

**ADOPTION OF DRYLAND TECHNOLOGIES BY
THE FARMERS IN AKOLA 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
BAHIRAM VIJAY JAGANNATH**

**DEPARTMENT OF EXTENSION EDUCATION,
POST GRADUATE INSTITUTE, AKOLA
DR. PANJABRAO DESHMUKH KRISHI VIDYAPEETH,
KRISHINAGAR PO, AKOLA (MS) 444104**

Enrolment Number - CC/740

Dr. PDKV Library, Akola

630.715/Bah



150390

2010



DECLARATION OF STUDENT

I hereby declare that the experimental work and its interpretation of the thesis entitled "ADOPTION OF DRYLAND TECHNOLOGIES BY THE FARMERS IN AKOLA 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 31/05/2010



(Bahiram Vijay Jagannath)

Enrolment No. CC/740

CERTIFICATE

This is to certify that thesis entitled "ADOPTION OF DRYLAND TECHNOLOGIES BY THE FARMERS IN AKOLA 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 **Shri. Bahiram Vijay Jagannath** under my guidance and supervision.

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

Place: Akola
Date: 31/05/2010


(M. K. Bhugul)
Chairman
Advisory Committee

Countersigned


Associate Dean,
Post Graduate Institute, Akola
Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola

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

- | | |
|--------------------|---------------------------|
| 1. Chairman | Shri. M. K. Bhugul |
| 2. Member | Dr. U. R. Chinchmalatpure |
| 3. Member | Dr. N. M. Kale |
| 4. Member | Dr. P. P. Chavan |
| 5. External Member | (Shri. M. A. Sagane) |







Acknowledgements

Any creativity is possible only after the involvement of many minds. Feelings can not be adequately expressed in words because those are transferred into mere formalities. Nevertheless, formalities have to be completed. My acknowledgements are innumerable than what I am expressing here.

It is my great privilege and immense pleasure in availing this opportunity and immense my deepest sense of gratitude to my Hon'ble Chairman Shri. M. K. Bhugul, Associate Professor, Department of Extension Education, Dr. PDKV, Akola for his constant inspiration, valuable guidance, helpful suggestions, constructive criticism, kind advise right selection of research work, up to final shaping of thesis in present form.

I am proud to express my sense of gratitude to Dr. D.M.Mankar, Professor and Head, Department of Extension Education, Dr. PDKV, Akola, for his generosity and moral support for completing the present study and providing necessary facilities to complete the research work.

It is a great pleasure for me to express my sincere thanks to the members of my Advisory Committee, Dr. U. R. Chinchmalatpure, Assistant Professor, Department of Extension Education, Dr.PDKV, Akola, Dr. N. M. Kale, Associate Professor, PGI, Dr. PDKV, Akola and Dr. P. P. Chavan, Associate Professor, Department of Agronomy and ATIC Manager, PGI, Dr. PDKV, Akola, for their timely advice, co-operation and valuable guidance throughout the course of research.

I am equally thankful to Dr. D.L. Sale, Dean Faculty of Agriculture, Director of Instruction and Associate Dean, PGI, Dr. PDKV, Akola, for providing necessary facilities for my research work.

I wish to record my cordial thanks to Shri. L.D.Nagalwade, Associate Professor, Shri. Y. B. Shambharkar, Assistant Professor, Dr. P. P. Bhople, Assistant Professor, Shri. M. A. Sagane, Assistant Professor,

Dr. R. S. Raut, Senior Research Assistant and Dr. U. G. Thakare, Research Associate, Department of Extension Education, Dr. PDKV, Akola, for their moral support and encouragement throughout the study.

My sincere thanks to all teaching and non-teaching staff of Department of Extension Education, Dr. PDKV, Akola. I have no words to express my sincere thanks and gratitude to my colleagues specially Mangesh, Gopal, Sandip, Ashwini, Vidya, Pratibha, Jayshri, Nita, for their valuable co-operation, encouragement, timely support and kind help during the study..

Special thanks are extended to my friends Atul, Pankaj, Sumit, Dhiraj, Jeevan, Lomesh, Vishal, Sunil, Sandip, Narendra, Vipin, Suresh, Swapnil and my seniors Zahur, Rahul, Pankaj for their valuable cooperation during course period.

I have no words to express feelings of my heart towards my parents for their pathetic efforts, scarifies and encouragement in educating me at the cost of their comfort and consolation. I humbly express deepest sense to my father Shri. Jagannath Jejiram Bahiram, mother Sau. Vasanti Jagannath Bahiram and brother Ajay and sister Vrushali for their hard job for educating me and shadowing me by shouldering their back to sun without which, this work would have been in the light of the day at all.

"Many other people also helped me directly or indirectly to accomplish this goal. I would like to express my sincere thanks to all of them."

It is a pleasure to convey my thanks to my friend Mr. Rajesh Pardeshi (Parvati Computers, Akola), for his contribution in neatly designing script within the stipulated time frame.

Place: Akola

Date: 31/05/2010



(Bahiram Vijay Jagannath)

TABLE OF CONTENTS

Sr. No.	Particulars	Page
A	List of Tables	i
B	List of Figures	ii
C	List of Abbreviations	iii
D	Thesis Abstract	iv
I	INTRODUCTION	1
II	REVIEW OF LITERATURE	7
III	METHODOLOGY	28
IV	SOCIO-ECONOMIC FEATURES OF AKOLA DISTRICT	43
V	RESULTS AND DISCUSSION	47
VI	SUMMARY AND CONCLUSIONS	75
VII	IMPLICATIONS	79
VIII	LITERATURE CITED	82
	VITA	
	APPENDIX	

(A)

List of Tables

Table	Title	Page
1	Details of villages and farmers proportionately selected for study.	30
2	Variables and their empirical measurements.	32
3	Distribution of respondents according to their age.	48
4	Distribution of respondents according to their education.	49
5.	Distribution of respondents according to their land holding.	50
6	Distribution of respondents according to their annual income.	51
7	Distribution of respondents according to their socio-economic status.	52
8	Distribution of respondents according to their social participation.	53
9	Distribution of respondents according to their sources of information.	53
10	Distribution of respondents according to utilization of sources of information.	55
11	Distribution of respondents according to their extension contact.	58
12	Distribution of respondents according to frequency with different extension contact sources.	59
13	Distribution of respondents according to innovativeness.	60
14	Distribution of respondents according to scientific orientation.	61
15	Distribution of respondents according to risk preference.	62
16	Distribution of respondents according to their level of knowledge.	63
17	Distribution of respondents according to practice wise knowledge possessed by them.	65
18	Distribution of respondents according to level of adoption of dry land technologies.	66
19	Distribution of respondents according to practice wise adoption.	67
20	Coefficients of correlation between selected characteristics of respondents with adoption.	71
21	Constraints faced by respondents.	73

(B)**List of Figures**

Figure	Title	After page
1	Conceptual model of research.	27
2	Map of Akola and Akot panchayat samiti.	28
3	Distribution of respondents according to their age.	48
4	Distribution of respondents according to their education.	48
5	Distribution of respondents according to their land holding.	50
6	Distribution of respondents according to their annual income.	50
7	Distribution of respondents according to their socio-economic status.	52
8	Distribution of respondents according to their social participation.	52
9	Distribution of respondents according to their sources of information.	56
10	Distribution of respondents according to their extension contact.	56
11	Distribution of respondents according to innovativeness.	60
12	Distribution of respondents according to scientific orientation.	60
13	Distribution of respondents according to risk preference.	61
14	Distribution of respondents according to their level of knowledge.	63
15	Distribution of respondents according to level of adoption of dry land technologies.	66
16	Empirical research model.	74

(C)

List of abbreviations

%	- per cent
>	- more than
@	- at the rate of
A.D.	-Anno domini
Agri.	- agriculture
Agril.	- agricultural
Educ.	- education
<i>et al.</i>	- et alia (and others)
Extn.	- extension
Fig.	- figure
ha	- hectare
i.e.	- that is
J.	- journal
Mm	-millimetre
Res.	- research
Rs.	- rupees
Std.	- standard
Univ.	- university
viz.,	- namely
Sr. No.	- serial number
\bar{X}	- mean
S.D.	- standard deviation
NGO	- non government organization
KVK	- krishi vidyan kendra



Thesis Abstract



found to be positive and highly significant and education, knowledge were significant relationship with adoption of dry land technologies. However age, social participation, extension contact, scientific orientation, risk preference were found to be non significant in relation with adoption.

