (63.33)	00.00 (00.00)	30 (100.00)
Total		26	73	01	100

(Figures in parentheses indicate percentage)

As the cell frequencies were less than five; therefore, it was pooled for the purpose of calculating chi-square test and table be as follows:-

S.No.	Annual Income	Technological gap		Total
		Low	Medium+ High	
1	Below Poverty Line + Low Income	15	55	70
2	Medium Income + High Income	11	19	30
Total		26	74	100

χ^2 = 2.534, Non-significant at 0.05 level of probability with 1 d.f. Table value= 3.841

Table 4.24 shows the association between annual income of growers and technological gap in sesame cultivation. It is clear from the data of the table that out of 02 sesame growers, who were below poverty line, 00.00 per cent had low technological gap followed by 100.00 per cent medium and 00.00 per cent had high technological gap in sesame cultivation. While out of 21 low income growers 00.00 per cent of respondents had low and 100.00 per cent had medium technological gap and 00.00 per cent high technological gap in sesame cultivation, While out of 47 medium income growers 31.91 per cent of respondents had low and 65.96 per cent had medium and, 02.13 per cent had high technological gap in sesame cultivation. Whereas out of 30 sesame growers having high annual income, 36.67 per cent had low technological gap, 63.66 per cent medium and 00.00 per cent had high technological gap in sesame cultivation.

The chi-square value 2.534 was found non-significant at 0.05 level of probability with 1 degree of freedom. Hence, it can be concluded that there was no significant association between annual income of growers and technological gap in sesame cultivation.

Table 4.25: Association between socio-economic status of growers and technological gap in sesame cultivation

S.No.	Socio-economic status	Technological Gap			Total
		Low	Medium	High	
1	Low (1 to 30 score)	10 (16.39)	50 (81.97)	01 (01.64)	61 (100.00)
2	Medium (31 to 60 score)	16 (41.03)	23 (58.97)	00 (00.00)	39 (100.00)
3	High (61 to 90 score)	00.00 (00.00)	00.00 (00.00)	00.00 (00.00)	00.00 (00.00)
Total		26	73	01	100

(Figures in parentheses indicate percentage)

As the cell frequencies were less than five; therefore, it was pooled for the purpose of calculating chi-square test and table be as follows :-

S.No.	Socio-economic status	Technological Gap		Total
		Low	Medium + High	
1	Low	10	51	61
2	Medium + high	16	23	39
	Total	26	73	100

χ^2 = 7.502 Significant at 0.05 level of probability with 1d.f. Table value = 3.841

Table 4.25 shows the association between socio-economic status of growers and technological gap in sesame cultivation. It is clear from the data of the table that out of 61 sesame growers who were having low socio-economic status, 16.39 per cent had low technological gap followed by 81.97 per cent medium and 01.64 per cent had high technological gap in sesame cultivation. While out of 39 sesame growers who were having medium socio-economic status, 16.00 per cent had low technological gap followed by 58.97 per cent medium and 00.00 per cent had high technological gap in sesame.

The chi-square value 7.502 was found to be significant at 0.05 level of probability with 1 degree of freedom. Hence, it can be concluded that there was significant association between socio-economic status of sesame growers and technological gap in sesame.

Table 4.26: Association between Mass Media Exposure of growers and technological gap in sesame cultivation

S.No.	Mass Media Exposure	Technological Gap			Total
		Low	Medium	High	
1	Low (1 to 9 score)	08 (10.39)	68 (88.31)	01 (01.30)	77 (100.00)
2	Medium (10 to 18 score)	16 (76.19)	05 (23.81)	00 (00.00)	21 (100.00)
3	High (19 to 27 score)	02 (100.00)	00 (00.00)	00 (00.00)	02 (100.00)
	Total	26	73	01	100

(Figures in parentheses indicate percentage)

As the cell frequencies were less than five; therefore, it was pooled for the purpose of calculating chi-square test and table be as follows :-

S.No.	Mass Media Exposure	Technological Gap		Total
		Low	Medium + High	
1	Low	08	69	77
2	Medium + high	18	05	23
Total		26	74	100

χ^2 = 42.402 Significant at 0.01 level of probability with 1d.f. Table value = 6.635

Table 4.26 shows the association between mass media exposure of growers and technological gap in sesame cultivation. It is clear from the data of the table that out of 77 sesame growers who were having low mass media exposure,10.39 per cent had low technological gap followed by 88.31 per cent medium and 01.30 per cent had high technological gap in sesame cultivation. While out of 21 sesame growers who were having medium mass media exposure, 76.19 per cent had low technological gap followed by 23.81 per cent medium and 00.00 per cent had high technological gap in sesame. While out of 02 sesame growers with high mass media exposure 100.00 per cent had low technological gap in sesame cultivation.

The chi-square value 42.402 was found to be significant at 0.05 level of probability with 1 degree of freedom. Hence, it can be concluded that there was significant association between mass media exposure of sesame growers and technological gap in sesame.

Table 4.27: Association between extension participation of growers and technological gap in sesame cultivation

S.No.	Extension Participation	Technological Gap			Total
		Low	Medium	High	
1	Low (1 to 8 score)	06 (08.69)	62 (89.86)	01 (01.45)	69 (100.00)
2	Medium (9 to 16 score)	06 (23.08)	20 (76.92)	00 (00.00)	26 (100.00)
3	High (17 to 24 score)	04 (80.00)	01 (20.00)	00 (00.00)	05 (100.00)
Total		16	83	01	100

(Figures in parentheses indicate percentage)

As the cell frequency were less than five; therefore, it was pooled for the purpose of calculating chi-square test and table be as follows :-

S.No.	Extension Participation	Technological Gap		Total
		Low	Medium + High	
1	Low	06	63	69
2	Medium + high	10	21	31
Total		16	84	100

χ^2 = 8.836, Significant at 0.05 level of probability with 1d.f. Table value = 3.841

Table 4.27 shows the association between extension participation of growers and technological gap in sesame

cultivation. It is clear from the data of the table that out of total 69 sesame growers who were having low extension participation, 08.69 per cent had low technological gap followed by 89.86 per cent medium and 01.45 per cent had high technological gap. While out of 26 sesame growers who were having medium extension participation, 23.08 per cent had low technological gap followed by 76.92 per cent medium and 00.00 per cent had high technological gap. Whereas out of 05 sesame growers who were having high extension participation, 80.00 per cent of respondents had low and 20.00 per cent had medium technological gap in sesame cultivation.

The chi-square value was found 8.836 significant at 0.05 level of probability with 1 degree of freedom. Hence, it can be concluded that there was association between extension participation of growers and technological gap in sesame cultivation.

Table 4.28: Association between scientific orientation of growers and technological gap in sesame cultivation

S. No.	Scientific Orientation	Technological Gap			Total
		Low	Medium	High	
1	Low (6 to 17 score)	00 (00.00)	00 (00.00)	00 (00.00)	00 (00.00)
2	Medium (18 to 30 score)	06 (17.64)	27 (79.41)	01 (02.95)	34 (100.00)
3	High (31 to 42 score)	25 (37.88)	41 (62.12)	00 (00.00)	66 (100.00)
Total		31	68	01	100

(Figures in parentheses indicate percentage)

As the cell frequencies were less than five; therefore, it was pooled for the purpose of calculating chi-square test and table be as follows :-

S.No.	Scientific Orientation	Technological Gap		Total
		Low	Medium + High	
1	Low + Medium	06	28	34
2	High	25	41	66
Total		31	69	100

χ^2 = 4.294, Significant at 0.05 level of probability with 1d.f. Table value = 3.841

Table 4.28 shows the association between scientific orientation of growers and technological gap in sesame cultivation. Out of 34 growers who had medium scientific orientation 17.64 per cent had low technological gap, followed by, 79.41 per cent had medium technological gap and 02.95 per cent had high technological gap in sesame cultivation. While out of 66 sesame growers who had high scientific orientation, 37.88 per cent had low technological gap, followed by 62.12 per cent had medium and 00.00 per cent had high technological gap in sesame cultivation.

