

**ADOPTION GAP IN VEGETABLE PRODUCTION
PRACTICES**

THESIS

Submitted to
Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola
in partial fulfilment of the requirements
for the Degree of

**MASTER OF SCIENCE
IN
AGRICULTURE
(EXTENSION EDUCATION)**

By
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DECLARATION OF STUDENT

I hereby declare that, the experimental work and its interpretation of the thesis entitled, "**ADOPTION GAP IN VEGETABLE PRODUCTION PRACTICES**" or part thereof has neither been submitted for any other degree or diploma of any University, nor the data have been derived from any thesis publication of any University or scientific organization. The sources of material used and all assistance received during the course of investigation have been duly acknowledged.

Place: Nagpur

Date: 15/06/2015



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Enrolment No. HH-332

CERTIFICATE

This is to certify that, the thesis entitled "ADOPTION GAP IN VEGETABLE PRODUCTION PRACTICES" submitted in partial fulfillment of the requirement for the degree of "Master of Science in Agriculture (Extension Education)" of the Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola is a record of bonafide research work carried out by **BHAGAT MITHUN CHUNNILAL** under my guidance and supervision.

The subject of the thesis has been approved by the student's advisory committee.






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(Bhagat Mithun Chunnilal)

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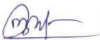
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(D)**Abbreviations**

%	:	Per cent
@	:	At the rate
Agri.	:	Agriculture
Agric. Sci.	:	Agricultural Sciences
Agril.	:	Agricultural
AGI	:	Adoption gap Index
BSKKV	:	Balasaheb Sawant Konkan Krishi Vidyapeeth
C ⁰	:	Celcius
cm	:	centimeter
DSAO	:	District Superintendent Agriculture Office
<i>et al.</i>	:	et alia (and associates)
Extn. Educ.	:	Extension Education
Freq	:	Frequency
gm	:	gram
govt.	:	Government
ha.	:	Hectares
ICAR	:	Indian Council of Agricultural Research
i.e	:	That is
Ind.	:	Indian
J.	:	Journal
Kg	:	Kilogram
KVK	:	Krishi Vigyan Kendra
lit.	:	litre

mm	:	Milimeter
MPKV	:	Mahatma Phule Krishi Vidyapeeth
NCEUS	:	Nation Sample Survey Land Holdings
NPK	:	Nitrogen, Phosphorus and Potasium
PDKV	:	Dr. Panjabrao Deshmukh Krishi Vidyapeeth
PS	:	Panchayat Samiti
Ph.D	:	Doctor in Philosophy
q.	:	quintal
Res.	:	Research
Rs.	:	Rupees
SD	:	Standard Deviation
Std.	:	Standard
Soc. Sci.	:	Social Sciences
unpub.	:	Unpublish
VDO	:	Village development officer
Vit.	:	Vitamine
Viz	:	Namely
VNMKV	:	Vasantrao Naik Marathwada Krishi Vidyapeeth
ZP	:	Zilla Parishad

(E) **THESIS ABSTRACT**

- a) Title of the Thesis : **ADOPTION GAP IN VEGETABLE PRODUCTION PRACTICES**
- b) Full Name of Student : **Bhagat Mithun Chunnilal**
- c) Name and Address of Major Advisor : **Dr. V.S. Tekale**
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- f) Major subject : **Extension Education**
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- i) Signature of the student : 
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ABSTRACT

Majority of population in India is vegetarian so increasing vegetable production is very important for all vegetarian and non-vegetarians. The present study on "Adoption gap in vegetable production practices" was conducted in Nagpur district of Maharashtra state. The exploratory design of social research was used. In all, 120 respondents were selected by simple random sampling method. The data were collected by personal method with the help of structured interview method. The data collected were carefully examined, classified, quantified and tabulated. Frequencies, mean, standard deviation and correlation were employed for interpreting the results.

The findings of the present study revealed that high proportion of brinjal growers (43.37%) were educated up to high school level, majority of tomato growers (61.66%) were educated up to high school level and also in overall vegetable growers majority of them (52.51%) were educated up to high school level (8th to 10th std), majority of brinjal (76.67%), tomato (70.00%) and overall vegetable growers (73.34%) had medium level of farming experience, higher proportion of respondents (36.67%) brinjal growers were belonged semi-medium land holding, higher proportion of tomato growers (33.33%) were belonged to semi-medium land holding and higher proportion of respondent vegetable growers (35.00%) belonged to semi-medium land holding (2.01 to 4.00 ha), nearly one third per cent of brinjal vegetable growers (33.24%) had high annual income, tomato growers (45.00%) had low medium annual income and in case of overall vegetable growers higher per cent of vegetable growers (36.67%) had low medium (Rs. 50,000/- to 1,00,000/-) annual income, majority of brinjal (65.00%), tomato (50.00%) and overall vegetable growers (57.50%) had medium level of social participation, majority of brinjal (63.33%), tomato (58.33%) and overall vegetable growers (60.84%) had medium extension contact, in case of regular use of information sources by vegetable growers were progressive farmers / relatives

(35.00%), followed by private agricultural company representative (25.00%), newspapers (Agro one, etc) (23.33%), in case of occasionally used sources of information by respondent vegetable growers namely, Agriculture Assistant / Agriculture Supervisor (83.00%), followed progressive farmers / relatives (40.00%), private Agricultural company representative (38.33%), mobile phones (33.34%), respectively. The great majority of respondents were not use the sources of information namely, Sub divisional Agriculture Officer / DSAO (96.67%), Extension Officers (PS / ZP) (95.00%), farm magazines (95.00%), radio (94.17%), internet (93.33%), Taluka Agriculture Officer (85.00%) and KVK Scientist (University / NGO's) (83.33%), respectively. Majority of brinjal (66.67%), tomato (58.33%) and overall vegetable growers (62.50%) had medium sources of information, majority of brinjal (75.00%), tomato (76.67%) and overall vegetable growers (75.83%) had medium risk orientation, majority of brinjal (66.67%), tomato (63.34%) and overall vegetable growers (65.00%) had medium market orientation, majority of brinjal (66.67%), tomato (60.00%) and overall vegetable growers (63.33%) had medium innovativeness.

In case of knowledge and adoption gap, majority of brinjal (65.00%), tomato (63.33%) and overall vegetable growers (64.16%) had medium level of knowledge about vegetable production practices, nearly half of the brinjal (48.34%), tomato (50.00%) and overall vegetable growers (49.16%) had medium level of adoption gap in vegetable production practices.

The result of correlation analysis revealed that the characteristics of respondents namely, education, land holding, annual income, social participation, extension contact, sources of information, market orientation, innovativeness and knowledge were negatively and significantly correlated at 0.01 per cent level of probability with adoption gap in vegetable production practices, farming experience was negatively and significantly correlated at 0.05 per cent level of probability with adoption gap in vegetable production practices. The

variable risk orientation had non significant relationship with adoption gap in vegetable production practices.

The important constraints faced by the great majority of the vegetable growers were fluctuation in market rates (97.50), followed by high labour wages (89.16%), low rates of vegetables (80.83%) and non availability of labours at the time of vegetable cultivation practices (72.50%) and these were ranked as Ist, IInd, IIIrd and IVth respectively.

Chapter I

INTRODUCTION

India is an agricultural country the production per unit area of various crops grown in India is very less as compared to developed countries. Due to low agricultural productivity it becomes very difficult to feed this tremendously increasing population. Now India has become self sufficient in food grains production. But our standard dietary requirements are still not fulfilled.

We eat food for sustenance of our body. The food we eat contains nourishing substances called nutrients. There are five major nutrients, namely carbohydrates, proteins, fats, minerals and vitamins. Vegetable are rich reservoir of these nutrients, particularly vitamins and minerals, which are most essential for maintaining good health. All vitamins are found in small or bulk quantities in common vegetable crops. Their use in daily diet demands a large production in country like India.

The basic challenge before India is to enhance the production of nutritious food in sustainable manner which, besides feeding the country's large population, can play a major role in meeting the shortage of food, particularly when many more mouths are required to feed from the limited land resources. Vegetables being short duration crops can give six to ten times more yield than any cereal crop in a year and thus, can provide better source of food to the rising population.

1.1 Background information

Majority of population in India is vegetarian so increasing vegetable production is very important for all vegetarians and non-vegetarians. Dietitians recommended inclusion of 285 gm of vegetables in our daily diet. It is recommended that 115 gm of these should be green leafy vegetables, 85 gm of fruit vegetable and

remaining 85 gm other vegetables. This means that we need to produce and consume more vegetables than we do at present.

The area under vegetable in India is 9.20 million ha and production is 162.18 million tones. In Maharashtra total area under vegetable is 4.74 lacks ha and production is 8.00 million tones. (Indian Horticulture, Database, 2013) and the area of vegetable crop in Nagpur district is 0.16 lacks ha and production is 0.34 million tons in the year 2012-13. (District Superintendent Agriculture Office, Nagpur Database, 2014).

As compared to any other country of the world Indian can claim to grow the largest no. of vegetable crops because of varied agricultural climatic conditions in India make it possible to grow more varieties of vegetables crops all the year round in one part of the country or another and as many as 61 annual and 4 perennial vegetable crops are commercially cultivated. Some of the important vegetable crops which were brinjal, tomato, okra, cucurbits, chillies, etc.

Brinjal (*Solanum melongena*) is a commercial vegetable crop belongs to the family of solanaceae. It is an annual crop. It is mainly used for culinary purpose. It is a good source of vit. A, C and B like thiamine and riboflavin and also small quantities of other ingredients like carbohydrates, protein, fibers, etc.

Brinjal has medicinal properties. Due to these properties, it has been recommended as an excellent remedy for those suffering from liver complaints. The green leaves of brinjal plant are the main source of the supply of antiscorbic vit-C. It is used in Aurveda as appetizer, aphrodisiac, cardi tonic and beneficial in illumination of kaph from body.

In India, brinjal occupies an area of 7.22 lacks ha with annual production of 13.44 million tons in Maharashtra. Brinjal occupies an area of 0.26 lacks ha with annual production 0.57 million tons (Indian

Horticulture Database, 2012-13.) and the area under brinjal crop in Nagpur district is 2041.20 ha and production is 1.29 lack tons in the year 2012-13. (District Superintendent Agriculture Office, Nagpur Database, 2014).

Tomato (*Lycopersicon esculentum Mill.*) is one of the most important members of solanceous vegetables. It was originated in Peruvian and Mexican regions. Tomato is one of the important "Protective food", both because of its special nutritive value and widespread cultivation. It is one of the world's largest vegetable crops after potato and sweet potato. However; it tops in the list of canned vegetables. Tomatoes are used for soups, salad, ketchup, puree, sauces and in many other ways. Tomato is popular vegetable fruit because it supplies vitamin 'C' and adds variety of colours and flavours to the foods. Green tomatoes are also used for pickles and preservatives.

Tomato is warm season crop. In Maharashtra, main season of cultivation of tomato is rabi, fruit set and lycopene development are the main constrains in summer cultivation, while fungal and viral disease particularly early blight and spotted wilt virus in kharif season. Beside these constrains considering longer and continuous demand it is grown throughout the year.

In India, Tomato occupies an area of 8.79 lacks ha. with annual production of 18.22 million tones. In Maharashtra tomato occupies an area of 0.5 lacks ha. with annual production 1.05 million tons (Indian Horticulture Database, 2012-13.) and the area under tomato crop in Nagpur district is 1635.70 ha and production is 0.81 lack tones during the year 2012-13. (District Superintendent Agriculture Office, Nagpur Database, 2014).

Average yield per hectare of vegetable crops is less in India. However, in the past successful attempts are made to increase yield by evolving high yielding varieties and hybrids. Moreover, various

production technologies have been developed to increase production of vegetables, which includes nutrient and water management, use of plant growth regulators, etc.

1.2 Need of study

It was found that researcher in social science have mainly gave attention towards the adoption of cultivation practices of different agronomical crops and in horticultural crops like pomology and floriculture. Scantly efforts through studies in the area of vegetables have been made. Also the studies in the field of adoption gap are very rare, on this background, the present study is proposed to undertake in the Nagpur district.

The systematic study in this direction would bring out the extent of adoption gap between recommended and actually adopted brinjal and tomato technology and also problems faced by the respondent brinjal and tomato growers in adoption of brinjal and tomato technology on their farm. The intension of the study is also to find out the communication gap if any among the brinjal and tomato growers regarding new technologies, practices recommended by Dr. Panjabrao Deshmukh Krishi Vidyapeeth Akola, which are useful to minimize the adoption gap.

1.3 Scope and importance of study

One of the reasons for low agriculture production in India as "Low working capacity" of the majority of the population. At present the diet of an average Indian is ill balanced. Thus, to improve our diet, we should necessarily increase the vegetable production.

At present, greater than 70 per cent of our populations engaged in agriculture over an area of 320 million acres. Out of this hardly about 1 to 2 per cent of the total cultivated area is under vegetable crops. These figures showed the necessity of the vegetable cultivation on larger area. On an average, the yield of vegetable crops is about 5 to

10 times more than these of cereals. They are quick growing and shorter duration. Therefore, it is time now, to take up the intensive and multiple vegetable cropping in India.

Recently more attention is being devoted to increase the agricultural production. This is being implemented through crash programmers, emergency and applied programmers, for this good seeds, irrigation facilities, knowledge of improved techniques of cultivation, proper plant protection measures quick transport and better storage facilities are being made available through different programmes.

As population of our country is increasing day by day. The peoples are aware about their health and their demands about consumption of vegetables as per dietitians recommendations are also increasing day by day, it leads to more quality and quantity requirements of vegetables. The different research organization were developed different vegetable production technologies but there was not increase in overall production of vegetables up to the recommended level. By considering these aspects the present study entitled Adoption gap in vegetable production practices has been taken for study purpose with the following specific objectives.

1.3 Objectives of study

In the present investigation following specific objectives were studied.

1. To study the personal, socio-economic, communicational and psychological characteristics of vegetable growers.
2. To study the adoption gap in vegetable production practices.
3. To study the relationship between characteristics of vegetable growers and adoption gap in vegetable production practices.
4. To study the constraints faced by vegetable growers in adoption of vegetable production practices.

1.4 Hypothesis

The following research hypothesis was framed on aspects of study in accordance with the objectives of the study. The hypothesis framed was presented in null form (H_0) as below.

H_0 = There is significant relationship between selected personal, socio-economic, communicational and psychological characteristics of vegetable growers with adoption gap in vegetable production practices.

1.5 Limitation of study

Being the student's research project, the study had to be carried out with following limitations.

1. This study has been conducted for only Nagpur and Mauda tahsils of Nagpur district.
2. The findings of this study are based on opinion express by the respondents. Therefore the objectivity of the data would be limited to the real opinion of respondents.
3. Since the study had been confined to only Nagpur and Mauda tahsils of Nagpur district of Maharashtra state, the generalization based on the finding may be applicable to this area and other areas having similar conditions.

1.6 Organization of the study

The present study has been presented in seven chapters. The first chapter is introduction containing need and importance, specific objectives, scope and limitation and hypothesis of study have been introduced. The second chapter comprises review of literature comprises the relevant literature reviewed by researcher, followed by third chapter methodology includes research methods, techniques, tools used and procedures followed in present investigation.

The fourth chapter results and discussion, deals with the findings of the present study along with the discussion there upon. The fifth chapter contains summary and conclusions followed by sixth chapter implications about study and last seventh chapter literature cited, and finally vita and appendix at the end.

Chapter II

REVIEW OF LITERATURE

Review of literature is an important aspect of scientific research. Review of literature is essential before and even actual start of research. It helps the researcher to get acquainted with the subject matter and get insight into the research problem. Hence, an attempt has been made to review the research studies and literature having direct relation or having its derived application with the aspect of the present study. The review of research has been presented in this chapter.

2.1 Reviews related to independent variables.

2.2 Reviews related to dependent variables.

2.3 Reviews related to relationship between independent and dependent variables.

2.4 Reviews related to constraints faced by the farmers

2.5 Conceptual model.

2.1 Reviews related to independent variables

Personal, socio-economic, communicational and psychological characteristics of the vegetable growers

The set of independent variables i.e. education, farming experience, land holding, annual income, social participation, extension contact, sources of information, risk orientation, market orientation, innovativeness and knowledge have been included in the present study. The review of the past studies pertaining to these variables has been presented below.

2.1.1 Education

Aghav (1997) reported that 33.33 per cent of vegetable growers were illiterate, 20.00, 19.31 and 10.65 per cent respondents were

primary, secondary, high school and college level educated, respectively.

Mutkule (1999) found that 42.66 per cent of the chilli growing respondents had education up to secondary level followed by, 18.00 per cent having education up to primary level, 16.00 per cent, 12 per cent, 4.67 per cent were educated up to high school, college level and illiterate, respectively.

Magar (2001) in his study on cucumber stated that majority of respondent's i.e. 32.66 per cent were educated up to primary education.

Dudhate (2002) found that 29.17 per cent of brinjal growing respondents were educated up to secondary level, 27.50 per cent up to higher secondary level, 16.67 per cent up to primary level, 12.50 per cent up to college level and 08.33 per cent were illiterate.

Sawant (2002) revealed that a majority of the respondents (53.32%) were educated up to secondary education whereas, 20.83 per cent of the respondents attained college level education. Only 09.17 per cent of respondent turmeric growers were illiterate while, 16.68 per cent had primary education.

Mate (2006) revealed that more than 93.00 per cent of the potato grower respondents were educated out of that 55.00 per cent had received secondary or college education.

