

**TECHNOLOGICAL GAP IN ADOPTION OF  
SRI METHOD OF PADDY CULTIVATION  
IN BHANDARA DISTRICT**

**THESIS**

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

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

**BY  
NIRWAN PRIYANKA PREMILAL**

Dr. PDKV Library, Akola

630.715/NIR



158114

**DEPARTMENT OF EXTENSION EDUCATION  
POST GRADUATE INSTITUTE, AKOLA**


**DR. PANJABRAO DESHMUKH KRISHI VIDYAPEETH,  
KRISHINAGAR PO, AKOLA (MS) 444 104**

## DECLARATION OF STUDENT

I hereby declare that the experimental work and its interpretation in the thesis entitled "TECHNOLOGICAL GAP IN ADOPTION OF SRI METHOD OF PADDY CULTIVATION IN BHANDARA DISTRICT" or part thereof has neither been submitted for any other degree or diploma of any University, nor the data have been derived from any thesis / publication of any University or scientific organization. The source of materials used and all assistance received during the course of investigation have been duly acknowledged.

Place : Akola

Date : 05/08/2016


  
(Nirwan Priyanka Premilal)  
Enrolment No. HH/1429

## CERTIFICATE

This is to certify that thesis entitled "TECHNOLOGICAL GAP IN ADOPTION OF SRI METHOD OF PADDY CULTIVATION IN BHANDARA DISTRICT" submitted in partial fulfilment of the requirement for the degree of "Master of Science in Agriculture (Extension Education)" of Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola is a record of bonafide research work carried out by **Nirwan Priyanka Premilal** under my guidance and supervision.

The subject of the thesis has been approved by the Student's Advisory Committee.

Place : Akola  
Date : 05/08/2016

  
**P. P. Bhople**  
Chairman  
Advisory Committee

Countersigned


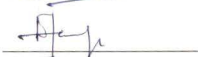
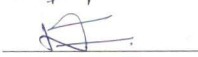




**Associate Dean**

Post Graduate Institute

Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola.

THESIS APPROVED BY THE STUDENT'S ADVISORY COMMITTEE  
INCLUDING EXTERNAL EXAMINER (AFTER VIVA-VOCE)

1. Chairman	Dr. P. P. Bhople	
2. Member	Dr. D. M. Mankar	
3. Member	Dr. N. V. Kayande	
4. Member	Shri. R. D. Walke	
4. External Member	Dr. N. M. Kale	

## ACKNOWLEDGEMENT

Success is not possible lonely without involvement of many minds and hands to beautify it. Emotion cannot be adequately expressed in words because then emotions are transformed into mere formalities. Nevertheless, formalities have to be completed. My acknowledgements are many more than what I am expressing here.

It is my great privilege and immense pleasure, in availing this opportunity of expressing my deepest sense of obligations towards Chairman of my advisory committee Dr. P. P. Bhole, Associate Professor, Department of Extension Education, PGI, Dr. PDKV, Akola, for his benevolent guidance, constant inspiration, constructive criticism, keep interest right for selection of my research problem up to final shaping of this dissertation and continuous encouragement during entire course of investigation.

I am immensely grateful to members of my advisory committee, Dr. D. M. Mankar, Head, Department of Extension Education, PGI, Dr. PDKV, Akola and Dr. N. V. Kayande, Assistant Professor, Department of Genetics and Plant Breeding, PGI, Dr. PDKV, Akola and Shri. R. D. Walke, Associate Professor, Department of Statistics, ARIS Cell, Dr. PDKV, Akola, for their valuable suggestions, needful counseling during the span of this investigation.

I acknowledge my sincere thanks to Dr. D. M. Mankar, Head, Department of Extension Education and Director of Research, Dr. PDKV, Akola, for valuable guidance, inspiration and providing necessary facilities through M.Sc. programme. I wish to record my earnest gratefulness to Dr. V. M. Bhale, Dean, Post Graduate Institute, Dr. PDKV, Akola, for providing all the facilities during the course of present investigation. I express my deep sense of honor to Dr. N. D. Parlawar, Associate Dean, Post Graduate Institute, Dr. PDKV, Akola for providing necessary facilities and administrative help during the entire course of study.

I wish to express my sincere and heartfelt thanks to faculty members Dr. N. M. Kale, Associate Professor, Department of Extension Education, Dr. R. S. Waghmare, Associate Professor, Department of Extension Education, Dr. P. P. Wankhade, Assistant Professor,

Department of Extension Education, Shri. Y. B. Shambharkar, Assistant Professor, Department of Extension Education, PGI, Dr. PDKV, Akola, who helped me directly or indirectly during the course of investigation.

I also thankful to Priti Todasam madam, Varsha Sangale madam, Wakhare kaka and Dandale kaka, from Department of Extension Education for constant encouragement for completing this investigation.

I think words with me are insufficient to express the feelings of hearts to acknowledge my parents, Shri. Premilal Antiram Nirwan and Sau. Shalini Premilal Nirwan for their hard work to educate me and shadowing me by showing their backs towards me without which this work would not have been seen in the light of the day at all. I am very thankful to my younger brother Pankaj for his affection, enlivened my ability and evoked me to complete this work.

I pleasure to express my heartiest gratitude towards the help rendered by my friends Jayant, Anju, Supriya, Bharti, Rajani, Shital tai, Swati and all M.Sc. (Agri.) 2015 Batch. My room-mate Ayodhya who helped me directly or indirectly for completion of this research work and for their timely co-operation.

I equally express my gratitude for all scientist and authors cited in literature cited. I am thankful to respondents and personnel of Department of Agriculture and those who spend their valuable time during data collection, unless I could not complete this huge exercise. I am also thankful to Mr. Nikhil Kathiwale (M/s Nikhil Grafix, Akola) for their neat type setting for preparing this dissertation.

While, traveling on the path of life and education many hands pushed me fourth hearth enlightened by their knowledge and experience. I ever rest thankful to them all.

Place : Akola

Date : 05/08/2016

  
(Nirwan Priyanka Premilal)

Enrollment No. HH/1429

## Table of Contents

Sl. No.	Particulars	Page
A	List of Tables	i
B	List of Figures	ii
C	List of Plates	iii
D	List of Abbreviations	iv
F	Thesis Abstract	v
I	INTRODUCTION	1-7
II	REVIEW OF LITERATURE	8-27
III	METHODOLOGY	28-42
IV	SOCIO-ECONOMIC FEATURES OF BHANDARA DISTRICT	43-47
V	RESULTS AND DISCUSSION	48-72
VI	SUMMARY AND CONCLUSIONS	73-77
VII	IMPLICATIONS	78-80
VIII	LITERATURE CITED	81-87
	Vita	
	Appendix	

(A)

## List of Tables

Table	Title	Page
1.	Cropping pattern and season of Bhandara district	30
2.	List of Village wise respondents for the study	32
3.	Land use pattern of Bhandara district	44
4.	Cropping pattern of Bhandara district	45
5.	Crop rotation of the Bhandara district	46
6.	Distribution of the paddy growers according to their age	49
7.	Distribution of the paddy growers according to their education	50
8.	Distribution of the paddy growers according to their land holding	51
9.	Distribution of the paddy growers according to their occupation	52
10.	Distribution of the paddy growers according to their experience in paddy cultivation	52
11.	Distribution of the paddy growers according to their area under paddy cultivation	53
12.	Distribution of the paddy growers according to their annual income	54
13.	Distribution of the paddy growers according to sources of information	55
14.	Distribution of the paddy growers according to their innovativeness	56
15.	Distribution of the paddy growers according to their risk preference	56
16.	Distribution of the paddy growers according to their economic motivation	57
17.	Distribution of paddy growers according to their practice wise knowledge about recommended SRI method of paddy cultivation practices	60
18.	Distribution of paddy growers according to their overall knowledge about recommended SRI method of paddy cultivation practices	62
19.	Distribution of paddy growers according to their practice wise extent of technological gap in recommended SRI method of paddy cultivation practices	65
20.	Distribution of paddy growers according to technological gap index	66
21.	Coefficient of correlation of selected characteristics of the paddy growers with their technological gap	68
22.	Reasons for existence of technological gap in SRI method of paddy cultivation practices	70

**(B)****List of Figures**

<b>Figure</b>	<b>Title</b>	<b>After Page</b>
1.	Conceptual model of research study	27
2.	Map of Bhandara district	31
3.	Distribution of the paddy growers according to their age	49
4.	Distribution of the paddy growers according to their education	49
5.	Distribution of the paddy growers according to their land holding	51
6.	Distribution of the paddy growers according to their occupation	51
7.	Distribution of the paddy growers according to their farming experience	53
8.	Distribution of the paddy growers according to area under paddy cultivation	53
9.	Distribution of the paddy growers according to their annual income	54
10.	Distribution of the paddy growers according to their sources of information	54
11.	Distribution of the paddy growers according to their innovativeness	56
12.	Distribution of the paddy growers according to their risk preference	56
13.	Distribution of the paddy growers according to their economic motivation	57
14.	Distribution of the paddy growers according to their overall knowledge about recommended SRI method of paddy cultivation practices	62
15.	Distribution of paddy growers according to technological gap index	65
16.	Empirical model of the research study	72

(C)

### List of Plates

Plates	Title	After Page
1.	Interaction with the farmers at the time of data collection in tahasil Lakhani	42
2.	Interaction with the farmers at the time of data collection in tahasil Sakoli	42
3.	Field of paddy crop at nursery stage	42
4.	Field of paddy crop after transplanting	42

**(D)****Abbreviations**


%	-	per cent
/	-	per
°	-	Degree
°C	-	Degree Celsius
Agri.	-	Agriculture
Agril.	-	Agricultural
Dept.	-	Department
Dr. PDKV	-	Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola
e.g.	-	Exempli gratia (for example)
Econ.	-	Economics
Educ.	-	Education
<i>et al.</i>	-	Et alia (and others)
Ext.	-	Extension
Fig.	-	Figure
ha	-	Hectare
i.e.	-	that is
J.	-	Journal
M.S.	-	Maharashtra State
No.	-	Number
Res.	-	Research
Rev.	-	Review
Rs.	-	Rupees
Sci.	-	Science
Sl. No.	-	Serial Number
sq. m.	-	Square meter
SRI	-	System of rice intensification
Univ.	-	University
Unpub.	-	Unpublished
<i>viz.,</i>	-	Namely



*Thesis Abstract*

(F)

## Thesis Abstract

- a) Title of the thesis : TECHNOLOGICAL GAP IN ADOPTION OF SRI METHOD OF PADDY CULTIVATION IN BHANDARA DISTRICT
- b) Full name of student : Nirwan Priyanka Premilal
- c) Name and address of Major Advisor : Dr. P. P. Bhople  
Associate Professor,  
Department of Extension Education,  
Dr. Panjabrao Deshmukh Krishi Vidyapeeth,  
Akola (M.S.) - 444 104.
- d) Degree to be awarded : M.Sc. (Agriculture)
- e) Year of award of degree : 2016
- f) Major subject : Extension Education
- g) Total number of pages in the thesis : 87
- h) Number of words in the abstract : 559
- i) Signature of the student : 
- j) Signature, name and address of forwarding authority :



**D. M. Mankar**

Head

Department of Extension Education  
Dr. Panjabrao Deshmukh Krishi Vidyapeeth  
Akola (M.S.)

---

## ABSTRACT

The study entitled "Technological gap in adoption of SRI method of Paddy Cultivation in Bhandara district." was purposively conducted in Bhandara district of Vidarbha Region. The study was conducted in Lakhani and Sakoli tahsil by using exploratory design of social research. The sample constituted 100 paddy farmers drawn from 10 villages by using random sampling. The main objective of study - to study the personal, socio-economic and psychological characteristics of paddy growers, to study the extent of knowledge to paddy grower about recommended cultivation practices of SRI method, to study the extent of technological gap between recommended and

actual adopted cultivation practices of SRI method by paddy growers, to ascertain the reasons for existence of technological gap in SRI method of paddy cultivation practices. Data from the paddy growers were collected by personally interviewing with the help of pretested and well structured interview schedule and data was subjected to appropriate statistical analysis.

The findings of the present investigation indicate that, about fifty per cent (50.00%) of the paddy growers were in middle age group, about 42.00 per cent of the paddy growers educated up to high school level. In case of land holding, 35.00 per cent paddy growers possessed small category of land holding. Most of the paddy growers having agriculture plus allied occupation is their main occupation, 93.00 per cent having medium level of experience in paddy cultivation. Regarding area under paddy crop, 35.00 per cent farmer's having 1.01 to 2 ha area under paddy crop. In case of annual income of the paddy growers, most of them having an income up to Rs.1,00,000/-. Maximum paddy growers utilize medium (87.00%) level of sources of information. Most of the paddy growers found in medium level of innovativeness (54.00%) and risk preference (91.00%). More than three fourth (78.00%) paddy growers found medium economic motivation. Maximum percentage of paddy growers possessed medium level of knowledge about recommended SRI method of paddy cultivation technology. Majority of paddy growers had knowledge about land preparation, recommended varieties, bed preparation, seed soaking, leveling of field, use markers, knowledge about pest and diseases, transplanting, harvesting and threshing. However, higher percentage of the paddy growers had poor knowledge about scented varieties, hybrid varieties, seed required, transfer of soaked seed into a gunny bag, ideal ploughing method, leaving pathway, water management, weed management and management of pest.

Majority of paddy growers observed in medium level of technological gap in SRI method of paddy cultivation. The partial technological gap was observed in case of recommended varieties, preparation of main field, nutrient management, pest and disease management. Low technological gap was noticed in land preparation, raising nursery, harvesting and threshing. High technological gap observed in transplanting, water management and weed management practices.

The results of relational analysis revealed that the variables namely education, source of information, risk preference, innovativeness and knowledge, were negatively and significantly correlated with the technological gap at 0.01 level of probability. Whereas, the variable such as annual income and economic motivation were found negatively and significantly correlated with the technological gap at 0.05 level of probability. Major reason ascertain for technological gap in SRI method of paddy were non availability of labour, weed problem, non availability of FYM in village, lack of knowledge about transfer of soaked seed into gunny bag, lack of knowledge about ideal ploughing, lack of knowledge about age of seedling for transplanting.



*Chapter I*

*Introduction*

# CHAPTER I

## INTRODUCTION

### 1.1 Background of Information

Ancient Indian scriptures, the 'Yajurveda', the 'Atharva Veda' and Smritis make mention about paddy as not just a cereal for consumption as food but also as sacred offering to the deities especially during religious and social functions. However, the general consensus is that domestication of paddy took place independently in China, India and Indonesia, giving rise to Asia's three varietal groups Japonica, Indica and Javanica.

Rice is one of the prominent cereal crops in India. It is an important staple food of 50 per cent of the world's population that resides in Asia, where 90 per cent of the world's rice is grown and consumed. In Asia, India has the largest area under rice (41.66 million ha) accounting for 29.4 per cent of the global rice area. The United Nations General Assembly, in a resolution declared the year 2004 as the "International Year of Rice", which has tremendous significance to food security. It very eloquently upheld the need to heighten the awareness for the role of rice in alleviating poverty and malnutrition. Paddy is grown on 150 million hectares which is about 11 per cent of the world's cultivated land, in 114 countries in major ecosystems, at altitudes ranging from more than 3000 meters mean sea level in Nepal and Bhutan to 3 meters below sea level in south Indian state of Kerala. In India, archaeological findings from the Ganga valley, Koldihwah (Neolithic) site suggest that paddy cultivation dates back to 5000 B.C.

When all developing countries are considered together, paddy (rice) provides 27 per cent of dietary energy supply and 20 per cent of dietary protein intake. Over 90 per cent of the world's paddy (rice) is

produced and consumed in Asia with over 2 billion people obtaining 60 to 70 per cent of their energy intake from rice and rice products.

India is an important center of rice cultivation and having largest harvesting area in the world. Two major rice varieties are grown worldwide are *Oryza sativa indica* and *Oryza sativa japonica* it owe their origins of domestication, independently, thousands of year ago. It historians believed that 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 and the Japonica variety was domesticated from wild rice in southern China which was introduced to India before the time of Greeks. Chinese records of rice cultivation 4000 years back.

The earliest remaining of cultivated rice in the sub-continent have been found in the Northern and Western India around 2000 BC. Perennial wild rice's are growing in Assam and Nepal. It seems to appeared around 1400 BC in southern India. After its domestication in the northern plains. Then, it spreads to all fertile alluvial plains watered by rivers. Cultivation and cooking methods spreads to the west rapidly and during medieval times, southern Europe saw the introduction of rice as a hearty grain. Some says that the word rice is derived from the Tamil word *arisi*.

Rice is grown as major staple food. Similarly, it is also grown for the other products like parched rice (Murmura), beaten rice (Poha) and parched paddy (Lahi). Paddy is consumed by human being after cooking as whole rice and by preparing product like Bhakari, Idali, Dosa, Uttapa, etc. The straw of paddy is being used for feeding cattle as roughage and for packing material. The by products after milling i.e. born and husk are used as food of cattle and for extracting edible oil. Rice is useful in manufacturing of cement as it contain silica and also used as a fuel. Rice grain are useful in ritual and important ceremonies connected with birth, marriages and funeral from very ancient times where as broken rice of inferior quality is used as poultry feed.

Rice provides 21% energy and 15% protein for human globally. Calories from rice are particularly important in Asia, especially among the poor, where it accounts 50-80% daily caloric intake. Asia accounts for over 90% of the world's production of rice, with China, India and Indonesia are higher producer. Only 6-7% of the world's rice crop is traded in the world market and Thailand, Vietnam, China and United States are the world's largest exporter. The United States produces 1.5% the world's rice crop with Arkansas, California and Louisiana producing 80% of the U.S. rice crop.

India ranked first in area under paddy (41.66 million ha) and second in terms of production (152.6 million metric ton) during 2012-13 and it stood next only to China in the world with respect to rice production. But, the yield levels in India were low per ha compared to other major rice producing countries viz., Japan (6.52 t/ha), China (6.24 t/ha) and Indonesia (4.25 t/ha). About 67 per cent of the area under paddy in India is under High yielding varieties. Due to excessive use of chemicals, fertilizers and other inputs the cost of cultivation has escalated. This is more so in irrigated crops like paddy. The spectacular increase in production of paddy was restricted to irrigated belts of the country. The skewed distribution of green revolution results and increased costs of cultivation have given alarming signals to the future needs of food security. At this juncture the System of Rice Intensification ("SRI" – Rice cultivation) came into light.

System of Rice Intensification (SRI) developed in Madagascar in the early 1980s by Father Henride Laulanie, A Jesuit Priest, who spent over 30 years in that country working with farmers, 25 years ago is gaining wider acceptance in many countries including India. SRI method claims to greatly enhance water productivity and grain yield but there is lack of understanding of scientific principles underlying. Hence, SRI method was evaluated across the country, results clearly indicated 7-20 per cent higher grain yield over the traditional irrigated transplanted rice. The varieties having better tillering ability and hybrids

were found promising and recorded higher grain yield over HYVs with moderate tillering and scented cultivars. Root volume, dry mass, and dehydrogenase activity in soil (measure of microbial activity) was found to be higher in SRI method as compared to conventional method. SRI method reduced the seed rate by 80%, water requirement by 29% and growth duration by 8–12 days; thereby enhancing the water productivity and per day productivity of rice cultivars. The water saving alone should be a strong justification for adopting SRI method wherever water is not abundant. There is a need for further enhancing the productivity of rice under the SRI method by identifying the suitable cultivars, modification of practices to suit local agroclimatic conditions and by understanding the synergic effects among the different practices.

SRI, the system of rice intensification is a system of production of rice. SRI is considered to be an intangible technological breakthrough in paddy cultivation. SRI involves the application of certain management practices, which together provide better growing conditions for rice plants, particularly in the root zone, than those for plants grown under traditional practices. This system seems to be promising to overcome the shortage of water in irrigated rice.

It has since been tested in China, India, Indonesia, Philippines, Sri Lanka and Bangladesh with positive results. In Sri Lanka, SRI cultivation was practiced in 18 districts with encouraging results of doubling the yields. In this method synergic interaction leads to much higher yields. It offers increased land, labour and water productivity. In fact, it is a less water consuming method of rice cultivation, which is suitable to poor farmers who have relatively more labour force than land and capital.