The chi-square value 4.294 was found significant at 0.05 level of probability with 1 degree of freedom. Hence, it can be concluded that there was significant association between scientific orientation of growers and technological gap in sesame cultivation.

Table 4.29: Association between knowledge of practices of sesame growers and technological gap in sesame cultivation

S.No.	Knowledge level	Technological Gap			Total
		Low	Medium	High	
1	Low (1 to 12 score)	01 (11.00)	08 (88.89)	00 (00.00)	09 (100.00)
2	Medium (13 to 26 score)	05 (09.43)	47 (88.68)	01 (01.89)	53 (100.00)
3	High (27 to 38 score)	26 (68.42)	12 (31.58)	00 (00.00)	38 (100.00)
Total		32	67	01	100

(Figures in parentheses indicate percentage)

As the cell frequencies were less than five; therefore, it was pooled for the purpose of calculating chi-square test and table be as follows

S.No.	Knowledge level	Technological Gap		Total
		Low	Medium + High	
1	Low	06	56	62
2	Medium + high	26	12	38
Total		32	68	100

χ^2 = 37.363, Significant at 0.05% level of significance with 1d. f. Table value = 3.841

Table 4.29 shows the association between knowledge level of growers and their technological gap in sesame cultivation. It is clear from the data of the table that out of

growers 09 growers, who were having low knowledge level followed by, 11.00 per cent had low technological gap, 88.89 per cent medium and 00.00 per cent had high technological gap. While, out of 53 growers who were having medium knowledge level, followed by 09.43 per cent had low technological gap, 88.68 per cent medium and 01.89 per cent had high technological gap. Whereas out of 38 sesame growers who had high knowledge level, 68.42 per cent had low technological gap, 31.58 per cent had medium technological gap and 00.00 per cent had high technological gap in sesame cultivation.

The chi-square value 37.363 was found significant at 0.05 level of probability with 1 degree of freedom. Hence, it can be concluded that there was association between knowledge of practices of growers and technological gap in sesame cultivation.

Table 4.30: Association between adoption level of sesame growers and technological gap in sesame cultivation

S.No.	Adoption Level	Technological Gap			Total
		Low	Medium	High	
1	Low (1 to 12 score)	03 (11.12)	23 (85.18)	01 (03.70)	27 (100.00)
2	Medium (13 to 26 score)	05 (10.87)	41 (89.13)	00 (00.00)	46 (100.00)
3	High (27 to 38 score)	21 (77.78)	06 (22.22)	00 (00.00)	27 (100.00)
Total		29	70	01	100

(Figures in parentheses indicate percentage)

As the cell frequencies were less than five; therefore, it was pooled for the purpose of calculating chi-square test and table be as follows :-

S.No.	Adoption Level	Technological Gap		Total
		Low	Medium + High	
1	Low	08	65	73
2	Medium + high	21	06	27
	Total	29	71	100

χ^2 = 42.739, Significant at 0.05 level of probability with 1d. f. Table value = 3.841

Table 4.30 shows the association between adoption level of growers and technological gap in sesame cultivation. It is clear from the data of the table that out of 27 sesame growers who were having low adoption level, 11.12 per cent had low technological gap followed by 85.18 per cent medium and 03.70 per cent had high technological gap. While out of 46 sesame growers who were having medium adoption level, 10.87 per cent had low technological gap followed by 89.13 per cent medium and 00.00 per cent had high technological gap in sesame cultivation. Whereas out of 27 sesame growers who were having high adoption level, 77.78 per cent had low technological gap followed by 22.22 per cent medium and 00.00 per cent high technological gap.

The chi-square value 42.739 was found significant at 0.05 level of probability with 1 degree of freedom. Hence, it can be concluded that there was significant association between adoption level of growers and technological gap in sesame cultivation.

4.4 To know the constraints in adoption of sesame production technology and suggest the measures to overcome them:

4.4.1 Situational constraints:

Table 4.31: Situational constraints reported by growers in adoption of sesame production technology

S.No.	Constraint	Frequency	Percentage	Rank
1	Market is far away from village	60	60.00	III
2	Shortage of labour	68	68.00	I
3	Poor transport facilities for crop produce	65	65.00	II

Table 4.31 shows the situational constraints of sesame as perceived by the growers. It is clear from the data that the majority of the growers reported shortage of labour (68.00%), poor transport facilities for crop produce (65.00%) and distal market from village (60.00%) as the major situational constraints.

4.4.2 Technological constraints:

Table 4.32: Technological constraints reported by growers in adoption of sesame production technology

S.No.	Constraint	Frequency	Percentage	Rank
1	Lack of knowledge about improved varieties	69	69.00	III
2	Lack of knowledge about seed treatment	60	60.00	IV
3	Lack of knowledge about recommended doses of fertilizers	78	78.00	I
4	Lack of knowledge about insects, pests, diseases and weeds	56	56.00	V
5	Lack of knowledge about calibration of chemical and their recommended doses	72	72.00	II

Table 4.32 shows the technological constraint of sesame as perceived by the growers. It is clear from the data that the majority of growers reported lack of knowledge about recommended doses of fertilizer (78.00%), lack of knowledge about calibration of chemical and their recommended doses (72.00%), lack of knowledge about improved varieties (69.00%), lack of knowledge about seed treatment (60.00%) and lack of knowledge about insects, pests, diseases and weeds (56.00%) as the main technological constraints.

4.4.3 Economic constraints

Table 4.33: Economic constraints reported by growers in adoption of sesame production technology

S.No.	Constraint	Frequency	Percentage	Rank
1	Complex procedure of bank loan	74	74.00	I
2	Higher rate of interest on loan	57	57.00	IV
3	Higher labour charges	62	62.00	III
4	High cost of inputs like seed, fertilizers, pesticides and diesel	65	65.00	II

Table 4.33 shows the economic constraint of sesame as perceived by the growers. It is clear from the data that the majority of growers reported complex procedure of bank loan (74.00%), high cost of inputs like seed, fertilizer, bio fertilizer (65.00%), higher labour charges (62.00%) and higher rate of interest on loan (57.00%) as the major economic constraints.

4.4.4 Marketing constraints

Table 4.34: Marketing constraints reported by growers in adoption of sesame production technology

S.No	Constraint	Frequency	Percentage	Rank
1	Lack of knowledge about market value of product	59	59.00	III
2	Lack of daily market facilities in their locality	81	81.00	I
3	Irregular supply of seed, fertilizer and pesticides	72	72.00	II

Table 4.34 shows the marketing constraints of sesame as perceived by the growers. It is clear from the data that the majority of growers reported lack of daily market facilities in their locality (81.00%), irregular supply of seeds, fertilizers and pesticides (72.00%) and lack of knowledge about market value of product (59.00%) as the main marketing constraints.