The uncertainty of weather, non availability of rain water at proper time, inadequacy of capital, non availability of labours, dry seeding in cotton is not possible due to uncertainty of rains ; soil type (black cotton soil) were the important constraints faced by majority of the farmers in adoption of dry land technologies.



Chapter I

Introduction

CHAPTER I

INTRODUCTION

1.1 Background information

Indian agriculture is predominantly a rainfed agriculture under which both dry farming and dry land agriculture are included. Out of the 143 million hectare of total cultivated area in the country, 101 million hectare (i.e. nearly 70 percent) area is rainfed. In dry land areas, variation in amount and distribution of rainfall influence the crop production as well as socio-economic conditions of farmers. The dry land areas of the country contribute about 42 percent of the total food grain production. Most of the coarse grains like Sorghum, Pearl millet, Finger millet and other millets are grown in dry lands only. The attention has been paid in the country towards development of dry land farming.

Indian agriculture is characterized by rainfed farming, the dry land agriculture. It covers about 65 percent total cropped area. All rainfed areas are not alike. There are massive regional variation in rain water availability and other natural resources. About 30 percent of the country area (109 million hectare) spread over 99 districts is drought prone. In these districts not only agriculture is not sustainable because of critical water shortage, the region as a whole suffers chronically from serious drinking water problems. The mean annual rainfall in about 70 percent of the area in the country is less than 1125mm, for the country as a whole 74 per cent of the annual rainfall is received during June-September period. Poor rainfall distribution causes drought more than once during the crop seasons in the arid and semi-arid rainfed lands. On the other hand soil erosion and runoff due to high intensity rains are the problems of high rainfall (>1125) areas.

Even with the full utilization of irrigation potential, agriculture could be practiced in around 50 per cent of the net cultivated area and thus leaving 50 per cent of the net cultivated area under rainfed condition. The net cultivated area is stabilized during the previous years. There is very

little scope of increasing it beyond 150 million hectares without adverse effect on the fragile eco-system. However, the cultivated area can be increased by using the rainfall which is a most important natural resource. Out of net area sown of country (143 million hectares), 51 million hectares each falls in dry rainfall area (less than 750 mm) and medium rainfall area (750-1150 mm) and remaining 41 million hectares is in assured rainfall area (more than 1150 mm).

India's population touched 1.198 billion in 2009, second to China's 1.3438 billion. The challenge for the research system in the 21st Century is, therefore, to evolve land productivity increasing farm technologies suited to the local environmental conditions of different agro-climate regions. Dryland farming will play an important role in increasing agricultural production of the country. Dryland farming is way of life for a majority of Indian farmers. It is characterized by the resource poor, small and marginal farmers, a poor infrastructure and low investments in technology and inputs. Although, the average productivity in dry regions is low. However, it contributes nearly half of the produce to the food basket of the nation and supports the life of a substantial chunk of the population. It is inevitable that the second green revolution has to come from the dryland farming and accordingly the application of technology, inputs and investments has to be tailored to converts these so-called "*grey areas into green*". Dryland farming means cultivation of crops purely under rainfed conditions where soil moisture is limited for crop growth. Sustainable agriculture involves the integrated use of inputs and appropriate technologies.

It is estimated that by 2020, the total domestic food grains demand will be about 294 million tonnes for the growing population. The total geographical area of our country is 329 million hectares. Inputs are important resources in order to make the farm productive. The productivity depends upon the availability and proper utilization of inputs and adoption of appropriate technology. Sustainability of dryland farming is the survival of the farmer practicing dryland farming with long term profitability. It

depends upon transfer and adoption of appropriate technologies and; the availability and utilization of required inputs, in order to maintain long term productivity.

Maharashtra state has highest proportion of rainfed areas among the states. About 85 per cent of net cultivated area is rainfed. Agriculture in Vidarbha region is also characterized by rainfed farming, the dry land agriculture. In dry lands the annual rainfall is about 750 mm to 1500 mm but its distribution throughout the year is not uniform. The production of crops in this region depends on natural rains. Small size of land holdings, periodical droughts, soil erosion, long dry spells, low crop yields and poor economic returns are the important features of the dry farming area. Use of improved technology is much slower in dry lands as compared to irrigated or assured rainfall areas. The productivity in dry lands is low because of lack of use soil moisture conservation techniques. The research results at demonstration and research farms have shown the possibility of stepping up yields of dry land crops through the use of dry land technologies.

1.2 Need and Importance of study

The Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola has identified dry land technologies and recommended a package of dry land technologies in respect of dry seeding in cotton, in situ moisture conservation, double cropping, intercropping, contingent crop planning and integrated nutrient management for the adoption in the areas. It was noted that about dry land technologies farmers were not fully aware and adopt only few components of these technologies at a given time it may due to certain constraints. The constraints may be related to the technology itself or to the farmers themselves and their situation it is therefore, thought desirable to access the present level of knowledge and adoption of dry land technologies by the farmers and to determine the gap in adoption of Dr. Panjabrao Deshmukh Krishi Vidyapeeth recommended dry land technologies and at the same time to find out constraints faced by the farmers in its use and adoption. The use and adoption of the technologies also help in increasing the production as well as to meet the projected

needs of food, fodders and fuel wood in dry land farming area. Therefore the following specific objectives were planned for the present study.

1.3 Objectives of the study

- 1 To study the personal, socio-economic, communication and psychological characteristics of farmers.
- 1 To study the adoption of dry land technologies by the farmers.
- 2 To find out the relationship between selected characteristics of the farmers with their adoption of dry land technologies.
- 3 To study the constraints faced by farmers in adoption of dry land technologies.

1.4 Scope of study

The study was revealed the present status of knowledge and extent of adoption of recommended dry land technologies by the farmers. The findings of the present study would be helpful to understand difficulties faced by the dry land farmers about using recommended dry land technologies. The study would provide useful guidelines for deciding ways and means to promote the use of dry land technologies and the possibilities of increasing production and income from dry lands. The findings of the study would also be provide a feed back to the researcher and concerned agencies about the actual reason for non adoption of recommended dry land technologies by dry land farmers and will indicate about any modification or renew needed by the farmers the technology.

The study will provide useful guidance for deciding the ways and means to promote the use of dry land technologies and possibilities of increased production and income for dry land.

1.5 Limitation of study

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

1. The study was conducted only in 10 villages, 5 villages each from Akola and Akot Panchayat Samit of Akola district. This being the student research project time, money and other resources do not permit the researcher to cover larger area than the one taken for the purpose of study.
2. The findings of the present study were based on the selected dryland farmers. Hence the objectivity of the data would be limited to the correctness of responses given by farmers.
3. The study was confined to only Akola and Akot panchayat samiti in Akola district. The findings of this study may therefore be applicable to the study areas or another areas having similar social and agro climatic conditions.

1.6 Organization of the thesis

The present report of research on "Adoption of dryland technologies by the farmers in Akola district" has been presented in eight chapters.

In this chapter of introduction, the statement of problem under study has been introduced. The need for study objectives of the study and its scope and limitations has also been presented.

The second chapter, namely review of literature comprises, review of relevant literature and findings of various past research studies, conducted in different locations on the same or similar topics, the model of research and study hypothesis.

The research methods, techniques and tools, used and procedure followed in the present investigation have been presented in the third chapter of methodology.

The fourth chapter is socio-economic status of the district. This chapter encompasses information about the location, topography and soil, climate and rainfall, land use pattern, cropping pattern, crop season and crop rotation, input supply and lastly the market facilities available in Akola district.

The fifth chapter was devoted to the findings of the present studying reliant discussion.

The sixth chapter "Summary and Conclusions" which included not only the study results but also other details has been summarized in brief and suitable conclusion drawn based on the obtained findings.

The seventh chapter implications emanated from the present findings have been presented into two parts i.e. Action implications and Research implications. The Action implications are connected with the guidelines and suggestions for extension personnel and policy makers and other related individuals. The implications with regards to research included suitable guidelines and suggestions for further research based on the experiences during the course of conducting the study and conclusions.

Lastly, the Literature cited is presented followed by vita, appendix (Research questionnaire) at the end.



Chapter II

Review of Literature

CHAPTER II

REVIEW OF LITERATURE

In any research endeavour a comprehensive review of literature is essential. It makes the researcher up-to-date with theoretical knowledge and findings of research in the field of investigation. In review of literature, it is necessary to give a theoretical background and provide a brief review of existing information in relation to research study at hand. The theoretical background indicates about the conceptual framework and relation among variables. The present chapter tries to put the chain of thinking of the researcher about the conceptual framework and their relations and the various findings related to the topic of research.

