EXTENT OF ADOPTION AND CAUSES OF NON ADOPTION OF RICE VARIETIES DEVELOPED BY DBSKKV, DAPOLI

by

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B. Sc. (Ag)

DEPARTMENT OF EXTENSION EDUCATION
FACULTY OF AGRICULTURE

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DAPOLI - 415 712, DIST. RATNAGIRI (M.S.)

MAY-2015

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A thesis submitted to the

Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli

(Agricultural University)

Dist. Ratnagiri (Maharashtra State)

In partial fulfilment of the requirements for the degree of

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CERTIFICATE

This is to certify that the thesis entitled, '**EXTENT OF ADOPTION AND CAUSES OF NON ADOTION OF RICE VAEITIES DEVELOPED BY DBSKKV, DAPOLI'** submitted to the Faculty of Agriculture, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Dist. Ratnagiri, Maharashtra State in the partial fulfillment of the requirements for the degree of **MASTER OF SCIENCE (AGRICULTURE) in EXTENSION EDUCATION,** embodies the results of a piece of *bonafide* research carried out by **MISS. PRAJAKTA SATISH TELANGE** under my guidance and supervision. No part of this thesis has been submitted for any other degree or diploma. All the assistance and help received during the course of investigation and the sources of literature have been duly acknowledged by her.

Place: Dapoli
Date:

(P. A. Sawant)
Chairman,
Advisory Committee
and
Research Guide

ACKNOWLEDGEMENT

With soul searching memories ……..

At the last the moment has come to look in to the deeper layers of heart, which is filled with the feeling of togetherness, loveliness, consolation and satisfaction, a sign of relief and a sense of fulfillment. Some are momentary and some are permanent but both involve a number of near and dear persons to whom I acknowledge my warm regards and take this opportunity to express my feelings during the course of my research.

"Coming together is beginning, carrying together is progress and keeping together is success", this phrase comes to be true, while completing the post graduation. Therefore, at the outset, it is necessary to shape my feeling in words even though carrying of feelings in words are difficult, still a little effort is being done to access the never ending helping hands. Emotions can't be adequately expressed in words.

There are several occasions when you say 'Thanks' to someone in your life time, but when a person divert your life towards a new achievement, that condition creates a real respect and faith in your heart and your words become an "Acknowledgement" in respect to that great personality. I place on record my deep sense of gratitude and heartfelt respect to my Honorable Research Guide and Chairman of my Advisory Committee ***Dr. P. A. Sawant,*** *Head, Department of Extension Education, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli for his profound interest in the research, guidance, patient audience, constructive criticism and warm affection throughout the course of studies till the completion of this manuscript even with his busy schedule of official engagements.*

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Parents teach us to dream, to try, with our feet on the ground and sights on the sky. My beloved father ***Shri. Satish Dhondu Telange*** *has enlightened me to believe, in the beauty of dreams, Mother,* ***Sau. Sheetal Satish Telange*** *for her inexhaustible source of inspiration throughout my life, their blessings, love and affection has brought the cherished dream to reality. Sister* ***Snehal, Apurva*** *and brother* ***Rushikesh*** *and my relatives for their love, blessings, moral support and unhearing sacrifice throughout my academic career.*

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*Last but far from the least, I bow my head in extreme regards to the almighty deity "**GANPATI BAPPA**" whom I believe, who is always with me in my all efforts and made every job a success for me.*

Place: Dapoli

Date: / /2015 ***(Prajakta S. Telange)***

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Name of the student	**:**	**Miss. Prajakta Satish Telange**
Registration Number	**:**	2311
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ABSTRACT

Present study was conducted in Karjat, Mangaon and Alibag tahsils of Raigad district of Konkan region. The sample was constituted 135 rice growers drawn from nine villages of three tahsils. The respondents were interviewed with the help of a specially designed schedule. The ex-post-facto research design was used for the present study.

The analysis of data revealed that majority of the respondents had completed 'Secondary' education and engaged in 'farming'. Majority of the respondents had 'medium' size of family, having 'marginal to small' land holding and 'medium' annual income. Majority of the respondents had 'medium' extension contact, cosmopoliteness and rice yield and they obtained seed from 'Krishi Seva Kendra'.

Maximum number of the respondents had 'medium' knowledge and adoption of the rice varieties evolved by the Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Majority of the farmers had knowledge about rice variety 'Karjat 7' and they adopted same variety and also gave 'first' preference for use of this variety.

The relationship of the characteristics of the farmers namely family size, annual income, size of land holding, extension contact, sources of information, sources of seed availability, cosmopoliteness and rice yield with that of extent of adoption of rice varieties developed by DBSKKV was found to be positive and significant. However, education and occupation of the respondents showed non-significant relationship with adoption.

All the non adopters encountered the difficulty namely 'Lack of information about the rice varieties' while majority of the adopters as well as all non adopters faced the difficulty of 'Non-availability of the seed material' in adoption of rice varieties developed by DBSKKV, Dapoli followed by 'Lack of demand for the grain in the market' (63.33 per cent) by the adopters.

विस्तार शिक्षण विभाग
कृषि महाविद्यालय, दापोली

प्रबंधाचे नाव	डॉ. बाळासाहेब सावंत कोकण कृषि विद्यापीठाने विकसित केलेल्या भात जातींचे अवलंबन आणि अवलंबन न करण्याची कारणे यांचा अभ्यास
विद्यार्थिनीचे नांव	कु. प्राजक्ता सतिश तेलंगे
नोंदणी क्रमांक	२३११
संशोधन मार्गदर्शकाचे नांव	डॉ. पी. ए. सावंत
पदवी	एम.एस्सी. (कृषि)
मुख्य विषय	विस्तार शिक्षण
सादरीकरणाचे वर्ष	२०१५

सारांश

हा अभ्यास कोंकण विभागाच्या रायगड जिल्हयातील कर्जत, माणगाव आणि अलिबाग या तालुक्यांमध्ये घेण्यात आला. त्यासाठी ९ गावामधील भातशेती करणाऱ्या एकूण १३५ शेतकऱ्यांकडून प्रत्यक्ष मुलाखतीद्वारे माहिती घेण्यात आली. अभ्यासामध्ये असे दिसून आले कि बहुतांश शेतकरी हे माध्यमिक शिक्षण घेतलेले असून शेती व्यवसाय करणारे होते. कुटुंब धारणा, वार्षिक उत्पन्न, जमीन धारणा, विस्तार संपर्क, विविधांगी माहिती, भात उत्पन्न या गुणांच्या बाबतीत बहुतांश शेतकरी मध्यम श्रेणीत आणि कृषिसेवा केंद्रातून भात बियाणे घेणारे आढळून आले. डॉ. बाळासाहेब सावंत कोकण कृषि विद्यापीठाने विकसित केलेल्या भात जातींविषयी शेतकऱ्यांना मध्यम प्रमाणात ज्ञान असून त्याचा अवलंब ही मध्यम प्रमाणात केला आहे. बहुतांश शेतकऱ्यांना कर्जत-७ या जातीविषयी माहिती असून त्यांनी या जातीस पहिला पसंती क्रमांक दिला आहे.

कुटुंब धारणा, वार्षिक उत्पन्न, जमीन धारणा, विस्तार संपर्क, माहिती स्त्रोत, बियाण्यांचा स्त्रोत, विविधांगी माहिती, भात उत्पन्न या गुणांचा डॉ. बाळासाहेब सावंत कोकण कृषि विद्यापीठाने विकसित केलेल्या भात जातींच्या अवलंबनाशी सांख्यिकीयदृष्ट्या समर्थनीय संबंध असल्याचे आढळले तर शिक्षण व व्यवसाय यांचा संबंध नसल्याचे आढळले.

विद्यापीठाने विकसित केलेल्या भात जातींचा अवलंब न करणाऱ्या शेतकऱ्यांना भात जातींविषयी ज्ञानाचा अभाव असल्याचे आढळले. तर अवलंब करणाऱ्या व न करणाऱ्या शेतकऱ्यांनी बियाणे वेळेत उपलब्ध होत नाही ही मुख्य अडचण असल्याचे सांगितले. तसेच उत्पादित भाताचा कमी दर ही अडचणही भेडसावत असल्याचे नमूद केले.

विस्तार शिक्षण विभाग

कृषि महाविद्यालय, दापोली

प्रबंध का विषय	डॉ. बालासाहेब सावंत कोंकण कृषि विद्यापीठ द्वारा विकसित की गई धान की जातियों का अवलम्बन और अवलम्बन न करने के कारणों का अभ्यास
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<u>प्रबंध सार</u>

प्रस्तुत अध्ययन कोंकण क्षेत्र के रायगड जिले के कर्जत, माणगाव और अलिबाग तहसीलों में आयोजित किया गया ! इसके लिए ९ गावोंसे धान की खेती करनेवाले १३५ किसानो से मुलाकात की गई ! इस अभ्यास में ऐसा निकष दिखाई दिया की अधिकतम किसानो ने माध्यमिक पढाई और खेती करनेवाले है! परिवार की स्थिति, वार्षिक आय, जमीन धारणा, विस्तार संपर्क, सार्वलौकिक जानकारी, धान की उपज इन गुणों के बारे में अधिकतम किसान मध्यम श्रेणी में है और कृषि सेवा केंद्र से धान के बिज लेनेवाले पाए गए ! डॉ. बालासाहेब सावंत कोंकण कृषि विद्यापीठ द्वारा विकसित की गई धान की जातियों के बारे में किसानो को मध्यम प्रमाण में ज्ञान है और इसका अवलम्बन भी मध्यम प्रमाण में किया है ! अधिकतम किसानो को कर्जत-७ जाती के बारे में जानकारी है और उन्होंने इस जाती को पहली प्रमुखता दी है !

परिवार की स्थिति, वार्षिक आय, जमीन धारणा, विस्तार संपर्क, जानकारी का माध्यम, बिज खरीदी का माध्यम, सार्वलौकिक जानकारी, धान की उपज का डॉ. बालासाहेब सावंत कोंकण कृषि विद्यापीठ द्वारा विकसित की गई धान की जातियों के अवलम्बन से सांख्यिकी स्तरपर समर्थनीय संबध दिखाई दिया ! शिक्षा और व्यवसाय का सांख्यिकी स्तर पर संबध दिखाई नहीं दिया !

धान की खेती न करनेवाले किसानो को धान की जातियों के बारे में ज्ञान के अभाव की प्रमुख समस्या है ! अवलंबन करनेवाले और न करनेवाले किसानों ने बिज समय पर उपलब्ध नहीं होता यह प्रमुख समस्या बताई ! उत्पादित धान की कम मूल्य दर इस समस्या का सामना करना पड़ता है ऐसे भी बताया !

Chapter I

INTRODUCTION

India is facing the challenges of food and fodder production to meet the demand of rising human and cattle population. One of the major causes of this problem is low level of adoption of improved agriculture practices by the farmers.

Rice (*Oryza sativa*. L.) commodity recognition as a supreme commodity to mankind, because rice is truly life, culture a tradition. It has its own history and religious importance in human life. Life starts with rice peg and ends with rice offering on “Pind”. India is one of the world's largest producers of white rice. For India, like many other developing countries, the issue of feeding ever increasing population is of prime importance, this problem can be solved by maximizing agricultural production through use of high yielding varieties. Rice is the foremost cereals of the world and is the staple food of over 60.00 per cent of the world’s population.

Oryza sativa, it is believed, is associated with wet, humid climate, though it is not a tropical plant. It is probably a descendent of wild grass that was most likely cultivated in the foothills of the far Eastern Himalayas. Another school of thought believes that the rice plant may have originated in southern India, then spread to the north of the country and then onwards to China. It then arrived in Korea, the Philippines (about 2000 B. C.) and then Japan and Indonesia (about 1000 B. C.). The journey of rice around the world has been slow, but once it took root it stayed and became a major agriculture and economic product for the people. In the Indian subcontinent more than a quarter of the cultivated land is given to rice (20011-12). It is a very essential part of the daily meal in the southern and eastern parts of India. In the northern and central parts of the subcontinent, where wheat is frequently eaten, rice holds its own and is cooked daily as well as on festivals and special occasions.

India is an important centre of rice cultivation. The rice is cultivated on the largest areas in India. Historians believe that while the *indica* variety of rice was first domesticated in the area covering the foothills of the Eastern Himalayas (i.e. north-eastern India), stretching through Burma, Thailand, Laos, Vietnam and Southern China, the *japonica* variety was domesticated from wild rice in southern China which was introduced to India. Perennial wild rice still grows in Assam and Nepal. It seems to have appeared around 1400 B.C. in southern India after its domestication in the northern plains. It then spread to all the fertile alluvial plains watered by rivers. Some says that the word rice is derived from the Tamil word *arisi.*

In India, rice is the only promising crop to acquire self sufficiency of food grain production for the population. Rice crop occupy the largest cultivated land in the country. It was cultivated on the area of 42.41 million hectares with production of 104.40 million tons in the year 2012- 2013 (Directorate of economics and statistics, Department of Agriculture and cooperation 2012- 2013). The area under rice in India is about 38.00 per cent of the total area production. The total production of rice in India is about 48.00 per cent of that of food grain. In the year 2012 – 2013, the area under rice crop in India was maximum (5.86 million hectares) in Uttar Pradesh followed by West Bengal (5.43 million hectares) and Odisa (4.03 million hectares). In terms of production of rice, West Bengal ranked first (14.96 million tons) followed by Uttar Pradesh (14.41 million tons) and Punjab (11.37 million tons) (Directorate of Economics and Statistics, Department of Agriculture and Cooperation 2012-2013). In Maharashtra rice is grown on area of about 1.55 million hectares with a production of about 3.04 million tones (Directorate of Economics and Statistics, Department of Agriculture and cooperation 2012-2013).

In Maharashtra State, rice is the main crop grown in the costal districts of the Konkan region mainly in the four districts namely Thane, Raigad, Ratnagiri and Sindhudurg district. Besides the coastal districts of the state, rice is also grown in some districts like Nashik, Pune, Kolhapur, Satara, Chandrapur and Bhandara district, where there is comparatively high rainfall. The area of Maharashtra state 1.49 million hectares with an annual production of nearly 3.27 million tones. The average productivity of the state is 1.76 t/ha. Maharashtra ranks 13th place in rice production in the country. (Raigad District Socio-economic Report, 2011)

Konkan region of Maharashtra state is known for its bounteous nature, beautiful landscape and variety of fruits, especially Alphanso mango. The major food of the people in this region is rice. It occupies an area of about 0.44 million hectares with annual production of nearly 15.10 lakh tones. The area under rice in Konkan is about 30.00 per cent of total area. However, productivity of Konkan region is 2.40 tons per hectare.

1.1 History of development of rice variety in India

Rice breeding programme in India was started by Dr. G. P. Hector, the then Economic Botanist during 1911 in undivided Bengal with headquarters at Dacca (now in Bangladesh). Subsequently, in 1912, a crop specialist was appointed exclusively for rice in Madras Province. Prior to the establishment of the Indian Council of Agricultural Research (ICAR) in 1929, Bengal and Madras were the only provinces which had specialist exclusively for rice crop. After the establishment of ICAR, it initiated rice research projects in various states of the country and by 1950, 82 research stations in 14 states of the country were established, fully devoted for rice research projects. These research stations, mainly by the pure line method of selection, released 445 improved varieties. These varieties were of various kind such as –earliness, deep water and flood resistant, lodging resistant, drought resistant, non-shredding of grains, dormancy of seed, disease resistant, higher response to heavy manuring etc.

Thus, during the pure line period of selection from 1911-1949, the advantage of natural selection have been fully exploited and there have been varieties available for every rice ecology. During the early period of breeding research programme, varieties were developed suitable for specific stress situation or for resistant to particular disease. When, after World War II, synthetic fertilizers became popular, efforts were made to identify varieties which respond to heavy fertilization.

After the establishment of the Central Rice Research Institute (CRRI) at Cuttack in 1946 by the Govt. of India, rice research and training received an added impetus. There had been a systematic screening of exotic types from the genetic stocks. Besides, for the purpose of direct introduction in the country, many Chinese, Japanese, Taiwanese and Russian types were also tested. The Chinese types, which were first, prior to 1947, tested in Kashmir Valley, found fairly successful and the Japanese and Russian types were found unsuitable under Indian conditions due to poor yield, unacceptable grain qualities and susceptibility to blast.

Inter-racial hybridization programme between *japonicas* and *indicas* was initiated during 1950-54. The Food and Agriculture Organization of the United Nations with a view of improving production of cereal on an international basis after the end of World-War II launched collaborative project japonica X indica hybridization in South-East Asian countries. The object of this project was to transfer the high yielding capacity and response to use higher dose of fertilizers into

local indica varieties from japonica varieties. Indica varieties were already well adapted to the local conditions and had tolerance to diseases and pests of the region. A parallel project of japonica X indica hybridization was also started by ICAR with the same objectives. These projects could achieve very limited success. Only four varieties, viz. - Malinja and Mashuri in Malaysia, ADT-27 in Tamil Nadu, India and Circna in Australia were released from more than 700 hybrid combinations.

The Central Rice Research Institute, Cuttack also started another project in 1960 with a view to evolve high yielding fertilizer responsive varieties with japonica in 11 states. In this project remarkable success was achieved in the development of japonica X indica hybrids.

The International Rice Research Institute was established in the Philippines in 1960 and this institute helped in evolving dwarf high yielding varieties with the concept of improving the plant type in indica rice based on the use of a gene from semi-dwarf Chinese varieties. These high yielding varieties were highlighted during the International Rice Year in 1966 by ICAR through national demonstration trials. This was the beginning of moving towards self-sufficiency in rice production. Further, the ICAR launched the All-India Co-ordinated Rice Improvement Project (AICRIP) in 1965 that helped in co-ordination of interdisciplinary and inter-institutional research results on the country basis for improving the production, productivity and profitability of rice in India.

Inter-racial hybridization programme between semi-dwarf Taiwanese types/derivatives and indica was started during 1965 onwards. India operated its most intensive rice breeding programmes under the AICRIP with the development of Taichung (Native) - I from the semi-dwarf mutant and achieved remarkable success. Padma and Jaya were the first varieties that emerged from the programme. Subsequently, many semi-dwarf varieties were released by the Central Variety Release Committee and also by the different state agencies. Most of these varieties have got high yield potential.

During the period of inter-racial hybridization between semi-dwarf Taiwanese types/derivatives and indica which was started during 1965, the most significant achievement is the prolific release of high yielding varieties. Infact 123 varieties were released during this period in 12 years as compared to 51 high yielding varieties released during the four decades prior to 1965. The semi-dwarf varieties have been

found superior in efficiency of grain production as compared to the tall traditional varieties.

1.2 Development of hybrid rice

Research programme was initiated during 1970 to develop hybrid rice variety in the country. There was no success in this programme during the subsequent two decades. However, the research programme was accelerated and intensified from 1989 with a mission mode project. With this concerted research efforts, a remarkable success was achieved within a short span of 5 years and half dozen hybrid rice varieties were developed from public and private sectors. The first four hybrid rice varieties were released in the country during 1994. Subsequently, two more hybrid rice varieties were also released. By the end of 2001, a total of 19 hybrid rice varieties were released.

Rice is grown in high intensity rainfall areas where it is only be grown. Initially rice cultivars were taller, low yielder, less responsive to nitrogenous fertilizer. Rice area is decreasing day by day due to its various constraints like urbanization, rice fallows due to timely unavailability of labours and other inputs. However, in modern era of rice research scientists have done remarkable job in modeling of rice plant architecture with non lodging, non-shattering, semi dwarf stature, more productive tillers and spikelet fertility along with adoption of improved cultivation technology and plant protective measures.

1.3 Development of rice varieties by DBSKKV

After the establishment of Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli (DBSKKV), breeding programs were guided by modern plant type concept and resulted in the development of several rice varieties with high yield potential and other desirable traits. The research for evolving the high yielding varieties of rice is being carried out at the Regional Agricultural Research Station at Karjat (Raigad), Kharland Research Station at Panvel (Raigad), Agriculture Research Station Palghar (Thane), Phondaghat (Sindhudurg), Shirgaon (Ratnagiri) and College of Agriculture, Dapoli (Ratnagiri). Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli has developed many location specific technologies and released several note worthy varieties especially in case of rice which is the primary crop in Konkan region. University has developed 19 best varieties through selection and in modern era of

rice research, developed 24 high yielding varieties with improved architecture and five excellent rice hybrids of various durations. (Annexure-I)

1.4 Need of the study

The environmental adaptability and yield stability are important attributes for farmers' choice of crop varieties. Research approaches that incorporate farmers' preferences for various attributes of rice in breeding programs and extension strategies have to be adopted and the research system should develop a range of varieties in order to meet the multiple concerns of the farmers (Joshi and Bauer, 2006). So, in many cases, grain size, color and taste were very important characteristics when it came to determining preference of varieties by respondents based on varietal attributes. In this context, it is important to find out the farmers' preference for rice varieties based on varietal attributes of the rice varieties recommended by DBSKKV, Dapoli. This is taken as the main objective of this study.

Rice scientists, extension agents as well as planners for various reasons need to know about existing rice varieties with their percentage share in area and their respective yields. Identifying the most popular rice varieties is particularly important for rice breeders who are trying to develop new varieties with higher yield and varieties suitable for unfavorable areas/climatic conditions. It is also important to know the diffusion process of modern varieties, identifying the traits for the popularity of some varieties and investigating the reasons for the discontinuation of growing some popular varieties as well as reasons for non-adoption of these varieties. The sources of seed supply and sources of information about new rice technology, the role of private and government organizations in supplying seed, etc. are also important aspects for enhancing rice production for food security. The scientific data with respect to varieties developed by DBSKKV, Dapoli on the above mentioned aspects is not available and hence this study has been designed with the following specific objectives.

1.5 Specific objectives of the study

1. To study the personal characteristics of the farmers.
2. To study the extent of knowledge and adoption of rice varieties developed by DBSKKV, Dapoli.

3. To find out the relationship between personal characteristics of the farmers,and adoption of rice varieties developed by DBSKKV,Dapoli.

4. To study the preferences of the farmers towards particular variety of rice.

5. To study the difficulties encountered by adopters and non-adopters in use of rice varieties developed by DBSKKV, Dapoli.

1.6 Scope of the study

The present investigation mainly pertains to study the knowledge and adoption of high yielding varieties of rice and to identify the causes of non-adoption of the farmer.

The systematically designed research studies with reference to adoption of high yielding rice varieties by the farmers in the Konkan region are very limited and hence the present study was planned and conducted in the Konkan region. The findings of the study would be useful to the Extension workers in order to know the status of adoption of high yielding varieties of rice by the farmers. The results would also be useful to the scientists of the DBSKKV, Dapoli in planning their future programme of breeding rice varieties. Besides, the findings shall also provide useful guideline to those involved in the programme of rural development in the Konkan region.

The experience gained through this study would also be helpful in conducting similar studies on the different crops in the region.

1.7 Limitations of the study

Due to limitation of time, money and other resources, the study was restricted to limited aspects. The data were collected from nine villages belonging to three tahsils from Raigad district. Hence, the findings cannot be generalized beyond the limits of the study area and to those areas which do not have similar conditions to those of villages under study.