The System of Rice Intensification (SRI) technique has received considerable attention globally including India due to its potential for yield improvement and water saving. The main features of this system include transplanting of young seedlings singly in a square pattern with wide spacing; using more of organic fertilizers and keeping the paddy field

moist with intermittent drying and wetting during the vegetative growth of plants. SRI causes better plant growth and development and economizes the use of seed, irrigation water, labour, plant protection chemicals and fertilizers and hence increases the productivity of land, water capital and labour significantly over conventional method of rice cultivation.

## **1.2 Need and Importance of Study**

Rice is important cereal crop of Maharashtra grown under diversified condition in the state.

Maharashtra is located in the western part of India along the Arabian Sea. It lies between 15° 44' to 22° 6' N and 72° 36' to 80° 54' E. The total area of Maharashtra State is 307,000 square kilometers, which is 9.36% of the country. Considering the area and population, Maharashtra state is the third largest state in India. The population of the state is 80 million which 9.47% of the country's total population.

In Maharashtra rice is the second important crop of the people, which is grown over an area of 14.99 lakh hectares with an annual rough rice production of 32.37 lakh tones. The average productivity of the state is 2.01 t/ha. Maharashtra ranks 13th place in rice production in country. The average productivity of the Maharashtra state is low as compared to other rice growing states viz. Punjab, Tamil Nadu, Haryana, Andhra Pradesh etc.

Maharashtra had about 14.99 lakh hectares under paddy. In Vidarbha region paddy crop is grown mostly in considerable area of about 7.319 lakh hectares in Bhandara, Gondia, Chandrapur, Gadchiroli and some part of Nagpur District. During 2009-10 average yield per hectare in Maharashtra state was observed 32.37 lakh tones (source: [www.rkmp.co.in](http://www.rkmp.co.in)). However, the yield was in Bhandara (2642 tonnes), Gondia (2550 tonnes), Chandrapur (2069 tonnes) and Gadchiroli (1757 tonnes) District of Vidarbha (source: [www.rkmp.co.in](http://www.rkmp.co.in)).

Major area is lowland and midland where rice is cultivated in the konkan region. Farmers are not ready to adopt SRI due to heavy rainfall and use of 10-12 days old seedlings for transplanting. However, from 5-6 years SRI trials were conducted on university farm on upland and midland situation in *kharif* and *rabi* season. However, on upland situation very few farmers were eager to adopt SRI under guidance of NGO, Agril. Dept., Agril. University and extension workers (KVK).

Therefore, it is felt that, there may exist large gap between the recommended practices and actual adopted practices at farmer level. The gap may be reduces by finding technological gap in adoption of recommended SRI method of rice cultivation technology by farmers. Keeping this view in mind, the present study entitled "Technological gap in adoption of SRI method of paddy in Bhandara District" was framed and conducted in Lakhani and Sakoli Panchayat Samiti of Bhandara District. It also helpful to indentify constraints faced by the farmers in adoption of recommended SRI method of paddy cultivation technology in their farming system. The study was planned with following specific objectives:-

### **1.3 Specific Objectives of the Study**

1. To study the personal, socio-economic and psychological characteristics of paddy growers.
2. To study the extent of knowledge to paddy grower about recommended cultivation practices of SRI method.
3. To study the extent of technological gap between recommended and actual adopted cultivation practices of SRI method by paddy growers.
4. To ascertain the reasons for existence of technological gap in SRI method of paddy cultivation practices.

### **1.4 Scope and Limitations of the Study**

The present study was conducted in Lakhani and Sakoli Panchayat Samiti of Bhandara District.

The study was found helpful in knowing the present status of knowledge and extent of gap between technologies recommended for SRI method and its actual use by growers. While using recommended technologies and a feedback through this study, it helpful to researcher in knowing the actual reason for non adoption of recommended SRI technology of rice.

The finding of this study can applied in similar situations of the socio-economic and cultural background of the farmers. The study may give guideline to experts and farmers themselves and may also help the extension worker to make efforts so that more farmers go for SRI method and adopt SRI method recommendations for the development of agriculture. However, the study suffers from the limitation of being time bound research work. The research could not cover the larger sample from wider operational area. The findings of the study need to be tested by conducting similar type of research in different areas to formulate the generalized hypothesis.

### **1.5 Formulation of Research Hypothesis**

Considering the findings of various research studies the assumed nature of relationship between variables was worked out and following research hypothesis was framed on various aspects of study in accordance with the objectives of the study. The hypothesis, framed are presented in null form (Ho) as below.

Ho = There is no significant relationship between selected personal, socioeconomic and psychological characteristics of respondents with technological gap in adoption of SRI method of paddy cultivation.

## CHAPTER II

### REVIEW OF LITERATURE

Research is a continuous process. It is to be always based on previous finding. Review of literature is essential before and even after actual start of research. It help researchers to get acquainted with the subject and get insight into the research problem. Through the previous review, the researchers become aware about various concepts, its definition and procedure adopted for their qualification. It provides guidelines at every stage in the process of research. Efforts have made to review the result of various past research studies and literature having direct or indirect relation with the present study. The reviews of researches have been presented in this chapter.

- 2.1 Reviews related to independent variables
- 2.2 Reviews related to dependent variables
- 2.3 Reviews related to reasons for existence of technological gap SRI method of paddy cultivation practices
- 2.4 Conceptual model of research study

#### **2.1 Reviews Related to Independent Variables**

The Independent variables selected for the present study were personal, socio-economic and psychological characteristic of paddy growers. The review of research studies related to the selected characteristics of the paddy growers have been presented in the succeeding paragraph.

##### **2.1.1. Age**

Sachinkumar (2000) observed that 80.00 and 72.73 per cent paddy growers from 35 to 40 years and up to 30 years age of group had medium level of overall need, respectively.

Vijayalayan (2001) concluded that most of the rice growers belonged to old and middle age.

Rayosu and Khasub (2003) in their study named "farmers knowledge and adoption of rice production technology in Nagaland" revealed that the majority of the respondents were of middle to old aged.

Thyagarajan (2004) observed that age showed positive and significant relationship with adoption.

Gedam (2007) observed majority of the respondents (67.33 %) were of middle age i.e. 36 to 50 years of age.

Sitadevi *et al.* (2009) revealed that age of respondents were positive and highly significant to adopt SRI technology by the paddy grower.

Sagane *et al.* (2010) observed that 58.00 per cent of the respondents belonged to middle age category followed by 24.00 and 18.00 per cent of the respondents who were found in young (up to 35 years) and old (above 50 years) categories respectively.

Singh and Varshney (2010) revealed that age was negatively contributing to the adoption of rice production technology.

Sathish *et al.* (2012) found that most (60.83 %) of the respondents belonged to middle age group followed by old and young age groups.

Dhenge (2013) revealed that higher per cent of the respondents (43.33%) were in the middle age group of 36 to 50 years. Nearly one third (30.83%) young age group i.e. up to 35 years. Whereas, one fourth (25.84%) respondents were in the old age group of above 50 years.

Reddy and Shenoy (2013) reported that SRI paddy farmers are found to be of younger age group.

Dohtare (2014) concluded that majority of respondents belonged to old age category, for adoption soil test recommendations by the paddy farmers.

Thatchinamoorthy and Rexlin Selvin (2014) reported that, nearly two-thirds of the respondents (61.70%) were found in the old age category, remaining respondents found to be young and middle age categories.

Sharma *et al.* (2015) observed that majority of the respondents (56.67%) were in middle age followed by old (26.67%) and young age (16.67%) category.

From the above reviews it can be assumed that majority of the paddy growers belonged to middle age group having age between 36 to 50 years.

### **2.1.2. Education**

Gogoi and Phukan (2000) stated that majority (54.54 %) of respondent were in high education category, while 36.36 per cent and 9.10 per cent of respondents were in medium and low education category respectively.

Chandra (2001) found that majority of the paddy growers had low level of education i.e. illiterate to primary level.

Gupta *et al.* (2001) indicated that education was positively and significantly related with knowledge level of paddy grower about seed treatment with chemicals.

Rani and Murugan (2010) observed that majority of the paddy farmers had education up to middle school level.

Sagane *et al.* (2010) observed that about one third (33.00%) of the respondents were found to be educated up to primary level, followed by 24.00, 20.00 and 16.00 per cent who had passed college, middle school and high school education respectively. The percentage of illiterates was found negligible.

Singh and Varshney (2010) revealed that the t- test of the significance indicated that coefficient of regression was highly significant for education.

Pranita (2012) observed that majority of the respondent 35.00 per cent in middle school level. It was followed by 28.00 per cent of the respondents in high school level where as primary school level farmer 20.00 per cent and (14.00%) appeared in college level. A meager percentage (8.00%) of the respondent in illiterate level.

Sathish *et al.* (2012) indicated that education, (29.17%) of respondents studied up to middle and high school. One fifth (20.80 %) of the respondents had primary school education, followed by pre-university (15.83%).

Dhenge (2013) revealed that the higher per cent of respondents (35.00%) were educated up to primary school level. It was observed that 21.67 per cent of the paddy growers were illiterate. Collegiate level education was availed by 19.17 per cent of the respondents. High school level education was possessed by 15.83 per cent rest orders followed by middle school i.e. 8.33 per cent. Educational level was low in paddy growers district like Bhandara.

Reddy and Shenoy (2013) found that all the SRI paddy respondents were found to be educated.

Pooja (2014) observed that most of the wheat growers were educated up to high school level.

Sharma *et al.* (2015) observed that sixty per cent of the respondents were having medium level of education followed by 35.00 per cent with low level of education. Only five per cent of the respondents were in high level of education category. Farmers with higher and medium level of education can be easily motivated for adoption of recommended practices.

### 2.1.3. Land holding

Dudhe (2002) reported that over half of paddy cultivating farmers (52.67%) were found to be small farmers, followed by 18 per cent respondents who were marginal farmers.

Sharma and Sharma (2002) in their study on constraints in adoption of modern technology for rice cultivation in the tribal district of Surguja, Chattisgarh found that maximum (45.84 %) number of the respondents had small land holding, while 30.83 per cent respondents had medium land holding.

Dhande (2003) observed that irrigated rice grower in majority belonged to medium category of land holding.

Gedam (2007) observed that the majority of the respondent belongs to medium category of land holding.

Rani and Murugan (2010) indicated in their study that marginal land holdings with medium level of area under paddy cultivation.

Sagane *et al.* (2010) noticed that near about equal (41.00% and 40.00%) per cent of the respondents were in small and marginal land holding group followed by respondents in semi-medium (11.00%) and medium (08.00%) categories of land holding.

Singh and Varshney (2010) revealed that the t- test of the significance indicated that coefficient of regression was highly significant for land holding.

Pranita (2012) observed that maximum per cent of the respondents (51.00%) belonged to category of small (1.01 to 2.00 ha) land holding, followed by about one fourth of the respondents (31.00%) belonged to category of marginal land holding (up to 1 ha). The respondents in semi-medium (2.01 to 4.00 ha) categories were (11.00%). The percentage of the respondents belonged to medium (4.01 to 10.00 ha) and large (above 10 ha) land holding were of relatively less (06.00% and 01.00%) respectively.

Sathish *et al.* (2012) observed that half (50.84%) of the respondents were medium land holders followed by big and small landholders.

Dhenge (2013) revealed that nearly one half (49.16%) of the respondents were belonged to semi medium land holdings (2.01 to 4 ha). Followed by the small land holders (24.16%), who possessed land between 1.01 to 2 ha. The marginal farmers who possessed the land below 1 ha were 12.5 per cent. Medium land holders were 10.84 per cent. It may be inferred that maximum percentage of the paddy growers were found in semi medium land holding to small land holdings (73.32%)

Reddy and Shenoy (2013) found that the average land holding of SRI paddy farmers was 6.02 hectares.

Shanmugasundaramt and Helen (2014) observed that majority of farmers (59.00%) are marginal farmers followed by small farmers (27.50%) and large farmers (13.50%).

Sharma *et al.* (2015) observed that more than sixty per cent (63.33%) were in small farmers category while about 36.00 per cent were marginal category farmers.

#### **2.1.4. Occupation**

Thyagarajan (2004) observed that occupation showed a positive and significant relationship with adoption.

Sagane *et al.* (2010) observed that agriculture was main occupation of 43.00 per cent of the respondents. Near about equal numbers (26.00 and 25.00) of respondents had agriculture plus labour and agriculture plus Dairy/Goatry/Poultry occupation, respectively and meager per cent (5.00% and 1.00%) were engaged in agriculture + business and agriculture + service as their occupation.

Bhople *et al.* (2011) observed that agriculture was the main occupation of 60.00 per cent of the respondents, it was followed by about one fifth (21.00%) of respondents had agriculture plus labour occupation

and near about equal number (10.00% and 7.00%) of the respondents had agriculture plus other business and meager per cent (2.00%) were engaged in agriculture plus service as their occupation.

Pooja (2014) observed that the majority of the respondents, 60.00 per cent had agriculture as their main occupation, it was followed by 17.00 per cent respondents having occupation agriculture and subsidiary occupation, 14.00 per cent respondents had agriculture plus labour and only 09.00 per cent respondents having agriculture plus services as an occupation.

Surve (2014) observed that majority of the respondents (67.50%) had agriculture occupation followed by 15.00 per cent, belonged to agriculture + labour category. The 12.50 per cent of respondents had agriculture + allied occupation. Only 04.17 per cent respondents had agriculture + service and very less per cent of respondents (00.83%) had agriculture + business occupation.

### **2.1.5 Farming experience**

Shinde *et al.* (2000) observed that 58.67 per cent of the respondents had enough experience in farming i.e. above 15 years.

Thyagarajan (2004) observed that farming experience showed a negative and significant relationship with adoption.

Anuradha and Zala (2010) observed that the experience in rice cultivation was the positive and significant factors.

Chandgude (2010) reported that nearly two third (65.83 %) of the respondents had medium farming experience.

Bhople *et al.* (2011) observed that more than three fourth (77.00%) of the gram growers respondents having more than 10 years of experience in agriculture. It was followed by 12.00 per cent having 6 to 10 years of experience in agriculture and only 11.00 per cent had below 5 year of experience in agriculture.

### 2.1.6 Area under paddy cultivation

Anjani Kumar and Jha (2001) observed that high yielding varieties under rice were gaining wider acceptability in the Bihar state in recent year. As the area under the high yielding varieties was increase up to 62 per cent during 1997-98.

Deshmukh (2002) noted that majority of the paddy growers had assigned up to 1 acre area under paddy.

Dhande (2003) concluded that majority of paddy growers (71.33%) belonged to 1.51 to 3.00 ha. of area under rice.

Gharade (2004) observed that relatively higher proportion of paddy growers (38.67%) had 1.01 to 2.0 hectares area under paddy, followed by 35.33, 14.00, and 08.00 per cent of paddy growers had up to 1.1 ha, 2.01 ha and 3.01 to 4.0 ha respectively area under paddy. Very few (4.00%) of the paddy growers above 4.0 ha under paddy crop.

Gedam (2007) observed that maximum percentage of the respondents (52.67%) had 2.01 to 4.00 ha area under paddy cultivation, fallowed by 34.67 per cent and 12.66 per cent of respondents had up to 2 ha and above 4.00 ha area under paddy, respectively. Majority of the respondents were mediocre in respect of their area under paddy crop having 2.01 to 4 ha of land under paddy crop.

Lavanya (2008) noticed that around 58.00 per cent of the farmers had cultivated their 76.00 to 100.00 per cent of the area under paddy through SRI technique.

Mahadik *et al.* (2009) revealed that average area under Sahyadri rice variety was 0.20 ha.

Dhenge (2013) revealed that little more than one third (37.50%) of the respondents were having area under paddy crop between 1.01 to 2 ha, followed by (30.83%) of the respondents having area under paddy cultivation between 2.01 to 4 ha, 28.34 per cent cultivated paddy in

below 1 ha of land, meager respondents (3.53%) possessed the low under paddy cultivation above 4.00 ha.

Dohtare (2014) observed that the 43.00 per cent of the respondents had 1.01-2.00 ha area under paddy, whereas 35.00 per cent respondents had comes under the area up to 01.00 ha under paddy crop, followed by 18.00 per cent farmers having 2.01-4.00 ha and only 04.00 per cent respondents having above 4.00 ha land under paddy crop.

### **2.1.7 Annual income**

Borkar (2001) revealed that the annual income had significant relationship with knowledge and adoption of recommended paddy technology.

Kasarlwar (2003) finding revealed that majority of the respondent's i.e. 67.77 per cent were from medium level annual income category.

Thyagarajan (2004) found that annual income showed a non-significant relationship with adoption.

Anoopkumar (2006) conclude that higher percentage of respondents had medium annual income category.

Gedam (2007) indicate that one third (33.34%) of the respondents having annual income in between Rs. 50,000 to Rs. 75,000, followed by 32.00 per cent of the respondents having annual income between Rs. 25,000 to Rs. 50,000 and 19.33 per cent of the respondents had up to 25,000.

Sitadevi *et al.* (2009) indicate that income of farm were positive and highly significant to adopt SRI technology by paddy growers.

Chandgude (2010) indicated that majority (52.6%) of the respondents had high annual income.

Sathish *et al.* (2012) observed that more than one-third (36.67%) of the respondents belonged to high income group followed by medium (31.67%) and semi medium (27.50%) income groups.

Dhenge (2013) revealed that relatively higher proportion of respondents (41.66%) were having annual income in between Rs. 25001/- to Rs. 50000/-, followed by (36.67%) of respondents were having annual income above Rs. 50000/-. Only (21.67%) of the respondents were having annual income up to Rs. 25000/-.

Pooja (2014) concluded that majority (45.00%) of the respondents belonged to Rs. 1,50,001 to Rs. 2,25,000 of annual income category.

Thatchinamoorthy and Rexlin Selvin (2014) reported that more than half of the respondents (50.80%) belonged to low level of income followed by middle (34.20%) and high level of income (15.00%).

### **2.1.8 Source of information**

Khobragade (2000) found that above half (53.53%) of the paddy growers had used information sources to medium level, while (29.04%) and (17.33%) paddy growers observed in high and low information sources category respectively.

Chandra (2001) reported that non-institution information sources were the major source of information for the paddy grower.

Gharade (2004) observed that relatively higher proportion of paddy growers (68.00%) had medium information source level. Whereas 17.33 per cent and 14.67 per cent of the paddy growers belonged to low and high level of information sources.

Ghodichor (2004) noted that sources of information was found to be positively and significantly correlated with knowledge of paddy growers about integrated pest management practices.

Gedam (2007) revealed that majority of the respondents belong to medium category of use of information sources.

Meshram (2008) concluded that majority of the respondent (57.00%) were medium category were utilized medium level of source of information for obtaining the knowledge about paddy crop.

Rani and Murugan (2010) reported that medium level of information source utilization.

Sagane *et al.* (2010) observed that 56.00 per cent of the respondents were mediocre in use of resources of information however, about equal per cent (23.00% and 21.00%) of the respondents belonged to high and low categories of use of resources of information, respectively.

Johnson and Vijayaragavan (2011) observed that 38.00 per cent of farmers in Tamil Nadu initially knew SRI through farm magazines, newspaper, All India Radio and TV channels, followed by Stat Department of Agriculture (SDA) (30.00%), Tamil Nadu Agricultural University (TNAU) (16.00%) and friends and neighbours (16.00%). Little less than half of the farmers (48.00%) in Andhra Pradesh initially knew SRI through farm magazines, newspaper, All India Radio and TV channels, followed by 30.00 per cent from Acharya N.G.Ranga Agricultural University (ANGRAU), 12.00 per cent from friends and neighbours, 08.00 per cent from State Department of Agriculture and 02.00 per cent from international conference.

Dhenge (2013) revealed that the nearly one third (65.00%) of the respondents were found in medium category of sources of information. It was followed by 20.83 per cent of respondents found to be having high level of sources of information and 14.17 per cent of the respondents were found to be keeping lower level of sources of information with various information sources for acquisition of information about integrated pest management practices of paddy.