2.1 A. Independent variables:

1) Age

Patil *et. al.* (1989) found in their study of adoption dryland agriculture technology recommended for bajra and groundnut that, there was no significant association of age with adoption of dry farming technology.

Sakharkar (1991) reported that about 33.33 per cent of the respondents belonged to primary standard and 28.67 per cent were illiterate however 26.67 per cent were illiterate. However 26.67 per cent respondents belonged to high school and above standard and 11.33 per cent had middle class education.

Reddy *et. al.* (1993) reported that age had negatively significant relationship with adoption level of modern dryland technology by the farmers.

Meti and Hachinal (1995) pointed out that age was positively and significantly related with the adoption of dryland cotton production technology.

Shrivastava *et. al.* (1996) found that age was significantly associated with adoption of soil and water conservation practices by the farmer.

Valekar (1997) reported that majority of the respondents (25.34 per cent) were educated upto high school, followed by middle and primary school level of education (23.33 % and 19.33 % respectively).

Malani (1998) reported that in the middle age group the number of big farmers was more (54 per cent) than the number in small (50 per cent) and medium (46 per cent) farmers respectively and age was non significantly associated with the adoption of dryland cotton production technology.

Zade (1998) found that majority of respondents (54.67 %) belonged to middle age group of 36 to 50 years, and reported that age had negative and non significant correlation with adoption of soybean production technology including weed control.

Joshi (1999) reported that majority of the farmers in the age group of 31 to 41 years.

Dhule (2000) reported that majority of the cotton growers (72.00 per cent) were found above 35 years of age.

Shinde (2000) found that majority of respondents (56.67%) were young age, he further noted that age was negatively correlated with knowledge and adoption of weedicide in soybean crop.

Bagadi *et. al.* (2001) noted that average age of the sample respondents was 50 years and adoption of soil and water conservation technologies by the farmers.

Kamble (2001) concluded that majority of the dryland farmers had age of above 35 years and there was no significant relationship between age and adoption of dryland technologies.

Sarangkar (2001) observed that majority of the respondents 71.55 per cent were middle age o group.

Bhopale *et. al.* (2003) revealed that 24.17 per cent respondents upto 35 years age group, 45.53 per cent respondents in 36 to 50 years age group and 31.76 per cent respondents above 50 years age group.

Deshmukh *et. al.* (2007) revealed that majority of the respondents belongs to middle age group.

Thakur (2007) revealed that higher percentage of the respondents (48.00%) was found in old age category of above 50 years.

Bembridge(2008) were observed that 30 per cent of dryland crop producers were over 60 years of age.

Bhugul *et. al.* (2009) revealed that almost equal percent of respondents i. e. 37 per cent and 38 per cent were middle and old aged respectively.

Gupta *et. al.* (2009) found that farmers were ranged in age from 25 to 62 years.

2) Education

Reddy and Bhaskaran (1991) observed that the extent of awareness knowledge of improved farm practices among the group of respondents who had education up to secondary school level was high (37.06 %) followed by primary school level (31-90), illiterate (17.97 %) and college level (13.37 %).

Malani (1998) indicates that the percentage of illiterate farmers in small and big farmers was less than 12.00 per cent expecting the medium famers having 24.00 per cent of illiterate farmers.

Bagdi *et. al.* (2001) observed that majority of the respondents (82%) in Sardar Sarovar Project were illiterate and the

education was reported to be positive and significant in relationship with adoption of soil and water conservation technologies by farmers.

Kamble (2001) observed that (54.67 %) of the respondents were educated up to high school level followed by 19.33 per cent who had middle school level education and few of the respondents had primary (12.00 %) and above college level (9.33 %) education where (4.67 %) illiterate respondent observed.

Sarangkar (2001) reported that majority of the respondents 46.15 per cent were educated upto middle school followed by 29.23 % upto high school and 14.62 % educated upto primary school.

Bhople *et. al.* (2003) revealed that 25.29 per cent respondents upto primary level of school education, in middle school 15.30 per cent respondents, 40.59 per cent respondents had high school level of education and 18.82 per cent respondents from college level of education.

Jawanjal (2003) observed that majority of the respondents were educated high school level.

Deshmukh *et. al.* (2007) revealed that majority of the respondents educated up to higher secondary.

Bembridge (2008) were observed that 20 per cent of dryland crop producers were illiterate.

Bhugul *et. al.* (2009) revealed that majority of the dryland farmers educated upto middle and high school education.

Gupta *et. al.* (2009) found that farmers were reported about their highest level of education; 30% of farmers had an elementary education; 25% were illiterate; 26% had high school; 19% had post high school education.

3) Land holding

Akolkar (1989) reported that higher percentages of the respondents (33.33 per cent) were found to be possessing land holding between 4.1 to 10 ha area.

Bhople *et. al.* (1991) found that majority of dry land farmers were found to be possessing more than 4.0 ha of land for cultivation of dryland crops.

Sakharkar (1991) observed that one fourth of the respondents (24.00 %) belonged to category of land having 5.1 to 10 acres while 22.67 per cent of the respondents had land holding upto 20.1 and above acres.

Valekar (1997) majority of the respondents (58.00 %) belonged to medium category of land holding, followed by nearly one fourth of them (24.67 %) having large size of land holding.

Sharma (1999) depicted that majority of respondents (56.67 %) belonged to the category of medium farmers whose land holding was between 2.6 to 7.5 acres where as 23.33 per cent and 20.00 per cent of the respondents were belonging small and big farmers category.

Chopde (2000) revealed that relatively higher proportion of respondents (36.00 %) had medium land holding. He further observed that land holding was significantly and positively correlated with adoption of integrated weed management practices.

Shetwad (2000) observed that higher proportion of the respondents (71.11 %) possessed land holding up to 3 ha.

Sarangkar (2001) shows that the majority of the respondents (62.00%) had low land holding followed by (34.00%) having medium land holding.

Bhugul *et. al.* (2009) found that majority of the respondents were belonged to small to semi-medium category of land holding.

4) Annual income

Sakharkar (1991) reported that one third (34.00%) respondents were having annual income of Rs. 10,000 to Rs. 25,000.

Padmaiah and Rao (1997) reported that 90 per cent of the respondents were below poverty line and their annual income has positively related with the extent of adoption of integrated watershed development programme.

Valekar (1997) majority of the respondents (42.67 %) had their annual income upto Rs. 40,000 followed by 36.67 per cent of them having their annual income ranging between Rs. 40,000 to 80,000. Also revealed that annual income had positive and significant relationship between annual income and adoption behaviour of rainfed maize grower.

Dhule (2000) reported that as much as 38.67 per cent cotton growers had annual income in between Rs. 25,000 to Rs. 50,000.

Shetwad (2000) reported that majority of the respondents had annual income Rs.30, 001 to Rs. 50,000.

Prasad *et. al.* (2004) found that farmers of the adopted village had significantly higher levels of income than farmers of non adopted village.

Deshmukh *et. al.* (2007) revealed that majority of the respondents (81.59 %) falls under medium level of income having Rs. 10001 to 87000 per annum.

Thakur (2007) reported that majority of the respondents 37.33 per cent had their annual income ranging from Rs. 50,000 to Rs. 1,00,000.

Bhugul *et. al.* (2009) revealed that more than two third respondents had upto Rs. 50,000 annual income.

5) Socio-economic status

Makode (1987) indicated that the farmer having high socio-economic status tends to adopt more number of recommended farm practices.

Akolkar (1989) indicated that about 43.33 per cent of the respondents were belonging to upper middle socio-economic status category.

Supe *et. al.* (1990) found that adoption and socio-economic status were significantly related.

Sakharkar (1991) indicated that 31.33 per cent of the respondents belonged to medium level of socio-economic status category.

Dharmale (1993) found that more than half of the respondents (55%) had moderate socio-economic status position. he further noted that socio-economic status was positively and significantly correlated with knowledge and adoption of improved cultivation practices by soybean farmers.

Valekar (1997) reported that over half of the respondents (56.67 %) belonged to upper middle socio-economic status category followed by over one third (34.00 %) of them having middle socio-economic status position in the rural farm family system.

Malani (1998) shows that nearly equal number in small, medium and big farmers categories of the farmers possess low and high socio-economic status.

