Adoption of Post harvest Practices by the Potato Growers

A thesis submitted to the

MAHATMA PHULE KRISHI VIDYAPEETH

RAHURI, DIST. AHMEDNAGAR

MAHARASHTRA (INDIA)

In partial fulfilment of the requirements for the degree

of

MASTER OF SCIENCE (AGRICULTURE)

in

AGRICULTURAL EXTENSION

By

Ms. Amundkar Jyoti Baban

Reg. No. P/013/356

EXTENSION EDUCATION SECTION

COLLEGE OF AGRICULTURE

PUNE (MAHARASHRTA)

2015

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Approved by

Dr. Pallavi D. Suryawanshi
Chairman and Research Guide
Asstt. Professor of Agril. Extension
College of Agriculture, Pune

Dr. V. S. Shirke
Committee Member
Professor of Agriculture Extension
College of Agriculture, Pune

Dr. S. G. Bhalekar
Committee Member
Associate Professor of Horticulture
College of Agriculture, Pune

CANDIDATE'S DECLARATION

I hereby declare that the thesis entitled,

Adoption of Post Harvest Practices by the Potato Growers

or part thereof has not been submitted by

me or any other person to any

other University or Institute

for Degree or Diploma.

Place : Pune
Date : / / 2015 **(Amundkar Jyoti Baban)**

Dr. Pallavi D. Suryawanshi
Asstt. Professor of Agril. Extension
College of Agriculture, Pune
Maharashtra, India

CERTIFICATE

This is to certify that the thesis entitled, **Adoption of Post harvest Practices by the Potato Growers** submitted to the Faculty of Agriculture, Mahatma Phule Krishi Vidyapeeth, Rahuri, Dist. Ahmednagar, Maharashtra State in partial fulfilment of requirements for the award of degree of **MASTER OF SCIENCE (AGRICULTURE)** in **AGRICULTURAL EXTENSION,** embodies the results of a piece of bonafide research work carried out by **Ms. Amundkar Jyoti Baban** under my guidance and supervision and that no part of the thesis has been submitted for any other Degree or Diploma.

Place: Pune **(Pallavi D. Suryawanshi)**

Date: / / 2015 Research Guide

Dr. D. W. Thawal
Associate Dean & Principal
College of Agriculture, Pune
Maharashtra, India

CERTIFICATE

This is to certify that the thesis entitled, **Adoption of Post harvest Practices by the Potato Growers** submitted to the Faculty of Agriculture, Mahatma Phule Krishi Vidyapeeth, Rahuri, Dist. Ahmednagar, Maharashtra State under the guidance and supervision of **Dr. Pallavi D. Suryawanshi** in partial fulfilment of requirements for the award of degree of **MASTER OF SCIENCE (AGRICULTURE)** in **AGRICULTURAL EXTENSION,** embodies the results of a piece of bonafide research work carried out by **Ms. Amundkar Jyoti Baban** and that no parts of the thesis has been submitted for any other Degree or Diploma.

Place: Pune
Date : / / 2015

(D. W. Thawal)
Associate Dean

ACKNOWLEDGEMENT

By the grace of God I have got an opportunity to acknowledge to express my gratitude to all those who guided, helped and supported me during the tenure of my post-graduation.

I express my sincere gratitude towards my research guide and the chairman of my advisory committee, **Dr. Pallavi D. Suryawanshi**, Asstt. Professor of Agricultural Extension, College of Agriculture, Pune for her unbounded knowledge and command over subject of my research, constant inspiration, prompt suggestions, constructive criticism and her sustained guidance during the completion of the investigation and preparation of this manuscript of thesis without whom it was impossible to complete the research project.

It is my proud privilege to express my sincere thanks to the member of my Advisory Committee **Dr. V. S. Shirke,** Professor of Agricultural Extension, College of Agriculture, Pune, for his valuable guidance and **Dr. S. G. Bhalekar** Asso. Professor of Horticulture, College of Agriculture, Pune, for providing every kind of help and expertise in the subject matter and for shapping of the manuscript to successfully accomplish this goal.

I am also obligated to **Dr. D. W. Thawal**, Associate Dean and Principal, Faculty of Agriculture, College of Agriculture, Pune for providing essential facilities and help during the tenure of this study.

I must mention my heartiest thanks to **Mrs. S. S. Khandave,** Asso. Professor of Agricultrural Extension,**Dr. H. P. Sonwane**, Asstt. Professor of Agicultural Extension, College of Agriculture, Pune for their suggestions, kind co-operation and willing guidance from time to time during research work and academic career. I am also thankful to other teaching and non - teaching staff members who helped me very promptly, whenever needed.

I am extremely indebted to Agriculture Officers, Agriculture Assistants and all the respondents of my research study from both Ambegaon and Khed tehsils for their co-operation and help during this period.

I am greatly indebted to **Mandakini S. Patil**, Asstt. Professor of Agicultural Engineering and Rector, Girls' Hostel, College of Agriculture, Pune. **Mr. Atul Deshmukh,** College Librarian and staff of Library, College of Agriculture, Pune for their direct or indirect help in this endeavor.

From hundreds of kilometres away, few special people always wished my success. I convey the depth of my gratitude, feelings and humble respect toward my beloved Mother **Mrs. Asha** and father **Mr. Baban Dhondibhau Amundkar** for their blessings, love, constant support, inspiration and guidance throughout my life. I also extend my heartfelt gratitude to my brothers **Satish** and **Nitin.** I also wish to convey my thanks to my paternal uncles **Mr. Martand D. Amundkar** and **Mr. Shankar D. Amundkar** for their support and affection.

I shall be failing in my duty if I do not express my gratitude to my friends who have supported me constantly and encouraged. I am highly apperceive of my friends **Varsha, Anuja, Prajakta, Ashwini, Anita and Priyanka** who played an excellent role by showering generous hospitality, friendly attitude, love, taking all the troubles for my sake and extending mental support in times of odd. My heartiest thanks to my batch mates **Vishal, Aniket, Shivraj, Vikas and Sachin** for extending their help and moral support throughout the entire period of study.

I wish to express my special thanks to my seniors **Sayali didi, Varsha didi and Neeta didi** for their co-operation immense help and proper advices.

I thank God for the wisdom and perseverance that he has been bestowed upon me throughout my life.

Last but not least, I am thankful to all those who helped me knowingly and unknowingly.

Place: Pune

Date: / /2015 **(Amundkar Jyoti Baban)**

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ABSTRACT

Adoption of Post Harvest Practices by the Potato Growers

by

Miss. Amundkar Jyoti Baban
(Reg. No. P/13/356)
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RAHURI

2015

Research Guide : Dr. Pallavi D. Suryawanshi

Department : Agricultural Extension

India is endowed with diverse agro-climatic conditions and soil types which are ideal for a wide range of horticultural crops. India is one of the major vegetable producing countries in the world. Potato *(Solanum tuberosum L.)* belongs to family Solanaceae is one of the most important vegetable tuber crop grown in the country. The potato is a crop which has always been the **"Poor man's friend."** In India potato is grown over an area of 1973.2 (000 hectares) and production of potato is 41555.4 (in 000 million tons).

Although, scientific research in agriculture is moving fast and new techniques are being added continuously but still adoption of these techniques is less hence productivity levels of different crops are very

low. In order to increase the crop production and productivity it is necessary that the level of adoption should increase hence it is necessary to study the level of knowledge and adoption among the potato growers regarding the different recommended post- harvest practices and to bring awareness among them.

Taking into consideration all these facts, present investigation was carried out in two tehsils viz; Ambegaon and Khed of Pune district from western Maharashtra. The data were collected by interviewing 120 potato growers with the help of well- designed and pre-tested schedule.

The objectives of the study were to study the profile of potato growers, their level of adoption regarding post harvest practices of potato. To study the constraints faced and suggestions made by the potato growers regarding post –harvest practices.

The present investigation indicated that 56.66 per cent of the potato growers belonged to middle age group between 36 to 55 years. Majority (40.00 per cent) of the potato growers had education up to secondary level. 44.16 per cent of the potato growers had semi medium (2.01 to 4.00 ha) size of land holding. Majority (43.33 per cent) of the potato growers had semi medium area (2.01 to 4.00 ha) under potato cultivation. More than 32.50 per cent of the potato growers had annual income between Rs.4.01 to Rs.6.00 lakh. Less than one-third (29.16 per cent) potato growers were getting income (Rs.4.01 to Rs.6.00 lakh) through potato production. About three-fourth (72.50 per cent) of the potato growers had medium information sources. (39.16 per cent) of the potato growers had experience in total farming between 5.1 to 10.00 years. Majority (53.33 per cent) of the potato growers had experience in potato farming between 5.1 to 10.0 years. Most of the (67.50 per cent) potato growers

had low level of social participation. More than half (50.83 per cent) of the potato growers were having medium level of cosmopoliteness.

The study depicted that majority (68.33 per cent) of the potato growers had low level of adoption regarding post harvest practices of potato.

In constraints, major problems observed that majority (95.83 per cent) of the respondents faced the problem of unavailability of cold storage or whatever storages are available are not adequate and charges to store produce were very high. Each 86.66 per cent of the respondents faced the constraints of high commission of middle man and compliant that for not getting returns of their produce immediately. The other problems like unavailability of processing centre (84.16 per cent) and price fluctuation was mentioned by 84.46 per cent respondents of each. About three-fourth (73.33 per cent) of the respondents expressed that the produce was not getting sold at worth price as per quality while each 62.50 per cent of the respondents complaint that they were not getting information regarding market prices in time. Forty per cent of the respondents mentioned that unavailability of labour at the time of harvesting was the biggest problem.

In suggestions, majority (95.83 per cent) of the respondents suggested that merchants should pay for their produce immediately and each 94.16 of the respondents suggested that commission of middle man should be minimized or very less and cold storages should be made available at every tehsil place with less charges. Other suggestions made by respondents were that Government should take initiatives for starting processing business in rural areas (85.83 per cent) and different market rates should be known to them well in advance (82.50 per cent). More

than three-fourth of the respondents suggested that capital should be made available in time and at less interest (76.66 per cent) and potato should get price worth as per the quality (75.83 per cent). More than one-third (35.83 per cent) of the respondents suggested that transport facility should be made available easily.

Chapter I

INTRODUCTION

Agriculture in India is the backbone of the country and is regarded as the largest sector of the state economy. A large number of populations engaged in variety of agricultural and allied enterprises.

Agriculture is the main occupation of our country; variations in soil, environmental condition provide huge scope for production of fruits, vegetables, fodder crop and grain crops. But there are certain limiting factors to this occupation like irrigation and other necessary inputs, unavailability of electric supply, lack of skilled labours, fluctuations in market prices and increasing cost of production. The increasing population has to serve in the same land (rather decreasing) and available resources, its biggest challenge in front of agriculture.

As far as challenges are concerned State Department of Agriculture, Maharashtra Government and Agriculture Universities combinly promoting scientific research in agriculture, new techniques, seeds, machinery, micro-irrigation system, plant protection measures comes on the fields of farmer. But practically there is lapse of time and importantly gap in research and its adoption at actual field condition.

Adoption is a mental process through which an individual passes from first hearing about an innovation to its final/ regular use. Adoption of improved practice helps in boosting agricultural production which improved standard of living of farmers. It is therefore, essential for the farmer to adopt

improved agricultural practices thereby increasing yield of various crops and thus add national income.

Various extension agencies are working for the farmers to adopt the recommendations of the scientists in respect of improved faming. However adoption of these recommendations by the farmers is observed to be different. By keeping in this view the adoption behavior of potato growing respondents about improved potato post harvest practices are studied in this study entitled "Adoption of Potato Post Harvest Practices."

1.1 Information about potato cultivation

1.1.1 Area and production

India is endowed with diverse agro-climatic conditions and soil types which are ideal for a wide range of horticultural crops. India is one of the major vegetable producing country in the world. Potato (*Solanum tuberosum L.)* belongs to family Solanaceae and it is one of the most important vegetable tuber crop of the country. Potato is a crop which has always been the **"Poor man's friend."** India has the richest collection of potato cultivars. Cultivation of potato is believed to have originated in South America.

Potato is a major crop among the vegetable in world. China is a major potato producing country in the world which is about 23.9 % and also it is first in Area under potato. Other potato producing countries are India, Russian federation, Ukraine, USA, Germany, Poland, Bangladesh, Belarus and Netherland**.**

The Indian scenario of horticulture (National Horticulture Board 2014-15) indicates India ranks second position in production and area of potato in the world after China. In India potato is grown over an area of 1973.2 (000 hectares) and production of potato is 41555.4 (in 000 million tons). Total productivity is 21.10 million tons per ha in India.

According to area and production report (NHB 2014-15), potato has highest area under cultivation in country and highest production too. The leading state in area under potato is Uttar Pradesh (603.76 ha) which contributes 33 per cent followed by West Bengal (386.61 ha), Bihar (322.46 ha) and Madhya Pradesh (108.87 ha) while production of potato is highest in Uttar Pradesh (14430.28 million tons) followed by West Bengal (11591.30 million tons) and Bihar (6640.55 million tons). Production share of potato is 25.50 per cent among all vegetables in India.

In Maharashtra production of Potato is less as compared to other states. Major potato growing districts in Maharashtra are Satara, Pune, Buldhana, Gondia, Wardha, Parbhani, Kolhapur, Wasim, Ahmednagar. Area under Pune district is 5974 ha. In Pune district, Ambegaon (3000 ha) and Khed (1630 ha) tehsils having highest area under potato cultivation. Important varieties of potato grown in the Maharashtra are Kufri Jyoti, Kufri Lavkar, Kufri Chipsona-3, Kufri Pukhraj, Kufri Chipsona-4 and Kufri Surya.

India is also a prominent exporter of potatoes. The country has the major potato export to Nepal, Shrilanka, Maldives, Malaysia and Russia.

After four decades of green revolution and with an appreciably improved extension service, the country is yet to attain the goals of sustained economic growth in the agricultural sector. Now, the progress in agriculture depends on willingness and ability of farmers to use the new technology and

required inputs. In this context, it is essential to understand the multidimensional behavior of the farmers for adoption of post harvest practices. The extent of adoption of innovation which is the function of various personnel and socio-psychological characteristics of farmers can be used as a tool to measure modernization in agriculture.

Although, scientific research in agriculture is moving fast and new techniques are being added continuously but still adoption of these techniques is less hence productivity levels of different crops are very low. In order to increase the crop production and productivity it is necessary that the level of adoption should increase. Knowledge of the recommended technologies is a pre-requisite to adoption process. Potato is susceptible for incidence of different diseases like late blight, potato scab, blackheart, early blight etc. and pests like cutworms, white grub, leaf eating caterpillar etc. Farmers should have knowledge about the appropriate post harvest practices like harvesting, sorting, grading, storage, curing, cold storage protection measure for post- harvest diseases. They should adopt those post harvest practices to maintain its quality.

Hence it is necessary to study the level of knowledge and adoption among the potato growers regarding the different recommended post-harvest practices and to bring awareness among them.

1.1.2 Statement of the problem

All the potato growers do not adopt the post harvest technology at the same time, at the same rate. The research problem, therefore, addressed to the following research questions:

1.1.2.1 Do the potato growers possess sufficient knowledge about post harvest technologies of potato crop; and if yes, to what extent?

1.1.2.2 Why some potato growers adopt the post harvest technologies quickly while others do not? What are the reasons for non-adoption?

Socio-economic and other behavioral aspects of potato growers might be influencing the adoption of post harvest technologies. There might be certain kind of relationship between these aspects and post harvest technologies. Potato growers might be facing certain constraints, particularly in securing the inputs and marketing of potato. With this background, the present study entitled "Adoption of Post Harvest Practices by the Potato Growers." is planned and carried out with the following specific objectives.