CHAPTER II

REVIEW OF LITERATURE

A comprehensive review of literature is an essential part of any investigation. It provides basis for developing theoretical framework as also for interpretation of findings. The present investigation was one of the attempts to study extent of adoption and causes of non adoption of rice varieties released by DBSKKV, Dapoli. While reviewing the literature, the focus was mainly given on the studies related with different aspects of rice growers. As reviews directly related with the topic were few, all such literature having direct or indirect bearing on the objectives of the present study were collected. The literature and studies reviewed are presented under the following heads

2.1 Personal characteristics of the farmers.

2.2 Extent of knowledge and adoption of rice varieties.

2.3 Relationship between personal characteristics of the farmers and adoption of varieties.

2.4 Preferences of the farmers for particular varieties of rice.

2.5 Problems and difficulties encountered by adopters as well as non adopters in use of rice varieties.

2.1 Personal characteristics of the farmers

2.1.1 Education

Gogoi and Phukan (2000) in a study on ‘Extent of adoption of improved rice cultivation practices by farmers’ observed that majority (54.54 per cent) of the respondents were from ‘high ‘education category, while 36.36 per cent and 9.10 per cent of the respondents were in ‘medium’ and ‘low’ education category, respectively.

Balasubramani, *et al*. (2005) ‘A study on the yield analysis in paddy in the Erode district of Tamil Nadu’ observed that maximum numbers of the respondents (36.66 per cent) had ‘secondary’ level of education, 22.92 per cent of the respondents were ‘illiterate’, followed by ‘primary education’ (24.00 per cent), ‘middle education’ (9.00 per cent) ‘higher secondary education’ (6.00 per cent) and only 1.42 per cent respondents had ‘college education’.

Ramesh and Santha (2005) in their study ‘Personal and socio- economic characteristics of organic farmers’ revealed that more than two-fifth (45.00 per cent) of the respondents were ‘illiterate’, followed by ‘primary education’ (31.00 per cent), ‘middle education’ (10.00 per cent) ‘secondary education’ (8.00 per cent) ‘higher secondary education’ (6.00 per cent) and only one respondent had ‘college education’.

Deore (2006) in his study on ‘Awareness of farmers regarding organic rice cultivation practices’ observed that maximum number (42.50 per cent) of the respondents had ‘higher secondary’ education. The respondents of the category of ‘secondary education’ were 29.50 per cent, followed by ‘primary’ (13.50 per cent) ’graduate’ (10.00 per cent), ‘pre-primary’ (2.50 per cent) and ‘illiterate’ (2.00 per cent).

Odogola (2006) in his study ‘final survey report on the status of rice production, processing and marketing in Uganda’ revealed that a total of 57.10 per cent of the respondents had ‘primary’ education, 30.60 per cent had ‘secondary education’, 4.10 per cent had ‘tertiary’ level education and 0.20 per cent had ‘vocational and university’ education, and 8.00 per cent did not attend school at all.

Sheikh, *et al.* (2006) in their study ‘Adoption of rice technological package by farmers of irrigated Punjab’ found that education level of the farmers in study area was low nearly to primary education. However, large farmers were significantly more educated (9 years of schooling) than small farmers.

Tambat (2007) in his study ‘A study on knowledge and adoption of recommended cultivation practices by the summer rice growers’ observed that a maximum number (29.33 per cent) of the respondents had ‘secondary’ education while in category of ‘pre-primary’ education. There were 26.00 per cent respondents followed by ‘primary’ (22.67per cent), ‘higher-secondary’ (10.00 per cent), ‘college’ level (6.67 per cent), and ‘illiterate’ category (5.33 per cent).

Bzugu and Mustapha (2010) in their study on ‘Adoption of Nerica 1 rice variety among farmers in Jalingo local government area of Taraba state, Nigeria’ found that 30.00 per cent of the respondents attained ‘primary’ education, 20.00 per cent attained ‘secondary’ education, while only 2.50 per cent attained ‘tertiary’ education. However, 47.50 per cent of the respondents did not have any ‘formal’ education.

Seyyed and Mohammad (2010) in their study ‘Socio-personal characteristics on the adoption of rice-fish culture system in north of Iran’ found that 19.00 per cent

of the respondents were ‘illiterate’, 26.10 per cent of the respondents had education upto ‘primary-school’ level, 22.30 per cent of them had ‘guidance level’, 26.10 per cent had ‘secondary’ education and ‘school diploma’ and 6.50 per cent had ‘college degree’ or ‘higher’ education.

Thakur (2011) in his study on ‘Influence of social values on adoption of the recommended rice cultivation practices’ observed that maximum number (37.50 per cent) of the respondents had ‘secondary’ education. The respondents in the category of ‘primary’ education were 26.67 per cent, followed by ‘pre-primary’ (18.33 per cent), ‘higher secondary’ (10.83 per cent) and ‘graduate’ (6.67 per cent). The average educational level of the respondents was 7th std.

Meena, *et al.* (2012) in their study entitled ‘Knowledge level and adoption pattern of rice production technology among farmers’ found that 57.50 per cent of the farmers were ‘medium’ educated i.e. from middle to high school standard, 24.50 per cent farmers were ‘low’ educated i.e. up to primary and only 18.00 per cent of them were ‘highly’ educated i.e. above high school.

Abel, *et al.* (2014) in their study ‘Improved rice variety adoption and its effects on farmers output in Ghana’ found that there was low level of education among the farmers. Specifically, 76.40 per cent of the farmers had ‘no formal’ education, while 20.90 per cent each finished ‘basic’ and ‘secondary’ education. Only 2.70 per cent made it to the ‘tertiary’ level.

Onumadu and Osahon (2014) studied ‘Socio-economic determinants of adoption of improved rice technology by farmers in Ayamelum local government area of Anambra state, Nigeri’ found that 45.00 per cent of the farmers had ‘primary’ education, 30.00 per cent attended ‘secondary’ school, and 25.00 per cent had ‘no formal’ education.

2.1.2 Occupation

Shinde, *et al.* (2000) in their study ‘Identification and adoption of indigenous agriculture practices by dry land farmers’ observed that majority (90.00 per cent) of the respondents had farming as main occupation, while the remaining 10.00 per cent had ‘service’ as major occupation..

Anonymous (2003) in their study on ‘A study of few aspects of Sahyadri variety growers of Konkan region’ revealed that 67.00 per cent of the respondents had

'farming' as major occupation, while the remaining 15.00 per cent had 'service' as major occupation. Only, 10.00 per cent and 8.00 per cent of them were observed in the category of 'independent profession' and 'farm labourers', respectively.

Pandey, *et al.* (2004) in their study 'Constraints in adoption of recommended rice production technology among the farmers of Chattisgard' found that the 81.25 per cent respondents were practicing agriculture as their major occupation and 18.75 per cent farmers were practicing more than two occupations.

Balasubramani, *et al.* (2005) observed that majority of the respondents (86.67 per cent) had agriculture as a 'primary' occupation. Remaining 13.33 per cent of the respondents had agriculture as 'secondary' occupation.

Ramesh and Santha (2005) revealed that majority (81.00 per cent) of the respondents had agriculture as their 'primary' occupation. Remaining 19.00 per cent of the respondents had agriculture as 'secondary' occupation.

Aliou (2006) in his study 'Diffusion and adoption of Nerica rice varieties in Cote D'ivoire' found that 'farming' was the main occupation of majority of them (89.00 per cent), and 'household work' was the main occupation of 11.00 per cent respondents.

Deore (2006) revealed that majority (83.50 per cent) of the respondents were engaged in 'farming' followed by 'business' (9.00 per cent) and 'service' (7.50 per cent) as their major occupation.

Thakur (2011) observed that majority (51.66 per cent) of the respondents were engaged in 'farming', followed by 'labour' (13.34 per cent), 'service' (11.66 per cent), 'dairy' (8.34 per cent), 'business' (7.50 per cent) and 'poultry' (7.50 per cent) as their major occupation.

Meena, *et al.* (2012) observed that majority (51.50 per cent) of the farmers were engaged in 'agriculture only' Whereas, 35.50 and 13.00 per cent farmers were engaged in agriculture along with business and agriculture along with services, respectively for their livelihood.

2.1.3 Size of family

Shigvan (2002) in his study entitled 'A study on aspirations of boys of college of agriculture, Dapoli' found that family size of majority (85.08 per cent) of the respondents was 'medium'. There were 9.84 per cent respondents having 'big' size families and only 5.08 per cent had 'small' size families.

Pandey, *et al.* (2004) observed that majority (80.27 per cent) of the respondents had 'medium' size family.

Ramesh and Santha (2005) revealed that majority of the respondents (52.00 per cent) had their family size with more than five members, while remaining (48.00 per cent) had their family size up to 5 members.

Rashmi (2005) in her study, 'A study of an aspirations of school going student farm fisherman families,' found that family size of majority (71.95 per cent) of the respondents was 'medium'. There were 17.08 per cent respondents having 'big' size families, only 10.97 per cent respondents had 'small' size families.

Amol (2006) in his study entitled 'A study on indigenous technical knowledge about rice cultivation and bovine health management practices in Konkan region of Maharashtra' observed that less than four-fifth (78.87 per cent) of the respondents had 'large' families of more than four members.

Odogola (2006) revealed that family size of the respondent households varied from a minimum of 2 to a maximum of over 30 members with a mode of 6 members.

Seyyed and Mohammad (2010) found that family size of about 80.00 per cent of the respondents was more than four people, while remaining 20 per cent had 'small' and 'big' family size.

Thakur (2011) observed that family size of majority (75.83 per cent) of the respondents was 'medium', while 12.50 per cent and 11.67 per cent respondents had 'big' and 'small' family size, respectively. The average family size was 5 members.

Meena, *et al.* (2012) showed that majority of the farmers belonged to 'large' family size. This group constituted 63.00 per cent of the total sample and rest 37.00 per cent farmers were from 'small' families.

Onumadu and Osahon (2014) found that 43.30 per cent of the farmers had household size of 6 to 10 people, 31.20 per cent had 1 to 5 people while 25.50 per cent had 11 to 15 people.

2.1.4 Annual income

Sharma and Sharma (2002) in their study ' Constraints in adoption of morden technology for rice cultivation in the tribal district of Surguja, Chattisgad' observed that maximum number (40.83 per cent) of the respondents had 'medium' annual

income, while 36.67 per cent and 15.00 per cent of the respondents had ‘low’ and ‘high’ annual income, respectively. Only 7.50 per cent of the respondents had ‘very low’ annual income.

Balasubramani, *et al*. (2005) observed that 33.67 per cent of the respondents had ‘low’ level of annual income, whereas 37.53 per cent had ‘high’ level of annual income, while 27.80 per cent had ‘medium’ level of annual income.

Ramesh and Santha (2005) revealed that most (73.00 per cent) of the respondents had ‘low’ level of annual income, whereas only 7.00 per cent had ‘high’ level of annual income, while 20.00 per cent had ‘medium’ level of annual income.

Amol (2006) showed that more than four-fifth (85.92 per cent) of the respondents were falling in the ‘medium’ category with the annual income in between Rs.12,568/- to 71,320/-, while remaining 14.08 per cent categories into ‘low’ and ‘high’ level annual income .

Deore (2006) revealed that maximum number (43.00 per cent) of the respondents were having ‘medium’ annual income, while 36.50 per cent and 20.50 per cent of the respondents had ‘low’ and ‘high’ annual income, respectively.

Sonali (2009) revealed that majority (80.83 per cent) of the respondents were having ‘medium’ annual income, while 11.67 per cent and 7.50 per cent of respondents had ‘low’ and ‘high’ annual income, respectively.

Manjunatha (2010) in his study entitled ‘Study on knowledge and adoption of plant protection measures by paddy growers of Raichur district’ that 38.85 per cent of the respondents had annual income below Rs. 49,310, followed by 35.42 per cent of them had an annual income between Rs. 49310 to Rs. 1, 21,217 and rest of the respondents (25.73 per cent) had an income more than Rs. 1, 21,217.

Thakur (2011) observed that about half (49.17 per cent) of the respondents were having ‘medium’ annual income, while 39.17 and 11.66 per cent of the respondents had ‘low’ and ‘high’ annual income, respectively.

Meena, *et al.* (2012) revealed that majority of the farmers belonged to ‘middle’ income group i.e. between 1.50 to 5.75 lakh per annum. This income group alone constituted 72.50 per cent of the total sample. Further, 11.50 per cent and 16.00 per cent farmers were from ‘low’ and ‘high’ income groups, respectively.

2.1.5 Size of land holding

Sharma and Sharma (2002) in their study on 'Constraints in adoption of modern technology for rice cultivation in the tribal district of Surguja, Chhattisgarh' found that maximum (45.84 per cent) number of the respondents had 'small' land holding, while 30.83 per cent respondents had 'medium' land holding remaining 15.83 per cent and 7.50 per cent farmers had 'marginal' and 'large' land holding, respectively.

Anonymous (2003) concluded that maximum number (43.00 per cent) of the respondents had 'small' land holding, while 32.00 per cent and 12.00 per cent of the respondents had 'marginal' and 'semi-medium' land holding, respectively. Remaining 8.00 per cent and 5.00 per cent respondents had 'medium' and 'big' land holding, respectively.

Ramesh and Santha (2005) revealed that majority of the respondents (48.00 per cent) belonged to 'medium' farm size category followed by 'low' (32.00 per cent) and 'high' farm size categories (20.00 per cent).

Krishna, *et al*. (2007) in their study entitled 'Dynamics of adoption of recommended rice production technologies among migrant farmers' revealed that maximum number (46.67 per cent) of the respondents possessed 'big' land holdings, followed by 29.33 per cent and 24.00 per cent of the respondents had 'small' and 'marginal' land holding, respectively.

Sonali (2009) observed that more than two-third (68.33 per cent) of the respondents had 'medium' size of land holding, while 17.50 per cent of the respondents who had 'semi-medium' land holding and 8.33 per cent and 5.84 per cent of the respondents had 'small' and 'marginal' land holding, respectively.

Bzugu and Mustapha (2010) found out that majority of the respondents had farm size of less than 3 hectares, while only 4.69 per cent of the respondents had farm size of more than 6 hectares.

Manjunatha (2010) reported that 32.57 per cent of the respondents belonged to 'medium' land holder category, followed by 'semi-medium' land holders (23.43 per cent), 'small' land holders (17.72 per cent), 'marginal' land holders (14.28 per cent) and 'big' land holders (12.00 per cent).

Thakur (2011) observed that majority (83.33 per cent) of the respondents had ‘marginal’ size of land holding, while 10.00 per cent of the respondents had ‘small’ land holding and 6.67 per cent of the respondents had ‘semi-medium’ land holding. The average size of land holding was 0.88 ha.

Meena, *et al.* (2012) observed that 72.00 per cent of the total farmers were ‘big,’ where as 28.00 per cent farmers were ‘small’ and rest 5.00 per cent of them were ‘marginal’ farmers.

Onumadu and Osahon (2014) found out that more than two-third (66.30 per cent) of the farmers had farm size of 1.0 to 2.0 ha, while 33.70 per cent of them had 2.0 to 3.0 ha farm holding.

2.1.6. Extension contact

Anonymous (2003) revealed that majority (74.00 per cent) of the respondents had ‘medium’ extension contact, while 14.00 per cent and 12.00 per cent of the respondents had ‘high’ and ‘low’ extension contact, respectively.

Anonymous (2005) in their study ‘A study of non cash (non monitory) inputs adoption by farmer for rice’ found out that 58.00 per cent of the respondents had ‘medium’ extension contact, while 27.33 per cent of the respondents had ‘low’ extension contact and 14.67 per cent of the respondents had ‘high’ extension contact.

Ramesh and Santha (2005) revealed that nearly two-thirds (64.00 per cent) of the respondents had ‘medium’ level of extension agency contact, whereas only 5.00 per cent of the respondents had ‘high’ level of extension agency contact, while remaining 31.00 per cent of the respondents had ‘low’ level of extension agency contact.

Aliou (2006) found that 66.00 per cent of surveyed farmers never had any contact with extension and research organization. 34.00 per cent of the respondents had positive contact with extension workers.

Deore (2006) observed that about three-fourth (74.50) of the respondents had ‘medium’ extension contact, 14.50 per cent of the respondents had ‘high’ extension contact, while 11.00 per cent of the respondents had ‘low’ extension contact. The average extension contact score of the respondents was 7.29 per cent.

Tambat (2007) observed that more than one half (52.00 per cent) of the respondents had ‘medium’ extension contact, while 28.00 per cent and 20.00 per cent of the respondents had ‘low’ and ‘high’ extension contact, respectively.

Thakur (2011) reported that majority (77.50 per cent) of the respondents had ‘medium’ extension contact; while 15.83 per cent of the respondents had ‘low’ extension contact and 6.67 per cent of the respondents had ‘high’ extension contact. The average extension contact score of the respondents was 6.9.

Manjunatha (2010) reported that 54.85 per cent of the respondents had ‘low’ extension contact, while 25.15 per cent and 20.00 per cent of them had ‘medium’ and ‘high’ extension contact, respectively.

2.1.7 Sources of information

Marimathu and Rathakrishnan (2000) in their study entitled ‘Information source utilization pattern of banana growers’ revealed that television (65.80 per cent) and radio (65.00 per cent) were the major sources among the impersonal cosmopolite. Exhibition (33.33 per cent), wall paintings (27.50 per cent), news papers (27.50 per cent), agricultural meetings (15.00 per cent), demonstrations (12.50 per cent), posters/charts (8.33 per cent) trial plots (7.50 per cent), extension literature (5.00 per cent) and hoardings (0.83 per cent) were the other sources.

Sangita, *et al.* (2001) in their study on ‘Utilization of communication sources by the farmers for seeking farm information’ observed that among the personal localite sources, majority (96.62 per cent) of the respondents used friends, followed by neighbourers (76.56 per cent) and progressive farmers (60.15 per cent) to seek information on agricultural technology. With regards to personal cosmopolite sources, most (96.87 per cent) of the farmers used Agricultural Assistants and among the mass media, they mainly used radio and television to acquire information about agricultural technology.

Ramesh and Santha (2005) revealed that more than half (52.00 per cent) of the respondents had ‘medium’ level of information source utilization followed by 30.00 per cent of respondents with ‘high’ level and 18.00 per cent of respondents had ‘low’ level of information source utilization.

Meena, *et al.* (2012) observed that 46.50 per cent of the total farmers were using information source up to ‘medium’ level. Only 32.00 per cent farmers were

under ‘low’ level of information sources used and rest 21.50 per cent of them were using information source to a ‘high’ extent.

Debashis and Jiban (2013) reported in their study entitled ‘Spread of new varieties of hybrid rice and their impact on the overall production and productivity in West Bengal’, that 76.25 per cent of the farmers got their information from ‘government through participating in training programmes’ and 81.25 per cent got their information from ‘extension workers of the State Department of Agriculture’.

Jothi (2014) stated in his study entitled ‘Spread of new varieties of hybrid rice and its impact on the overall production and productivity in Tamil Nadu,’ revealed that more than four-fifth of the farmers (86.25 per cent) reported that they have participated in the frontline demonstration programme conducted by the government, whereas 82.50 per cent reported that they had participated in training programmes organized by the government, 77.50 per cent of the farmers came to know about hybrid rice technology through extension workers and 67.23 per cent were informed about the technology by the agricultural department officers who visited the villages.

2.1.8 Sources of seed availability

Saka, *et al.* (2005) in their study ‘Adoption of improved rice varieties among small-holder farmers in South-Western Nigeria’ observed that the Agricultural Development Projects (26.80 per cent) and Ministry of Agriculture (24.80 per cent) of the respective state are the most important sources of improved rice seeds. Farmer obtained the seed of the local varieties notably from local markets (42.30 per cent) and fellow farmers (23.50 per cent).

Debashis and Jiban (2013) revealed that most (70.00 per cent) of the farmers and/or hybrid growers obtained seed from ‘government sources’ on full subsidy while 30.00 per cent of them have obtained seeds from ‘private sources’.

2.1.9 Cosmopoliteness

Patel and Sharma (1995) in their study ‘Role of contact farmers in information dissemination under training and visit system in Maharashtra’ revealed that more than one-third of the respondents had ‘high’ (36.00 per cent) and ‘medium’ (35.00 per cent) level of cosmopoliteness. Close to three-tenth (29.00 per cent) of the respondents had ‘low’ level of cosmopoliteness.

A study conducted in Development Block of the College of Agriculture, Dapoli, Maharashtra State observed that majority (56.36 per cent) of the respondents were in 'medium' category and 29.09 per cent and 14.55 per cent of the respondents were in 'low' and 'high' categories of cosmopoliteness. The average cosmopoliteness score of the respondents was 4 (Anonymous, 1998)

Shaha, *et al.* (1999) in their study ' Preferences of rural youth for selected income generating activities in Bangladesh' observed that majority (77.00 per cent) of the respondents had 'low' level of cosmopoliteness, 12.00 per cent and 11.00 per cent of the respondents had 'medium' and 'high' level of cosmopolitness, respectively.

Puri (2003) in his study 'A study on role of agricultural consultants in agricultural development' found that less than two third (64.00 per cent) of the agricultural consultants had 'medium' level of cosmopoliteness, while 24.00 per cent and 12.00 per cent had 'high' and 'low' level of cosmopoliteness. Average cosmopolitness score of the agricultural consultants was 12.64.

2.1.10 Rice yield

Balasubramani, *et al.* (2005) observed that the yield obtained by the farmers varied from 39 to 78.00 q/ha. 68.00 per cent of the farmers obtained a yield of 58.50q/ha, 18.00 per cent of the respondents had obtained lowest yield of 39.00 q/ha where as only 14.00 per cent of them had highest yield of 78.00q/ha.

Deore (2006) observed that more than one half (54.00 per cent) of the respondents had 'medium' rice yield, while 32.00 per cent of the respondents had 'low' rice yield and 14.00 per cent of the respondents had 'high' rice yield.

Tambat (2007) observed that about three-fourth (73.33 per cent) of the respondents had 'medium' rice yield, while 14.67 per cent of the respondents had 'low' rice yield and 12.00 per cent of the respondents had 'high' rice yield.

2.2 Extent of knowledge and adoption of rice varieties

Saxena and Singh (2000) in a study on 'Adoption of organic farming practices by farmers of Malwa region' observed that maximum number of the farmers (40.90 per cent) of the farmers belonged 'medium' level of adoption category. Also, 33.65 per cent of the farmers had 'high' level of adoption, whereas 25.45 per cent of the farmers had 'low' level of adoption.

Anjani and Jha (2001) in their study on ‘Modern varieties of rice in Bihar’, indicated that more than 70.00 per cent of the farmers were identified, who were either cultivating modern varieties or traditional varieties and both, in which only 33.75 per cent of the farmers had adopted modern varieties, 28.75 per cent of the farmers had adopted traditional varieties and 37.50 per cent of the farmers had adopted both the varieties.

Khan, *et al.* (2002) in their study on ‘Adoption pattern of eco-friendly technologies by rice growers’ reported that most of the respondents fell in the category of ‘medium’ adoption (71.00 percent) with a trend from ‘low’ adoption (14.56 per cent) to ‘high’ adoption (14.44 per cent) in adoption of eco-friendly technologies.

Vinod, *et al.* (2003) in a study on ‘Extent of adoption and constraints in rice cultivation faced by farmer in Jammu’ revealed that majority of the total number of respondents studied (70.67 per cent) had a ‘medium’ level of adoption followed by 16 per cent in the ‘high’ adoption category and 13.33 per cent in the ‘low’ adoption category.

Mankar, *et al.* (2004) in their study entitled ‘Factors influencing adoption of recommended rice cultivation technology by Scheduled Caste farmers’ revealed that three-fourth (76.67 per cent) of the respondents had ‘medium’ extent of adoption, while 12.66 per cent of the respondent had ‘low’ extent of adoption of rice technology. One-tenth (10.67 per cent) of the respondents had ‘high’ extent of adoption. The average extent of adoption score of the farmer was 38.47 which indicated ‘medium’ extent of adoption.