Maghade (2007) revealed that 35.00 per cent of the respondent onion growers had received primary education (up to 4th std.) while 30.00 per cent of them received secondary education (5th to 10th std.). Only 26.00 per cent respondents received higher secondary education (10th to 12th std.) and 9.17 per cent respondents received college education (above 12th std.).

Gade (2012) reported that maximum number of the respondents (33.00%) was educated up to middle school, followed by 26.00, 19.00,

14.00 per cent of them belonging to high school, primary, and graduate, respectively. Whereas, 08.00 per cent of them were illiterates.

Jalit (2012) observed that 27.00 per cent of the respondents were educated up to high school level followed by 21.00 per cent of the respondents had higher secondary, 18.00 per cent had attended education up to college level and 15.00 per cent of the respondents were educated up to middle school. 10.00 per cent of the respondents were attended education up to primary school and only 09.00 per cent of respondents found to be illiterate.

Mohanty, *et al.* (2013) reported that maximum of the vegetable growing farmers (51.68%) were educated up to secondary school followed by higher secondary school level (21.67%).

Ajeh and Patrick Chuks (2014) reveals that majority of the respondents (94.00%) had one form of formal education or the other ranging from primary to post-secondary education.

Sharma, *et al.* (2014) reveals that majority of potato growers were up to middle school to post graduation level of education (67.78%), followed by 18.89 per cent had primary level of education and the remaining 13.33 per cent of them were graduate and above level of education.

Boruah, *et al.* (2015) reveals that majority of the respondents (52.50%) had medium level of education whereas, 27.50 per cent had low educational level, 13.33 per cent had no education and only 6.67 per cent had high level of education.

Tekale (2015) observed that majority of vegetable growers (52.00%) were educated up to high school level, followed by over one fifth of respondents (22.00%) had primary school level education. The 14.00 per cent of respondents had higher secondary level education.

The meager per cent of respondents (04.00%) were educated at college level.

2.1.2 Farm experience

Kale (1994) observed that majority of the respondents (62.50%) had farm experience from 5 to 9 year whereas, 21.67 per cent had farm experience only up to 4 year and 15.83 per cent of respondents had experience 10 year and above.

Ghodeswar (2006) noticed that more than half of the respondents (55.00%) had experience of 4-6 years whereas, 23.34 per cent of cultivators had experience of 7 years and above and 21.66 per cent of them had experience up to 3 years in pomegranate cultivation.

Nemade (2007) revealed that majority of the respondents (81.67%) had experience of 6-7 years whereas, 15.83 per cent of the respondents had experience above 7 years and 02.50 per cent of the respondents had experience up to 6 years.

Ajieh and Patrick Chuks (2014) reveals that majority of the respondents (88.00%) had farming experience of between 1 and 15 years.

Sharma, *et al.* (2014) reveals that majority of potato growers (66.67%) belonged to the medium range of farm experience (5 to 9 years), followed by 21.11 per cent of them in high range of farm experience (above 9 years) and the remaining 12.22 per cent of them having low range of farm experience (below 5 years).

Tekale (2015) observed that great majority of respondent vegetable growers (73.00%) had more than 20 years of experience in overall farming, whereas nearly one fourth of respondents (23.00%) had 10.01 to 20.00 years experience in farming.

2.1.3 Land holding

Aghav (1997) reported that majority of the vegetable growers (75.92%) had below 2 hectares of land, 12.65 per cent of respondents had 2 to 8 hectares land, while 11.43 per cent of respondents possessed above 8 hectares of land.

Dudhate (2002) In his study on brinjal found that most of the respondents (45.83%) were medium farmers followed by big farmers (44.17%) similarly 10.00 per cent of respondents were from small farmers category.

Kolte (2002) revealed that a majority (50.00%) of the chilli growers had medium size of land holding (2.01 to 5.00 ha), 42.00 per cent had small land holding (upto 2.00 ha) and very few respondents (8.00%) had large size of land holding (5.01 and above ha).

Sawant (2002) observed that a majority of turmeric growers (50.84%) belongs to medium category (2.01 to 4.00 ha) whereas, 44.16 per cent growers had small land holding (up to 2.00 ha) and only 5.00 per cent farmers had big size of land holding (4.01 and above ha).

Mate (2006) revealed that majority of the respondent of potato growers (55.50%) had medium size of land holding (2.01 to 4.00 ha) whereas, 28.50 per cent of them had small size of land holding (less than 2.00 ha). The remaining 16.00 per cent of the respondents had large farm size (4.01 ha and above).

Maghade (2007) revealed that 43.44 per cent of the onion growers had medium size of land holding i.e. 2.01 to 4.00 ha, followed by 34.67 per cent of them had small size of land holding (less than 2.00 ha). While, 22.00 per cent of the respondent onion growers had large size of land holding (4.1 ha and above).

Gade (2012) reported that 35.00 per cent of the respondents were semi-medium farmers, 25.00 per cent were small farmers, 17.00

per cent were medium farmers and 10.00 and 13.00 per cent of them were big and marginal farmers, respectively.

Jalit (2012) observed that majority of the respondents (55.00%) were possessed small land holding (1.01 to 2.00 ha) followed by 18.00 per cent of the respondent having marginal land holding (up to 1.00 ha). Also noted that 16.00 per cent of the respondents had semi-medium land holding (2.01 to 4.00 ha) and 08.00 per cent of the respondents were possessed having medium land holding (4.01 to 10.00 ha). Only 03.00 per cent of the chilli farmers had large land holding (above 10.00 ha).

Mohanty, *et al.* (2013) observed that the highest percentage of farmer (40.00%) were small farmer followed by medium farmer (30.83%) and marginal farmer (22.66%).

Ajieh and Patrick Chuks (2014) revealed that the mean farm size of respondents was 2.3 hectares with 81.00 per cent of the respondents having farms ranging between 0.5 to 3.5 hectares. It indicates that majority of the respondents operate as small scale farm.

Sharma, *et al.* (2014) reveals that majority of potato growers (75.56%) were having medium size of land (1.70 to 4.88 ha), followed by 15.56 per cent of them were big size of land (above 4.88 ha) and the remaining 08.89 per cent of respondent had small size of land (below 1.70 ha).

Boruah, *et al.* (2015) reveals that 37.50 per cent of the respondents belonged to small farmer category, followed by semi medium farmer (36.67%). The marginal and medium farmers recorded 08.33 per cent and 17.50 per cent, respectively.

Tekale (2015) found that nearly equal proportion of respondent vegetable growers belonged to small (1.01 to 2.00 ha) and semi medium (2.01 to 4.00 ha) land holding, followed by over one fifth of vegetable growers (22.00%) possessed (2.01 to 4.00 ha) medium land

holding. The meager per cent of respondents (04.00%) belonged to small land holding and only 02.00 per cent belonged to big land holding (above 10.00 ha).

2.1.4 Annual income

Aghav (1997) revealed that majority of the vegetable growers (62.68%) having annual income up to Rs.36,000/- whereas, 20.00 per cent and 17.32 per cent respondents had annual income between Rs.36,000 to 74,000/- and more than Rs. 74,000/-, respectively.

Dudhate (2002) in his study on brinjal observed that substantial number (69.17%) of the respondents had medium level of annual income, 16.66 per cent had high level of annual income while 14.17 per cent of respondents had low level of annual income.

Magar (2001) observed that substantial number (40.00%) of respondents had medium level of annual income whereas, 33.34 per cent of respondents had low level of annual income and 26.66 per cent of respondents had high level of annual income while study of package of practices of cucumber.

Sawant (2002) revealed that majority of the turmeric growing respondents (61.66%) were from low income group (up to Rs. 97,000) while 33.34 per cent of the respondents were from medium income group i.e. Rs. 97,001 to Rs. 173000 and few respondents (05.00%) belonged to high income category (Rs. 173001 and above).

Ahire and Shinde (2002) revealed that majority of the respondents (63.33%) were from medium annual income followed by 23.33 and 13.34 per cent from high and low annual income

Dhakane (2005) observed that 28.67 per cent of the grape growers had annual income ranging from Rs. 1,00,001 to 2,00,000 while 20.66 per cent and 18.66 per cent of them had annual income up to Rs. 1,00,001 and Rs. 2,00,000 to 3,00,001, respectively.

Maghade (2007) observed that a great majority of the respondent onion growers (82.51%) had medium annual income i.e. Rs. 45,667 to Rs. 1,55,086 only 11.66 per cent respondents were in high income group where as only 05.83 per cent of them had low income group.

Gade (2012) observed that nearly half of the respondents (49.00%) having medium income level whereas, 33.00 per cent of the respondents had high level of annual income and 18.00 per cent of them were in low annual income category.

Jalit (2012) observed that over one third of the respondents (37.00%) had low medium annual income Rs.75,001 to 1,50,000/- followed by 29.00 per cent of the respondents had medium annual income Rs. 1,50,001 to 2,25,000/-. It was also noted that 16.00 per cent of the respondents and annual income above Rs.3,00,000/- and 12.00 per cent of the respondents were having medium high annual income Rs. 2,25,001 to 3,00,000/-. Only 06.00 per cent of the respondents were having low annual income up to Rs. 75,000/-.

Mohanty, *et al.* (2013) revealed that the highest proportion (43.34%) of the respondents belongs to low income group (Rs. 30,000-60,000) followed by medium income group (Rs. 60,000-1,00,000).

Sharma, *et al.* (2014) reveals that majority of potato growers (86.67%) belonged to the medium range of annual income (Rs. 12,432/- to Rs. 1,08,977/-), followed by 13.33 per cent in the high range of annual income (above Rs. 1,08,977/-), whereas none of them were in low range of annual income (below Rs. 12,432/-).

Boruah, *et al.* (2015) reveals that majority of the respondents (51.67%) had annual income ranging from Rs 25001-50000 followed by, 25.00 per cent with Rs. Rs.75001 and above. The 20.83 per cent had income level between Rs. 50001-75000 and only 02.50 per cent of the respondents were found low income group up to Rs.25000.

Tekale (2015) revealed that majority of vegetable growers (52.00%) had low medium annual income in the range of Rs. 75,000/- to Rs. 1,50,000/-. The 16.00 and 14.00 per cent of vegetable growers had low annual income (up to Rs. 75,000/-) and medium annual income Rs. 1,50,001/- to 2,25,000/-, respectively. The 12.00 per cent of respondents had medium annual income (Rs. 225,001/- to 3,00,000/-) whereas, 06.00 per cent had high annual income above Rs. 3,00,000/-

2.1.5 Social participation

Rathod (1999) observed that most of the onion growing respondents (50.34%) had medium level of social participation followed by, 30.96 per cent high level of social participation, while 18.70 per cent of respondents were having low level of social participation.

Dudhate (2002) in his study on brinjal observed that a majority of the respondents (57.07%) were having medium level of social participation followed by 23.33 per cent low level of social participation, while 19.17 per cent of respondents were having high level of social participation.

Magar (2001) in his study of package of practices of cucumber found that significant percentage (49.34%) of the respondents were having medium level of social participation followed by low (40.00%) and high (10.66%) social participation.

Sawant (2002) found that majority of the respondents (73.33%) had medium social participation whereas, 22.50 per cent of the turmeric growing respondents had low social participation and a few 04.17 per cent respondents had high social participation. The average social participation score of the respondents was 03.30 per cent.

Mate (2006) found that more than half of the respondents (55.00%) belonged to medium social participation group whereas, 33.50 per cent of them belonged to low participation group. Only 11.50

per cent of potato growing respondents belonged to high social participation group.

Maghade (2007) revealed that 43.33 per cent respondent onion growers had medium social participation category while, 27.34 per cent of respondents had high social participation and 25.33 per cent of the respondent onion growers had low social participation category.

Jalit (2012) observed that nearly equal proportion of the respondents (44.00 and 43.00%) had medium and low social participation in different formal and informal organizations whereas, only 13.00 per cent of respondents had high participation in social organization.

Tekale (2015) observed that, great majority of vegetable growers (84.00%) had medium social participation whereas, 17.00 per cent respondents had low social participation and 09.00 per cent vegetable growers had high social participation.

By and large majority of respondents had medium level social participation in different formal and informal organization.

2.1.6 Extension contact

Mutkule (1999) in his study on chilli found that, majority of respondents (74.67%) had medium extension contact followed by 14.67 per cent of respondents had low extension contact and 10.66 per cent had high extension contact.

Rathod (1999) found that majority of the respondents (79.16%) had medium extension contact followed by, low (08.34%) and high (12.16%) extension contact.

Kumbhar (2003) in his study on chilli observed that near about 47.50 per cent of the respondents had medium extension contact while 34.17 per cent of the respondents had low extension contact followed by 18.33 per cent of them had high extension contact.

Gade (2012) observed that majority of the respondents (62.00%) had medium extension contact whereas, 20.00 per cent of the vegetable grower had high extension contact and 18.00 per cent of the respondents had low extension contact.

Jalit (2012) observed that majority of respondents (62.00%) had medium extension contact whereas, 20.00 per cent of respondents had high extension contact with workers of different organization and agencies for acquiring agricultural information. Only 18.00 per cent of the respondents had low extension contact.

Mohanty, *et al.* (2013) observed that 46.67 per cent of respondent had low extension contact and 40.00 per cent had medium contact with extension agency while only 13.33 per cent of them had high extension contact.

Boruah, *et al.* (2015) reveals that majority of the respondents had medium level of extension contact (70.83%), followed by 16.67 per cent and 12.50 per cent had low and high level of extension contact, respectively.

Tekale (2015) observed that, half of the vegetable growers (50.00%) had medium level of extension contact with extension personnel of different organizations whereas, 28.00 22.00 per cent of vegetable growers had low and high level of extension contact, respectively.

2.1.7 Sources of information

Sharma (1997) observed that majority of the respondents had medium level of profile in respect of source of information and it was found to exercise maximum effect on technological gap of gram cultivation in Haryana.

Mutkule (1999) found that a majority of chili growers (68.79%) fall under medium level of sources of information channels.

Chand (1999) found that average number of respondents belonged to an average possessed medium sources of information utilization.

Badodia, *et al.* (2002) found that in the category of utilization of number of information source majority of chickpea cultivators utilized 4 to 6 information sources.

Prasad, *et al.* (2004) in their study on role of transfer of technology in dry land agriculture revealed that farmers of adopted villages had significantly higher sources of information than farmers of non-adopted villages.

Tripathi (2006) concluded that the main sources of information obtained from Gram pradhan (00.65%) and VDO (00.37%) among formal, family members (00.99%) and neighbors (00.89%) among informal and in case of mass media, radio (00.94%) and TV (00.68%) about the chickpea production.

Pal, *et al.* (2009) conducted a study on communication pattern in dry land of Uttar Pradesh and found that, access to the different cosmopolite sources was as compared to inter personal localite sources. The farmers relied more on neighbors and privet companies, dealers for information access.

Divakar (2011) revealed that majority of chickpea growers had (61.33%) utilized medium level source of information, followed by 22.67 per cent low source of information and 16.00 per cent had high source of information.

Khare (2013) reported that majority of respondents (70.83%) utilized medium level of sources of information whereas, 15.00 per cent of respondents had low sources of information and 14.17 per cent of the respondents were having high level sources of information.

Sharma, *et al.* (2014) revealed that great majority of the respondents (93.33%) had medium level of utilization of information sources (0.82 - 2.04), followed by high level (06.67%) of information sources (above 02.05), whereas none of them had low level of utilization of information sources.

2.1.8 Risk orientation

Magar (2001) in his study on cucumber noticed that most of the (68.66%) of the respondents were having medium level of risk orientation followed 22.00 per cent were having high risk orientation and 09.34 per cent of respondents having low risk orientation.

Kumbhar (2003) concludes that majority of the chilli growing respondents (60.83%) had medium risk orientation whereas, 21.67 per cent of the respondents had high risk orientation followed by 17.50 per cent of the respondents had low risk orientation.

Dhakane (2005) revealed that majority of the grape growers (64.67%) had medium degree of risk orientation while 21.33 per cent of them had low degree of risk orientation and only 14.00 per cent respondents had high degree of risk orientation.

Mate (2006) observed that a majority of the potato growing respondents (59.90%) were in medium risk orientation category while, only 15.50 per cent of them were found to be low risk orientation category.

Maghade (2007) revealed that majority of the respondents (56.67%) onion growers belonged to medium risk orientation category whereas, the 24.67 per cent of them belonged to low risk orientation category and 18.66 per cent of the respondent onion growers belonged to high risk orientation category.

Gade (2012) observed that 46.00 per cent of the respondents had medium risk bearing ability and 28.00 and 26.00 per cent of the respondents had high and low risk orientation ability, respectively.

Jalit (2012) observed that great majority of respondents (85.00%) had medium risk orientation whereas, 12.00 per cent of the respondents had low risk orientation and only 03.00 per cent had high risk orientation.

Sharma, *et al.* (2014) revealed that, majority of the potato growers (46.67%) had medium level of risk and uncertainty of production pattern, 27.78 per cent of them had high level of risk and uncertainty of production pattern and only 25.56 per cent of the respondents had low level of risk and uncertainty of production pattern.

Tekale (2015) observed that, majority of respondents (72.00%) had medium level of risk orientation followed by, 15.00 and 13.00 per cent of respondents had low and high risk orientation.

2.1.9 Market orientation

Waman (1993) revealed that majority of the onion growers (78.00%) marketed their produce through commission agents.

Sadhaphal (2000) inferred that most of the white onion growers relied upon the wholesaler from their own or neighboring village for marketing of the white onion produced in their field.