1.1.3 Objectives of the study

1. To study the personal and socio-economic characteristics of potato growers.
2. To study the adoption level of post harvest practices followed by potato growers.
3. To study the constraints in adoption of post harvest practices faced by the potato growers.
4. To study the suggestions in adoption of post harvest practices.

1.1.4 Hypotheses of the study

The extent of adoption of recommended potato post harvest practices by the potato growing respondents is influenced by their profile.

1.1.5 Importance and scope of the study

Potato is the important vegetable crop having good prospects in the state as well as country. Potato is an important vegetable crop grown in Pune district. The area and production of this crop is large in Pune district as compared to other districts of the state. However, it is observed that full production potential is not tapped by the cultivators because large number of

farmers is still using traditional method of post harvesting techniques of potato crop. It was felt necessary to undertake the present study of potato growers from Pune district to know the adoption of recommended post harvest technological practices of potato and also to know the reasons of their low adoption.

There is desperate need to increase the area under this crop because of its bright future prospective. It is therefore, thought to study the recommended post- harvest technological practices adopted by the farmers in that area, so that future suggestions and recommendations could be made to improve the existing situation.

1.1.6 Limitations of the study

The major limitation of this investigation was that the findings were based on expressed response of potato growers. The study was restricted to only 120 potato growers selected from eight villages from Ambegaon and six villages from Khed tehsil of Pune district of Maharashtra state. Hence these findings may not be generalized however could be applied to the localities having ecological and social environment as that of Ambegaon and Khed tehsil.

Similar studies therefore, at different location with larger sample size need to be undertaken for arriving at general conclusions regarding adoption of post harvest practices of potato. In short present investigation has been exploratory nature and need to be replicated for wider applicability and generalization of findings.

Chapter II

REVIEW OF LITERATURE

Review of literature is an essential aspect which helps the researcher to get more acquainted with the subject matter and direct the effort towards the desired goal. A comprehensive review of literature is of paramount important to any research endeavor. Its main aim is to determine the research work is done previously and Assessing frame work and suggest operational definition of major concepts and also to provide a basis for interpretation of findings.

The efforts are made to collect the information pertaining to studies conducted on post -harvest technology of potato crop. Very few studies are available pertaining to knowledge and adoption of post-harvest technology of potato crop and constrains in adoption. Hence in this chapter, review of directly and indirectly related studies has been presented under headings and sub-headings.

2.1 Profile of the potato growers.

2.2 Adoption of post- harvest technology by the Potato growers.

2.3 Constraints experienced by the Potato growers' adoption of post- harvest technology.

2.4 Suggestions made by Potato grower

2.1 Profile of Potato growers

2.1.1 Age

Hinge (1996) revealed that 46.66 per cent of the respondent potato growers belonged to the middle age group of 36 to 50 years.

Kolte (2002) revealed that a majority (86.00 per cent) of the chilli growers belongs to the middle age group of 26 to 45 years. Whereas very

few per cent. (7.34 per cent) of them were old farmers of more than 46 years age. The young grower of chilli growers below 25 year (6.66 per cent).

Sunil Kumar (2004) conducted a study in Belgaum district and indicated that, majority (53.30 per cent) of the tomato growers belonged to middle age group.

Wankhede (2004) revealed that, 58.67 per cent of the respondents belonged to middle age group of 32 to 52 years.

Dhakane (2005) revealed that 44.66 per cent of the grape growers belonged to younger group of below 35 years followed by middle 35.34 per cent and old age group 20.00 per cent.

Amol (2006) conducted a study on indigenous technical knowledge about rice cultivation and bovine health management practices in Konkan region of Maharashtra reported that, majority of the respondents belonged to middle age group.

Mate (2006) observed that 41.50 per cent of the potato growing respondents were in the middle age group (i.e. 36 to 50 years) and 35.50 per cent of them were from young age group (upto 35 years). The remaining of them (23.00 per cent) was old age group of 51 and above years.

Raut (2006) revealed that majority (53.33 per cent) of orange growers was middle aged followed by old age (30.00 per cent) and young age (16.67 per cent) respectively.

Jadhav (2009) revealed that, 73.86 per cent of the respondent onion growers belonged to middle age group of 33 to 50 years.

Radhika Phalphale and Fatak (2010) revealed that majority of respondents (78.33 per cent) were from middle age group, while 17.50 per cent and 4.17 per cent from young and old age group.

Sasane *et al.* (2011) revealed that a majority (41.66 per cent) of the chilli growers belonged to the age group of 25 to 35 years.

Shirke *et al.* (2011) revealed that (83.33 per cent) of respondents had medium age.

Rathod and Mandve (2012) observed that majority of respondents (53.75 per cent) belonged to 36 to 50 years age group followed by 26.25 per cent respondents in the age of above 50 years.

2.1.2 Education

Sawant (2002) reported that, 57.53 per cent of respondent turmeric growers were educated up to secondary education while 20.83 per cent of them attained college level education.

Moulasab (2004) in his study on mango growers in North Karnataka indicated that, more than 23.00 per cent of growers were educated up to primary school, followed by higher secondary school (19.16 per cent) and 14.16 per cent of them were noticed to be illiterates.

Wankhede (2004) found that a majority of the respondents had undergone formal education i.e. primary education (50.00 per cent) followed by secondary (25.33 per cent) higher education 14.00 per cent.

Dhakane (2005) observed that 46.00 per cent of grape growers received primary education up to 7^{th} std. followed by 27.34 per cent had secondary education and 8.00 per cent respondents had received higher education. About 18.66 per cent respondents were illiterate.

Thorat *et al* .(2005) reported that, 40.00 per cent of the respondents were educated up to secondary education.

Amol (2006) conducted a study on indigenous technical knowledge about rice cultivation and bovine health management practices in Konkan region of Maharashtra reported that, majority of the farmers (66.20 per cent) were educated up to or below middle school. Whereas, 21.13 per cent of the respondents were illiterate, followed by primary (40.85 per cent), middle school (23.35 per cent) and only (2.82, 8.45 per cent) of the respondents had studied high school and pre-university level education respondents belonged to middle age group.

Mate (2006) found that, more than 93.00 per cent potato growers were educated, out of which 55.00 per cent received secondary education. Only 6.50 per cent of them did not receive any formal education.

Raut (2006) revealed that (87.78 per cent) of sample respondents were literates in different groups while (12.22 per cent) of respondents were illiterate.

Chandrashekhar (2007) from his analysis of onion production and marketing behavior of farmers in Gadag district of Karnataka revealed that, 43.33 per cent of the respondents had high school level of education, followed by 26.67 per cent up to middle, 3.33 per cent up to primary, 7.50 per cent illiterate, 1.67 per cent of the respondents can read and write category and 0.83 per cent fall in post graduate category.

Maghade (2007) revealed that 35.00 per cent of the respondent onion growers had received primary education (up to 4^{th} std.) while 30.00 per cent of them received secondary education (5^{th} to 10^{th} std.). Only 20.00 per cent respondents received higher secondary education (10^{th} to 12th std.) and 9.17 per cent received college education (above 12^{th} std.).

Hawale (2009) reported that, 62.25 per cent of respondent custard apple cultivators were educated up to secondary education while 13.30 per

cent and 8.15 per cent of the respondents received primary and college level education.

Radhika Phalphale and Fatak (2010) revealed that nearly two-third (64.16 per cent) farm women educated up to primary school followed by 20.00 per cent educated up to secondary school.

Tayade (2010) revealed that 76.67 per cent respondent of the cotton growers had received secondary education while 10.00 of them received primary education. Only 5.00 per cent respondent of cotton growers received higher secondary education. 2.50 per cent received college education whereas 5.83 per cent of them illiterate.

Sasane *et al.* (2011) revealed that more than half (58.33 per cent) of the chilli growers had secondary and higher secondary education.

Shirke *et al.* (2011) revealed that majority of the respondents had (65.83 per cent) high school education followed by (14.17 per cent) educated up to middle school and (10.00 per cent) had higher and primary education.

Rathod and Mandve (2012) observed that 97.50 per cent were literate and only 2.50 per cent were illiterate.

2.1.3 Land holding

Wane (2000) found that 64.67 per cent of the respondents were in the medium land holding category.

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

Sawant (2002) indicated that, 50.84 per cent of the respondent turmeric growers belonged to medium category (2.01 to 4.00 ha), 44.16 per

cent of them had small land holding (up to 2.00 ha) and only 5.00 per cent of them had big size of land holding (4.01 ha and above).

Koli (2003) found that, more than half 55.83 per cent of the onion respondents had medium size of land holding (2.01 to 4.00 ha).

Raghavendra (2004) in his study on Knowledge and adoption level of post- harvest technologies by Red gram cultivators in Gulbarga district of Karnataka revealed that, majority of the respondents belonged to medium land holding (48.75 per cent), followed by semi-medium land holding Category (30 per cent).

Gowda (2005) investigated on cultivation and marketing pattern of selected cut flowers in Belgaum district and revealed that 31.50 per cent of the respondents were medium farmers followed by semi medium (28.12%), small (20.30%) and big farmers (14.06%).

Thorat *et al.* (2005) observed that, 45.00 per cent of the respondents were in the category of medium land holding.

Mate (2006) reported that, 55.50 per cent of the respondent potato growers were having medium size of land holding (2.01 to 4.00 ha) followed by 28.50 per cent of them had small size of land holding (less than 2.00 ha) and the remaining 16.00 per cent had large size of land holding (more than 4.01 ha).

Maghade (2007) revealed that, 43.44 per cent of the respondent onion growers had medium size of land holding (2.01 to 4.00 ha) whereas 34.56 per cent of them had small size of land holding (less than 2 ha) and 22.00 per cent of the respondents had large size of land holding (above 4.01 ha).

Vijay kumar (2008) revealed that, 58.09 per cent respondent paddy growers had medium size of land holding.

Walke (2008) observed that 61.66 per cent of the respondent brinjal growers had small size of land holding i.e. less than 2.00 ha, followed by 31.67 per cent of them had medium size of land holding i.e. 2.01 to 4.00 ha, while 6.67 per cent respondent of the brinjal growers had large size of land holding i.e. 4.01 and above.

Radhika Phalphale and Fatak (2010) revealed that (41.66 per cent) of farm women were small land holders, while 37.50 per cent and 16.66 per cent had marginal and semi medium land holding respectively.

Sasane *et al.* (2011) observed that 51.67 per cent had land holding less than one hectare.

Shirke *et al*. (2011) revealed that the respondents having medium semi medium and small size of land holding respectively was 20.00, 5.83 and 17.50 per cent.

Rathod and Mandve (2012) observed that among all the respondents 50.00 per cent were having medium land holding while remaining were small (33.75 per cent) and large (16.25 per cent) farmers.

2.1.4 Annual income

Kolte (2002) observed that 68.66 Per cent of the chilli growers fall in medium annual income (up to Rs. 67475 to 98455) while 20.00 per cent of chilli growers had low annual income ranges upto Rs. 67475. However, only 11.54 per cent chilli growers had high annual income level of Rs. 98455 and above.

Sawant (2002) found that, 61.00 per cent of the respondent turmeric growers were from low income group up to Rs. 97,000/- while 33.14 per cent of the respondents were from medium income group between Rs. 97,000/- to 1,73,000/-. Only 5.00 per cent of them had high income category (Rs. 1,73,000/- and above).

Sunil Kumar (2004) conducted a study on farmers knowledge and adoption of production and post- harvest technology in tomato crop of Belgaum district in Karnataka found that, majority of the respondents belonged to medium income category (48.33 per cent), followed by 32.50 per cent and 19.16 per cent were under low and high income category, respectively.

Chavan (2005) reported that, 64.00 per cent of the respondents had medium level of annual income from Rs. 1,00,001 to 4,00,000/-.

Khaire (2005) reported that, 64.50 per cent of the respondents were having medium annual from Rs. 74,023/- to 80,000/-.

Raghavendra (2005) conducted a study on knowledge and adoption of recommended cultivation practices of cauliflower growers in Belgaum district of Karnataka reported that, majority of the respondents (15.00 per cent) had annual income between Rs. 75,000 to Rs. 1,00,000, whereas, 31.60 per cent of respondents had an annual income above Rs. 1,00,000. Rest of them 23.30 per cent had an income between Rs. 20,000 to Rs. 75,000 per annum, whereas, only 10.00 per cent of them had income below Rs. 20,000 per annum.

Thorat *et al* . (2005) reported that, 40.00 per cent of the respondents had annual income upto Rs. 50,000/- to 1,50,000/-.

Mate (2006) revealed that, 64.50 per cent of the potato growing respondents had medium annual income between Rs. 40,001/- to 80,000/-.

Chandrashekhar (2007) investigated on analysis of onion production and marketing behaviour of farmers in Gadag district of Karnataka revealed that, half of the respondents (50.00 per cent) had annual income ranging from Rs. 25,000 to Rs. 50,000 followed by 24.17 per cent of them had up to Rs. 25,000, 16.67 per cent had in between Rs. 50,000 to Rs. 75,000, 5.83 per

cent had Rs. 75,000 to 1,00,000 and 3.33 per cent of the respondents had income above Rs. 1,00,000 per annum from all the sources.

Maghade (2007) observed that a majority of (82.51 per cent) of the respondent onion growers had medium annual income i.e. 45,667 to 1,55,086, 11.66 per cent respondents were in high income group whereas only 5.83 per cent of them had low income group.

Walke (2008) observed that, a majority (79.16 per cent) of the brinjal growers had medium income from brinjal cultivation.

Radhika Phalphale and Fatak (2010) revealed that a majority (51.66 per cent) of the respondents had medium income from crop production.

Shirke *et al.* revealed (2011) the respondents had (65.00 per cent) medium level income followed by (18.33 per cent) high and (16.67 per cent) had low level of income.

Rathod and Mandve (2012) observed that majority of respondents (45.00 per cent) were found in the medium category of annual income which is followed by 37.50 per cent respondents in the category of high annual income.

2.1.5 Sources of information

Kolte (2002) found that, 45.34 per cent of the chili growers used medium sources of information, whereas 38.66 per cent of the respondents used low source of information and only 16.00 per cent had used high source of information.

Dhakane (2005) indicated that, 42.67 per cent of the grape growers had used medium level of sources of information followed by 65.66 per cent and 22.00 per cent of them had low and high sources of information respectively.

Mate (2006) observed that, 70.50 per cent of the respondent potato growers were using medium sources of information followed by 20.00 per cent of them were using high sources of information and only 9.50 per cent of the respondents were using few sources of information.

Maghade (2007) revealed that, 65.50 per cent of the respondent onion growers were using medium sources of information whereas 20.00 and 14.50 per cent of the respondents had used high and low sources of information, respectively.

Hawale (2009) revealed that, 74.10 per cent of the respondents were using medium sources of information.

Meena (2011) revealed that among the impersonal localite channels of information, agricultural college/ university (37.74 per cent) and government agricultural department (30.06 per cent) were much preferred channels for information among the respondents.

Singh *et al.* (2011) observed that among the impersonal cosmopolite source of information television (33.23 per cent) and radio (30.70 per cent) were the most important sources of information utilized by the farmers regarding post - harvest technology and among the personal cosmopolite channels for source of information the respondents got information from demonstrations (18.67 per cent) and Gramsevak (13.92 per cent) were the most important source of information utilized by the farmers.

Singh *et al.* (2011) stated that among the impersonal cosmopolite source of information television (33.23 per cent) and radio (30.70 per cent) were the most important sources of information while other were newspaper (13.93 per cent), film show (9.81 per cent), extension literature (6.65 per cent) and wall painting (5.69 per cent). The personal cosmopolite channels

utilized by the respondents were demonstrations (18.67 per cent) and Agriculture supervisor/VLW/Gramsevak (13.92 per cent).