Sridevi and Rameshbabu (2004) in their study entitled ‘Knowledge and adoption of farmers of recommended cultivation practices for paddy’ observed that majority (63.34 per cent) of the farmers were in ‘medium’ adoption category, followed by 26.66 per cent and 10.00 per cent in ‘high’ and ‘low’ adoption category, respectively.

Singh (2005) in a study on ‘Adoption trend towards improved rice production technology’ indicated that 44.00 per cent of the respondents were using high yielding varieties of paddy under rainfed upland and at sowing time, 54.00 per cent respondents used farm yard manure as per availability. Only 35.00 per cent farmers used fertilizers as per recommended practice, 60.00 per cent farmers were not

interested to invest much on weeding in upland due to less anticipated return and instead concentrated more on mid and low lands, where return was assured and 50.00 per cent of the respondents did not use plant protection measures for control of pests in that ecosystem.

Chandra, *et al.* (2006) in their study entitled 'Adoption of KRH-2 hybrid paddy among the farmers in Caveri command area *Karnataka'* revealed that 39.00 per cent of the respondents were in 'high' adoption category; where as 33.00 per cent and 28.00 per cent of the respondents were in 'low' and 'medium' adoption category, respectively.

Sheikh, *et al.* (2006) found that farmers are in search of new improved varieties except 3.00 per cent of rice growers all other farmers of study area have adopted recommended varieties. However many farmers (33.83 per cent) partially adopted in the sense that they have not only planted recommended varieties but also planted non-recommended.

Kirar and Mehata (2009) in their study entitled 'Extent of knowledge of tribal farmers about rice production technology' found in case of contact tribal farmers had 58.33 per cent knowledge about improved variety and in case of non contact tribal farmers had 55.42 per cent knowledge about improved variety.

Bzugu and Mustapha (2010) found out that the level of adoption of NERICA 1 Rice variety was low.

Wiredu, *et al.* (2010) in their study entitled 'Impact of improved varieties on the yield of rice producing households in Ghana' concluded that the study had two categories of improved rice varieties new rice for Africa (NERICA) and national program (NARS) varieties. About 46.00 per cent of the interviewed farmers had adopted at least one of the improved varieties. A little over 90.00 per cent of the rice farmers in Tolon-Kumbungu used at least one of the rice farmers in Ejura-Sekyedumase and Hohe.

Meena, *et al.* (2012) revealed that majority of the farmers i.e.70.00 per cent had 'medium' level of knowledge followed by 'low' and 'high' level of knowledge with 16.00 per cent and 14.00 per cent farmers respectively.

Umesh and Chukwa (2013) in their study on ‘Determinants of adoption of improved rice production technologies in Ebonyi state of Nigeria’ revealed that majority (91.67 per cent) of rice farmers had knowledge about availability and use of improved rice varieties and remaining 8.33 per cent of the farmers had no knowledge about the rice varieties.

Singh and Yadav (2014) in their study ‘ Knowledge and adoption gap of tribal farmers of bastar towards rice production technology’ observed that maximum number of the respondents (45.00 per cent) had ‘medium’ level of knowledge, followed by 33.33 per cent who had ‘high’ level of knowledge and it was observed that 21.67 per cent had ‘low’ level of knowledge.

2.3 Relationship between personal characteristics of the farmers and adoption of rice varieties

2.3.1 Education and adoption

Mankar, *et al.* (2004) revealed that there was positive and significant relationship at 1.00 per cent level of probability between education and extent of adoption.

Joshi (2005) found that the model which included only the farm and the farmer-specific variables, education was found to have statistically significant effect on adoption.

Krishna, *et al.* (2007) revealed that relationship between education and adoption of upland rice technologies was non-significant.

Rath, *et al.* (2007) in their study ‘Adoption of upland rice technologies and its correlates’ indicated that the relationship between education and adoption of upland rice technologies was non-significant.

Tambat (2007) indicated that the association between education of summer rice grower and extent of adoption was significant.

Seyyed and Mohammad (2010) revealed that there was no significant relation between adoption and education level variable.

Onumadu and Osahon (2014) found that education is significant at 1.0 per cent, but positively related to adoption of improved rice varieties.

2.3.2 Occupation and adoption

Kamble (1996) observed that there was positive and significant relationship between major occupation and adoption of recommended rice cultivation technology.

Chaudhary, *et al.* (2001) found that there was positive and non-significant relationship between major occupation and adoption of improved rice technology.

Mankar, *et al.* (2004) revealed that there was positive and significant relationship between occupation and extent of adoption at 5.00 per cent level of probability.

2.3.3 Size of family and adoption

Mankar, *et al.* (2004) revealed that there was positive and significant relationship between size of family and extent of adoption at 5.00 per cent level of probability.

Seyyed and Mohammad (2010) found that that there was a significant relationship between adoption and family size.

2.3.4 Annual income and adoption

Kamble (1996) observed that there was positive and highly significant relationship between annual income and extent of adoption of recommended rice cultivation technology in Ratnagiri district.

Chaudhary, *et al.* (2001) revealed a positive and highly significant relationship between annual income and adoption of improved rice technology.

Mankar, *et al.* (2004) revealed that there was positive and highly significant relationship between annual income and extent of adoption.

2.3.5 Size of land holding and adoption

Pandey, *et al*. (2004) found that the association between size of land holding and adoption of recommended rice technology among the farmers of Chhattisgarh was significant.

Saka, *et al.* (2005) found that farm size was the significant factor influencing both the decision of farmers to adopt the improved rice varieties and intensity of use.

Krishna, *et al.* (2007) revealed that relationship between size of land holding and adoption of the recommended rice production technologies among migrant farmer was significant.

Onumadu and Osahon (2014) found that farm size was significant at 1.0 per cent and positively related to adoption of improved rice varieties.

2.3.6 Extension contact and adoption

Mankar, *et al.* (2004) revealed that there was positive and significant relationship between extension contact and extent of adoption at 1.00 per cent level of probability.

Joshi (2005) found that the model which included only the farm and the farmer-specific availability of extension contact were found to have statistically significant effect on adoption.

Saka, *et al.* (2005) found that frequency of extension contact was the significant factor influencing both the decision of farmers to adopt the improved rice varieties and intensity of use.

Mahesh, *et al.* (2007) in their study entitled 'Performance level of HYV's and intercropping system in Ragi an intervention introduction under TAR-IVLP indicated that there was a positive and significant relationship between extension contact and adoption.

Seyyed and Mohammad (2010) found that there were significant relation between adoption and number of visits with extension operative during a year.

Singh and Varshney (2010) in their study 'Adoption level and constraint in rice production technology' revealed that extension contact had non-significant and positive influence on the adoption level of the rice production technology.

2.3.7 Source of information and adoption

Kubde, *et al*. (2000) in their study 'Knowledge and adoption of cultivation practices of potato' found the positive and significant relationship of use of sources of information with the extent of adoption of potato production technology.

Dudhate (2000) in his study ‘The study on recommended practices on brinjal in Parbhani district’ reported that sources of information had positive and significant relation with adoption of recommended cultivation practices of brinjal.

Magar (2001) in his study ‘Study on adoption of recommended package of practices of cucumber growers,’ reported that sources of information had positively and significantly related with adoption of recommended cultivation practices of cucumber.

Lad (2013) in his study ‘Knowledge and adoption of recommended package of practices of green gram’ observed that the sources of information was found to be positively and significantly related with adoption of recommended package of practices of green gram.

2.3.8 Cosmopoliteness and adoption

Mankar, *et al.* (2004) revealed that there was positive and highly significant relationship between cosmopoliteness and extent of adoption.

2.3.9 Rice yield and adoption

Saka, *et al.* (2005) found out that the yield of the improved rice varieties was the significant factor influencing both the decision of farmers to adopt the improved rice varieties and intensity of use.

Wiredu, *et al.* (2010) found that the rate of adoption of improved rice varieties had positive impact on farmers rice yield.

2.4 Preferences of the farmers for particular varieties of rice

Joshi and Pandey (2005) in their study ‘Effect of farmers perception on the adoption of modern rice varieties in Nepal’ found that more than 70.00 per cent farmers perceived traditional varieties in comparison to modern variety in terms of grain and straw yield, traditional varieties were considered superior only in term of taste. The traditional varieties also appeared to be inferior in terms of the quality of straw as a fodder.

Lipi, *et al.* (2011) in their study ‘Extent of adoption of CRRI rice varieties for lowland and their appropriateness as perceived by growers’ revealed that majority

(88.00 per cent) of the farmers adopted rice variety Gayatri followed by Pooja (83.00 per cent), Varshadhan (25.00 per cent) and Sarala (25.00 per cent).

Borthakur, *et al.* (2014) observed that among the 25 varietal attributes considered in the study, high yield got the highest mean score (9.60) for High Yielding Varieties (HYV) and was ranked one followed by low cost benefit ratio (9.20) and fertilizer response (9.00). In case of traditional varieties 'resistance to insects and pests' got the highest mean score (8.09) and ranked 'first' followed by 'resistance to diseases' (7.92) and 'high input costs' (7.82). Farmers' preference towards attributes of recommended HYV had positive and significant correlation with number of family members engaged in farm activities (r = 0.2839**) and economic motivation(r = 0.3494**).

Onumadu and Osahon (2014) found that most of the farmers (65.00 per cent) adopted and planted MASS (240), 15.00 per cent cultivated Ofoda while 10.00 per cent planted faro-48; other improved varieties planted by the farmers were negligible.

2.5 Problems and difficulties encountered by adopters as well as non adopters in use of rice varieties

Anonymous (2003) found that most of the rice growers were experiencing constraint namely, 'high cost of hybrid seed' (96.00 per cent), 'lack of assured rainfall' (77.00 per cent) and 'high cost of fertilizer' (75.00 per cent) ,'Lack of financial support' (62.00 per cent) and 'unavailability of seed in time' (35.00 per cent).

Manohari (2004) in his study on 'Constraints in adopting production technologies of rice among tribal farmers of Andhra Pradesh' revealed that most of the rice growers experiencing constraints were 'high cost of seed' (85 per cent), 'non availability of seed' (78.33 per cent), 'high cost of fertilizer' (76.67 per cent), 'lack of capital' (68.33 per cent) and 'lack of plant protection equipments' (81.67 per cent).

Pandey, *et al.* (2004) revealed that 'Non availability of the improved seeds at proper time' (70.63 per cent) was found a major constraint. 'high cost of seeds' (65.84 per cent) was reported as second major constraint and 'attack of insect pest and diseases' was found as third ranked constraint with 53.75 mean per cent score.

Angadi, *et al*. (2007) in their study entitled, 'Constraints in use of organic manures perceived by farmers of Tungabhadra command of Karnataka' revealed, that majority (68.00 per cent) of farmers expressed that maintenance of animal was a

major constraint in use of organic manures. Other problems expressed by farmers were ‘labour problem’ (37.33 per cent), ‘non availability of good quality manures’ (29.33 per cent) and ‘non availability of manures’ (20.00 per cent).

Sonali (2009) observed that major constraint faced by the respondents were, ‘shortage of labours’ (91.67 per cent), ‘uncertainty of rains’ (83.23 per cent), ‘non availability of credit (75.00 per cent), ‘non availability of farming implements’ (72.50 per cent), ‘non availability of neem leaves’ (64.17 per cent), ‘lack of knowledge about various irrigation methods’ (52.50 per cent) and ‘inability to identify pests’ (29.17 per cent).

Bzugu and Mustapha (2010) found that the most glaring constraint affecting the adoption of NERICA 1 Rice variety among the respondents was ‘lack of credit facilities’ (40.62 per cent), and ‘poor extension services’ (32.03 per cent). The other constraint of ‘poor market information’ (29.69 per cent) was the least important.

Sawant, *et al*. (2010) in their study entitled ‘Adoption behaviour of Sahyadri rice growers in South Konkan’ observed that problem expressed by the farmers in production of Sahyadri rice were, ‘high cost of hybrid seeds’ (47.00 per cent), ‘cooked rice become sticky’ (46.00 per cent), ‘non availability of seeds in time’ (44.00 per cent) and ‘low market price for grains of Sahyadri’ (34.00 per cent).

Lipi, *et al.* (2011) revealed that ‘high cost of labour’ (86.00 per cent), ‘non availability of quality seeds at time of sowing’ (94.00 per cent), ‘delayed monsoon at the time of sowing’ (96.00 per cent) were the major constraints.

More (2011) in his study ‘Factors Influencing adoption of hybrid rice cultivation technology’ found that the major constraints faced by the respondents in adopting hybrid rice cultivation practices were, ‘non availability of neem leaves’ (75.00 per cent), ‘non availability of seed in time’ (54.00 per cent), ‘inability to indentify diseases’ (51.00 per cent), ‘lack of assured rainfall’ (47.00 per cent), ‘high cost of hybrid seeds’ (34.00 per cent), ‘shortage of labours’ (32.00 per cent), ‘high infection of disease and pest’ (25.00 per cent), ‘inability to indentify pest’ (29.00 per cent), ‘high weed infection’ (25.00per cent), ‘high rate of weedicide’ (10.00 per cent), ‘high rate of pesticides’ (15.00 per cent), ‘non availability of credit’ (11.00 per cent), ‘high wage rate of labours’ (07.00 per cent), ‘non availability of duster and sprayer’ (06.00 per cent), ‘non availability of farm implements’ (05.00 per cent) and ‘lack of knowledge about various irrigation methods’ (02.00 per cent).

Onumadu and Osahon (2014) found that ‘scarcity of inputs’ (37.50 per cent) and ‘paucity of fund’ (35.80 per cent) were the major constraints of the farmer, while 25.00 per cent of the farmers identified dearth of information as another type of constraint.

CHAPTER III

METHODOLOGY

This chapter deals with the research methods and techniques used in conducting the present study. It includes description of locale, sampling procedure, variables and their measurement procedure, data collection methods and statistical tools and operational definitions of the important terms which have been used in the study.

3.1 Area of study and its geography
3.2 Sampling procedure
3.3 Variables under study and their empirical measurement
3.4 Tools and techniques of data collection
3.5 Statistical analysis
3.6 Research design

3.1 Area of study and its geography

The study was conducted in Raigad district of the Konkan region. Among the four districts of Konkan region, Raigad district ranks second in rice production, but the productivity of rice per hectare is highest in Raigad district. So, it was purposively selected for this study (Fig. 1).

3.1.1 Topography

Raigad district can be divided into three natural zones, first the coastal zone is marked by rice cultivation in low-lying areas and plantation of coconut and arecanut in nearby coastal area. Second the central zone has fertile lands in low-lying areas which are used for rice cultivation, whereas, ragi and vari are grown on hill slopes and the last hill zone which has good forest.

Raigad district lies between 17 ^{0} 51’ and 19 ^{0} 80’ north latitude and 72 ^{0} 51’ and 73 ^{0} 40’ east longitude. The length of the district is about 160 km, while the breadth varies between 24 to 48 km.

3.1.2 Boundaries

Raigad district is surrounded in the East partly by the foothill zone and partly by the watersheds of the major Sahyadrian scraps beyond which lies Pune district. The district is bounded by Ratnagiri district in South, Thane district in North, Arabian Sea in the West, Satara district in the South-East and Mumbai in the North-East.

3.1.3 Soils

The soils of Raigad district are reddish brown and coffee brown in colour, excellent for paddy cultivation and are capable of producing a second crop. The subsoil stratum consists of 'Deccan trap' rock.

The soils of these broad groups are found in several grades, depending on their location and admixture of different rocks. Locally these are known as Rice soils, *Varkas* soils, Garden soils and Khar soils. On the hill slopes, the soil is reddish which is covered with local grasses. The shell sands near the coast are suitable for plantation of coconut and arecanut.

3.1.4 Climate

Climate of the Raigad district is generally humid. At places situated in the interior, the mid days are hot in summer and nights are sometimes cool and chilly. The annual rainfall at Matheran is 5000 mm, which is highest in district, whereas the lowest rainfall is at Uran and Murud that is 1900 mm. The district receives an average rainfall of 2900 mm annually during the months of June to September.

3.1.5 Crops

In Raigad district, Rice (*Oryza sativa* L.) is the major staple crop (70.91 per cent of gross cropped area) followed by nagali (*Eleusine coracana*) and vari (*Panicum miliaceaum*). In *rabi* season, pulses like wal (*Dolichus lablab*), cowpea (*Vigna unguiculata)* are grown, while in summer season, where irrigation facilities are available, rice and vegetable crops are cultivated. Among the horticultural crops, coconut (*Cocus nucifera*), mango *(Mangifera indica* L.) and arecanut (*Areca catechu* L.) are grown on limited area.

3.2 Sampling procedure

3.2.1 Selection of tahsils

Raigad district comprises of fifteen tahsils. From these tahasils, three tahsils namely Karjat, Mangaon and Alibag having maximum area under rice cultivation were selected.

3.2.2 Selection of villages

From each tahsil, three villages having maximum area under rice cultivation were selected. Thus the total numbers of selected villages were nine. A list of selected villages is given in Appendix-II.

3.2.3 Selection of respondents

A list of farmers was obtained from the Agricultural Assistant of the Department of Agriculture. From each village, 15 rice farmers were selected randomly. Thus the total sample for the research study was 135 rice farmers. A list of selected rice farmers is given in Appendix III.

3.3 Variables and their empirical measurement

3.3.1 Dependent variable

The dependent variable for present study was the adoption of high yielding varieties of rice, which is measured as follows.

3.3.1.1 Adoption of high yielding varieties of rice

The major aspect of the study was to find out adoption of high yielding varieties of rice developed by DBSKKV by the farmers. The farmers were asked about the adoption of high yielding varieties of rice developed by DBSKKV. The farmers growing any of high yielding varieties of rice on continuous basis was given score 2, the farmers those who adopted but discontinued later on was given score 1 and if 'no' scored as 0. According to adoption of rice varieties, cumulative score for all varieties adopted by each farmer was calculated and then respondents were classified into four categories by using the formula mean (4.2) ± ½ S.D. (1.6).

Sl. No.	Category	Adoption (Score)
1	No adoption	0
2	Low	Upto 2
3	Medium	3 to 6
4	High	7 and above

3.3.1.2 Per cent area brought under rice varieties developed by DBSKKV

For measuring the per cent area brought under rice varieties developed by DBSKKV, Dapoli index was computed for individual farmer by using procedure followed by Philip, *et. al.* (2000)

$$\text{Adoption Index} = \frac{\text{Area under rice variety of DBSKKV, Dapoli}}{\text{Total area under rice}}$$

After calculating the Adoption Index for each farmer, they were grouped into three categories as indicated further**.**

Sl. No.	Category	Adoption Index
1.	Low	Up to 33
2.	Medium	34 to 66
3.	High	67 and above

3.3.2 Independent variables

The personal and socio- economic characteristics of the farmers were considered as the independent variables in the present study. These variables were quantified as indicated below.

3.3.2.1 Education

It was operationalised as the number of year of formal schooling completed by the respondents. For measuring this variable, one score was assigned to each year of formal schooling completed by the respondents. Further, the respondents were classified into six categories as below.

Sl. No.	Category	Education (Std)
1.	Illiterate	No Education
2.	Pre-primary	Up to 4^{th}
3.	Primary	5^{th} to 7^{th}
4.	Secondary	8^{th} to 10^{th}
5.	Higher secondary	11^{th} to 12^{th}
6.	Graduate	13^{th} and above

3.3.2.2 Major occupation

The occupation from which the farmer derives maximum share in family annual income was considered as his major occupation. Accordingly, the respondents were grouped into six categories.

Sl. No.	Category	Occupation(score)
1	Labour	0
2	Caste occupation	1
3	Business	2
4	Independent profession	3
5	Farming	4
6	Service	6

3.3.2.3 Family size

The size of family refers to the total number of members in each family of the farmer. According to size of family the respondents were classified into three categories by using the formula mean (5.5) ± ½ S.D. (1.14)

Sl. No.	Category	Family size (members)
1.	Small	Up to 3
2.	Medium	4 to 7
3.	Big	8 and above

3.3.2.4 Annual income

Total annual income of all the family members from all the sources was considered in the present study. The respondents were grouped into different three categories by using the formula mean (Rs.131601.5) ± ½ S.D. (Rs.58507.17).

Sl. No.	Category	Annual income (Rs.)
1.	Low	Up to 73094/-
2.	Medium	73095/- to 190108/-
3.	High	190109/- and above

3.3.2.5 Size of land holding

The size of land holding contributes to the income of the farmer and provides an opportunity to try the innovations. On the basis of total land holding, the respondents were grouped into five categories as per the norms laid by the Government of Maharashtra.

Sl. No.	Category	Land holding (ha)
1.	Marginal	Up to 1.00
2.	Small	1.01 to 2.00
3.	Semi-medium	2.01 to 4.00
4.	Medium	4.01 to 10.00
5.	Large	10.01 and above

3.3.2.6 Extension contact

It refers to the frequency with which the respondents met the various extension personnel and vice-versa. Frequency of contact was measured considering

the contact of farmers with the extension personnel's '1' and '0' score was assigned to 'yes' and 'no' contact respectively and '2', '1' and '0' score was given for frequency of contact that is 'always meeting', 'occasionally meeting' and 'never meeting' respectively. On the basis of cumulative score the respondents were grouped into three categories of extension contact considering the mean (2.82) and standard deviation (2.01).

Sl. No.	Category	Extension contact (Score)
1.	Small	Up to 1
2.	Medium	2 to 4
3.	Big	5 and above

3.3.2.7 Sources of information

It refers to the various media from which the respondents get information about new high yielding rice varieties. There are the different sources where respondent get the information. Each source have given the 1 score. From this the total score obtained by each respondent was calculated. The category formed as per given in the questionnaires.

Sl. No.	Category	Score
1	Agril. Assisant (DBSKKV)	1
2	Agril. Extension Officers (Panchayat Samiti)	1
3	Progressive Farmers	1
4	Neighbours /Friends	1
5	Gram Krishi Vistarak	1
6	University Staff	1
7	Gram Sevak	1
8	Television	1
9	Newspapers	1
10	Agricultural Magazines	1
11	Agriculture Officers	1
12	Subject Matter Specialists	1
13	Radio	1
14	Others	1

3.3.2.8 Source of seed availability

It refers to the various sources used by the respondent to get the seed. There are the different sources from where the respondent gets the seed. Each source scored as a one. The total score of the respondent was calculated. The category form as per given in the questionnaires.

Sl. No.	Category	Score
1	Krishi Seva Kendra	1
2	Own Seed	1
3	Mahabeej	1
4	Neighbours/Friends	1
5	Krishi Vigyan Kendra	1
6	Panchayat Samiti	1
7	Agriculture University	1
8	Village Panchayat	1
9	Other	1

3.3.2.9 Cosmopoliteness

It was operationalised as the degree to which the respondent is oriented to his immediate outside social system. This variable measured with the help of scale developed by Nirban (2004).The scale consisted of five items. The responses were collected on two point continuum namely ‘Yes’ and ‘No’ and the score of 1 and 0 was given, respectively.

Finally, the respondents were categorized into three categories ‘low’ ,’medium’ and ’high’ by considering the formula mean (2.44) ± S.D. (1.03).

Sl. No.	Category	Cosmopoliteness (Score)
1.	Low	Up to 1
2.	Medium	2 to 3
3.	High	4 and above

3.3.2.10 Rice yield

The actual yield of rice crop obtained by the respondent during the last year from his total land under rice cultivation was considered. Then this yield was

converted into per hectare yield. Finally, the respondents were categorized by using the formula mean (28.26) ±S.D. (4.66).