4.4.5 Extension constraints:

Table 4.35: Constraints about extension activities reported by the growers in adoption of sesame production technology

S.No	Constraint	Frequency	Percentage	Rank
1	Irregular visits of RAEOs	92	92.00	I
2	Lack of demonstrations on improved sesame production technology	88	88.00	II
3	Lack of trainings on improved sesame production technology	79	79.00	III

Table 4.35 shows the extension constraint of sesame as perceived by the growers. It is clear from the data that the

majority of growers reported irregular visits of RAEOs (92.00%), lack of demonstrations on improved sesame production technology (88.00%), lack of trainings on improved sesame production technology (79.00%) as the major extension constraints.

4.4.6 Institutional constraints:

Table 4.36: Constraints about institutional reported by growers in adoption of sesame production technology

S.No	Constraint	Frequency	Percentage	Rank
1	Lack of co-operative societies	87	87.00	II
2	Unavailability of inputs at proper time through government agencies	58	58.00	III
3	Unavailability of information on improved technology through government agencies	90	90.00	I

Table 4.36 shows the institutional constraint of sesame as perceived by the growers. It is clear from the data that the majority of growers reported unavailability of information on improved technology through government agencies (90.00%), lack of co-operative societies (87.00) and unavailability of inputs at proper time through government agencies (58.00%) as the main institutional constraints.

4.4.7 Suggestions:

Table 4.37: Suggestions reported by sesame grower in technological gap of improved sesame production technology

S.No.	Suggestions	Frequency	Percentage	Rank
1	Rate of seeds, fertilizers and insecticides should be less	84	84.00	IV
2	Demonstrations should be conducted on farmers' field by agriculture department	85	85.00	III
3	Training should be given on technical sesame production	87	87.00	II
4	Visits of RAEOs should be regular	93	93.00	I
5	Technological knowledge should be given by RAEOs	81	81.00	V
6	The crop loan and subsidy should be provided in time	58	58.00	VIII
7	Field visit should be taken by ADOs at least twice a months	79	79.00	VI
8	Co-operative societies should be in every village	64	64.00	VII

Table 4.37 shows the suggestion made by the sesame growers for technological gap of improved sesame production technological out of the total sesame growers 93.00 per cent agreed on regular visits of RAEOs, 87.00 per cent suggested trainings on technical sesame production, 85.00 per cent advised for conduction of demonstrations on farmers' field, 84.00 per cent suggested reduction in cost of inputs, 81.00 per cent for providing technological knowledge by the RAEOs, 79.00 per cent for bi monthly visits of ADOs, 64.00 per cent for setting up co-operative societies in every villages and 58.00 per cent for timely provision of crop loan and subsidies.

* * *

DISCUSSION

The main findings of the investigation have been discussed in this chapter to draw generalization. The discussion has been presented under the following sub heads:-

5.1 To know the socio-economic, psychological and communicational attributes of farmers.

5.2 To determine the technological gap in different practices of sesame cultivation.

5.3 To find out the association between socio-economic, psychological and communicational attributes with technological gap.

5.4 To know the constraints responsible for existing technological gap and suggest the strategy for enhancing sesame production technology.

5.1 To know the socio-economic, psychological and communicational attributes of farmers :

The result of the present study showed that the higher percentage of sesame growers (59.00%) belonged to middle age group (36 to 55 years). Less interest in farming activities and new options of occupations has diverted the young generations from the farming activities. The finding finds support with the work of Parey (2000), Rajput (2005), Mahoviya (2006) and Dwivedi (2007).

As regard to level of education, 25.00 per cent of sesame growers were educated up to middle level. This might be due to lack of educational institutions during the past time in the villages. The finding finds support with the work of Rajput (1993), Raghuwansi (2010) and Chinchmalatpure et al. (2011).

The result of the present study showed that the higher percentage of sesame growers (75.00%) had marginal to small size of land holding (up to 2 ha). The conversion of joint families into nuclear families and land holding into small and marginal land holdings may be the reason behind this. The work of Khobragade *et al*. (1988), Chinchmalatpure *et al*. (2011), Jahagirdar *et al*. (2012) and Machhar *et al*. (2015) are in support with the present work.

The study further revealed that the majority of growers (88.00%) had marginal land holding under sesame cultivation. It is so because this crop is susceptible to standing water, has high cost of improved seeds, property of sticking of seeds in the seed drills and suitability to be taken mostly on undulated topography. The work of Sagar *et al.* (2004) is in line with the present finding.

The majority of sesame growers (67.00%) were having low material possession because of poor socio-economic status. The work of Sahi (1994) and Mahoviya (2006) support the present finding.

The result of the present study showed that the majority of respondents (88.00%) had no social participation group. Lack of leisure time and interest in the social activities might be the reason for such finding. The work of Singh (2003) and Machhar *et al*. (2015) supports the present finding.

The study further revealed that the majority of sesame growers (47.00%) had medium annual income. This may be due to lack of dependency on various sources of occupation and poor socio-economic status. The work of Kawale *et al*. (2003), Patidar (2007) and Raghuwansi (2010) support the present finding.

The majority of sesame growers (61.00%) had low socio-economic status. Low material possesion, nuclear family status, small and marginal land holdings and no social participation might be the reason for this finding.

The majority of sesame growers (77.00%) had low mass media exposure on agriculture aspects. Low income and lack of radio sets for listening, lack of television sets for viewing agricultural programmes and lack of newspaper and agricultual study material might have resulted in this finding. The finding finds support with the work of Krishnamurthy and Siddaramaiah (1994).

The majority of sesame growers (69.00%) had low extension participation in the extension activities performed in their villages by extension workers. This may be due to irregular visits of grass root level workers and non conduction of extension activities in the villages. The work of Rajput (2005) and Aske (2008) is in support of the present finding.

The majority of growers (66.00%) had high scientific orientation on sesame cultivation. It may be due to the higher expectations and belief in scientific technology.

The majority (53.00%) of sesame growers had medium knowledge of sesame production practices. This might be due to low extension participation, poor mass media exposure, irregular visits of RAEOs and lack of trainings on improved sesame production technology. The work of Singh and Sharma (2005), Pare *et al*. (2006), Kumar (2009) and Kumar *et al*. (2012) support the present finding.

The majority (46.00%) of sesame growers had medium adoption of sesame production practices. It may be due to poor economic status and non conduction of demonstrations on improved technology. The work of Veeraih *et al*. (1998), Vakaria *et al*. (2000), Jadhav *et al*. (2004), Anonymous (2004-05), Sachan *et al*. (2005), Kumar *et al*. (2012) and Hadiya *et al*. (2014) is in line with the present finding.

Dependent variable:

5.2 Technological gap:

The study showed that 72.00 per cent of the sesame growers had medium technological gap in sesame cultivation. This medium technological gap may be due to poor socio-economic conditions, less awareness of package of practices from the grass root level workers and poor mass media exposure.

The important package of practices on which they were having high technological gap were fertilizer management (85.66%), followed by weed management (65.00%), plant protection management (51.50%), field preparation (47.99%), seed and sowing management (43.66%), and harvesting (08.75%). The study is in line with Tripathi AK and Singh DK (2012).

5.3 Association between attributes of sesame growers and their technological gap:

The association between various attributes of sesame growers like socio-personal-economic, psychological and communicational characteristics with the technological gap were worked out, which showed that age, annual income and material possession were found to be non-significantly associated with technological gap, whereas education, size of land holding, land under sesame crop, socio-economic status, mass media exposure, social participation, extension participation, scientific orientation, knowledge level and adoption level were found to be significantly associated with technological gap.

The age of sesame growers had not shown significant association with technological gap, although the sesame growers belonged to middle age group had low adoption of improved sesame production technology. This leads to the acceptance of

hypothesis Ho-1. The work of Singh (2007), Kapse *et al*. (2007), Patel *et al*. (2010) and Machhar *et al*. (2015) are in line with the study.