Yadav *et al.* (2011) revealed that majority of the farmers (62.00 per cent) had medium utilization level of different sources of information. Only 21.00 per cent belonged to the category of high utilization level of source of information and 17.00 per cent respondents had utilized different sources of information up to low utilization level.

2.1.6 Experience

Radhika Phalphale and Fatak (2010) revealed that a large majority 71.67 per cent farm woman had medium level farm experience while 16.67 per cent and 11.66 per cent had high and low level of farm experience respectively.

Shirlke *et al.* (2011) revealed that a medium farming experience of between 21 to 34 years was observed in case of majority of 60.84 per cent respondent followed by 24.16 per cent respondents having low farming experience and 15.00 per cent having high farming experience.

Rathod and Mandve (2012) observed that majority (47.50 per cent) were having medium farm experience i.e. 11-20 years, followed by 31.25 per cent respondents were in high farming experience group i.e. above 20 years farm experience.

2.1.7 Social participation

Kolte (2002) revealed that a majority (86.00 per cent) of the chilli growers constituted in medium social participation category followed by (4.66 per cent) of the chilli growers found in low participation category and 9.34 per cent in high social participation category.

Wankhede (2004) observed more than half of the respondent 61.33 per cent had medium social participation.

Mate (2006) found that more than half (55.00 per cent) of the respondent potato growers belonged to medium social participation group while 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 25.00 per cent of the respondent onion growers were in low social participation category. The 27.34 per cent in high social participation and 43.33 per cent respondent onion growers were in medium.

Anita Walke (2008) observed that 70.83 per cent of the respondent Brinjal growers were in medium social participation followed by 26.67 per cent in low social participation and 2.50 per cent in high social participation categories.

Tayade (2010) observed that a majority (45.00 per cent) of the respondent cotton growers were in medium social participation category. The 40.00 per cent of them were in low social participation category and 15.00 per cent of the respondent cotton growers were in high social participation category.

Dependent variable

Roger (1962) defined; adoption is the mental process through which an individual passes from first hearing about an innovation to its final adoption.

2.2 Adoption of Potato growers about post-harvesting technology of Potato

Sakharkar and Sundaraswami (1997) reported that 69.00 per cent of the soybean growers had medium level of category.

Zade (1998) observed that 57.33 per cent of the soybean respondents had medium level of adoption.

Kubde *et al.* (1999) found that 57.33 per cent soybean growers had medium adoption index.

Tomar *et al* (2003) noted that Kufri Chandramukhi / Kufri Sindhari were maximum popularized and adopted by 87.09 per cent farmers. However, the other interventions point i.e. seed treatment with Dithane M-45 (80.64 per cent), use of P.S.B. (77.42per cent), optimum seed rate(74.20 per cent), balance fertilizer(67.74 per cent) and timely furrow irrigation (61.29 per cent) were also adopted by a large number of farmers in view of their impact on potato yield

Mane (2005) observed that 67.50 per cent of soybean respondent had medium level of adoption.

Mate (2006) observed that 55.50 per cent of potato growing respondents had medium adoption level followed by 32.00 per cent of them having high adoption level.

Raut (2006) revealed that the majority (53.33 per cent) of the orange growers had medium level of adoption followed by low (27.78 per cent) and high (18.89 per cent) adoption of orange cultivation practices.

Patil (2007) found that maximum number of respondents (65.50 per cent) had medium level of adoption while 17.50 and 17.00 per cent of the respondents had low and high level of adoption, respectively.

Badodiya *et al.* (2010) revealed that majority (54.17 per cent) of the respondents had medium, 25.83 per cent high and 20.00 per cent low level of knowledge and adoption about eco-friendly practices.

Shirke et al. (2010) revealed that more than 35.00 per cent of the farmers had knowledge about technologies of soybean cultivation

recommended by MPKV, Rahuri, however more than 60.00 per cent of the farmers adopted such recommendations.

2.3 Constraints faced by the potato growers in adoption of post- harvest technology of potato

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

Mutkule *et al.* (2001) conducted a study on constraints in adoption of chilli technology in Nanded district of Maharashtra, and observed that, majority of the respondents (93.33 per cent) experienced the constraints like 'insecticides and pesticides were costly' followed by 'fluctuation of prices of chilli' (86.00 per cent).

Tarade *et al.* (2003) stated that unavailability of information in time (56.98 per cent) and lack of technical information (36.05 per cent) were the major technical constraints faced by the onion growers, while high cost of seed and fungicide (76.74 per cent), inadequate supply of seed (50.00 per cent) and unavailability of seeding time (43.02 per cent) were major constraints as regard the input supply. The data in respect of constraints about laborers indicated that, inadequate laborers (83.72 per cent), high wages (80.23 per cent) and non-availability of skilled laborers (40.72 per cent) were the major constraints faced by the onion growers. Fluctuation in market rates (94.19 per cent), monopoly of middleman (88.37 per cent), lack of market facility in the village and nearby village (54.65 per cent) were the major constraints faced by the growers in marketing and transportation.

Sunilkumar (2004) carried out a study on farmers knowledge and adoption of post-harvest technology in tomato crop of Belgaum district in

Karnataka and reported that, majority of the farmers (75.83 per cent) faced the problem of lack of technical knowledge and guidance about improved cultivation practices as well as post-harvest technology. Whereas, 65.00 per cent of the respondents faced the problem of high fluctuation in market price followed by high whereas 65.00 per cent of the respondents faced the problem of high fluctuation in market price, followed by high transportation cost (62.53 per cent), labour shortage and high wages (55.83 per cent) and lack of irrigation facilities and power shortage (46.66 per cent).

Maghade (2007) reported that, high cost of chemical fertilizers (91.67 per cent), irregular supply of electricity, lack of knowledge about improved storage structure (80.00 per cent). Lack of knowledge about time of application of chemical fertilizers, shortage of labour during weeding operation (64.17 per cent), difficulty in identifying pests and diseases (64.16 per cent), shortage of labour during harvesting period (53.33 per cent), non-availability of quality seeds and planting material in time (53.33 per cent), hand weeding is time and labour consuming as well as expensive (51.67 per cent) were the major constraints for existing technological gap in cultivation practices of onion.

Nayak (2007) carried out a study on management practices of Pineapple growers in Karnataka and revealed that cent per cent of respondents were facing the problem of lack of regulated markets, where as almost all the farmers faced the problem of low market price for the produce (97.50 per cent). Micronutrient deficiency in soil (92.50 per cent), lack of storage facility (88.12 per cent), lack of technical guidance (85.63 per cent), lack of processing units (80.00 per cent), non- availability and high labour charges (70.63 per cent) were the other reported problems. Further less than sixty per cent of respondents expressed problems of exploitation from pre-

harvest contractors and middle men (57.50 per cent) and non- availability of required quantity of fertilizers in time (33.12 per cent).

Hawale (2009) reported that, 100 per cent irregular supply of electricity, scarcity of water during bahar treatment period (91.94 per cent) constraints in fertilizers and micronutrient application (90.40 per cent), high commission charged by middleman (88.92 per cent) more fluctuation in prices of fruit produce (88.69 per cent), unavailability of disease, pest and drought resistant varieties (79.28 per cent) were the major constraints for existing technological gap in the production of custard apple.

Prakash (2009) indicated that lack of knowledge, lack of technical help, lack of extension contact, high cost of resources, complexity of practices, non-availability of inputs and non-profitability of practices were the major constraints responsible for varying magnitude of gap between recommended and adoption package of practices of potato crop.

Randhawa *et al.* (2010) stated that the most frequently perceived infrastructure and transport related problems were lack of pre cooling facilities (97.60 per cent), lack of insulated refrigerated vehicles (93.60 per cent) and high weight rates (84.00 per cent) respectively. Majority of respondents (88.0 per cent) perceived high cost of greenhouse to be the major problem whereas 77.6 per cent, 72.0 and 68.0 per cent of respondents perceived problems of lack of adequate training in post-harvest care, failure to meet recommended international standards due to lack of uniformity in size and color and intensive application of fungicides/pesticides and chemicals respectively as major problems concerning production and technical aspects. Majority of respondents (89.60 per cent) perceived inadequate market research to identify potential markets and varieties to be

promoted for export to the major problem whereas 84.00 per cent, 69.60 per cent and 62.40 per cent of the respondents perceived problems of sorting and grading, exploitation by middle men and non-existence of direct link with the foreign markets respectively, as major drawbacks concerning export of their produce directly to foreign markets.

Thorat and Bhujbal (2010) observed that major problems were lack of cold storage facilities in the producing area (100 per cent). Packages are not returned back to the growers (100 per cent) and transportation charges are high (79.17 per cent). Packing material is costly (56.67 per cent). Commission charges are high (68.33 per cent). Absence of co-operative vegetable marketing society in the study area (100 per cent).

Sasane *et al.* (2011) revealed that a majority of farmers (98.33 per cent) faced problem of load shading of electricity, high cost of seeds, fertilizers, insecticides and pesticides (95.00 per cent) while (85.83 per cent) and (81.67 per cent) farmers faced the constraints of lack of marketing facilities and labour problem.

Vishnugouda *et al.* (2012) observed that lack of cold storage units was ranked highest in post-harvest managements constraints by the respondents with garrets ranking score of 77.6. Lack of expertise and non-availability of package material were ranked at second and third position.

Shrinivas *et al.* (2014) revealed that cent price of farmers expressed with regard to price fluctuation, 96.67 per cent of farmers expressed with regard to high commission charges, 85.00 per cent of them expressed relating demand/supply information from different markets.

2.4 Suggestions made by the potato growers to overcome the constraints in adoption

Sheth *et al.* (2008) noticed that suggestions offered by the respondents were fruit processing may be started on co-operative basis (37.50 per cent) and machinery, equipments and packing materials be made available at subsidized rates (32.14 per cent), whereas, storage facilities be made available (28.57 per cent) and timely supply of credit be made (16.07 per cent) were the another important suggestions made by them.

Kolte (2002) observed that, a majority of the respondents suggestions included the reasonable selling price for chilli (75.00 per cent), providing fertilizers and pesticides at reasonable rates (69.50 per cent) and establishment of storage facilities (55.50 per cent).

Shinde (2003) reported that, practical knowledge regarding plant protection measures (71.00 per cent) was one of the important suggestions. The other suggestions were financial assistance in the form of subsidy (65.00 per cent), making available good quality seed at reasonable rate (63.50 per cent), easily available loan faculties (61.00 per cent) and timely supply of seeds (57.00 per cent), fertilizers (53.00 per cent) and pesticide (51.50 per cent).

Mane (2005) concluded that, a majority of the suggestions included in the remunerative price to marketable soybean produced in the market (83.00 per cent), providing chemical fertilizer of subsidize rate (80.50 per cent), availability of high yielding variety seed (78.00 per cent), availability of pesticides (73.00 per cent) and insecticides (69.00 per cent).

Maghade (2007) found that, the major suggestions viz., stable market price for onion (74.16 per cent), co-operative marketing societies be established (60.83 per cent), government should fix the minimum support

price for onion (78.33 per cent), positive responses of NAFED to purchase onion at reasonable rate (58.33 per cent), effective and efficient marketing system (57.50 per cent), provision of quality seed and planting material with technical know-how (53.33 per cent).

Jadhav (2009) found that, the major suggestions reported by the respondents were that Government should fix the minimum support price for onion (72.30 per cent), stable market price for onion (68.46 per cent), establishment of co-operative societies for marketing (56.15 per cent) and effective and efficient marketing system (53.07 per cent). The other suggestions include the provision of good seed and planting material with technical know-how (49.23 per cent) and establishment of storage facilities of onion (43.84 per cent). `

Kharade *et al*. (2010) observed that important suggestions made were Government should fix the mininum support price for onion (72.30 per cent) and stable market price for onion (68.46 per cent).The other suggestions made were establishment of co-operative marketing societies (56.15 per cent) and NAFED need to purchase onion at reasonable rate (53.84 per cent).

Waman and Kalamkar (2013) showed that 90.84 per cent of the potato growers suggested one day training followed by 25.83 per cent and 10.83 per cent of the potato growers required three days and five days of training respectively.

Chapter III

METHODOLOGY

Scientific study of any problem requires an investigation to adopt appropriate method and procedure in order to arrive at fruitful conclusion. This chapter attempt to describe and explain the locale of study, the procedure followed in the selection of respondents and designing of interview schedule. It also include procedure and technique followed in the collection of data, operational definitions of the dependent and independent variables, their measurements and classification, analysis technique and statistical tools used for interpreting the results. The research methodology followed is described under the following heads.

3.1 Location of the research study

The present study was conducted in Pune district of Maharashtra state. Pune district was purposively selected for the study because it is leading potato cultivation and potato seed market in Maharashtra, where potato is grown on an area of **6363** ha. Out of 14 tehsils of Pune two tehsils were purposively selected viz., Ambegaon (3000 ha) and Khed (1630 ha) having maximum area under potato cultivation / production.

3.1.1 Geographical location

Ambegaon and Khed are situated on Northern side of Pune district. It is surrounded by Haweli tehsil on south and Shirur tehsil on eastern side.

3.1.2 Area rainfall and population

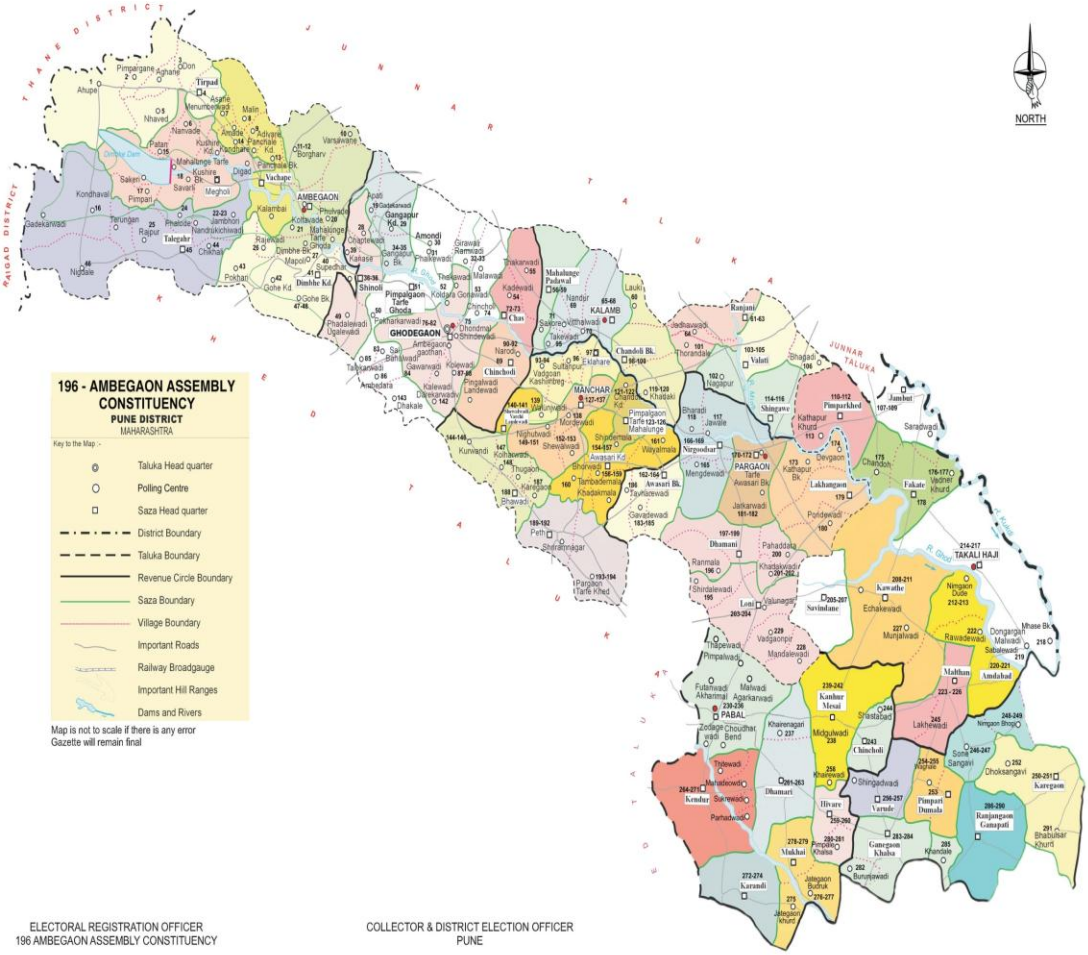
3.1.2.1 Area

The total geographical area of Ambegaon tehsil is 1.04 lakh ha which constitute six per cent area of the Pune district. Out of this area, 7794 ha land is under cultivation.