Chopde (2000) observed that three fourth of the respondents (75.66%) had moderate socio-economic status and socio-economic status

of the respondents was positive and significantly correlated with knowledge and adoption of integrated weed management practices by the farmers.

Dhule (2000) reported that the higher percentage of the cotton growers (40.67 %) belonged to middle socio-economic status category.

Sarangkar (2001) reported that majority of the respondents 63.07 % possess medium level of socio-economic status, and socio-economic status was positively and significantly related with adoption of P.K.V. recommendation about cotton technology.

Thakur (2007) revealed that majority of the respondents (47.33%) belonged to lower to middle socio-economic status group in village community.

Rai and Singh (2008) show that majority of respondents (56.25%) had low socio-economic status whereas, only 18.75% belonged to high socio -economic status.

6) Social participation

Baitule (1984) found that significant relationship between social participation and adoption of improved practices of Jowar by the farmers.

Bhoite and Thorat (1984) noted that there was non-significant association between social participation and adoption of rabi jowar technology by the farmers.

Girase and Bhoite (1986) reported that social participation had significant association with the adoption of improved dryland agriculture technology in an Integrated Dryland Agriculture Development Project In Maharashtra.

Dube *et. al.* (1988) observed that social participation had significant association with the adoption level of farmers about dryland wheat technology.

Bhonde (1990) found non significant relationship between social participation and their knowledge level about dry farming technology by the jowar growers.

Supe *et. al.* (1990) showed significant relationship between social participation and adoption of improved practices of jowar among the farmers in dry land area.

Bhoite and Girase (1991) found significant association between social participation and adoption of improved practices for bajra.

Sakharkar (1991) reported that majority of the respondents (74.00 %) belonged to low category of social participation.

Patil (1992) revealed that social participation of the respondents was positively correlated with adoption of recommended cultivation practices of cotton.

Gowda *et. al.* (1997) indicated that social participation by big farmers was significantly related to their knowledge level and adoption level.

Valekar (1997) observed that overwhelming majority of the respondents (85.33 %) had low level of social participation, while the percentage of respondent in medium and high category of social participation as negligible (8.67 % and 6.00 % respectively) and also found positive and significant relationship among social participation and adoption of rainfed maize growers.

Malani (1998) indicated that all three categories i. e. small, medium and big farmers possess low level of social participation.

Sarangkar (2001) indicated that majority of the respondents shows low social participation (56.62%).

Patel *et. al.* (2002) observed that social participation had positive and significant association with their extent of adoption of the watershed management technology.

7) Sources of information

Vijayaraghavan and Subramaniam (1981) noted that in case of dryland farmers the gramsevek emerged as the most credible source scoring a maximum scale value (1.57), the dryland farmer in general have placed the maximum trust on gramsevek whom they found more homophilous.

Urade *et. al.* (1991) found that three major sources of information for dryland fruit growers were the extension personnel of State Horticulture Department, Agriculture scientists and other extension personnel in order of preference.

Ajore and Singh (1992) reported that the sources of information was significantly associated with the adoption gap in reclamation technology of sodic soils.

Gowda *et. al.* (1997) reported that sources of information i.e. mass media use by big farmers were significantly related to their knowledge level, where small farmers were significantly related to their adoption level.

Prasad *et. al.* (2004) revealed that farmers of the adopted village had significantly higher sources of information than farmers of non adopted village.

Deshmukh *et. al.* (2007) revealed that 69.09 per cent of the respondents fall under medium sources of information.

Pal *et. al.* (2009) revealed that the access of different cosmopolite sources was low as compared to interpersonal localite sources. The farmers relied more on neighbours and private companies, dealers for information access.

8) Extension contact

Sakharkar (1991) reported that more than fifty per cent (54.67%) had shown medium level of extension contact followed by 23.33 per cent in low level of extension contact category.

Sarkar and Banyopadhyay (1996) reported that 52 per cent of the respondents had high level of extension contact.

Shivannapan (1997) observed that extension contact had positive relationship with adoption of integrated watershed development programme.

Tailor *et. al.* (1998) revealed that the extension contact of small and a big farmer was positively related with their knowledge of dryland farming practices in watershed area.

Joshi (1999) reported that about 44.44 per cent of the respondents having high level of extension contact where as only 11.90 per cent farmers with low extension contact category.

Pathan (1999) observed that majority of the respondents (63.00%) were in medium level of extension contact.

Shetwad (2000) revealed that higher proportion of the respondents (53.34 %) were in medium level of extension contact.

Prasad *et. al.* (2004) found that farmers of the adopted village had significantly higher extension contact than farmer of non adopted village.

Deshmukh *et. al.* (2007) revealed that most of the respondents had medium extension contact (79.51 %).

Thakur (2007) reported that majority of the respondents (45.33%) had medium level of extension contact, the farmers used to contact always village leaders, progressive farmers, input dealers etc (80.00%).

Bembridge(2008) revealed that their was insufficient contact and intensity of contact with all sources of farming information.

9) Innovativeness

Akolkar (1989) indicated that 68.00 per cent of the respondents were belonging to the category of medium level of innovativeness and innovativeness was positively and significantly related with knowledge and adoption of rainfed cotton.

Gawande (1997) found that majority of the respondents (59.50 %) were from medium innovativeness category. He further reported that innovativeness was significantly correlated with adoption of improved practices of major crop jowar and cotton.

Kalaskar (1998) and Dhule (2000) noted that innovativeness was found to have significant relation with knowledge of farmers about IPM in rainfed cotton.

Shinde (2000) found that majority of the respondents (93.33 %) were highly innovative and also concluded that innovativeness was significantly correlated with knowledge and adoption of weedicide practices in soybean crop.

10) Scientific orientation

Sakharkar (1991) observed that 46.67 per cent of the respondents belonged to medium category of scientific orientation and scientific orientation had significant association with knowledge and adoption of improved practices of soybean cultivation technology.

Kulkarni (1992) observed that scientific orientation was significant related with adoption of dryland horticulture practices.

Gawande (1997) observed that majority of respondents had medium level of scientific orientation.

Gowda *et. al.* (1997) reported that scientific orientation of small farmers was significantly to their knowledge level.

Valekar (1997) revealed that majority of the respondents (67.33 %) had medium level of scientific orientation.

Wabhitkar (1997) observed that there was significant relationship between scientific orientation and adoption.

Malani (1998) reported that in all three categories i. e. small, medium, big farmers most of the farmers had medium scientific orientation level.

Sarangkar (2001) reported that the maximum number of (54.62 %) respondents had medium scientific orientation.

Suryawanshi (2002) revealed that scientific orientation showed significant relationship with knowledge and adoption of the farmers regarding package of practices of paddy.

11) Risk preference

Bhonde (1990) expressed that farmer who preferred risks were the better adopter of new cultivation practices in dry farming.

Kale (1990) found that majority of the respondents (52%) preferred to take moderate risk extent in their farm business. He further noted that risk preferences was found to be negative and significantly correlated with adoption of improved cotton cultivation practices.

Sakharkar (1991) observed that majority of the respondents (70.67%) accepted medium risk and it had positive and significant correlation with adoption of improved cultivation practices.

Sarkar and Bandopadhyay (1996) in the study of adoption of soil and water conservation practices reported that 66 per cent of the farmers have risk taking willingness. The risk taking willingness is significantly related to the adoption.

Pande and Singh (1997) stated that adoption of agricultural innovations by small and marginal farmers of Varanasi founded positive correlation of risk preference with adoption.

Deshpande *et. al.* (1998) in their study of analysis of time of adoption of agricultural innovations reported that risk preferences had significant negative correlation with the time of adoption for pkv hy-2 cotton.

Malani (1998) reveals that most of the small farmers (40.00 per cent) had high risk preference level whereas most of the big farmers (50.00 per cent) medium farmers (44.00 per cent) had medium risk preference level.

Patel *et. al.* (2002) reported that risk preference had positive and significant association with their extent of adoption of the watershed management technology.

12) Knowledge

Bhaskaran and Praveena (1982) reported that the recommended practices, about which a large number of respondents displaying high level of knowledge were off season tillage, post harvest and summer mid season correlation, correct time of sowing of dryland crops, soil mulching, improved seed, correct seed rate, spacing, weeding, and interculture. Those practices about which a large number of farmers possessed medium level of knowledge were fertilizer use, intercropping

and sequence cropping. The practices about which many farmers had low knowledge level were: seed treatment, fertilizer spray of urea, chemical control of weed, plant protection measures and improved agricultural implements (seed cum fertilizer drill and sowing attachment to plough.)