Sl. No.	Category	Rice yield (q/ha)
1.	Low	Up to 23
2.	Medium	24 to 32
3.	High	33 and above

3.3.3 Knowledge

It refers to the factual information possessed by the farmer regarding recommended varieties of rice. The knowledge test was developed by considering the characteristics of the varieties like name of variety, released year, duration of variety, nature of grain and per hectare yield of variety.

The response of each respondent was obtained on two-point continuum, that is ‘know’ and ‘do not know’ and it was assigned score of ‘1’ and ‘0’, respectively. Accordingly the cumulative knowledge score was worked out for each respondent. Considering the mean (20.41) ± S.D ½ (6.54), the respondents were grouped into four categories.

Sl. No.	Category	Knowledge (score)
1	No Knowledge	0
2	Low	Up to 14
3	Medium	14 to 27
4	High	28 and above

3.3.4 Preference given to the rice varieties by the respondents

The preference given by each respondent for different varieties was considered. Then the variety wise preference given by all the respondents was calculated.

3.3.5 Difficulties faced by the rice growers

Difficulties are the circumstances, which prohibit the respondents in adopting improved rice varieties. Difficulties faced by respondents in adoption of improved rice

varieties released by DBSKKV, Dapoli were studied. A schedule was developed for this purpose.

3.4 Tools and techniques of data collection

The data were collected with help of a specially designed interview schedule by keeping in view the objectives of the study**.**

3.4.1 Construction of schedule

An interview schedule was prepared, so as to collect the information in line with the objectives of the study. It was developed into two parts. Part first included the questions about the personal and socio-economic characteristics of the respondents. Part second was about extent of adoption of rice varieties released by DBSKKV, Dapoli, preference of the respondent towards different rice varieties and difficulties faced by them in adopting rice varieties.

3.4.2 Pretesting of interview schedule

The interview schedule was pre-tested in non-sampled area by interviewing twenty respondents of Navanagar and Bhangar village of Dapoli tahsil of Ratnagiri district. Necessary modifications were carried out on the basis of observations made during pre-testing and the schedule was finalized to collect the final data (Appendix- IV)

.3.4.3 Collection of data

Personal interview technique was used for data collection. Before starting an interview, the investigator introduced herself and explained the purpose of her visit to each respondent. During the course of interview, the questions were explained to them to ensure proper understanding. This helped in getting appropriate responses. The filled in interview schedule were checked immediately after the closure of interview for their completion in all respects.

3.5 Statistical analysis

The data were analyzed by using the statistical tools like frequency, percentage, mean, standard deviation and correlation analysis.

Correlation test was applied to ascertain the degree of relationship between the personal and socio – economic characteristics of the farmer and their adoption of improved rice varieties released by DBSKKV, Dapoli.

3.5.1 Frequency and Percentage

Frequency and percentage were used in descriptive analysis of data for making simple comparison.

3.5.2 Mean

Mean was calculated by using the following formula**.**

$$\overline{X} = \frac{\sum Xi}{n}$$

Where,

$\overline{X}$ = Mean,
n = number of observation
Xi = value i th of observation

3.5.3 Standard deviation

It is defined as the square root of the mean of the squares of the deviations taken from arithmetic mean (Chandel, 1978).

$$SD = \sqrt{\frac{\sum(Xi - \overline{X})^2}{n-1}}$$

Where,

S.D. = standard deviation
Xi = Individual score
$\overline{X}$ = Mean of the sample
n = Total number of respondents

3.5.4 Correlation coefficient (r)

Karl Pearson's correlation coefficient (r) was used for measuring relationship between independent and dependant variables, by using following formula.

$$r = \frac{\sum xy - \frac{(\sum X)(\sum y)}{n}}{\sqrt{\sum X^2 - \frac{(\sum X)^2}{n}}\ \sqrt{\sum y^2 - \frac{(\sum y)^2}{n}}}$$

Where,

r = Correlation coefficient
x = Independent variable
y = Dependent variable
n = Total number of respondents

3.6 Research design

A research design is the arrangement of conditions for the collection and analysis of data in a manner that combines relevance to the research purpose with economy in procedure. In fact, the research design is the conceptual structure within which research is conducted. It constitutes the blue print for the collection, measurement and analysis of data. ‘Ex-post facto’ research design is worthy to apply when the independent variables have already acted upon. Hence, this design was used in the present study.

CHAPTER IV

RESULTS AND DISCUSSION

The findings of the present investigation and discussion there upon are presented in this chapter. The data collected for the study have been classified, tabulated and analyzed in the light of the objectives of the study. The results and interpretation thereof are presented under the following heads.

4.1 Personal characteristics of the farmers.

4.2 Extent of knowledge and adoption of rice varieties developed by DBSKKV, Dapoli.

4.3 Relationship between personal characteristics of the farmers, and adoption of rice varieties developed by DBSKKV, Dapoli.

4.4 Preferences of the farmers towards particular variety of rice.

4.5 Difficulties encountered by adopters as well as non-adopters in the use of rice varieties developed by DBSKKV, Dapoli.

4.1 Personal characteristics of the farmers

The data related to the selected personal, socio-economic and psychological characteristics of the farmers are presented and discussed in this part.

4.1.1 Education

The information pertaining to educational level of the respondents is given in Table 1.

Table 1. Distribution of the respondents according to their education

Sl. No.	Education (Standard)	Respondents (N=135)	
		Number	Percentage
1.	Illiterate (No Education)	14	10.37
2.	Pre primary (Up to 4^{th})	21	15.56
3.	Primary (5^{th} to 7^{th})	34	25.18
4.	Secondary (8^{th} to 10^{th})	47	34.81
5.	Higher-secondary (11^{th} to 12^{th})	10	07.41
6.	Graduate (13^{th} and above)	09	06.67
Mean: 7 std	**Total**	**135**	**100.00**

It could be observed from Table 1 that maximum number (34.81 per cent) of the respondents had 'secondary' education. The respondents in the category of 'primary' education were 25.18 per cent, followed by 'pre-primary' (15.56 per cent), 'illiterate' (10.37 per cent), 'higher secondary' (07.41 per cent), and 'graduate' (06.67 per cent). The average educational level of the respondents was 7^{th} std. indicating primary education.

It can be said that rice cultivation in the study area is in the hands of educated farmers. It means they are educated to a satisfactory level, which in turn, might have helped them in their information seeking behavior and adoption of improved rice varieties.

The results of the present study are similar with those of Balasubramani, *et al.* (2005), Tambat (2007) and Thakur (2011).

However, these results are dissimilar with the study conducted by Ramesh and Santha (2005) and Abel, *et al. (*2014).

4.1.2 Major occupation

The data in respect of the major occupation of the respondents are given in Table 2.

Table 2. Distribution of the respondents according to their major occupation

Sl. No.	Major occupation	Respondents (N=135)	
		Number	Percentage
1.	Labour	01	00.74
2.	Caste Occupation	02	01.50
3.	Business	09	06.70
4.	Independent Profession	22	16.25
5.	Farming	70	51.85
6.	Service	31	22.96
Mean: 4.08 score	**Total**	**135**	**100.00**

It is revealed from Table 2 that majority (51.85 per cent) of the respondents were engaged in 'farming', followed by 'service' (22.96 per cent), 'independent

profession' (16.25 per cent), 'business' (06.70 per cent), 'caste occupation' (01.50 per cent) and 'labour' (00.74 per cent) as their major occupation.

It can be discerned from these observations that farming was the major source of livelihood of the selected rice growers. Hence, they might have been making all efforts to increase the production and productivity of the crops grown by them.

Similar findings were reported by Shinde, *et al.* (2000), Anonymous (2003), Pandey, *et al.*(2004), Balasubramani, *et al.*(2005), Ramesh, P. and Santha Govind (2005), Aliou Diagen (2006), Deore (2006), Thakur (2011) and Meena, *et al.* (2012).

4.1.3 Size of family

Data pertaining to size of family of the respondents are presented in Table 3.

Table 3. Distribution of the respondents according to their size of family

Sl. No.	Size of family (Members)	Respondents (N=135)	
		Number	Percentage
1.	Small (Up to 3)	19	14.08
2.	Medium(4 to 7)	95	70.37
3.	Big (8 and above)	21	15.55
Mean: 6 members	**Total**	**135**	**100.00**

It is observed from Table 3 that family size of majority (70.37 per cent) of the respondents was 'medium', while 15.55 per cent and 14.08 per cent respondents had 'big' and 'small' family size, respectively. The average member of family was 6.

It can be concluded that the most of farmers were having the medium to large family size, which helps them in good management in farming.

Similar findings were reported by Shigvan (2002), Pandey and Sarkar (2004) and Rashmi (2005).

The result of the present study is dissimilar to Meena, *et al*. (2012) and Onumadu and Osahon (2014).

4.1.4 Annual income

It is seen from Table 4 that maximum number (48.15 per cent) of the respondents were having 'medium' annual income, while 36.30 and 15.55 per cent

of the respondents had ‘low’ and ‘high’ annual income, respectively. The average annual income of the respondents was Rs 131601.50/-.

The data regarding annual income of the respondents are presented in Table 4.

Table 4. Distribution of the respondents according to their annual income

Sl. No.	Annual income (Rs.)	Respondents (N=135)	
		Number	Percentage
1.	Low (Below 73094)	49	36.30
2.	Medium (73095 to 190108)	65	48.15
3.	High (190109 and above)	21	15.55
Mean: Rs.131601.50/-	**Total**	**135**	**100.00**

The findings lead to conclude that majority of the farmers belonged to medium income group. The average income of the farmers indicated their satisfactory economic status, though majority of them had marginal and small land holdings. This might be because they might have been growing high value crops or might have other supporting source of income like service, independent profession and business.

These results are similar with the findings of Sharma and Sharma (2002), Amol (2006), Deore (2006), Tambat (2007) and Sonali Ranaware (2009).

These results are dissimilar with the findings of Balasubramani, *et al.* (2005) and Ramesh and Santha (2005).

4.1.5 Size of land holding

With respect of land holdings of the respondents, they are classified into 5 groups and presented Table 5.

It is evident from Table 5 that maximum number (36.30 per cent) of the respondents had ‘marginal’ size of land holding; while 33.33 per cent of the respondents had ‘small’ land holding, 22.95 per cent of the respondents had ‘semi-medium’ land holding, 05.92 per cent of the respondents had ‘medium’ land holding and remaining 01.50 per cent of the respondent had ‘large’ size land holding. The average size of land holding was 1.6 ha.

This finding leads to conclude that nearly seven out of ten rice growers had either small or marginal land holding. The findings resemble to the overall scenario of Konkan agriculture, where in predominance of small, marginal and semi medium farmers is seen.

Table 5. Distribution of the respondents according to their size of land holding

Sl. No.	Size of land holding (ha)	Respondents (N=135)	
		Number	Percentage
1.	Marginal (Up to 1.00)	49	36.30
2.	Small (1.01 to 2.00)	45	33.33
3.	Semi-medium (2.01 to 4.00)	31	22.95
4.	Medium (4.01 to 10.00)	08	05.92
5.	Large (10.01 and above)	02	01.50
Mean: 1.6 ha	**Total**	**135**	**100.00**

Similar findings were reported by Sharma and Sharma (2002), Anonymous (2003), Onumadu and Osahon (2014).

Findings of the present study are not confirmed by the findings of Ramesh and Santha (2005), Sonali (2009), Manjunatha (2010) and Thakur (2011), and totally opposite with Balasubramani, *et al.* (2005), Krishna, *et al*. (2007) and Meena, *et al.* (2012).

4.1.6 Extension contact

The data pertaining to the extension contact of the respondents are presented in Table 6.

Table 6. Distribution of the respondents according to their extension contact

Sl. No.	Extension contact (score)	Respondents (N=135)	
		Number	Percentage
1	Low (Up to 1)	18	13.33
2	Medium (2 to 4)	93	68.90
3	High (5 and above)	24	17.77
Mean: 2.82 score	**Total**	**135**	**100.00**

It is seen from Table 6 that majority (68.90 per cent) of the respondents had ‘medium’ extension contact; while 13.33 per cent of the respondents had ‘low’ extension contact and 17.77 per cent of the respondents had ‘high’ extension contact. The average extension contact score of the respondents was 2.82.

It could be inferred that maximum number of the respondents had ‘medium’ extension contact. The level of extension contact of the rice growers might have

influenced their adoption behavior about improved rice varieties released by the University.

The findings are in tune with the findings Anonymous (2003), Anonymous (2005), Ramesh and Santha (2005), Deore (2006), Tambat (2007) and Thakur (2011) and the result are totally dissimilar with the findings of Aliou (2006).

4.1.7 Sources of information

The data regarding the sources of information utilized by the respondents are presented in Table 7.

Table 7. Distribution of the respondents according to their sources of information

Sl. No.	Source of information	Respondents (N=135)	
		Number	Percentage
1	Agril. Assistant (DBSKKV)	52	38.51
2	Agril. Extension Officers (Panchayat Samiti)	52	38.51
3	Progressive Farmers	43	31.85
4	Neighbours/Friends	39	28.88
5	Gram Krishi Vistarak	30	22.22
6	University Staff	13	09.62
7	Gram Sevak	12	08.88
8	Television	12	08.88
9	Newspapers	11	08.14
10	Agricultural Magazines	09	06.66
11	Agriculture Officers	07	05.18
12	Subject Matter Specialists	06	04.44
13	Others	04	02.96
14	Radio	01	00.74
Mean: 2.15 score	**Total**	**291**	**215.47**

It is seen from Table 7 that the maximum number of the respondents (38.51 per cent) had the contact with ‘Agril. Assistants’ (DBSKKV) and ‘Agril. Extension Officers’ (Panchayat Samiti) (38.51 per cent) for the information regarding the improved rice varieties and also rice cultivation followed by ‘Progressive farmers’ (31.85 per cent), ‘Neighbours or friends’ (28.88 per cent) and ‘Agril. Assistants’ (22.22 per cent). The respondents get less information from ‘University staff’ (09.62 per cent), ‘Gram sevak’ (08.88 per cent).

'Television' (08.88 per cent), 'Newspapers' (08.14 per cent), 'Agricultural magazines' (06.66 per cent), 'Agriculture Officers' (05.18 per cent), 'Subject Matter Specialists' (04.44 per cent), 'Others' (02.96 per cent) and 'Radio' (0.74 per cent).

These findings are similar to the findings of Marimathu and Rathakrishnan (2000), Ramesh and Santha (2005), Debashis and Jiban (2013) and Jothi (2014).

4.1.8 Source of seed material

The data regarding source of seed material of the respondent are presented in Table 8.

Table 8. Distribution of the respondents according to their source of seed material

Sl. No.	Source of seed	Respondents(N=135)	
		Number	Percentage
1	Krishi Seva Kendra	69	51.11
2	Own Seed	40	29.62
3	Mahabeej	18	13.33
4	Neighbours/Friends	18	13.33
5	Krishi Vigyan Kendra	15	11.11
6	Panchayat Samiti	08	05.92
7	Agriculture University	03	02.22
	Total	**171**	**126.64**

It is evident from Table 8 that majority (51.11 per cent) of the respondent get seed from 'Krishi Seva Kendra' followed by 'Own seed' (29.62 per cent), 'Mahabeej' (13.33 per cent), 'Neighbours or friends' (13.33 per cent), 'Khishi Vigyan Kendra' (11.11 per cent), 'Panchayat Samiti' (05.92 per cent), 'Agriculture University' (02.22 per cent).

These findings are similar to the findings of Saka, *et al.* (2005) and Debashis and Jiban (2013).

4.1.9 Cosmopoliteness

With regards to cosmopoliteness, it is observed from Table 9 that 68.14 per cent of the rice growers had 'medium' cosmopoliteness, followed by 16.30 per cent of

them had ‘high’ cosmopoliteness and remaining 15.56 per cent had ‘low’ cosmopoliteness. The average cosmopoliteness score of the respondents was 2.44.

The data regarding cosmopoliteness of the respondents are presented in Table 9.

Table 9. Distribution of the respondents according to their cosmopoliteness

Sl. No.	Cosmopoliteness (score)	Respondents (N=135)	
		Number	Percentage
1	Low (Up to 1)	21	15.56
2	Medium (2 to 3)	92	68.14
3	High (4 and above)	22	16.30
Mean: 2.44 score	**Total**	**135**	**100.00**

It is concluded that there was medium cosmopoliteness nature occurring in the respondents.

Similar findings were reported by Anonymous (1998), Shaha, *et al.* (1999), Patel and Sharma (1995) and Puri (2003).

4.1.10 Rice yield

The observations in respect of the rice yield of the respondents are presented in Table 10.

Table 10. Distribution of the respondents according to their rice yield

Sl. No.	Rice yield (q/ha)	Respondents (N=135)	
		Number	Percentage
1.	Low (Upto 23)	23	17.04
2.	Medium (24 to 32)	101	74.81
3.	High (33 and above)	11	08.15
Mean: 28.26 q/ha	**Total**	**135**	**100.00**

It was observed from Table 10 that majority (74.81 per cent) of the respondents had ‘medium’ rice yield, while 17.04 per cent of the respondents had ‘low’ rice yield and 8.15 per cent of the respondents had ‘high’ rice yield. Average yield of rice produced by the rice growers was 28.26 q/ha.

These findings make it clear that the productivity of upland rice is not satisfactory. The reasons for such low productivity might be the inefficient management by the farmers due to some reasons. What so ever, might be the

reason, the fact remains that all out efforts are needed to increase the productivity of rice in uplands.

These findings are similar to the findings of Balasubramani, *et al.* (2005), Deore (2006), Tambat (2007) and dissimilar with the findings of Borthakur, *et al.* (2014).

4.2 Knowledge and adoption of rice varieties developed by DBSKKV, Dapoli

The information regarding the knowledge and adoption of rice varieties developed by DBSKKV among the respondents is presented hereunder.

4.2.1 Overall knowledge about rice varieties developed by DBSKKV, Dapoli

An attempt was made in the present study to assess the knowledge and adoption of rice varieties developed by the DBSKKV, Dapoli of the respondents. The data regarding the knowledge level of the respondents about improved rice varieties developed by DBSKKV, Dapoli are presented in Table 11.

Table 11. Distribution of the respondents according to their overall knowledge about the rice varieties developed by the DBSKKV, Dapoli

Sl. No.	Knowledge level (score)	Respondents (N=135)	
		Number	Percentage
1	No knowledge (0)	4	02.95
2	Low (Up to 14)	39	25.93
3	Medium (14 to 27)	76	56.30
4	High (28 and above)	20	14.82
Mean: 20.41 score	**Total**	**135**	**100**

It is seen from Table 11 that maximum number (56.30 per cent) of the respondents had ‘medium’ knowledge of the rice varieties developed by the DBSKKV. More than one-fourth (25.93 per cent) of the respondents had ‘low’ level of knowledge and 14.82 per cent of the respondents had the ‘high’ level of the knowledge. Only 02.95 per cent of the respondents had ‘no’ knowledge of the rice varieties developed by DBSKKV, Dapoli. The maximum knowledge score obtained by the farmer was 108 and average knowledge score of the farmer was 20.41

It means that majority of the respondent did not have complete knowledge regarding the rice varieties developed by DBSKKV, Dapoli. This might have happened because most of them had undertaken rice cultivation by availing the benefits of the different schemes of Zilha Parishad or Department of Agriculture of

Maharashtra State. It seems that the farmers had cultivated rice varieties according to the availability of seed in the market

These findings are similar to the findings of Anjani and Jha (2001), Joshi (2005), Kirar and Mehata (2009), Meena, *et al.* (2012), Umesh and Chukwa (2013), Singh and Yadav (2014).

4.2.2 Variety wise knowledge of the farmers about the rice varieties developed by DBSKKV, Dapoli

The data regarding the variety wise knowledge of the farmers about the rice varieties developed by DBSKKV, Dapoli were collected and presented in Table 12.

Table 12. Distribution of the farmers according to their variety wise knowledge of the rice varieties developed by DBSKKV, Dapoli

Sl.No.	Varieties	Knowledge	
		Yes	No
1.	Karjat 184	35 (25.92)	100 (74.08)
2.	Ratnagiri 24	46 (34.08)	89 (65.92)
3	Ratnagiri 711	5 (3.71)	130 (96.29)
4	Ratnagiri 73	27 (20.00)	108 (80.00)
5	Ratnagiri 1	8 (5.92)	127 (94.08)
6	Karjat 3	95 (70.38)	40 (29.62)
7	Karjat 1	12 (8.88)	123 (91.12)
8	Phondaghat 1	0 (0.00)	135 (100.00)
9	Karjat 4	21 (15.55)	114 (84.45)
10	Karjat 7	120 (88.88)	15 (11.12)
11	Ratnagiri 5	64 (47.41)	71 (52.59)
12	Palghar 1	0 (0.00)	135 (100)
13	Palghar 2	0 (0.00)	135 (100)
14	Karjat 5	76 (56.29)	59 (43.71)
15	Karjat 6	3 (2.22)	132 (97.78)
16	Ratnagiri 4	6 (4.44)	129 (95.56)
17	Ratnagiri 2	6 (4.45)	129 (95.55)
18	Karjat 2	68 (50.37)	67 (49.63)
19	Ratnagiri 3	2 (1.48)	133 (98.52)
20	Karjat 8	57 (42.23)	78 (57.77)
21	Panvel 1	2 (1.48)	133 (98.52)
22	Panvel 2	1 (0.75)	134 (99.25)
23	Panvel 3	0 (0.00)	135 (100.00)
24	Sahyadri	28 (20.75)	107 (79.25)
25	Sahyadri 2	54 (40.00)	81 (60.00)
26	Sahyadri 3	5 (3.71)	130 (96.29)
27	Sahyadri 4	59 (43.70)	76 (56.30)
28	Sahyadri 5	7 (5.18)	128 (94.82)

It was observed from Table 12 that majority (88.88 per cent) of the farmers had knowledge about rice variety ‘Karjat 7’ developed by DBSKKV, Dapoli followed by ‘Karjat 3’ (70.38 per cent), ‘Karjat 5’ (56.29 per cent), ‘Karjat 2’ (50.37 per cent) and ‘Ratnagiri 5’ (47.41 per cent). However, none of the farmers had knowledge about ‘Phondaghat 1’, ‘Palghar 1’, ‘Palghar 2’ and ‘Panvel 3’. Among the hybrid rice varieties developed by DBSKKV, Dapoli the farmers had more knowledge about ‘Sahyadri 4’ (43.70 per cent) and ‘Sahyadri 2’ (40.00 per cent).

The findings lead to conclude that the farmers had knowledge about very few varieties of rice developed by the DBSKKV, Dapoli. This might be because of no demonstration/minikit trials might have conducted in the study area. Another reason might be non availability of seed material in the study area. Secondly, farmers might have recommended those varieties which might used and seen in nearly area.

4.2.3 Overall adoption of rice varieties developed by DBSKKV, Dapoli

The present status of adoption of rice varieties developed by DBSKKV on the field of farmers was studied. The observations on these aspects are presented and discussed in this part. The data regarding overall adoption of rice varieties developed by DBSKKV, Dapoli are presented in Table 13.

Table13. Distribution of the respondents according to their overall adoption of the rice varieties developed by DBSKKV, Dapoli

Sl. No.	Adoption (score)	Respondents (N=135)	
		Number	Percentage
1.	No adoption (0)	15	11.11
2.	Low (Up to 2)	26	19.26
3.	Medium (3 to 6)	74	54.82
4.	High (7 and above)	20	14.81
Mean: 4.2 score	**Total**	**135**	**100.00**

It is noticed from Table 13 that 54.82 per cent of the respondents had ‘medium’ adoption of the rice varieties released by DBSKKV, Dapoli, while 19.26 per cent and 14.81 per cent of the respondents had ‘low’ and ‘high’ adoption, respectively and remaining 11.11 per cent of the respondents had not adopted any variety released by DBSKKV, Dapoli. The average adoption score of the respondents was 4.2.