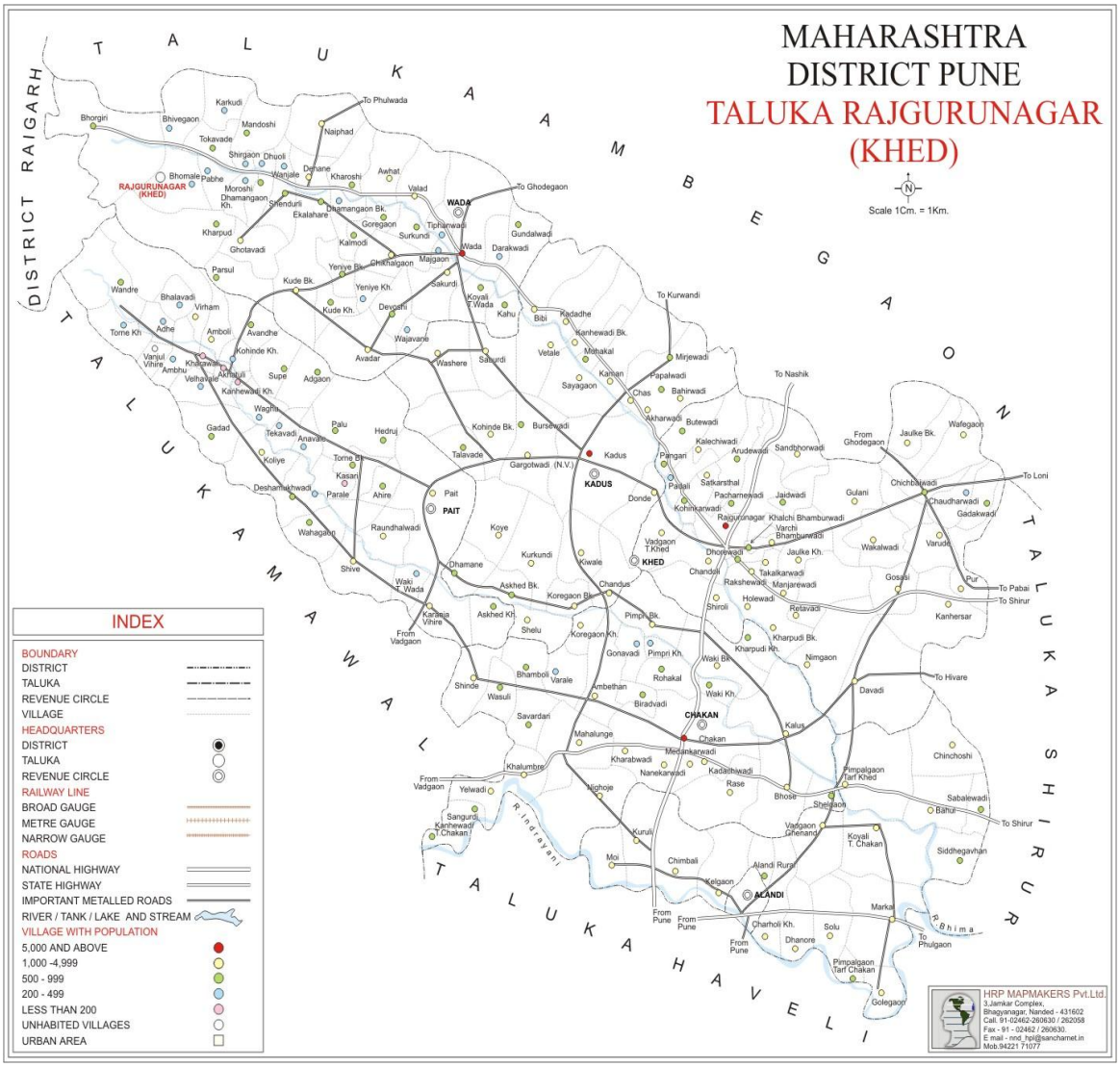
The total geographical area of Khed tehsil is 1.37 lakh ha which constitute nine per cent of the Pune district. Out of this area, 10580 ha are under cultivation.

Map of the Research Area

1. Map of Ambegaon Tehsil



2. Map of Rajgurunagar Tehsil



3.1.2.2 Rainfall

The annual rainfall ranges between 600 to 700 mm in Pune district.

3.1.2.3 Population

According to 2001 census the total population in Khed tehsil recorded is 33.40 lakh and that of Ambegaon is 20.00 lakh.

3.1.3 Soil

The soil of Ambegaon and Khed tehsil varied in nature ranging from red laterite to medium black and deep black. Laterite soils are mainly observed on the elevated areas of mountain. Medium black and deep black soils are observed on plains.

Table1. Land utilization pattern of Khed and Ambegaon tehsils

Sr. No.	Particulars	Khed		Ambegaon	
		Area (ha)	Per cent	Area (ha)	Per cent
1.	Total geographical area	137354	100	104275	100
2.	Area under forest	20079	14.61	24300	23.30
3.	Area not available for cultivation	9530	6.93	6707	6.43
a.	Land put to cultivable land	1997	1.45	1494	1.43
b.	Barren and uncultivable land	7533	5.48	5213	4.99
4.	Other uncultivable excluding fallow land	12230	8.90	9348	8.96
5.	Total fallow	6601	4.80	702	0..67
a.	Current fallow	864	0.62	304	0.29

Sr. No.	Particulars	Area (ha)	Per cent	Area (ha)	Per cent
b.	Other fallow	5737	4.18	398	0.38
6.	Net sown area	88914	64.73	62214	60.62
7.	Area sown more than once	16238	11.82	14686	14.08
8.	Gross cropped area (6+7)	105152	76.55	77904	74.71

3.1.4 Cropping pattern

The information relating to area under various vegetable crops grown in Khed and Ambegaon tehsils are presented in table 2.

Table2. Area under major vegetables of Khed and Ambegaon tehsils

Sr.No	Vegetables	Khed tehsil area (00 ha)	Ambegaon tehsil area (00 ha)
1	Onion	71.80	32.00
2	Tomato	2.10	1.00
3	Potato	16.30	30.00
4	Cauliflower	4.90	1.10

3.1.5 Irrigation

One of the most important input for Agricultural production is water i.e. irrigation. The cultivators of Pune district have natural gift of Bhima, Indrayani, Mula, Mutha and other small rivers. In Pune district, total irrigated area is 62 per cent. The total irrigated area of Khed tehsil is 14513 ha and Ambegaon tehsil is 12517 ha.

3.1.6 Educational facilities

Educational facilities are available up to secondary and higher school level in both tehsils.

3.1.7 Credit facilities

The credit needs are well satisfied through the branches of different commercial and nationalized banks. The well organized and dense networks of banks help in fulfillment of credit need. Credit facilities are also available through Pune District Central Co-operative Bank.

3.1.8 Communication and transport

Communication facilities are available for easy and proper communication. The network of radio and mobile is reached up to remote areas of both tehsil.

National highway No.50 (Pune-Nashik highway) is passing through Khed and Ambegaon tehsils. Dense network of roads help in easy and fast transport of agricultural produce.

3.2 Sampling procedure

3.2.1 Selection of tehsils

The study was carried out in Ambegaon and Khed tehsils of Pune district. These two tehsils were purposively selected because potato is cultivated on large scale in these two tehsils than other tehsils of Pune district.

3.2.2 Selection of villages and respondents

As the area under potato cultivation in Ambegaon tehsil (3000 ha) is almost double of Khed tehsil (1630 ha), almost the same ratio was followed

in selection of respondents. So 80 respondents were selected from Ambegaon tehsil and 40 respondents were selected from Khed tehsil. A list of potato growing villages was obtained from Taluka Agricultural Office of Ambegaon and Khed tehsil. On the basis of area under potato cultivation eight and six villages were selected purposively for the study from Ambegaon and Khed tehsil respectively. Further, the necessary details of the selected villages were collected from Agricultural Assistants and numbers of farmers were selected randomly and interviewed. Statement showing villages and number of respondents selected in the villages.

Name of villages	**Area (ha)**	**Number of potato growers selected**
Ambegaon tehsil :		
1. Pargaon	1280.00	21
2. Peth	1180.00	18
3. Kurwandi	890.00	15
4. Bhavadi	490.00	9
5. Thugav	294.00	8
6. Karegaon	262.00	5
7. Kolharwadi	190.00	2
8. Shirdale	190.00	2
Total		**80**
Khed tehsil :		
1. Gulani	355.00	14
2. Koye	301.00	10
3. Vakalvadi	265.00	6
4. Kurkundi	214.00	4
5. Wafgaon	176.00	3
6. Kohinde BK	170.00	3
Total		**40**
Grand total		**120**

3. 3 Designing of interview schedule

An interview schedule, based on the selected objectives of the study was prepared in local language (Marathi) in order to get accurate responses from potato growers.

While preparing the interview schedule, due care was taken to avoid confusing questions, contradictory statements. The language of the questions was kept simple for easy understanding of the respondents.

3.4 Pre-testing of interview schedule

Before finalizing the interview schedule, it was pre-tested outside the sample area for the reliability and validity of the questions by interviewing ten respondents. The interview schedule was modified in the light of the practical experience of pre-testing and it was finally used for data collection.

3.5 Collection of data

The research worker personally interviewed the farmers included in the sample. Before starting the interview, raport was established with potato growing respondents to get proper, adequate and accurate response. The importance and objective of the study were clearly explained to all the potato growing respondents before interview. The respondents were getting interviewed during their leisure time, generally in the morning before they proceed for their work on farm in the afternoon and in the evening hours when they returned to home.

3.6 Compilation of data

The information collected through interview was transferred from the questionnaire to primary tables and then to secondary tables. Whenever

necessary, the information of qualitative nature was converted into quantitative form. In this way the collected information was tabulated and analyzed.

3.7 Operational definition

Age:

It is defined as chronological age of the potato grower at the time of interview.

Education:

The term education referred to the formal education completed by potato grower, from primary to degree level.

Size of land holding:

It refers to the total area owned by the potato grower and area under potato cultivation.

Annual income:

It is the total income of all family members generated by all sources and especially from potato crop in year.

Sources of information:

It is operationally defined as the degree of informal, formal and mass media sources accessed by potato growers for seeking information and guidance about recommended post harvest practices.

Experience:

It refers to the number of years, the potato grower engaged in cultivation and particularly potato cultivation.

Cosmopoliteness:

It is the degree of contact of potato growers with outside world.

Knowledge:

It is operationally defined as the extent of information possessed by the potato growers about the improved potato post harvest practices.

Adoption:

It is operationally defined as a continuous use of a particular practice for more than two years the time of investigation.

Constraints:

It is a reason, cause or circumstances which compel a potato grower's non adoption or partial adoption of advocated potato post harvest technology which ultimately result in poor yield and income.

3.8 Scoring technique and categorization

A list of operation to potato cultivation and post harvest technology was prepared and information of adoption with respect to relevant activities was obtained. The total score of each respondent was worked out for each variable.

3.8.1 Independent variables and their measurement

3.8.1.1 Age

Considering chronological age completed at the time of interview the potato growers were classified into three categories.

Sr. No.	Category	Age
1.	Young	Up to 35 years
2.	Middle	36-55 years
3.	Old	56 years and above

3.8.1.2 Education:

According to level of formal education, the potato growers were grouped into following categories.

Sr. No.	Category	Education
1.	Illiterate	No education
2.	Primary	I^{st} to IV^{th} Std.
3.	Secondary	V^{th} to X^{th} Std.
4.	Higher education	XI^{th} to XII^{th} Std.
5.	College level education	1. Graduation
		2. Post- Graduation

3.8.1.3 Land holding:

On the basis of total land possessed by the potato growers and area under potato crop, on the basis of standard land norms of Government of Maharashtra they were classified in to following categories.

Sr. No.	Land holding	Area
1	Marginal	Up to 1.00 ha
2	Small	1.01 to 2.00 ha
3	Semi medium	2.01 to 4.00 ha
4	Medium	4.01 ha and above

3.8.1.4 Annual income

Annual gross income of potato growers from different sources during preceding year was worked out. On the basis of annual income, potato growers were grouped into following categories.

Sr. No.	Annual income (Rs.)
1.	Up to Rs.2.00 lakh
2.	Rs.2.01-4.00 lakh
3.	Rs.4.01-6.00 lakh
4.	Rs.6.01-8.00 lakh
5	Rs.8.01-10.00 lakh
6	Rs.10.01-12.00 lakh
7.	Rs.12.01 lakh and above

3.8.1.5 Sources of information

It refers to the use of sources of agricultural information for various recommended potato cultivation practices used or consumed by the respondent potato growers.

The potato growers were asked to record the consulting pattern used by them and their response was recorded in yes or no form. The numerical score one and zero respectively were assigned to yes or no reply. Thus, total score was worked out and on the basis of mean ± SD they were classified into following categories.

Sr. No.	Category	Source of information(score)
1.	Low	up to 5
2.	Medium	6 to 11
3.	High	12 and above

Mean = 9.54 SD = 3.0

3.8.1.6 Experience in farming and particularly in potato farming

It refers to the number of years the potato growers were engaged in farming and particularly in potato farming. On regular interval basis basis, the potato growers were grouped into 6 categories.

Sr. No.	Experience (years)
1	1 to 5 years
2	5.1 to 10 years
3	10.1 to 15 years
4	15.1 to 20 years
5	20.1 to 25 years
6	25.1 to 30 years

3.8.1.7 Social participation

Social participation of potato growers was worked out by considering their membership in one or more social organizations. Social participation score of the respondents was obtained by accessing one score for membership and two score was assigned to those who were participated as office bearer of the organization. The total score was obtained for each respondent for each organization they had participated in and on the basis of mean ± SD they were classified in to following categories.

Sr. No.	Category	Social participation (score)
1.	No participation	0
2.	Low	1 to 4
3.	Medium	5 and above

Mean = 2.45 SD = 2.00

3.8.1.8 Cosmopoliteness

Cosmopoliteness of the potato growers was tested by knowing their exposure to various knowledgeable sources outside their village. One score was given to potato grower who visited any organization, additional one, two and three score was given to the frequency of visits of each of these places. On the basis of mean ± SD potato growers were classified into three categories.

Sr. No.	Category	Cosmopoliteness score
1	Low	Up to 8
2	Medium	9 to 13
3	High	14 and above

Mean =11.54 SD =2.58

3.8.2 Measurement of dependent variables

3.8.2.1 Adoption

The adoption of post harvest technological practices of potato was measured by computing adoption score. One score was given to the potato grower if he had completely adopted the practice and zero score was assigned if it was not adopted. Total score of every potato growers was worked out and on the basis of mean ± SD they were grouped into following categories.