Bhople *et. al.* (1991) indicated that the dryland farmers were aware about few practices connected with soil and water conservation, rain water management and alternative land use patterns.

Ingle and Kude (1991) reported that more than half proportion of respondents of Manoli Watershed Project were having knowledge about contour sowing was very low and its adoption was nil.

Ramchandra and Sripal (1991) observed that all the farmers were aware of summer ploughing with broad bed furrow system and pre monsoon sowing.

Sundarswamy and Bavalatti (1991) observed that 22 per cent respondents had knowledge about strip cropping in high category, 57.34 per cent medium category and 20.64 per cent in low category.

Bhople (1997) observed that majority of the farmers knowledge about intercropping, gully plugging, strip cropping and broad bed furrow method of cultivation.

Malani (1998) reported that the knowledge level of majority of medium and big farmers was of the medium level.

Kadam *et. al.* (2001) reported that most of beneficiaries had knowledge about the practices namely dividing the fields with small bunds (82.00 per cent) and small earthen bunds (76.66 per cent), more than two fifth beneficiaries had knowledge about the practices namely stubble and agro waste plucking (46.00 per cent), drains/trenches (43.33 per cent) and intercropping (42.00 per cent).

Kamble (2001) reported that 88 per cent farmers had knowledge about double cropping and double cropping system for soybean was 70.67 per cent.

Bhople *et. al.* (2003) observed that 99.33 per cent farmers had knowledge about ratio of cotton + green gram for intercropping, 78 per cent farmers had knowledge about ratio of sorghum + green gram intercropping.

Deshmukh *et. al.* (2007) revealed that majority of the respondents (97.92 %) belong to the low level of knowledge.

Thakur (2007) revealed that cent per cent respondents in knew about summer ploughing, sowing across the slope and frequent hoeing during dry spell (96.67%), farm ponds (96.00%), opening broad bed and furrows (94.67%), intercropping (84.67%), crop rotation (84.00%), preparation of loose boulder structure (74.67%) and earthen bunds (71.33%).

Rai and Singh (2008) revealed that the majority of respondents (60%) had partial knowledge; where as a very low proportion (15%) is having complete level of knowledge regarding recommended watershed practices.

Bhugul *et. al.* (2009) reported that majority of the respondents were having knowledge of the dryland technologies such as frequent hoeing during dry spell, intercropping of cotton + mung, cotton + udid , double cropping of safflower after mung, contour sowing of crops.

13) Adoption

Rastogi (1979) observed that in many locations the preparatory tillage is causal and often inadequate. The use of improved seeds, fertilizers and plant protection chemicals is low.

Ingle (1989) reported that 51.92 per cent respondents adopted intercropping. However no body adopted contour sowing.

Krishna and Chandrakandan (1996) showed that adoption of soil conservation practices has resulted in many changes not only in the farming aspects but also in social aspects.

Bhople *et. al.* (1991) found that 48 per cent of the respondents farmers were adopting only 3 to 4 recommended dry farming practices on their farm. The majority of the farmers (63.20 %) were adopting 4 to 6 crop husbandry practices.

Khedkar and Ingle (1994) reported that 94.16 per cent, 92.50 per cent and 60 per cent respondents had adopted intercropping, brushwood dam at outlet and boundary bunds respectively.

Farooq *et. al.* (1997) observed that all the respondents adopted the recommended drought resistant varieties, chemical fertilizer and intercultural operations. Majority of them also adopted the practices like application of farm yard manure (99.33 %), deep ploughing (94.67 %) crop rotation (97.33 %) and contour cultivation (91.33 %).

Malani (1998) indicated that 58.00 per cent of big farmers, 50.00 per cent of medium farmers and 48.00 per cent of small farmers possessed medium adoption level.

Khatik (1999) concluded that majority of the farmers (99 %) adopted contour farming practice. The second most popular vegetative soil and water conservation practice was; intercropping adopted by 88 per cent of farmers, the other important practices were; green manuring and summer ploughing. The least adopted soil and water conservation technologies were; mulching, strip cropping and grass water way.

Shinde *et. al.* (2000) concluded that majority of the farmers have adopted those practices which involve low cost or almost no cost and no much scientific techniques.

Kadam (2001) found that majority (68.00 per cent) of the beneficiaries had adopted only one practice namely dividing field with

small bunds. Where stubble and agro waste plucking (38.66 per cent) and small earthen bunds (23.33 per cent) were also adopted by beneficiaries.

Khillare (2004) revealed that majority of the respondents (64.67) were medium adopters of dryland farming technology.

Deshmukh *et. al.* (2007) revealed that majority of the respondents 81.94 per cent were falling under low level of adoption.

Thakur (2007) reported that practices such as summer ploughing (95.33%), frequent hoeing during dry spell (91.35%), crop rotation (90.67%), sowing across the slope (87.33%), preparation of broad bed and furrow (83.33%) were adopted by majority of respondents as the no cost and low cost practices.

Rao (2008) found that contour cultivation was adopted by all farmers. Where as formation of dead furrows at 3.6 m intervals and contour bunding was not adopted by any of farmers. Deep ploughing once in three years was adopted by 17 per cent of farmers.

Sharma *et. al.* (2008) found that farmers of watershed-1 and watershed-2 adopted soil and water conservation practices up to 36.32 and 65.21 per cent, respectively.

Bhugul *et. al.* (2009) found that most of the dryland farmers having low level of adoption recommended dry land technology.

2.2 Constraints in adoption of dryland technology

Bhaskaran and Praveena (1982) reported that the most commonly cited reasons for not adopting dry farming practices by farmers were; lack of knowledge about the practice, practice not being practicable and lack of proper guidance.

Bhoite and Nimaje (1983) stated that inadequacy of capital, lack of scientific knowledge and technical guidance, non-availability of seeds, fertilizers, pesticides etc., lack of improved implements,

inadequacy of labour and uneconomic holding were the reasons for non-adoption of dryland technology.

Sinha *et. al.* (1984) concluded that 76 per cent farmers lacked in knowledge about the utility of terraces, 72 per cent did not believe that any benefit can be derived out of it, 67 per cent did not adopt due fragmentation of their holding into unconventional shape and size, 51 per cent lacked money and 48 per cent thought that bunds would waste a part of land.

Sekar (1990) reported that unlike irrigated farming the dryland agriculture has many constraints starting with climate, soils, crops and socio-economic condition.

Mahajan and Hanava (1991) showed that non-availability of good quality seed, lack of funds for purchase of inputs, scarcity of transport and poverty were some of the constraints identified in adoption of new technologies.

Anonymous (2000) reported that meagre and uncertain income, unpredictable rainfall and low inputs use were the major problems. Therefore policy issues related to low productivity access to technology and inputs supplies and investment in research and development were needed to be examined.

Kadam (2001) reported that most of the beneficiaries have lack of information / guidance regarding each practice for non adoption. Also non availability of inputs, material labour difficulty in maintenance and lack of skill were the important constraints faced by farmers in adoption of recommended soil and water conservation practices.

Deshmukh *et. al.* (2007) revealed that more than half of the respondents stated constraints like costly seed, lack of information regarding seed cost, place of sale and proper guidance.

Jaitawat *et. al.* (2007) indicates that unavailability of improved varieties used for transplanted fennel, lack of drying facilities, high cost of input, lack of finance agencies, high fluctuation in market prices, lack of export marketing facilities in the area, unavailability of technical guidance, lack of need based training, high temperature during nursery period.

Jeet and Kushawaha (2007) observed that most of respondents faced constraints such as inadequate irrigation facilities, the higher cost of farm inputs and less price of farm produce, non-availability of labour in time, discrimination in making the facilities available to growers, inadequate and untimely supply of inputs, marketing problem.

Singh *et. al.* (2007) revealed that the incidence of pests and diseases on plants (97.52% respondents), non-availability of quality seed material (96.23% respondents) and non-availability of sulphur based phosphatic fertilizer for balanced nutrition (94.35% respondents) were identified as major constraints faced by farmers.

Sharma *et. al.* (2007) found that most serious problems experienced by the farmers where lack of immediate returns, poor contact between farmers and officers, non availability of appropriate literature, lack of communication facilities and lack of proper marketing facilities.

Rao (2008) stated that the majority of farmers perceived that factors such as additional cost, greater labour requirement, little benefit, and interference with other operations, were responsible for non adoption of recommended soil and moisture conservation technology.