The education level of sesame growers showed significant association with technological gap. Thus, the hypothesis Ho-2 is rejected. The apparent reason of this finding might be that the qualification plays a pivotal role in changing the attitude of the sesame growers effectively with regard to the adoption of improved sesame production technology. This finding finds support from Singh (2007), Kapse et al. (2007), Patel et al. (2010) and Machhar et al. (2015).

The size of land holding of sesame growers and technological gap was found to be significantly associated. As such, hypothesis Ho-3 is rejected. It is an important factor which would provide to produce more, since medium the farm size, longer will be the productivity and surpluses to support innovation and introduction of technological changes in farming. But where most of the farmers cultivate their land traditionally, this thing may be true. The finding is in conformity with the findings of Kapse et al. (2007) and Patel et al. (2010).

The size of land under sesame crop of sesame growers and technological gap was found to be significantly associated. As such, hypothesis Ho-4 is rejected.

The association between material possession and technological gap was found non-significant. This leads to the acceptance of hypothesis Ho-5.

The association between social participation and technological gap was significant. As such, hypothesis Ho-6 is rejected. The sesame farmers belonged to no or low social participation group. This finding finds support from Singh (2007), Patel et al. (2010) and Machhar et al. (2015).

Annual income of sesame growers showed significant association with technological gap. In view of the finding, the hypothesis Ho-7 is rejected. The farmers belonging to medium annual income group. The finding is supported by the work of Singh (2007) and Kapse *et al*. (2007).

Socio-economic status of growers showed significant association with technological gap. In view of the finding, the hypothesis Ho-8 is rejected. The finding finds support from Patel *et al*. (2010).

The mass media exposure of sesame growers had significant association with technological gap. In view of the finding, hypothesis Ho-9 is rejected.

The variable extension participation exhibited significant association with technological gap. As a result of this, hypothesis Ho-10 is rejected. This finding finds support from Patel *et al*. (2010).

Scientific orientation exhibited significant association with technological gap of sesame growers. Therefore, hypothesis Ho-11 is rejected. Thus, the values play an important role in individual life. It is thus important that the specific value orientation on individual determines his mental set-up affecting his total gap pattern in a particular situation. Now-a-days the agriculture has become a scientific enterprise and farmers who want to get more yields and earn more, tends to acquire themselves with scientific farming. This finding finds support with Singh (2007).

The knowledge regarding improved sesame production technology was found to be significantly associated with technological gap of sesame growers. Thus, the hypothesis Ho-12 is rejected. The reason for such finding is perhaps the adoption of improved technologies recommended by the scientists are known to the farmers. The farmers must possess

the correct, reliable and sufficient knowledge about the package of cultivation. The observation of Singh (2007), Kapse et al. (2007), Patel et al. (2010), Dixit et al. (2005) and Machhar et al. (2015) confirm the present finding.

The study indicated that adoption level had significant association with technological gap of sesame growers. Thus, the hypothesis Ho-13 is rejected.

5.4 Constraints and suggestions reported by sesame growers in adoption of improved sesame production technology:

1) Constraints reported by sesame growers in adoption of improved sesame production technology:

5.4.1 Situational constraints

Majority of the growers reported shortage of labour (68.00%) as the main problem. The finding is supported by Machhar *et al*. (2015) and Markana *et al*. (2015).

Another constraints were poor transport facilities for crop (65.00%) distal market from village (60.00%), the finding is in line with the study of Machhar *et al*. (2015) and Markana *et al*. (2015).

5.4.2 Technological constraints:

In technological constraints, the majority of sesame growers reported lack of knowledge about recommended doses of fertilizer (78.00%), lack of knowledge about calibration of chemical and their recommended doses (72.00%), lack of knowledge about improved varieties (69.00%), lack of knowledge about seed treatment (60.00%) and lack of knowledge about insects, pests, diseases and weeds (56.00%) as the main technological constraints. The findings find support with the work of Bhople *et al*. (1991), Amarnath and Jeyalakshmi (1999), Vengatesan *et al*. (2004) and Rai *et al*. (2014).

5.4.3 Economic constraints :

Among the economic constraints, the majority of growers reported complex procedure of bank loan (74.00%), high cost of inputs like seed, fertilizer, biofertilizer (65.00%), higher labour charges (62.00%) and higher rate of interest on loan (57.00%) as the major economic constraints. The findings are supported by Kumar *et al*. (2012), Singh and Jat (2014) and Raghuwanshi (2014).

5.4.4 Marketing constraints:

In market constraints, higher percentage of growers reported lack of daily market facilities in their locality (93.3%), irregular supply of seeds, fertilizers and pesticides (91.6%), lack of knowledge about market value of product (82.5%) as the main marketing constraints. The findings are in line with the study of Grover and Singh (2007), Machhar *et al*. (2015) and Singh and Jat (2014).

5.4.5 Extension constraints:

In extension related constraints, the majority of growers reported irregular visits of RAEOs (92.00%), lack of demonstrations on improved sesame production technology (88.00%), lack of trainings on improved sesame production technology (79.00%) as the major extension constraints. The findings find support with the work of Perane and Harde (2014) and Venkattakumar and Padmaiah (2010).

5.4.6 Institutional constraints:

The majority of growers reported unavailability of information on improved technology through government agencies (90.00%), lack of co-operative societies (87.00) and unavailability of inputs at proper time through government agencies (58.00%) as the main institutional constraints. The

findings are in line with the study of Singh *et al*. (2006) and Venkattakumar and Padmaiah (2010).

2) Suggestions given by sesame growers for adoption of improved chickpea production technology:

The most important suggestions given by sesame growers for adoption of improved sesame production technology were that there should be regular visits of RAEOs, trainings should be conducted on technical sesame production, conduction of demonstrations on farmers' field, cost of inputs should be reduced, provision of technological knowledge by the RAEOs, there should be bi-monthly visits of ADOs, co-operative societies should be set up in every village and crop loan and subsidies should be available timely. The finding finds support from the work of Kumar et al (2012), Singh and Jat (2014), Ambulakar and Dixit (2014),Hadiya *et al*. (2014) and Maraddi *et al*. (2014).

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SUMMARY, CONCLUSION AND SUGGESTIONS FOR FURTHER WORK

6.1 Summary:

Sesame is one of the important edible oilseeds grown in India and it is cultivated over an area of 16.73 lakh hectares with a production of 6.85 lakh tonnes and average yield of 409 kg/ha.

Jabalpur district is also one of the important oilseed growing districts. The district shared 1000 ha. area with the production of 4625 quintals and productivity of 462.50 kg/ha. The yield per hectare of the crop is low as compared to other districts of M.P. It is also clearly observed from the available secondary data from Agricultural Statistics that the productivity of sesame in Sihora block is low as compared to other blocks of the district.

Therefore, it is essential to know the technological status of sesame growers for developing technological strategy for higher production per unit area. It is noticed by reviewing the research reports and findings of research journals that the package of practices as adopted by the farmers are some what different from what is recommended by the scientists for optimum production.

So keeping this view in mind, the present investigation has been planned to know the existing gap in different technology. For this, “A study on Technological Gap in recommended sesame production technology among farmers of Sihora block of district Jabalpur (M.P.)” has been undertaken with the following specific objectives :-

Objectives of the study:

1. To know the socio-economic, psychological and communicational attributes of sesame farmers.
2. To determine the technological gap in different practices of sesame cultivation.
3. To find out the association between socio-economic, psychological and communicational attributers of sesame farmers with technological gap.
4. To know the constraints responsible for existing technological gap and suggest the strategy for enhancing sesame production technology.