Sr. No.	Category	Adoption (score)
1.	Low	up to 15
2.	Medium	16 to 19
3.	High	20 and above

Mean = 17.77 SD = 2.10

3.8.3 Constraints

It is a reason, cause or circumstance which compels the potato growers in non-adoption or partial adoption of recommended post harvest technological practices of potato. The constraints experienced by the potato growers were assessed by asking close end questions. Potato growers reply about this aspect were recorded and respective percentage was worked out in order to extract conclusion.

3.8.4 Suggestions

Suggestions were secured from the potato growers to overcome constraints experienced by them in adoption of recommended post- harvest technological practices of potato. The suggestions were grouped and percentage of suggestions was worked out.

3.9 Statistical tools used for analysis of data

In this study the statistical methods, such as frequency, mean, standard deviation have been used.

3.9.1 Frequency

Frequency is the number of items repeated in the selected variables.

3.9.2 Percentage

Percentage was used in descriptive analysis for making simple comparison.

3.9.3 Mean

Mean was calculated by using the formula.

$$\overline{X} = \frac{\Sigma X}{N}$$

Where,

$\overline{X}$ = Mean

ΣX = Sum of respondents score

N = Number of respondents

3.9.4 Standard deviation

It is positive square root of mean of the squared deviation taken from the arithmetic mean.

$$SD = \sqrt{\frac{\Sigma(X - \overline{X})^2}{N}}$$

Where,

SD = Standard deviation

$\overline{X}$ = Mean

X = Score of each respondent

N = Number of respondent

Chapter IV

RESULT AND DISCUSSION

This chapter deals with the presentation, analysis and interpretation of data. The data collected from 120 potato growers from 14 villages' of Ambegaon and Khed tehsils of Pune district were compiled through the primary and secondary table in view of objectives of study.

Subsequently, they were subjected to statistical treatment for descriptive analysis per cent and frequencies were worked out. The data is presented tabular form with graphs as under the following heads, subheads and discussed as under.

The result of the research study are presented and discussed in the following headings and sequence.

4.1 Profile of the Potato growers.

4.2 Adoption of post- harvest technology by potato growers.

4.3 Constraints faced by potato growers about the recommended Post-harvest practices of potato.

4.4 Suggestions made by the potato growers to overcome the constraints.

4.1 Profile of potato growers

4.1.1 Age

The data about chronological age of the potato growers were collected, compiled and presented in table 3.

An overview of Table 3 and Figure 1 revealed that, Majority (56.66 per cent) of were the potato growing respondents in the middle age group and followed by 36.66 per cent of them were from young age group. The remaining were 6.60 per cent of the respondents from old age group.

Table 3: Distribution of potato growers according to their age

Sr. No.	Age (Years)	Respondents (n=120)	
		Number	Per cent
1	Young (Up to 35 Years)	44	36.66
2	Middle (36 to 55 Years)	68	56.66
3	Old (56 and above)	8	6.60
	Total	**120**	**100.00**

The Table 3 also state that the maximum number of potato growing respondents were from young and middle age groups which are considered as actively working age groups of potato growers.

4.1.2 Education

The level of formal education attained by an individual tends to influence the extent to which he adopts the improved post- harvest practices. Emphasizing this information on education attained were collected and analyzed. The findings are presented in Table 4 and Figure 2.

Table 4: Distribution of potato growers by their level of education

Sr. No.	Education level	Respondents (n=120)	
		Number	Per cent
1	No education	4	3.33
2	Primary level (1^{st} to 7^{th} std.)	24	20.00
3	Secondary level (8^{th} to 10^{th})	48	40.00
4	Higher secondary(11^{th} and 12^{th})	20	16.66
5	College level 1. Under Graduation	15	12.50
	2. Post -Graduation	9	7.50
	Total	**120**	**100.00**

It is observed from the Table 4 and Figure 2 that, almost all potato growing respondents were educated. Among the educated, majority (40.00 per cent) of respondents have completed secondary school level of education. The primary level of education was completed by 20.00 per cent of the respondents while 16.66 per cent of the respondents had completed higher secondary level of education. The study also revealed that 12.50 per cent and 7.50 per cent of the respondents had completed their graduation and post graduation studies respectively. Only four (3.33 per cent) respondents were found illiterate and did not complete any formal education. These findings might be because these areas are the part of education hub Pune.

The findings are in line with the findings of Chavan (2005) and Mate (2006) where thy found that 43.33 per cent and 38.50 per cent respondents had secondary level of education.

4.1.3 Size of land holding

Size of land holding is studied in two sub categories i.e. total land holding and area under potato cultivation as follows;

4.1.3.1 Total land holding

Distribution of the potato growers into four categories according to total land possessed by them is given in Table 5 and Figure 3.

It was observed from the data given in Table 5 and Figure 3 that 44.16 per cent of the potato growers had semi medium (2.01 to 4.00 ha) size of land holding, 35.00 per cent of them had small (1.01 to 2.00 ha) size of land holding, while 17.50 per cent of the potato growers had medium (4.01 and above) size of land holding, whereas only 3.33 per cent of them had marginal (Up to 1 ha) size of land holding.

Table 5: Distribution of the potato growers according to their total land holding

Sr. No.	Size of Land Holding	Respondents (n=120)	
		Number	Per cent
1	Marginal (Up to 1 ha)	4	3.33
2	Small (1.01 to 2.00 ha)	42	35.00
3	Semi medium (2.01 to 4.00 ha)	53	44.16
4	Medium (4.01 to and above)	21	17.50
	Total	**120**	**100.00**

It can be concluded that substantial proportion of the potato growers had semi medium and small size of land holding, possible reason might be that the ancestral land was fragmented into smaller sized land holding.

4.1.3.2 Area under potato cultivation

The potato growers were categorized on the basis of the area under potato cultivation. The distribution is given in Table 6 and Figure 4.

Table 6: Distribution of the potato growers according to their area under potato cultivation:

Sr. No.	Size of Land Holding	Respondents (n=120)	
		Number	Per cent
1	Marginal (Up to 1 ha)	8	6.66
2	Small (1.01 to 2.00 ha	48	40.00
3	Semi medium (2.01 to 4.00 ha)	52	43.33
4	Medium (4.01 to and above)	12	10.00
	Total	**120**	**100.00**

It was observed from the data given in Table 6 and Figure 4 that 43.33 per cent of the potato growers had semi medium (2.01 to 4.00 ha) size of land holding, 40.00 per cent of them had small (1.01 to 2.00 ha) size of land holding, while 10.00 per cent of the potato growers had medium (4.01 and above) size of land holding, whereas only 6.66 per cent of them had marginal (Up to 1 ha) size of land holding.

Thus it is concluded that, a large size of potato growers had semi medium size of land holding followed by small and large of land holding.

4.1.4 Annual income

Annual income is discussed in two sub categories i.e. total annual income and income generated through potato production is as follows:

4.1.4.1 Total annual income

The data regarding total annual income of the potato growers were obtained. According to their annual income they were grouped into seven categories on regular interval basis as given in Table 7 and Figure 5.

Table 7: Distribution of potato growers according to their annual income

Sr. No.	Annual income (Rs.)	Respondents (n=120)	
		Number	Per cent
1	Up to Rs. 2.00 Lakh	9	7.50
2	Rs. 2.01 to Rs. 4.00 Lakh	25	20.83
3	Rs. 4.01 to Rs. 6.00 Lakh	39	32.50
4	Rs. 6.01 to Rs. 8.00 Lakh	24	20.00
5	Rs. 8.01 to Rs. 10.00 Lakh	12	10.00
6	Rs. 10.01 to Rs.12.00 Lakh	4	3.33
7	Rs. 12.01 Lakh to and above	7	5.83
	Total	**120**	**100.00**

From the data mentioned in Table 7 and Figure 5, it can be concluded that 32.50 per cent of the potato growers had annual income between Rs. 4.01 to 6.00 lakh and around one-fifth (20.83 per cent) of them had annual income between Rs. 2.01 to 4.00 lakh while 20.00 and 10.00 per cent of them had annual income between Rs. 6.01 to 8.00 lakh and Rs. 8.01 to 10.00 lakh respectively. Whereas 7.50 per cent of them had annual income between Rs. Up to 2.00 lakh and 5.83 per cent of potato growers had annual income between Rs.12.01 lakh to and above. Very less i.e. only 4 (3.33 per cent) of the potato growers had annual income between Rs. 10.01 to 12.00 lakh.

Majority of the potato growers had annual income between Rs.4.01 to 6.00 lakh and Rs. 2.01 to 4.00 lakh. It may be due to possession of medium and small sized of land holding and cultivation of this land was only source of their income.

4.1.4.2 Income generated through potato production

According to annual income generated through potato production they were grouped into seven categories as given in Table 8 and Figure 6.

From the data mentioned in Table 8 and Figure 6, it can be concluded that 29.16 per cent of the potato growers had annual income between Rs. 4.01 to 6.00 lakh and little more than one-fourth (26.66 per cent) of them had annual income between Rs. 2.01 to 4.00 lakh Whereas one-fifth (20.00 per cent) of them had annual income between Rs. Up to 2.00 while 10.83 and 7.50 per cent of them had annual income between Rs. 6.01 to 8.00 lakh and Rs. 8.01 to 10.00 lakh respectively. Only 3.33 per cent of potato growers had annual income between Rs.12.01 lakh to and above. Very less i.e. only

2.50 per cent of the potato growers had annual income between Rs.10 .01 to 12.00 lakh.

Table 8: Distribution of potato growers according to their income generated through potato production

Sr. No.	Annual income (Rs.)	Respondents (n=120)	
		Number	Per cent
1	Up to Rs. 2.00 Lakh	24	20.00
2	Rs. 2.01 to Rs. 4.00 Lakh	32	26.66
3	Rs. 4.01 to Rs. 6.00 Lakh	35	29.16
4	Rs. 6.01 to Rs. 8.00 Lakh	13	10.83
5	Rs. 8.01 to Rs. 10.00 Lakh	9	7.50
6	Rs. 10.01 to Rs. 12.00 Lakh	3	2.50
7	Rs. 12.01 Lakh to and above	4	3.33
	Total	**120**	**100.00**

Majority of the potato growers had annual income between Rs.4.01 to 6.00 lakh and Rs.2.01 to 4.00 lakh. It may be due to possession of medium and small sized of land holding and cultivation of this land was only source of their income.

4.1.5 Sources of Information

Sources of information refer to the various information channels used by the potato growers for getting information about potato post harvest technology. The data regarding the sources of information used by the potato growers were obtained and they were grouped into three categories given in Table 9 and Figure 7.

Table 9: Distribution of the potato growers according to their sources of information

Sr. No.	Sources of Information (score)	Respondents (n=120)	
		Number	Per cent
1	Low (Up to 5)	26	21.66
2	Medium (6 to 11)	87	72.50
3	High (12 and above)	7	5.83
	Total	**120**	**100.00**

Mean = 9.54 SD = 3.0

The data given in the Table 9 and Figure 7 shown that almost three-fourth (72.50 per cent) of the potato growers had medium sources of information, while nearly 21.66 per cent and 5.83 per cent of them had low and high sources of information respectively.

Further, frequency and per cent of the various sources of information used by the respondents were worked out and the findings are presented in Table 10.

Table 10: Distribution of potato growers by the type of sources of information used by them

Sr. No.	Sources of information (score)	Respondents (n=120)	
		Number	Per cent
A	**Individual contact**		
1	Agricultural assistant	72	60.00
2	Agricultural Extension Officer	32	26.66
3	Block Development Officer	1	0.83
4	Progressive farmer	87	72.50
5	Local leader	12	10.00
6	Relative/ Friend/ Neighbor	32	26.66
7	RAWE student	1	0.83

8	Other	8	6.66
B	**Group contact**		
1	Practical	36	30.00
2	Group discussion	101	84.16
3	Educational trip	9	7.50
4	Meetings	12	10.00
5	Others	3	2.50
C	**Mass contact**		
1	Agril. Magzines/Newspapers	79	65.83
2	Radio	29	24.16
3	T.V	68	56.66
4	Agril. exihibition	105	87.50
5	Shetkari melawa	71	59.16
6	Other	5	4.16
7	Kisan call center	45	37.50
8	Krishi vigyan Kendra	27	22.50

Table 10 revealed that a majority (72.50 per cent) of the respondents used progressive farmer as their individual sources of information. It is observed that 84.16 per cent respondents used group discussion as a source of information from mass contact sources of information. It is observed that most (87.50 per cent) of the respondents used Agricultural exhibition as source of information Followed by 65.83 per cent of the farmers who collected information from Agril. Magazines and Newspaper. Almost equal i.e. 59.16 per cent and 56.66 per cent of the respondents collected information through shetkari melava and T.V.

4.1.6 Experience

The distribution of the potato growers by their experience in total farming is presented in Table 11 and Figure 8.

Table 11: Distribution of potato growers according to their experience in total farming

Sr. No.	Experience (in years)	Respondents (n=120)	
		Number	Per cent
1	1 to 5 years	19	15.83
2	5.1 to 10 years	47	39.16
3	10.1 to 15 years	42	35.00
4	15.1 to 20 years	8	6.66
5	20.1 to 25 years	3	2.50
6	25.1 to 30 years	1	0.83
	Total	**120**	**100.00**

It is seen from Table 11 that 39.16 per cent of the potato growers were having experience between 5.1 to 10 years while 35.00 per cent respondents of them had experience between 10.1 to 15 years. However 15.83 per cent respondents had experience between 1 to 5 years, whereas 6.66 per cent and 2.50 per cent had experience between 15.1 to 20 years and 20.1 to 25 years respectively. Only one respondent (0.83 per cent) had experience between 25.1 to 30 years.

The distribution of the potato growers by their experience in potato farming is presented in Table 12 and Figure 9.

Table 12 ad Figure 9 revealed that, a little more than one-half (53.33 per cent) of the potato growers had experience between 5.1 to 10 years while almost equal 20.83 per cent of them had experience between 1 to 5 years and 20.00 per cent of them had experience between 10.1 to 15 years.

Especially only 3.33 per cent and 1.66 per cent respondents had experience between 15.1 to 20 years and 20.1 to 25 years and only one (0.83 per cent) respondent had experience in 25.1 to 30 years in potato farming.

Table 12: Distribution of potato growers according to their experience in potato farming

Sr. No.	Experience (in years)	Respondents (n=120)	
		Number	Per cent
1	1 to 5 years	25	20.83
2	5.1 to 10 years	64	53.33
3	10.1 to 15 years	24	20.00
4	15.1 to 20 years	4	3.33
5	20.1 to 25 years	2	1.66
6	25.1 to 30 years	1	0.83
	Total	**120**	**100.00**

The in depth study of data collected regarding farming experience revealed that 66.66 per cent of the respondents were engaged in potato farming since they start farming. Thus, the result shown that, most of farmers moved towards potato farming.

4.1.7 Social Participation

The data regarding to the social participation of the potato growers was obtained and they were grouped in different categories. This distribution is given in Table 13 and Figure 10.

Table 13 and Figure 10 indicated that a little two-third (67.50 per cent) of the potato growers had low level of social participation, while almost one fourth (24.16 per cent) of the Potato growers had no social participation followed by 8.33 per cent of the respondent having medium social participation. This clearly indicated that more than three fourth of the

potato growers had satisfactory level of social participation. The similar findings were reported by Anita Walke (2008) and Tayade (2010).

Table 13: Distribution of Potato growers according to their level of social participation

Sr.No.	Social participation (score)	Respondents (n=120)	
		Number	Per cent
1	No participation	29	24.16
2	Low (1 to 4)	81	67.50
3	Medium (5 and above)	10	8.33
	Total	**120**	**100.00**

Mean = 2.45 SD = 2.46

Further, frequency and per cent of the various sources of information used by the respondents were worked out and the findings are presented in Table 14.