Sharma *et. al.* (2008) observed that most important constraints expressed by the respondents were non-availability of communication facility, financial crisis in the family, very low support price fixed by the Govt., higher input cost and inadequate and untimely rainfall.

Bhugul *et. al.* (2009) observed that most of the respondents faced constraints such as contour sowing or contour bunding operation had not been adopted due to difficulty in cultivation, dry seeding in cotton is not possible due to uncertainty of rains, non availability of vetiver grass for planting on contour, inconvenience in intercropping in contour sowing, mung does not perform well in jowar, intercrop of tur does not perform well when intercropped with jowar and non availability of labours, in adoption of Dr. PDKV recommended dry land technology.

INDEPENDENT VARIABLES

DEPENDENT VARIABLE ●

Personal characteristics

- Age
- Educational
- Land holding
- Annual income
- Socio-economic status
- Social participation

Communication Characteristics

- Sources of information
- Extension contact

Psychological Characteristics

- Innovativeness
- Scientific orientation
- Risk preference
- Knowledge

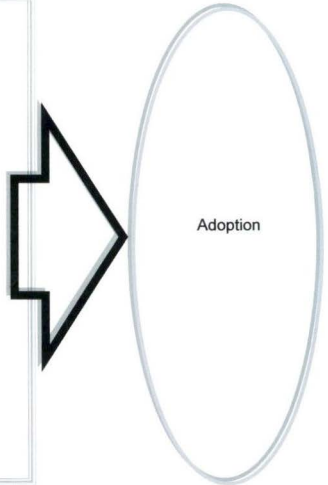


Fig. 1 Conceptual Research Model of the Study



Chapter III

Methodology

CHAPTER III

METHODOLOGY

Research methodology deals with the description of research methods and techniques used as empirical measures for testing the hypothesis developed earlier.

To evaluate the adoption of dryland technologies in dryland areas of Vidarbha region standard and detailed methodology was developed and used. Considering the importance of the accuracy of research methodology, the chapter has been divided as follows, to enable equal presentation of the definitions, methods, procedure and techniques used for the present investigation.

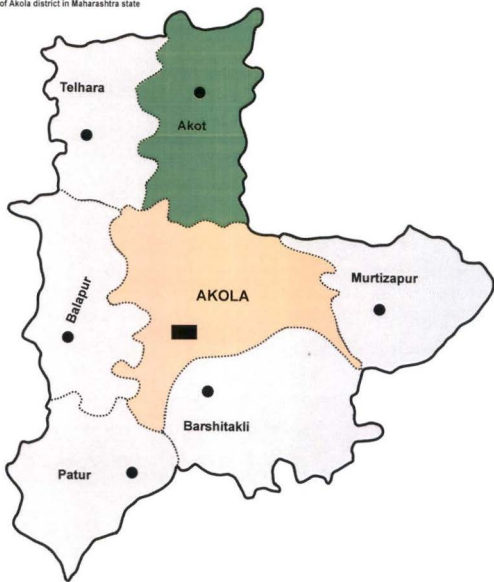
- 3.1 Locale of study
- 3.2 Research design
- 3.3 Sampling plan
 - Selection of villages
 - Selection of respondents
- 3.4 Preparation of interview schedule
- 3.5 Pre testing of interview schedule
- 3.6 Collection of data
- 3.7 Variables and their measurement
- 3.8 Operationalization, scoring and categorization of the variables.
- 3.9 Tabulation and analysis of data
- 3.10 Statistical techniques used.

3.1 Locale of study

The present study entitled "Adoption of dryland technologies by the farmers in the Akola district" was undertaken in Akola and Akot Panchayat Samities of Akola district in Vidarbha region of Maharashtra State because this area comes under dryland farming.



Location of Akola district in Maharashtra state



LEGEND

- Tahsil
- District

Selected tahsil in Akola district

- Akola tahsil
- Akot tahsil

Fig. 1. Map of Akola district

3.2 Research design

The emphasis in the study was on assessing knowledge, adoption and constraints faced by the farmers in adoption of dryland technologies recommended by Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola. Therefore the use of exploratory design of social research was followed in present investigation.

3.3 Sample and Sampling plan

Sampling plan adopted for this study was as under.

3.3.1 Selection of Panchayat Samiti

Out of seven Panchayat samities in Akola district, Akola and Akot Panchayat samities were selected purposively because most of the area in their tahsil is under dry land farming.

3.3.2 Selection of villages

For the present study, a random sampling method was used. After selection of Akola district, Akola and Akot Panchayat Samities were selected because most of area and crops to be grown comes under dryland condition and hence provide an appropriate area for the study of adoption of dryland technologies. After selection of Akola Panchayat samiti, out of 199 villages, only 5 villages were purposively selected as well as Akot Panchayat Samiti out of 186 villages, 5 villages were purposively selected because most of the villages comes under dry land condition.

3.3.3 Selection of respondents according to villages

Table1. Details of villages and farmers proportionately selected for study

Sr. No.	Name of Tahsil	Name of village	Farmers proportionately selected.
A	Akola	Nawthad	12
		Ugwa	12
		Dongargaon	12
		Maispur	12
		Wani Rambhapur	12
B	Akot	Belura	12
		Karodi	12
		Vadoli	12
		Nandkhed	12
		Divthana	12
	Total		120

3.4 Preparation of interview schedule

In order to obtain information about adoption of dryland technologies by the farmers interview schedule was developed. The interview schedule was designed with relevant questions in accordance with the study, objectives. The study schedule was divided in to two parts. The first part of the schedule included the questions related to general personal, socio economic, communication characteristics of farmers. The questions regarding the knowledge as a psychological characteristics, adoption and constraints faced by the farmers in adoption of dryland technologies were included in the second part for some variables the standardized scales were used, some schedules were prepared and for some other variables close or open end questions were included in the schedule. The schedule was developed in English and at the time of interview questions were asked in local language 'Marathi' for ease in understanding by the respondents and eliciting appropriate responses from them.

3.5 Pre testing of interview schedule

The Pre testing of interview schedule is necessary on the part of researcher. It helps in ascertaining the appropriateness of question and their language. It indicates the mistake and short falls. It helps in achieving clarity, reliability and validity of schedule. The pre testing of interview schedule was done on 20 farmers in Hingana and Umari villages of Akola Panchayat Samiti. These villages and farmers were not included in the sample of respondents. The data collected from such non sampled farmers were thoroughly studied to detect the unfamiliar words and complexity of questions included in the schedule. In the interview schedule language or few questions was changed and necessary modifications were made. The interview schedule then finalized and 120 copies were prepared for collection of data.

3.6 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 farm as per their convenience. Sometimes the help of sarpanch and gramesevak was taken to get authentic information. Before actual seeking of information, farmers were introduced with the objectives of present study. The interview schedule prepared for the study was used to record the data.

3.7 Variables and their measurement

Two sets of variables were selected with consultation of experts in the field of extension education. The selected variables and their empirical measures are given in Table 2.

Table 2: Variables and their empirical measurements

Sr. No.	Variables	Empirical measures
(I)	Independent variables	
	A) personal and socio-economic characteristics	
1	Age	Chronological age of farmers in years at the time of interview.
2	Education	Number of standards in formal school passed by the farmers.
3	Land holding	Number of hectares of land possessed by the farmers for cultivation of crops.
4	Annual income	Gross income in rupees derived from all sources in a year by the family of dryland farmers.
5	Socio-economic status	Scale developed by Thakare (2004) was used.
6	Social participation	Participation of farmers in formal and informal organizations.
	B) Communication characteristics	
7	Sources of information	A schedule was developed and quantitatively measured in terms of number of information sources consulted by the dryland farmers with relative frequency for a question of information about dryland technologies.
8	Extension contact	It was measured on 3 point continuum scale as always, sometime, never by assigning the score 2, 1 and 0 respectively.
	C) Psychological characteristics	
9	Innovativeness	Scale developed by Singh (1972) was used.
10	Scientific orientation	Scale developed by Supe (1969) was used.
11	Risk preference	Scale developed by Supe (1969) was used.
12	Knowledge	A teacher made knowledge test was developed. Response was taken on two point continuum as knowledge and no knowledge by assigning score 1 and 0 respectively.
(II)	Dependent variable	
1	Adoption	It was measured on 3 point continuum as complete, partial and no adoption by assigning the score 2, 1 and 0 respectively.

3.8 Operationalization, scoring and categorization of variables.

Operational definitions, scoring and categorizations procedure used for the set of variables under study has been described separately under the heads of independent variables and dependent variable as below.