In general, majority of respondents had medium level of information with sources of information for obtaining the information about integrated pest management practices of paddy.

#### **2.1.9 Innovativeness**

Dhande (2003) inferred that most of the respondents were found in medium level of innovativeness.

Gawande (2006) reported that of 61.33 per cent respondents had medium level of innovativeness.

Jagannath (2010) reported that relatively high i.e. 64.17 per cent of respondent had medium level of innovativeness.

Ingle (2011) reported that maximum (62.00%) numbers of respondents were found in medium category of innovativeness.

Dohtare (2014) observed that majority of the farmers have medium level innovativeness.

Harsha (2014) observed that more than half of the respondents (55.00%) were having medium level of innovativeness followed by high level of innovativeness (27.50%) and low level of innovativeness (17.50%).

#### **2.1.10 Risk preference**

If the risk taking behaviour is more, then the adoption of new technologies among the respondents would also be more. The literatures related to risk preference are as follows.

Natkar (2001) indicated that 67.50 per cent of farmers belonged to high risk orientation category, followed by medium risk orientation (16.86%) and low risk orientation (15.63%) categories.

Shashidhara (2003) found that an equal per cent of farmers had low (36.67%) and high (35.50%) risk orientation and the remaining 27.78 per cent possessed medium risk orientation.

Ghodichor (2004) revealed that majority of the paddy growers (88.00%) had medium level of risk preference. A meager percentage of paddy growers had low (7.00%) and high level (5.00%) of risk preference.

Govinda Gowda and Narayana Gowda (2006) revealed that majority of both Thompson Seedless grape growers (82.0%) and Bangalore Blue grape growers (88.00%) possessed medium level of risk orientation.

Gotyal (2007) indicated that around half of the grape growers belonged to medium risk orientation category, followed by high risk (34.50%) and low risk (16.50%) orientation category.

Singh and Varshney (2010) revealed that risk preference was negatively contributing to the adoption of rice production technology.

Kharat (2012) conclude that most of the respondents were mediocre in respect of risk performance in jawar.

Dhenge (2013) observed that nearly two third of the respondents (65.00%) found to be in the medium level of risk preference, followed by 20.00 per cent in high level of risk preference whereas, 15.00 per cent were found to be in low level of risk preference regarding IPM management practices of paddy growers.

#### **2.1.11 Economic motivation**

Economic motivation is related to the psychological feeling of the respondents about their return from agriculture. It is directly related to the adoption of technologies among the respondents.

Chandra (2001) observed that majority of the paddy growers had low to medium level of economic motivation.

Lalitikumar (2002) observed that 55.34 and 28.00 per cent farmers were grouped in the medium and high category of economic motivation, respectively. While 16.66 per cent farmers were grouped in the low category of economic motivation.

Thyagarjan (2004) found that economic motivation showed non-significant relationship with adoption.

Gedam (2007) observed that majority of the respondents (30.00%) were included in medium category of economic motivation.

Jadhav (2008) observed that majority of the respondents (72.00%) had medium level of economic motivation, followed by (18.00%) respondents who were low in economic motivation. Only 10.00 per cent of

respondents had high level of economic motivation. The majority of the respondents were found to be in medium level economic motivation.

Meshram (2008) concluded that higher percentage of paddy growers (79.33%) had medium level of economic motivation.

Dhenge (2013) observed that nearly one half of the respondents (58.83%) were found in medium category of economic motivation. As much as 23.33 per cent of the respondents found to be having low level of economic motivation and 18.34 per cent of the respondents were found in high level of economic motivation.

Borthakur *et al.* (2015) reveals that extent of adoption of recommended rice production technology had positive and significant correlation with economic motivation.

#### **2.1.12 Knowledge**

Haque (2001) noted that 42.75 to 49.00 per cent of rice growers had knowledge about seed treatment, 44.50 per cent about plant protection and 43.27 per cent about chemical weed control.

Sagwal and Malik (2001) observed that majority of the paddy growers (80.00%) had low level of knowledge about motivational production practices including seed treatment, fertilizer and plant protection measures.

Vijayalayan (2001) reported that ETL based pest control, bio-pesticides, collection and destruction of affected plant parts were well known to the paddy growers to the content of 25 to 100 per cent.

Dhande (2003) concluded that per cent of paddy growers possessed the knowledge of important insects (gall fly and stem borer) and diseases (blast and blight) of rice crop followed by 78.66 per cent of paddy growers who possessed the knowledge of use of recommended control measures against stem borer and gall fly.

Gedam (2007) revealed that majority of respondents (62.67%) possessed medium level of knowledge. As much as 29.33 per

cent had high and 8.00 per cent respondents had low level of knowledge about recommended paddy cultivation technology.

Jambhale (2007) revealed that an overwhelming majority of respondents had complete knowledge about preparatory tillage (95.33%), selection of soil (98.00%), application of FYM (53.33%), method of sowing (100%), sowing time (71.33%), seed rate (63.33%) and recommended varieties of paddy (75.33%).

Kirar and Mehta (2009) observed that maximum number of the contact tribal farmers (51.67%) had medium knowledge level of recommended rice production technology, 33.33 per cent and 15.00 per cent of the farmers had low and high knowledge level of recommended rice technology, respectively.

Jhajharia *et al.* (2009-2010) observed that majority of the respondents (95.90%) were having knowledge about importance of matasi soil. It was followed by 78.19 per cent knowledge about water holding capacity of kanhar soil. And (83.33%) of respondents have knowledge about bhata soil. Majority of the respondents (70.97%) were having knowledge about soil topography of dorsa soil. Majority of the respondents (70.79%) and (81.48%) were having knowledge about soil depth and soil productivity of Kanhar soils, respectively. Among, all the traits of soils being in interrogated by the farmers, the level of knowledge about all soil types was found fairly high.

Sagane *et al.* (2010) observed that respondents in study area having high knowledge about technologies recommended for puddling (knowledge index 99.50), harvesting and threshing (99.00), water management (93.50), major pest and diseases of paddy crop (93.00), transplanting (89.67), nursery management (80.00), preparatory tillage (74.50), and seed and seed treatment (69.67). However, the respondents had middle level knowledge about technologies related to intercultural operations (66.67), recommended varieties (65.80), and control measures for diseases (52.50), integrated pest management

(51.40), integrated nutrient management (44.21) and technologies related to control measure for pests (37.50). No respondents were observed low category of knowledge.

Khatik *et al.* (2012) observed that out of 120 respondents, 57.50 per cent respondents had medium level of knowledge about improved rice production technology. This was followed by 18.33 per cent farmers having high knowledge level regarding improved rice production technology. Whereas, only 24.17 per cent respondents were observed in the low knowledge group.

Dhenge (2013) observed that over three fourth of respondents (82.5%) belonged to medium category of knowledge level, were as 09.17 per cent possessed low and 8.33 per cent of respondents were include in high level of knowledge category.

Dohtare (2014) observed that majority of the respondents (69.00%) had medium level of knowledge about soil test technique and recommendation of soil test reports whereas, 16.00 percent and 15.00 per cent of the respondent farmers were having low and high level of knowledge about the recommended soil sampling, soil testing and its recommendations, respectively.

## **2.2 Reviews Related to Dependent Variables**

The dependent variable in the present study was technological gap with regard to adoption of SRI method of paddy cultivation in Bhandara district.

### **2.2.1. Technological gap**

Kapse *et al.* (2000) revealed that respondents having higher technological gap in respect of application of gypsum (52.86%), followed by use of plant protection measure (37.17%), seed treatment (27.85%) and application of chemical fertilizers (25.42%) in groundnut cultivation.

Badodia *et al.* (2002) found that maximum number of respondent were having medium level of technological gap about recommended chickpea cultivation technology while in case of different agronomical practices of chickpea cultivation technology, the maximum gap was found in seed treatment, use of rhizobium culture, plant protection measures and sowing time.

Gedam (2007) revealed that nearly half of the respondents (48.57%) were observed under high category of technological gap in recommended paddy cultivation practices followed by 32.00 per cent who were observed in middle level of technological gap. A sizeable percentage of the respondents (19.33%) were observed in low category of technological gap.

Jambhale (2007) found that high technological gap was present in control measure for disease (92.83%), irrigation management (88.00%), seed treatment with fungicide (84.67%) and rhizobium culture (76.33%). However, low technological gap was observed in practice like method of sowing, soil for gram cultivation (04.33%), spacing (16.33%) and moderate technological gap was reported in practice like application of FYM (53.66%) fertilizer application (34.00%) and control measure for pest (39.00%).

Chaudhary *et al.* (2008) observed that more gap in case of resource poor farmers for various nursery and main field practices of rice. Higher gap was visible in case of seed treatment, selection of field, and use of varieties for both farmers categories.

Sagane *et al.* (2010) observed that high technological gap (94.80, 77.63, 75.25, 71.93 and 71.50%), were observed in operation of recommended varieties, measures for pest control, measures for disease control, integrated nutrient management and integrated pest management. This was followed by medium level gap in respect of technologies related to nursery management, intercultural operations, seed and seed treatment and preparatory tillage operations as the

composite technological gap index was observed 61.50, 52.17, 49.50 and 44.37 per cent, respectively. Low technological gap (30.16, 20.75, 2.00 and 0.00%), was observed in technology adoption related to transplanting, weed management, puddling and harvesting and threshing operations respectively.

Goudappa *et al.* (2012) observed that the 45.83 per cent of farmers had medium technological gap followed by high technological gap (30.83%) about the chilli cultivation practices with mean technological gap scores of 13.75 and 30.90, respectively. While, 23.33 per cent of them possessed low overall technological gap with mean technological score of 13.75.

Pooja (2014) observed that 63.00 per cent of respondents were observed under medium level category of technological gap of recommended wheat cultivation practices and its adoption by the respondents followed by 21.00 per cent of respondents were observed in low level of technological gap and 16.00 per cent of respondents were observed in high level category of technological gap

### **2.3 Reviews Related to Reasons for Existence of Technological Gap SRI Method of Paddy Cultivation Practices**

Singh and Singh (2002) noticed that the reason for technology gap was lack of knowledge, time of application and non-availability of herbicides as recommended in mustard crop.

Gedam (2007) revealed that main reasons for technological gap in preparatory tillage of paddy was lack of skilled labour (52.00%), followed by non availability of FYM (21.33%), less moisture in soil (18.57%) and do not have own bullocks and implements (12.66%). Over half of the respondent (56.10%) opinioned that high cost seed of improved varieties was the main reason for existence of technological gap in seed and seed treatment practices. The other reasons also attributed to technological gap in seed and seed treatment were; non availability of seed at proper time (45.33%), inadequate knowledge about

recommended seed rate and seed treatment (24.00%) and unknown about benefit of seed treatment (6.67%).

Jambhale (2007) revealed that limited number of tractors and improved implements for preparation of land (36.66%) and unavailability of labour (22.66%) was main reason for technological gap in land preparation of gram crop. Regarding manures, it was observed that farmer felt this practice as costly affairs mentioned by 68.66 per cent farmers.

Pooja (2014) revealed that main reasons for technological gap in preparatory tillage was non availability of labour (42.00%), non availability of FYM (38.00%), lack of improved implements for the land preparation (35.00%), and do not have own bullocks and implements (11.00%). Reasons of technological gap existence in recommended varieties of wheat, lack of knowledge about recommended varieties (87.00%).

Sigdel *et al.* (2014) revealed that majority of the respondents responded that there was lack of training (70.59%), lack of enough information on SRI (65.88%), alternate nursery raising technique (54.12%), tedious to transplant and maintain spacing (37.06%), maintaining water during puddling field for transplanting (30.00%) and to maintain alternate wetting and drying (28.82%).

Shanmugasundaram and Helen (2015) revealed that, 100.00 per cent respondents expressed more weed, followed by 81.00 per cent farmers expressed high labour cost, non availability of System of Rice Intensification tools (69.80%) like Cono Weeder and Markers. It was followed by lack of information on System of Rice Intensification (62.70%), technical Know-How and need more labours (48.80%) for adoption of System of Rice Intensification method.

## **2.4 Conceptual Model of Research Study**

During the course of investigation the researcher has to assume relations amongst study variables develop a conceptual model/scheme and use the same during research. A model helps in critical and logical thinking about the research problem. Theoretical model presents the concepts and variables used in research studies, a conceptual model has been developed for the present study and same has been depicted in Fig. 1.

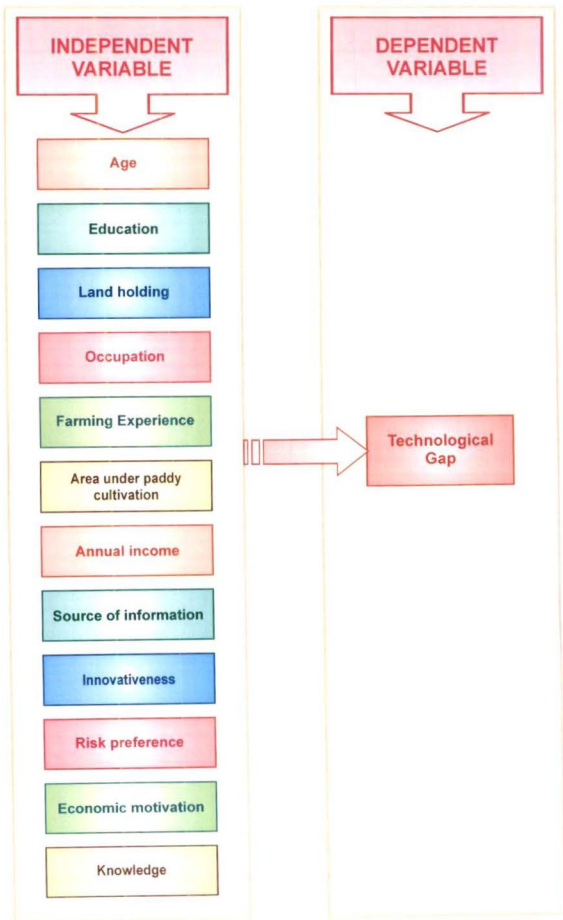


Fig. 1. Conceptual model of research study

## CHAPTER III

### METHODOLOGY

Methodology is the third chapter. This chapter attempts to describe and explain the locale of the study, the procedure followed in the selection of respondents and designing of interview schedule. It also includes the procedures and techniques followed in the collection of data, operational definitions of the dependent and independent variables, their measurements and classification, analysis techniques and statistical tools used for interpreting the results. The research methodology followed is described under the following heads.

- 3.1 Research design
- 3.2 Locale of the study
- 3.3 Sampling and Sampling procedure
  - 3.3.1 Selection of Panchayat samities
  - 3.3.2 Selections of villages
  - 3.3.3 Selection of respondents
- 3.4 Variables for study, there operational definitions, measurements and categorization
- 3.5 Preparation of interview schedule
- 3.6 Pre testing of interview schedule
- 3.7 Collection of data
- 3.8 Statistical tools used for analysis of data

#### **3.1 Research Design**

The aim of present study was to assess the knowledge and technological gap in SRI method of paddy, therefore exploratory design of social research was used for the present investigation.

## **3.2 Locale of the Study**

### **3.2.1 Geographical locations**

The study was conducted in Bhandara district. Bhandara is located in Vidarbha region. There are 7 tahsils in Bhandara district, out of these, Lakhani and Sakoli tahsils are selected for the present study. The district lies between 20°39' and 21°38' North latitudes and 76°30' and 79°27' East latitudes. It is surrounded by Gondia district and Balaghat (Madhya Pradesh) district to the North and Gondia district to the East, Gadchiroli district to the South and Nagpur to the West.

### **3.2.2 Area and population**

The total geographical area of Bhandara district 4087 square kilometers. According to 2011 census, the total population of Bhandara district is 1,200,334 out of this male are 605,520 and female are 594,81.

### **3.2.3 Soil**

The major soil types of this district are Kali Kanhar, Sihar, Thorand, Khardi and Bardi. The Kali Kanhar type is most fertile but covers less area. The type Bardi is different from Kanhar and is full of limestone and harder in nature. Out of total cultivated area of the district 79 per cent is of the type Sihar. The reddish yellow Sihar soil type is formed by the erosion of stone crystals. In summer this type of land becomes dry. The land along the coasts of river Vainganga is of Kali Kanhar and high quality Thorand. This soil type has deep layers, it is sticky and it can absorb and hold water for long time.

### **3.2.4 Climate**

The climate of Bhandara district in general is hot and dry with moderately cold winters. The average rainfall received by the district is 1387.9 mm Most of the annual rainfall is received during South West Monsoon. The maximum temperature of Bhandara district is 47°C in the

month of June and minimum temperature is about 9.5°C in the month of January.

### 3.2.5 Cropping pattern and season

The major *kharif* crops grown in Bhandara district is Paddy whereas during rabi season major crops grown are Wheat, Gram, Sugarcane. In case of vegetables Brinjal, Chili, Potato, Bhendi, Tomato are the important crops. Recently cultivation of paddy in specialized way carried out in Bhandara district.

**Table 1. Cropping pattern and season of Bhandara district**

Types	Names	Cropping Period in Months
Major Crops (Irrigated)	Kh. Paddy S/Paddy	June to October January to May
Major Crops (Non-Irrigated)	Kh. Paddy	June to October
Major Cash Crops	1. Sugar cane 2. Summer Groundnut	11 Months to 18 Months January to May

### 3.2.6. Irrigation facility

Wells are the main irrigation source of Bhandara district. Rivers and Tube Wells also used for irrigation purpose. The total area under irrigation of Bhandara district is 224264 hectares out of 105652 hectares. Under well irrigation. Bhandara district is having 14228 wells.

### 3.2.7. Transport facility

In Bhandara district State Transport buses are the significant means of transportation. Major towns and villages are mostly linked by cement roads. Other means of transportation are trucks, tempos, private jeeps, autos, etc. The national highway 6 (Mumbai to Kolkata) passes through Bhandara district.

### **3.2.8. Communication facility**

Mass communication viz., Television, Radio facilities are available Sahyadri, Doordarshan and radio stations. Telephone facilities are also available almost all villages. Various Newspapers viz., Lokmat, Deshonnati, Sakal, Loksatta are the means of communication spread over district.

### **3.2.9. Credit facility**

The credit need of the people from Bhandara district are fulfilled through State Co-operative Bank, Land Development Bank, Nationalized Bank viz., Bank of Maharashtra, Bank of India, Co-operative Bank, State Banks, etc.

## **3.3 Sampling and Sampling Procedure**

### **3.3.1 Selection of Panchayat Samities**

The study was conducted in Bhandara district. In Bhandara District, there are seven Panchayat Samiti out of which purposive selection of Lakhani Panchayat Samiti and Sakoli Panchayat Samiti will be made. Out of each panchayat samities selected five villages on the basis of large area under paddy cultivation.

### **3.3.2 Selection of villages**

The list of paddy growing villages of Lakhani tahsil and Sakoli tahsil were obtained from Taluka Agriculture Office of the taluka. There are 94 and 85 villages in Lakhani and Sakoli tahsil, respectively. Out of these, 5 villages from Lakhani and 5 villages from Sakoli in total 10 villages were selected having highest area under paddy cultivation.

### **3.3.3 Selection of respondents**

From these five villages the list of paddy growers were prepared separately by consulting the Taluka Agriculture Office (TAO). From the list 10 paddy growers from each villages were drawn randomly,



Location of Bhandara district in Maharashtra state

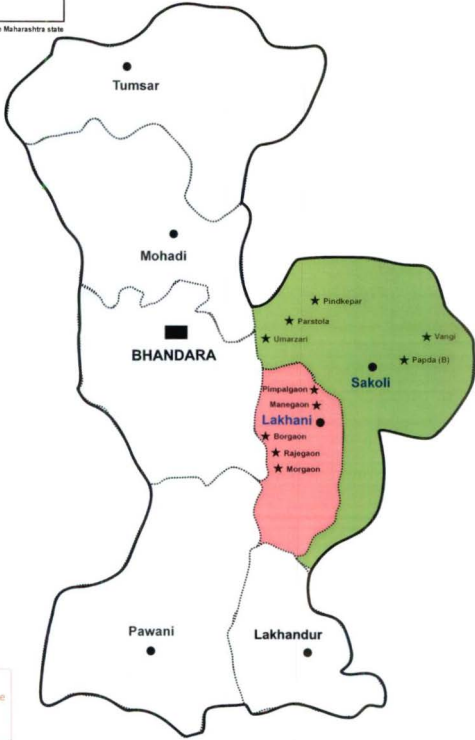


Fig. 2. Map of Bhandara district

thus in total 100 paddy growers considered the sample respondents for the study.