Table 14: Distribution of the potato growers by their particulars of social participation

Sr. No.	Social participation (score)	Respondents (n=120)	
		Number	Per cent
1	Grampanchayat	48	40.00
2	Panchayat Samitti	9	7.50
3	Zilha Parishad	3	2.50
4	Develop Service Center	21	17.50
5	Self helf group	29	24.16
6	Credit society	31	25.83
7	Bhajani Mandal	28	23.33
8	Agriculture Produce Marketing Committee	9	7.50
9	Educational Institute	9	7.50
10	Vegeatable production group	7	5.83
11	Co-operative dairy society	8	6.66

Table 14 revealed that 40.00 per cent of the respondents had social participation in Grampanchayat. Almost equal per cent of potato growers had social participation in credit society (25.83 per cent), self-help group (24.16 per cent) and Bhajani Mandal (23.33 per cent). In Development Service Center (*Vikas Seva Sanshtha*) 17.50 per cent of the potato growers had participation. Each 7.50 per cent of the respondents had participation in Panchayat Sammitee, APMC and education institutes. In Co-operative Dairy Society and vegetable production group 6.66 per cent and 5.83 per cent of the potato growers had participation. These respondents had social participation either office bearer or member of these rural social institutions.

4.1.8 Cosmopoliteness

The data on cosmopoliteness of the potato growers are presented in Table 15 and Figure 11.

Table 15: Distribution of potato growers by their level of cosmopoliteness

Sr. No.	Cosmopoliteness (score)	Respondents (n=120)	
		Number	Per cent
1	Low (Up to 8)	53	44.16
2	Medium (9 to 13)	61	50.83
3	High (14 and above)	6	5.00
	Total	**120**	**100.00**

Mean =11.54 SD =2.58

It is revealed from Table 15 and Figure 11 that, half (50.83 per cent) of the potato growers were having medium level of cosmopoliteness while 44.16 per cent of them had low levels of cosmopoliteness. Only 5.00 per cent of them had high level of cosmopoliteness. The result indicated that

majority of potato growers had medium level and low level of cosmopoliteness.

Further, frequency and per cent of the various cosmopoliteness particulars followed by the respondents were worked out and it is found that more than half (58.33 per cent) of the respondents visited other villages every fortnightly and 33.33 per cent of the respondents visited daily. Almost two-third (65.80 per cent) of the respondents visited markets weekly and 17.50 per cent of the respondents visited the same fortnightly. Two-third (66.66 per cent) of the respondents visited their respective tehsil place every fortnightly while each 16.66 per cent of the respondents visited the same weekly and monthly.

To other district places 37.50 per cent of the respondents visited once in a three month while one-fourth (25.00 per cent) of the respondents visited once in a six month and one- fifth (20.83 per cent) of the respondents visited monthly. More than two-fifth (41.66 per cent) of the respondents visited Mumbai, the capital of the state once in six months while 11.66 per cent visited the same once in a three months. It is also observed that one-fourth (25.00 per cent) of the respondents visited other states once in a year while 5.83 per cent of the respondents visited other states once in a six months.

4.2 Adoption level of post harvest practice followed by the potato growers

The term adoption was operationally defined as continuous use of post harvest practices in potato crop.

Technique used for measurement of adoption has explained in methodology. The adoption score of individual potato growers worked out

and they were classified into three categories. The distribution is given Table 17 and Figure 12.

Table 16: Distribution of the potato growers according to their adoption level

Sr. No.	Adoption level	Respondents (120)	
		Number	Per cent
1	Low (Up to 15)	82	68.33
2	Medium (16 to 19)	32	26.66
3	High (20 and above)	6	5.00
	Total	**120**	**100.00**

Mean = 17.77 SD = 2.10

It is observed from Table 16 and Figure 12 that about little more than two-third (68.33 per cent) of the potato growers had low level of adoption regarding post harvest practices, while 26.66 per cent of them had medium level of adoption and only 5.00 per cent of the respondents had high level of adoption.

4.2.1 Practice wise adoption level of potato growers regarding post harvest practices

The data regarding practice wise adoption of potato post harvest practices of the respondents give in Table 17.

Table 17: Distribution of the potato growers by their practice wise adoption (n=120)

Sr. No.	Post harvest Practices selected	Respondents (n=120)	
		Number	Per cent
A	**Timing of harvesting**		
1	Harvest the potato after yellowing and drying of leaves	116	96.66

2	Cut the vines before harvesting	114	95.00
3	Harvest the potato by wooden plough or digger	116	96.66
4	Stop the water 2-3 weeks before harvesting	119	99.16
B	**Storage**		
1	Store in cold storage at 2-3^0 C and 75-80 per cent Relative Humidity	5	4.16
2	Arani method	119	99.16
C	**Grading**		
1	Small tuber less than 25 gm	118	98.33
2	Medium tubers 25 to 50 gm	117	97.5
3	Large tuber 50 to 75 gm	117	97.5
4	Extra-large greater than 75 gm	113	94.16
D	**Packaging**		
1	Net bags	120	100
2	Other	7	5.83
E	**Transport**		
1	Self	37	30.83
2	Hundekari	110	91.66
3	Through transport company	14	11.66

F	**Processing**		
1	Have knowledge about processing	25	20.83
2	If yes, then it use	0	0
G	**Selling**		
1	Local market	95	79.16
2	City market	105	87.5
3	Other	10	8.33

The Table 17 reflects the adoption behavior of potato grower respondents. Regarding timing of harvesting almost all (99.16 per cent) of the respondents paid keen attention to stop irrigation 2 to 3 weeks before harvesting. Each 96.66 per cent of the respondents harvested the potato after yellowing and drying of leaves and harvested potato with the help of wooden plough or digger. Majority (95.00 per cent) of the respondents followed the operation of cutting the vine before harvesting.

Almost all (99.16 per cent) of the respondents used traditional (*Arani)* method and only 4.16 per cent respondents stored the potato in cold storage at 2 to 3 ^{0}C and at 75.00 to 80.00 per cent relative humidity which is located in Ambegaon tehsil.

Regarding grading operation, more than 90.00 per cent of the respondents preferred grading on the size. Potato produce was graded in different sizes i.e. small (less than 25 gram), the medium tuber (25 to 50

gram), large tuber (50 to 75 gram) size and extra-large size (greater than 75 gram) of tuber.

All (100.00 per cent) of the respondents of potato grower using net bags.

Most of (91.16 per cent) of the potato growers transported potato produce through *Hundekari*. (*Hundekari* is one of the farmers who collects potatoes from marginal and small farmers and sends the same to different markets collectively). It is also observed that more than one-fourth (30.83 per cent) of the respondents transported their produce at their own with the help of pick-up vans, tractor trollies and goods carrier etc. Only 11.66 per cent of the respondents transported their produce through transport companies which picked up those produce from respective villages.

Only 20.83 per cent of the respondents knew about processing of potato and how to prepare potato chips. But none of the farmer did any processing ever.

More than four-fifth (87.50 per cent) of the respondents sent and sold their potato at nearby Pune and Mumbai city market while 79.16 per cent of the respondents sold their produce at local market Manchar. Only 8.33 per cent of the respondents sold their produce at weekly markets.

4.3 Constraints faced by potato growers respondents

The data were collected on the constraints faced by the potato growing respondents in adoption of the potato post harvest practices and analyzed. The findings are presented in Table 18.

Table 18: Distribution of the potato growers by their constraints faced in the potato post harvest practices

Sr. No.	Constraints	Respondents (n=120)	
		Number	Per cent
1	Unavailability of cold storage	115	95.83
2	High cost of merchant rate	104	86.66
3	Not getting returns in time	104	86.66
4	Unavailability Of processing center	101	84.16
5	Glut in market, leads to financial loss	101	84.16
6	No worth price	88	73.33
7	Not getting information of market price in time	75	62.5

From Table 18, it is observed that majority (95.83 per cent) of the respondents faced the problem of unavailability of cold storage or whatever storages are available are not adequate and charges to store produce were very high. Each 86.66 per cent of the respondents faced the constraints of high commission of middle man and compliant that for not getting returns of their produce immediately.

The other problems like unavailability of processing center (84.16 per cent) and price fluctuation was mentioned by 84.46 per cent respondents of each.

About three-fourth (73.33 per cent) of the respondents expressed that the produce was not getting sold at worth price as per quality while each

62.50 per cent of the respondents complaint that they were not getting information regarding market prices in time. Forty per cent of the respondents mentioned that unavailability of labor at the time of harvesting was the biggest problem.

4.4 Suggestions made by the potato grower

Suggestions were invited from the respondents to overcome the constraints faced by them. The suggestions help to eliminate problems and made potato cultivation as profitable enterprise.

Table 19: Distribution of the potato growers by their suggestions to overcome the constraints

Sr. No.	Suggestions	Respondents (n=120)	
		Number	Per cent
1	Getting returns in time	115	95.83
2	Availability of cold storage	113	94.16
3	Take less merchant price	113	94.16
4	Give attention by Government for starting processing business in rural areas	103	85.83
5	Knowing about rates of different market to farmers	99	82.5
6	Getting capital in time and in less interest	92	76.66
7	Getting proper rate to potato	91	75.83
8	Availability of transport facility	43	35.83

It can be revealed from Table 19 that, majority (95.83 per cent) of the respondents suggested that merchants should pay for their produce immediately and each 94.16 of the respondents suggested that commission of middle man should be minimized or very less and cold storages should be made available at every tehsil place with less charges.

Other suggestions made by respondents were that Government should take initiatives for starting processing business in rural areas (85.83 per cent) and different market rates should be known to them well in advance (82.50 per cent). More than three-fourth of the respondents suggested that capital should be made available in time and at less interest (76.66 per cent) and potato should get price worth as per the quality (75.83 per cent). More than one-third (35.83 per cent) of the respondents suggested that transport facility should be made available easily.

Chapter IV

SUMMERY, CONCLUSIONS AND IMPLICATIONS

This chapter deals with the summary of finding of the study and implications for the future line of action and research.

5.1 Summery and Conclusion

The potato (*Solanum tuberosum L.*) is one of the most important vegetable crops in India. It is native of South America. Due to larger area under potato in India it is popularly called as **'King of vegetables'**. In India potato is grown over an area of 1973.2 (000 hectares) and production of potato is 41555.4 (in 000 million tons) (National Horticulture Board 2014-15). Particularly in Maharashtra state Pune district is one of the major potato growing districts. The area selected for research is Pune district. Among Pune district Ambegaon and Khed tehsils were purposively selected due to maximum area under potato and vicinity near research area.

Bearing in the mind, important of various post-harvest practices of potato, it was felt necessary to study the adoption of the potato growers and their constraints in adoption of post-harvest technology.

Therefore, the present investigation entitled, "Post-harvest technology followed by potato growers" is undertaken with the following objectives.

1. To study the personal and socio-economic characteristics of potato growers.
2. To study the adoption level of post- harvest practices followed by potato growers.
3. To study the constraints in adoption of post-harvest practices faced by the potato growers.
4. To study the suggestions in adoption of post-harvest practices.

The present study was undertaken in Ambegaon and khed tehsil of Pune district. A list of potato growing villages was obtained. Out of these villages eight and six villages were selected from Ambegaon and Khed tehsils respectively. Thus a sample of 120 potato growers was drawn. The data from the potato growers were collected through personal interview schedule. The qualitative data were converted into quantitative form. The independent and dependent variable were measured by assigning score. The simple percentage was work out to describe the characteristics of potato growers.

The findings are summarized under

5.1.1 Profile of the potato growers

The present investigation revealed that

1. The present investigation indicated that 56.66 per cent of the potato growers belonged to middle age group (36 to 55 years).
2. Majority (40.00 per cent) of the potato growers had education up to secondary level.
3. 44.16 per cent of the potato growers had semi medium (2.01 to 4.00 ha) size of land holding.
4. Majority (43.33 per cent) of the potato growers had semi medium area (2.01 to 4.00 ha) under potato cultivation.
5. More than 32.50 per cent of the potato growers had annual income between Rs.4.01 to Rs.6.00 lakh.
6. Most of the (29.16 per cent) potato growers were getting income (Rs.4.01 to Rs.6.00 lakh) through potato production.
7. More than 72.50 per cent of the potato growers had medium information sources.

8. Majority (39.16 per cent) of the potato growers had experience in total farming between 5.1 to 10.0 years.
9. Majority (53.33 per cent) of the potato growers had experience in potato farming between 5.1 to 10.0 years.
10. Most of the (67.50 per cent) potato growers had low level of social participation.
11. Majority (50.83 per cent) of the potato growers were having medium level of cosmopoliteness.

5.1.2 Adoption level of post-harvest practices followed by the potato growers

The study depicted that majority (68.33 per cent) of the potato growers had low level of adoption regarding post-harvest practices of potato.

5.1.3 Constraints faced by the potato growers in adoption of recommended post-harvest practices

The major constraints faced by the potato growers were;

It is observed that majority (95.83 per cent) of the respondents faced the problem of unavailability of cold storage or whatever storages are available are not adequate and charges to store produce were very high. Each 86.66 per cent of the respondents faced the constraints of high commission of middle man and compliant that for not getting returns of their produce immediately.

The other problems like unavailability of processing center (84.16 per cent) and price fluctuation was mentioned by 84.46 per cent respondents of each.

About three-fourth (73.33 per cent) of the respondents expressed that the produce was not getting sold at worth price as per quality

5.1.4 Suggestions made by the potato growing respondents to overcome the constraints faced

Majority (95.83 per cent) of the respondents suggested that merchants should pay for their produce immediately and each 94.16 of the respondents suggested that commission of middle man should be minimized or very less and cold storages should be made available at every tehsil place with fewer charges.

Other suggestions made by respondents were that Government should take initiatives for starting processing business in rural areas (85.83 per cent) and different market rates should be known to them well in advance (82.50 per cent). More than three-fourth of the respondents suggested that capital should be made available in time and at less interest (76.66 per cent) and potato should get price worth as per the quality (75.83 per cent). Agricultural Produce Market Committee should provide necessary facilities to the farmers (60.83 per cent).

5.2 Implications

The research study will be useful in understanding the personal and socio-economic characteristics of the potato growers, their adoption level and constraints faced by them, while adoption of post- harvest technologies of potato. Moreover, the result of this study would provide guidance to village level worker, extension officials and other development agencies for bringing about desirable changes in implementation of agricultural programme. This dissertation however, does not claim to give implication

that can be applicable everywhere, since the social and ecological conditions may not be identical everywhere. This study is confined to a two tehsils (Ambegaon and Khed) of single district Pune only.

The result of this study will be useful guideline to policy makers and executors associated with horticultural development. Suggestion made by the potato growers would also be useful to overcome the constraints observed in the study. Following implications are drawn.

1. The present study conducted in Ambegaon and Khed tehsils of Pune district comprising a large number of potato growers. However these growers were not found to be united. Therefore potato co-operative marketing federation should be established which would look into the welfare of potato growers.
2. The federation should also look into tapping of market at distant places. This would help the potato growers to get higher prices. The necessary market information and market intelligence regarding the potato marketing should be facilitated by the federation by using advanced communication media like internet, mobile SMS etc. The market intelligence would also help to tide over the losses faced by the potato growers due to fluctuations in market prices.
3. Financial difficulty was the major hurdle in non-adoption of complex and important practices as it involved high cost. Therefore credit facility should be made available at proper time and also other inputs and plant protections should be made available in proper time.
4. The federation should also see that to make available cold storage and ware house storage facilities for the potato.