The investigation was conducted in Sihora block of Jabalpur district which was selected purposively on account of low productivity (375 kg/ha.) of sesame as compared to other blocks. Ten villages were taken on random basis after preparation of list of sesame growing villages and ten farmers from each village were selected on random basis. Thus, a total of 100 respondents were considered for the study. The data were obtained through pre-tested structured schedule with the help of interview. Both qualitative and quantitative types of data were collected. The qualitative data were converted into quantitative form by giving suitable scores. The collected data were quantified, classified, tabulated and presented on the basis of frequencies and percentages. In order to ascertain association between independent and dependent variables, the chi-square test was worked out.

6.2.1 Conclusions:

The conclusions of the present study are presented here on the basis of objectives.

1. Socio-economic, psychological and communicational attributes of farmers :

The finding regarding socio-economic and communication attributes of sesame growers are as follows:-

The personal-socio-economic attributes of sesame growers were selected in the study and after reviewing the results on the basis of information gained, it can be summarized that the higher percentage of sesame growers (60.00%) were middle aged (36 to 55), higher percentage of them (25.00%) were educated up to middle level, a higher percentage (41.00%) had small size (1.1 to 2 ha.) of land holding and a huge majority of them (88.00%) had marginal land area (up to 1 ha) under sesame crop.

The higher percentage of sesame growers (67.00%) had low material possession, had no social participation (88.00%), while 68.00 per cent of growers belonged to medium to low (24001 to 100000/-) annual income group, low socio-economic status (61.00%) and low mass media exposure (77.00%). The majority of growers had low extension participation (69.00%), had high scientific orientation (66.00%), had medium knowledge level (53.00%), and had medium adoption of package of practices (46.00%).

6.2.2 Technological gap:

The majority of growers (72.00%) had medium to high technological gap in sesame cultivation practices. This may be due to non-availability of technical information during the field visits of grass root level workers in the villages and various constraints in adoption of the practices.

The important package of practices on which they were having high technological gap were fertilizer management (85.66%), followed by weed management (65.00%), plant

protection management (51.50%), field preparation (47.99%), seed and sowing management (43.66%) and harvesting (08.75%).

6.2.3 Association between independent variables with dependent variable:

Education, land holding, area under sesame, socio-economic status, exposure to mass media, social participation, extension participation, scientific orientation, knowledge level of practices and adoption of tribal growers had significant association with technological gap, while age, annual income, material possession were found to be non-significant association with technological gap.

6.2.4 Constraints reported by sesame growers:

As situational constraints are concerned, majority of the growers reported shortage of labour (68.00%) as the main problem. Another constraints were poor transport facilities for carrying produce to the market (65.00%) and market is far away from village (60.00%).

In case of technological constraints, the large majority of sesame growers reported lack of knowledge about recommended doses of fertilizer (78.00%), lack of knowledge about calibration of chemical and their recommended doses (72.00%), lack of knowledge about improved varieties (69.00%), lack of knowledge about seed treatment (60.00%) and lack of knowledge about insects, pests, diseases and weeds (56.00%) as the main constraints.

Regarding economical constraints, the huge majority of growers reported complex procedure of bank loan (74.00%), high cost of inputs like seed, fertilizer, biofertilizer (65.00%), higher labour charges (62.00%) and higher rate of interest on loan (57.00%) as the major constraints.

In case of market related constraints, a large majority of growers reported lack of daily market facilities in their locality (93.3%), irregular supply of seed, fertilizer and pesticides (91.6%) and lack of knowledge about market value of product (82.5%) as the main constraints.

Regarding extension related constraints, the large majority of growers reported irregular visits of RAEOs (92.00%), lack of demonstrations on improved sesame production technology (88.00%) and lack of trainings on improved sesame production technology (79.00%) as the major constraints.

In case of institutional constraints, a huge majority of growers reported unavailability of information on improved technology through government agencies (90.00%), lack of co-operative societies (87.00) and unavailability of inputs at proper time through government agencies (58.00%) as constraints.

The most important suggestions given by the growers for adoption of improved sesame production technology were the regular visits of RAEOs, conduction of trainings on technical sesame production, conduction of demonstrations on farmers' field, reduction in cost of inputs, provision of technological know how by the RAEOs, bi-monthly visits of ADOs, establishment of co-operative societies in every village and timely availability of crop loan and subsidies.

6.3 Suggestions for further work:

1. The present study was confined to ten villages only. Hence, the result may not be applicable to a large area. For appropriate generalization, similar work should be undertaken on a large scale.
2. A separate study may be conducted on assessment to know the adoption of components of sesame production practices and assessment of technological gap of sesame growers with

assessment of constraints in adoption of recommended components of production practices.

3. Replication of research may be planned for studying in various agro-climatic zones of the state.
4. In this study, the dependent and independent variables were limited and therefore, further studies may be taken up based on situational and infrastructural variables.

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firk dk uke %&----------

xzke iapk;r dk uke %&----------

fodkl[k.M dk uke %&----------

ftyk dk uke %&----------

lkekftd ,oa vkfFkZd Lrj ¼Socio-Economic Status½ %&

1- **vk;q ¼Age½** %& vkidh vk;q D;k gS \ ----------

2- **tkfr ¼Category½**%& vkidh tkfr D;k gS \ ----------

3- **f'k{kk ¼Education½** %& vkius dgka rd f"k{kk xzg.k dh gS A

1½ vf"kf{kr □ 2½ izkbejh f"k{kk ¼1] 2] 3] 4] 5½ □ 3½fefMy f"k{kk ¼6] 7] 8½ □ 4½ gkbZ Ldwy f"k{kk ¼9] 10½ □ 5½ gk;j f"k{kk ¼12½ □ 6½ dkyst f"k{kk ¼izFke o'kZ]f}rh; o'kZ]vafre o'kZ½ □

7½ LukrdksRrj □ ¼izFkr o'kZ]] f}rh; o'kZ] vafre o'kZ ½

4- **vkidk O;olk; D;k gS**

eq[; ---------- vU; ----------

vfrfjDr ---------- ¼ Jfed] tkfrxr /ka/kk] nqdku] Ms;jh] Lora= O;olk;] ukSdjh ½

5- **edku %&**

v- vkidk edku ¼?kj½ fdl izdkj dk gSA

1- dPpk %& ----------

2- fefJr¼dPpk] iDdk½ %& ----------

3- iDdk %& ----------

c- vkids ikl Lo;a ds fdrus edku gSaA

1- ,d %&----------

2- nks %& ----------

3- nks ls vf/kd %& ----------

6- **ifjokj %&**

v- vkidk ifjokj fdl rjg dk gSA

1- ,dy %& ----------

2- la;qDr %& ----------

c- vkids ifjokj dk vkdkj @;k ifjokj esa lnL;ksa dh la[;kA

1- efgyk %& ----------

2- iq:'k %& ----------

3- cPps %& ----------

4- dqy %& ----------

7- Hkwfe dk jdok¼Size of land holding½ %& vkids ikl Lo;a dh fdruh Hkwfe gSA ----------gsDVs;j