It can be concluded from these findings that rice growers had medium level of adoption of the rice varieties evolved by Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth Dapoli. In other words, it can be said that there is scope to increase the

adoption by way of educating and motivating the farmers along with arrangements for supply of seed in time and in required quantity of developed varieties. Secondly, it can be said that all the varieties may not suitable for the area under study.

4.2.4 Area brought under rice varieties developed by DBSKKV, Dapoli

Out of the total area under rice, area brought under varieties developed by DBSKKV by each farmer was calculated on per cent basis. The information in this regard is presented in Table 14.

Table14. Distribution of the respondents according to the percent area brought under rice varieties developed by DBSKKV, Dapoli

Sl. No.	Area under rice varieties (Per cent)	Respondents (N=135)	
		Number	Percentage
1	Low (Up to 33)	21	17.50
2	Medium (34 to 66)	46	38.33
3	High (67 and above)	53	44.17
Mean: 56.93	**Total**	**120**	**100.00**

It is observed that from Table 14 maximum number of the respondents (44.17 per cent) had brought ‘high’ area under rice varieties developed by DBSKKV, Less than two fifth (38.33 per cent) of the respondents had brought ‘medium’ area and remaining 17.50 per cent of the respondents had brought ‘low’ area under rice varieties developed by the DBSKKV, Dapoli.

The findings are similar with the findings of Khan, *et al.* (2002), Vinod *et al.* (2003), Mankar, *et al.* (2004), Sridevi and Rameshbabu (2004), Tambat (2007) however, the findings are dissimilar with the findings of Chandra, *et al*. (2006), Bzugu and Mustapha (2010) and Thakur (2011).

4.2.5 Varietywise adoption of rice varieties developed by DBSKKV, Dapoli

The data pertaining to the rice varieties developed by DBSKKV adopted by the farmers are presented in Table 15.

It is observed from Table 15 that majority (62.96 per cent) of the farmers adopted ‘Karjat 7’ variety of rice developed by DBSKKV followed by ‘Karjat 3’ (51.85 per cent), ‘Karjat 5’ (39.25 per cent), ‘Karjat 2’ (18.52 per cent) and ‘Ratnagiri 5’ (17.04 per cent). Among the hybrid rice varieties developed by DBSKKV, 16.30 per cent farmers adopted ‘Sahyadri 4’ followed by ‘Sahyadri 2’ (10.38 per cent) and ‘Sahyadri’ (07.41 per cent).

None of the farmers had adopted ‘Karjat 1’, ‘Phondaghat 1’, ‘Palghar 1’, ‘Palghar 2’ ‘Panvel 1’ and ‘Panvel 3’ varieties of rice developed by DBSKKV, Dapoli.

Table 15. Distribution of the farmers according to the adoption of rice varieties developed by DBSKKV

Sl. No.	Varieties	Adopters	Non adopters
1.	Karjat 184	1 (0.75)	134 (99.25)
2.	Ratnagiri 24	4 (02.96)	131 (97.04)
3.	Ratnagiri 711	5 (03.71)	130 (96.29)
4.	Ratnagiri 73	1 (0.75)	134 (99.25)
5.	Ratnagiri 1	1 (0.75)	134 (99.25)
6.	Karjat 3	70 (51.85)	65 (48.15)
7.	Karjat 1	0 (0.00)	135 (100.00)
8.	Phondaghat 1	0 (0.00)	135 (100.00)
9.	Karjat 4	5 (03.71)	130 (96.29)
10.	Karjat 7	85 (62.96)	50 (37.04)
11.	Ratnagiri 5	23 (17.04)	112 (82.96)
12.	Palghar 1	0 (0.00)	135 (100.00)
13.	Palghar 2	0 (0.00)	135 (100.00)
14.	Karjat 5	53 (39.25)	82 (60.75)
15.	Karjat 6	1 (0.75)	134 (99.25)
16.	Ratnagiri 4	1 (0.75)	134 (99.25)
17.	Ratnagiri 2	2 (01.48)	133 (98.52)
18.	Karjat 2	25 (18.52)	110 (81.48)
19.	Ratnagiri 3	1 (0.75)	134 (99.25)
20.	Karjat 8	27 (20.00)	108 (80.00)
21.	Panvel 1	0 (0.00)	135 (100.00)
22.	Panvel 2	1 (0.75)	134 (99.25)
23.	Panvel 3	0 (0.00)	135 (100.00)
24.	Sahyadri	10 (7.41)	125 (92.59)
25.	Sahyadri 2	14 (10.38)	121 (89.62)
26.	Sahyadri 3	1 (0.75)	134 (99.25)
27.	Sahyadri 4	22 (16.30)	113 (83.70)
28.	Sahyadri 5	2 (1.48)	133 (98.52)

4.3 Relationship between personal characteristics of the farmers, and adoption of rice varieties developed by DBSKKV, Dapoli

The relationship between personal characteristics of the farmers, and adoption of rice varieties developed by DBSKKV, Dapoli was tested by computing the correlation coefficient ('r'). The findings in this regard are presented in Table16

Table 16. Relationship between personal characteristics of the farmers and adoption of rice varieties developed by DBSKKV, Dapoli

Sl. No.	Variables	Variable code	Correlation coefficient (' r ')
1	Education	X_1	0.14283 NS
2	Major occupation	X_2	-0.03109 NS
3	Family size	X_3	0.27375**
4	Annual income	X_4	0.32809**
5	Size of land holding	X_5	0.51954**
6	Extension contact	X_6	0.75480**
7	Source of information	X_7	0.71469**
8	Source of seed availability	X_8	0.29344**
9	Cosmopoliteness	X_9	0.42471**
10	Rice yield	X_{10}	0.18059*

* * Significant at 1 per cent level of probability NS - Non- significant
* Significant at 5 per cent level of probability

The relationships shown in Table 16 are explained hereunder.

4.3.1 Education and extent of adoption

It is revealed that from Table 16 that the relationship between education of the respondents (X_1) and their adoption level (Y) was positive but non-significant.

It can be said that education status had not shown any significant influence on the adoption level of the respondents about different rice varieties released by DBSKKV, Dapoli. Usually, it is experienced that the educated farmers being knowledgeable, enthusiastic in various activities may show interest in adoption of new high yielding varieties of rice. But in the present study, the results revealed that there was no any specific trend indicating association between education and adoption of rice varieties developed by DBSKKV by the farmers. Thus, it can be said that the farmers from any of the education category may or may not have adopted rice varieties developed by DBSKKV.

These observations are in accordance with the findings Rath (2007) and Krishna, *et al* (2007), Seyyed and Mohammad (2010), Onumadu and Osahon (2014). The findings are different from the findings of of Mankar, *et al.* (2004), Pandey (2004) and Tambat (2007).

4.3.2 Occupation and extent of adoption

From Table 16, it is revealed that the relationship between occupation of the respondents (X_2) and their adoption (Y) was negatively non-significant.

It can be said from this observation that major occupation did not exert any statistically significant influence on the adoption of improved rice variety developed by Konkan Krishi Vidyapeeth. It can, therefore, be concluded that the adoption level of rice varieties developed by DBSKKV belonging to different occupation categories was more or less same. The influence, if any, of the occupation on adoption level might have been nullified due to the factors such as experience, need, interest etc.

The findings are similar with the Chaudhary, *et al*. and different from the findings of Mankar, *et al.* (2004)

4.3.3 Size of family and extent of adoption

It is observed from Table 16 that the relationship between size of family of the respondents (X_3) and extent of adoption (Y) was positive and significant .It means the size of family of the respondents cultivating rice are influenced their extent of adoption.

It can be said that, as the size of family was big, the more number of members might have involved in the decision making, because of which they might have adopted more varieties. Big size families might have focused on increasing rice production by adopting improved rice varieties developed by DBSKKV.

These observations are accordance with the findings of Mankar, *et al.* (2004) and Seyyed and Mohammad (2010).

4.3.4 Annual income and extent of adoption

It is observed from Table 16 that the relationship between annual income of the respondents (X_4) and extent of adoption (Y) was positive and significant.

It was seen that as the annual income of the farmer increased their percentage in adopters category also increased. Income is considered as one of the

motivating factors in adoption of expensive farm technologies. That is why, the annual income of the farmers might have shown relationship with the adoption of rice varieties developed by DBSKKV. Another reason may be the farmers with higher economic status usually hold influential positions in the rural areas and are looked upon as respectable personalities in the rural areas. Usually, such persons first try, use and demonstrate the new varieties on their own farm. This results into higher adoption by them.

These observations are similar with the finding of Chaudhary, *et al.* (2001) and Mankar, *et al.* (2004).

4.3.5 Size of land holding and extent of adoption

It is observed from Table 16 that the relationship between size of land holding of the respondents (X_5) and their adoption level (Y) was positively significant.

It can be inferred from the findings that the total land owned by the respondents had significantly influenced their adoption behaviour in respect of the rice varieties released by Konkan Krishi Vidyapeeth. Bigger the land holding, greater was the adoption and *vice-versa*. The marginal and small farmers, by virtue of their small size holding are unable to follow the diversified cropping scheme and hence their net returns are low. On the other hand, the farmer with larger land holding are able to grow different varieties. As a result, the total losses are minimized and they get maximum net returns. The bigger landowners are usually the resourceful persons, who can know the different varieties and afford to use the costly inputs on their farms and also to take some risk in adopting innovations. Resultantly, the level of adoption is usually more among farmers with higher income.

These observations are in accordance with the findings of Chaudhary, *et al.* (2001), Pandey (2004) and Krisha, *et al.* (2007) Onumadu and Osahon (2014).

4.3.6 Extension contact and extent of adoption

It is observed from Table 16 that the relationship between extension contact of the respondents (X_6) and extent of adoption (Y) was positively significant.

It can be concluded from these findings that the adoption level of the respondents had increased remarkably with an increase in their extension contact. It is presumed that the better extension contact would enrich the knowledge level of the

farmers, which would increase their adoption of new technologies of different crops. Here, the farmers with better extension contact might have adopted more number of rice varieties developed by DBSKKV.

These observations are in accordance with the findings of Mankar, *et al.* (2004), Joshi (2005), Saka, *et al.* (2005), Seyyed and Mohammad (2010), Singh and Varshney (2010).

4.3.7 Source of Information and extent of adoption

It is observed from Table 16 that the relationship between source of information of the respondents (X_7) and extent of adoption (Y) was positively significant.

It can be concluded from the observations that the respondents using more number of sources of information with higher frequencies possessed better knowledge about improved rice varieties and therefore they might have adopted more number of varieties also. Consulting the knowledgeable sources helps an individual to enrich his knowledge about the technologies of his interest which ultimately increases the adoption of those technologies. This has been justified by the findings of the present study.

These observations are in accordance with the findings of Kubde, *et al*. (2000), Dudhate (2000), Magar (2001) and Lad (2013).

4.3.8 Source of seed availability and extent of adoption

It is observed from Table 16 that the relationship between source of seed availability of the respondents (X_8) and extent of adoption (Y) was positively significant.

It is the fact that adoption of any practice is dependent on its availability in locality, in time and in required quantity.

The findings indicated that as the farmers are aware of sources of seed availability, they might have obtained the seed of required varieties from those sources and hence the adoption was found more.

4.3.9 Cosmopoliteness and extent of adoption

It is observed from Table 16 that the relationship between cosmopoliteness of the respondents (X_9) and extent of adoption (Y) was positively significant.

Contacts with sources of information outside the social system increase the knowledge level of an individual and create interest in him for adoption. Afterword the farmers might have adopted those varieties about which they became aware through different sources of information outside his social system. This fact might have been highlighted in the present investigation.

These observations are in accordance with the findings of Mankar, *et al.* (2004).

4.3.10 Rice yield and extent of adoption

It is observed from Table 16 that the relationship between rice yield of the respondents (X_{10}) and extent of adoption (Y) was positively significant.

It indicated that rice growers with higher rice yield adopted more number of the recommended rice varieties and vice–versa. Efficient use of rice varieties might have increased the yield, might have motivated the rice growers to adopt maximum number of recommended rice varieties released by DBSKKV for better production.

These observations are similar with the findings of Saka, *et al.* (2005), Wiredu, *et al.* (2010).

4.4 Preference of the farmers towards particular variety of rice developed by DBSKKV, Dapoli

The preferences of the farmers towards particular rice varieties developed by DBSKKV, Dapoli were studied and the information in this regard is presented in Table 17.

Table 17 indicated that maximum number (39.17 per cent) of the farmers gave first preference to ‘Karjat 7’ variety of rice developed by DBSKKV, Dapoli followed by ‘Karjat 5’ (17.50 per cent) and ‘Sahyadri 4’ (13.33 per cent). Other varieties of rice developed by DBSKKV were least preferred by the farmers.

Table 17. Preference of the farmers towards particular variety of rice developed by DBSKKV, Dapoli

Sl. No.	Variety	Preferences (N=120)				
		1st	2nd	3rd	4th	5th
1.	Karjat 3	12 (10.00)	11 (9.17)	22 (18.33)	3 (2.50)	1 (0.83)
2.	Ratnagiri 24	----	----	----	2 (1.67)	----
3.	Karjat 7	47 (39.17)	31 (25.83)	9 (7.50)	----	----
4.	Ratnagiri 5	6 (5.00)	5 (4.17)	4 (3.33)	6 (5.00)	----
5.	Karjat 5	21 (17.50)	15 (12.50)	7 (5.83)	----	----
6.	Karjat 2	----	5 (4.17)	2 (1.67)	4 (3.33)	----
7.	Ratnagiri 3	----	----	----	1 (0.83)	----
8.	Karjat 8	5 (4.17)	9 (7.50)	6 (5.00)	----	1 (0.83)
9.	Sahyadri	----	3 (2.50)	3 (2.50)	2 (1.67)	----
10.	Sahyadri 2	8 (6.67)	3 (2.50)	1 (0.83)	4 (3.33)	----
11.	Sahyadri 3	----	----	----	1 (0.83)	----
12.	Sahyadri 4	16 (13.33)	2 (1.67)	1 (0.83)	1 (0.83)	----
13	Sahyadri 5	2 (1.67)	4 (3.33)	2 (1.67)	----	----

4.5 Difficulties encountered by adopters as well as non-adopters in use of rice varieties developed by DBSKKV, Dapoli

An attempt was made in the present study to understand the difficulties encountered by adopters as well as non-adopters in use of rice varieties developed by DBSKKV, Dapoli. The data in this regard are presented in Table 18.

It is observed from Table 18 that all the non adopters encountered the difficulties namely ‘Lack of information about the rice varieties’ and ‘Non-availability of the seed material’ in adoption of rice varieties developed by DBSKKV, Dapoli.

Table 18. Difficulties encountered by adopters as well as non-adopters in use of rice varieties developed by DBSKKV, Dapoli

Sl. No.	Difficulties	Respondents (N=135)	
		Frequency	Percentage
	Non adopters (N=15)		
1.	Lack of information about the rice varieties	15	100.00
2.	Non-availability of seed material	15	100.00
	Adopters (N=120)		
1.	Non-availability of seed material	98	81.66
2.	Lack of demand for the grain in the market	76	63.33
3.	Varieties are susceptible to pest and diseases	35	29.17
4.	Less yield	25	20.13
5.	No knowledge about package of practices	22	18.33
6.	Less production of paddy straw	20	16.67

It was further observed that majority of the adopters faced the difficulty namely ‘Non-availability of the seed material’ (81.66 per cent) in adoption of rice varieties developed by DBSKKV followed by ‘Lack of demand for the grain in the market’ (63.33 per cent), ‘Varieties are susceptible to pest and diseases’ (29.17), ‘Less yield’ (20.83 per cent), ‘No knowledge about the package of practices’ (18.33 per cent) and ‘Less production of paddy straw’ (16.67).

Chapter V

SUMMARY

The present research project entitled ‘Extent of adoption and causes of non-adoption of rice varieties developed by DBSKKV, Dapoli’ was undertaken with the following specific objectives.

1. To study the personal characteristics of the farmers.
2. To study the extent of knowledge and adoption of rice varieties developed by DBSKKV, Dapoli.
3. To find out the relationship between personal characteristics of the farmers and adoption of rice varieties developed by DBSKKV, Dapoli.
4. To study the preferences of the farmer towards particular variety of rice.
5. To study the difficulties encountered by the adopters as well as non-adopters in use of rice varieties developed by DBSKKV, Dapoli.

The study was conducted in Raigad district of the Konkan region. In all, nine villages from three tahsils namely Karjat, Mangaon and Alibag were selected based on the maximum area under rice cultivation. An interview schedule was specially designed, in line with the objectives set forth, to collect the needed information. The data were collected by personally interviewing 135 randomly selected rice growers from these villages. The findings of the study are summarized below.

5.1 Personal characteristics of the farmers

Maximum number (34.81 per cent) of the respondents had ‘secondary’ education with an average educational level of 7^{th} standard. Majority (51.85 per cent) of the respondents were engaged in ‘farming’. Family size of majority (70.37 per cent) of the respondents was ‘medium’ and average members in the family were six. Maximum numbers (48.15 per cent) of the respondents were having ‘medium’ annual income. Average of the annual income of the respondents was Rs 131601.50/-. Maximum number (36.30 per cent) of the respondents had ‘marginal’ size of land holding and average size of land holding was 1.6 ha. Majority (68.90 per cent) of the respondents had ‘medium’ extension contact. Maximum number of the respondents (38.51 per cent) had the contact with ‘Agril. Assistants’ (DBSKKV) and ‘Agril. Extension Officers’ (38.51 per cent) for getting information. Majority (51.11 per cent) of the respondents obtained seed from ‘Krishi Seva Kendra’. Majority (68.14 per cent) of the respondents had ‘medium’ cosmopoliteness. The average cosmopolitness

score of the respondents was 2.44. Majority (74.81 per cent) of the respondents had ‘medium’ rice yield. Average yield of rice was 28.26 q/ha.

5.2 Knowledge and adoption of rice varieties developed by DBSKKV, Dapoli

Majority (88.88 per cent) of the farmers had knowledge about rice variety ‘Karjat 7’ developed by DBSKKV, Dapoli followed by ‘Karjat 3’ (70.38 per cent), ‘Karjat 5’ (56.30 per cent), ‘Karjat 2’ (50.37 per cent) and ‘Ratnagiri 5’ (47.41 per cent). However, none of the farmers had knowledge about ‘Karjat 184’, ‘Phondaghat 1’, ‘Palghar 1’, ‘Palghar 2’ and ‘Panvel 3’. Among the hybrid rice varieties developed by DBSKKV, Dapoli the farmers had knowledge about ‘Sahyadri 4’ (43.70 per cent) and ‘Sahyadri 2’ (40.00 per cent)..

More than half (54.82 per cent) of the respondents had ‘medium’ adoption of the rice varieties developed by DBSKKV. The average adoption score of the respondents was 4.2. It was observed that majority (62.96 per cent) of the farmers adopted ‘Karjat 7’. Maximum number of the respondents (44.17 per cent) had brought ‘high’ area under rice varieties developed by DBSKKV. The average area brought under rice varieties developed by DBSKKV by the respondents was 56.93 per cent.

5.3 Relationship between personal characteristics of the farmers and adoption of rice varieties developed by DBSKKV, Dapoli

The relationship of the characteristics of the farmers namely family size, annual income, size of land holding, extension contact, sources of information, sources of seed availability, cosmopoliteness and rice yield with that of extent of adoption of rice varieties developed by DBSKKV was found to be positive and significant.

It was, however, observed that the relationship between education and occupation of the respondents and the adoption of rice varieties developed by DBSKKV was non-significant.

5.4 Preferences of the farmers towards particular variety of rice

Maximum number (39.17 per cent) of the farmers gave first preference to ‘Karjat 7’ variety of rice developed by DBSKKV followed by ‘Karjat 5’ (17.50 per cent) and ‘Sahyadri 4’ (13.33 per cent). Other varieties of rice developed by DBSKKV were least preferred by the farmers.

5.5 Difficulties encountered by adopters as well as non- adopters in use of rice varieties developed by DBSKKV, Dapoli

All the non adopters encountered the difficulties namely ‘Lack of information about the rice varieties’ and ‘Non-availability of the seed material’ in adoption of rice varieties developed by DBSKKV, Dapoli. Majority of the adopters faced the difficulty namely ‘Non-availability of the seed material’ (81.66 per cent) in adoption of rice varieties developed by DBSKKV followed by ‘Lack of demand for the grain in the market’ (63.33 per cent), ‘Varieties are susceptible to pest and diseases’ (29.17), ‘Less yield’ (20.83 per cent), ‘No knowledge about the package of practices’ (18.33 per cent) and ‘Less production of paddy straw’ (16.67).

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Chapter VI

IMPLICATIONS

After the establishment of DBSKKV in 1968, breeding programs were guided by modern plant type concept and resulted in the development of several rice varieties with high yield potential and other desirable traits. Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli has developed 19 best varieties of rice through selection and in modern era of rice research, developed 25 high yielding varieties with improved architecture and 5 excellent rice hybrids of various durations.

Rice scientists, extension agents as well as planners for various reasons need to know about existing rice varieties with their percentage share in area and their respective yields. Identifying the most popular rice varieties is particularly important for rice breeders who are trying to develop new varieties with higher yield and varieties suitable for unfavorable areas/climatic conditions. It is also important to know the diffusion process of modern varieties, identifying the traits for the popularity of some varieties and investigating the reasons for the discontinuation of growing some popular varieties as well as reasons for non-adoption of these varieties. The sources of seed supply and sources of information about new rice technology, the role of private and government organizations in supplying seed, etc. are also important aspects for enhancing rice production for food security. The scientific data with respect to varieties developed by DBSKKV, Dapoli on the above mentioned aspects is not available and hence this study was designed and conducted to collect the data on this vital aspect. The implications brought forward by the present study are listed below.

1. It was revealed that the farmers had secondary education, having on an average six members in their family, had farming as their major occupation, medium annual income, marginal to small size land holding, medium extension contact and cosmopoliteness. Maximum number of farmers contacted Agricultural Assistants of DBSKKV and Agricultural Extension Officer of Panchayat Samiti for getting information and contacted Krishi Seva Kendra for obtaining seed material. The extension workers should consider these facts while planning and executing the programmes for rice development in the Konkan region.

2. It was observed that the extent of adoption of rice varieties developed by DBSKKV among the farmers was at medium level. Majority of the farmers adopted Karjat 7 variety followed by Karjat 3 and Karjat 5 variety of rice developed by DBSKKV. The study has clearly indicated that most of the the varieties developed by DBSKKV were not adopted by the farmers. These observations may serve as feedback for future line of action.
3. The findings regarding the rice varieties preferred by the farmers revealed that most of the farmers preferred Karjat 7 variety followed by Karjat 5. The stress of the research workers should , therefore, be on evoloving the high yielding varieties which are preferred by the farmers for their different characteristics such as dwarf stature, long slender grain and resistant to pest and diseases.
4. The investigation has confirmed that the extent of adoption of rice varieties developed by DBSKKV was dependent on their characteristics namely, family size, annual income, size of land holding, extension contact, sources of information, sources of seed availability, cosmopoliteness and rice yield. The extension workers may use these factors for promoting the use of rice varieties developed by DBSKKV, Dapoli.
5. The non adopters of rice varieties developed by DBSKKV encountered the difficulties such as lack of information about rice varieties and non-availability of seed material. Adopters also faced the major difficulty namely non-availability of seed material. This finding suggest that seed of the rice varieties developed by DBSKKV should be made available to the farmers. This could be done by undertaking Village Seed Production programme on larger scale.
6. For popularizing the rice varieties developed by DBSKKV, training classes at the village level need to be organized. So also, for convincing the farmers regarding the merits of these varieties over other varieties, numerous demonstrations of the varieties developed by DBSKKV need to be organized systematically on the farmers' field.
7. This study will act as a bench mark in understanding the spread of rice varieties developed by DBSKKV, Dapoli over a period of time. The planners, researchers and extension workers can use the findings of this study and accordingly can prepare the action plans for future.