**Table 2. List of Village wise respondents for the study**

Sl. No.	Tahsils	Villages	Proportionate number of paddy growers selected as respondents
1.	Lakhani	Manegaon	10
		Borgaon	10
		Rajegaon	10
		Morgaon	10
		Pimpalgaon	10
2.	Sakoli	Parstola	10
		Pindkepar	10
		Vangi	10
		Umarzari	10
		Papda (B)	10
<b>Total</b>			<b>100</b>

### 3.4 Variables for Study, there Operational Definitions, Measurements and Categorization

#### 3.4.1 Independent variables

The independent variables selected for the present study, their operational definition, scoring and categorization have been discussed below.

#### 1. Age

It is the one of the basic characteristics of an individual and is linked with ones maturity, Physical fitness, productivity level etc. Chronological age of the paddy grower from birth in years was considered as the score of an individual. The categorization was done of actual age of farmer at the time of data collection.

Sl. No	Age	Year
1	Young	Up to 35
2	Middle	36-50
3	Old	Above 50

## 2. Education

Education is a process of developing capabilities of the individuals so that they can adequately respond to their situations.

It has been operationally defined as formal standard level of schooling passed by paddy growers. Zero score for illiterate and one score were assigned to each standard passed by the literate respondent and then following categories were formed for classifying respondents on the basis of their educational level.

Sl. No	Education	Standard
1	Illiterate	No schooling
2	Primary school	1-4
3	Middle school	5-7
4	High school	8-10
5	Higher secondary school	11-12
6	College	Above – 12

## 3. Land holding

It refers to an area of land in hectares possessed by individual respondents for cultivation of crop.

It is operationally defined as the area owned and cultivated in the family of the paddy growers. The actual hectares of land possessed by an respondent and his family was consider as score and then respondents were categorized into following categories as per Government norms.

Sl. No.	Land holding	Land in ha.
1	Marginal	Up to 1.00 ha
2	Small	1.01 -2.00 ha
3	Semi-medium	2.01 -4.00 ha
4	Medium	4.01 -10.00 ha
5	Large	Above 10.00 ha.

#### 4. Occupation

It was operationalized as the activities in which the farmer and his family are regularly engaged and get major income out of them. It was categorizing and scoring procedure developed by Thakare (2004) was used as.

Sl. No.	Subsidiary Occupation	Score
1	Agriculture + labour	1
2	Agriculture (Farming)	2
3	Agriculture + Allied Occupation	3
4	Agriculture + Business	4
5	Agriculture + Service	5

#### 5. Farming experience

It refers to experience of paddy growers in rice cultivation (in years). It was categorized as bellow.

Sl. No.	Farming experience	Years
1	Low	Up to 5 yr.
2	Medium	6 to 10 yr.
3	Large	Above 10 yr.

## 6. Area under paddy cultivation

It refers to the actual area of land in hectares put under paddy cultivation by the selected respondents. On the basis of area under paddy, the paddy growers were categorized into groups considering the maximum and minimum area put by the farmer under paddy crop.

Sl. No.	Levels of area under paddy cultivation
1	Up to 1 ha
2	1.01 to 2 ha
3	2.01 to 4 ha
4	4.01 to 10.00 ha
5	Above 10.00 ha

## 7. Annual income

It refers to the gross income in a year by an individual and his family members from all sources.

It is operationally defined as gross income in rupees derived from all sources in a year by paddy growers and his family members. Actual income was considered as score. It was categorized by equal interval basis, as bellow.

Sl. No.	Annual Income (Rs.)
1	Up to 1,00,000/-
2	1,00,001 to 2,00,00 /-
3	Above 2,00,000/-

## 8. Source of information

It refers to the various sources and channels used by the paddy growers for getting information about different innovations.

The scoring procedure for responses i.e. always-2, sometimes-1 and never-0 were used. Final score of an individual respondent was obtained by adding the scores. Finally the respondents were categories on the basis of equal interval basis.

Sl. No.	Category	Score range
1	Low	Up to 13
2	Medium	13 to 26
3	High	Above 26

### 9. Innovativeness

Rogers (1995), it is the degree to which an individual adopts the ideas earlier than other in the social system. It is operational defined as the degree to which respondent adopts the idea regarding SRI method recommendation.

Scale developed by Singh (1972) was used, to measure innovativeness. It consist of six statement. Statement 1, 4 and 5 are positive and statement 2, 3, 6 are negative. Positive statement were assigned score 3, 2 and 1 for response categories, viz. agree, undecided, disagree. Reverse was done for negative statement. The categorization was made on the basis of equal interval basis.

Sl. No.	Category	Score
1	Low	Up to 6
2	Medium	6 to 12
3	High	Above 12

### 10. Risk preference

It is operationally defined as the degree to which paddy farmers are oriented towards risk and have courage to face the problem and uncertainty in adoption of improved cultivation practices in paddy crop.

It was measured with the help of scale developed by Supe (1969). The scale has six statements, there were four positive and two negative statements. Statements no 1 and 5 were negative while statement number 2, 3, 4, and 6 were positive statements. The

statements were rated by five point's response categories ranging from strongly agree, agree, undecided, disagree and strongly disagree. The positive statements were assigned 5, 4, 3, 2, and 1 score for above response categories. For the negative statement the scoring was reversed.

The score obtained was summed up and then respondents were categorized on basis of equal interval basis.

Sl. No.	Risk performance level	Score Range
1	Low	Up to 10
2	Medium	10-20
3	High	Above 20

#### 11. Economic motivation

It is operationally defined as the occupational success in terms of profit maximization and relative value respondent places on economic ends. A standard economic motivation scale developed by Supe (1969) was used to measure economic motivation. There are six statements in this scale, out of these, statement number 1, 2, 3, 4, and 5 are positive and statement 6 is negative. The responses of respondents were obtained on five point continuum i.e. strongly agree, agree, undecided, disagree and strongly disagree by assigning score of 5, 4, 3, 2, and 1 respectively for the positive statements and for the negative statements reverse score were given. Total obtained score ranged from 6 to 30. Then the respondents were classified on the basis of equal interval basis.

Sl. No.	Economic motivation	Score
1	Low	Up to 10
2	Medium	10-20
3	High	Above 20

## 12. Knowledge

English and English (1961) defined knowledge as a body of understood information by an individual farmer.

Operationally knowledge has been defined as the body of understood information possessed by the paddy growers about improved cultivation practices of SRI method.

It was measured with the help of teacher made knowledge test. It was developed to measure the knowledge of individual paddy growers about the SRI method. Responses of the paddy growers were taken on two point continuum i.e. yes or no knowledge with the numerical score of 1 and 0 were assigned, respectively. Obtained knowledge raw score was converted into knowledge index by using following formula.

$$\text{Knowledge index} = \frac{\text{Actual knowledge score obtained}}{\text{Maximum Obtainable Knowledge score}} \times 100$$

On the basis of knowledge index score, respondents were categorized as below.

Sl. No.	Knowledge	Index range
1	Low	Up to 33.33
2	Medium	33.34 to 66.66
3	High	and above

### 3.4.2 Dependent variable

#### 1. Technological gap

It is difference between the recommended technologies and its actual adoption by the individual. In the context of the present study, it is operationally defined as the difference between all the cultivation practices of SRI method of paddy cultivation recommended by university and extent of adoption of these recommended practices of SRI method by

paddy growers. By using adoption score of individual technology selected, the technological gap index was calculated by using following formula.

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

Where,

R = Maximum obtainable score of adoption of the improved practices of SRI method of paddy.

A = Actual obtained score of adoption of improved cultivation practices of SRI method of paddy.

Finally, the composite gap index was worked out by summing up of technological gap indicates of all selected technologies and divided the same by total number of technologies selected for the study. Respondents were then categorized on the basis of composite gap index (CGI) into Low, Medium and High technological gap, as below by using equal interval method.

SI. No.	Technological gap	Index
1	Low	0 to 33.33
2	Medium	33.34 to 66.66
3	High	Above 66.66

### 3.5 Preparation of Interview Schedule

Development of interview schedule was an important aspect. The interview schedule was designed with relevant questions in accordance with the study objectives. The schedule was divided into two parts. The first part of the schedule included the questions related to general, personal, socio-economic, situational, communication and psychological characteristics of respondents. The questions regarding technological gap and reason for non-adoption for each practice were included in the second part. Teacher made scales were also prepared and used for collecting data on information sources by the respondents.

The schedule was firstly developed in English and then translated in to local language 'Marathi' so as to collect data from selected respondents.

### **3.6 Pre-testing of Interview Schedule**

The pre-testing of interview schedule is necessary in order to know the mistake, ambiguities and short falls if any in interview schedule. Pre-testing is also essential for clarity the reliability and validity. The pre-testing of interview schedule was done in a village of Lakhani Panchayat Samiti and Sakoli Panchayat Samiti which was not included in the study sample. The schedule was administered to total 10 non respondent farmers in village selected for this purpose. Then, the data collected from non sampled farmers were thoroughly studied to detect the unfamiliar words, vagueness and on experience of pre-testing the elimination of unwanted questions and substitution of required one was done in the interview schedule. The interview schedule was then finalized and prepared for data collection.

### **3.7 Collection of Data**

The data were collected through face to face contact method by contacting the selected farmers. The farmers were contacted at their homes or on their farm as per their convenience. For easy and quick approach with selected farmers, the help of Sarpanch and Gramsevak was taken. Before actual seeking of information, farmers were introduced with the objectives of the present study.

### **3.8 Statistical Methods Used**

The data collected through personal interview were carefully examined for its completeness and correctness. The scoring procedure was decided and all the data from schedule were transferred to master tables. Then the qualitative and quantitative classes arbitrarily or by using mean and standard deviation were formed. The data were tabulated and frequencies and percentage in each class were then worked out.

Following statistical techniques were used in the present study for analysis of data and drawing of conclusions.

1. Arithmetic mean ( $\bar{X}$ )
2. Standard deviation (SD)
3. Coefficient of correlation ( $r$ )

### 1) Arithmetic mean ( $\bar{X}$ )

It was calculated by summing all the score and dividing it by number of respondents.

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

Where,

- $\bar{X}$  = Arithmetic mean
- $\Sigma X$  = Sum of respondent score
- $N$  = Number of respondents

### 2) Standard deviation

It is measure of variability calculated around mean. The usual symbol of the S.D.

$$\sigma = \sqrt{\frac{\Sigma (X - \bar{X})^2}{N}}$$

Where,

- $\sigma$  - Standard deviation
- $\Sigma X^2$  - Sum of square of X series
- $(\Sigma X)^2$  - Square of sum of X series
- $N$  - No. of respondents

### 3) Coefficient of correlation

The relationship between independent and dependent were calculated with the help of following given formula.

$$r = \frac{N\Sigma XY - (\Sigma X)(\Sigma Y)}{\sqrt{[N\Sigma X^2 - (\Sigma X)^2][N\Sigma Y^2 - (\Sigma Y)^2]}}$$

Where,

r	-	Coefficient of correlation
$\Sigma X$	-	Sum of the score of variable X
$\Sigma Y$	-	Sum of the score of variable Y
$\Sigma XY$	-	Sum of products of 'X' and 'Y' variables
$\Sigma X^2$	-	Sum of the square of 'X' variable
$\Sigma Y^2$	-	Sum of the square of 'Y' variable
N	-	Total number of respondents



**Plate 1. Interaction with the farmers at the time of data collection in tahasil Lakhani**



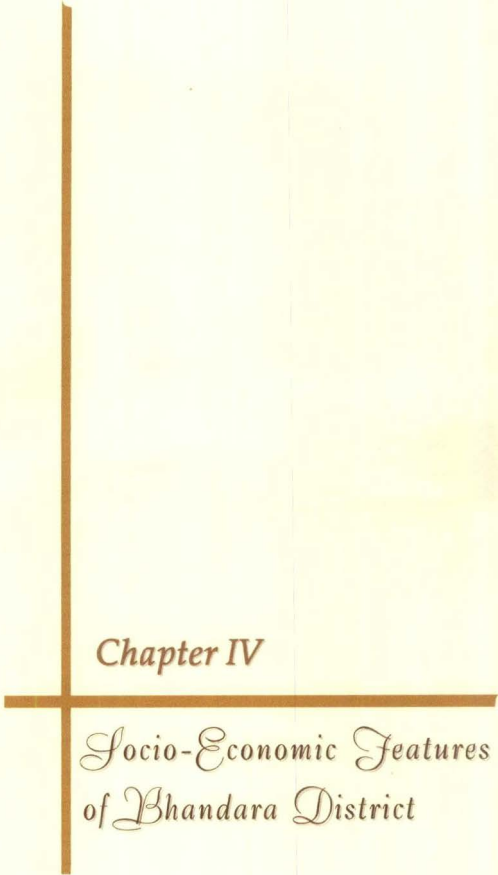
**Plate 2. Interaction with the farmers at the time of data collection in tahasil Sakoli**



**Plate 3. Field of paddy crop at nursery stage**



**Plate 4. Field of paddy crop after transplanting**



*Chapter IV*

*Socio-Economic Features  
of Bhandara District*

## CHAPTER IV

### SOCIO-ECONOMIC FEATURES OF BHANDARA DISTRICT

Maharashtra state has six revenue divisions viz., Mumbai, Pune, Nasik, Aurangabad, Amravati and Nagpur. Vidarbha region includes Amravati and Nagpur revenue divisions comprising eleven districts viz., Amravati, Buldana, Akola, Washim, Yavatmal, Wardha, Nagpur, Bhandara, Gondia, Chandrapur and Gadchiroli. Washim and Gondia are newly formed districts bifurcating Akola and Bhandara districts respectively. Nagpur division includes Nagpur, Bhandara, Gondia, Chandrapur, Gadchiroli and Wardha are the eastern district of Vidarbha. The western districts are Buldana, Akola, Amravati, Yavatmal and Washim. The western districts are known for its cotton crop and the eastern region is for good quality of rice. Vidarbha as a whole contributes cotton, rice, jowar, millets, oilseeds, soybean, citrus, forest timber, etc.

The present study is confined to Bhandara districts of eastern Vidarbha. The agro-climatic conditions differ from place and even in close vicinity also.

#### 4.1 Location of Bhandara District

Bhandara district falls in Vidarbha region of Maharashtra. It comprises of 7 tahsils. It lies between 20°39' and 21°38' north latitudes and 76°30' and 79°27' east latitudes. It covers area of 5417 sq.km. accounting for 1.76 per cent of the total area of Maharashtra. Bhandara district is surrounded by Gondia district. Balaghat (M.P) district in North and Gondia district in the East, Gadchiroli district to the South and Nagpur district toward West.

#### 4.2 Topography and Soil

The central part of the Bhandara district is a part of Vainganga and Chulbandh river basin. River Vainganga has formed fertile basin in Bhandara, Pauni, Tumsar and Mohadi of tahsils Bhandara. Bhandara district is divided into 7 tahsils for smooth administration. The

soil of the district is basically derived from volcanic trap rock and it is quite fertile. It is classified into categories as coarse soil found in south, medium black soil in the plain and deep black soil found in river valley.

### 4.3 Climate and Rainfall

Being away from the sea, the district extreme climate. The weather during winter is cool, while in summer it is too hot. The average minimum and maximum temperature extremities observed throughout the year was 15°C and 47°C, respectively. Bhandara district falls in assured rainfall zone of Maharashtra state having on an average rainfall 1387.9 mm.

### 4.4 Land use pattern

The details of land use pattern of Bhandara district are presented in Table 3.

**Table 3. Land use pattern of Bhandara district**

Sl. No.	Content	Area ('000ha)	Percentage
1	Area for land utilization statistics	372	100.00
2	Forest	42	11.2
3	Barren and uncultivable land	29	7.79
4	Land put on non Agricultural use	13	3.45
5	Cultural waste land	23	6.13
6	Permanent pasture and other grazing land	19	5.10
7	Land under miscellaneous tree crops and groves not included in net area sown	0.3	0.080
8	Current fallows	6	1.64
9	Other fallows	7	1.88
10	Net area sown	208	55.91
11	Area sown more than once	53	14.24
12	Gross cropped area	261	70.16
13	Cropping intensity	136.4	

(Source\* District Socio- economic Review 2014 of respective district published by Govt. of M.S., Mumbai Source: <https://mahades.maharashtra.gov.in>)

## 4.5 Cropping Pattern

The usual cropping is determined by large number of factors. The most important factors are climate, soil, topography, customs and distance to market (Table 4).

**Table 4. Cropping pattern of Bhandara district**

Sl. No.	Crop	Total area ('000 ha)
1	Paddy	190.9
2	Wheat	3.7
	<b>Total cereals</b>	<b>194.6</b>
3	Gram	2.6
4	Tur	4.2
	<b>Total pulses</b>	<b>6.8</b>
5	Summer groundnut	0.1
6	Soybean	9.2
	<b>Total</b>	<b>9.3</b>
<b>Horticulture crops – Fruits</b>		
7	Mango	3.9
8	Chikoo	0.06
9	Citrus	0.1
10	Guava	0.1
11	Others	0.3
	<b>Total</b>	<b>4.46</b>
<b>Horticultural crops - Vegetables</b>		
12	Brinjal	1.2
13	Tomato	0.6
14	Chilli	0.7
15	Lady finger	0.5
16	Leafy vegetables	0.5
17	Others	1.4
	<b>Total</b>	<b>4.9</b>

(Source\* District Socio- economic Review 2014 of respective district published by Govt. of M.S., Mumbai Source: <https://mahades.maharashtra.gov.in>)

## 4.6 Crop Season

There are two important crop seasons i.e. *Kharif* and *Rabi* where as in summer season land generally remains fallow and preparatory tillage operations are under taken.

**Table 5. Crop rotation of the Bhandara district**

Sl. No.	Sowing window for 5 major field crops	Paddy Nursery	Soybean	Pigeon pea	Linseed	Gram
1	Kharif- Rainfed	15 June – 10 July	15 June – 15 July	15 June – 7 July	-	-
2	Kharif-Irrigated	10 June – 20 June	-	-	-	-
3	Rabi- Rainfed	-	-	-	1-15 Oct	1-15 Oct.
4	Rabi-Irrigated	-	-	-	15 Oct- 15 Nov.	15 Oct – 25 Oct.

Paddy and Soybean are important crops grown in *Kharif* season on large scale. Tur, mung, udid, are also grown in *Kharif* on large scale. Paddy crop is grown by the farmers on large area. Wheat, Gram and Sugarcane are important *Rabi* crops grown in the area. Linseed, Sunflower, Safflower, some spices and vegetable, fruit crops are also grown in *Rabi* season wherever the sources of irrigation is available mostly through wells and cannel, and river.

## 4.7 Input Supply

Agricultural inputs like seed, manure, fertilizers, insecticides, pesticides etc. are required by the farmers are made available to them through number of agricultural service centers established at district level and block level.

Maharashtra State Seed Corporation Ltd., Dr. PDKV, Akola and other private seed companies supply the quality seeds to the farmers.

The farm inputs are made available to the farmers by co-operative societies and nationalize banks functioning at block level, panchayat samiti also provide inputs to the farmers. Co-operative society supply input against the loan sanctioned by the District Central Co-operation Bank to individual cultivator.

#### **4.8 Markets**

For the marketing of agricultural produce, agricultural produce market committees are functioning in the district. All seven tahsils having facilities of regulated markets functioning in the district. These sub-markets are connected with roads and having facilities of banking, electricity, etc.

## CHAPTER V

### RESULTS AND DISCUSSION

The data collected by adopting the procedure presented earlier in the methodology. The results obtained from the analysis of the data in accordance of the study objectives along with logical discussion have been given to interpret the observed phenomena. With the help of findings of the research studies conducted easier in the field also been taken into account to defend the interpretation given here. The results of the study are presented under the following suitable sub-headings.