1- dqy jdok %&----------

2- [ksrh ;ksX; jdok %&----------

3- flafpr jdok %&----------

4- vflafpr jdok %&----------

5- v/kZflafpr jdok %&----------

8- fry dk dqy jdck ¼Area under sesame½ %&

1- flafpr jdok %&----------

2- vflafpr jdok %&----------

3- v/kZflafpr jdok %&----------

9- lkefxz;ksa dh miyC/krk ¼Material possession ½ %&

v- vkids ikl ?kjsyq lkexzh dkSu&dkSu lh gS\

1- dqlhZ □ 2- Vsfcy □ 3- ?kM+h □ 4- ia[kk □ 5- jlksbzZ xSl □ 6- vU; ----------

c- vkokxeu dk lk/ku %& vkids ikl vkokxeu ds lk/ku dkSu&dkSu ls gSa\

1- lk;dy □ 2- cSyxkM+h □ 3- eksVj lk;dy □ 4- vU; ----------

l- d`f'k ds lk/ku %& vkids ikl d`f'k mi;ksxh dkSu&dkSu ls lk/ku gSa\

1- ns"kh gy □ 2- feV~Vh iyVus okyk gy □ 3- ikVk □ 4- dfYVosVj □ 5- Lizs;j@MLVj □ 6- lhMfMªy □ 7- Fkzslj □ 8- VqQu □ 9- iEe¼Mhty@fo|qr½ □ 10- vU; ----------

n- lapkj ds lk/ku %& vkids ikl lapkj ds dkSu&dkSu ls lk/ku gSaa\

1- jsfM;ks □ 2- VsyhQksu □ 3- VsyhQksu@eksckby □ 4- lekpkj i= □ 5- d`f'k if=dk,a □ 6- vU; ----------

10- lkekftd Hkkxhnkjh ¼Social participation ½%& D;k vki fdlh xzkeh.k laLFkk ;k laxBu ds lnL; ;k

inkf/kdkjh gS ;k ugha \ ;fn gka rks fdu&fdu laLFkkvksa esa gSa] rFkk vkidh Hkkxhnkjh dSlh gS \

Ø0	laLFkk dk uke	lnL; in	cSBdksa esa Hkkxhnkjh			
			vR;kf/kd	ges'kk	dHkh&dHkh	dHkh&ugha
1-	xzke iapk;r					
2-	lgdkfjrk laLFkk					
3-	xzke fodkl lfefr					
4-	lkaLd`frd					

	laxBu					
5-	“kkyk fodkl lfefr					
6-	vU;					

11- iz{ks= 'kfDr %& vkids ikl iz{ks= “kfDr ds dkSu&dkSu ls lk/ku gSa crkb;s \

1- dqN ugha □ 2- ,d tksM+h cSy □ 3- nks tksM+h cSy@;k vf/kd □ 4- V^{a}sDVj □ 5- vU; ----------

12- okf"kZd vk; ¼Annual income ½%& fofHkUu L=ksrksa ls vkidh okf’kZd vk; fdruh gS\

Ø0	L=ksr	vk; :i;s esa
1-	etnwjh	
2-	tkfrxr /ka/kk	
3-	Lora= O;olk;	
4-	nqdku	
5-	ukSdjh	
6-	[ksrh	
7-	vU;	
8-	dqy	

13-o`gr ek/;eksa dk mi;ksx ¼Mass media exposure½%& vki fry dh [ksrh ls lacaf/kr tkudkjh fdu&fdu ek/;eksa ls rFkk fdrus gn rd ysrs gSa] crkb;s \

Ø0	ek/;e	mi;ksx dh nj			
		vR;kf/kd	ges'kk	dHkh&dHkh	dHkh&ugha
1-	jsfM;ks				
2-	VsyhQksu				
3-	lekpkj i=				
4-	d`f’k if=dk				
5-	izn'kZu				
6-	isz{k.k Hkze.k				
7-	cSBd				
8-	izn'kZuh				
9-	fdlku esyk				
10-	vU;				

14-foLrkj laLFkk ls laidZ ¼Contact with extension personnel ½ %&

Ø0	laLFkk	vR;kf/kd	ges'kk	dHkh&dHkh	dHkh&ugha
1-	m|kfudh foHkkx				
2-	d`f’k foHkkx				
3-	cht forj.k dsUnz				
4-	[kkn forj.k dsUnz				
5-	cht fuxe				
6-	fdlku dky lsaVj				
7-	lgdkjh lfefr				
8-	d`f’k foKku dsUnz				
9-	dhV uk”kd MhylZ				

10-	vU;				

15-foLrkj xfrfof/k;ksa esa Hkkxhnkjh ¼Extension participation ½ %& d`i;k fuEu dFkuksa dk tokc nsA

Ø0	dFku	nks ckj ls T;knk ¼3½	nks ckj ¼2½	,d ckj ¼1½	dHkh&ugha ¼0½
1-	xzke lsod }kjk vki ds [ksr esa izn"kZu Mkys x;s gSa\				
2-	xzke lsod }kjk vk;ksftr cSBd esa vius fdruh ckj fgLlk fy;k gSa\				
3-	xzke lsod ds lkFk vkius fdruh ckj laidZ fd;k gS\				
4-	fdlh ds [ksr esa vk;ksftr Hkze.k esa vkius fdruh ckj Hkkxhnkjh dh gS\				
5-	vkius fdruh ckj iM+kslh ds ;gka Mkys x;s izn"kZu dks ns[kk gS\				
6-	fdlku esyk esa vkidh fdruh Hkkxhnkjh gS\ v½ d`f'k egkfo|ky; esa c½ d`f'k foKku dsanz esa l½ d`f'k vuqla/kku dsanz esa n½ tuin Lrj esa				
7-	vkius fdruh ckj d`f'k izn"kZuh ns[kh gS\ v½ d`f'k egkfo|ky; esa c½ d`f'k foKku dsanz esa l½ d`f'k vuqla/kku dsanz esa n½ tuin Lrj esa				
8-	vkius fdruh ckj d`f'k lkfgR; i<+k gSA				

16-oSKkfud fnXn'kZu ¼Scientific orientation½%& uhps fy[ks dFkuksa ls vki fdl gn rd lger@vlger gS] crkb;s\

Ø0	dFku	n`<+rkiw.kZ lger	lger	vfuf'pr	vlger	n`<+rkiw.kZ vlger
1-	iqjkuh fof/k;ksa dh vis{kk ubZ fof/k;ksa ls vPNs] ifj.kke izkIr gksrs gSaA					
2-	fdlku ds ikl vf/kd vuqHko gksus ij gh mls ubZ d`f'k fof/k;ksa dk mi;ksx djuk pkfg;sA					
3-	;fn ubZ fof/k;ka lh[kus esa le; yxrk gS] rks Hkh mls mlds fy, iz;kl djuk pkfg;sA					
4-	,d vPNk fdlku ubZ fof/k;kas dk iz;ksx d`f'k esa djrk gSA					
5-	fdlku ds thou Lrj esa lq/kkj ds fy;s ijaijkxr [ksrh dh fof/k;kas esa					

	ifjorZu djuk vko";d gSA					
6-	ftu fof/k;ksa ls fdlkuksa ds iwoZt [ksrh djrs Fks] og vkt dh vis{kk vPNh FkhA					

16-fry mRiknu dk cktkj fnXn'kZu ¼Market orientation ½%& uhps fy[ks okD;kssa ls vkids ;gka D;k&D;k gS] o D;k ugha gS \ d`i;k crkbZ;sA