5. The study revealed that potato growers were not directly made any processing product. Also there is problem in various agencies not directly related to growers. The concern agencies like Agricultural Department, Maharashtra Agricultural Marketing Federation etc. should provide information to the potato growers about package of practice for processing which encourage the stability in price.
6. The agricultural Universities, various ARS and Agricultural department should provide information and knowledge to the potato growers about proper time of harvesting, proper post-harvest technologies, etc. which will help to prevent losses and also to obtain higher market price.
7. The extension workers should use advanced communication Medias for diffusion of innovations in the field of horticulture, especially about potato growers for convincing them about the adoption of post- harvest technology of potato. This should necessarily include the organization of demonstrations, rallies and exhibitions.

Chapter VI

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Fig 1: Distribution of the potato grower according to their age

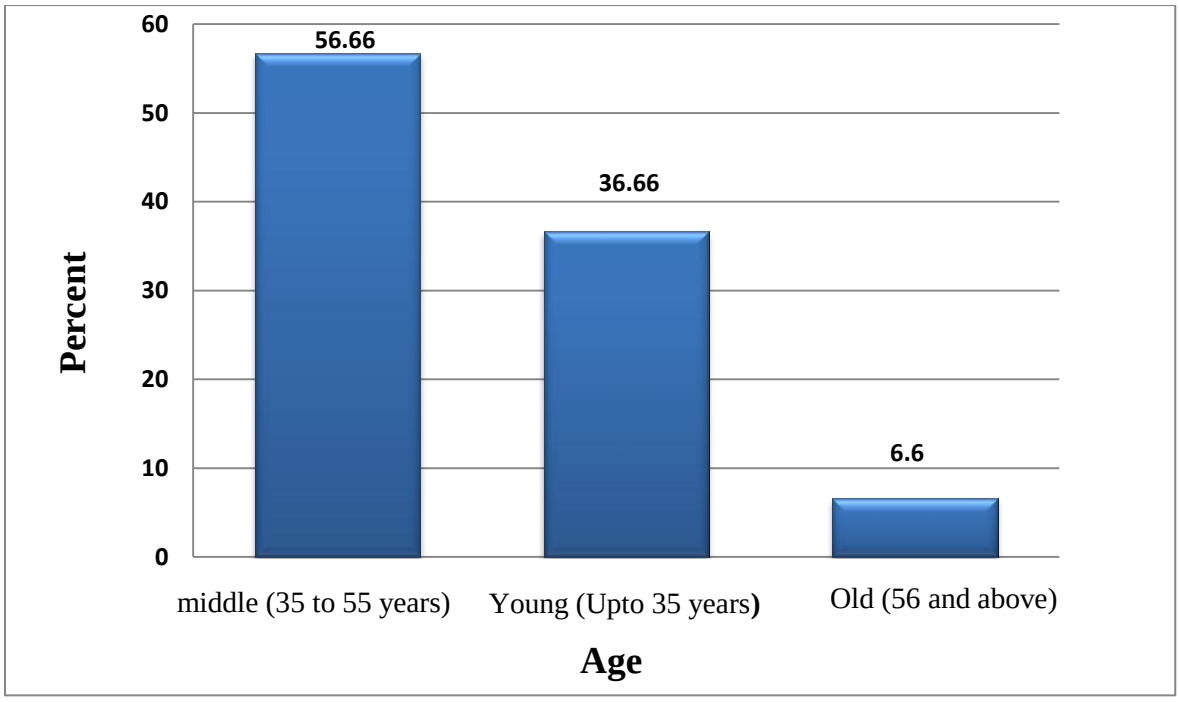


Fig 2: Distribution of potato growers according to their education level

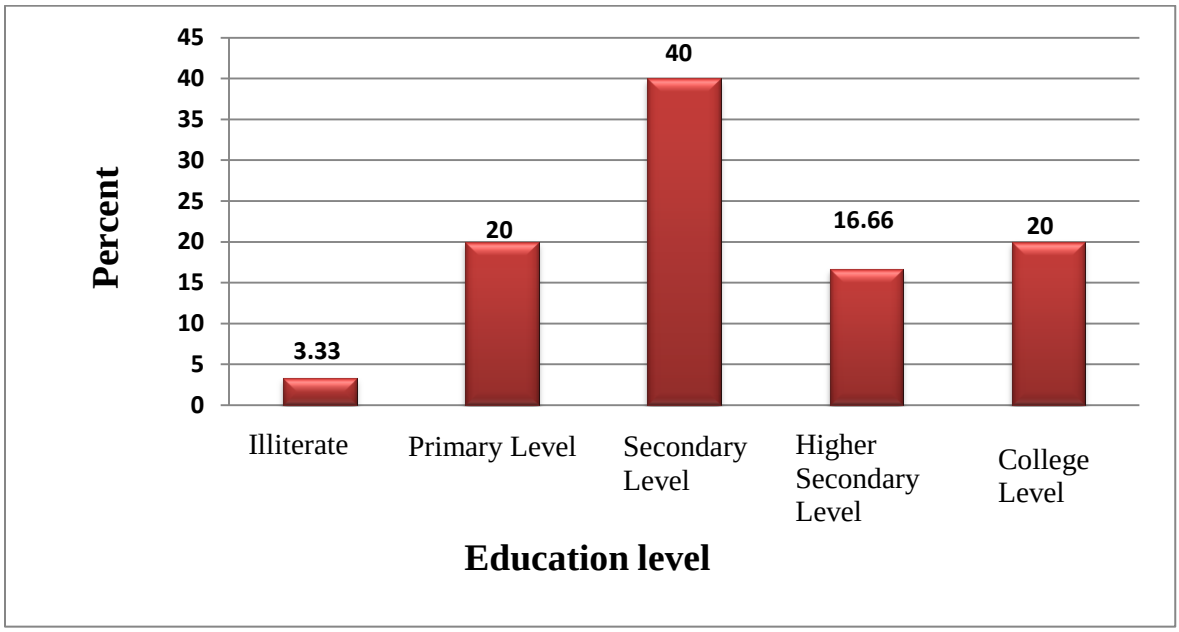


Fig 3: Distribution of potato growers according to their total land holding

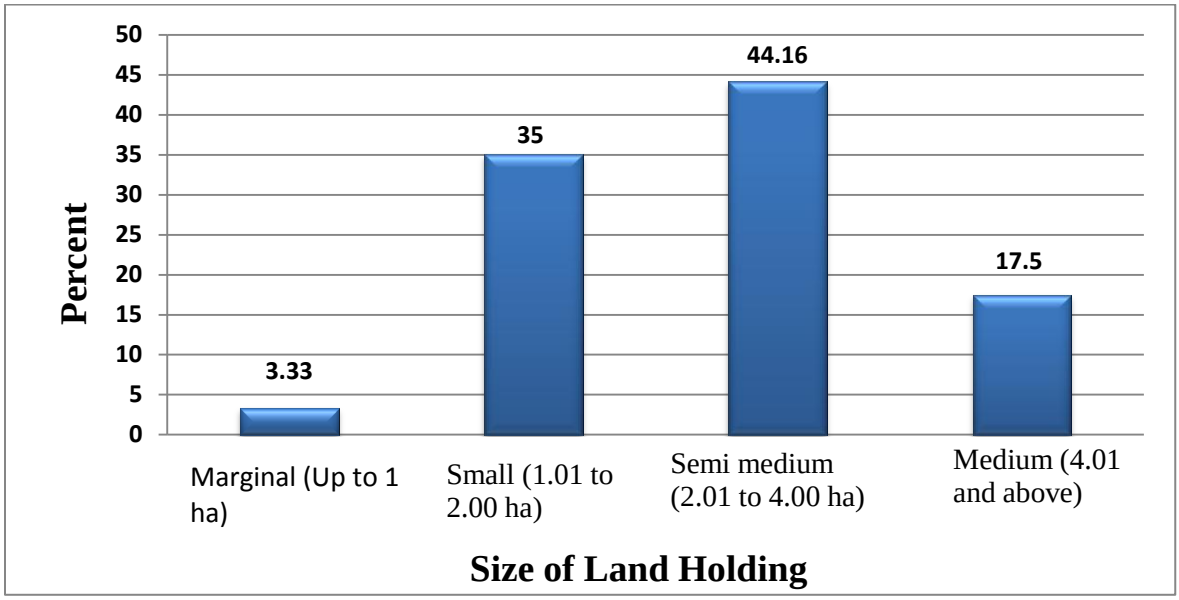


Fig 4: Distribution of potato growers according to their area under potato cultivation

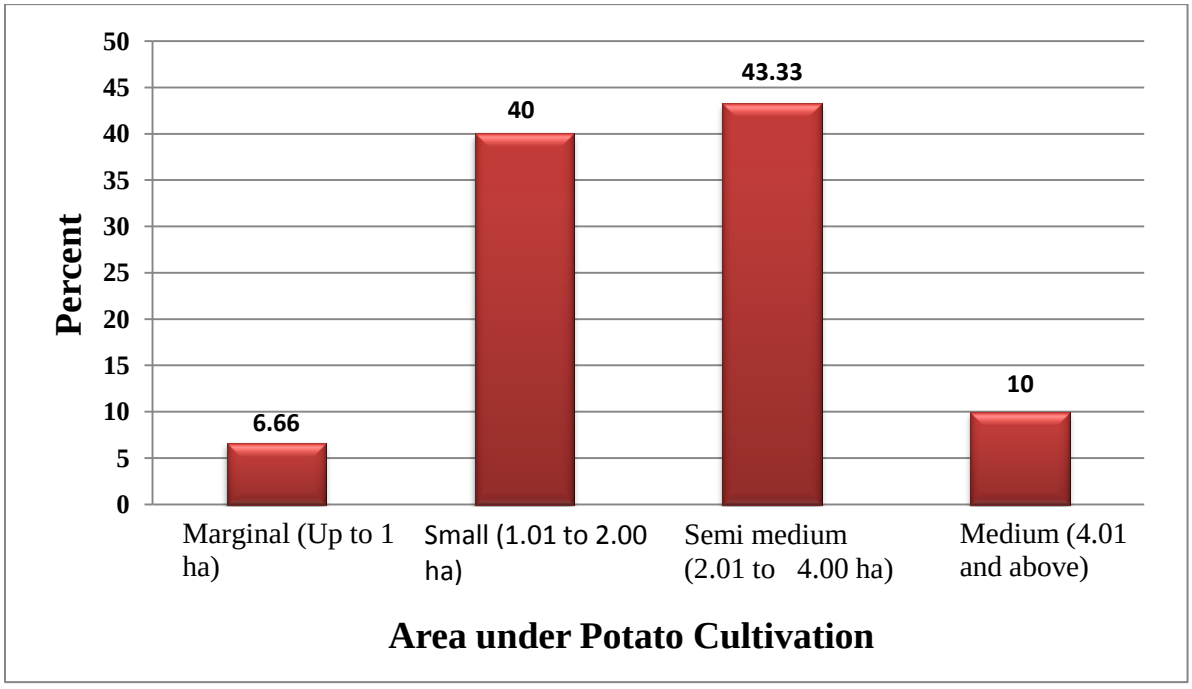


Fig 5: Distribution of potato growers according to their annual income

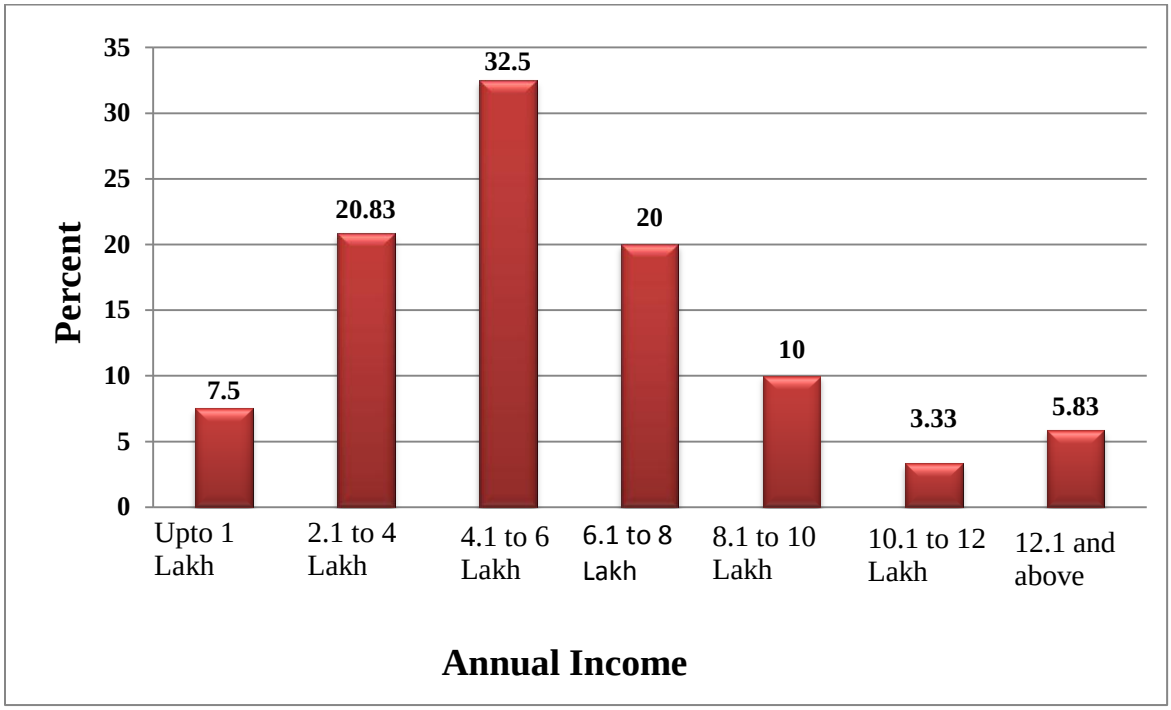


Fig 6: Distribution of potato growers according to their income through potato production

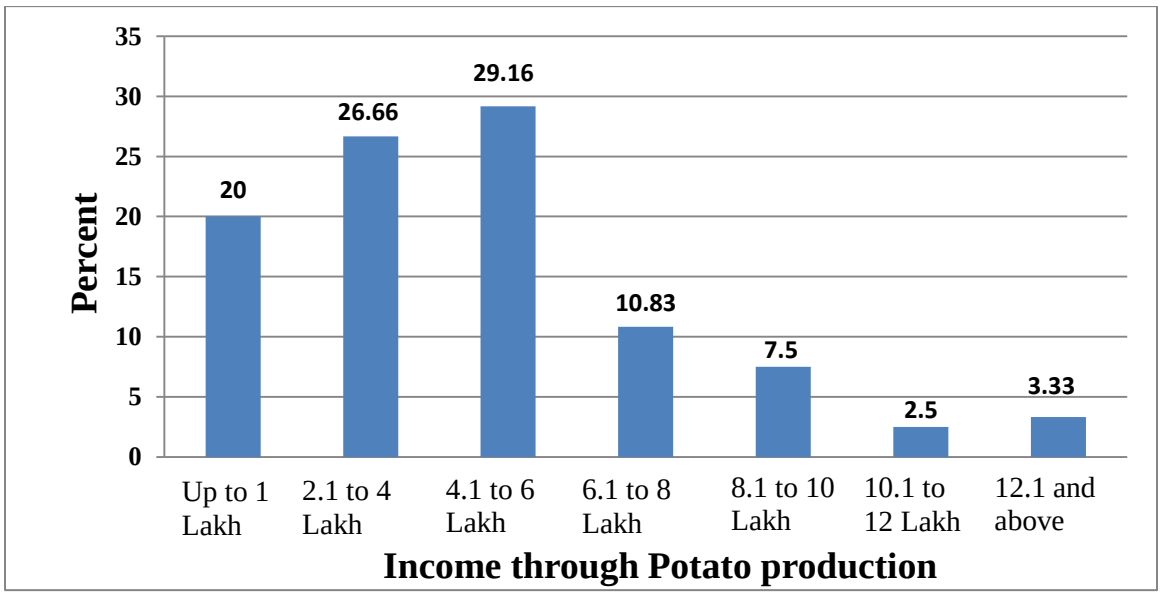


Fig 7: Distribution of the potato growers according to their source of information