3.8.1 Independent variables

i) Age

The chronological age of the dryland farmers in years and measured in terms of completed years at the time of data collection was considered. A numerical score of one was assigned for each year of age and respondents were categorized as follows.

Sr. No.	Category	Age range (year)
1	Young	Up to 35
2	Middle	36 to 50
3	Old	51 and above

ii) Education

Education has been operationally defined as formal level of education completed by an individual respondent. One score was given for each standard passed and it was considered as the score of education. On the basis of education qualification respondents were categorized as follows.

Sr. No.	Educational level	Range of education
1	Illiterate	No formal schooling
2	Primary school	1 to 4 std.
3	Middle school	5 to 7 std.
4	Secondary school	8 to 10 std.
5	Higher secondary	11 to 12 std.
6	College	Above 12 std.

iii) Land holding

It refers to the total land in hectare possessed by an individual farmer for cultivation of crops. The actual area possessed by the respondent was considered as such for scoring. The categorization of respondents was considered as per the norms laid down by the Government of Maharashtra.

Sr. No.	Land holding level	Range of land holding
1	Marginal	Up to 1 ha
2	Small	1.01 to 2 ha
3	Semi medium	2.01 to 4 ha
4	Medium	4.01 to 10 ha
6	Large	Above 10 ha

iv) Annual income

It refers to the income in the rupees of the dry land farmer and his family received from different sources in a year. It was measured in rupees. Considering the annual income, the respondents were categorized as under.

Sr. No.	Category (Rs.)
1	Upto 25,000
2	25,001 to 50,000
3	50,001 to 75,000
4	Above 75,000

v) Socio-economic status

Socio-economic status refers to the position of individual respondents with reference to prevailing average standard of cultural position, effective income, material possession and participation in the group activities of the community.

The scale developed by Thakare (2004) was used for measuring the socio-economic status of the respondents.

The respondents were categorized in the following categories as suggested in the scale.

Sr. No.	Socio-economic status	Score range
1	Very low	Upto 05.21
2	Low	05.22 to 08.37
3	Medium	08.38 to 11.52
4	Medium high	11.53 to 14.67
5	High	Above 14.67

vi) Social Participation

Social participation has been operationally defined as participation of respondent in formal and informal organization in the village and elsewhere.

For quantification, list of formal and informal organizations was prepared and the participation of respondent as office bearer or member was obtained. The score of 4 and 3 for office bearer and score of 2 and 1 for members was assigned for formal and informal organization respectively. The score was summed up for obtaining the total social participation score of the individual respondent. The respondents were categorized on the basis of mean and standard deviation ($\bar{X} \pm 1S.D.$).

Sr. No.	Social participation	Score range
1	Low	Upto 1
2	Medium	2 to 3
3	High	Above 3

$$\bar{X} = 1.92 \quad S.D. = 1.66$$

vii) Sources of information

The sources utilized by dry land farmers for seeking information about agriculture and dry land techniques was taken as sources of information.

All the possible information sources of dry land technologies were listed out. There were important sources. These sources were classified into three categories viz., personal, personal cosmopolite and mass media sources of information. The respondents were asked to state their frequency of contact with these sources of information in terms of regularly, sometimes and never. The numerical score of 2, 1 and 0 were assigned for regularly, sometimes and never responses respectively. The score for all information sources were added together and on the basis of mean and standard deviation ($\bar{X} \pm 1S.D.$) the respondents were grouped into following three categories.

Sr. No.	Sources of information	Score range
1	Low	Upto 7
2	Medium	8 to 14
3	High	Above 14

$$\bar{X} = 10.75$$

$$S.D. = 3.72$$

viii) Extension contact

Extension contact in the present study refers to various contacts made by the respondents with extension workers and other transfer of technologies agencies for seeking information about dryland technologies. The scoring of contacts with various extension agencies was done on 3 point continuum i.e. always, sometime and never with score 2, 1 and 0 respectively. Each contact reported was scored accordingly and the total extension contact score of the respondents was calculated. The respondents were categorized on the basis of mean and standard deviation ($\bar{X} \pm 1S.D.$) as follows.

Sr. No.	Extension contact	Score range
1	Low	Upto 2
2	Medium	3 to 5
3	High	Above 5

$$\bar{X} = 3.79$$

$$S.D. = 1.77$$

ix) Innovativeness

Rogers (1983) defined innovativeness as the degree to which an individual or other unit of adopting new ideas relatively earlier than other members of social system.

It is operationally defined as the degree to which the dry land farmer has adopted the recommended dry land technologies relatively earlier than other farmers in his village community.

The scale developed by Singh (1972) was used to measure innovativeness. There were six statements. Out of the six statements in the scale statement 1, 4, 5 were positive and remaining 2, 3 and 6 were negative. The responses were rated on a three point continuum agree, undecided and disagree and scoring was done on the basis of the response of an individual respondent. The positive statements were assigned the score of 3, 2, and 1 for agree, undecided and disagree response categories respectively, reverse scoring was done for negative statements. Score earned on all the six statements of the scale were summed up and this sum total indicates the innovativeness. The respondents were categorized in to following three categories on the basis of mean and standard deviation ($\bar{X} \pm 1S.D.$).

Sr. No.	Innovativeness	Score range
1	Low	Upto 10
2	Medium	11 to 15
3	High	Above 15

$$\bar{X} = 12.75$$

$$S.D. = 2.59$$

x) Scientific orientation

It has been defined as the degree to which an individual is inclined to use of scientific method in farming and decision making.

A scale developed by Supe (1969) was used for measuring scientific orientation. There were six statements. Out of six statements in the scale statement 1, 3, 4, 5, 6 were positive and remaining 2 was negative statement. The responses were rated on all five point continuum strongly agree, agree, undecided, disagree, and strongly disagree. Where positive statements were assigned the score of 5, 4, 3, 2, 1 and reverse scoring was done for negative statements. On the basis of mean and standard deviation ($\bar{X} \pm 1S.D.$) the respondents were categorized in to following three categories.

Sr. No.	Scientific orientation	Score range
1	Low	Upto 16
2	Medium	17 to 22
3	High	Above 22

$$\bar{X} = 19.77$$

$$S.D. = 2.92$$

xi) Risk preference

It has been defined as the degree to which the respondents are oriented towards risk and have courage to face the new problems.

A scale developed by Supe (1969) was used for measuring risk preference. There were six statements, out of the six statements in the scale statement No. 1, 2, 3, 4, and 6 were positive and remaining 5 was negative statement. The response were rated on five point continuum strongly agree, agree, undecided, disagree, strongly disagree. Where positive statements were assigned the score of 5, 4, 3, 2, 1 and reverse scoring assign for negative statements. On the basis of mean and standard deviation ($\bar{X} \pm 1S.D.$) the respondents were categorized into following three categories.

Sr. No.	Risk preference	Score range
1	Low	Upto 15
2	Medium	16 to 21
3	High	Above 21

$$\bar{X} = 18.2$$

$$S.D. = 2.92$$

xii) Knowledge

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

Knowledge in the present study is operationally defined as amount of information possessed by the respondents about different recommended dry land technologies.

A teacher made knowledge test was developed and used for measuring the knowledge quantitatively about recommended dry land technologies. Only considered the major practices namely dry seeding in cotton, in situ moisture conservation, double cropping, intercropping, contingent crop planning, integrated nutrient management and cropping system were considered for ascertaining knowledge. For this purpose in all 40 dry land technologies/practices were selected. The responses of the respondents were contacted on two point continuum i. e. Yes / No and a numerical score of 1 and 0 was assigned respectively.

On the basis of raw score obtained the knowledge index was calculated by using following formula.

$$\text{Knowledge index} = \frac{\text{Actually obtained Knowledge score}}{\text{Maximum obtainable knowledge score}} \times 100$$

The respondents were then categorized on the basis of equal interval method as follows.

Sr. No.	Knowledge	Score range
1	Low	Upto 33.33
2	Medium	33.34 to 66.66
3	High	Above 66.66

3.8.2 Dependent variable

The dependent variable in the present study was adoption of recommended dry land technologies. The operational definitions and procedure used for measurement of the components of dependent variable is presented in this sub part.

i) Adoption :

Rogers (1995) defined adoption as the decision to make full use of innovation in the best course of action available.