Maghade (2007) observed that 38.33 per cent respondent onion growers sold their produce in local market, while 08.33 per cent of them sold their produce in the district market and 26.67 per cent of them sold in Pune market.

Nemade (2007) noticed that majority of the mango growing respondents (60.00%) had medium market orientation whereas, 32.50 per cent of the respondents had high market orientation and at the

same time 17.50 per cent of the respondents had low market orientation.

Sharma, *et al.* (2014) reveals that majority of the potato growers (81.11%) had medium level of marketing orientation programme, only 18.89 per cent of them had high level of marketing orientation programme whereas, none of them had low level of marketing orientation programme.

Tekale (2015) observed that majority of vegetable growers (73.00%) had medium overall management orientation including market orientation followed by 15.00 and 12.00 per cent of respondents had low and high management orientation.

2.1.10 Innovativeness

Phalke (1999) noted that a high level of innovativeness was 63.00 per cent in majority of potato growers.

Raju, *et al.* (2003) revealed that innovativeness of the farmer had higher and positive significant association with information source of the farmer.

Shamagat (2008) observed that nearly cent percent of the respondent 98.67 per cent were included in the medium category of innovativeness, it was followed by Meager 01.33 per cent of the respondent who was includes in the low innovativeness category none of the respondent were included in the category of high innovativeness.

Khiratkar (2009) observed a high level of innovativeness (about 42.00 %) in pan-pimpri cultivator farmers.

Kotwal (2009) observed that nearly half of the respondents (47.00%) had medium level innovativeness about kisan credit card scheme.

Dhobale (2010) noted that majority of farmers (68.00%) belong to medium level of innovativeness.

Jalit (2012) observed that majority of the respondents (55.00%) had medium innovativeness whereas, 34.00 per cent of the respondents had low innovativeness and only 11.00 per cent of respondents were having high innovativeness.

Rathod (2013) observed that majority of respondents (64.00%) had medium level of innovativeness whereas, 25.00 per cent of the respondents had low level of innovativeness and 11.00 per cent of respondents had high level of innovativeness.

Tekale (2015) revealed that majority of respondent vegetable growers (60.00%) had medium level of innovativeness, followed by 19.00 and 15.00 per cent had low and high level of innovativeness, respectively.

2.1.11 Knowledge

Dudhate (2002) reported that majority of the respondents (60.00%) had medium level of knowledge about modern technology of brinjal crop cultivation followed by 26.67 and 13.33 per cent of the respondents had high low and high level of knowledge, respectively.

Kalaskar, *et al.* (2001) revealed that majority of the respondents (67.25%) were moderately aware about different IPM practices in cotton. In other words, it could be stated that quite a few (16.97%) respondents had high level of knowledge about IPM practices.

Ahire and Shinde (2002) in his study on pomogranate observed that 53.33 per cent respondents had high knowledge about pomogranate technology, followed by 40.00 and 06.67 per cent had medium and high knowledge level.

Shrivastava, *et al.* (2002) concluded that majority of respondents (65.00%) had medium level of knowledge whereas, 18.33 and 16.67

per cent had high and low level of knowledge, respectively regarding chilli cultivation technology.

Chaudhary and Sharma (2012) reported that none of the beneficiary respondents had low level of knowledge and 31.00 per cent beneficiary respondents had high level of knowledge about interventions of chilly cultivations.

Jalit (2012) observed that majority of the respondents (64.00%) had medium level of knowledge about recommended chilli cultivation practices whereas, 21.00 per cent were had high knowledge level and only 15.00 per cent of respondents had low knowledge level.

Khare (2013) observed that majority (59.16%) of the respondents had medium level of knowledge about improved cultivation practices of gram whereas, 21.67 per cent and 19.17 per cent of respondent farmers had high and low level of knowledge, respectively of improved cultivation of gram.

Rathod (2013) observed that majority of the respondents (73.00%) had medium level of knowledge of orange cultivation whereas, 14.00 per cent of the respondents had high level of knowledge and 13.00 per cent of the respondents had low level of knowledge category.

Sharma, *et al.* (2014) reveals that majority of potato growers (53.33%) had medium range of knowledge, followed by 34.44 per cent of them with low range of knowledge and the remaining 12.23 per cent of them having high knowledge about the HYV seed of potato cultivation.

2.2 Reviews related to Dependent variable

2.2.1 Adoption gap

Ahire and Shinde (2002) in his study on pomegranate observed that medium (66.33%) technological gap. Whereas, 21.66 and 15.00 per cent respondents in low and high technological gap.

Waman, *et al.* (2006) revealed that 88.33 per cent of the banana growers had low level of technological gap while remaining only 11.67 per cent of them had medium level of technological gap.

Maghade (2007) observed that a majority of the respondent onion growers were found in the level of medium technological gap i.e. 58.33 per cent and 18.34 per cent of the respondent onion growers were in high technological gap group. While 23.33 per cent of the respondent onion growers were found in low technological gap group.

Sorate (2011) observed that, 72.00 per cent of respondents were observed under low category of technological gap of recommended grape cultivation practices.

Jalit (2012) observed that majority of the respondents (57.00%) had medium level of adoption of recommended chilli cultivation practices whereas, 27.00 per cent of the respondents had low adoption level and only 16.00 per cent of the respondents had high adoption level.

Pandey, *et al.* (2012) this study revealed that the technological gap in brinjal production and potential. Eight numbers of technological gaps including application of fertilizers and pesticides for commercial brinjal production were identified.

Matouleibi Chanu, *et al.* (2014) reveals that majority of the respondents (65.33%) had medium extent of adoption followed by 24.67 per cent high level of adoption. Only 10.00 per cent of the respondents had low extent of adoption.

Meena, *et al.* (2014) revealed that majority of the respondents (74.00%) were in medium category of adoption gap as against 13.00 per cent of farmers in high and equal percentage in low categories.

Barman, *et al.* (2015) reveals that majority of the respondents (51.00%) were in the high extent of adoption category followed by 49.00 per cent in the medium extent of adoption category.

2.3. Reviews related to relationship between independent and dependent variables

2.3.1 Adoption gap correlationship

Singh, *et al.* (1991) observed that there was negative and significant correlation between social participation and knowledge gap of citrus growers.

Patil (1995) found that there was significant and negative correlation between risk orientation and technological gap in banana growers.

Kausadikar (2000) found that market orientation had positive and significant relationship with attitudes of farmers towards horticultural development programmed.

Ahire and Shinde (2002) found that annual income was found to be negatively related with technological gap.

Bhati (2002) reported that knowledge level of the big small and marginal farmers were negatively and significantly correlated with technological gap in the improved mustard production technology.

Maghade (2007) showed that there was negative and significant correlation ($r = -0.44$) between education and technological gap and negative and highly significant correlation between annual income and technological gap in onion cultivation.

Wattamwar and Deshmukh (2008) revealed that education showed negative and significant relationship with technological gap in soybean production practices.

Sorate (2011) in his study on grape reported that farm experience were negatively but significantly correlated with adoption gap of recommended grape cultivation practices at 0.01 per cent level of probability.

Gade (2012) revealed that land holding and annual income had positive and significant relationship and education, extension contact and risk orientation had non significant relationship with the marketing behavior of the vegetable growers.

Jalit (2012) revealed that education, social participation and extension contact had positive and significant correlation with adoption of recommended chilli cultivation practices at 0.01 per cent level of probability.

2.4. Reviews related to constraints

Kadam and Borse (1993) revealed that, the problems of banana growers in Jalgaon district were; lack of cultural and marginal requirement of the crop in relation to variety to soil climate, problem of availability of rhizomes, perishability of the banana fruit, disease and pest control in the field and marketing of banana fruits.

Wane (2000) reported that uncertainty of rainfall (80.50%), lack of knowledge about pest and disease (75.50%) were the major constraints in adoption of improved cultivation practices of soybean.

Jadhav (2002) studied production and marketing management of brinjal in Phaltan area of Satara district. He indicated that high transport cost non-receipt of payment time, problem of price fluctuation high commission charges, non-availability of cheap packing material, faulty weights and measures etc. were the major problem faced by the farmers in the marketing of brinjal.

Maghade (2007) reported high cost of chemical fertilizers (91.67%), Irregular supply of electricity and lack of knowledge about improved storage structure (80.00%). Lack of knowledge about time of application of chemical fertilizers, shortage of labour during weeding operation (64.17%), difficulty in identifying pests and diseases (64.16%), shortage of labour during harvesting period (53.33%), non-availability of quality seeds and planting material in time (53.33%),

Hand weeding is time and labour consuming as well as expensive (51.67%) were the major constraints for existing technological gap in cultivation practices of onion.

Gade (2012) reported that fluctuation in the market prices (97.50%), markets are far away (91.25%), lack of market information (52.00%) and commission charges (88.12%) were the major problems in the study area.

Jalit (2012) reported that majority of respondents were faced constraints non availability of improved seeds of chilli (66.00%), non availability of labour on time (84.00%), non availability of adequate FYM (83.00%), fertilizers and insecticides in time (76.00%), major economic constraints reported were high labour charges (87.00%), high cost of improved variety seeds, fertilizers, FYM and insecticides (85.00%) and inadequate finance (61.00%), in storage constraints non availability of storage facility (81.00%) and great loss of deterioration in storage (80.00%), in case of non remunerative prices (81.00%), fluctuating prices (78.00%), irregular demand for chilli (78.00%) and high cost of transport were the major the constraints face by chilli growers.

Mohanty, *et al.* (2013) revealed that mean score for all these constraints were higher among all small farmers as compared to marginal, medium and large farmers.

Tekale (2015) reveled that cent per cent of vegetable growers were faced the marketing constraints like price fluctuation in the market (100.00%), followed by exploitation by middle man (83.00%), heavy competition in market (77.00%), lack of cold storage and processing facilities (77.00%) and high perishability of vegetable (66.00%), high market expanses (46.00%) and transportation (27.00%), respectively. The production related constraints faced by vegetable growers were adverse climatic condition (74.00%), high labour wages (60.00%),

irregular electric supply (51.00%), high cost of inputs (46.00%) and non availability of skilled labour (43.00%), respectively.

2.5 Conceptual model of research study

The researcher has to bare his research on some assumptions of relations among variables and is required to develop a conceptual scheme / model showing the relations among study variables. A model helps in critical and logical thinking about the research problem. A theoretical model represents the perceived relations among the concepts and variables used in research. Based on forgoing review of the past research studies a conceptual model has been developed for the present investigation and the same has been depicted in Fig. 1.

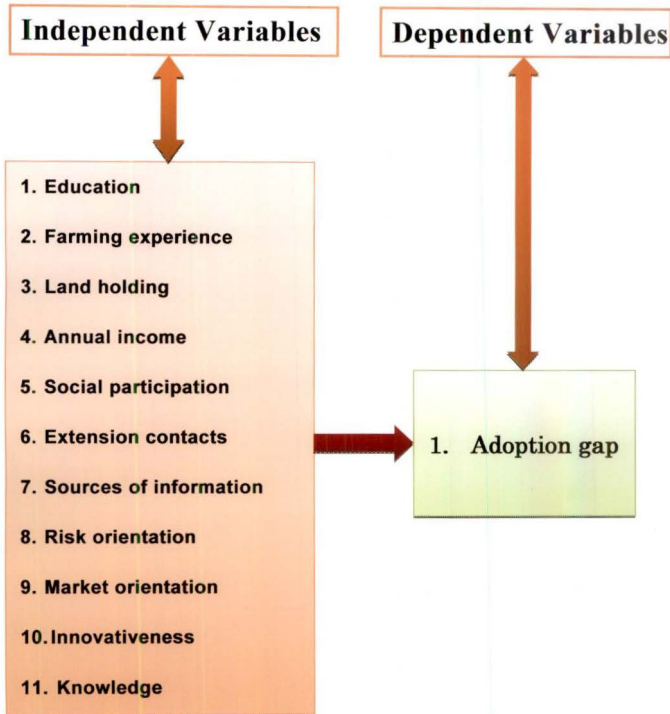


Fig. 1: Conceptual model of the study

Chapter III

METHODOLOGY

Research methodology deals with the description of research method and procedures used in the present study. The researcher has to develop and use his own techniques to fulfill the demands of his research. For the present study detailed methodology was developed for studying various aspects in line of the specific objectives and has been explained in this chapter. The study was conducted during the year 2014-15 in Nagpur district of Maharashtra State. The various aspects included in this chapter have been described with relevant details under following heads.

3.1 Locale of the study

3.2 Research design

3.3 Sample and sampling procedure

3.4 Preparation of interview schedule

3.5 Pre-testing and collection of data

3.6 Variables and their empirical measurement

3.7 Operationalization, scoring and categorization of variables

3.8 Constraints faced by the vegetable growers

3.9 Statistical procedure used for analysis data

3.1 Locale of the study

The present research was confined to Mauda and Nagpur tahsil of Nagpur district of Vidarbha region of Maharashtra state as it has considerable area under brinjal and tomato vegetable crops and as this area under brinjal and tomato crops are higher than other tahsils of Nagpur district, so these two tahsils were purposively selected.

3.1.1 Physiography

The geographical area of the district is 9,86,550 ha. Nagpur district is situated between parallels of 21⁰09' North latitude and between meridians of 79⁰ 09' East latitude.

3.1.2 Soil

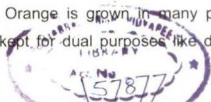
The soils of Nagpur district are black cotton soil. The soil varies both in texture and depth on the northern position of the district. It is shallow and relatively poor in south. It becomes deep and fairly rich in Wardha valley especially along with bank of Wardha river.

3.1.3 Climate

The climate of Nagpur district is tropical. The year divided into three seasons.

1. Moderately warm wet season from June to September.
2. A cool dry season from October to February.
3. Hot dry season from March to May.

The rainy season starts from June to September is warm and pleasant. During rainy season, the temperature normally ranges between 21⁰ C to 31⁰ C. the winter season is comparatively dry and starts from October starts in March even as high as 42.5⁰ C. hot dry winds prevail occasionally in April and November. During the summer, days are hot and nights are fairly good. Thus the climate of Nagpur district is pleasant and healthy. The maximum temperature recorded is 48⁰ C respectively. The average rainfall in Nagpur is 1205 mm which falls in assured rainfall zone. Major kharif crops are tur, mung, cotton, sunflower etc. whereas, major crops grown in rabi are rabi wheat, gram, safflower, sunflower, linseed etc. the vegetable crops like okra, brinjal, onion, garlic, potato, cabbage, tomato, chilli, etc. are also cultivated under seasonal crops. Orange is grown in many parts of district. Cattle and buffaloes are kept for dual purposes like drought,



milch and FYM. Goat and poultry keeping are subsidiary occupations of the people. Landless labours are mostly engaged in agriculture and nearby industries.

3.2 Research design

An exploratory research design of social research was used in the present study.

3.3 Sample and sampling procedure

3.3.1 Selection of tahsils

Nagpur and Mauda taluka were purposively selected as these tahsils consists of considerable area under brinjal and tomato vegetable cultivation and higher than other talukas of Nagpur district.

3.3.2 Selection of villages

By considering the higher area under brinjal and tomato crop, five villages from each taluka were purposively selected for study. From Nagpur taluka these selected villages were namely, Chicholi, Khadgaon, Dahegaon, Borgaon (Khurd), Khandala and from Mauda taluka villages selected were namely, Lapka, Korad, Navegaon, Dhamangaon and Anjangaon.

3.3.3 Selection of respondents

From each of the selected villages, 6 brinjal and 6 tomato growers were randomly selected from each selected villages thus, from 10 villages, 60 brinjal and 60 tomato growers were selected and constitute a total sample of 120 respondents. These 120 vegetable growers were considered as sample in the present study.

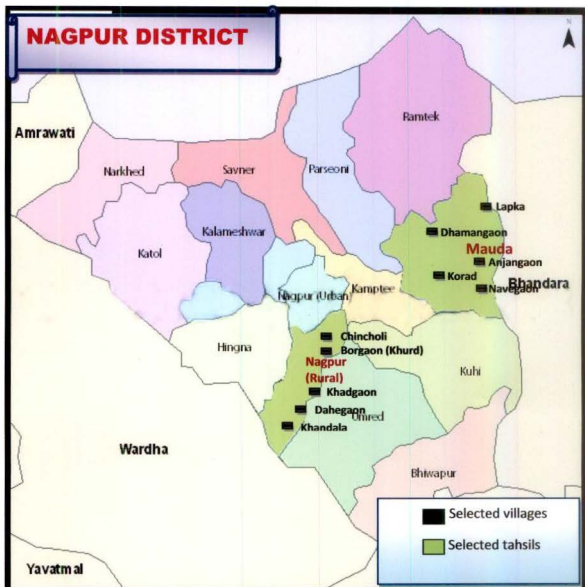


Fig. 2 Map of Nagpur district indicating tahsils and villages selected for study

Table 1: Taluka wise list of selected villages and respondents

Sr. No.	Nagpur district		Selected respondents (N)
	Taluka	Village	
1	Nagpur	Chicholi	12
		Khadgaon	12
		Dahegaon	12
		Borgaon (Khurd)	12
		Khandala	12
2	Mauda	Lapka	12
		Korad	12
		Navegaon	12
		Dhamangaon	12
		Anjangaon	12
	Total	10	120

3.4 Preparation of interview schedule

An interview schedule consists of various items concerned with the objectives of the study were developed for respondents. Necessary precautions were taken to keep language simple, so as to get desired responses from the respondents. The schedule contained questions related to personal, socio-economical, communicational and psychological characteristics of vegetable growers and questions related to knowledge of brinjal and tomato recommended production practices and its adoption gap and also the constraints faced by the vegetable growers.