- 5.1 Profile of the paddy growers
- 5.2 Technological gap in respect of recommended cultivation practices of SRI method of paddy
- 5.3 Relational analysis
- 5.4 Reasons for technological gap in adoption of recommended cultivation practices of paddy
- 5.5 Empirical research model

#### **5.1 Profile of the Paddy growers**

The study of personal, socio-economical and psychological characteristics were made with reference to age, education, land holding, occupation, farming experience, area under paddy cultivation, annual income, source of information, innovativeness, risk preference, economic motivation and knowledge. The results have been presented under the following sub-heads.

##### **5.1.1 Age**

Age is important factor, which determines the role of farmers in adoption of improved practices. The distribution of the paddy growers according to age was ascertained and has presented in Table 6.

The distributional analysis pertaining to age of the paddy growers in Table 6 indicates that half of the paddy growers (50.00%) were found in the middle age group of 36 to 50 years, followed by 39.00 per cent appeared in old age category that is above 50 years. A very few of the paddy growers (11.00%) were observed in young age group of up to 35 years.

It can therefore conclude from the above findings that paddy growers were mostly middle age farmers. These findings were in conformity with the finding of Sachinkumar (2000), Gedam (2007) and Sagane *et al.* (2010).

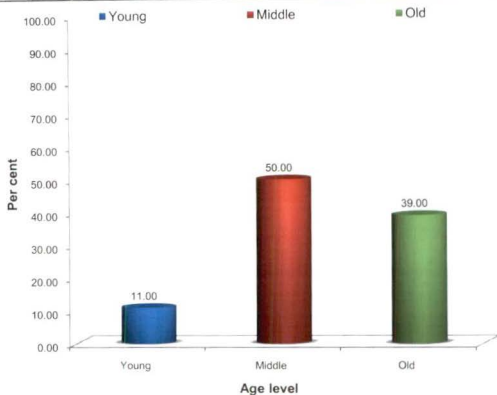
**Table 6. Distribution of the paddy growers according to their age**

Sl. No.	Age	Respondents (n=100)	
		Number	Percentage
1	Young (up to 35)	11	11.00
2	Middle (36 to 50)	50	50.00
3	Old (Above 50)	39	39.00
	<b>Total</b>	<b>100</b>	<b>100.00</b>

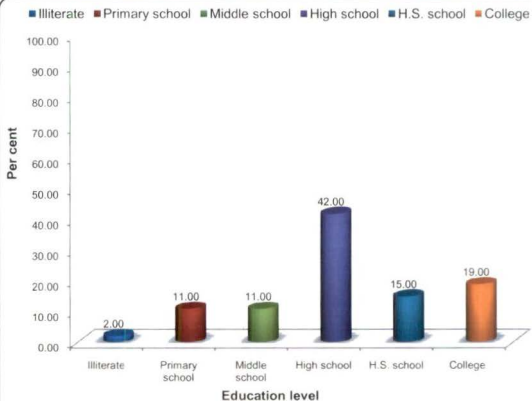
### 5.1.2 Education

It was considered as one of the most important variable with the help of which social change can be achieved. The education level of the paddy growers was studied and the result has been presented in Table 7.

It could be noticed from Table 7, that relatively higher percentage of paddy growers were educated up to high school level (42.00 %), followed by 19.00 per cent of paddy growers were educated up to college level. Further, it was found that 15.00 per cent of the paddy growers were educated up to higher secondary school level, followed by equal percentage i.e. 11.00 per cent of the respondent educated up to middle school and primary school. However, the remaining only 02.00 per cent of respondent were observed illiterate.



**Fig. 3. Distribution of the paddy growers according to their age**



**Fig. 4. Distribution of the paddy growers according to their education**

It can be concluded from above findings that higher percentage of the paddy growers i.e. 42.00 per cent educated up to high school level. These results were similar to the results obtained by Pooja (2014).

**Table 7. Distribution of the paddy growers according to their education**

Sl. No.	Education	Respondents (n=100)	
		Number	Percentage
1	Illiterate	02	02.00
2	Primary school	11	11.00
3	Middle school	11	11.00
4	High school	42	42.00
5	Higher secondary school	15	15.00
6	College	19	19.00
	<b>Total</b>	<b>100</b>	<b>100.00</b>

### 5.1.3 Land holding

Land holding is the major key component of the farm occupation. It provide a workable area to the farmer so that he can get more chances to apply new recommended cultivation practices SRI method of paddy and hence it has been considered in the present study. Distribution of the paddy growers according to land holding is presented in Table 8.

It was observed from the Table 8, that 35.00 per cent of the paddy growers possessed small size land holding, followed by 31.00 per cent having marginal category of land holding and 23.00 per cents of the paddy growers who possessed land 2.01 to 4 ha and belonging to semi-medium land holding category. Further, it was found that 08.00 per cent of the paddy growers who possessed land 4.01 to 10 ha and belonging to medium land holding category. The percentage of the paddy growers belongs to large land holding above 10.00 ha was only 03.00 per cent.

Thus, it was concluded that majority of the paddy growers possessed small size land holding. Similar finding were reported by Dudhe (2002) and Pranita (2012) who observed that majority of the paddy growers possessed small size land holding.

**Table 8. Distribution of the paddy growers according to their land holding**

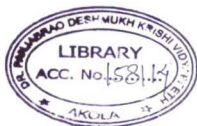
Sl. No.	Land holding	Respondents (n=100)	
		Number	Percentage
1	Marginal (up to 1.00 ha)	31	31.00
2	Small (1.01 to 2.00 ha)	35	35.00
3	Semi-medium (2.01 to 4.00 ha)	23	23.00
4	Medium (4.01 to 10.00 ha)	08	08.00
5	Large (Above 10.00 ha)	03	03.00
	<b>Total</b>	<b>100</b>	<b>100.00</b>

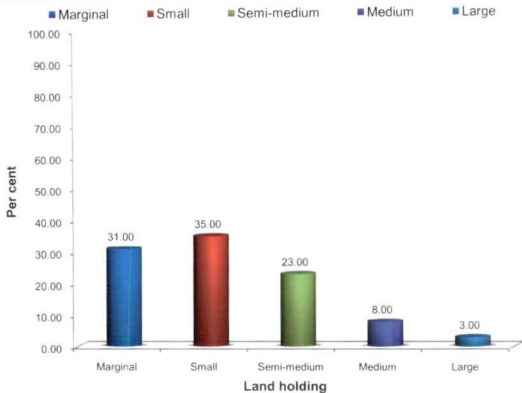
#### 5.1.4 Occupation

The occupation of the paddy growers was studied and the result has been presented in Table 9.

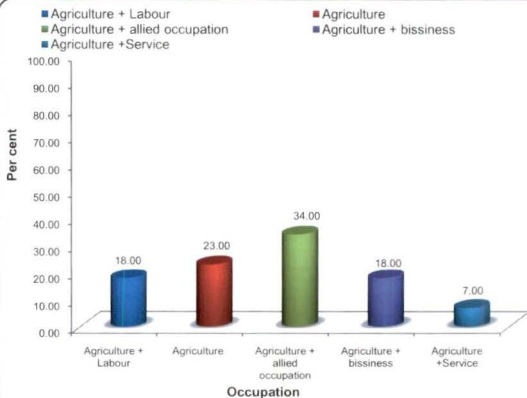
From the distribution Table 9, it is observed that the majority of the paddy growers 34.00 per cent had their main occupation agriculture plus allied occupation, it was followed by 23.00 per cent paddy growers having occupation agriculture. Equal percentage i.e. 18.00 per cent of the respondent had occupation agriculture labour and agriculture plus business. Only 07.00 per cent of the paddy growers having occupation agriculture plus services.

It could be therefore concluded that, most of the paddy growers had occupation is agriculture plus allied occupation.





**Fig. 5. Distribution of the paddy growers according to their land holding**



**Fig. 6. Distribution of the paddy growers according to their occupation**

**Table 9. Distribution of the paddy growers according to their occupation**

Sl. No.	Occupation	Respondents (n=100)	
		Number	Percentage
1	Agriculture + labour	18	18.00
2	Agriculture (Farming)	23	23.00
3	Agriculture + Allied Occupation	34	34.00
4	Agriculture + Business	18	18.00
5	Agriculture + Service	07	07.00
	<b>Total</b>	<b>100</b>	<b>100</b>

### 5.1.5 Farming experience

Experience was the important factor in influencing the paddy growers in terms of knowledge and adoption. The results obtained have been presented in Table 10. The paddy growers were categorized as below.

From Table 10, it was apparent that 93.00 per cent of the paddy growers had experience of above 10 years in paddy cultivation. It was followed by 06.00 per cent paddy growers who had experience from 6 to 10 years in paddy cultivation and only 01.00 per cent of the paddy growers had experience up to 5 years.

It could be therefore concluded that, most of the paddy growers had high level of experience in paddy cultivation. Similar finding were reported by Bhole *et al.* (2011).

**Table 10. Distribution of the paddy growers according to their experience in paddy cultivation**

Sl. No.	Experience in paddy cultivation	Respondents (n=100)	
		Number	Percentage
1	Low (up to 5 yr)	01	01.00
2	Medium (6 to 10 yr)	06	06.00
3	High (above 10 yr)	93	93.00
	<b>Total</b>	<b>100</b>	<b>100.00</b>

### 5.1.6 Area under paddy cultivation

The area under paddy of the paddy growers was studied and the result has been presented in Table 11.

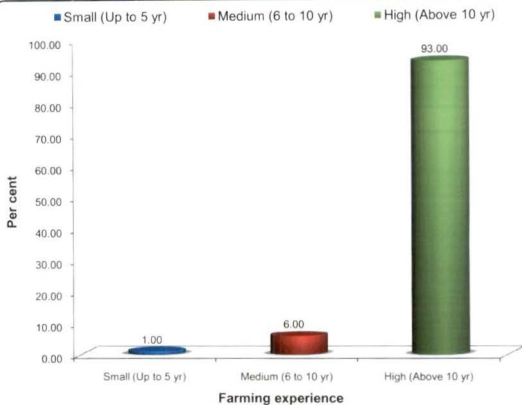
It is revealed from Table 11, that majority of the paddy growers (35.00%) had put the area under paddy crop ranged between 1.01 to 2 ha. It was followed by 32.00 per cent paddy growers who had area under paddy crop ranged up to 1.00 ha followed by 22.00 per cent of them put the area under paddy crop ranged between 2.01 to 4.00 ha category. Only 08.00 per cent and 03.00 per cent of them put the area under paddy crop ranged between 4.01 to 10.00 and above 4.00 ha category, respectively.

Thus, it could be inferred that majority of the paddy growers (35.00%) had put the area under paddy crop ranged between 1.01 to 2 ha.

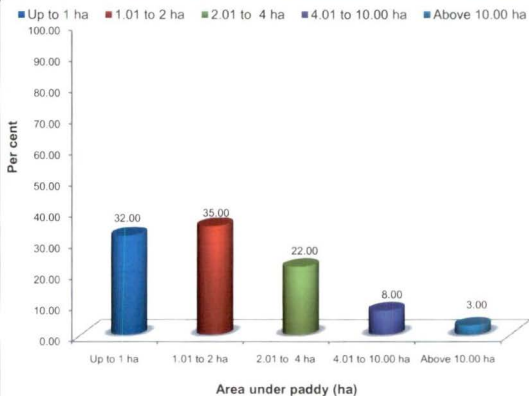
Similar results was obtained by Gharade (2004) and Dhenge (2013) who reported that majority of the paddy growers (38.67%) and (37.50%) had put the area under paddy crop ranged between 1.01 to 2 ha category.

**Table 11. Distribution of the paddy growers according to their area under paddy cultivation**

Sl. No.	Area under paddy (ha)	Respondents (n=100)	
		Number	Percentage
1	Up to 1.00 ha	32	32.00
2	1.01 to 2.00 ha	35	35.00
3	2.01 to 4.00 ha	22	22.00
4	4.01 to 10.00 ha	08	08.00
5	Above 10.00 ha	03	03.00
	<b>Total</b>	<b>100</b>	<b>100.00</b>



**Fig. 7. Distribution of the paddy growers according to their farming experience**



**Fig. 8. Distribution of the paddy growers according to area under paddy cultivation**

### 5.1.7 Annual income

Annual income provides availability of capital for farming. The results obtained have been presented in Table 12.

From the distribution of the paddy growers according to annual income, data presented in Table 12 revealed that majority of the paddy growers (63.00%) had annual income of up to Rs.1,00,000/-, followed by one fourth of them (20.00%) had annual income above Rs. 2,00,001/-. Whereas, 17.00 per cent of them had annual income in the range of Rs. 1,00,001/- to 2,00,000/-. Thus, it is concluded that majority (63.00%) of the paddy growers belonged to Rs. up to 1,00,000/- of annual income category.

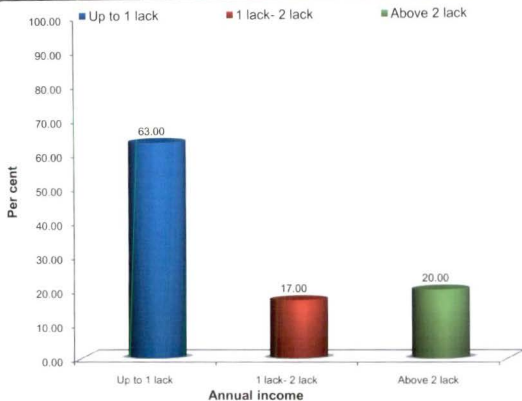
The above findings are in consonance with the finding of Kadam *et al.* (2010).

**Table 12. Distribution of the paddy growers according to their annual income**

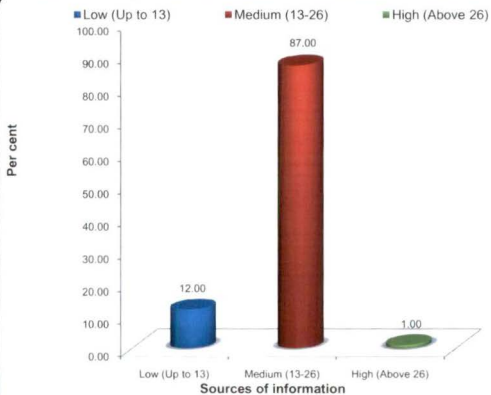
Sl. No.	Annual income (Rs.)	Respondents (n=100)	
		Number	Percentage
1	Up to 1,00,000/-	63	63.00
2	1,00,001 to 2,00,000/-	17	17.00
3	Above 2,00,001/-	20	20.00
	<b>Total</b>	<b>100</b>	<b>100.00</b>

### 5.1.8 Sources of information

The individual is likely to use different sources for getting information about recommended SRI method of paddy cultivation practices. The results obtained have been presented in Table 13.



**Fig. 9. Distribution of the paddy growers according to their annual income**



**Fig. 10. Distribution of the paddy growers according to their sources of information**

It is observed from Table 13, that majority of the paddy growers (87.00%) were having medium level sources of information, about 12.00 per cent of the paddy growers were having low level sources of information. Only 01.00 per cent of the paddy growers were having high level sources of information about SRI method of paddy cultivation practices.

It could be therefore concluded that, most of the paddy growers had medium level of use of sources of information. The similar findings were reported by Gharade (2004), Gedam (2007) and Dhenge (2013)

**Table 13. Distribution of the paddy growers according to sources of information**

Sl. No.	Sources of information	Respondents (n=100)	
		Number	Percentage
1	Low (up to 13)	12	12.00
2	Medium (13-26)	87	87.00
3	High (above 26)	01	01.00
	<b>Total</b>	<b>100</b>	<b>100.00</b>

### 5.1.9 Innovativeness

The distribution of the paddy growers according to their innovativeness has been presented in Table 14.

It is seen from the data presented in Table 14, that more than half (54.00%) of the paddy growers included in the category of medium innovativeness followed by 46.00 per cent paddy growers with high innovativeness and 00.00 per cent respondent have low level innovativeness.

From the above observation it, has been clearly observed that majority of the farmers have medium level innovativeness. Similar finding were reported by Ingle (2011) and Dohtare (2014).

**Table 14. Distribution of the paddy growers according to their innovativeness**

Sl. No.	Innovativeness	Respondents (n=100)	
		Number	Percentage
1	Low (up to 6)	00	00.00
2	Medium (6-12)	54	54.00
3	High (above 12)	46	46.00
	<b>Total</b>	<b>100</b>	<b>100.00</b>

### 5.1.10 Risk preference

The distribution of the paddy growers according to their risk preference is shown in Table 15.

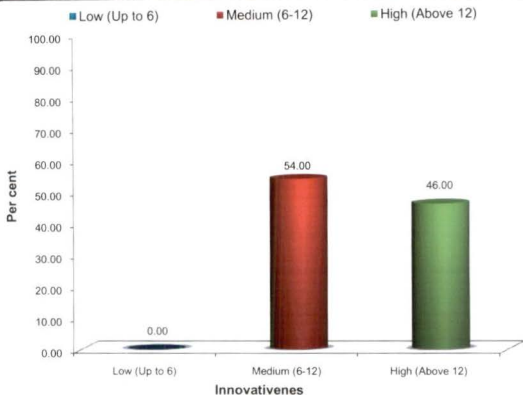
It was observed that higher number of the paddy growers (91.00%) found to be in the medium level of risk preference, followed by only 09.00 per cent in high level of risk preference, whereas, no one were found to be in low level of risk preference category.

It must be said that more number of the paddy growers were preference towards the medium level (91.00%) risk preference.

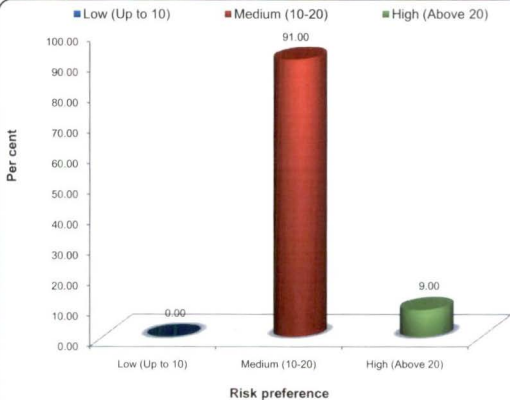
The results are similar to Ghodichor (2004) and Dhenge (2013) who stated that medium level of risk preference.

**Table 15. Distribution of the paddy growers according to their risk preference**

Sl. No.	Risk preference	Respondents (n=100)	
		Frequency	Percentage
1	Low (up to 10)	00	00.00
2	Medium (10-20)	91	91.00
3	High (above 20)	09	09.00
	<b>Total</b>	<b>100</b>	<b>100</b>



**Fig. 11. Distribution of the paddy growers according to their innovativeness**



**Fig. 12. Distribution of the paddy growers according to their risk preference**

### 5.1.11 Economic motivation

The distribution of the paddy growers according to their economic motivation is shown in Table 16.

The distribution of the paddy growers as per economic motivation in Table 16 reported that, majority of the paddy growers (73.00%) had medium level of economic motivation, followed by 27.00 per cent paddy growers who were high in economic motivation. And no one found in low level of economic motivation. The majority of the paddy growers were found to be in medium level economic motivation.

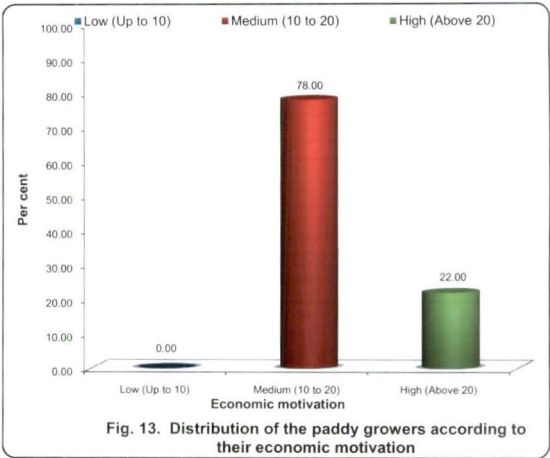
Similar findings were reported by Gedam (2007), Meshram (2008) and Dhenge (2013), they observed that majority of the paddy growers in medium level of economic motivation category.