Ø0	dFku	gka	ugha
1-	D;k cktkj esa [kkn] cht] nok;sa le; ij feyrs gS\		
2-	D;k vkidks fry cspus ds fy, ikl esa cktkj gS\		
3-	D;k vki Hkkoksa dks /;ku esa j[kdj Qly dk mRiknu djrs gSa\		
4-	D;k vki mRiknu dks Js.kh ;qDr cukdj cktkj esa ys tkrs gSa\		
5-	D;k vkids ikl oSKkfud Hk.Mkj.k lqfo/k miyC/k gS\		
6-	D;k vkids ikl Qly mRiknu dks cktkj ys tkus gsrq leqfpr ifjokgu O;oLFkk gS\		
7-	D;k vkidks fry ds lgh ewY;ksa dh tkudkjh jgrh gS\		
8-	D;k cktkj esa mRiknu dh ukirksy Bhd ls gksrh gS\		
9-	D;k cktkj esa Qly mRiknu Hkqxrku lgh le; ij feyrk gS\		
10-	D;k cktkj dk ewY; de feyrk gS\		

[k.M & c

fry dh mUur d`f"k fØ;kvksa ds KkuLrj ,oa vaxhdj.k Lrj dk v/;;uA

1. Field prepration and Management½

KkuLrj **vaxhdj.k Lrj**

I) D;k vki tkurs gS fd fry dh [ksrh ds esa fry dh [ksrh fdl izdkj dh Hkwfe fy, loksZRre Hkwfe dkSu lh gSA djrs gSA

Ø0		ugha	vkaf'kd	iw.kZ
1-	cyqbZ nkseV			
2-	efV;kj Hkwfe			
3-	e/;e Hkwfe			
4-	nkseV Hkwfe			
5-	dkyh Hkwfe			

Ø0		ugha	vkaf'kd	iw.kZ
1-				
2-				
3-				
4-				
5-				

II) Hkwfe dh tqrkbZ fdruh ckj djuh pkfg;sA vki fdruh ckj tqrkbZ djrs gSaA

Ø0		ugha	vkaf'kd	iw.kZ
1-	,d ckj			
2-	nks ckj			
3-	rhu ckj			
4-	vf/kd ckj			

Ø0		ugha	vkaf'kd	iw.kZ
1-				
2-				
3-				
4-				

III) D;k vkidks ekywe gS fd xkscj dh [kkn@ esa xkscj dh dEiksLV dc vkSj fdruh ek=k esa nsuh pkfg,A vki dc vkSj fdruh ek=k [kkn nsrs gSaA

Ø0		ugha	vkaf'kd	iw.kZ

Ø0		ugha	vkaf'kd	iw.kZ

1-	10&20 Vu@ gsDVs;j vk[kjh tqrkÃ ls igys				1-					
2-	izFke tqrkbZ ds iwoZ 20&25 Vu@gsDVs;j				2-					
3-	nwljh tqrkbZ ds le; 20&30 Vu@gsDVs;j				3-					

2. Seed and sowing Management

I) vkidks dkSu&dkSu lh mUur'khy tkfr;ksa mUur'khy tkfr;ksa dks Ds ckjs esa ekywe gSA

vki dkSu&dkSu lh yxkrs gSaA

Ø0	fdLe	ugha	vkaf'kd	iw.kZ	Ø0	fdLe	ugha	vkaf'kd	iw.kZ
1-	ts-Vh-7 ¼dapu½				1-				
2-	,u &32				2-				
3-	Vh-ds-th- 21				3-				
4-	Vh-ds-th 22				4-				
5-	Vh-ds-th 55				5-				
6-	VkÃi&93				6-				
7-	t-Vh-,l- 8				7-				
8-	ih-ds-Mh-,l 99 ¼oSadV½				8-				
9-	Vh-ds-th-306				9-				
10-	Vh-ds-th 308				10-				

II) D;k vkidks ekywe gS] fd fdruk cht izfr cksrs gSA

vki fdruk cht izfr gsDVs;j gsDVs;j cksuk pkfg,A ¼cht nj½

Ø0	cht nj@ha.	ugha	vkaf'kd	iw.kZ	Ø0	cht nj@ha.	ugha	vkaf'kd	iw.kZ
1-	2&2-5 fd-xzk-¼efJr½				1-				
2-	2-5&3 fd-xzk-¼lhM fM$y½				2-				
3-	4&7 fd-xzk-¼fNVdkao½				3-				

III) vkidks dkSu&dkSu lh chtksipkj dh nokvksa nokvksa dk ds ckjs esa ekywe gSA

vki dkSu lh chtksipkj dh mi;ksx djrs gSA

Ø0	nok	ugha	vkaf'kd	iw.kZ	Ø0	nok	ugha	vkaf'kd	iw.kZ
1-	Fkk;je				1-				
2-	Fkhje $ cSoLVhu				2-				
3-	,xzksekblhu 100								

3- Fertilizer Management :-

1) D;k vkidks ekywe gS] fd izfr gsDV;j moZjd nsrs fdruh ek=k esa moZjd nsuk pkfg,A

vki izfr gsDVs;j fdruk gSA

Ø0	moZjd	ugha	vkaf'kd	iw.kZ
1-	ukbV^{a}kstu			
2-	QkLQksjl			
3-	iksVk'k			
4-	xa/kd			

Ø0	moZjd	ugha	vkaf'kd	iw.kZ
1-				
2-				
3-				
4				

2) D;k vkidks xa/kd nsus dh lgh fof/k ekywe gS

vki dc nsrs gSA

Ø0		ugha	vkaf'kd	iw.kZ
1-	cqokbZ ls igys			
2-	cqokbZ ds ckn			

Ø0	moZjd	ugha	vkaf'kd	iw.kZ
1-				
2-				

3) D;k vkidks ekywe gS fd dkSu lk tSo moZjd nsuk pkfg,A

vki dkSu lk tSo moZjd nsrs gSA

Ø0	tSo moZjd	ugha	vkaf'kd	iw.kZ
1-	gjh [kkn			
2-	oehZdEiksLV			

Ø0	tSo moZjd	ugha	vkaf'kd	iw.kZ
1-				
2-				

4- Weed Management:-

i) D;k vki dks ekywe gSa] fd [kjirokj dh fuankbZ&xqM+kbZ djrs gSA

vki fdruh ckj fuankbZ&xqM+kbZ djuk pkfg,A

Ø0		ugha	vkaf'kd	iw.kZ
1-	isaMhfeFkyhu ¼1-5 fd-xzk lfØ; inkFkZ@ gsDVs;j½			
2-	,ykDyksj ¼1-5 fd-xzk-@ gsDVs;j cksuh ds ckn ij vadqj.k ls iwoZ ½			

Ø0		ugha	vkaf'kd	iw.kZ
1-				
2-				

ii) D;k vki dks ekywe gSa] fd fry esa fdruh djrs gSA

vki fdruh ckj [kqnkbZ ckj [kqnkbZ djuk pkfg,A

Ø0		ugha	vkaf'kd	iw.kZ
1-	,d ckj ¼15 fnu ckn½			
2-	nks ckj			

Ø0		ugha	vkaf'kd	iw.kZ
1-				
2-				

5. Plant Protection Management :-

1½ D;k vkidks fry esa yxus okys dhV ls dhV ds ckjs esa tkudkjh gSA

vkids ;gka dkSu dkSu yxrs gSA

Ø0	dhV	ugha	vkaf'kd	iw.kZ
1-	xky ¶ykÃ			
2-	iRrh eksM+d ,oa Qyh Nsnd			
3-	fry gkWd eWkFk			