3.5 Pre-testing and Collection of data

The data for study were collected by personal interview of the respondents with the help of pre-tested structured interview schedule during the period from December- January. In all 120 respondents were contacted at their home and interviewed. Their responses were



Plate 1: Investigator collecting data from vegetable grower at his brinjal field



Plate 2: Investigator collecting data from vegetable grower at his home



Plate 3: Investigator collecting data from vegetable grower at his vegetable field

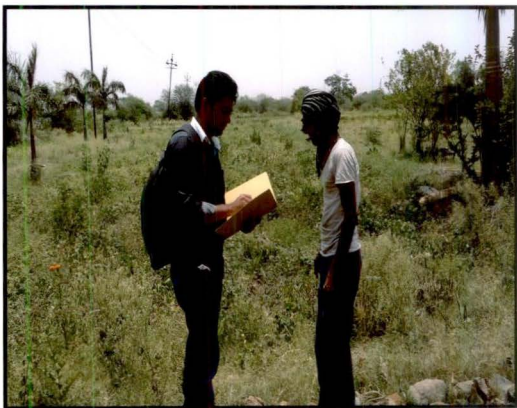


Plate 4: Investigator collecting data from vegetable grower at his vegetable field

considered for the purpose of the study. Necessary help from the village level personnel was obtained.

3.6 Variables and their empirical measurement

In the present study two sets of variables, namely, independent and dependent variables were selected. The independent variables included were personal, socio-economic, communicational and psychological characteristics. The dependent variables were adoption gap in vegetable production practices and constraints faced by them about adoption of vegetable production practices were also identified. The details about independent and dependent variables and their empirical measurement were shown Table 2.

Table 2: Variables and their measurements

Sr. No.	Variables	Measurement procedure
A.	Independent variables	
1.	Education	The number of standard passed by the respondent was considered as his/her educational score
2.	Farming experience	The period in terms of years from which the respondent has under taken farming occupation considered as a score
3.	Land holding	A numerical score of one was assigned for each hectare of land possessed by the respondent
4.	Annual income	The total income of respondents and his family members received in rupees from all the sources in a year was considered as score
5.	Social participation	Respondent's involvement in activities of formal and non-formal organization. Numerical score of 1 was assigned for the membership of informal organization whereas, score 2 was assigned for office bearer in informal organization. Similarly for formal organization, a score of 3 was assigned for the membership where as a score of 4 was assigned for office bearer in the formal organization.
6.	Extension contact	For its measurements schedule was developed. It was measured on 3 point continuum as always, sometime and never by assigning score 2, 1, and 0, respectively.

7.	Sources of information	All the sources of information were listed out and scoring was assigned on three point continuum as regular, occasional and never and scored as 2, 1 and 0, respectively.
8	Risk orientation	Scale developed by Supe and Singh (1969) was used. The items were rated on five point continuum i.e. strongly agree, agree, undecided, disagree and strongly disagree. The scoring procedures were as follows, for positive items the score was assigned as 5, 4, 3, 2 and 1 while the negative items were reversely scored as 1, 2, 3, 4 and 5, respectively.
9	Market orientation	Scale developed by Samanta and Ray (1983). The items were rated on five point continuum i.e. strongly agree, agree, undecided, disagree and strongly disagree. The scoring procedure was as follows, for positive items the score was assigned as 5, 4, 3, 2 and 1 while the negative items was reversely scored as 1, 2, 3, 4 and 5.
10	Innovativeness	It was measured with the help of scale developed by Singh (1972). In this scale there were six items and it was measured in on three continuum as agree, undecided and disagree and scored as 2, 1 and 0, respectively. For positive statement and reverse score for negative statement.
11	Knowledge	Knowledge test was developed and it was measured on two point continuum as Yes and No and it was scored as 1 and 0, respectively.
B. Dependent variable		
1	Adoption gap	It was measured on three point continuums as complete adoption, partial adoption and no adoption by assigning score as 2, 1 and 0, respectively. Measured by using adoption gap index formula $R - A$ $= \frac{\quad}{R} \times 100$ Where, R = Use as per the recommendations (Maximum possible score.) A = Actual use (Actual score)

3.7 Operationalization, scoring and categorization of variables

3.7.1 Independent variables

The operationalization, scoring and categorization of variables i.e. the characteristics of vegetable growers were as follows.

3.7.1.1 Education

It refers to the formal standard of schooling possessed by the individual respondent. A numerical score of one was allotted for successful completion of one year in formal schooling. Then the respondents were grouped into five categories of education according to standards as follows.

Sr. No.	Category	Standard
1	Illiterate	No schools
2	Primary school	1 st to 4 th
3	Middle school	5 th to 7 th
4	High school	8 th to 10 th
5	Junior college	11 th to 12 th
6	Senior college	Above 12 th

3.7.1.2 Farming experience

It refers to number of year undertaken farming as an occupation by the respondents. On the basis of their experience, respondents were classified into three categories by using, mean \pm standard deviation.

Sr. No.	Category	Score
1.	Low	Up to 17.15 years
2.	Medium	17.16 to 38.23 years
3.	High	Above 38.23 years

Mean=27.69

SD=10.54

3.7.1.3 Land holding

It was operationally defined as number of hectares of land actually posses by the respondent. The score of one was assigned for each hectare of land posses by respondent. Depending on the size of land holdings, five categories were made as given by NCEUS, (2008).

Sr. No.	Category	Hectares.
1.	Marginal	Up to 1.00
2.	Small	1.01 to 2.00
3.	Semi-medium	2.01 to 4.00
4.	Medium	4.01 to 10.00
5.	Large	Above 10.00 ha

3.7.1.4 Annual income

It was refers to gross earning of an individual respondent and his family members in terms of rupees received from all sources in a year. The respondents were categorized on the basis of equal interval method.

Sr. No.	Category	Score
1.	Up to Rs. 50,000	1
2.	Rs. 50,000 to Rs. 1,00,000	2
3.	Rs. 1,00,001 to Rs.1,50,000	3
4.	Rs. 1,50,001 to Rs. 2,00,000	4
5.	Above 2,00,000	5

3.7.1.5 Social participation

It was operationally defined as a participation and involvement of respondent in various formal and informal organizations. Numerical score of 1 was assigned for the membership of informal organization whereas, score 2 was assigned for office bearer in informal organization. Similarly for formal organization, a score of 3 was assigned for the membership, whereas a score of 4 was assigned for office bearer in the formal organization. The total score on such item was taken as indicator of social participation. The respondents were

further categorized on the basis of mean \pm standard deviation as follows.

Sr. No.	Category	Score
1.	Low	Up to 7.38
2.	Medium	7.39-13.78
3.	High	Above 13.78
<i>Mean=10.58</i>		<i>SD=3.20</i>

3.7.1.6 Extension contact

It refers to the frequency of contact by the respondent with extension workers of different organization and agencies for acquiring information mostly related to vegetable production practices.

It was measured in terms of number of frequency of contact with extension personnel, for its measurements schedule was developed. It was measured on 3 point continuum as always, sometime and never by assigning score 2, 1 and 0, respectively.

The respondents were categorized into three categorized on the basis of mean \pm standard deviation as below.

Sr. No.	Category	Score
1.	Low	Up to 4.29
2.	Medium	4.30-12.47
3.	High	Above 12.47
<i>Mean=8.38</i>		<i>SD=4.09</i>

3.7.1.7 Sources of information

It refers to frequency with which the sources are consulted by the vegetable growers in order to seek information regarding vegetable production practices. To find out the extent of consultation of respondents to each these sources was measured in three point

continuum as regular, occasional and never and the score was assigned as 2, 1 and 0, respectively. The data were presented by using frequency and percentage of sources of information.

Sr. No.	Sources of information	Frequency of use		
		Regular (2)	Occasional (1)	Never (0)
1.	KVK scientists (University/NGO's)			
2.	Taluka agriculture officer (TAO)			
3.	Sub Divisional Agricultural Officer / SAO			
4.	Agril. Assistant / Agril. Supervisor (State)			
5.	Extension Officer (P.S.) / (Z.P.)			
6.	University Scientist			
7.	Progressive farmers/relatives			
8.	Private company representative			
9.	Radio			
10.	Television			
11.	Farm magazines			
12.	Newspaper (Agro one, etc.)			
13.	Mobile phones			
14.	Internet			
15.	Other			

On the basis of mean \pm standard deviation respondents categorized as follows.

Sr. No.	Category	Score
1.	Low	Up to 9.30
2.	Medium	9.31 to 21.26
3.	High	Above 21.26

Mean=15.28

SD=5.98

3.7.1.8 Risk orientation

It is degree to which a vegetable grower is oriented towards risk and has courage to face the problems in vegetable farming.

It was measured with the help of risk preference scale developed by Supe and Singh (1969). This scale has six items, of which item number 1 and 5 were negative rests was positive. These items were rated on five point continuum i.e. strongly agree, agree, undecided, disagree and strongly disagree. The scoring procedures were as follows, for positive items the score was assigned as 5, 4, 3, 2 and 1 while the negative items were reversely scored as 1, 2, 3, 4 and 5. On the basis of total score obtained by the respondents, they were classified as follow on the basis of mean \pm standard deviation.

Sr. No.	Category	Score
1.	Low	Up to 8.93
2.	Medium	8.94-17.55
3.	High	Above17.55

Mean=13.24 *SD=4.31*

3.7.1.9 Market orientation

It refers to orientation of vegetable grower about prevalence of ready and remunerative market. It was measured with the help of scale developed by Samanta and Ray (1983).This include six item number 1, 4 and 5 were negative and rests was positive. These items were rated on five point continuum i.e. strongly agree, agree, undecided, disagree and strongly disagree and scored as 5, 4, 3, 2 and 1 for positive items while, for negative items it was scored as 1, 2, 3, 4 and 5. An individual vegetable grower's score on market orientation scale was computed. The respondents were categorized on the basis of mean \pm standard deviation.

Sr. No.	Category	Score
1.	Low	Up to 7.48
2.	Medium	7.49-18.74
3.	High	Above 18.74

Mean=13.11 *SD=5.63*

3.7.1.10 Innovativeness

It refers to degree to which an individual vegetable grower is inclined to adopt new idea about vegetable production relatively earlier than the other member of society. The scale developed by Singh (1972) was used adopted to measure the innovativeness of the respondent. In this scale there were six items and it was measured in on three continuum as agree, undecided and disagree and scored as 2, 1 and 0, respectively. For positive statement and reverse score for negative statement.

Further three categories of innovativeness was formed on the basis of mean \pm standard deviation as follow

Sr. No.	Category	Score
1.	Low	Up to 3.72
2.	Medium	3.73-9.10
3.	High	Above-9.10

Mean=6.41 *SD=2.69*

3.7.1.11 Knowledge

English and English (1961) defined knowledge as totality of understood information possessed by an individual. Knowledge was a body of understood information possessed by an individual or by a culture. For the purpose of this study, knowledge was operationalized as the information and understanding of the vegetable growers regarding improved production practices of vegetable cultivation. For measuring the knowledge of vegetable growers a knowledge test was developed as per Dr. Panjabrao Deshmukh Krishi Vidyapeeth, recommended production practices of brinjal and tomato vegetable and in consultation with expert in the field of Horticulture.

A list of different recommended production practices of brinjal and tomato was developed and it was measured on two point continuum as Yes and No and scored as 1 and 0, respectively.

The total score of each respondent was worked out. The respondent brinjal and tomato vegetable growers were further categorized into following three groups by using mean \pm standard deviation and overall knowledge of vegetable growers were as below.

Sr. No.	Knowledge	Score
1.	Low	Up to-5.36
2.	Medium	5.37-12.00
3.	High	Above-12.00

Mean=8.68 *SD=3.32*

3.7.2 Dependent variable

3.7.2.1 Adoption gap

In the present study for measurement of adoption gap in vegetable production practices of two vegetable crops brinjal and tomato were considered as an area under these vegetable crops were higher than other vegetable crop in Nagpur district.

It is operationally defined as gap between recommended brinjal and tomato production practices and actual adoption of brinjal and tomato production practices by the vegetable growers. The list of brinjal and tomato vegetable production practices were developed as per brinjal and tomato recommended production practices of Dr. Panjabrao Deshmukh Krishi Vidyapeeth and in consultation with experts of vegetable crop production and a teacher made scale was developed. It was measured on three point continuums as complete adoption, partial adoption and no adoption and scored as 2, 1 and 0, respectively.

Then on the basis of brinjal and tomato recommended production practices adopted by the vegetable growers, the adoption

gap index was work out separately for brinjal and tomato vegetable by using following formula.

$$\text{Adoption Gap Index} = \frac{R-A}{R} \times 100$$

Where,

R = Use as per the recommendations (Maximum possible score.)

A = Actual use (Actual score)

On the basis of adoption gap index of brinjal and tomato production practices, the overall vegetable production practices gap was measured and it was further categorized into low, medium, high adoption gap as given bellow by using equal interval method.

Sr. No.	Adoption gap	Score
1.	Low	Up to 33.33
2.	Medium	33.34-66.66
3.	High	Above 66.66

3.8 Constraints

Reading (1971) defined constraints as use of force to influence or prevalent as action or utility or state of being completed to do or not to do something.

The Oxford dictionary meaning of the word constraints is confinement, restriction of liberty or compulsion of circumstances compulsion put upon the behavior.

In the present study it is operationally defined as the problems or difficulties faced by the vegetable growers at the time of adoption of vegetable production practices.

The constraints were recorded and they were further classified on the basis of frequency, percentage and rank.

3.9 Statistical procedure used for analysis data

The statistical tests used in the present study for analysis of data area given below.

3.9.1 Frequency and percentage

Frequency and percentage were used for making simple comparisons. The frequency of the particular category was multiplied by hundred and divided by total number of respondents in the particular category to get percentage.

3.9.2 Mean (X)

Mean was calculated by summing the entire individual's score and dividing it by number of respondents.

The formula is

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

Where,

\bar{X}	=	Arithmetic mean
Σ	=	Sum of respondent's score
N	=	Number of respondents

3.9.3 Standard deviation

Standard deviation is a measure of variability calculated around mean. It is denoted by Greek letter δ (sigma).

The formula is,

$$\delta = \text{S.D.} = \frac{\sqrt{N\sum X^2 - (\sum X)^2}}{N}$$

Where,

δ	=	Standard deviation
$\sum X^2$	=	Sum of square of 'X' series
$(\sum X)^2$	=	Square of summation 'X' series
N	=	Number of respondents.

3.9.4 Correlation coefficient

To find out the relation between the selected independent and dependent variables "Karl Pearson's coefficient of correlation" 'r' was worked out by using the following formula.

$$r_{xy} = \frac{\sum XY - (\sum X \sum Y) / N}{\sqrt{[\sum X^2 - (\sum X)^2 / N] [\sum Y^2 - (\sum Y)^2 / N]}}$$

Where,

R = Coefficient of correlation

N = Number of observations

X = Value of independent variables

Y = Value of dependent variables

Chapter IV

RESULTS AND DISCUSSION

The result of present study emerged out after the analysis of the collected empirical facts from the respondents with appropriate discussion there on has been presented in this chapter. The collected data were suitably organised, scored, classified into different classes tabulated and analysed in accordance with the objectives of the study. The findings of the present study have been presented under the following heads.

- 4.1 Personal, socio-economic, communicational and psychological characteristics of vegetable growers.
- 4.2 Adoption gap in vegetable production practices.
- 4.3 Relationship between characteristics of vegetable growers and adoption gap in vegetable production practices
- 4.4 Empirical model of research
- 4.5 Constraints faced by vegetable growers in adoption of vegetable production practices.

4.1 Personal, socio-economic, communicational and psychological characteristics of the vegetable growers.

4.1.1 Education

Education has been considered as one of the important variables with help of which the social change can be achieved. The education of the respondents was studied and the results have been presented in the Table 3.

Table 3: Distribution of respondents according to their education

Sr. No	Category	Vegetable growers		
		Brinjal (n=60) Freq. (%)	Tomato (n=60) Freq. (%)	Overall (N=120) Freq. (%)
1.	Illeterate	01 (01.66)	01 (01.66)	02 (01.67)
2.	Primary school	18 (30.00)	05 (08.34)	23 (19.16)
3.	Middle school	04 (06.64)	05 (08.34)	09 (07.50)
4.	High school	26 (43.37)	37 (61.66)	63 (52.51)
5.	Junior college	06 (10.00)	07 (11.67)	13 (10.83)
6.	Senior college	05 (08.33)	05 (08.33)	10 (08.33)
	Total	60 (100.00)	60 (100.00)	120 (100.00)

Figures in parentheses indicates percentage

It was observed from Table 3 that high proportion of brinjal growers (43.37%) were educated up to high school level, followed by primary school (30.00%) and junior college level (10.00%). In case of tomato growers majority of respondents (61.66%) were educated up to high school level, followed by 11.67 per cent were educated up to junior college level (11th and 12th std).

The tomato vegetable growers were more educated than the brinjal vegetable growers. In overall vegetable growers majority of them (52.51%) were educated up to high school level. The 19.16 per cent of respondents were educated up to primary school and 10.83 per cent of respondents had educated up to junior college level (11th and 12th std). The 08.33 per cent respondents were educated up to senior college. The 01.67 per cent of the respondents was found illiterate. It could be concluded that higher proportion of respondents had high school level education. These findings were supported by the findings of Mohanty, et al. (2013).