8. The study was conducted in few tahsils of Raigad district and hence the findings would be applicable to these tahsils in particular. However, the conclusions could be generalized and applied wherever similar conditions exist. Further, it is suggested that similar studies may be conducted in other districts of the region to get overall picture of the adoption of rice varieties developed by DBSKKV for the Konkan farmers.

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Annexure-I

Rice Varieties Developed by Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli

Early duration varieties:-

Varieties	Released Year	Yield (q/ha)	Characteristics
Karjat 184	1971	30-35	Dwarf stature, medium slender grain, moderately resistant to blast and bacterial leaf blast, recommended for rainfed uplands, tolerant to leaf folder and stem borer
Ratnagiri 24	1971	35-40	Semi dwarf stature, long slender grain, tolerant to stem borer, suitable for both kharif and hot weather, resistant to blast and moderately, susceptible to bacterial leaf blight
Ratnagiri 711	1978	35-40	Semi dwarf stature, long slender grain, suitable for light & medium type soils, suitable for both kharif and hot weather conditions, can be grown under dibbled and transplanted conditions
Ratnagiri 73	1979	35-40	Dwarf stature, short and bold grain, moderately resistant to leaf blast, neck blast and bacterial leaf blight
Ratnagiri 1	1986	35-40	Long bold grain, moderately resistant to blast and neck blast, internationally released in Zambia for irrigated ecology
Karjat 3	1994	30-35	Dwarf stature, short bold grain, resistant to blast suitable for rainfed uplands as well as irrigated areas for kharif & rabi season
Karjat 1	1987	35-40	Dwarf stature, short bold grain, recommend for rainfed uplands, resistant to bacterial leaf blight & moderately resistant to blast & leaf scald
Phondaghat 1	1997	40-50	Dwarf stature, long slender grain, resistant to blast, suitable for upland areas, moderately resistant to leaf folder and bacterial leaf blight
Karjat 4	2000	30-35	Dwarf stature, short slender, superfine grain, moderately resistant to leaf folder, suitable for rainfed upland as well as irrigated areas for kharif &

			rabi season
Karjat 7	2009	45-50	Dwarf stature, long slender grain, resistant to leaf folder, moderately to brown plant hopper, white brown plant hopper and blast and bacterial leaf blast
Ratnagiri 5	2012	35-38	Short slender grain, moderately resistant to leaf blast, neck blast and bacterial leaf blight

Mid late varieties:

Varieties	**Released Year**	**Yield (q/ha)**	**Characteristics**
Palghar 1	1988	40-45	Dwarf stature, medium slender grain, moderately resistant to stem borer & blast
Palghar 2	2002	30-35	Semi dwarf, Short slender grain, moderately resistant to stem borer and blast
Karjat 5	2006	40-50	Semi dwarf stature, long bold grain, resistant to neck blast, suitable for midland under rainfed & irrigated conditions
Karjat 6	2006	35-40	Short slender grain, resistant to bacterial leaf blast & brown plant hopper, suitable for midland under rainfed & irrigated conditions
Ratnagiri 4	2009	45-50	Long slender grain, moderately resistant to neck blast, leaf blast & bacterial leaf blight
Karjat 9	2014	45-50	Dwarf stature, medium slender grain, moderate resistant to neck blast, bacterial leaf blast, brown plant hopper and white brown plant hopper

Late varieties:

Varieties	Released Year	Yield (q/ha)	Characteristics
Ratnagiri 2	1990	40-45	Short bold grain, resistant to blast & neck blast, recommended for low land rice growing areas having assured rainfall in Maharashtra.
Karjat 2	1994	40-45	Dwarf stature, long slender grain, resistant to blast & neck blast, recommended for shallow, low land areas
Ratnagiri 3	1996	40-45	Long bold grain, resistant to gall midge, suitable for shallow low land area
Karjat 8	2010	35-40	Short slender grain, resistant to brown plant hopper, white brown plant hopper and neck blast, suitable for shallow low land area

Khar land varieties:

Varieties	Released Year	Yield (q/ha)	Characteristics
Panvel 1 (Midlate)	1984	35-40	Semi dwarf stature, short bold grain, resistant to blast & moderately resistant to stem borer, recommended for coastal saline soils of Konkan region, tolerant to salinity condition
Panvel 2 (Early)	1987	35-40	Semi dwarf stature, long slender grain, resistant to blast & moderately, resistant to stem borer, recommended for coastal saline soils of Konkan region, tolerant to salinity condition

Panvel 3 (Midlate) (Early)	2000	45-50	Mid tall stature, short bold grain, moderately resistant to blast, stands well in dry spell for more than 17 days, highly salt tolerant suitable for medium to high rainfall area in coastal saline soil condition

Hybrid varieties:

Varieties	**Released Year**	**Yield (q/ha)**	**Characteristics**
Sahyadri	1998	60-65	First rice hybrid released in Maharashtra state, semi dwarf stature, long slender grain, resistant to leaf blast & leaf scald, mild aroma
Sahyadri 2 (Vashisthi)	2006	55-60	Semi dwarf stature, long slender grain, resistant to falsesmut, suitable for uplands & double crop areas in the state
Sahyadri 3 (Savitri)	2006	65-70	Semi dwarf stature, long slender grain, resistant to leaf blast, neck blast, leaf folder, bacterial leaf blight, sheath blight & brown plant hopper,
Sahyadri 4 (Hansa)	2009	55-60	Released for commercial cultivation in five state of the country viz. Punjab, Haryana, Uttar Pradesh, West Bengal and Maharashtra by Central Varietal Release Committee, moderately resistant to leaf blast, neck blast, brown spot & rice tungro virus.
Sahyadri 5 (Hirkani)	2012	65-70	Semi dwarf stature, long slender grain, moderately resistant to leaf blast, neck blast & bacterial leaf blast, tolerant to brown plant hoppers, white brown plant hoppers, green leaf hoppers & stem borer

APPENDIX II

List of selected villages and number of respondents

Sl. No.	Name of village	Name of tahsils	No. of respondents
1	Vadap	Karjat	15
2	Salokh	Karjat	15
3	Barne	Karjat	15
4	Repoli	Mangoan	15
5	Talegoan	Mangoan	15
6	Kurvade	Mangoan	15
7	Belkade	Alibag	15
8	Shahapur	Alibag	15
9	Pali	Alibag	15
		Total	**135**

APPENDIX-III

List of the Respondent

Sl.No.	Name of the Respondents	Village
Raigad District		
Karjat Tahsil		
1	Mr. Baliram Ganapat Mandale	Vadap
2	Mr. Ganapat Vittal Shinde	Vadap
3	Mr. Ramesh Janardhan Marathe	Vadap
4	Mr. Bhagavan Haribhau Chavan	Vadap
5	Mr. Lakshaman Baburao Dalavi	Vadap
6	Mr. Vinay Maruti Vekhande	Vadap
7	Mr. Pradhan Narayan Patil	Vadap
8	Mr. Yashavant Narayan Patil	Vadap
9	Mr. Param Parshuram Patil	Vadap
10	Mr. Jagadish Janardhan Patil	Vadap
11	Mr. Khandu Raghunath Shinde	Vadap
12	Mr. Arun Janardhan Patil	Vadap
13	Mr. Janardhan Mahadu Marade	Vadap
14	Mr. Vitttal Govind Patil	Vadap
15	Mr. Pravin Madhukar Chandan	Vadap
16	Mr. Khushnaji Lakshman Kadam	Salokh
17	Mr. Manoj Mahadev Shinde	Salokh
18	Mr. Ganapat Rama Yadav	Salokh
19	Mr. Bhiku Chandu Parade	Salokh
20	Mr. Khushna Hari Mokashi	Salokh
21	Mr. Ashok Ganapat Mokashi	Salokh
22	Mr. Padamakar Ganapat Mokashi	Salokh
23	Mr. Ganesh Hari More	Salokh
24	Mr. Mangesh Ramchandra Malusare	Salokh

25	Mr. Vasant Madukar More	Salokh
26	Mr. Vaman Damu Chavan	Salokh
27	Mr. Subhash Mahadev Mande	Salokh
28	Mr. Chandrakant Tatya Kadu	Salokh
29	Mr. Ravindra Pandurng Cadam	Salokh
30	Mr. Chandrakant Sakharam Mande	Salokh
31	Mr. Ramachandra Raghav Mune Barne	Barne
32	Mr. Dasharath Nanu Mune	Barne
33	Mr. Dilip Subhas Dole	Barne
34	Mr. Kashinat Sakharam Mune	Barne
35	Mr. Ramachandra Parsuram Shelake	Barne
36	Mr. Vasant Babu Mune	Barne
37	Mr. Ravindra Tukaram Dhole	Barne
38	Mr. Bhanudas Dev Mune	Barne
39	Mr. Janardhan Narayan Mune	Barne
40	Mr. Bhagavan Kalu Bhule	Barne
41	Mr. Sharad Sakharam Muni	Barne
42	Mr. Govind Damu Dalvi	Barne
43	Mr. Sudam Narayan Mune	Barne
44	Mr. Uday Dinakar Chande	Barne
45	Mr. Sudhar Hari Patil	Barne
Alibag Tahsil		
46	Mr. Shekar Babaji Patil	Belkade
47	Mr. Nandakumar Kashinath Raut	Belkade
48	Mr. Anant Appa Naik	Belkade
49	Mr. Nilesh Suresh Patil	Belkade
50	Mr. Damodar Ramchandra Patil	Belkade
51	Mr. Nathuram Narayan Naik	Belkade
52	Mr. Ravindra Bhau Patil	Belkade
53	Mr. Madukar Bhaskar Naeik	Belkade

54	Mr. Shashikant Ganapat Kandakar	Belkade
55	Mr. Ramachandra Kashinath Patil	Belkade
56	Mr. Nandkumar Suresh Patil	Belkade
57	Mr. Ghanasham Tukaram Mhatre	Belkade
58	Mr. Dipak Ganapat Patil	Belkade
59	Mr. Anil Pandurang Deshmukh	Belkade
60	Mr. Baban Damaji Vakale	Belkade
61	Mr. Dhananjay Dukhalya Patil	Shahapur
62	Mr. Jayvant Maruti Patil	Shahapur
63	Mr. Uttam Mahadev Patil	Shahapur
64	Mr. Prakash Mukumd Patil	Shahapur
65	Mr. Vijay Dattatrey Patil	Shahapur
66	Mr. Nitin Hasuram Patil	Shahapur
67	Mr. Vinay Balakhush Bhoir	Shahapur
68	Mr. Balakhush Maruti Bhagat	Shahapur
69	Mr. Vikas Motiram Bhagat	Shahapur
70	Sau. Suvarna Rajendra Bhagat	Shahapur
71	Mr. Mularidhar Mahadev Patil	Shahapur
72	Sau. Alaka Maruti Mokal	Shahapur
73	Mr. Satish Shankar Bhagat	Shahapur
74	Mr. Rajendra Kashinath Bhoir	Shahapur
75	Sau. Jayashri Vithoba Mokal	Shahapur
76	Mr. Prabhakar Raghunath Patil	Pali
77	Mr. Vikas Shantaram Patil	Pali
78	Mr. Lahu Damodar Kamalakar	Pali
79	Mr. Raghunath Shankar Patil	Pali
80	Mr. Suresh Namadev Patil	Pali
81	Mr. Sanjay Ganapat Patil	Pali
82	Mr. Sudhir Attmaram Patil	Pali
83	Mr. Prasanna Govind Patil	Pali

84	Mr. Narendra Baliram Patil	Pali
85	Mr. Tukaram Narayan Patil	Pali
86	Mr. Nilesh Naresh Shinde	Pali
87	Mr. Ramesh Sudhir Kamalakar	Pali
88	Mr. Ramesh Ramachandra Patil	Pali
89	Mr. Jayesh Ramesh Mhatre	Pali
90	Mr. Sandesh Naresh Patil	Pali
Mangaon Tahsil		
91	Mr. Ramu Mahadu Mahale	Repoli
92	Mr. Shankar Babu Bendugade	Repoli
93	Mr. Vithoba Kanu Damal	Repoli
94	Mr. Khushna Kanu Jambhale	Repoli
95	Mr. Ranjan Pavar	Repoli
96	Mr. Suresh Shankar Jambhale	Repoli
97	Mr. Pandurang Shjankar Jambhale	Repoli
98	Mr. Saheb Dattu Chavan	Repoli
99	Mr. Shankar Dagadu Yadav	Repoli
100	Mr. Santosh Lakshman Jambhale	Repoli
101	Mr. Balaram Lakshman Jambhale	Repoli
102	Mr. Maruti Vittal Bendugade	Repoli
103	Mr. Ramachandra Raghav Bendugade	Repoli
104	Mr. Sakharam Bendugade	Repoli
105	Mr. Khushna Shankar Kadu	Repoli
106	Mr. Vijay Rajaram Vaghmare	Talegoan
107	Sau. Shevani Vaghamare	Talegoan
108	Mr. Pandu Ganapat Shigavan	Talegoan
109	Mr. Ramadas Shankar Bhovare	Talegoan
110	Mr. Vishvanath More	Talegoan
111	Mr. Nathuram Balu Waghmare	Talegoan
112	Mr. Yethu Waghmare	Talegoan

113	Mr. Baliram Bhagogi More	Talegoan
114	Mr. Parshuram Shitaram Waghmare	Talegoan
115	Mr. Madhu Sitaram Waghmare	Talegoan
116	Mr. Gangaram Baraku Kadam	Talegoan
117	Mr. Laksham Dhamane	Talegoan
118	Mr. Baliram Khushna Manjare	Talegoan
119	Mr. Santosh Baliram Sawant	Talegoan
120	Mr. Kisan Panduran Tirgude	Talegoan
121	Mr. Sitaram Govind Vadave	Kurvade
122	Mr. Santosh Daji Shifade	Kurvade
123	Mr. Ashok Tukaram Panavalkar	Kurvade
124	Mr. Vitoba Zilo Vadaval	Kurvade
125	Mr. Tanaji Sitaram Jadhav	Kurvade
126	Mr. Ranjana Maruti Panvilkar	Kurvade
127	Mr. Babu Balu Panvilkar	Kurvade
128	Mr. Yashvant Kalu Panvilkar	Kurvade
129	Mr. Nathuram Narayan Panvilkar	Kurvade
130	Mr. Rajaram Dagadu Panvilkar	Kurvade
131	Mr. Babu Rama Panvilkar	Kurvade
132	Mr. Tukaram Chandrakant Panvilkar	Kurvade
133	Mr. Anat Lakshaman Karkare	Kurvade
134	Mr. Ashish Vasant Andhere	Kurvade
135	Mr. Dattram Shigavan Thekale	Kurvade

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foLrkj f'k{k.k foHkkx

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iz'ukoyh

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2	Ñf”k lgk¸;d ¼Ñf”k foHkkx½				
3	Ñf”k foLrkj vf/kdkjh ¼iapk;r lferh½				
4	Ñf”k vf/kdkjh ¼Ñf”k foHkkx½				
5	‘kkL=K ¼Ñf”k fo|kihB½				
6	Ñf”k fo|kihBkrhy brj O;Drh				
7	rkyqdk Ñf”k vf/kdkjh				
8	xVfodkl vf/kdkjh				
9	Lo;alsoh laLFkk				
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2- xzkelsod
3- Ñf”k xzke foLrkjd
4- ‘kstkjh@fe=
5- izxrh’khy ‘ksrdjh
6- fo|kihB ‘kklu
7- Ñf”k foLrkj vf/kdkjh
8- Ñf”k vf/kdkjh
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11- ‘ksrhfo”k;d ekflds
12- vkdk’kok.kh
13- nwjn’kZu
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3- xzkeiapk;r
4- iapk;r lferh
5- Ñf”k lsok dsanz
6- Ñf”k foKku dsanz
7- Ñf”k fo|kihB
8- brj

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tj gks; vlsy rj ueqn djk-

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2	ftYgk		

3	egkuxj@'kgj		

3½ vki.k ekxhy o"khZ dks.kR;kgh deZpkÚ;kaph HksV ?ksryh vkgs dk\ gks;@ukgh-

vlY;kl iq<hy ekfgrh |k-

v-Ø-	lk/ku	fdrh osGk HksV nsrk	HksVhps dkj.k
1	os|dh; vf/kdkjh		
2	ifjpkfjdk		
3	LFkkfud@[kktxh MkWDVj		
4	Lo;alsoh laLFkk		
5	brj		

4½ vki.k xkokckgsjhy dks.kR;kgh laLFksps lnL; vkgkr dk\ gks;@ukgh-

vlY;kl ueqn djk-

5½ xsY;k o"kZHkjkr vki.k xkokckgsjhy dks.kR;kgh izn'kZukyk HksV fnyh vkgs dk\ gks;@ukgh-

izn'kZukps fBdk.k % izn'kZukpk fo"k; %

12½ vki.k ;k tfeuhe/;s ykxoMhlkBh dks.kR;k izdkjps fc;k.ks okijrk

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1	lq/kkjhr						
2	ladjhr						
3	LFkkfud						

13½ vki.kkl dksd.k Ñf”k fo|kihBkus fuekZ.k dsysY;k Hkkr tkrhaph ekfgrh vkgs dk;\ gks;@ukgh

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1½ 2½

3½ 4½

5½ 6½

14½ vki.k dksd.k Ñf”k fo|kihBkus fuekZ.k dsysY;k Hkkr tkrh okijY;k vkgsr dk\ gks;@ukgh

okijY;k vlY;kl dks.kR;k

v-Ø-	tkr	{ks=	feGkysys mRié

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dksd.k Ñf”k fo|kihBkus izlkjhr dsysY;k Hkkr tkrhaP;k ekfgrhpk ri’khy

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dksd.k Ñf”k fo|kihBkus izlkjhr dsysY;k Hkkr tkrhaP;k voyacukpk ri’khy

v-Ø-	dksd.k Ñf”k fo|kihB fufeZr Hkkr tkrh	izlkj.k o”kZ	izFke ekfgrhps o”kZ	izFke okijysys o”kZ	R;kuarj fdrh o”kZ okijys	l/;kgh okij pkyw vkgs dk gks;@ukgh	okijr ulY;kl dkj.ks lkaxk
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tkr	ilarhØe	dkj.k

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dksd.k Ñf”k fo|kihB fufeZr Hkkr tkrhaP;k okijke/;s vki.kkl dkgh vMp.kh ;srkr dk;

;sr vlY;kl dks.kR;k tkrhcíy o dks.kR;k vMp.kh ;srkr

v-Ø-	tkr	vMp.kh
		fo|kihBkus izlkfjr dsysY;k tkrhaph ekfgrh ukgh- deh isa<k feGrks- deh mRié- [krs tkLr ykxrkr- jksx vkf.k fdMhapk tkLr izknqHkkZo gksrks- eG.kh dj.;kl vo?kM- nkus ,dkp osGh Hkjr ukghr- fc;k.;kapk nj tkLr vkgs- fc;k.ks osGsr miyC/k gksr ukgh- fc;k.;kapk viqjk iqjoBk- rkaf=d Kkukpk vHkko- Hkkrkpk nj deh feGrks- tfeuhlkBh vuqdwy ukghr-

foLrkj f’k{k.k foHkkx
Ñf”k egkfo|ky;] nkiksyh
MkW- ckGklkgsc lkoar dksad.k Ñf”k fo|kihB] nkiksyh] ft- jRukfxjh
iz’ukoyh
xzkeh.k fL=;kapk eqyhaP;k f’k{k.kkfo”k;hP;k n`”Vhdksukpk vH;kl
Hkkx & ifgyk
xzkeh.k fL=;kaph oS;fDrd ekfgrh

1½ ?kjkrhy izeq[k L=hps ukao %----------

2½ xko %---------- 3½rkyqdk % ---------- 4½ ftYgk %----------

5½ oS;fDrd ekfgrh

v- Ø-	uko	o;	f’k{k.k	dqVqac izeq[kk’kh ukrs	O;olk;	mRié
1-						
2-						
3-						
4-						
5-						

6½ tkr %

7½ ik;kHkqr lqfo/kk %

1- jkT;@ftYgk egkekxkZiklwups varj

v- jLR;kP;k cktwyk ykxqu ¼ ½

c- 5 fd-eh- is{kk deh ¼ ½

d- 6&10 fd-eh- ¼ ½

M- 11&15 fd-eh- ¼ ½

b- 16&20 fd-eh- ¼ ½

bZ- 21 fd-eh- vkf.k R;kis{kk ¼

2- jLR;kps izdkj

v- ik;okV ¼ ½

c- xkMhokV ¼ ½

d- dPpk jLrk ¼ ½

M- cl LVs’ku ¼ ½

tkLr ½

3- cllsok

v- cl Fkkack ¼
½

c- p< mrkj Fkkack ¼
½

d- cl LFkkud ¼
½

4- jktdh; laLFkk

v- xV xzkeiapk;r ¼
½

c- xzkeiapk;r ¼
½

5- vkfFkZd laLFkk

v- lgdkjh lkslk;Vh ¼
½

c- lgdkjh c¡d ¼
½

d- O;kikjh c¡d ¼
½

M- js'kfuax nqdku ¼
½

6- f'k{k.k

v- ckyokMh ¼
½

c- ckyokMh 1 yh&4 ¼
Fkh ½

d- izkFkfed 'kkGk 7 ¼
oh i;±r ½

M- ek/;fed 'kkGk ¼
½

b- mPp ek/;fed 'kkGk ¼
½

bZ- izkS< f'k{k.k oxZ ¼
½

7- vkjksX;

v- vkjksX; vf/kdkÚ;kaph ¼
HksV ½

c- vkjksX; midsanz ¼
½

d- izkFkfed vkjksX; ¼
½

M- ukxjh nok[kkuk ¼
½

8- i'kqoS|dh;

v- i'kq/ku oS|dh; HksV ¼
½

c- Ñf=e xHkkZ/kku ¼
dsanz ½

d- i'kq/ku i;Zos{kd ¼
dsanz ½

M- i'kqoS|dh; ¼
nok[kkuk ½

9- foLrkj laidZ

v- xzkelsod eq[;ky; ¼
½

c- xzkefoLrkj deZpkjh ¼
½

d- Ñf"k vf/kdkjh eq[;ky; ¼
½

10- laokn

v- i=isVh ¼
½

c- 'kk[kkiksLV ¼
½

d- miiksLV ¼
½

M- iksLV ¼
½

b- nwj/ouh ¼
¼[kktxh@ukxjh½ ½
bZ- nwj/ouh dsanz ¼
½

11- laokn ek/;es

v- nwjn’kZu lapkP;k ¼
xzkgd’kDrhe/;s ½
c- lkeqnkf;d jsfMvks lap ¼
½
d- lkeqnkf;d nwjn’kZu lap ¼
½
M- lkeqnkf;d okpuky; ¼
½