**Table 16. Distribution of the paddy growers according to their economic motivation**

Sl. No.	Economic motivation	Respondents (n=100)	
		Number	Percentage
1	Low (up to 10)	00	00.00
2	Medium (10-20)	73	73.00
3	High (above 20)	27	27.00
	<b>Total</b>	<b>100</b>	<b>100.00</b>

### 5.1.12 Knowledge

Adequate and relevant knowledge of SRI method of paddy cultivation practices by the paddy growers has relevance in obtaining maximum benefit through production. Looking to the importance of knowledge, paddy growers knowledge was studied practice wise and the data in this regards has been presented in Table 17.



A critical look towards practice wise knowledge in the Table 17 revealed that 89.00 per cent of the paddy growers having knowledge about type of soil suitable for paddy crop.

With regards the knowledge about recommended varieties of paddy, it was found that higher percentage of paddy growers (84.00%) had knowledge about medium duration varieties, followed by 76.00 per cent had knowledge about long duration varieties, followed by 68.00 per cent had knowledge about short duration varieties, followed by 36.00 per cent had knowledge about scented varieties and only 04.00 per cent paddy growers had knowledge about hybrid varieties of paddy.

While, studying the knowledge about raising nursery. It was seen that nearly cent per cent of paddy growers 100.00 per cent had knowledge about time of seed sowing in raised bed, followed by 91.00 per cent of paddy growers had knowledge about uniform broadcasting, 84.00 per cent of paddy growers had knowledge about seed soaking, about 72.00 per cent of paddy growers had knowledge about bed preparation. With regards with the knowledge of seed treatment 41.00 per cent of paddy growers had knowledge about seed treatment. And only 04.00 per cent of paddy growers had knowledge about transfer the soaked seed into a gunny bag for 24 hour for seed germination.

As regards to the knowledge about puddling, it is seen that cent per cent of paddy growers 100.00 per cent had knowledge about use markers, vogue majority 93.00 per cent of paddy growers had good knowledge about leveling of field. It was followed by 69.00 per cent of paddy growers had knowledge about wide spacing, only 06.00 per cent of paddy growers had knowledge about ideal ploughing method and knowledge about leaving path for every 2 meter.

While, studying the knowledge about transplanting, it is seen that 89.00 per cent of the paddy growers had knowledge about

seedling/hill. And 44.00 per cent of paddy growers had knowledge about age of seedling for transplant.

While, studying the knowledge about nutrient management, it was seen that 87.00 per cent of paddy growers had knowledge about recommended first does of fertilizer, followed by 66.00 per cent of paddy growers had knowledge about third does of chemical fertilizer for paddy. It is followed by 59.00 per cent of paddy growers had knowledge about recommended does of fertilizer before ploughing and 45.00 per cent of paddy growers had knowledge about second dose chemical fertilizer.

However, 16.00 per cent of paddy growers had awareness knowledge about water management. And 12.00 per cent of paddy growers had knowledge about weed management.

While, assessing the awareness knowledge about important pest and diseases, it was observed that majority of paddy growers (78.00%) had knowledge about pest of paddy. And 75.00 per cent of paddy growers had knowledge about diseases of paddy.

About 76.00 per cent of paddy growers had knowledge about use of pesticide, 37.00 per cent of paddy growers had knowledge about use of resistance varieties. 21.00 per cent of paddy growers had knowledge about use of *Trichogramma* spp., 13.00 per cent of paddy growers had knowledge about rope dragging, 11.00 per cent of paddy growers had knowledge about clip off the leaf tip before transplanting. And only 01.00 per cent of paddy growers had knowledge about clean cultivation. Further, in case of disease management 75.00 per cent of paddy growers had knowledge about seed treatment and 70.00 per cent of paddy growers had knowledge about use of chemicals.

It was surprising to note that 100.00 per cent of paddy growers had knowledge about time of harvesting and threshing of paddy.

**Table 17. Distribution of paddy growers according to their practice wise knowledge about recommended SRI method of paddy cultivation practices**

Sl. No.	Recommended paddy cultivation practices	Respondents (n=100)	
		Freq- uency	Perce- ntage
<b>A)</b>	<b>Land preparation</b>		
1.	Do you know which soil suitable for SRI method of paddy (Rich in organic matter)	89	89.00
<b>B)</b>	<b>Recommended varieties</b>		
1.	Do you know the short duration varieties of paddy (Sakoli-6, Sindewahi-1)	68	68.00
2.	Do you know the medium duration varieties of paddy (PKV Ganesh, Sindewahi-4, PKV- HMT, Sindewahi-2001)	84	84.00
3.	Do you know the long duration varieties of paddy (Sindewahi -5, Sakoli-8)	76	76.00
4.	Do you know the scented varieties of paddy (Sakoli-7, PKV-Makarand, PKV- Khamang)	36	36.00
5.	Do you know the hybrid varieties of paddy (Sahyadri)	04	04.00
<b>C)</b>	<b>Raising Nursery</b>		
1.	Bed preparation		
a	Do you know the size of raised bed required/acre (length- as necessary, wide- 4 feet, height- 5-6 inch, 400sq. ft/acre or 4 beds of 4x25 feet)	72	72.00
2.	Seed required		
a	Do you know the recommended seed rate for SRI method of paddy (2 kg /acre or 5 kg/ ha)	41	41.00
3.	Seed soaking, broadcasting		
a	Do you know required hours for seed soaking of paddy (12 hr)	84	84.00
b	Does it required transfer the soaked seed into a gunny cloth/bag or make a heap and cover it with gunny cloth for 24 hour for seed germination (Yes)	04	04.00
c	Uniform broadcasting is necessary (Yes)	91	91.00
4.	What is time of seed sowing in raised bed (onset of monsoon Jun-July)	100	100.00
<b>D)</b>	<b>Preparation of main field</b>		
1.	Puddling		
a	Do you know ideal ploughing method for SRI system (Dry plough, without tractor)	06	06.00
b	Do you know the leveling of field (Used levels)	93	93.00

2.	Wide spacing		
a	Do you know spacing required for SRI method (25×25 cm r to r and p to p, or 10×10 inches)	69	69.00
3.	Use markers		
a	What type of marker you used for making spacing (Rope, stick, marker made out of wood as well as iron)	100	100.00
4.	Leaving pathway		
a	Do you know to leave paths for every 2 meter (Yes)	06	06.00
<b>E)</b>	<b>Transplanting</b>		
a	What is the age of seedling for transplant (8-12 days)	44	44.00
b	How deep seedling are to be transplanted (1 seedling/hill, depth 2-3 cm deep)	89	89.00
<b>F)</b>	<b>Nutrient management</b>		
1.	Do you know recommended dose of fertilizer before ploughing (FYM/compost 10-12 t/ha)	59	59.00
2.	What is recommended first dose of chemical fertilizer/ha? (50% of recommended fertilizer (NPK) i.e., 50:30:20 kg NPK in kharif and 60:30:20 kg in rabi)	87	87.00
3.	What is recommended second dose of chemical fertilizer/ha (25% of N i.e., 25 kg/ha at the time of second weeding)	45	45.00
4.	What is recommended third dose of chemical fertilizer/ha (25% of N i.e., 25 kg/ha)	66	66.00
<b>G)</b>	<b>Water management</b>		
1.	What is the water level recommended to keep in paddy field? (SRI method does not require continuous flooding irrigation is given to maintain soil moisture. After panicle initiation stage until maturity, one inch of water should be maintain in the field. The water can be removed after 70% of grains get hardened.	16	16.00
<b>H)</b>	<b>Weed management</b>		
1.	How to manage the weed in SRI system of paddy cultivation (By using weeder on 10 <sup>th</sup> and 20 <sup>th</sup> day after transplantation. Then after 10-15 days interval.	12	12.00
<b>I)</b>	<b>Pest and disease management</b>		
1.	Knowledge about pest of paddy crop		
a	Name of the major pest of paddy (Stem borer, Rice hispa, Rice gundhi bug, Brown plant hopper, Rice case worm, Green leaf hopper, Rice grass hopper, Rice gall midge, Rice thrips)	78	78.00
2.	Knowledge about diseases of paddy crop		
a	Name of major diseases (Blast, Bacterial leaf blight of rice, Brown leaf spot, Khaira disease, Tungro disease, Grassy stunt, Udbatta disease, False smut, Neck blast)	75	75.00

3.	How to manage pest		
a	Use resistance varieties	37	37.00
b	Rope dragging (Army worm)	21	21.00
c	Use <i>trichogramma</i> spp.	13	13.00
d	Use of pesticide	76	76.00
e	Clip off the leaf tip before transplanting (Rice hispa, Stem borer)	11	11.00
f	Clean cultivation (Rice gundhi bug)	01	01.00
4.	How to manage diseases		
a	Seed treatment	75	75.00
b	Use chemicals	70	70.00
<b>J)</b>	<b>Harvesting and Threshing</b>		
1.	Which period is suitable for harvesting of paddy? (When 90% grains are matured, harvest the paddy on 25-30 days after panicle initiation.)	100	100.00
2.	Which period is suitable for threshing of paddy? (After complete drying the crop threshing should be done.)	100	100.00

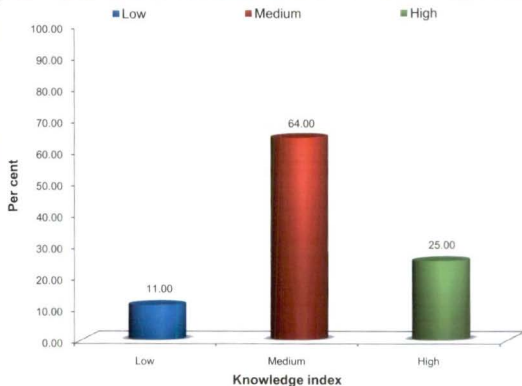
Distribution of paddy growers according to their knowledge levels was ascertained and presented in Table 18.

The knowledge possessed by the paddy growers indicated in Table 18, that majority of the paddy growers (64.00%) were having medium level of knowledge of SRI method of paddy cultivation. While, 25.00 per cent of the paddy growers were having high level of knowledge and 11.00 per cent of paddy growers were having low level of knowledge.

These findings were in conformity with the findings of Gedam (2007) and Dhenge (2013).

**Table 18.** Distribution of paddy growers according to their overall knowledge about recommended SRI method of paddy cultivation practices

Sl. No.	Knowledge level	Respondents (n=100)	
		Number	Percentage
1.	Low	11	11.00
2.	Medium	64	64.00
3.	High	25	25.00
	<b>Total</b>	<b>100</b>	<b>100.00</b>



**Fig. 14. Distribution of the paddy growers according to their overall knowledge about recommended SRI method of paddy cultivation practices**

## 5.2 Dependent Variable

### 5.2.1 Practice wise extent of technological gap in recommended SRI method of paddy cultivation

The technological gap of various practices connected with paddy growing by paddy growers was further ascertained practice wise and the same have been reported in Table 19.

The practice wise distribution of the paddy growers according to extent of technological gap about recommended SRI method of paddy cultivation technology was ascertained and findings with respect to them are presented in Table 19.

In case of recommended practices of SRI method of paddy. It was observed that considerable higher percentage of paddy growers (89.00%) were observed in low technological gap category in land preparation practice and only 11.00 per cent paddy growers were observed in high technological gap about land preparation and none of the paddy growers were observed in category of medium technological gap.

With regards to recommended varieties of paddy, it was found that majority of the paddy growers (64.00%) were observed in medium technological gap, whereas 32.00 per cent of the paddy growers were observed in high technological gap and only 04.00 per cent of paddy growers observed in category of low technological gap.

In case of raising nursery of paddy, it was observed that more than half of the paddy growers (54.00%) were observed in low category of technological gap, it was followed by 31.00 per cent paddy growers were observed in medium category of technological gap and 15.00 per cent of the paddy growers were observed in high category of technological gap.

In the practice of preparation of main field, majority of paddy growers (89.00%) were observed in medium level technological gap category, and 10.00 per cent of the paddy growers observed in high level

technological gap category. Only 01.00 per cent of the paddy growers were observed in low technological gap category.

In case of transplanting it was found medium i.e. more than fifty per cent (60.00%) of paddy growers were observed in high technological gap category and 89.00 per cent of the paddy growers were found in medium technological gap category and only 06.00 per cent of the respondent was observed in low technological gap category.

Further, it is summarized that high level technological gap observed in transplanting practice.

As regards technological gap about nutrient management for SRI method of paddy maximum percentage of paddy growers (46.00%) were observed in medium technological gap category, 39.00 per cent of the paddy growers were observed in low technological gap category and 15.00 per cent paddy growers were observed in high level technological gap category.

In case of water management practice, 94.00 per cent of paddy growers were observed in high level technological gap in water management, it was followed by 06.00 per cent paddy growers were observed in low level technological gap category and none of the paddy growers were observed in medium level technological gap category.

The average technological gap in weed management practice, majority of paddy growers (88.00%) were observed in high level of technological gap category, 12.00 per cent paddy growers were observed in low level technological gap category and none of the paddy growers were observed in medium level technological gap category.

With regards to technological gap about pest and disease management, it was observed that about 60.00 per cent of paddy growers were observed in medium technological gap. 40.00 per cent of the paddy growers were observed in high level technological gap category, and none of the paddy growers were observed in low level technological gap category.

It is surprising to note that, in case of harvesting 100.00 per cent of the paddy growers observed in low technological gap category and only none of the paddy growers were found in high category and medium category of technological gap. It has quite logical that due to cultivation of paddy from generation to generation, farmers had well experience in identifying the maturity stage of paddy leads to harvesting and threshing at proper time.

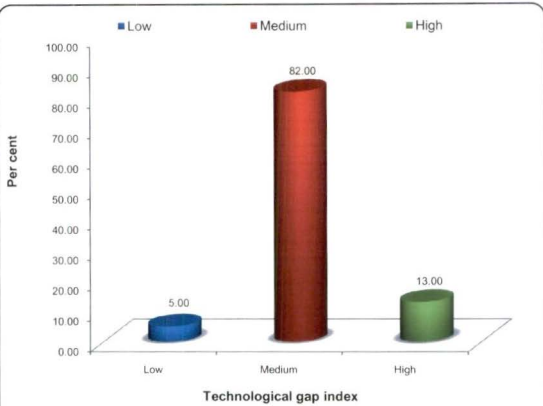
The present findings, wide gap in transplanting, and low gap in harvesting and threshing did get support from the observations of Gedam (2007).

**Table 19. Distribution of paddy growers according to their practice wise extent of technological gap in recommended SRI method of paddy cultivation practices**

Sl. No.	Recommended practices of SRI method of paddy	Technological gap (respondents (n=100))					
		Low		Medium		High	
		Freq.	%	Freq.	%	Freq.	%
A	Land preparation	89	89.00	00	00.00	11	11.00
B	Recommended varieties	04	04.00	64	64.00	32	32.00
C	Raising nursery	54	54.00	31	31.00	15	15.00
D	Preparation of main field	01	01.00	89	89.00	10	10.00
E	Transplanting	06	06.00	34	34.00	60	60.00
F	Nutrient management	39	39.00	46	46.00	15	15.00
G	water management	06	06.00	00	00.00	94	94.00
H	weed management	12	12.00	00	00.00	88	88.00
I	pest and disease management	00	00.00	60	60.00	40	40.00
J	Harvesting and threshing	100	100.00	00	00.00	00	00.00

### 5.2.2 Extent of technological gap index

The effort have been made to find out distribution of the paddy growers based on their level of existing technological gap between



**Fig. 15. Distribution of paddy growers according to technological gap index**

recommended and actual adoption of improved cultivation practices about SRI method by the paddy growers and presented as below –

It is evident of data in Table 20 that, 86.00 per cent of paddy growers were observed under medium level category of technological gap in adoption of recommended SRI method of paddy cultivation, followed by 10.00 per cent of paddy growers were observed in high level of technological gap and 04.00 per cent of paddy growers were found in low level category of technological gap. Similar result was reported by Badodia *et al.* (2002) and Goudappa *et al.* (2012).

**Table 20. Distribution of paddy growers according to technological gap index**

Sl. No.	Technological gap index	Respondents (n=100)	
		Number	Percentage
1.	Low	05	05.00
2.	Medium	82	82.00
3.	High	13	13.00
	<b>Total</b>	<b>100</b>	<b>100.00</b>

### 5.3 Relational Analysis

Efforts were made to find out the relationship of the selected characteristics of paddy growers with their technological gap in adoption of recommended cultivation practices SRI method of paddy. In order to find out the correlates of technological gap, the coefficients of correlation was worked out and have been presented as below.

#### 5.3.1 Correlation of coefficient of selected characteristics of paddy growers with their technological gap

The correlation coefficient of personal, socio-economical, situational and psychological characteristics of paddy growers with technological gap has been depicted in Table 21.

It could be seen from Table 21, that among selected variables education, source of information, risk preference, innovativeness and knowledge, were negatively and significantly correlated with the technological gap at 0.01 level of probability. Therefore, the null hypothesis for these characteristics were rejected.

However, the variable age, farming experience were found positively and significant correlate with technological gap at 0.01 level of probability.

The variable annual income and economic motivation were found negatively and significantly correlated with the technological gap at 0.05 level of probability. Therefore, the null hypothesis for these variables were rejected.

The variable land holding, occupation and area under paddy cultivation were non-significant.

The above results indicate that some of characteristics of the paddy growers have influence on technological gap levels. It is quite logical that paddy growers with high level education with higher farming experience, annual income, sources of information, innovativeness, risk preference, economic motivation and higher knowledge adopted more recommended practices for paddy crop and keeping low technological gap.

Similar findings were also reported by Badodia et.al. (2002) concluding education, sources of information and knowledge were significant correlated with technological gap.

Thyagarajan (2004) observed that educational status showed a negative and significant relationship with adoption. Sitadevi *et al.* (2009) revealed that age, annual income of paddy growers were positive and highly significant to adopt SRI technology by the paddy grower. Anuradha and Zala (2010) observed that the experience in rice cultivation and were the positive and significant factors. Singh and

Varshney (2010) revealed that risk preference was negatively contributing to the adoption of rice production technology.

**Table 21. Coefficient of correlation of selected characteristics of the paddy growers with their technological gap**

Sl. No.	Variable	'r' value's
1	Age	0.689**
2	Education	-0.530**
3	Land holding	-0.113 NS
4	Occupation	-0.104 NS
5	Farming experience	0.713**
6	Area under paddy cultivation	0.072 NS
7	Annual income	-0.244*
8	Source of information	-0.399**
9	Innovativeness	-0.384**
10	Risk preference	-0.296**
11	Economic motivation	-0.204*
12	Knowledge	-0.949**

\* Significant at 0.05 level of probability

\*\* Significant at 0.01 level of probability

NS Non Significant

#### **5.4 Reasons for Existence of Technological Gap in SRI Method of Paddy Cultivation Practices**

The attempt have been made to find out actual reasons behind existence of practice wise technological gap in SRI method of paddy cultivation technology and same has been depicted in Table 22.

The data presented in Table 22, revealed that reasons for technological gap in land preparation were non availability of labour (52.00%), non availability of FYM (32.00%), lack of moisture in soil (28.00%). In case of recommended varieties of paddy were lack of knowledge about recommended varieties (65.00%).

Regarding raising nursery, higher percentage of paddy growers were reported lack of knowledge about transfer of soaked seed into a gunny cloth/bag (96.00%), over half of the paddy growers (55.00%) opined that SRI method is a complicated method, followed by inadequate knowledge about recommended seed rate and chemical seed treatment and unknown about benefits of seed treatment (35.00%), lack of knowledge about bed preparation (28.00%), unavailability of good seed (25.00%), lack of knowledge about proper seed rate per ha (18.00%) and lack of knowledge about seed soaking and its benefits (16.00%).

While, studying the technological gap in puddling operation of paddy, lack of knowledge about ideal ploughing method and lack of knowledge about leaving pathway (94.00%), lack of knowledge about spacing and unavailability of markers were the reason as expressed by 31.00 and 28.00 per cent of paddy growers, respectively.