4.1.2 Farming experience

It was assumed in the present study that as the farming experience in vegetable production increases, the adoption of the vegetable production practices also increases. Hence, the farming experience in vegetable production was taken as variable in the present study and the results obtained have been presented in Table 4.

Table 4: Distribution of respondents according to their farming experience

Sr. No	Category	Vegetable growers		
		Brinjal (n=60) Freq. (%)	Tomato (n=60) Freq. (%)	Overall (N=120) Freq. (%)
1.	Low	06 (10.00)	10 (16.67)	16 (13.33)
2.	Medium	46 (76.67)	42 (70.00)	88 (73.34)
3.	High	08 (13.33)	08 (13.33)	16 (13.33)
	Total	60 (100.00)	60 (100.00)	120 (100.00)

Figures in parentheses indicates percentage

It was observed from Table 4 that majority of brinjal (76.67%), tomato (70.00%) and overall vegetable growers (73.34%) had medium level of farming experience. In overall equal per cent of respondents (13.33%) had low and high level of farm experience. It could be concluded from results that the majority of the respondents had medium farming experience. The findings were in consonance with the findings reported by the Ajieh and Chuks (2014) and Tekale (2015).

4.1.3 Land holding

Land holding was observed as an important variable of the farming occupation. It provides the workable area to the farmer so that, they can get more chances to apply recommended vegetable production practices on farm. Hence, it has been considered in the present study and the result has been presented in Table 5.

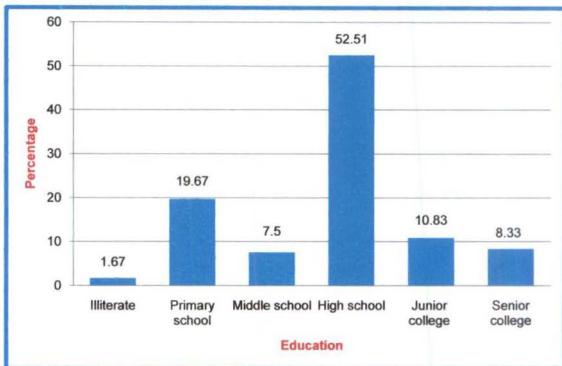


Fig. 3: Distribution of respondents according to their education

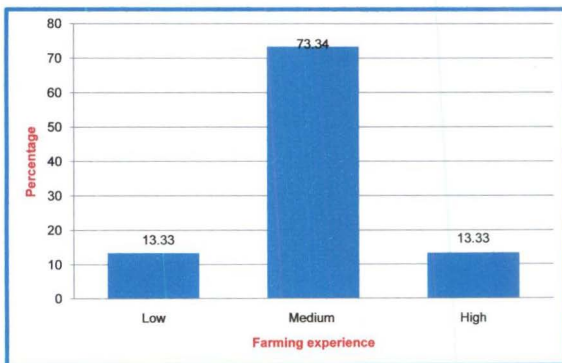


Fig. 4: Distribution of respondents according to their farming experience

Table 5: Distribution of respondents according to their land holding

Sr. No	Category	Vegetable growers		
		Brinjal (n=60) Freq. (%)	Tomato (n=60) Freq. (%)	Overall (N=120) Freq. (%)
1.	Marginal	03 (05.00)	04 (06.67)	07 (05.83)
2.	Small	19 (31.66)	17 (28.33)	36 (30.00)
3.	Semi- medium	22 (36.67)	20 (33.33)	42 (35.00)
4.	Medium	15 (25.00)	16 (26.67)	31 (25.83)
5.	Large	01 (01.67)	03 (05.00)	04 (03.34)
	Total	60 (100.00)	60 (100.00)	120 (100.00)

Figures in parentheses indicates percentage

It was observed from Table 5 that higher proportion of respondents (36.67%) brinjal growers were belonged semi- medium land holding (2.01 to 4.00 ha), followed by 31.66 per cent were belonged to small (1.01 to 2.00 ha) land holding category. The 05.00 per cent of brinjal growers had marginal land holding. In case of tomato growers higher proportion of respondents (33.33%) were belonged to semi- medium (2.01 to 4.00 ha) land holding followed by 28.33 per cent belonged to small land holding and nearly equal per cent were belonged to marginal (06.67%) and large (05.00%) land holding.

By and large higher proportion of respondent vegetable growers (35.00%) belonged to semi- medium land holding followed by 30.00 per cent of vegetable growers were belonged to small level holding (1.01 to 2.00 ha) and over one fourth per cent of respondents (25.83%) had medium land holding (4.01 to 10.00 ha). 05.83 per cent respondents had marginal level and meagre per cent of respondents (03.34%) had large land holding. The higher proportions of the respondents were belonged to semi-medium to small land holdings. This finding was supported by Kolte (2002) and Tekale (2015).

4.1.4 Annual income

Annual income provides the availability of the capital for farming. The result obtained has been presented in the following Table 6.

Table 6: Distribution of respondents according to their annual income

Sr. No	Annual income	Vegetable growers		
		Brinjal (n=60) Freq. (%)	Tomato (n=60) Freq. (%)	Overall (N=120) Freq. (%)
1.	Low	03 (05.00)	05 (08.33)	08 (06.67)
2.	Low medium	17 (28.33)	27 (45.00)	44 (36.67)
3.	Medium	15 (25.00)	13 (21.66)	28 (23.33)
4.	Medium high	05 (08.33)	04 (06.67)	09 (07.50)
5.	High	20 (33.24)	11 (18.34)	31 (25.83)
	Total	60 (100.00)	60 (100.00)	120 (100.00)

Figures in parentheses indicates percentage

It was apparent from the Table 6 that nearly one third per cent of brinjal vegetable growers (33.24%) had high annual income followed by 28.33 and 25.00 per of brinjal growers had low medium and medium annual income, respectively. Whereas, in case of tomato growers high proportion of respondents (45.00%) had low medium annual income followed by 21.66 and 18.34 per cent of respondents had medium and high annual income, respectively. The 08.33 and 06.67 per cent of tomato growers had low and medium high annual income, respectively.

In case of overall vegetable growers higher per cent of vegetable growers (36.67%) had low medium (Rs.; 50,000/- to 1,00,000/-) annual income. Nearly equal per cent of vegetable growers (25.83 and 23.33%) had high annual income, respectively. Only 07.50 and 06.67 per cent of respondents were belonged to medium high (1,50,001/- to 2,00,000) and low (up to Rs. 50,000/-) annual income.

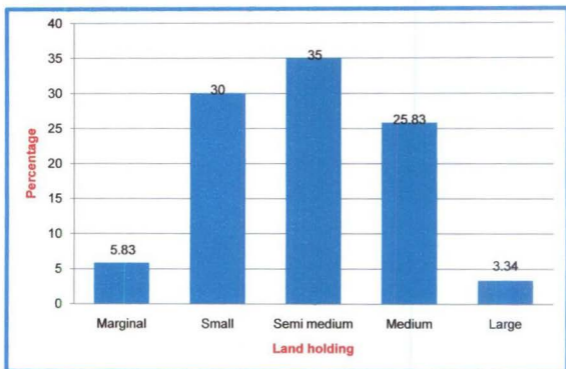


Fig. 5: Distribution of respondents according to their land holding

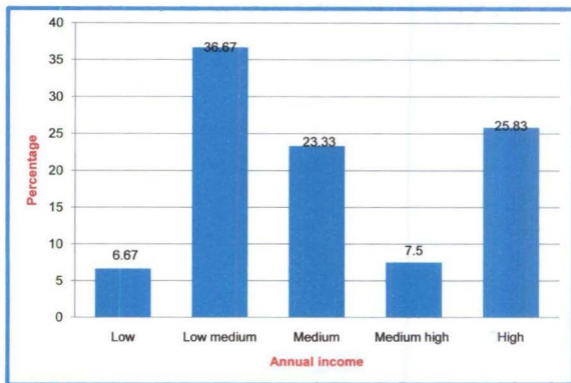


Fig. 6: Distribution of respondents according to their annual income

The higher proportion of respondents had low medium (50,001/- to 1,00,000/-) annual income.

4.1.5 Social participation

The distribution of the respondents according to their social participation has been presented in following Table 7.

Table 7: Distribution of respondents according to their social participation

Sr. No	Category	Vegetable growers		
		Brinjal (n=60) Freq. (%)	Tomato (n=60) Freq. (%)	Overall (N=120) Freq. (%)
1.	Low	08 (13.33)	18 (30.00)	26 (21.67)
2.	Medium	39 (65.00)	30 (50.00)	69 (57.50)
3.	High	13 (21.67)	12 (20.00)	25 (20.83)
	Total	60 (100.00)	60 (100.00)	120 (100.00)

Figures in parentheses indicates percentage

It was observed from Table 7 that majority of brinjal (65.00%), tomato (50.00%) and overall vegetable growers (57.50%) had medium level of social participation. The overall vegetable growers (21.67%) had low level of social participation and 20.83 per cent had high level of social participation. It could be concluded from results that the majority of the respondents had medium level of social participation. The findings were in consonance with the findings reported by the Dudhate (2002).

4.1.6 Extension contact

The distribution of the respondents according to their extension contact has been presented in following Table 8.



Table 8: Distribution of respondents according to their extension contact

Sr. No	Category	Vegetable growers		
		Brinjal (n=60) Freq. (%)	Tomato (n=60) Freq. (%)	Overall (N=120) Freq. (%)
1.	Low	12 (20.00)	13 (21.67)	25 (20.83)
2.	Medium	38 (63.33)	35 (58.33)	73 (60.84)
3.	High	10 (16.67)	12 (20.00)	22 (18.33)
	Total	60 (100.00)	60 (100.00)	120 (100.00)

Figures in parentheses indicates percentage

It was observed from Table 8 that majority of brinjal (63.33%), tomato (58.33%) and overall vegetable growers (60.84%) had medium extension contact. The overall vegetable growers (20.83%) had low extension contact and 18.33 per cent had high extension contact. It could be concluded from results that the majority of the respondents had medium extension contact. The findings were in consonance with the findings reported by the Boruah, *et al.* (2015).

4.1.7 Sources of information

It refers to frequency with which the sources were consulted by the vegetable growers in order to seek information regarding vegetable production practices. To find out the extent of consultation of respondents to each these sources were measured in three point continuum as regular, occasional and never and the score was assigned as 2, 1 and 0, respectively. The data were presented by using frequency and percentage of sources of information.

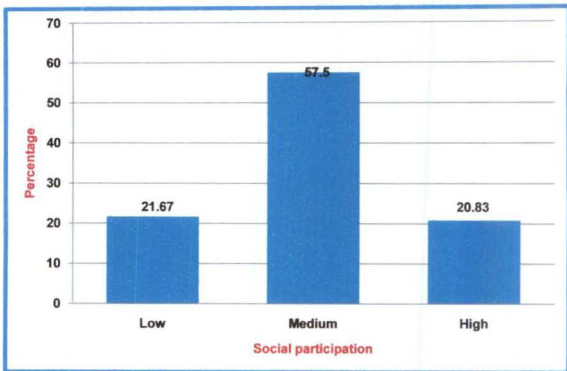


Fig. 7: Distribution of respondents according to their social participation

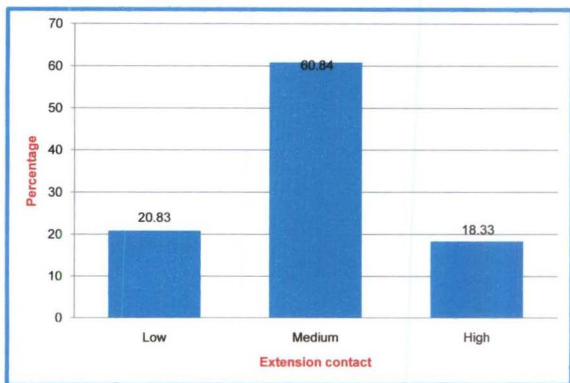


Fig. 8: Distribution of respondents according to their extension contact

Table 9: Distribution of respondent according to various types of information sources used by them

Sr. No.	Sources of information	Frequency of use (N=120)		
		Regular (2)	Occasional (1)	Never (0)
1.	KVK scientists (University/NGO's)	06` (05.00)	14 (11.67)	100 (83.33)
2.	Taluka Agriculture Officer (TAO)	02 (01.67)	16 (13.33)	102 (85.00)
3.	Sub Divisional Agricultural Officer / DSAO	00 (00.00)	04 (03.33)	116 (96.67)
4.	Agril. Assistant / Agril. Supervisor (State)	08 (06.67)	100 (83.33)	12 (10.00)
5.	Extension Officers (PS) / (ZP)	00 (00.00)	06 (05.00)	114 (95.00)
6.	Gram sevak	14 (11.67)	37 (30.83)	69 (57.50)
7.	Progressive farmers/ relatives	42 (35.00)	48 (40.00)	30 (25.00)
8.	Private company representative	30 (25.00)	46 (38.33)	44 (36.67)
9.	Radio	00 (00.00)	07 (05.83)	113 (94.17)
10.	Television	20 (16.67)	30 (25.00)	70 (58.33)
11.	Farm magazines	00 (00.00)	06 (05.00)	114 (95.00)
12.	Newspapers (Agro-one, etc.)	28 (23.34)	34 (28.33)	58 (48.33)
13.	Mobile phones	39 (32.50)	40 (33.34)	41 (34.16)
14.	Internet	00 (00.00)	08 (06.67)	112 (93.33)

Figures in parentheses indicates percentage

The data depicted in Table 9 shows that, in case of regular use of information sources by vegetable growers were progressive farmers / relatives (35.00%), followed by private agricultural company representative (25.00%), newspapers (Agro one, etc) (23.33%), television (16.67%) and gram sevak (11.67%).

The meager per cent of respondents were regularly use the sources namely, Agriculture Assistant / Agriculture Supervisors (06.67%), KVK Scientist (University / NGO'S) (05.00%) and Taluka Agriculture Officer (01.67%), respectively. The progressive farmers / relatives they were the locally available sources from same homogeneous system so they were good source of information. The private agricultural company representative sale their input to vegetable growers and they were the one of best information to vegetable growers in rural areas.

In case of occasionally used sources of information by respondent vegetable growers namely, Agriculture Assistant / Agriculture Supervisor (83.00%), followed progressive farmers / relatives (40.00%), private Agricultural company representative (38.33%), mobile phones (33.34%), Gram sevak (30.83%), newspapers (28.33%), television (25.00%), Taluka Agriculture Officer (13.33%) and KVK Scientist (University / NGO's) (11.67%), respectively. The meager per cent of respondents were occasionally use the sources namely, internet (06.67%), radio (05.83%), extension officers (05.00%) and farm magazine (05.00%), respectively.

The great majority of respondents were not use the sources of information namely, Sub divisional Agriculture Officer / DSAO (96.67%), Extension Officers (PS / ZP) (95.00%), farm magazines (95.00%), radio (94.17%), internet (93.33%), Taluka Agriculture Officer (85.00%) and KVK Scientist (University / NGO's) (83.33%), respectively. The respondent were not using information sources were television (58.00%), Gram sevak (57.50%), newspaper (48.33%), private Agricultural company representative (36.67%) and mobile phones (34.16%), respectively.

Table 10: Distribution of respondents according to their sources of information

Sr. No	Category	Vegetable growers		
		Brinjal (n=60) Freq. (%)	Tomato (n=60) Freq. (%)	Overall (N=120) Freq. (%)
1.	Low	12 (20.00)	11 (18.33)	23 (19.17)
2.	Medium	40 (66.67)	35 (58.34)	75 (62.50)
3.	High	08 (13.33)	14 (23.33)	22 (18.33)
	Total	60 (100.00)	60 (100.00)	120 (100.00)

Figures in parentheses indicates percentage

It was observed from Table 10 that majority of brinjal (66.67%), tomato (58.33%) and overall vegetable growers (62.50%) had medium sources of information about vegetable production. The 19.17 per cent overall vegetable growers had low sources of information and 18.33 per cent had high sources of information. It could be concluded from results that the majority of the respondents had medium sources of information. The findings were in consonance with the findings reported by the Mutkule (1999).

4.1.8 Risk orientation

The distribution of the respondents according to their risk orientation has been presented in following Table 11.