12- Lo;alsoh laLFkk

v- ;qod la?kVuk ¼
½
c- lekt dsanz ¼
½
d- Hktuh eaMG ¼
½
M- ‘ksrdjh eaMG ¼
½
b- efgyk eaMG ¼
½
bZ- xzke fodkl ifj”kn ¼
½

13- oht

v- vaf’kd fo|qrhdj.k ¼
½
c- iw.kZ fo|qrhdj.k ¼
½

14- flapu O;oLFkk

v- foghj ¼
½
c- milk flapu ¼
½
d- dkyok ¼
½

15- buiqV iqjoBk

v- fc;k.ks nqdku ¼
½
c- [krkaph o[kkj ¼
½
d- Ñf”k lsok dsanz ¼
½
M- [kjsnh foØh la?k ¼
½

16- cktkj lqfo/kk

v- eaMbZ ¼
½
c- vkBoMk cktkj ¼
½
d- lgkdkjh dksBkj ¼
½
M- nq/k Msvjh ¼
½

17- izfØ;k

v- Hkkr fxj.kh ¼
½

c- ihB fxj.kh ¼
½

d- y?kq|ksx ¼
½

8½ cnykl iks”kd okrkoj.k %

Ñi;k [kkyhy eqíÓkaoj rqeph izfrfØ;k n’kZok-

v-Ø-	fo/kku		i;kZ;
1½	rqeP;k foHkkxkr ,[kknk fodkl dk;ZØe jkcfoyk tkr vlY;kps rqEgkyk dGY;kl rqEgh dk; djky\	v½ c½ d½	Bjfoysys ukgh- Fkkacsu vkf.k nqlÚ;k ykHkkFkh±pk izfrlkn ikfgu- Lor% voyac djhu-
2½	rqeP;k dqVaqckrhy mPp f’kf{kr efgyk lnL;kackcr rqeps dk; er vkgs\	v½ c½ d½	efgyk f’kf{kr ulkO;kr- Bjfoysys ukgh- efgyk lqf’kf{kr vlkO;kr-
3½	rqEgkyk vls okVrs dk] dh cnyR;k ifjfLFkrhuqlkj vé] oL=] fuokjk xjtkae/;s cny dsyk ikfgts\	v½ c½ d½	djk;yk udks- Bjfoysys ukgh- djk;yk gok-

Hkkx nqljk

xzkeh.k fL=;kapk eqyhaP;k f’k{k.kkfo”k;hP;k n`”Vhdksukpk vH;kl

v-Ø-	ri’hky	iw.kZr% lger	v’kar% lger	lkaxw ‘kdr ukgh	v’kar% vlger	iw.kZr% vlger
1	eqyhaP;k LokLFk o dY;k.kklkBh f’k{k.k xjtsps vkgs-					
2	dqVaqckP;k LokLFk o dY;k.kklkBh f’k{k.k xjtsps vkgs-					
3	eqyhaps nSuafnu thoukrhy iz’u lksMo.;kl f’k{k.k enr djrs-					
4	eqyhae/;s lqjf{krrsph Hkkouk fuekZ.k gks.;klkBh f’k{k.k xjtsps vkgs-					
5	Hkfo”;krhy jkg.kheku lq/kkj.;klkBh f’k{k.k mi;qDr Bjrs-					
6	vk;q”;kpk ;ksX; tksMhnkj fuoM.;klkBh f’k{k.k mi;qDr Bjr ukgh-					
7	eqyhae/khy vkRefo’okl ok<fo.;klkBh f’k{k.k mi;qDr Bjrs-					
8	f’k{k.kkeqGs eqyh ;ksX; fu.kZ; ?ksÅ ‘kdrkr-					
9	f’k{k.kkeqGs eqyhaps lektkrhy LFkku ok<rs-					
10	f’kf{kr eqyh ?kjdkekr enr djr ukghr-					
11	f’kf{kr eqyh fu;a=.kkckgsj tkrkr-					
12	f’kf{kr eqyh ?kjP;k ijaijk ukdkjrkr-					

Hkkx frljk

eqyhaP;k f’k{k.kkr xzkeh.k Hkkxkrhy efgykauk ;s.kkÚ;k leL;k

v½ lkekftd leL;k

1	lektkr eqyhaP;k f’k{k.kkyk fdaer ukgh-	¼ ½
2	eqyhaP;k f’k{k.kklkBh ckgsj Bso.ks lektkP;k n`”Vhdksukrwu VhdkRed Bjrs-	¼ ½
3	eqyhauk f’k{k.k fnY;kl R;k vkarjtkrh; fookg djrhy v’kh vkEgkyk Hkhrh okVrs-	¼ ½
4	eqyhauk f’k{k.kklkBh ?kjkP;k ckgsj Bsorkuk lektkrhy vlkekftd ?kVdkiklwu R;kauk lqjf{krrk feGr ukgh-	¼ ½
5	eqyhaP;k f’k{k.kkpk Qk;nk frP;k vkbZ ofMykauk u gksrk frP;k lkljdMhy ek.klkaukp gksrks-	¼ ½

c½ vkfFkZd leL;k ¼ ½

1	eqyhaP;k f’k{k.kklkBh R;kauk vkEgh vko’;d rso<s iSls iqjow ‘kdr ukgh-	¼ ½
2	lqf’kf{kr eqyhauk oj ikg.;klkBh tkLr gqaMk ykxrks dkj.k R;kauk R;kaP;kis{kk mPp f’kf{kr oj ikfgts vlrks-	¼ ½
3	eqyhaP;k f’k{k.kklkBh tks iSlk [kpZ gksrks rks yXu >kY;kuarj R;k ikydkauk ijr d: ‘kdr ukghr-	¼ ½
4	eqyhaP;k f’k{k.kklkBh [kpZ dj.;kis{kk rs iSls R;kaP;k yXuklkBh o HkforO;klkBh okij.ks tkLr egRokps okVrs-	¼ ½

d½ ekufld leL;k

1	vkEgh eqyhauk f’kdfo.;klkBh r;kj vkgksr] ijarq R;kauk f’k{k.kkph vkdka{kk ukgh-	¼ ½
2	eqyhauk vkbZ&ofMykaoj ekufldn`”VÓk voyacwu jkg.;kph lo; vlrs R;keqGs R;kauk lksMwu nwj tk.;kl r;kj ulrkr-	¼ ½