In case of transplanting, over half of the paddy growers (56.00%) reported lack of knowledge about age of seedling for transplanting and (54.00%) reported unequal distribution of rainfall was the main reason responsible for technological gap in transplanting operation. This was followed by high wage during transplanting (40.00%), non availability of irrigation facilities (38.00%), non availability of labour at proper time (20.00%) and lack of knowledge about transplanted one seedling/hill (11.00%).

As regards technologies for nutrient management, higher percentage of paddy growers were reported main reasons such as lack of knowledge about recommended dose of fertilizer (66.00%), high cost of fertilizers (47.00%), shortage of fertilizer with dealers at proper time (25.00%) and lack of income (16.00) were the reasons for technological gap in fertilizer application.

With respect to water management, unawareness about proper stages water level (88.00%), lack of knowledge about recommended water level for SRI method (84.00%) and drainage problem

due to heavy rainfall (44.00%) were the reasons perceived by paddy growers for existence of gap in recommended technologies for water management.

While, studying the reasons for existence of gap in weed management technology, it was observed that majority (90.00%) of the paddy growers reported weed problem in SRI method and lack of knowledge about how to manage the weed in SRI method (88.00%).

In respect of gap in technologies for plant protection, lack of technical and biological knowledge about plant protection measures (90.00%), followed by high cost of pesticides (85%), lack of knowledge about identification of diseases and pests (40.00) and un availability of labour for spraying (33.00) were the main reasons for technological gap in pest and disease management.

Delaying harvesting due to non availability of labour (54.00%) and non-availability of threshing machine (46.00%) were the main reasons as expressed by paddy growers for existence of technological gap in harvesting and threshing technology.

The present finding with respect to plant protection measures did support the findings of Shanmugasundaram and Helen (2015) noted that more weed, high labour cost, Non availability Markers, Lack of information on System of Rice Intensification were the major reasons in adoption of SRI method of paddy cultivation.

**Table 22. Reasons for existence of technological gap in SRI method of paddy cultivation practices**

Sl. No.	Reasons	Frequency (N=100)	Per cent (%)
<b>A)</b>	<b>Land preparation</b>		
1	Less moisture in soil	28	28.00
2	Non availability of labour	52	52.00
3	Non availability of FYM in village	32	32.00

<b>B</b>	<b>Recommended varieties</b>		
1	Lack of knowledge about recommended varieties	65	65.00
<b>C)</b>	<b>Raising nursery</b>		
1	Lack of knowledge about bed preparation	28	28.00
2	Lack of knowledge about proper seed rate per ha.	18	18.00
3	Unavailability of good seed	25	25.00
4	Lack of knowledge about seed soaking and its benefits.	16	16.00
5	Inadequate knowledge about recommended seed rate and chemical seed treatment	35	35.00
6	Lack of knowledge about transfer of soaked seed into a gunny cloth/ bag	96	96.00
7	Unknown about benefits of seed treatment	35	35.00
8	Complicated method	55	55.00
<b>D)</b>	<b>Puddling</b>		
1	Heavy hiring charges for power tiller/ tractor	25	25.00
2	Lack of knowledge about ideal ploughing method	94	94.00
3	Lack of knowledge about spacing between two rows and plant to plant	31	31.00
4	Unavailability of markers	28	28.00
5	Lack of knowledge about leaving pathway	94	94.00
<b>E)</b>	<b>Transplanting</b>		
1	Lack of knowledge about age of seedling for transplanting	56	56.00
2	Lack of knowledge about transplanted 1 seedling/hill.	11	11.00
3	Unequal distribution of rainfall	82	82.00
4	High wages during transplanting	40	40.00
5	Non availability of labour at proper time	20	20.00
6	Non availability of irrigation facilities	57	57.00

<b>F)</b>	<b>Nutrient management</b>		
1	High cost of fertilizer	47	47.00
2	Lack of income	16	16.00
3	Lack of knowledge about recommended fertilizer doses and importance of N, P and K.	66	66.00
4	Shortage of fertilizer with dealers at proper time (shop, society).	25	25.00
<b>G)</b>	<b>Water management</b>		
1	Lack of knowledge about recommended water level for SRI method	84	84.00
2	Drainage of water was not possible due to heavy rainfall	44	44.00
3	Unawareness about proper stages of water level	88	88.00
<b>H)</b>	<b>Weed problem</b>		
1	Lack of knowledge about how to manage the weed	88	88.00
2	Weed problem	90	90.00
<b>I)</b>	<b>Pest and disease management</b>		
1	Lack of knowledge about identification of diseases and pests.	40	40.00
2	High cost of pesticides	85	85.00
3	Lack of technical and biological knowledge about plant protection measures	90	90.00
5	Unavailability of labour for spraying	33	33.00
<b>J)</b>	<b>Harvesting and threshing</b>		
1	Non availability of threshing machine	46	46.00
2	Unavailability of labour causes delay in harvesting	54	54.00

## 5.5 Empirical Model of Study

Keeping in view, anticipated relation amongst independent and dependent variables and actual results obtained after analysis of data an empirical model of relations were prepared and relationship has been depicted in Fig. 16. The empirical model shows observed relation of independent variables with the dependent variable.

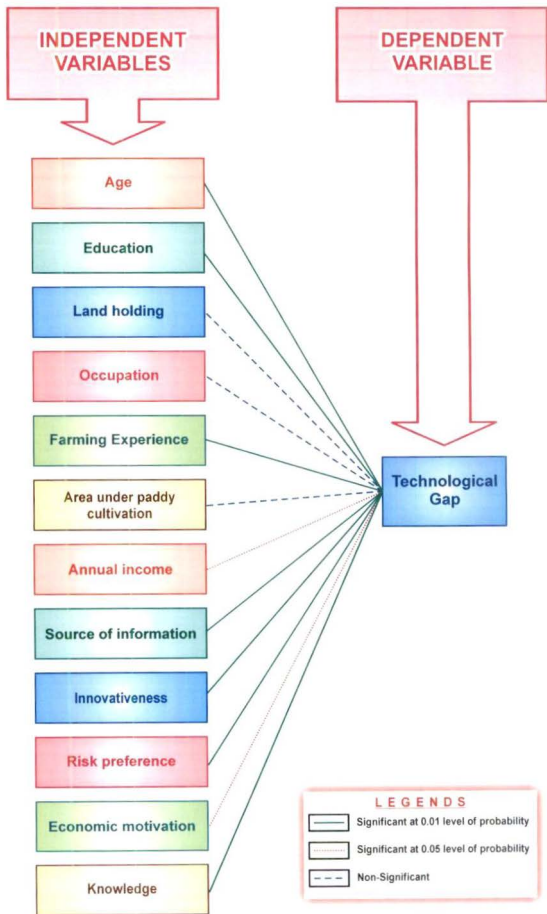


Fig. 16. Empirical model of the research study



*Chapter VI*

*Summary and  
Conclusions*

## CHAPTER VI

### SUMMARY AND CONCLUSION

The present study "Technological gap in adoption of SRI method of paddy cultivation in Bhandara district." was conducted in Lakhani and Sakoli Panchayat Samiti of Bhandara district. The study was planned to investigate the technological gap of recommended package of practices of SRI method of paddy. It was also thought to be worthwhile to ascertain the reasons of paddy grower in technological gap about recommended package of practices of SRI method of paddy. Keeping this view in mind, the study was carried out with the following objectives.

1. To study the personal, socio-economic and psychological characteristics of paddy growers.
2. To study the extent of knowledge to paddy grower about recommended cultivation practices of SRI method.
3. To study the extent of technological gap between recommended and actual adopted cultivation practices of SRI method by paddy growers.
4. To ascertain the reasons for existence of technological gap in SRI method of paddy cultivation practices.

The exploratory design of social research was used for the present investigation.

The sample was drawn from Lakhani and Sakoli Panchayat Samiti of Bhandara district in Maharashtra state. From Lakhani Panchayat Samiti 5 villages were selected and from Sakoli Panchayat Samiti 5 villages were selected on the basis of large no of paddy growers. The list of the farmers in the selected villages was prepared in consultation with Taluka Agriculture Officer and Agriculture Assistant. From the list 10 farmer were selected purposively from each village by disproportionate random sampling method. Thus, 100 farmers constituted the sample for

the study. Data were collected by personally interviewing the respondents with help of pre-tested and structured interview schedule. The data collected were tabulated and the statistical tools namely mean, standard deviation, percentage, frequency, coefficient of correlation analysis were employed for interpretation of the findings. Null hypothesis set for the study were tested for its acceptance or rejection.

The characteristics of the farmers namely age, education, land holding, occupation, farming experience, area under paddy cultivation, annual income, sources of information, innovativeness, risk preference, economic motivation and knowledge were studied as independent variables. Whereas, technological gap was studied as dependent variable. Reason for technological gap was also studied for each cultivation practice.

## **6.1 Findings**

The salient findings of the study are summarized in succeeding paragraphs.

### **6.1.1 Profile of the respondents**

1. Nearly half of the respondents (50.00%) were found in the middle age group of 36 to 50 years.
2. About 42.00 per cent of the respondents were educated up to high school.
3. Regarding land holding, 35.00 per cent of the respondents were possessed small category of land holding.
4. Agriculture plus allied occupation was the main occupation of 34.00 per cent respondents.
5. In majority, 93.00 per cent respondents were found in high category of experience in paddy cultivation.
6. As per the area under paddy cultivation, 35.00 per cent of the respondents having 1.01 to 2 ha area under paddy cultivation.

7. Most of the respondents annual income was found in the range of Rs. Up to 1,00,000/-
8. Maximum number of the respondents (87.00%) were found mediocre in use of sources of information.
9. Over half of the respondents (54.00%) were found in medium level of innovativeness.
10. Highest per cent of the respondents (91.00%) were found in medium level of risk preference.
11. About 73.00 per cent respondents were found to be in high economic motivation category.
12. Maximum percentage of respondents (64.00%) possessed medium knowledge level about SRI method of paddy cultivation technology.
13. About 82.00 per cent respondents were found in medium level of technological gap.

As regards to practice wise knowledge, majority of respondents had knowledge about land preparation, recommended varieties, bed preparation, seed soaking, leveling of field, use markers, knowledge about pest and diseases, transplanting, harvesting and threshing.

While, higher percentage of the respondents had poor knowledge about scented varieties, hybrid varieties, seed required, transfer of soaked seed into a gunny bag, ideal ploughing method, leaving pathway, water management, weed management and management of pest.

#### **6.1.2 Practice wise extent of technological gap in recommended SRI method of paddy cultivation practices**

In overall low, technological gap was found in land preparation (89.00%), raising nursery (54.00%) and harvesting and threshing of paddy (100.00%). Whereas, high technological gap was

found in transplanting (60.00%), water management (94.00%) and weed management (88.00%). While medium technological gap was found in the practices were, recommended varieties (64.00%), preparation of main field (89.00%), nutrient management (46.00%) and pest and disease management.

### **6.1.3 Relational analysis**

#### **6.1.3.1 Technological gap**

The selected characteristics of paddy growers *viz.*, education, source of information, risk preference, innovativeness and knowledge, were negatively and significantly correlated with the technological gap at 0.01 level of probability. Therefore the null hypothesis was rejected, for these characteristics shows that there exists significantly relation with technological gap of recommended SRI method of paddy cultivation practices. Whereas, annual income and economic motivation were found negatively and significantly correlated with the technological gap at 0.05 level of probability. Therefore, the null hypothesis for these variables was also rejected.

However, the variables age and farming experience were found positively and significantly correlate with technological gap at 0.01 level of probability. Therefore the null hypothesis for these variables was also rejected.

#### **6.1.4 Reasons with regards to technological gap in recommended cultivation practices of SRI method of paddy cultivation**

The findings related with perceived reasons associated with major practice wise technological gap of SRI method of paddy cultivation technology revealed that, In case of raising nursery lack of knowledge about transfer of soaked seed into gunny bag (96.00%). While in case of puddling operation, lack of knowledge about ideal ploughing and lack of knowledge about leaving pathway (94.00%) was the main reason for technological gap. 90.00 per cent of respondents mention weed problem as major reason for technological gap. In case of water management

unawareness about proper stages of water level (88.00%). And 85.00 per cent of respondents mention high cost of pesticides. In case of transplanting unequal distribution of rainfall (82.00%). It was found that lack of knowledge about recommended fertilizer doses and importance of N, P, and K (66.00%). In case of land preparation non availability of labour (52.00%) was the main reason for technological gap.

## CHAPTER VII

### IMPLICATION

The implication based on the present findings of this investigation have been presented into two parts viz., implication for future research work in the related scientific field and for future extension work, for transfer of technology to the targeted audience. Implication with regards to research is based on experience during the course of investigation and useful for suitable guidelines and suggestion for further research on same topic. Implication for future extension work are also useful for extension personal policy makers, NGO's personnel and other related individuals engaged in agricultural development.

#### **7.1 Implication for future extension work, for transfer of technology to the targeted audience**

1. In case of knowledge through majority of the farmers possessed medium level of knowledge about recommended SRI method of paddy cultivation technologies, the respondents possessed, they tends to adopt very few practices of them, which create a wider technological gap. The knowledge prosperity of the respondents needs to be convert in to adoption. In this connection, it is implicated that the extension agencies and government functions engaged in development of agriculture in the area should try hard by using appropriate strategies like organization of qualitative trainings and filed days, exhibitions and result demonstrations to improve adoption of recommended SRI method of paddy cultivation technology at grass root level so as to reduce technological gap exist there.

The extension, thus, should be in line of the providing importance and the significance of the neglected practices in increment of the yield and economic return through paddy farming. So, the tenants will adopt the same.

2. As per results related to existence of technological gap, the higher proportion of respondents had partial technological gap in recommendation related to use of transplanting, water management, and weed management. As these are the important cultivation practices contributing towards more yields. Extension agency workers should take note of this high gap while planning and implementing extension activities/programme in the study area. It is also suggested to conduct different short duration trainings through Krishi Vigyan Kendra on the theme in which high technological gap exist which improves skill and creating confidence and aptitude among the farmers for adoption of same.
3. Reasons for non adoption analysis revealed that the lack of knowledge to the farmers about the recommended SRI method of paddy cultivation practices has been observed to be the major reasons for non adoption of practices like transplanting, weed problem, labour problem, plant protection measures against pests and diseases of paddy, it has thus implied that, the extension agency may arrange method demonstration to improve skill in application of use of weeder, how to transplant paddy seedling by the use of markers and secondly the literature on use of plant protection may be brought out for the use of paddy growers. It helps to provide the knowledge and use as reference for future there by eliminating or reducing technological gap in cultivation of SRI method of paddy crop.
4. Besides technical knowledge, one of the reasons for existence of technological gap was high cost of required inputs. In this regard, it is implicated that Government or concerned agencies may reduce the cost of inputs.

## **7.2 Implication for future research work in related scientific field**

1. The study was conducted in Lakhani and Sakoli Panchayat Samiti of Bhandara district in Vidarbha (Maharashtra state) with restricted sample size. Therefore, generalization based on this study alone will not be meaningful. It is therefore, imperative that study should be extended to others parts of Vidarbha with sufficient sample size. Where this crop is grown on considerable area.
2. To increase the contribution of independent variables, in explaining variations, in knowledge and technological gap about SRI method of paddy cultivation practices, some more independent variables should identified and be included in to future research on technological gap such as attitude of the paddy growers, credit sources, agricultural infrastructure facilities and market orientation, etc.
3. This type of study can also be carried out in other cereal, pulses and oil seed crops where intensive cultivation practices are applicable. It will help to know the different levels of technological gap in different crops.

**CHAPTER VIII**  
**LITERATURE CITED**

- Anjani Kumar and A. K. Jha. 2001. Adoption of modern varieties of rice in Bihar. *Agril. Ext. Rev.*, 13(3) : 9-18.
- Anonymous. 2014. District Socio-economic Review 2014 of respective district published by Govt. of M.S.
- Anoopkumar, A.B. 2006. Constraints in input the faced by paddy growers. M.Sc. (Agri.) Thesis (Unpub.), Dr. PDKV, Akola.
- Anuradha, N. and Y. C. Zala. 2010. Technical efficiency of rice farms under irrigated conditions in central Gujarat. *Agricultural Economics and Research Review*. 2 : 375-381.
- Bhople, P. P., N. D. Parlwar and A. K. Khade. 2011. Technological gap in gram cultivation in Yavatmal District. Research review committee report. Dep. of Ext. Edu., Dr. PDKV, Akola.
- Borkar, M. M. 2001. Impact of technology of paddy crop recommended by Dr. PDKV, Akola. M.Sc. (Agri.) Thesis (unpub.), Dr. PDKV, Akola.
- Borthakar, S., P. Mishra, R. K. Talukdar and D. Bortamuly. 2015. Scaling the adoption of recommended rice production technologies by the farmers in Assam state. *Indian Res. J. Ext. Educ.* 15(2) : 32-37.
- Chandgude, K. M. 2010. Adoption of recommended paddy cultivation technology by small farmers in College Development Block, Pune. M.Sc. Thesis (Unpub.), Mahatma Phule Krishi Vidyapeeth, Rahuri.
- Chandra, R. S. 2001. Effectiveness of eco-friendly cultivation practices in paddy Analysis. Post Graduate, Thesis Obstract, Coimbtore 1 : 88.
- Chaudhary, R. P., A. K. Singh and M. Prajapati. 2008. Technological gap in Rice-Wheat production system. *Indian Res. J. Ext. Educ.* 8(1) : 39-41.

- Deshmukh, S. S. 2002. Adoption of rice production technology by Tribals. M.Sc. (Agri.), Thesis (Unpub.), Dr. PDKV, Akola.
- Dhande, H. N. 2003. Adoption of University Recommend Rice Production Technology by Rice Growers. M.Sc. (Agri.), Thesis (Unpub.), Dr. PDKV, Akola. pp 28-30.
- Dhenge, S. A. 2013. Knowledge and adoption of integrated pest management practices by paddy growers. M.Sc. (Agri) Thesis (unpub.), Dr. PDKV, Akola.
- Dohtare, P. N. 2013. Adoption of soil test recommendations by the paddy farmers. M.Sc. (Agri) Thesis (unpub.), Dr. PDKV, Akola.
- Dudhe, V. H. 2002. Adoption of paddy technology by the farmers. M.Sc.(Agri.)Thesis (Unpub.), Dr. PDKV, Akola.
- English, H. D. and A. English. 1961. A comprehensive dictionary of psychology and psychoanalytic terms, New York, Longman Green and Company-33.
- Gawande, K. J. 2006. Knowledge and adoption of organic farming practices among the farmers. M.Sc. (Agri.) Thesis (Unpub.) Dr. PDKV, Akola.
- Gedam, A. R. 2007. Technological gap in paddy cultivation. M.Sc. Thesis (Unpub.) Dr. PDKV, Akola.
- Gharade, A. N. 2004. Adoption behaviour of farmers about PKV-HMT paddy variety. M.Sc. (Agri.) Thesis (unpub.), Dr. PDKV, College of Agriculture Nagpur.
- Ghodichor, N. S. 2004. Knowledge and adoption of integrated pest management practices by paddy growers. M.Sc. (Agri.), Thesis (Unpub.), Dr. PDKV, Akola.
- Gogoi, M. and Phukan. 2000. Extent of adoption improved rice cultivation practices by farmer. Maharashtra J. Extn. Edu.V.19 : 190-193.
- Gotyal, S. H. 2007. Backward and forward linkages of grape production in Karnataka. Ph.D. Thesis, Univ. Agric. Sci., Dharwad.
- Goudappa, S. B., G. S. Biradar and R. Bairathi. 2012. Technological gap in chilli cultivation perceived by farmers. Raj. J. Ext. Educ. 20 : 171-174.