Table 11: Distribution of respondents according to their risk orientation

Sr. No	Category	Vegetable growers		
		Brinjal (n=60) Freq. (%)	Tomato (n=60) Freq. (%)	Overall (N=120) Freq. (%)
1.	Low	08 (13.33)	06 (10.00)	14 (11.67)
2.	Medium	45 (75.00)	46 (76.67)	91 (75.83)
3.	High	07 (11.67)	08 (13.33)	15 (12.50)
	Total	60 (100.00)	60 (100.00)	120 (100.00)

Figures in parentheses indicates percentage

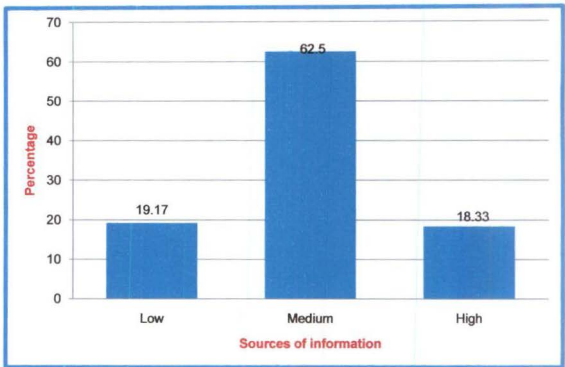


Fig. 9: Distribution of respondents according to their sources of information

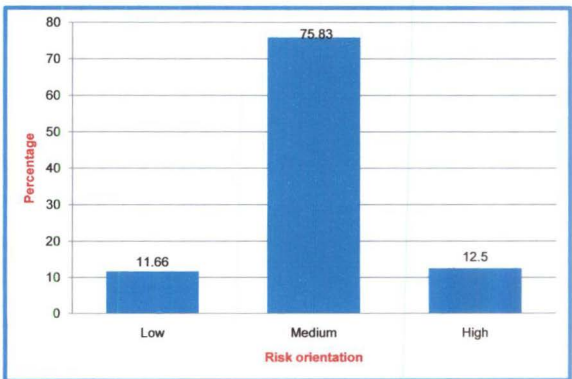


Fig. 10: Distribution of respondents according to their risk orientation

It was worthwhile to note from Table 11 that majority of brinjal (75.00%), tomato (76.67%) and overall vegetable growers (75.83%) had medium risk orientation. The 12.50 per cent overall vegetable growers had high risk orientation and 11.66 per cent had low risk orientation. It could be concluded from results that the majority of the respondents had medium risk orientation. The findings were in consonance with the findings reported by the Tekale (2015).

4.1.9 Market orientation

The distribution of the respondents according to their market orientation has been presented in following Table 12.

Table 12: Distribution of respondents according to their market orientation

Sr. No	Category	Vegetable growers		
		Brinjal (n=60) Freq. (%)	Tomato (n=60) Freq. (%)	Overall (N=120) Freq. (%)
1.	Low	12 (20.00)	11 (18.33)	23 (19.17)
2.	Medium	40 (66.67)	38 (63.34)	78 (65.00)
3.	High	08 (13.33)	11 (18.33)	19 (15.83)
	Total	60 (100.00)	60 (100.00)	120 (100.00)

Figures in parentheses indicates percentage

The Table 12 shows that majority of brinjal (66.67%), tomato (63.34%) and overall vegetable growers (65.00%) had medium market orientation (7.49 to 18.74). The overall vegetable growers (19.17%) had low market orientation and 15.83 per cent had high market orientation. It could be concluded from results that the majority of the respondents had medium market orientation. The findings were in consonance with the findings reported by the Nemade (2007).

4.1.10 Innovativeness

The distribution of the respondents according to their innovativeness has been presented in following Table 13.

Table 13: Distribution of respondents according to their innovativeness

Sr. No	Category	Vegetable growers		
		Brinjal (n=60) Freq. (%)	Tomato (n=60) Freq. (%)	Overall (N=120) Freq. (%)
1.	Low	10 (16.66)	07 (11.67)	17 (14.17)
2.	Medium	40 (66.68)	36 (60.00)	76 (63.33)
3.	High	10 (16.66)	17 (28.33)	27 (22.50)
	Total	60 (100.00)	60 (100.00)	120 (100.00)

Figures in parentheses indicates percentage

It was observed from Table 13 that majority of brinjal (66.68%), tomato (60.00%) and overall vegetable growers (63.33%) had medium innovativeness. The 22.50 per cent overall vegetable growers had high innovativeness and 14.17 per cent had low innovativeness. It could be concluded from results that the majority of the respondents had medium innovativeness. The findings were in consonance with the findings reported by the Tekale (2015).

4.1.11 Knowledge

Adequate and relevant knowledge of vegetable cultivation practices by the vegetable growers has relevance in obtaining maximum benefit through production. Looking to the importance of knowledge, the practice wise knowledge of vegetable grower's about brinjal, tomato and overall vegetable production was studied and the data in this regards has been presented Table 14 below.

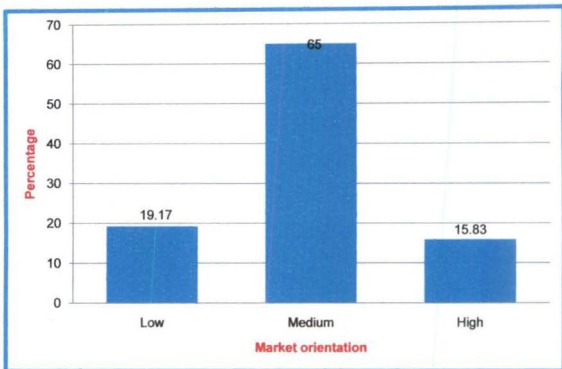


Fig. 11: Distribution of respondents according to their market orientation

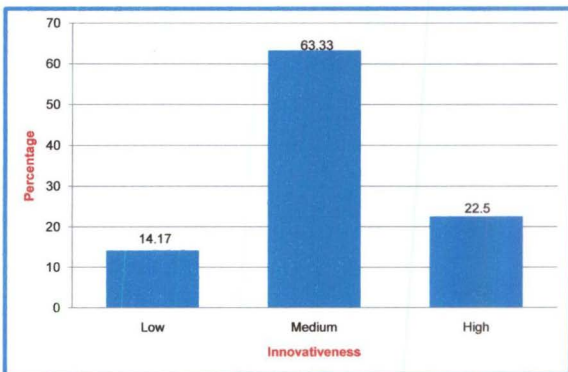


Fig. 12: Distribution of respondents according to their innovativeness

Table 14: Distribution of respondents according to their practice wise knowledge about brinjal, tomato and overall vegetable production practices

Sr. No.	Recommended practices	Knowledge (N=120)		
		Brinjal (n=60) Freq. (%)	Tomato (n=60) Freq. (%)	Overall (N=60) Freq. (%)
A.	Preparatory tillage			
1.	Selection of soil	47 (78.33)	53 (88.33)	100 (83.34)
2.	Ploughing and harrowing	56 (93.33)	52 (86.67)	108 (90.00)
3.	FYM	57 (95.00)	58 (96.67)	115 (95.83)
B.	Sowing time			
1.	Kharif	50 (83.33)	52 (86.66)	102 (85.00)
2.	Rabi	45 (75.00)	48 (80.00)	93 (77.50)
3.	Summer	34 (56.67)	40 (66.66)	74 (61.67)
C.	Sowing Method			
1.	Transplanted after 6-8 weeks	33 (55.00)	37 (61.67)	70 (58.33)
D.	Seed rate	31 (51.67)	27 (45.00)	58 (48.33)
E.	Varieties	34 (56.66)	30 (50.00)	64 (53.33)
F.	Seed treatment	28 (46.67)	22 (36.66)	50 (41.66)
G.	Spacing	22 (36.66)	25 (41.67)	47 (39.17)
H.	Interculture	40 (66.67)	44 (73.33)	84 (70.00)
I.	Irrigation interval	44 (73.33)	47 (78.33)	91 (75.84)
J.	Method of irrigation	33 (55.00)	35 (58.33)	68 (56.66)
K.	Fertilizers	31 (51.67)	33 (55.00)	64 (53.33)
L.	Plant protection measures			
1.	Insects / pests	37 (61.67)	39 (65.00)	76 (63.33)
2.	Diseases	32 (53.33)	27 (45.00)	58 (48.33)
M.	Harvesting	53 (88.33)	51 (85.00)	104 (86.67)
N.	Yield	51 (85.00)	49 (81.66)	100 (83.33)

Figures in parentheses indicates percentage

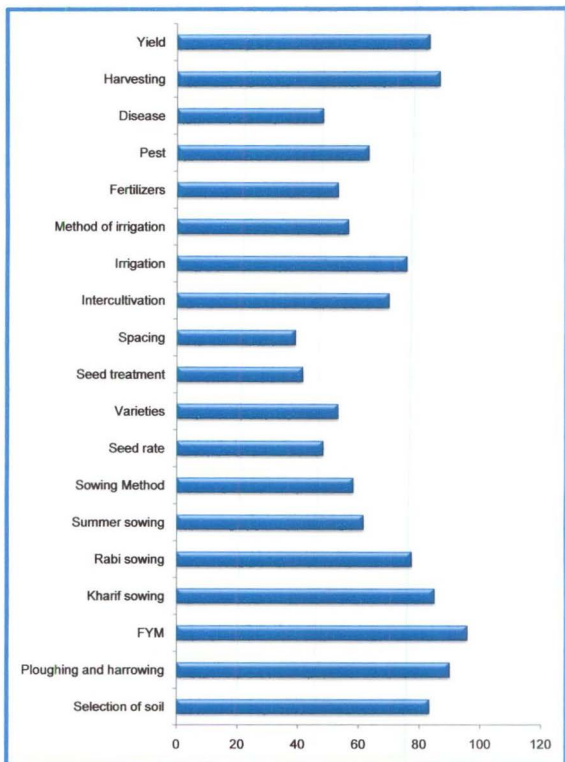


Fig. 13: Distribution of respondents according to their practice wise extent of knowledge about overall vegetable production practices

It was observed from Table 14 that in case of preparatory tillage great majority of respondents brinjal (78.33%), tomato (88.33%) and overall vegetable growers (83.34%) had knowledge about selection of soil medium heavy fertile and well drained soil whereas, 93.33 per cent brinjal growers, 86.67 per cent tomato growers and 90.00 per cent overall vegetable growers were aware about 2-3 ploughing and harrowing before sowing. In case of FYM, great majority of respondents brinjal (95.00%), tomato (95.83%) and overall vegetable growers (95.83%) had knowledge about use of well decomposed FYM @ 30 to 40 cart load per hectore for vegetable crops.

By and large great majority of respondents were very well aware about preparatory tillage practices.

In case of sowing time, the majority of brinjal (83.33%), tomato (86.66%) and overall vegetable growers (95.00%) were having knowledge about kharif sowing (May-June) whereas, brinjal (75.00%), tomato (80.00%) and overall vegetable (77.50%) growers had knowledge about rabi sowing (Aug-Sept), and 56.66, 66.67 and 61.67 per cent brinjal, tomato and overall vegetable growers, respectively had knowledge about summer sowing (Dec-Jan). more per cent of respondents had knowledge about kharif vegetable sowing time as compared to rabi and summer vegetable sowing time.

With regard to sowing method (nursery), the majority of brinjal (55.00%), tomato (61.67%) and overall vegetable growers (58.33%) were having knowledge about preparation of seedling on raised bed and transplanted 4-6 weeks after sowing. The 51.66, 45.00 and 48.34 per cent brinjal, tomato and overall vegetable growers possessed knowledge about seed rate respectively. The per cent of brinjal (56.66%), tomato (50.00%) and overall vegetable growers (53.33%) possessed knowledge about varieties of brinjal, tomato and overall vegetables, respectively.

The brinjal (46.67%), tomato (36.36%) and overall vegetable growers (41.66%) had knowledge about seed treatment Captan

@ 3 gm/kg or Carbendazim 2 gm/kg, 36.66 per cent brinjal, 41.67 per cent tomato and 39.16 per cent overall vegetable growers possessed knowledge about plant to plant and row to row spacing and 66.67 per cent brinjal, 73.33 per cent tomato and 70.00 per cent overall vegetable growers possessed knowledge about different inter cultivation operations like weeding, hoeing, etc.

The majority of brinjal (73.33%), tomato (78.33%) and overall vegetable growers (75.83%) had knowledge about irrigation requirement. Whereas, 55.00 per cent brinjal, 58.33 per cent tomato and 56.66 per cent overall vegetable growers had knowledge about method of irrigation (ridges and furrows). The majority of brinjal (51.67%), tomato (55.00%) and overall vegetable growers (53.33%) had knowledge about different recommended fertilizer dose to brinjal, tomato and overall vegetables, respectively.

In case of plant protection measures, majority of the brinjal (61.67%), tomato (65.00%) and overall vegetable growers (63.33%) possessed knowledge about different insects / pests of vegetable crops and its control measures. The 53.33 per cent brinjal, 45.00 per cent tomato and 48.33 per cent overall vegetable growers had knowledge about different diseases like little leaf, bacterial wilt, blossom end rot, downy mildew, etc. and its control measures of brinjal, tomato and overall vegetables.

The great majority of the brinjal (88.33%), tomato (85.00%) and overall vegetable growers (86.67%) possessed knowledge about harvesting of brinjal, tomato and vegetables whereas, 85.00 per cent brinjal, 81.66 per cent tomato, 83.33 per cent overall vegetable growers had knowledge about yield.

By and large majority of respondent vegetable growers were very well aware about all vegetable production practices except seed treatment and disease management.

The distribution of the respondents according to their overall knowledge about different vegetable production practices has been presented in following Table 15.

Table 15: Distribution of respondents according to their overall knowledge

Sr. No	Category	Vegetable growers		
		Brinjal (n=60) Freq. (%)	Tomato (n=60) Freq. (%)	Overall (N=120) Freq. (%)
1.	Low	10 (16.66)	11 (18.33)	21 (17.50)
2.	Medium	39 (65.00)	38 (63.33)	77 (64.16)
3.	High	11 (18.33)	11 (18.33)	22 (18.33)
	Total	60 (100.00)	60 (100.00)	120 (100.00)

Figures in parentheses indicates percentage

It was observed from Table 15 that majority of brinjal (65.00%), tomato (63.33%) and overall vegetable growers (64.16%) had medium level of knowledge (05.36 to 12.00). about different vegetable production practices. The 18.33 per cent of brinjal, tomato and overall vegetable growers had high level of knowledge about brinjal, tomato and overall vegetable production practices. Whereas, 16.67 per cent brinjal, 18.33 per cent tomato and overall vegetable growers had low level of knowledge, respectively. The majority of respondents had medium knowledge. The findings were in consonance with the findings reported by the Shrivastava, *et al.* (2002).

4.2 Adoption gap

One of the objectives of this study was to study the adoption gap in vegetable production practices, for these different recommended production practices of brinjal and tomato vegetables were considered and on that basis the practice wise overall adoption gap in vegetable production was studied and data have been presented in Table 16

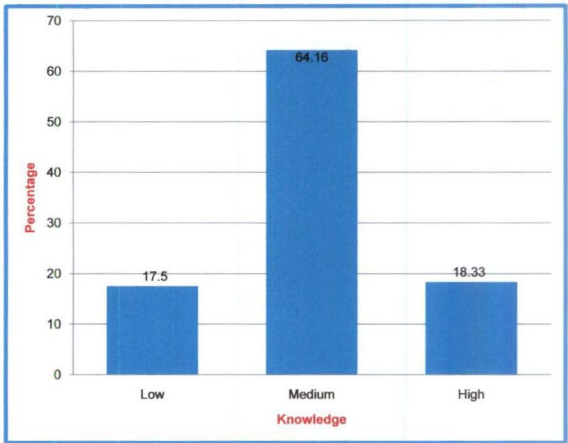


Fig. 14: Distribution of respondents according to their overall knowledge

Table 16: Distribution of respondents according to adoption gap in brinjal, tomato and overall vegetable production practices

Sr. No.	Recommended practices	Adoption gap (N=120)		
		Brinjal (n=60) Freq. (%)	Tomato (n=60) Freq. (%)	Overall (n=60) Freq. (%)
A.	Preparatory tillage			
1.	Selection of soil	08 (13.33)	10 (16.66)	18 (15.00)
2.	Ploughing and harrowing	05 (08.33)	07 (11.67)	12 (10.00)
3.	FYM	27 (45.00)	32 (53.33)	59 (59.17)
B.	Sowing time			
1.	Kharif	24 (40.00)	27 (45.00)	51 (42.50)
2.	Rabi	28 (46.66)	30 (50.00)	58 (48.34)
3.	Summer	31 (51.66)	30 (50.00)	61 (50.84)
C.	Sowing Method			
1.	Transplanted after 6-8 weeks	04 (06.66)	06 (10.00)	10 (16.67)
D.	Seed rate	41 (68.33)	45 (75.00)	86 (71.66)
E.	Varieties	46 (76.67)	49 (81.67)	95 (79.16)
F.	Seed treatment	12 (20.00)	33 (55.00)	45 (37.50)
G.	Spacing	25 (41.67)	23 (38.33)	48 (40.00)
H.	Interculture	23 (38.33)	20 (33.33)	43 (35.84)
I.	Irrigation interval	20 (33.33)	26 (43.33)	46 (38.33)
J.	Method of irrigation	15 (25.00)	34 (56.66)	49 (40.83)
K.	Fertilizers	22 (36.66)	30 (50.00)	52 (43.33)
L.	Plant protection measures			
1.	Insects / pests	33 (55.00)	29 (48.33)	62 (51.67)
2.	Disease	31 (51.67)	34 (56.67)	65 (54.16)
M.	Harvesting	08 (13.33)	11 (18.33)	19 (15.83)
N.	Yield	15 (25.00)	17 (28.33)	32 (26.67)

Figures in parentheses indicates percentage

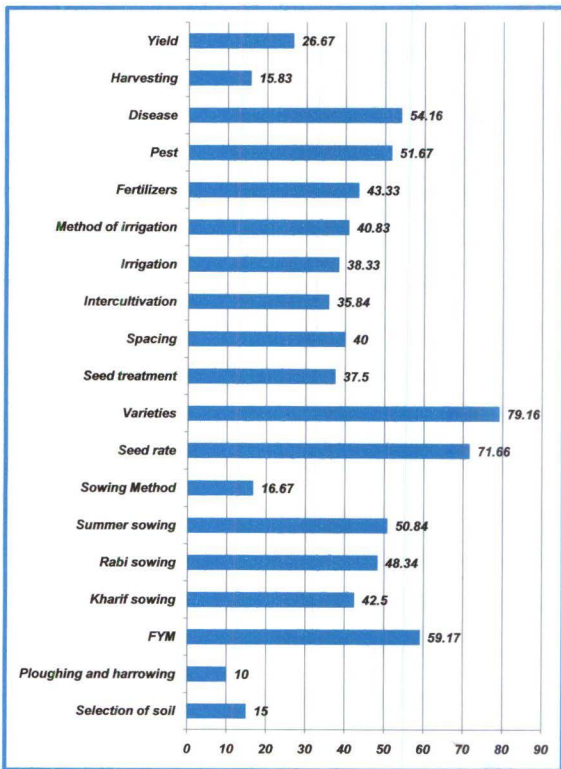


Fig. 15: Distribution of respondents according to adoption gap in overall vegetable production practices

It was apparent from Table 16 that with respect to preparatory tillage per cent of brinjal (13.33%), tomato (16.66%) and overall vegetable growers (15.00%) had adoption gap in selection of medium to heavy fertile and well drain soil for vegetable production and also less per cent of respondents had adoption gap in tillage practice ploughing and 2-3 harrowing before sowing to brinjal (08.33%), tomato (11.67%) and overall vegetables growers (10.00%). In case of use of recommended FYM 45.00, 53.33 and 49.17 per cent respondents were not using well decomposed FYM @30 to 40 cart load per hectare at the time of sowing to brinjal, tomato and overall vegetable growers, respectively. There was less adoption gap in preparatory tillage of vegetable production.