M½ brj leL;k

Fig. 1. Map of Raigad district showing area of study

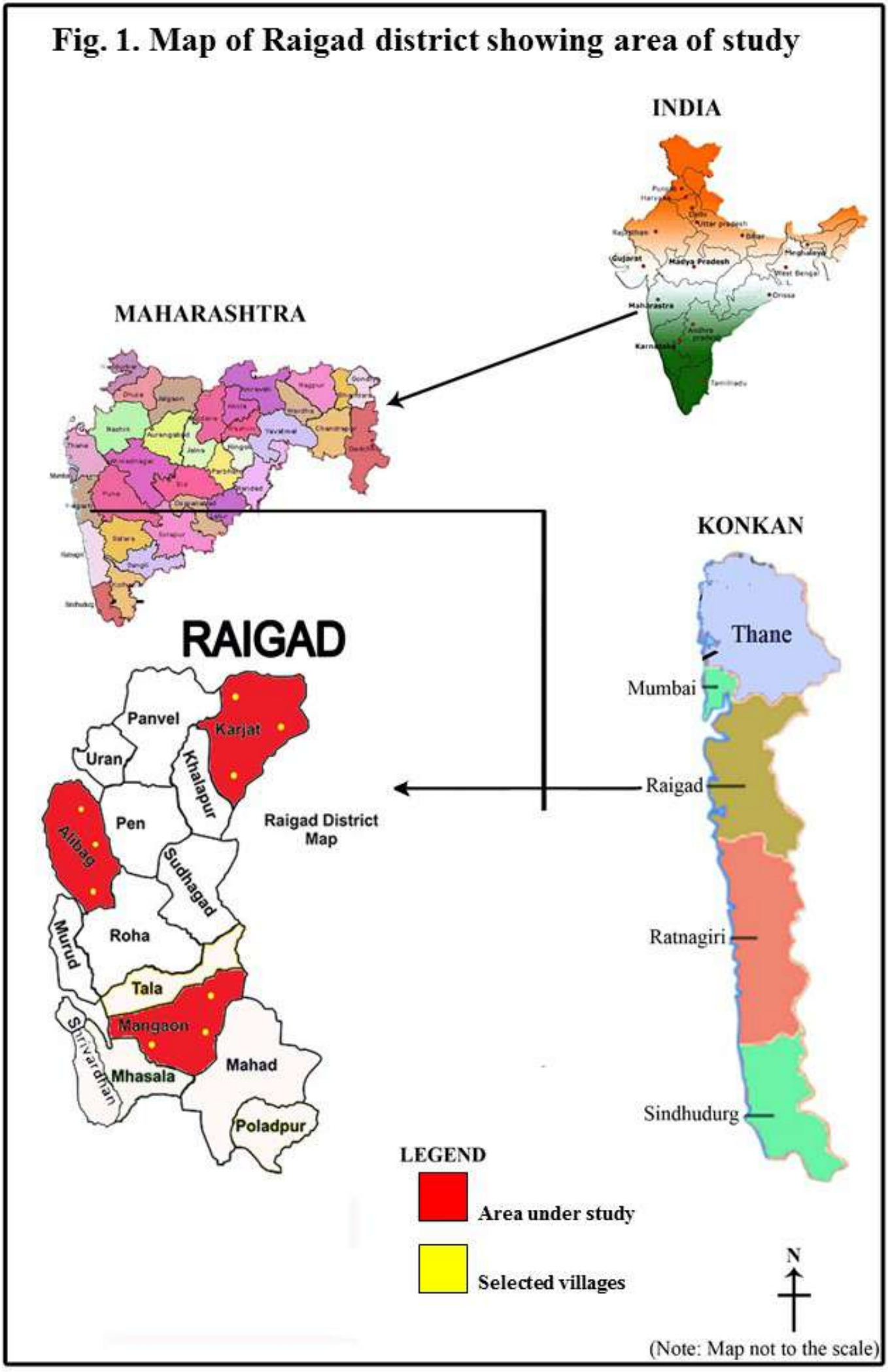

Fig. 2. Distribution of the respondents according to their education

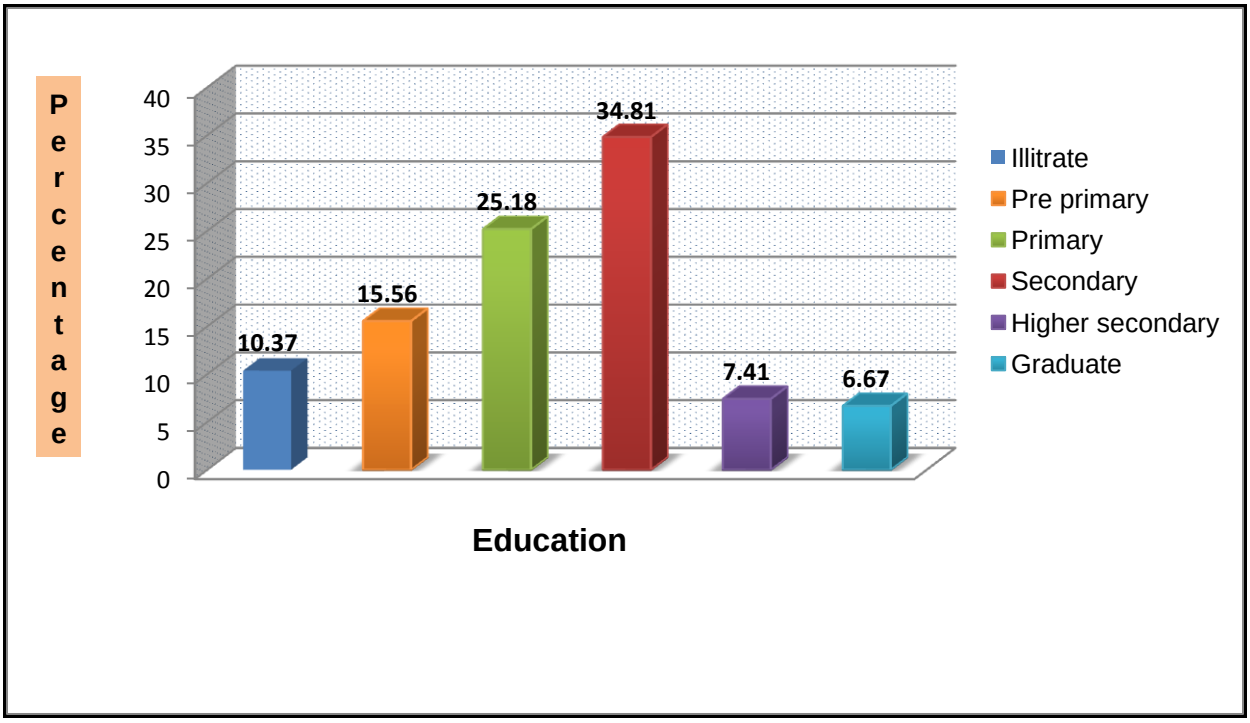

Fig.3. Distribution of the respondents according to their major occupation

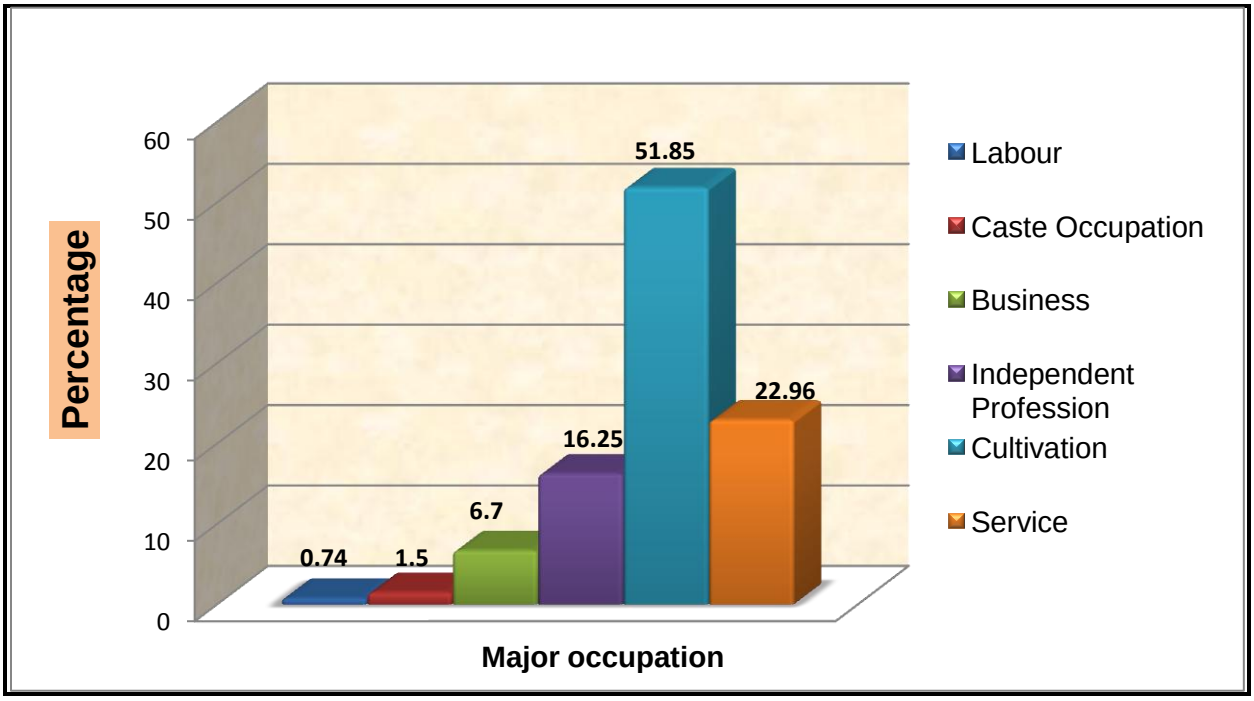

Fig.4. Distribution of the respondents according to their size of family

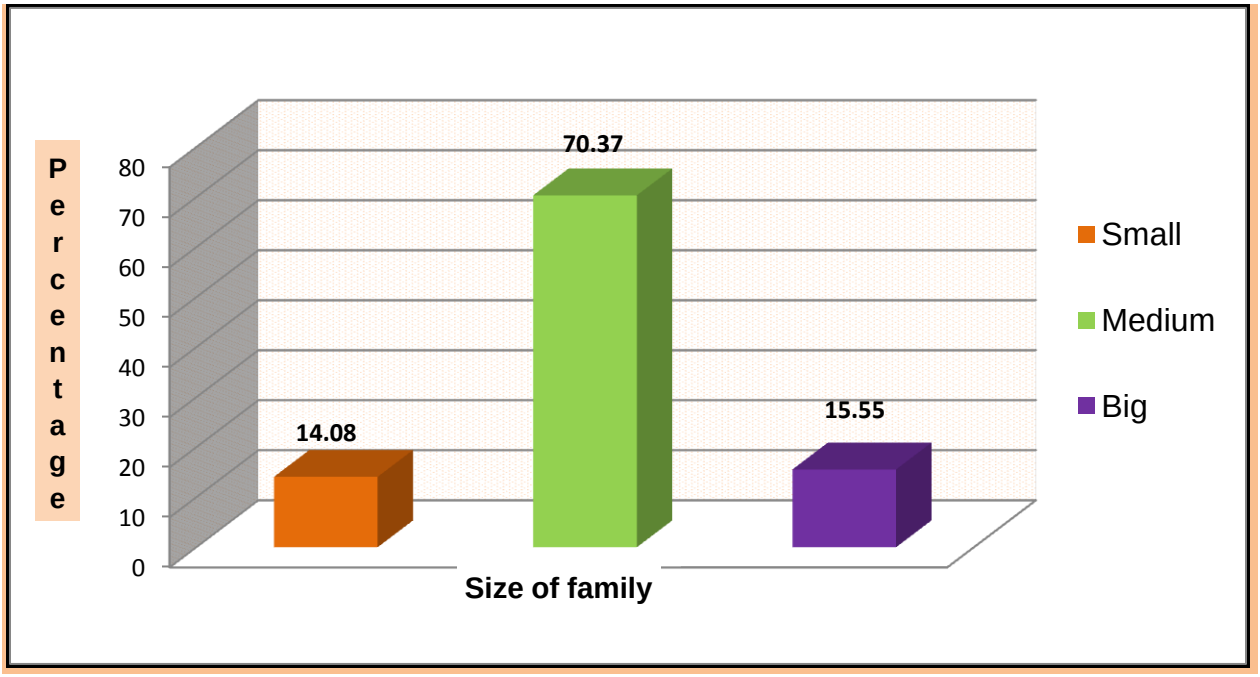

Fig.5. Distribution of the respondents according to their annual income

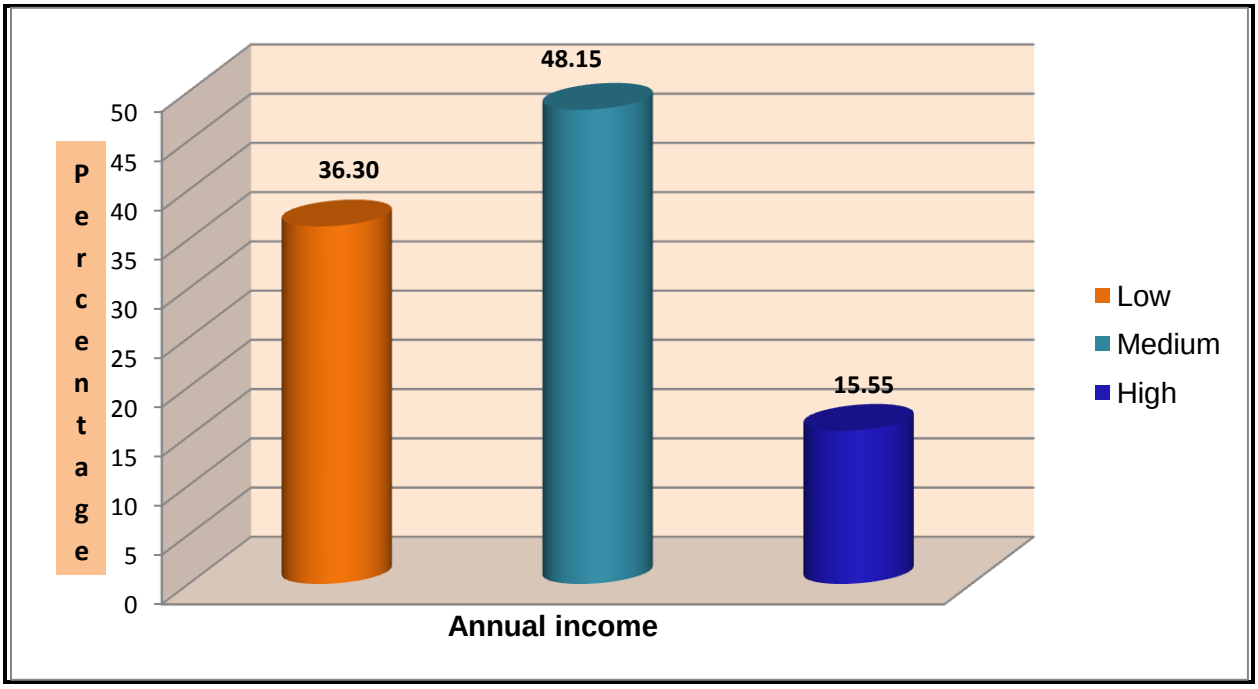

Fig.6. Distribution of respondents according to their size of land holding

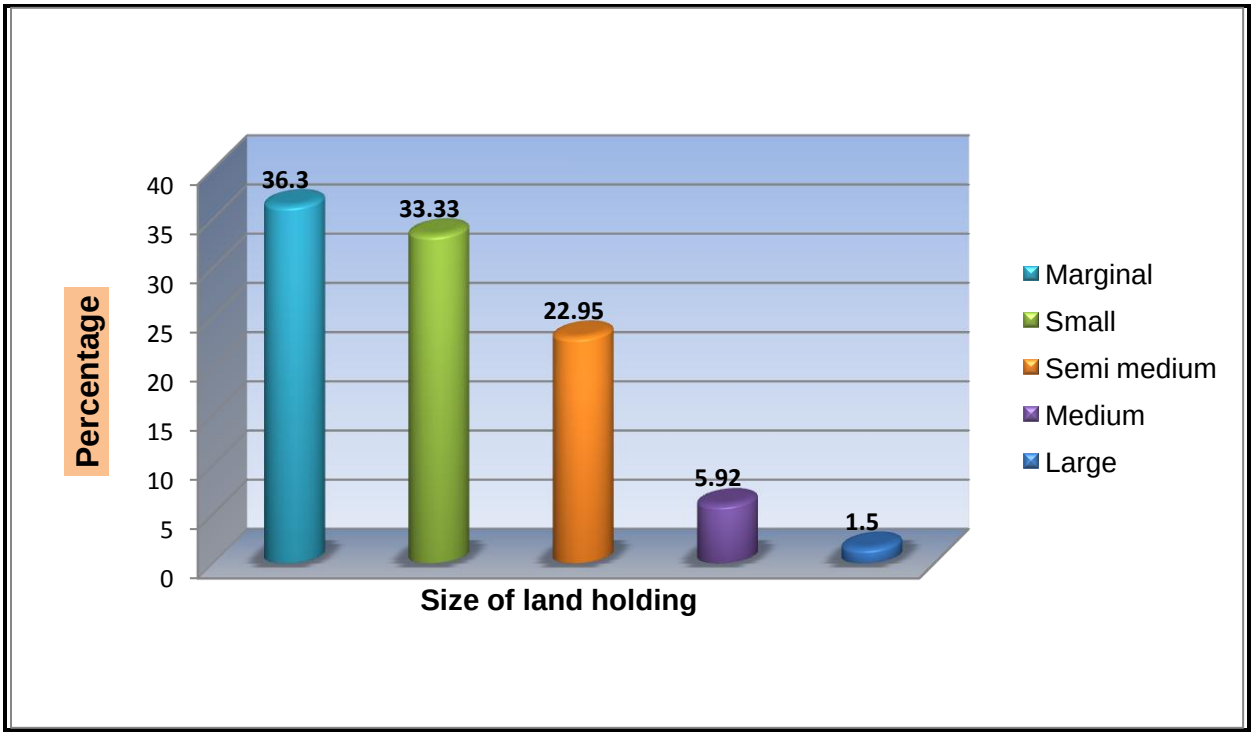

Fig.7. Distribution of the respondents according to their extension contact

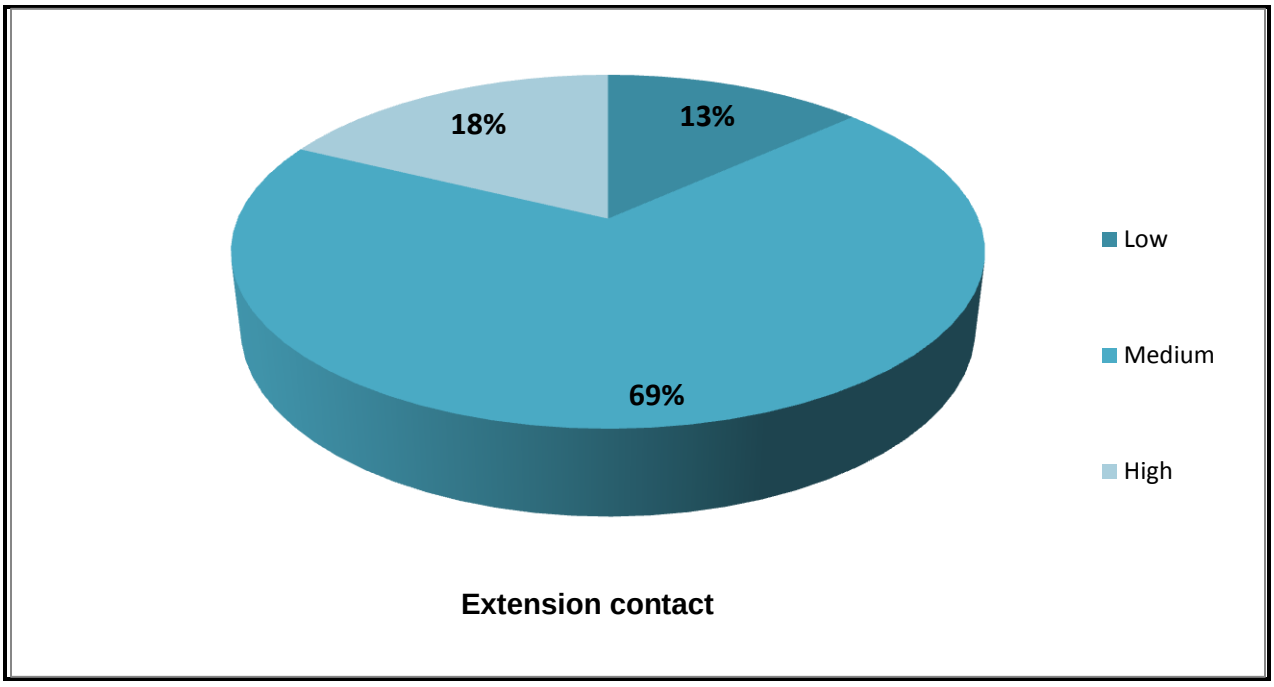

Fig.8. Distribution of the respondents according to their sources of information

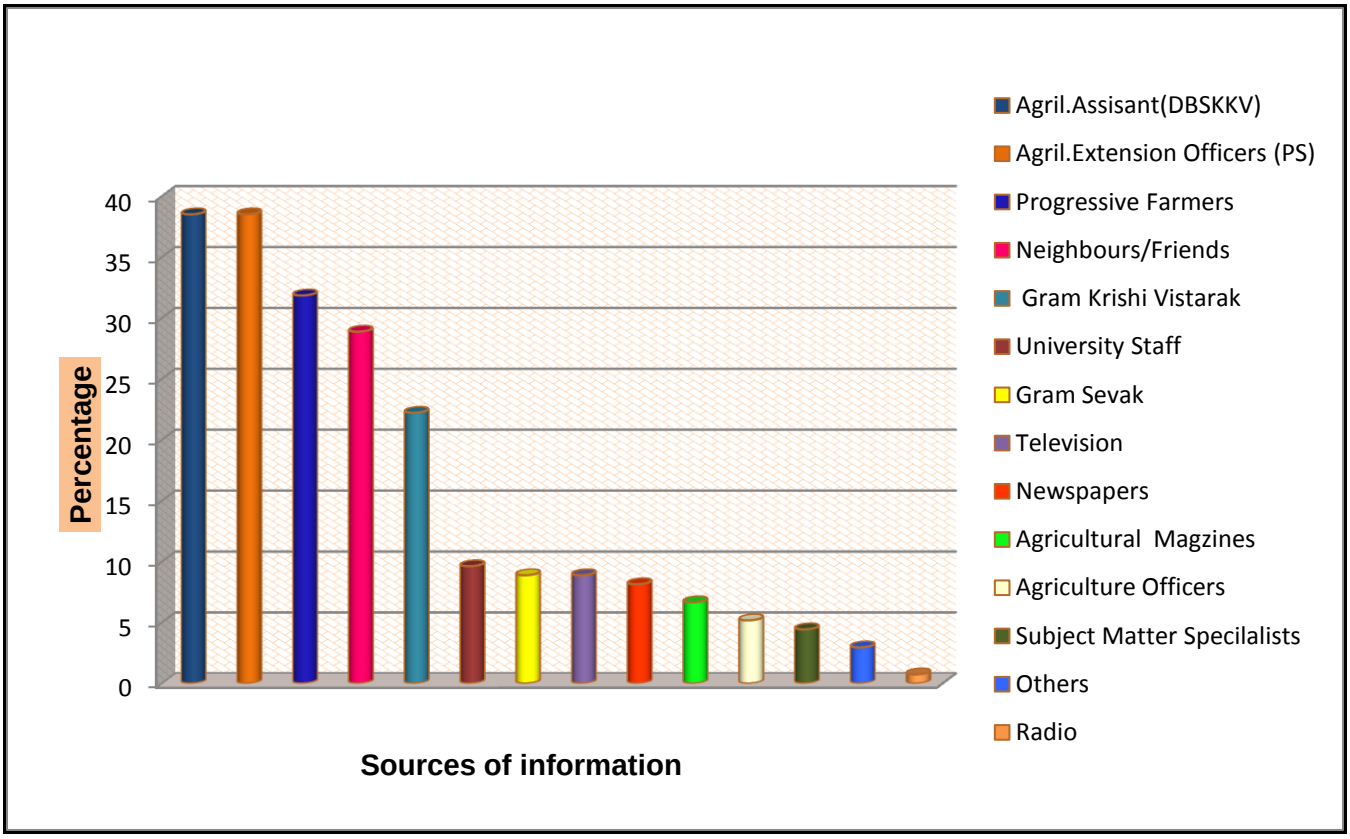

Fig.9. Distribution of the respondents according to their source of seed material

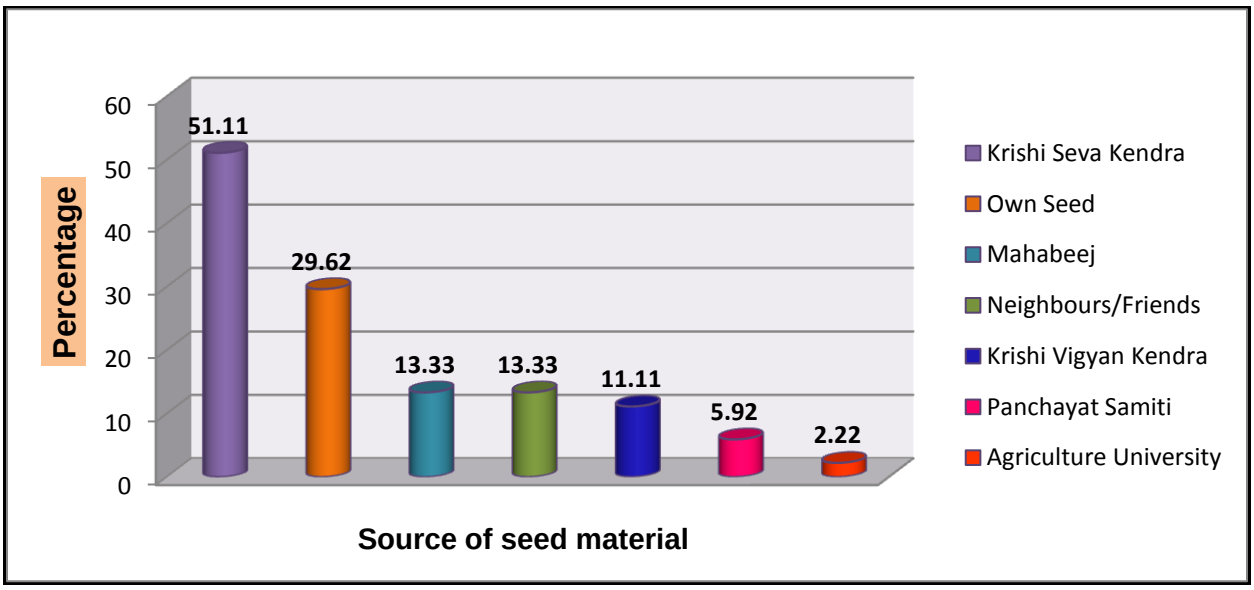

Fig.10. Distribution of the respondents according to their cosmopoliteness

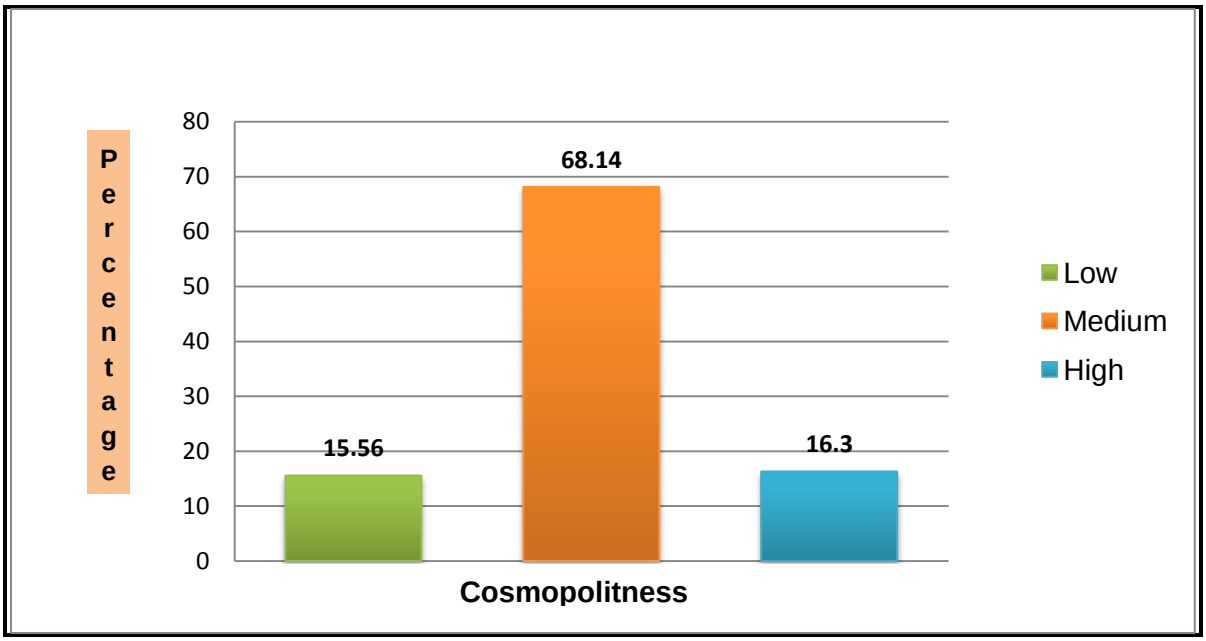

Fig.11. Distribution of the respondents according to their rice yield

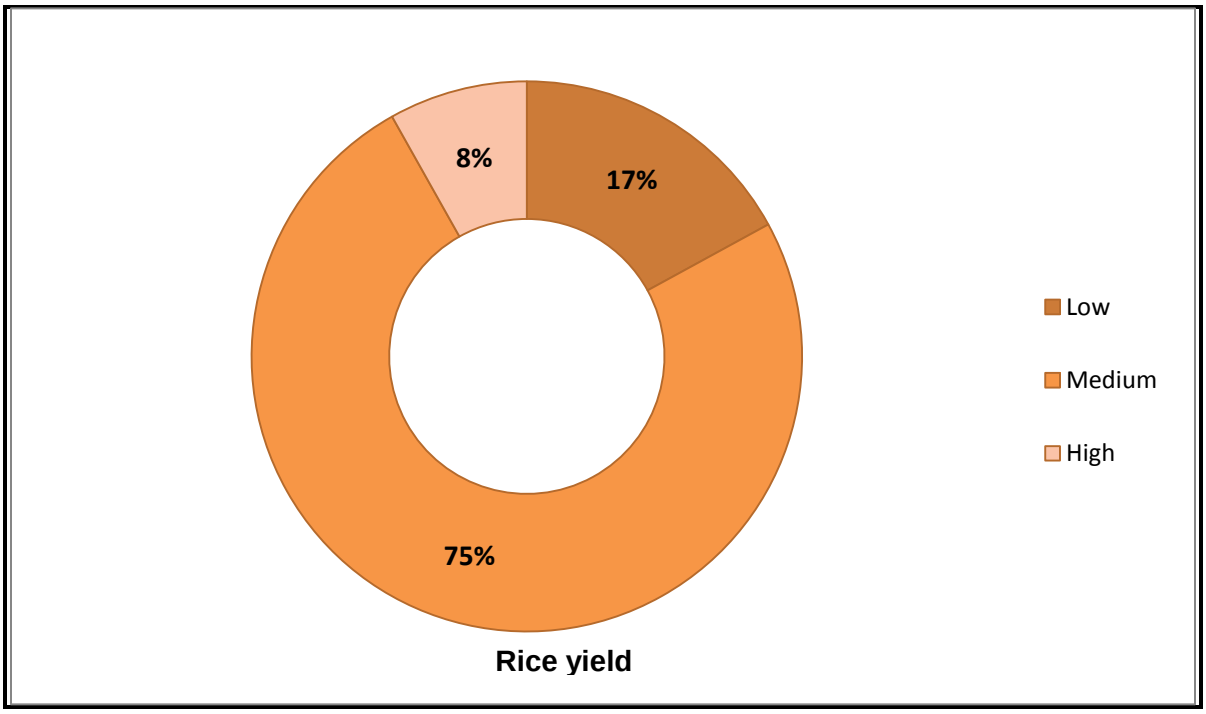

Fig.12. Distribution of the respondents according to knowledge of the rice varieties developed by DBSKKV, Dapoli

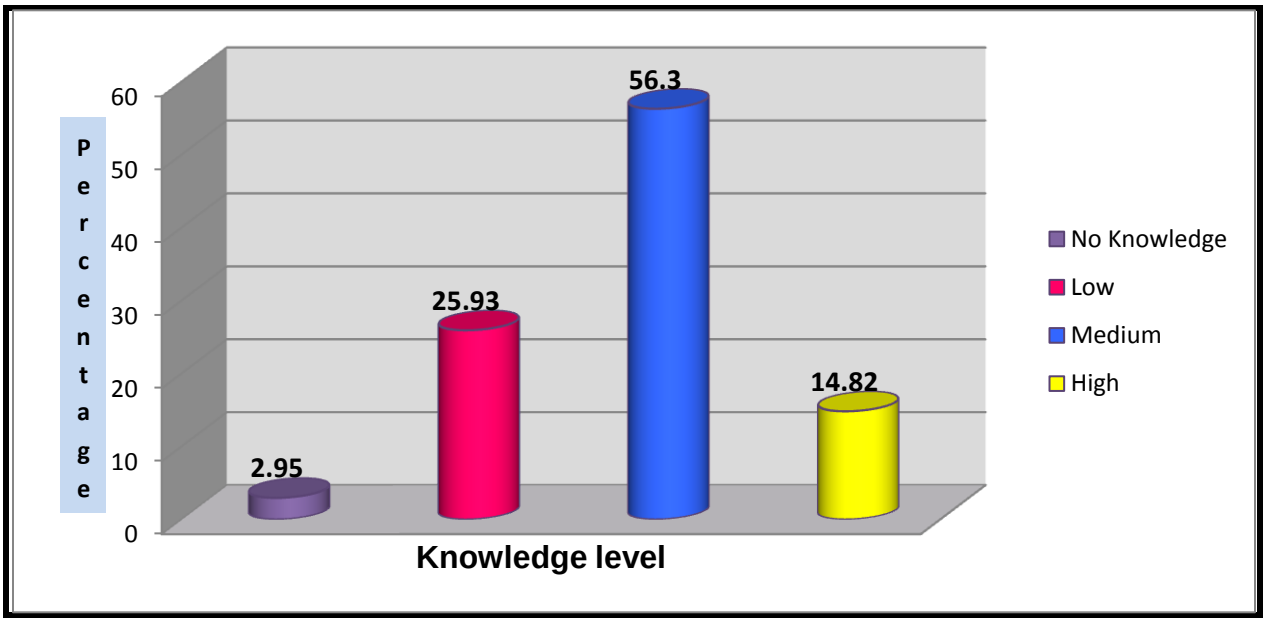

Fig.13. Distribution of the respondents according to their overall adoption of the rice varieties developed by DBSKKV, Dapoli

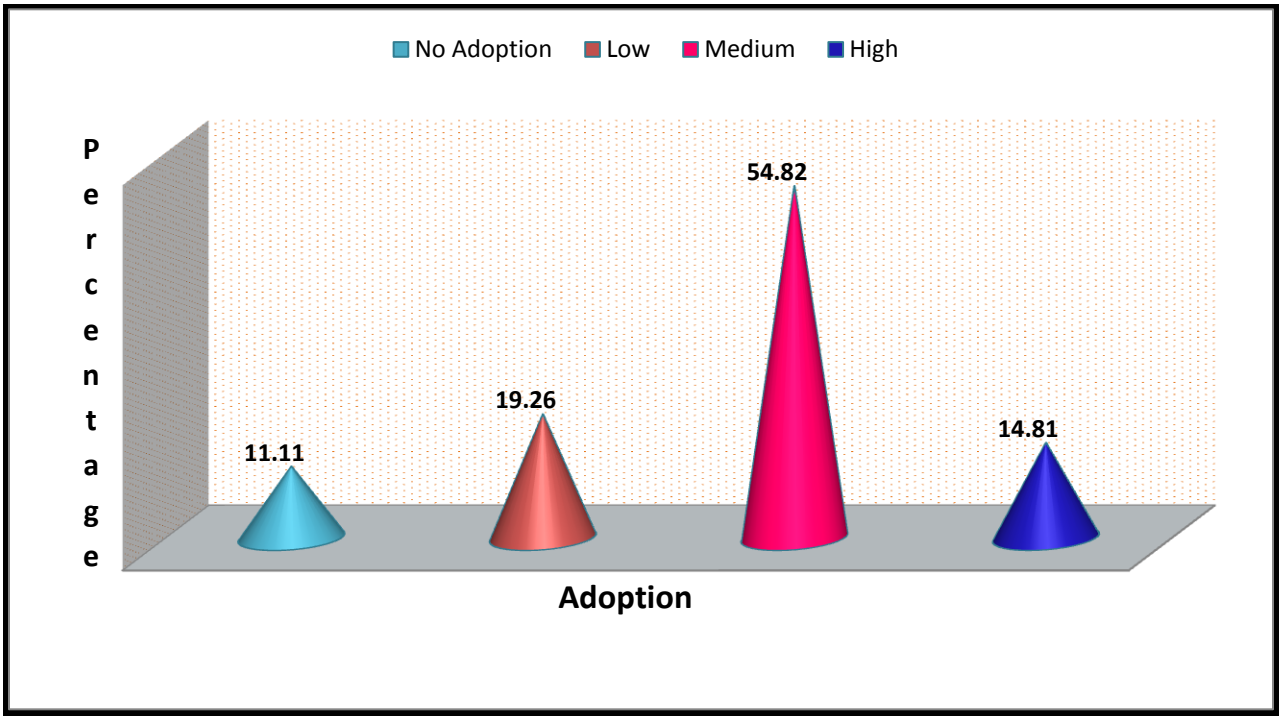

Fig.14. Distribution of the respondents according to the percent area brought under rice varieties developed by DBSKKV, Dapoli

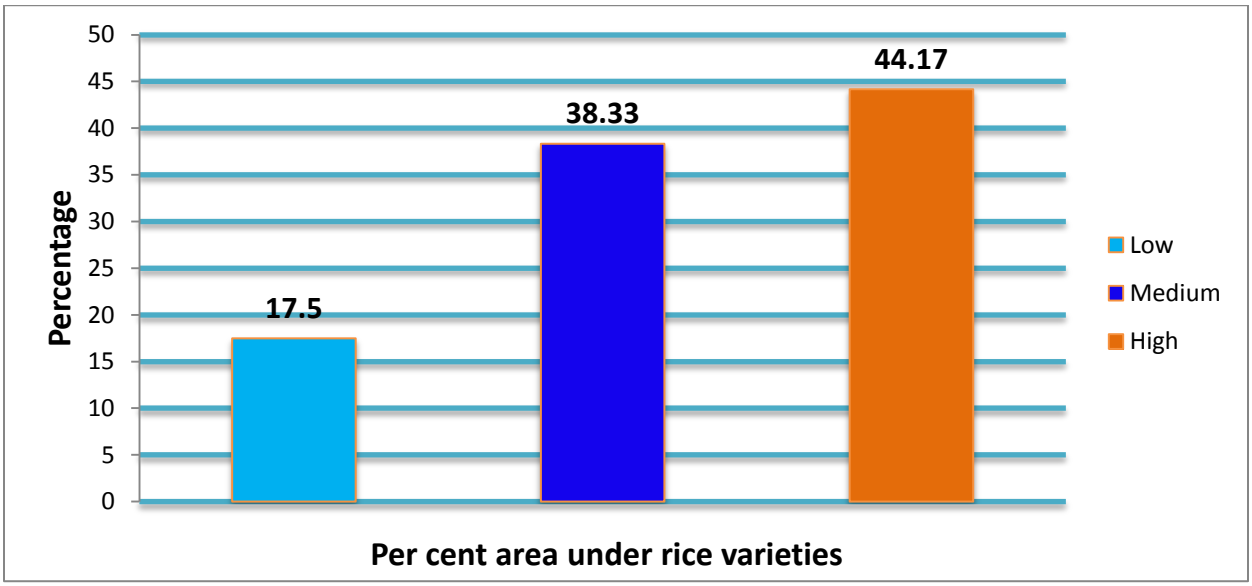

Plate 1. Investigator while interviewing the repsondents

Plate 2. Investigator while interviewing the repsondents

Plate 3. Investigator while interviewing the repsondents