Ø0	dhV	ugha	vkaf'kd	iw.kZ
1-				
2-				

2½ vki dkSu&dkSu lh dhVuk'kd nokvksa ds ckjs esa tkurs gSA

vki fdu&fdu nokvksa dk mi;ksx djrs gSA

Ø0		ugha	vkaf'kd	iw.kZ
1-	DoksukyQkl 25 bZ-lh- ¼ 0-05 750yh- ikuh esas@ gsDVs;j½			
2-	dkcksZfjy ¼20 fd-xzk-½ @ gsDVs;j			

Ø0		ugha	vkaf'kd	iw.kZ
1-				
2-				

3½ D;k vkidks fry esa yxus okyh chekfj;ksa ds dkSu&dkSu gSA

vkidh Qlyksa esa lh chekfj;ka yxrh gSA

ckjs esa tkudkjh

Ø0	chekjh	ugha	vkaf'kd	iw.kZ
1-	vkYVjusfj;k i.kZnkx			
2-	QkbVksQFkk sjk			
3-	i.kZrkHk ¼QkbyksMh ½			

Ø0		ugha	vkaf'kd	iw.kZ
1-				
2-				
3-				

4½ vki chekjh fu;a=.k dh dkSu&dkSu lh jksdFkke ds fy;s nokvksa ds ckjss esa tkurs gSA

vki chekjh dh dkSu&dkSu lh nokvksa dk mi;ksx djrs gSA

Ø0		ugha	vkaf'kd	iw.kZ
1-	fjMksfey ,e- tsM- ¼0-25 %@gsDVs;j ½			
2-	MkbesFkks,V ¼0-03 %@gsDVs;j ½			
3-	osoLVhu ¼0-05 %@gsDVs;j ½			

Ø0		ugha	vkaf'kd	iw.kZ
1-				
2-				
3-				

6. Harvesting:-

1½ D;k vkidks ekywe gS] fd fry dh

vki fry dh dVkbZ dc djrs gSA

dVkbZ dc djuh pkfg;sA

Ø0		ugha	vkaf'kd	iw.kZ
1-	70& 90fnu ckn			
2-	90&100 fnu ckn			
3-	100& 150 fnu ckn			

Ø0		ugha	vkaf'kd	iw.kZ
1-				
2-				
3-				

2½ D;k vkidks ekywe gS] fd fry dh vki fdl ;a= ls dVkbZ djrs gSA

dVkbZ fdu ;a=ksa ls dh tkrkh gSA

Ø0	;a=	ugha	vkaf'kd	iw.kZ
1-	gafl;k			
2-				

Ø0		ugha	vkaf'kd	iw.kZ
1-				
2-				

]3½ D;k vkidks ekywe gS] fd fry dh vki fdl ;a= ls xbkbZ djrs gSA

eM+kbZ fdu ;a=ksa ls dh tkrkh gSA

Ø0	;a=	ugha	vkaf'kd	iw.kZ
1-	cSykas }kjk			
2-	Vs^{a}DVj }kjk			
3-	NM+ }kjk			

Ø0		ugha	vkaf'kd	iw.kZ
1-				
2-				

[k.M & I

1- **fry dh mUur rduhd dks viukus esa vkus okyh leL;k;saA**

ifjfLFkrh;	gk¡	ugha
ifjfLFkrh; ck/kk;sa 1- D;k xkao ls cktkj nwj gSA 2- D;k Jfedksa dh deh jgrh gSA 3- D;k vkokxeu ds lk/kuksa dh deh gSA **rduhdh ck/kk;sa** 1- D;k vkidks fry dh mUur fdLeksa dh tkudkjh gS 2- D;k vkidks fry esa chtksipkj dh nok rFkk ek+=k dk Kku gS 3- D;k vkidks fry dh dhV ,oa jksxksa dk Kku gS 4- D;k vkidks fry dh Qly esa mi;ksx gksus okys jlk;uksa dh lgh ek=k dk Kku gS **vkfFkZd ck/kk;sa** 1- D;k +_.k izkIr djus dh izfdz;k tfVy gS 2- D;k +_.k ij O;kt nj vf/kd gS 3- D;k Jfedks dh etnwjh vf/kd gS 4- D;k [kkn] cht] nok;s];= Mhty eagxs gS **cktkj laca/kh ck/kk;**sa 1- D;k vkidks lgh ewY;ksa dh tkudkjh feyrh gS		

2- D;k fu;fer cktkj lqfo/kk gS 3- D;k cktkj esa [kkn]cht] nok;s le; ij feyrs gS **foLrkj lac/kh ck/kk;sa** 1- D;k xzkelsod xkao esa yxkrkj vkrk gSA 2- D;k xzke lsod }kjk vkids ;gk Qly izn'kZu Mkys x;s gSA 3- D;k vkidks mUur rduhdh laca/kh izf'k{k.k feyrk gSA **laLFkkxr leL;k;sa** 1- D;k xkao esa lgdkjh lfefr;k¡ gSA 2- D;k lgdkjh laLFkkvksa }kjk le; ij [kkn] cht] d`f"k ;a= miyC/k djk;s tkrs gSA 3- D;k vkidks xzke iapk;r }kjk mUur rduhdh tkudkjh feyrh gSA		

^^ [k.M &n^^

fry dh mUur rduhd ds fy;s lq>ko

	gk¡	**ugha**
1- cht mojZd vkSj dhVuk"kd dh mfpr ek=k gksuk pkfg;sA 3- d`f"k foHkkx }kjk fdlkuksa ds [ksr esa izn'kZu Mkyuk pkfg;sA 4- rduhdh fry mRiknu ds fy;s izf"k{k.k fn;k tkuk pkfg;sA 5- xzke lsod dk fu;fer Hkze.k gksuk pkfg,A 6- xzke lsod ds }kjk rduhdh Kku fn;k tkuk pkfg,A 7- Qly _`.k le; ij fn;k tkuk pkfg,A 8- d`f"k fodkl vf/kdkjh dk ekg esa nks ckj iz{ks= Hkze.k gksuk pkfg;sA 9- izR;sd xkao esa lgdkjh lfefr gksuk pkfg,A		

CURRICULAM VITAE

Name of the author- Ku. Chandrika Sharma

Place- Sehore (M.P.)

Date of Birth- 25 Jan, 1992

The author of this thesis Ku. Chandrika Sharma, D/o Shri Ashok Kumar Sharma and Smt. Sunita Sharma was born on 25 Jan, 1992 at Sehore (M.P.). She has joined the following institutions and successfully completed the degree of M.Sc. (Ag.) during the year 2015 -16 with 8.6 OGPA with 10 point scale.

She has got the following degrees,

S.No.	Degrees granted	Institution	University / Board	Percentage	Year
1	M.Sc.(Ag.)	College of Agriculture, Jabalpur	JNKVV, Jabalpur	86.00	2016
2	B.Sc.(Ag.)	RAK College of Agriculture, Sehore	RVSKVV, Gwalior	85.00	2014
3	12^{th}	St. Anne's Sr. Sec. School Sehore	CBSE, Delhi	81.60	2010
4	10^{th}	St. Anne's Sr. Sec. School Sehore	CBSE, Delhi	85.00	2008

She has following scientific interests-

Scientific interests

- Research methadology
- Research Works on "Hi-tech agriculture"

PROFESSIONAL EXPERIENCE

S.No.	Professional experience	University/ Board	Date
1.	DCA	AISECT University, M.P.	2012-13
2.	NCC(B and C) Certificate	BU, Bhopal M.P.	2013-14

For the partial fulfilment of the master's degree programme she was allotted a research problem "A study on Technological Gap in recommended sesame production technology among the farmers of Sihora block of district Jabalpur (M.P.)" which was successfully conducted by her and being submitted in the form of the thesis.