Except use of recommended FYM to vegetable crops, as reported by the respondent due to non availability of FYM, they were not using recommended doses of FYM for vegetable crop, so in this case there was gap observed.

In case of sowing time, the over two fifth of brinjal (40.00%), tomato (45.00%) and overall vegetable growers (42.50%) were having adoption gap in kharif vegetable sowing. Whereas, brinjal (46.66%), tomato (50.00%) and overall vegetable (48.34%) growers had adoption gap in rabi sowing, and 51.66, 50.00 and 50.84 per cent brinjal, tomato and overall vegetable growers, respectively had adoption gap in summer sowing. This might be due to climatic conditions and timely availability of seeds.

With regard to sowing method (nursery), the very less per cent of respondent brinjal (06.66%), tomato (10.00%) and overall vegetable growers (16.67%) observed adoption gap in preparation of seedling on raised bed and it after transplanted 4-6 weeks after sowing. The majority of vegetable growers brinjal (68.33%), tomato (75.00%) and overall vegetable growers (71.66%) were not adopting recommended seed rate. The used high seed rate of vegetable seeds and gap was high. The 76.67 per cent brinjal, 81.67 per cent tomato and 79.16 per

cent overall vegetable growers shows adoption gap in use of recommended varieties. As reported by the respondent vegetable growers recommended varieties of vegetable were not available in market so, they were using private vegetable seeds company varieties so this gap was high.

In case of seed treatment the respondent brinjal (20.00%), tomato (55.00%) and overall vegetable growers (37.50%) had adoption gap in use of recommended seed treatment. The 41.67 per cent brinjal, 38.33 per cent tomato and 40.00 per cent overall vegetable growers shows adoption gap in spacing i. e. plant to plant and row to row spacing and over one third of brinjal (38.33%), tomato (33.33%) and overall vegetable growers (35.83%) were not adopted interculture practices like weeding, hoeing, etc.

The percentage of respondents brinjal (33.33%), tomato (43.33%) and overall vegetable growers (38.33%) were not adopting irrigation at recommended interval and as per need of vegetable crop this gap was due to electric problem, labour problem and irrigation water availability as reported by the vegetable growers. Whereas, 25.00 per cent brinjal, 56.66 per cent tomato and 40.33 per cent overall vegetable growers were not adopting proper method of irrigation (ridges and furrows) to vegetable crops. In case of fertilizer doses, 36.67 per cent brinjal, 50.00 per cent tomato and 43.33 per cent overall vegetable growers were not adopting recommended fertilizer doses to brinjal, tomato and overall vegetables, respectively. The respondents reported this adoption gap due to inadequate and timely non availability of fertilizers and high cost of fertilizers.

In case of plant protection measures, it was observed that majority of the brinjal (55.00%), tomato (48.33%) and overall vegetable growers (51.67%) were not adopting recommended control measures of insects / pests. The majority of brinjal (51.67%), tomato (56.67%) and overall vegetable growers (54.16%) were not adopting recommended control measures for control of vegetable diseases. The

respondents reported that to this gap was due to non availability of control measures, high cost of control measures and also lack of knowledge about this practices.

The less than two fifth of respondents brinjal (13.33%), tomato (18.33%) and overall vegetable growers (15.33%) shows gap in recommended time of harvesting. As reported by the respondent these gap was due to timely non availability of labours, climatic and market factors.

In case yield of vegetables over one fourth of respondents i. e. brinjal (25.00%), tomato (28.33%) and overall vegetables growers (26.67%) were not received recommended yield from vegetable crops.

By and large majority of respondents were adopting recommended vegetable practices like preparatory tillages selection of soil, ploughing and harrowing, sowing time, method of sowing, seed treatment, spacing, interculture operations, irrigation interval, method of irrigation, fertilizer doses application, harvesting and yield of vegetables, so the adoption gap in these practices was less. Whereas, majority of respondents were not adopting practices like use of FYM by tomato and overall vegetable growers, seed rate of vegetable crops, varieties, use of plant protection measures for control of insects / pests and diseases of vegetables. So, in case of these practices adoption gap was more than 50.00 per cent observed. It is necessary to make publicity of vegetable production practices use of FYM, recommended seed rate, recommended varieties, plant protection measures for control of insects / pests and diseases of vegetable crops and also solving the problems of vegetable growers regarding adoption of these practices for obtaining maximum benefits from vegetable production.

Table 17: Distribution of respondents according to their overall adoption gap in vegetable production practices

Sr. No	Category	Vegetable growers		
		Brinjal (n=60) Freq. (%)	Tomato (n=60) Freq. (%)	Overall (N=120) Freq. (%)
1.	Low	12 (20.00)	07 (11.66)	19 (15.83)
2.	Medium	29 (48.34)	30 (50.00)	59 (49.16)
3.	High	19 (31.66)	23 (38.34)	42 (35.00)
	Total	60 (100.00)	60 (100.00)	120 (100.00)

Figures in parentheses indicates percentage

It was observed from Table 17 that nearly half of the brinjal (48.34%), tomato (50.00%) and overall vegetable growers (49.16%) had medium level of adoption gap. Whereas, over one third of overall vegetable growers (35.00%) had high adoption gap and in use of vegetable production practices 15.83 per cent had low level of adoption gap. It could be concluded from results that the majority of the respondents had medium level of adoption gap. The findings were in consonance with the findings reported by the Barman, *et al.* (2015).

4.3 Relationship between selected personal, socio-economic, communicational and psychological characteristics of respondents with their adoption gap in vegetable production practices.

Relationship between selected personal, socio-economic, communicational and psychological characteristics of respondents with their adoption gap in vegetable production practices has been presented in Table 18.

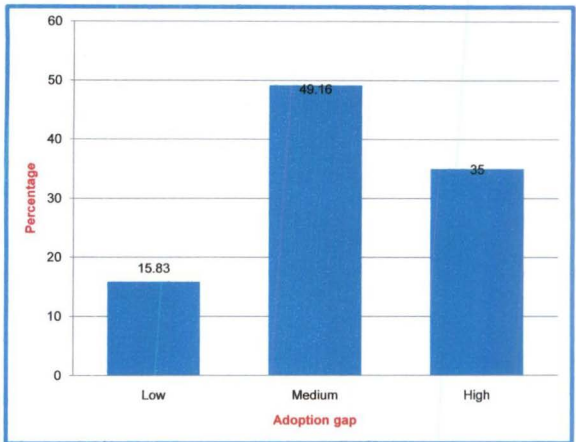


Fig. 16: Distribution of respondents according to their overall adoption gap in vegetable production practices by the vegetable growers

Table 18: Correlation coefficients of characteristics of the respondents with their adoption gap

Sr. No.	Variables	'r' values
1	Education	-0.4315**
2	Farming experience	-0.2421*
3	Land holding	-0.6099**
4	Annual income	-0.8097**
5	Social participation	-0.3286**
6	Extension contact	-0.3270**
7	Sources of information	-0.4886**
8	Risk orientation	0.1716 ^{NS}
9	Market orientation	-0.4175**
10	Innovativeness	-0.2955**
11	Knowledge	-0.4722**

** - Significant at 0.01 per cent level,

* - Significant at 0.05 per cent level,

NS – Non-significant

It could be seen from Table 18, the characteristics of respondents namely, education, land holding, annual income, social participation, extension contact, sources of information, market orientation, innovativeness and knowledge were negatively and significantly correlated at 0.01 per cent level of probability with adoption gap in vegetable production practices. Farming experience was negatively and significantly correlated at 0.05 per cent level of probability with adoption gap in vegetable production practices. The characteristics of respondents namely, risk orientation was non-significantly related with adoption gap in vegetable production practices.

The medium level of education enhance his capacity to understand the intricacies involved in various vegetable production practices and applying them in the field situation hence a negative and significant relationship was observed between adoption gap in vegetable production practices. Similar findings were also reported by Wattamwar and Deshmukh (2008).

The correlation coefficient between knowledge and adoption gap was found to be negative and significant at 0.01 per cent level of probability. Similar findings were also reported by Bhati (2002).

If the size of land holdings is big, than more number of vegetable production practices were adopted. Hence a negative and significant relationship was observed between adoption gap in vegetable production practices and the variable land holding. Similar results were also reported by Gade (2012).

Extension contact enables farmers to attend a number of training conducted by a number of organizations along with their discussion with vegetable experts, and in training also visit to successful farmers' fields, group discussion, conduct study tour to other states, etc. were also organized. Therefore extension contact had negative and significant relationship with adoption gap in vegetable production practices.

The result therefore stated that, the characteristics of respondents namely, education, land holding, annual income, social participation, extension contact, sources of information, market orientation and innovativeness along with knowledge are the factors that negative influence on adoption gap in vegetable production practices.

From the above data, it was observed that, independent variables viz., education, farming experience, land holding, annual income, social participation, extension contact, sources of information, market orientation, innovativeness and knowledge were found negatively and significantly correlated with adoption gap in vegetable production practices. Therefore, the null hypothesis already formed in these has been accepted whereas, in case of risk orientation, it had non-significant relation with the adoption gap. Thus, the null hypothesis formed for this variable was rejected.

4.4 Empirical model of study.

Considering the tested relations amongst the independent and dependent variables the empirical model was prepared and the relationship has been depicted in Fig. 17. The empirical model shows the observed relation of independent variables with the dependent variables.

4.5 Constraints faced by the vegetable growers

Table 19: Distribution of respondents according to their constraints faced by vegetable growers

Sr. No.	Constraints	Respondents (n=60)		Rank
		Frequency	Percentage	
A	Technical			
1.	Lack of knowledge about latest vegetable production technology	45	37.50	IX
2.	Non availability of recommended variety seeds	86	71.67	V
3.	Non availability of good quality FYM	52	43.33	VII
4.	Inadequate and timely non availability of fertilizers	20	16.67	XVII
B	Financial			
1.	Inadequate sources of finance	23	19.16	XV
2.	Non availability of money in time	21	17.50	XVI
3.	High cost of input	37	30.83	XIII
C	Labour constraints			
1.	Non availability of labours at the time of vegetable cultivation practices	87	72.50	IV

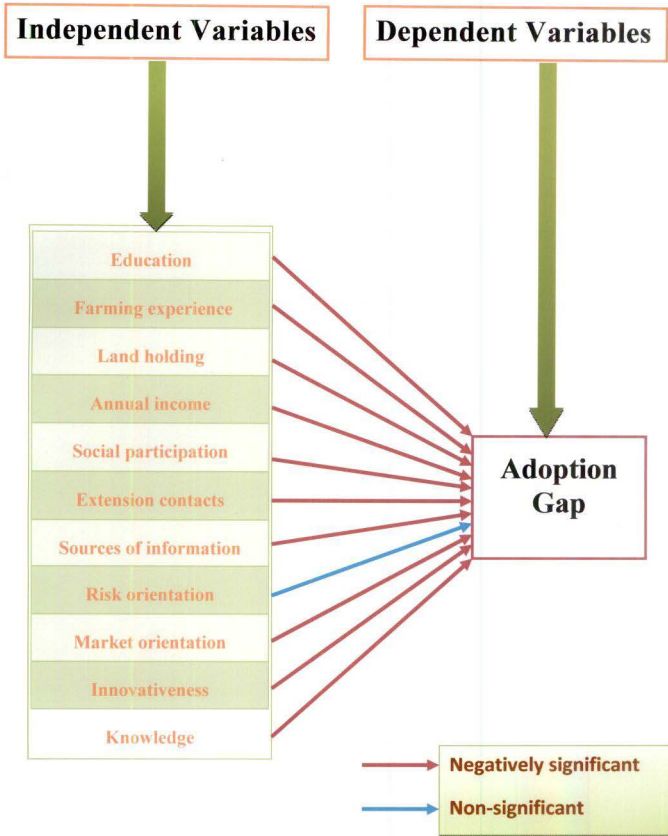


Fig. 17: Empirical model of the study

2.	High wages of labour	107	89.16	II
D	Irrigation			
1.	Shortage of irrigation water during summer	42	35.00	XI
2.	Non availability of electric supply for irrigation	52	43.33	VII
E	Plant protection			
1.	Problems in identification of diseases and pests	57	47.50	VI
2.	Non availability of insecticides and pesticides at proper time	40	33.33	XII
F	Marketing			
1.	Low rates of vegetables	97	80.83	III
2.	Fluctuation in market rates	117	97.50	I
3.	High commission of brokers from vegetable growers	43	35.83	X
4.	High transportation charge	34	28.33	XIV
5.	Non availability of vegetable processing and preservation units	47	39.16	VIII

To get more yields from vegetable crops it was necessary to study the various constraints faced by the vegetable growers, which were help the vegetable growers for further planning in vegetable cultivation. The relevant data in this regard has been presented in Table 19.

The data presented in Table 19 revealed that reasons for high adoption gap and less production of vegetables in studied area as reported by the respondents were fluctuation in market rates (97.50), followed by high wages of labour (89.16%), low rates of vegetables (80.83%) and non availability of labours at the time of vegetable cultivation practices (72.50%) and these were ranked as Ist, IInd, IIIrd

and IVth respectively. In this case labour constraints and marketing constraints were the major constraints faced by the great majority of respondents.

The 71.67 per cent of respondents were faced the constraints non availability of recommended variety seeds, followed by problems in identification of diseases and pests (47.50%) and these were ranked Vth and VIth respectively. The 43.33 per cent of respondents were reported that, non availability of good quality FYM and non availability of electric supply for irrigation were the major constraints by them which had combined rank VIIth. The 39.16 per cent of the respondents were faced constraints non availability of vegetable processing and preservation units, followed by lack of knowledge about latest vegetable production technology (37.50%) and these were ranked as VIIIth and IXth respectively.

The high commission of brokers from vegetable growers was the constraints reported by the 35.83 per cent vegetable growers and ranked as Xth. The 35.00 per cent of the respondents were faced the constraints shortage of irrigation water during summer, it was ranked as XIth, followed by non availability of insecticides and pesticides at proper time ranked as XIIth. High cost of input (30.83%) and high transportation charge (28.33%) were constraints and ranked as XIIIth and XIVth respectively. The other constraints faced by the respondents were inadequate sources of finance (19.16%), non availability of money in time (17.50%), inadequate and timely non availability of fertilizers (16.67%) and they were ranked XVth, XVIth and XVIIth, respectively.

The technical, marketing, irrigation and plant protection constraints were the major constraints faced by the vegetable growers in adoption of vegetable production practices.

SUMMARY AND CONCLUSIONS

The present study is entitled as "Adoption gap in vegetable production practices" was conducted in Nagpur district of Vidarbha region of Maharashtra state. Total 120 respondent farmers were selected randomly from two tahsils namely Nagpur and Mauda in Nagpur district. Those randomly selected farmers were personally interviewed with help of structured interview schedule. The collected data were then analyzed and interpreted.

The present chapter is a summarized account of procedure adopted in the present study and findings emerged out of the investigation and conclusion drawn there upon. The present study was based on the following objectives.

5.1 Objective of the study

1. To study the personal, socio-economic communicational and psychological characteristics of vegetable growers.
2. To study the adoption gap in vegetable production practices.
3. To study the relationship between characteristics of vegetable growers and adoption gap in vegetable production practices.
4. To study the constraints faced by vegetable growers in adoption of vegetable production practices.

5.2 Conclusions

The conclusions of findings of the present study were summarized in succeeding paragraphs.

5.2.1 Distribution analysis

1. High proportion of brinjal growers (43.37%) were educated up to high school level, majority of tomato growers (61.66%) were educated up to high school level and also in overall vegetable

growers majority of them (52.51%) were educated up to high school level (8th to 10th std).