- Govinda Gowda, V. and K. Narayana Gowda. 2006. Profile of Thompson Seedless and Bangalore Blue grape growers. Mysore J. Agric. Sci., 40 (3) : 424-429.
- Gupta, V., D. Mankar and S. Sundaraswamy. 2001. Knowledge of farmers about improved cultivation practices of rice in Jammu. Maharashtra J. Extn. Edu. V. 20 : 74-76.
- Haque, M. S. 2001. Knowledge and adoption behavior of farmers about different components of rice production technologies under SRPP in Bihar. RAU. J. Res. 11(1&2) : 7- 9.
- Harsha, V. R. 2014. Technological gap in adoption of recommended practices of sugarcane cultivation in Bhandara district. M.Sc. (Agri.), Thesis (Unpub.), College of Agriculture Nagpur, Dr. PDKV, Akola.
- Ingle, S. M. 2011. Knowledge and adoption of land care technique in salt affected track of Puma Valley. M.Sc. (Agri) Thesis (Unpub.) Dr. PDKV, Akola.
- Jadhav, S. M. 2008. Technological gap in soybean cultivation. M.Sc. (Agri.), Thesis (Unpub.), Dr. PDKV, Akola.
- Jagannath, B. V. 2010. Adoption of dryland technologies by the farmers In Akola district. M.Sc. (Agri.) Thesis (Unpub.) Dr. PDKV, Akola.
- Jambhale, N. N. 2007. Technological gap in gram cultivation. M.Sc. Thesis (Unpub.) Dr. PDKV, Akola.
- Jhajharia, A. K., S. Kumari and I. M. Khan. 2009 and 2010. Adoption of recommended rice production technology in Raipur district of Chhattisgarh. Raj. J. Ext. Educ. 17-18 : 178-180.
- Johnson, B. and K. Vijayaragavan. 2011. Diffusion of System of Rice Intensification (SRI) across Tamil Nadu and Andhra Pradesh in India. Indian Res. J. Ext. Educ. 11(3) : 72-79.
- Kapse, P. S., Y. K. Pimpalkar and S. D. Wangikar. 2000. Technological gap in summer groundnut cultivation. Maharashtra J. Extn. Educ. XIX : 56-58.
- Kasarlwar, S. A. 2003. Adoption in improved paddy cultivation practices by tribal farmers. M.Sc. (Agri.) Thesis (Unpub.), Dr. PDKV, Akola.

- Kharat, N. B. 2012. Technological gap in cultivation of rabi sorghum. M.Sc. (Agri) Thesis (unpub.), Dr. PDKV, Akola.
- Khatik, R. L., B. S. Bhimawat and B. Upadhyay. 2012. Knowledge of improved rice production technology by the farmers in Durgapur district of Rajasthan. Raj. J. Ext. Educ. 20 : 97-101.
- Khobragade, S. M. 2000. Need assessment of farmers in adoption of paddy cultivation practices. M.Sc. (Agri.), Thesis (Unpub.), Dr. PDKV, Akola.
- Kirar, B. S. and B. K. Mehta. 2009. Extent of knowledge of tribal farmers about rice production technology. Indian Res. J. Ext. Educ. 9(1) : 32-35.
- Kumar, M. R., K. Surekha, Ch. Padmavathi, L.V. SubbaRao, P.C. Latha, M. S. Prasad, V. RavindraBabu, A.S. Ramprasad, O. P. Rupela, V. Goud, P. M. Raman, N. Somashekar, S. Ravichandran, S.P. Singh, and B.C. Viraktamath. 2007. Research experiences on system of rice intensification and future directions. J. of Rice Res. 2(2) : 61-71.
- Lalitikumar, R. S. 2002. Knowledge and adoption of packages practices of paddy by the farmers. M.Sc. (Agri.), Thesis (Unpub.), Dr. PDKV, Akola.
- Lavanya. 2008. A study on adoption and sustainability of System of Rice Intensification (SRI) in Coimbatore District. Ph.D. Topical Research, TNAU, Coimbatore.
- Mahadik, R. P., A. N. Desai and A. J. Pharate. 2009. Knowledge and Adoption behavior of farmers growing Sahyadri (KRH-1) variety of Rice. Asian J. Extn. Edn. 27(1&2) : 171-175.
- Meshram, P. M. 2008. Knowledge and adoption of paddy growers about recommended technology. M.Sc. (Agri) Thesis (unpub.), Dr. PDKV, Akola.
- Natkar, K. V. 2001. Attitude and use of farm journal by the subscribers farmers and their profile - A critical analysis. Ph.D. Thesis, Univ. Agric. Sci., Dharwad, Karnataka (India).
- Pooja, S. R. 2014. Technological gap in wheat cultivation in Akola District. M.Sc. (Agri) Thesis (unpub.), Dr. PDKV, Akola.

- Pranita, J. P. 2012. Knowledge and adoption of paddy cultivation practices by tribal farmers. M.Sc. (Agri) Thesis (unpub.), Dr. PDKV, College of Agriculture Nagpur.
- Rani and Murugan. 2010. A study on adoption behaviour of eco-friendly agricultural practices in paddy. *Advances in Plant Sciences*. 23(2) : 657-661.
- Rayosu and R. K. Khasyb. 2003. Farmers knowledge and adoption of rice production technology in Nagaland. *Thesis Abstracts* 309(1) : 308-309.
- Reddy, R.J. and N. S. Shenoy. 2013. Impact of SRI technology on rice cultivation and the cost of cultivation in Mahabubnagar district of Andhra Pradesh. *International Journal of Scientific and Research Publications*. Vol. 3(8).
- Rogers, E. M. 1995. *Diffusion of innovation*, New York. The Free Press.
- Sachinkumar, M. K. 2000. Need assessment of farmers in adoption of paddy cultivation practices. M.Sc. (Agri.), Thesis (Unpub.), Dr. PDKV, Akola.
- Sagwal, R. C. and R. S. Malik. 2001. Knowledge of index of rice grower farmer. *Agri. Ext. Rev.* 13(5) : 13-18.
- Sangne, M. A., S. P. Lambe and P. P. Wankhade. 2010. Technological gap in paddy cultivation in Gadchiroli District. Research review committee report. Department of Extension Education, Dr. PDKV, Akola.
- Sathish, H.S. 2012. A study on profile of system of rice intensification (SRI) paddy growers of Karnataka. *Karnataka J. Agric. Sci.*, 25(4) : 450-454.
- Shanmugasundaramt, B. and S. Helen. 2014. Variation in adoption of System of Rice Intensification (SRI) in Kerala. *International J. of Ext. Educ.* 10 : 73-75.
- Shanmugasundaramt, B. and S. Helen. 2015. Adoption of System of Rice Intensification under Farmer Participatory Action Research Programme (FPARP). *Indian Res. J. Ext. Edu.* 15(1) : 114-117.

- Sharma, K., N. S. Dhaliwal and Ajay Kumar. 2015. Analysis of adoption and constraints perceived by small paddy growers in rice production technologies in Muktsar district of Punjab state, India. *Indian Res. J. Ext. Educ.* 15(2) : 20-23.
- Sharma, R. and A. Sharma. 2002. Constraints in adoption of modern technology for rice cultivation in the tribal district of Surguja, Chhattisgarh. *Maharashtra J. Extn. Edn.* 21(1) : 52-54.
- Shashidhara, K. K. 2003. A study on socio-economic profile of drip irrigation farmers in Shimoga and Davanagere districts of Karnataka. M.Sc. (Agri.) Thesis, Univ. Agric. Sci., Dharwad, Karnataka (India).
- Shinde, P. S., V. R. Vaidya and S. K. Satpute. 2000. Identification and adoption of indigenous agricultural practices by dry land farmers. *Maharashtra J. Extn. Edn.* 19 : 259-263.
- Sigdel, U. P., D. Devkota, R. N. Joshi and N. R. Devkota. 2014. Impact of result demonstration on System of Rice Intensification (SRI) adoption among participant and non-participant farmers in Chitwan, Nepal. *International J. Agr. Ext.* 2(3) : 153-158.
- Singh, P. and K. Singh. 2002. Technological gap in rapeseed and mustard cultivation in Bharatpur. *Agril. Ext. Rev.* 7 : 10-13.
- Singh, P. K. and J. G. varshney. 2010. Adoption level and constraints in rice production technology. *Indian Res. J. Ext. Educ.* 10(1) : 91-94.
- Singh, S. M. 1972. A study of socio-psychological values and some biographical characteristics in relation to adoption of farm mechanization by farmers of Ludhiana. M.Sc. (Agri.) Thesis (Unpub.) PAU, Ludhiana.
- Sitadevi, K. and T. Ponnarasi. 2009. An economic analysis of modern rice production technology and its adoption behaviour in Tamil Nadu. *Agril. Econ. Res. Review.* 22 : 341-347.
- Supe, S. V. 1969. Farmers opinion about approved farm practices and their use. *Nagpur Agriculture College Magazine.* 44 : 67-71.
- Surve, S. G. 2014. Knowledge and adoption of improved cultivation practices by Gram Growers. M.Sc. (Agri.) Thesis (Unpub.), College of Agriculture Nagpur, Dr. PDKV, Akola.

- Thakare, U. G. 2004. Impact of centrally sponsored crop development programme on the beneficiaries. Ph.D. Thesis (Unpub.), Dr. PDKV, Akola.
- Thatchinamoorthy, C. and Rexlin Selvin. 2014. A Study on Profile of System of Rice Intensification (SRI) Paddy Growers in Tirunelveli District of Tamilnadu. International Journal of Current Research. 6(4) : 64-66.
- Thaware, B. L., R. L. Kunkerkar and H. A. Shivade. 2009. Status Paper on Rice in Maharashtra. ADR, Regional Agricultural Research Station, Karjat - 410201, Maharashtra, India.
- Thyagarajan, S. 2004. Rice production technology-adoption and constraints. Indian J. Ext. Educ. 40(3) : 44-47.
- Vijayalayan, R. 2001. A study of awareness knowledge and adoption of eco-friendly practices in rice. M.Sc. Thesis (Unpub.) Agriculture and Research Institute, Coimbatore. pp 88-90.

Website -

[www.rkmp.co.in](http://www.rkmp.co.in)



*Vita*

## VITA

1. Name of student : **Nirwan Priyanka Premilal**
2. Date of Birth : 16<sup>th</sup> May 1992
3. Name of the College : Department of Extension Education,  
Post Graduate Institute,  
Dr. Panjabrao Deshmukh  
Krishi Vidyapeeth, Akola.
4. Residential Address : At. Post Lakhani, Tah. Lakhani,  
Dist. Bhandara.  
Cell : 9403120191, 9175374183  
E-mail : priya9216@gmail.com
5. Academic Qualification :


Sl. No.	Name of Degrees awarded	Year in which obtained	Division/ Class	Name of awarding University	Subjects
1.	B.Sc. (Agri.)	2013	Second	Dr. PDKV, Akola	Agriculture and Allied Subject

6. Research papers published (if any) : NIL
7. Field of Interest (in which you desire to work) : Banking and Agricultural Extension Education Activities

Place : Akola

Date : 05/08/2016

  
(Nirwan Priyanka Premilal)  
Signature of Student



*Appendix*

## APPENDIX I

### INTERVIEW SCHEDULE

**Title of Thesis** : Technological Gap in Adoption of SRI method of Paddy Cultivation in Bhandara District

**Name of Researcher** : **Nirwan Priyanka Premilal**

M.Sc. (Agri), 2<sup>nd</sup> year

Department of Extension Education

Dr. P.D.K.V., Akola

#### - General Information -

**Name of farmer:** \_\_\_\_\_

**Village:** \_\_\_\_\_

**Taluka:** \_\_\_\_\_

**Dist.:** Bhandara

**Mo. No. :** \_\_\_\_\_

#### : PART - I :

1. **Age** : \_\_\_\_\_ Years

2. **Education** : \_\_\_\_\_ Std.

3. **Land holding**

a. Rainfed : \_\_\_\_\_ Acre

b. Irrigated : \_\_\_\_\_ Acre

c. Total : \_\_\_\_\_ Acre

4. **Area under Paddy** : \_\_\_\_\_ Acre

5. **Experience in Paddy Cultivation** : \_\_\_\_\_ year

6. **Occupation:**

Sl. No.	Occupation	Score
1	Agriculture + Labour	1
2	Agriculture ( Farming)	2
3	Agriculture + Allied occupation	3
4	Agriculture + Business	4
5	Agriculture + Service	5

7. **Annual income** (Income of all family members in year)

Sl. No.	Source of income	Total income (Rs)
1	Agriculture	
2	Agriculture + Labour	
3	Agriculture + Dairy/ Poultry / Goat Farming	
4	Agriculture + Business	
5	Agriculture + Service	

### 8. Source of information

Please state the source of information among the following from which you have received information about SRI method of paddy cultivation.

Sl. No	Sources of information	Frequency of Contact		
		Regular (2)	Occasionally (1)	Never (0)
<b>I.</b>	<b>Formal sources</b>			
1.	Agricultural Assistant (Agri. Department)			
2.	Agricultural Extension officer (Panchayat Samiti)			
3.	Agriculture officer (Z.P.)			
5.	Subject Matter Specialist (K.V.K.)			
6.	University scientists			
<b>II.</b>	<b>Informal Sources</b>			
<b>A.</b>	<b>Personal contact</b>			
1.	Local Leaders			
2.	Friends			
3.	Relatives			
4.	Neighbors			
5.	Proprietor of krishi kendra			
<b>B.</b>	<b>Group contact</b>			
1.	Group Discussion			
2.	Training			
3.	Demonstration			
4.	Tour (Field trip)			
<b>C.</b>	<b>Mass contact</b>			
1.	Radio			
2.	Television			
3.	News paper			
4.	Farm magazine			
5.	Agricultural Exhibition			

### 9. Innovativeness (Singh 1972)

Please indicate your response in any of the given categories which you feel appropriate to each of the following statement.

Sl. No.	Samples	A	U	D
1	I feel restless still I try out a new production practice, I have heard about (+ve)			
2	They talk of many new production practices these days but who knows if they are better than the old ones (-ve)			
3	After all our fore fathers were wise in their farming practices and I do not see any reason for changing old one (-ve)			
4	Often new farm practices are not successful however if they are promising I would surely like to adopt them (+ve)			
5	From many time to time I have heard of several new farm practices and I have tried most of these in the last few years (+ve)			
6.	Same has, I believe that the traditional way of farming are best (-ve)			

A= Agree, U= undecided, D= Disagree.

### 10. Risk Preference (Supe, 1969)

Please give your response to following statement

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

SA – Strongly Agree, A- Agree, UD- Undecided, D- Disagree, SDA- Strongly Disagree.

### 11. Economic Motivation (Supe 1969)

Please give your response to the following statement related to economic motivation.

Sl. No.	Statement	SA	A	UD	D	SDA
1	A farmer should work towards large yield and economic profit (+ve)					
2	The most successful farmer is who makes more profit (+ve)					
3	A farmer should try any new farming idea which may can him more money (+ve)					
4	A farmer should grow cash crop to increase monetary profit in comparison to growing of food for home consumption (+ve)					
5	It is difficult for farmers children to make good start unless the provides them economic assistance (+ve)					
6	A farmer must earns his means of living but the most important things in life it cannot be defined in economic terms (-ve)					

SA – Strongly Agree, A- Agree, UD- Undecided, D- Disagree, SDA- Strongly Disagree.

### : PART - II :

Sl. No.	Recommended paddy cultivation practices	Knowledge		Adoption		Technological gap
		Yes	No	Yes	No	
<b>A)</b>	<b>Land preparation</b>					
1.	Do you know which soil suitable for SRI method of paddy (Rich in organic matter)					
<b>B)</b>	<b>Recommended varieties</b>					
1.	Do you know the short duration varieties of paddy (Sakoli- 6, Sindewahi-1)					
2.	Do you know the medium duration varieties of paddy (PKV Ganesh, Sindewahi-4, PKV- HMT, Sindewahi-2001)					
3.	Do you know the long duration varieties of paddy (Sindewahi -5, Sakoli-8)					
4.	Do you know the scented varieties of					

	paddy (Sakoli-7, PKV-Makarand, PKV- Khamang)					
5.	Do you know the hybrid varieties of paddy (Sahyadri)					
<b>C)</b>	<b>Raising Nursery</b>					
<b>1.</b>	<b>Bed preparation</b>					
a	Do you know the size of raised bed required/acre (length- as necessary, wide- 4 feet, high- 5-6 inch, 400sq. ft/acre or 4 beds of 4×25 feet)					
<b>2.</b>	<b>Seed required</b>					
a	Do you know the recommended seed rate for SRI method of paddy (2 kg /acre or 5 kg/ ha)					
<b>3.</b>	<b>Seed soaking, broadcasting</b>					
a	Do you know required hours for seed soaking of paddy (12 hr)					
b	Does it required transfer the soaked seed into a gunny cloth/bag or make a heap and cover it with gunny cloth for 24 hour for seed germination (Yes)					
c	Uniform broadcasting is necessary (Yes)					
<b>4.</b>	<b>What is time of seed sowing in raised bed ( onset of monsoon Jun-July)</b>					
<b>D)</b>	<b>Preparation of main field</b>					
<b>1.</b>	<b>Puddling</b>					
a	Do you know ideal ploughing method for SRI system (Dry plough, without tractor)					
b	Do you know the leveling of field (Used levels)					
<b>2.</b>	<b>Wide spacing</b>					
a	Do you know spacing required for SRI method (25×25 cm r to r and p to p, or 10×10 inches)					
<b>3.</b>	<b>Use markers</b>					
a	What type of marker you used for making spacing (Rope, stick, marker made out of wood as well as iron)					

<b>4.</b>	<b>Leaving pathway</b>					
a	Do you know to leave paths for every 2 meter (Yes)					
<b>E)</b>	<b>Transplanting</b>					
a	What is the age of seedling for transplant (8-12 days)					
b	How deep seedling are to be transplanted (1 seedling/ hill, depth 2-3 cm deep)					
<b>F)</b>	<b>Nutrient management</b>					
1.	Do you know recommended dose of fertilizer before ploughing (FYM/compost 10-12 t/ha)					
2.	What is recommended first dose of chemical fertilizer/ha? (50% of recommended fertilizer (NPK) i.e., 50:30:20 kg NPK in kharif and 60:30:20 kg in rabi)					
3.	What is recommended second dose of chemical fertilizer/ ha (25% of N i.e., 25 kg/ha at the time of second weeding)					
4.	What is recommended third dose of chemical fertilizer/ ha (25% of N i.e., 25 kg/ha)					
<b>G)</b>	<b>Water management</b>					
1.	What is the water level recommended to keep in paddy field? (SRI method does not require continuous flooding irrigation is given to maintain soil moisture. After panicle initiation stage until maturity, one inch of water should be maintain in the field. The water can be removed after 70% of grains get hardened.					
<b>H)</b>	<b>Weed management</b>					
1.	How to manage the weed in SRI system of paddy cultivation (By using weeder on 10 <sup>th</sup> and 20 <sup>th</sup> day after transplantation. Then after 10-15 days interval.					
<b>I)</b>	<b>Pest and disease management</b>					
1.	<b>Knowledge about pest of paddy crop</b>					

a	Name of the major pest of paddy (Stem borer, Rice hispa, Rice gundhi bug, Brown plant hopper, Rice case worm, Green leaf hopper, Rice grass hopper, Rice gall midge, Rice thrips)				
2.	<b>Knowledge about diseases of paddy crop</b>				
a	Name of major diseases (Blast, Bacterial leaf blight of rice, Brown leaf spot, Khaira disease, Tungro disease, Grassy stunt, Udbatta disease, False smut, Neck blast)				
3.	<b>How to manage pest</b>				
a	Use resistance varieties				
b	Rope dragging (Army worm)				
c	Use <i>trichogramma spp.</i>				
d	Use of pesticide				
e	Clip off the leaf tip before transplanting (Rice hispa, Stem borer)				
f	Clean cultivation (Rice gundhi bug)				
4.	<b>How to manage diseases</b>				
a	Seed treatment				
b	Use chemicals				
J)	<b>Harvesting and Threshing</b>				
1.	Which period is suitable for harvesting of paddy? (When 90% grains are matured, harvest the paddy on 25-30 days after panicle initiation.)				
2.	Which period is suitable for threshing of paddy? (After complete drying the crop threshing should be done.)				

Reasons for existence of Practice wise Technological gap in SRI method of paddy cultivation practices:-

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