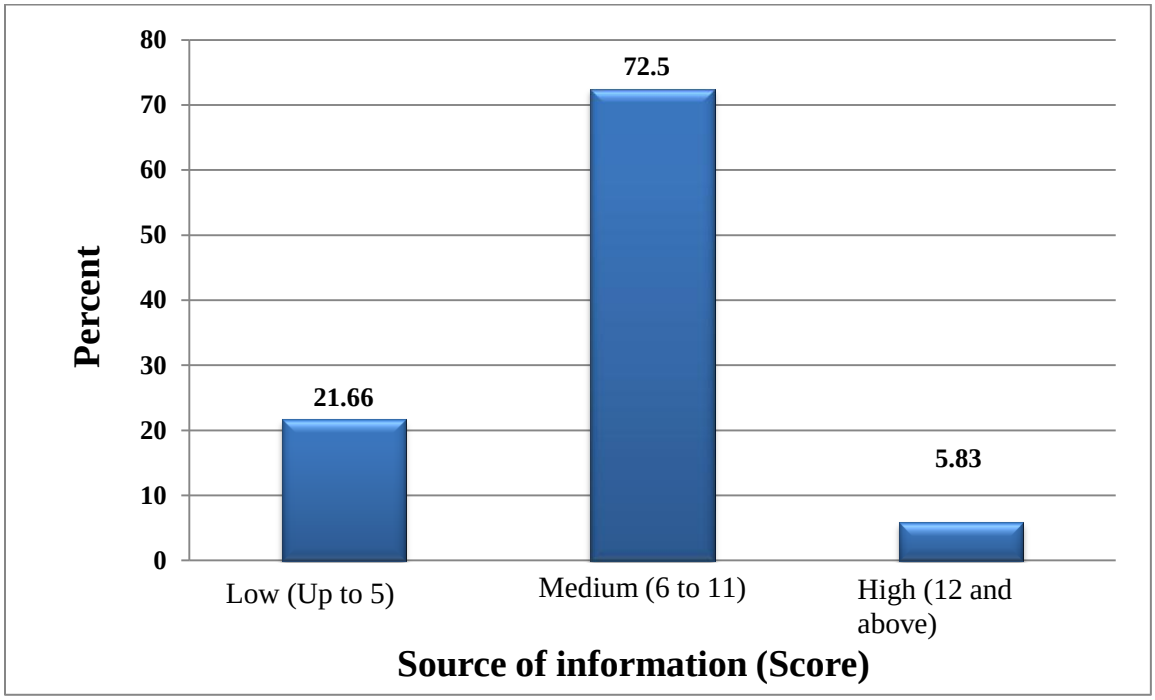


Fig 8: Distribution of the potato growers according to their experience in total farming

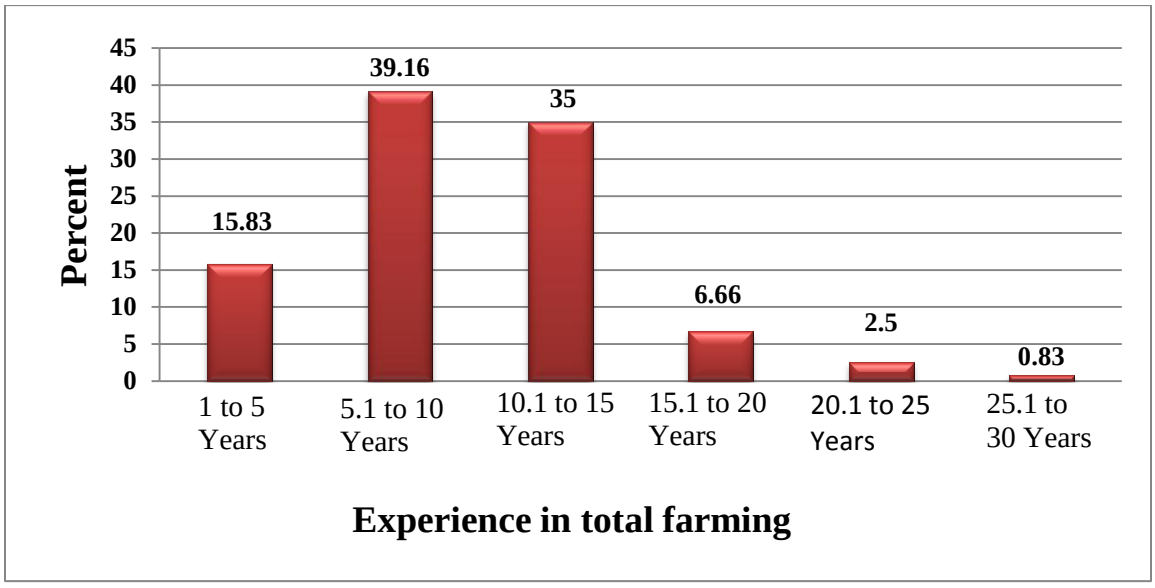


Fig 9: Distribution of the potato growers according to their experience in potato farming

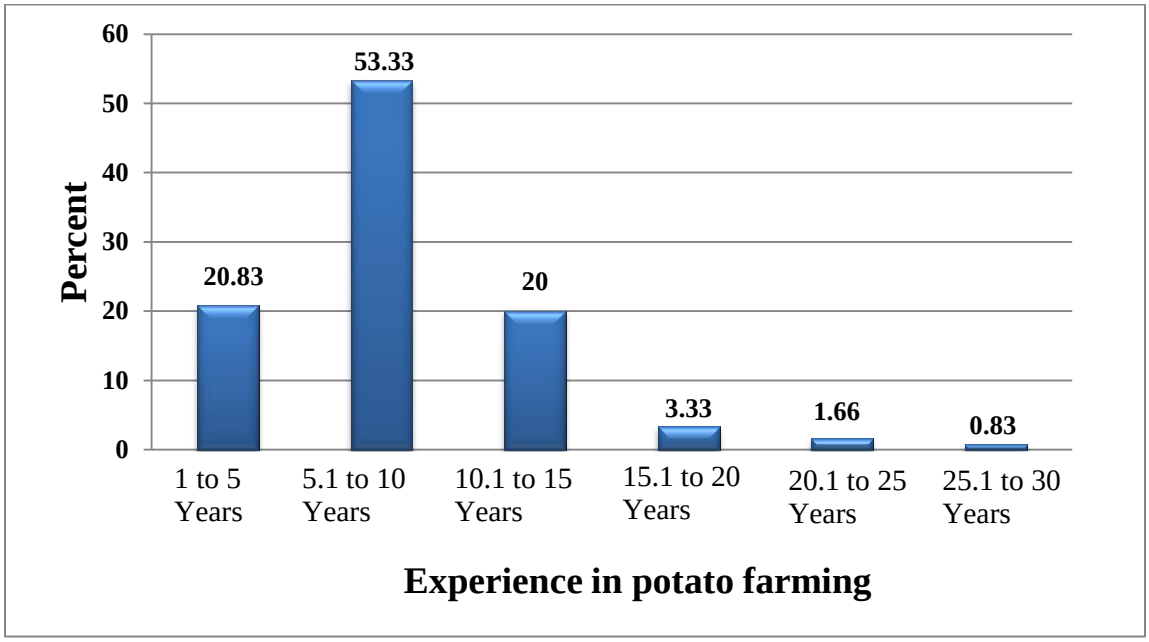


Fig 10: Distribution of the potato growers according to their social participation

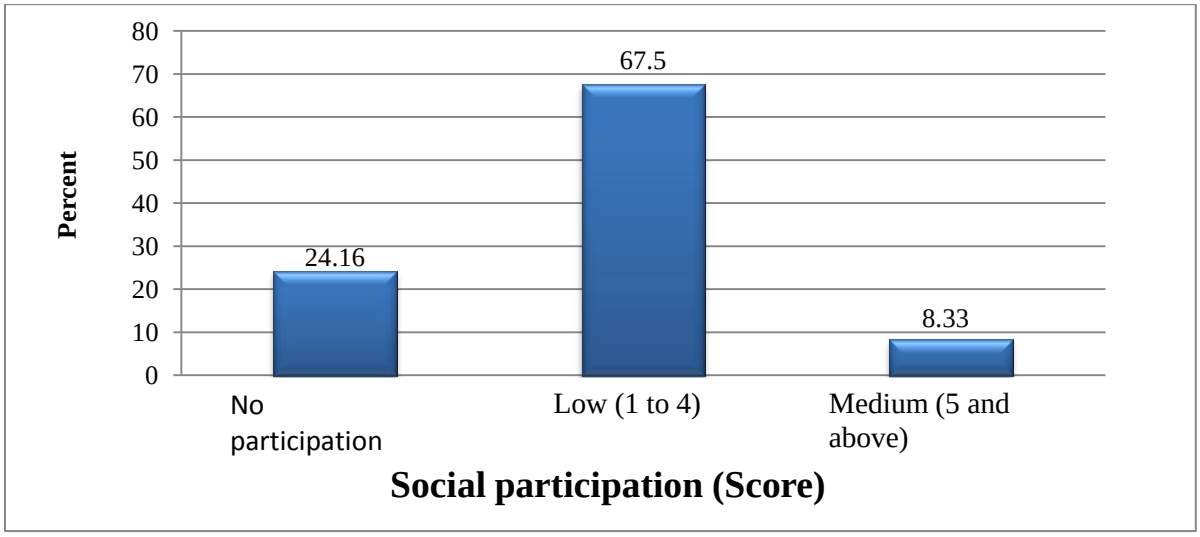


Fig 11: Distribution of the potato growers according to their cosmopoliteness

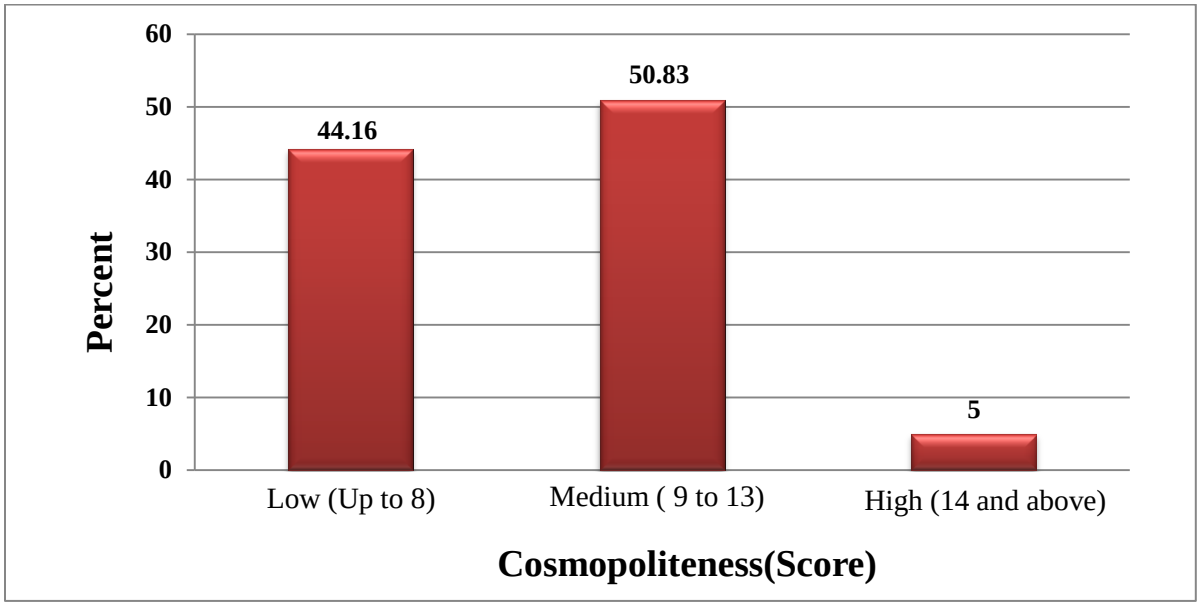
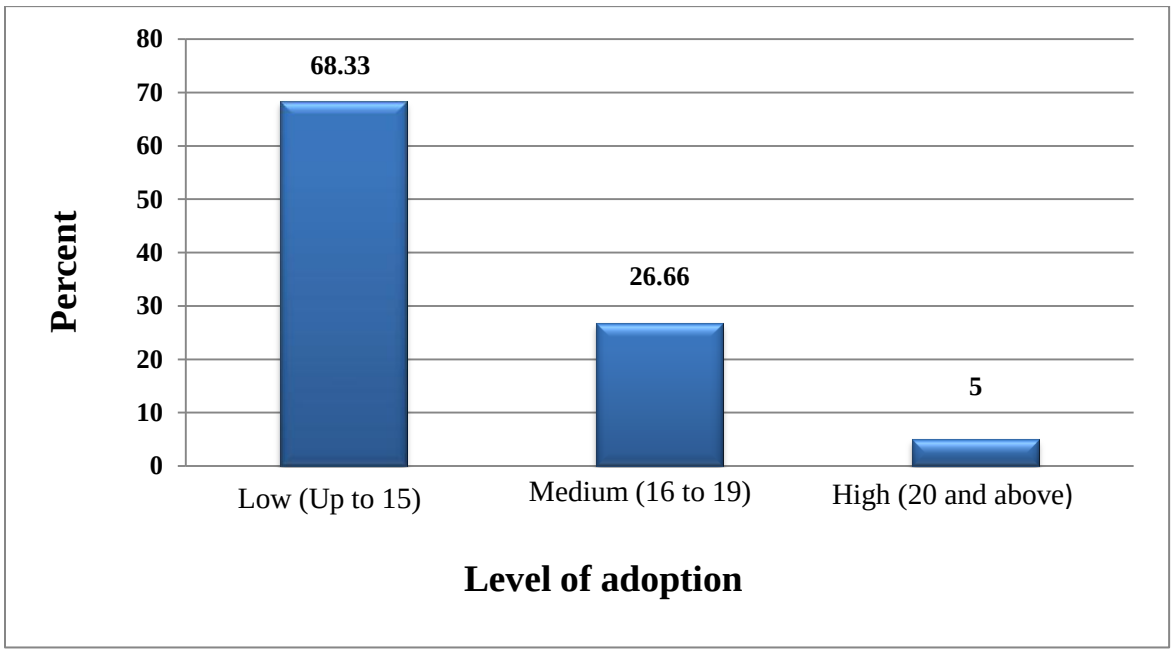


Fig 12: Distribution of the potato growers according to their level of adoption



VITA

MS. AMUNDKAR JYOTI BABAN

A candidate for the degree

of

MASTER OF SCIENCE (AGRICULTURE)

In

AGRICULTURE EXTENSION

2015

Title of Thesis : Adoption of post harvest Practices by the potato growers

Major Field : Agricultural Extension

Biographical information

Personal : Born on 6th June 1991 at Dimbhe Tal. Ambegaon, Dist. Pune

Daughter of Sau. Asha and Shri. Baban Dhondibhau Amundkar

Educational : Passed Secondary school Examination from Sharad Chandraji Pawar Madyamik Vidyalay, Dimbhe Kh. Tal. Ambegaon Dist. Pune in 2007 in Distinction (84.76 %)

: Passed Higher Secondary school Certificate from Mahatma Gandhi Junior College, Manchar Tal. Ambegaon Dist. Pune in 2009 in First class (78.00 %)

: Received Bachelor of Science (Agriculture) Degree from College of Agriculture, Pune Under M.P.K.V. Rahuri, Ahmednagar in 2013 in First Class (81.15%).

Address : At-Dimbhe BK. Dimbhe Colony
Tal. Ambegaon, Dist. Pune.
Pin code - 410509

Email Id. : **jyotiamundkar@gmail.com**