2. Majority of brinjal (76.67%), tomato (70.00%) and overall vegetable growers (73.34%) had medium level of farming experience.
3. Higher proportion of respondents (36.67%) brinjal growers were belonged semi- medium land holding, higher proportion of tomato growers (33.33%) were belonged to semi- medium land holding and higher proportion of respondent vegetable growers (35.00%) belonged to semi- medium land holding (2.01 to 4.00 ha).
4. Nearly one third per cent of brinjal vegetable growers (33.24%) had high annual income, tomato growers (45.00%) had low medium annual income and in case of overall vegetable growers higher per cent of vegetable growers (36.67%) had low medium (Rs.; 50,000/- to 1,00,000/-) annual income.
5. Majority of brinjal (65.00%), tomato (50.00%) and overall vegetable growers (57.50%) had medium level of social participation.
6. Majority of brinjal (63.33%), tomato (58.33%) and overall vegetable growers (60.84%) had medium extension contact.
7. In case of regular use of information sources by vegetable growers were progressive farmers / relatives (35.00%), followed by private agricultural company representative (25.00%), newspapers (Agro one, etc) (23.33%), television (16.67%) and gram sevak (11.67%). In case of occasionally used sources of information by respondent vegetable growers namely, Agriculture Assistant / Agriculture Supervisor (83.00%), followed progressive farmers / relatives (40.00%), private Agricultural company representative (38.33%), mobile phones (33.34%), Gram sevak (30.83%), newspapers (28.33%), television (25.00%), Taluka

Agriculture Officer (13.33%) and KVK Scientist (University / NGO's) (11.67%), respectively. The great majority of respondents were not use the sources of information namely, Sub divisional Agriculture Officer / DSAO (96.67%), Extension Officers (PS / ZP) (95.00%), farm magazines (95.00%), radio (94.17%), internet (93.33%), Taluka Agriculture Officer (85.00%) and KVK Scientist (University / NGO's) (83.33%), respectively.

8. Majority of brinjal (66.67%), tomato (58.33%) and overall vegetable growers (62.50%) had medium sources of information.
9. Majority of brinjal (75.00%), tomato (76.67%) and overall vegetable growers (75.83%) had medium risk orientation.
10. Majority of brinjal (66.67%), tomato (63.34%) and overall vegetable growers (65.00%) had medium market orientation.
11. Majority of brinjal (66.67%), tomato (60.00%) and overall vegetable growers (63.33%) had medium innovativeness.
12. In case of preparatory tillage great majority of respondents brinjal (78.33%), tomato (88.33%) and overall vegetable growers (83.34%) had knowledge about selection of soil medium heavy fertile and well drained soil whereas,93.33 per cent brinjal growers, 86.67 per cent tomato growers and 90.00 per cent overall vegetable growers were aware about 2-3 ploughing and harrowing before sowing. In case of FYM, great majority of respondents brinjal (95.00%), tomato (95.83%) and overall vegetable growers (95.83%) had knowledge about use of well decomposed FYM @ 30 to 40 cart load per hectore for vegetable crops.
13. Majority of brinjal (65.00%), tomato (63.33%) and overall vegetable growers (64.16%) had medium level of knowledge.

14. With respect to preparatory tillage per cent of brinjal (13.33%), tomato (16.66%) and overall vegetable growers (15.00%) had adoption gap in selection of medium to heavy fertile and well drain soil for vegetable production and also less per cent of respondents had adoption gap in tillage practice ploughing and 2-3 harrowing before sowing to brinjal (08.33%), tomato (11.67%) and overall vegetables growers (10.00%). In case of use of recommended FYM 45.00, 53.33 and 49.17 per cent respondents were not using well decomposed FYM @30 to 40 cart load per hectare at the time of sowing to brinjal, tomato and overall vegetable growers, respectively. There was less adoption gap in preparatory tillage of vegetable production.
15. Nearly half of the brinjal (48.34%), tomato (50.00%) and overall vegetable growers (49.16%) had medium level of adoption gap.
16. High adoption gap and less production of vegetables in studied area as reported by the respondents were fluctuation in market rates (97.50), followed by high wages of labour (89.16%), low rates of vegetables (80.83%) and non availability of labours at the time of vegetable cultivation practices (72.50%) and these were ranked as Ist, IInd, IIIrd and IVth respectively. In this case labour constraints and marketing constraints were the major constraints faced by the great majority of respondents. The 71.67 per cent of respondents were faced the constraints non availability of recommended variety seeds, followed by problems in identification of diseases and pests (47.50%) and these were ranked Vth and VIth respectively. The 43.33 per cent of respondents were reported that, non availability of good quality FYM and non availability of electric supply for irrigation were the major constraints by them which had combined rank VIIth. The 39.16 per cent of the respondents were faced constraints non availability of vegetable processing and preservation units, followed by lack of knowledge about latest vegetable production

technology (37.50%) and these were ranked as VIIIth and IXth respectively.

5.2.2 Relation analysis

1. The characteristics of respondents namely, education, land holding, annual income, social participation, extension contact, sources of information, market orientation, innovativeness and knowledge were negatively and significantly correlated at 0.01 per cent level of probability with adoption gap in vegetable production practices.
2. Farming experience was negatively and significantly correlated at 0.05 per cent level of probability with adoption gap in vegetable production practices. The characteristics of respondents namely, risk orientation was non-significantly related with adoption gap in vegetable production practices.

Chapter VI

IMPLICATIONS

The implications emanated from the findings of the present study, "Adoption gap in vegetable production practices" were reported in this section. The implications are presented in two parts. The first is related with the implications for action, while second part deals with the implications for the future research work. Based on the findings of the present study the following suggestions in the forms of implications are offered.

1) Implications for action

1. In respect of adoption gap in brinjal, tomato and overall vegetable production practices highlighted that majority of the respondents were not adopting practices. Vegetable production practices like use of FYM, seed rate varieties, use of protection measures for insects / pests and diseases of vegetables.. Hence it is suggested that, organized training and demonstration programmes on brinjal and tomato vegetable production practices and also frequent field visit should be taken up by the concerned extension agency to vegetable field so that knowledge and adoption level of recommended cultivation technology of brinjal and tomato growers is enhanced and it help to minimizing the adoption gap in vegetable production practices.
2. The vegetable crops are short duration but these crop are remunerative they are seasonal cash crop. In view of adoption of correct technology and marketing of these vegetables, the vegetable growers should form vegetable growers groups which will help the vegetable growers to purchase the inputs and marketing of vegetables.
3. The market agencies should take necessary steps to provide high rates to vegetables. The extension agencies should take for supply

the recommended vegetable variety seeds to vegetable growers, provide them knowledge about identification of insects / pests and diseases of vegetable crops, make them available electric supply for irrigation and also start processing and preservation units, so that vegetable growers get higher prices of their vegetable produce.

2) Implications for future research

1. One of the limitations of this study was conducted in only ten villages of the Nagpur district with restricted sample size, therefore, it is suggested to undertake more comprehensive project in future in different locations for obtaining data from different vegetable farmers and in order to arrive at the valid conclusions for their comprehensive adoptability.
2. To increase the contribution of independent variables in explaining variation, some more independent and intervening variables should be include into future research on vegetable production practices.
3. The study was confined only two vegetable i. e. brinjal and tomato growers, the detail study including all other vegetable crops production practices should be taken which may be clear about present status of vegetable production practices.
4. It is suggested to study the impact of adoption of different vegetable production practices on the socio-economic conditions of the vegetable growers.

A decorative graphic consisting of a vertical line with a dot at the top, a circle at the bottom containing the text 'Chapter VII', and a horizontal line with a dot at the right end. The text 'LITERATURE CITED' is enclosed in a rounded rectangular box to the right of the vertical line.

**LITERATURE
CITED**

Chapter
VII

Chapter VII

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VITA

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5. **Academic Qualifications:**

Sr. No	Name of Degrees awarded	Year in which obtained	Division / class	Name of awarding University	Subject
1.	B. Sc.(Agri.)	2013	First	PDKV Akola	Agriculture
2.	HSC	2009	First	State Board, Nagpur	Science
3.	SSC	2007	First	State Board, Nagpur	General

6. **Field of Interest** : To do Extension works in government sector.

Place: Nagpur

Date: 15/06 / 2015


Signature of Student

APPENDIX I

INTERVIEW SCHEDULE

Title of research : Adoption gap in vegetable production practices

Name of researcher : Bhagat Mithun Chunnial
M.Sc. (Agriculture)
Extension Education

Part-A

I) GENERAL INFORMATION

- 1) Name of farmer: _____
- 2) Village : _____ Tahsil : _____ District : Nagpur
- 3) II) **Personal, socio-economic, communicational and psychological characteristics**
1. **Age** : years
2. **Education** : standard pass
3. **Farming experience** : Years
4. **Land holding**
- a) Rainfed :ha
- b) Irrigated :ha
- Total :ha
5. **Annual income**
- a) Income from main occupation :
Rs. _____
- b) Income from subsidiary occupation :
Rs. _____
- c) Total income (a+b) :
Rs. _____

6. Social participation

Please indicate whether you are member or office bearer of any of the following social organization.

Sr. No.	Social organization	Position		Duration
		Member	Office bearer	
I)	Formal organization			
1.	Zilla Parishad			
2.	Panchayat Samiti			
3.	Gram Panchayat			
4.	Primary Service Co-operative			
5.	School committee			
6.	Sugar factory			
7.	Dairy co-operative			
II)	Informal organization			
1.	Bhajan Mandal			
2.	Shetakari Sanghatana			
3.	Yuvak Mandal			
4.	Self help group			
5.	Other (if any)			

7. Extension contact

Sr. No.	Extension contact	Always (2)	Sometimes (1)	Never (0)
1.	Dr. PDKV, Scientist			
2.	Project director			
3.	B. D. O.			
4.	Agriculture officer			
5.	Agri Extension officer			
6.	Agri. Supervisor			
7.	Agri. Assistant			
8.	Gram Sevak			
9.	Any other			

8. Sources of information

Please indicate about your frequency of use with following source of information for getting information about crop insurance scheme.

Sr. no.	Source of information	Always (2)	Sometimes (1)	Never (0)
1.	KVK scientists (University/NGO's)			
2.	Taluka agriculture officer (TAO)			
3.	Sub Divisional Agricultural Officer / SAO			
4.	Agril. Assistant / Agril. Supervisor (State)			
5.	Extension Officer (P.S.) / (Z.P.)			
6.	University Scientist			
7.	Progressive farmers / relatives			
8.	Private company representative			
9.	Radio			
10.	Television			
11.	Farm magazines			
12.	Newspaper (Agro one, etc.)			
13.	Mobile phones			
14.	Internet			
15.	Other			

9. Risk orientation: (Supe and Singh 1969)

Sr. No.	Statements	SA (5)	A (4)	UD (3)	D (2)	SDA (1)
1.	A vegetable grower should grow large number of crops to avoid greater risk involved in growing one or two crops.					
2.	A vegetable grower should rather take more of chance in making a big profit than to be content with a smaller but less risky profits					
3.	A vegetable grower who is willing to take greater risk than the average farmers usually user better financially.					
4.	It is good for a farmer to take risk when he knows his chance of success is fairly high.					
5.	It is better for farmer not to try new farming methods unless most other farmers used them for success.					
6.	Trying an entirely new method in farming by a farmer risk but it is worth doing.					

SA: Strongly agree; **A:** Agree; **UD:** Undecided; **D :** Disagree; **SDA :**Strongly disagree

10. Market orientation

Please give opinion on following items

Sr. No.	Items	SA (5)	A (4)	UD (3)	DA (2)	SDA (1)
1.	Market news is not so useful to a farmers					
2.	A vegetable grower can get good price by grading his produce					
3.	One should sell his produce to nearest market irrespective of price					
4.	One should purchase his inputs from the shop were his other relatives purchase					
5.	One should grow those crops which have more market demand					

SA --- Strongly agree,
DA --- Disagree,

A ---- Agree, UD --- Undecided,
SDA --- Strongly disagree

11. Innovativeness

Sr. No.	Statements	Agree (2)	Undecided (1)	Disagree (0)
1.	I feel restless till I try out a new vegetable production practices, I have heard about			
2.	They talk about many new vegetable farm practices these days, but who knows, if they are better than old ones.			
3.	After all our forefather were wise in their vegetable farming practices and I did not see any reason for changing these old methods.			
4.	Often new vegetable farm practices are not successful however, if they are promising, I would surely like to adopt them.			
5.	From time to time, I have heard of several new vegetable production practices and I have tried most of these in the last few years.			
6.	Somehow I believe that the traditional ways of vegetable farming are the best.			

Part-B

12. Knowledge & Adoption

1. Brinjal

Sr.No.	Cultivation practice	Knowledge		Adoption		
		Yes	No	CA	PA	NA
1.	Preparatory tillage a) Selection of medium to heavy fertile, deep well drained soil b) Ploughing and 2-3 harrowing before sowing c) Well decomposed FYM used @30 to 40 cart load per hectare at the time of sowing					
2.	Sowing time a) Kharif sowing May-Jun b) Rabi sowing Aug-Sept c) Summer sowing Dec-Jan					
3.	Sowing method (Nursery) Preparation of seedling on raised bed and transplanted 6-8 weeks after sowing					
4.	Seed rate 700-1000 gm/ha					
5.	Varieties Aruna, Manjari, Gota, Pusa purple round, Pusa purple cluster, Ruchira, Pragati, Pusa Purple long, Pusakranti, Phuleharit and Krusna (hybrid variety)					
6.	Seed treatment before sowing with captan @3gm/kg or cabendazine @2gm/kg					
7.	Spacing Improved var. 75x60 cm or 75x75 cm Hybrid var. 90x75 cm					
8.	Inter cultivation 2-3 hoeing and hand weeding for maintain weed free crop					
9.	Irrigation interval					

	As per the need of crop required irrigation interval is 10-12 days. And in summer season irrigation interval is 8-10 days its depend upon soil type and soil profile				
10.	Method of irrigation Ridges and furrows				
11.	Fertilizers Recommended fertilizer dose 60:50:00 NPK kg/ha				
12.	Plant protection measures for pests / insects and diseases a) Insects / pests 1. Aphid, jassid, white fly for control Endosulphon (35%) @ 11ml in 10 lit. water, Malathion (50%) @ 20ml in 10 lit. Water 2. Shoot and fruit borer - for its control duster application carbaril (10%) @ 20kg per hactor a) Diseases 1. Little leaf in brinjal - for its control apply malathion 50EC in 2 lit of water or uprooted infected plant from field. 2. Bacterial wilt - for control since the disease is soil borne, proper rotation of crop.				
13.	Harvesting Harvesting is done 75-85 days after transplanting. Ten to twelve picks at weekly interval are possible.				
14.	Yield 250-300 q. per ha.				

CA- Complete Adoption PA- Partial Adoption NA- No Adoption

2. Tomato

Sr. No.	Cultivation practices	Knowledge		Adoption		
		Yes	No	CA	PA	NA
1.	Preparatory tillage a) Selection of medium to heavy fertile, well drained soil b) Ploughing and 2-3 harrowing before sowing c) Well decomposed FYM used @30 to 40 cart load per hectare at the time of sowing					
2.	Sowing time a) Kharif sowing May-Jun b) Rabi sowing Sept- Oct c) Summer sowing Dec-Jan					
3.	Sowing method (Nursery) Preparation of seedling on raised bed and transplanted 4-6 weeks after sowing					
4.	Seed rate 500-600gm/ha					
5.	Varieties Pusarubi, Roma, Punjab chhuara, S120, Pusa early dwarf, Bhagyashri, Dhanashri, Pusa Gaurav, Arka sourabh, Vasundhara, Rajeshri, Phule raja (Hybrid var.)					
6.	Seed treatment before sowing with capton @3gm/kg or cabendazine @2gm/kg					
7.	Spacing Improved var. 60x60 cm or 75x60 cm or 90x30 cm					
8.	Inter cultivation 2-3 hoeing and hand weeding for maintain weed free crop					
9.	Irrigation interval As per the need of crop required irrigation interval is 10-12 days. And in summer season irrigation interval is 4-6 days its depend upon soil type and soil profile					
10.	Method of irrigation					

	Ridges and furrows				
11.	Fertilizers Recommended fertilizer dose 75-100:60:50 NPK kg/ha				
12.	Plant protection measures for pests / insects and diseases a) Insects / pests 1. Cut worm - treat 3% corbofuran planting holes at time of transplanting 2. Tomato fruit borer - apply chlofluwersuron 50g/l 3. White fly - control Endosulphon (35%) @11ml in 10 lit. water ,Malathion (50%) @ 20ml in 10 lit. Water b) Diseases 1. Blossom end rot - water regularly to avoid drought stress 2. Leaf curl virus - remove diseased plant 3. Downy mildew - use fungicide like Manzeb, Mancozeb				
13.	Harvesting Harvesting is done 75-85 days after transplanting. Ten to twelve picks at weekly interval are possible.				
14.	Yield 160-200 q. per ha.				

CA- Complete Adoption PA- Partial Adoption NA- No Adoption

13. Constraints

Please tell about the constraints that you face in cultivation of vegetable crop.

Sr. No.	Constraints	Specify
A	Technical	
	Lack of knowledge about latest vegetable production technology	
	Non availability of recommended variety seeds	
	Non availability of good quality	

	FYM	
	Inadequate and timely non availability of fertilizers	
B	Financial	
	Inadequate sources of finance	
	Non availability of money in time	
	High cost of input	
C	Labour constraints	
	Non availability of labours at the time of vegetable cultivation practices	
	High wages of labour	
D	Irrigation	
	Shortage of irrigation water during summer	
	Non availability of electric supply for irrigation	
E	Plant protection	
	Problems in identification of diseases and pests	
	Non availability of insecticides and pesticides at proper time	
F	Marketing	
	Low rates of vegetables	
	Fluctuation in market rates	
	High commission of brokers from vegetable growers	
	High transportation charge	
	Non availability of vegetable processing and preservation units	