It is operationally defined as an extent of actual use of recommended dry land technologies by dry land farmers. In all 40 dryland technologies/practices were identified. The adoption was measured on 3 point continuum i.e. fully adoption, partial adoption and non adoption. The score of 2, 1 and 0 respectively was granted. On the basis of raw score obtained the adoption index was calculated by using following formula.

$$\text{Adoption Index} = \frac{\text{Actual obtained adoption score}}{\text{Maximum obtainable adoption score}} \times 100$$

The respondents were categorized according to the adoption score on the basis of equal interval method as follows.

Sr. No.	Adoption	Score range
1	Low	Upto 33.33
2	Medium	33.34 to 66.66
3	High	Above 66.66

3.8.3 Constraints

It refers to the problems or difficulties faced by the dryland farmers in adoption of recommended dryland technologies.

A list of probable constraints was prepared and responses of the farmers were collected accordingly. The frequency and percentage of each constraint was worked out to decide the intensity of the constraints encountered by the respondents.

3.9 Tabulation and analysis of data

Mean, percentage, and standard deviation, coefficient of correlation used to analyze the data or the different aspects of the study. The details about the statistical techniques used are summarized as follows.

The categories of low, medium and high were computed on the tasks of mean and standard deviation in some of the cases.

The relationship of independent variables with adoption was done with the help of coefficient of correlation (r) was tested against the value ' r ' in the table of significant at $n-2$ degree of freedom if the calculated value of r was greater than the table value of ' r ' at either 0.01 or 0.05 level of probability. The relationship was considered to be significant.

3.10 Statistical methods used.

1. Mean

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

Where,

$$\bar{X} = \text{Mean}$$

$$\sum X = \text{Sum of respondents score}$$

$$n = \text{Number of respondents}$$

2. Standard deviation

$$\sigma = \sqrt{\frac{N \sum X^2 - (\sum x)^2}{n}}$$

Where,

σ = Standard deviation

$\sum X^2$ = Sum of square of X series

$(\sum x)^2$ = Square of sum of X series

n = Number of respondents

3. Coefficient of correlation

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

Where,

r = Coefficient of correlation

$\sum X$ = Sum of the score of variable X

$\sum Y$ = Sum of the score of variable Y

$\sum XY$ = Sum of products of 'X' and 'Y' variables

$\sum X^2$ = Sum of square of 'X' variable

$\sum Y^2$ = Sum of the square of 'Y' variable

N = Total number of respondents



Chapter IV

*Socio-Economic
Features of District*

CHAPTER IV

SOCIO-ECONOMIC FEATURES OF AKOLA DISTRICT

Maharashtra state has six revenue divisions viz., Mumbai, Pune, Nasik, Aurangabad, Amravati and Nagpur. Vidarbha area includes Amravati and Nagpur revenue divisions comprising eleven districts viz., Buldana, Akola, Washim, Amravati, Yavatmal, Wardha, Nagpur, Bhandara, Gondia, Chandrapur, Gadchiroli. Washim and Gondia are newly formed districts bifurcating Akola and Bhandara districts respectively. Nagpur division includes 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 Akola districts of Western Vidarbha. The agro-climatic conditions differ from place to place and even in close vicinity also.

4.1 Location of Akola district

Akola district falls in Vidarbha region of Maharashtra. It comprises of 7 tehsils. It lies between 20°17' and 21°18' north latitudes and 76°17' and 77°14' east latitudes. It covers area of 5417sq.km. accounting for 1.76 % of the total area of Maharashtra. Akola district is surrounded by Amravati district in north, part of Amravati district and Yavatmal district in the East, Washim and Yavatmal district to the south and Buldhana district toward West.

4.2 Topography and soil

The northern part of the Akola district lies in Purna valley which itself is a part of Tapi river basin. River Purna has formed fertile basin in Akola, Balapur and Murtizapur tahsil of Akola. Akola district is divided into 7 tahsils for smooth administration. The district ranks fourth in

respect of size and fifth in respect of population among the eleven districts of Vidarbha region of Maharashtra. The soil of the districts 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 found in the plain and deep black soil found in river valley.

4.3 Climate and rainfall

Being away from the sea, the district has extreme climate. The weather during winter is too cool, while in summer it is too hot. The average minimum and maximum temperature extremities observed throughout the year was 10°C and 46.5°C, respectively. Akola district falls in assured rainfall zone of Maharashtra state having on an average rainfall between 750 to 1000 mm.

4.4 Land use pattern

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

Table 3. Land use pattern of Akola district

Sr. No.	Content	Area (In 00' ha)	Percentage
1.	Area for land utilization statistics	5429	100.00
2.	Forest	299	5.51
3.	Barren and uncultivable land	115	2.12
4.	Land put to non agricultural use	300	5.52
5.	Cultural waste land	31	0.57
6.	Permanent pasture and other grazing land	167	3.08
7.	Land under miscellaneous tree crops and groves not included in net area sown	12	0.22
8.	Current fallows	100	1.84
9.	Other fallows	56	1.03
10.	Net area sown	4349	80.11
11.	Area sown more than once	911	16.78
12.	Gross cropped area	5260	96.89
13.	Cropping intensity	120.95	

(Source Agricultural statistical information Maharashtra state, 2006)

4.5 Cropping pattern

The usual cropping pattern 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 Akola district

Sr. No.	Crop	Area (In 00' ha)
1.	Wheat	34
2.	Kharif jowar	822
3.	Rabi jowar	1
4.	Bajari	14
5.	Other cereals	9
	Total cereals	880
6.	Gram	240
7.	Tur	522
8.	Other pulses	785
	Total pulses	1547
	Total Food grains	2427
9.	Sugarcane	5
10.	Cotton	2076
	Total fibre	2076
11.	Safflower	19
12.	Sunflower	
	Kharif	15
	Rabi	11
	Summer	4
13.	Summer groundnut	5
14.	Soybean	503
	Total oilseed	587

(Source Agricultural statistical information Maharashtra state, 2006)

4.6 Crop season and crop rotation

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.

Cotton and Jowar are the two important crops grown in Kharif season on large scale. Tur, Mung, Udid are also grown in Kharif on large scale. Now, in addition to this, Soybean is also grown by the farmers. Wheat and gram are important Rabi crops grown in the area, Linseed, Sunflower, Safflower, some spices and vegetables, fruit crops are also



grown in Rabi season, wherever the irrigation is available mostly through wells. The manners in which crop rotations commonly followed are presented in Table 4.3.

Table 5 . Crop season and crop rotation

Sr No	Kharif	Rabi
1.	Cotton	-
2.	Cotton + tur + jowar	-
3.	Jowar	Gram
4.	Cotton + mung + udid	Wheat
5.	Cotton + tur + mung	Gram
6.	Jowar	Safflower/ wheat
7.	Cotton + tur	Safflower
8.	Cotton + tur + jowar + mung	Sunflower
9.	Mung	Safflower
10.	Cotton + mung	-

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 levels.

Maharashtra state seed corporation and other private seed companies supply quality seeds to the farmers. The farm inputs are made available to the farmers by co-operative societies also. Functioning at block level, Panchayat Samiti also provides 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 agriculture produce, agriculture market committees are functioning in the district. All 7 tahsils having facilities of regulated markets are also functioning in the district. These sub-markers are connected with roads and having facilities of banking, electricity, etc.



Chapter V

*Results and
Discussion*



CHAPTER V

RESULTS AND DISCUSSION

The data obtained from the respondents have been suitably organized, scored, classified into qualitative and quantitative classes, tabulated and analyzed by taking into account the objectives of the study. The data were also subjected to statistical treatments and analysis with the help of appropriate statistical techniques and tests. The results obtained from the analysis of data have been presented in this chapter in the subsequent pages. The results have also been discussed appropriately with the logical reasoning in light of the findings of the previous researches on the topic. The results along with the discussion have been described under the following subheads.

- 5.1 Characteristics of respondents.
- 5.2 Knowledge about dryland technologies.
- 5.3 Adoption of dryland technologies.
- 5.4 Relational analysis with adoption
- 5.5 Constraints faced by respondents in adoption of dryland technologies.

5.1 Characteristics of respondents :

The distribution of selected dryland farmers according to their personal, socio-economic, communication and psychological characteristics have been presented in this section.

5.1.1 Personal and socio-economic characteristics

The characteristics namely, age, education, land holding, annual income, socio-economic status, social participation were the variables studied under personal characteristics. The findings

pertaining to distribution of the respondents on these characteristics are presented in the succeeding paragraphs.

5.1.1.1 Age

Age has been considered as an important variable in influencing the adoption of the respondents. The distribution of the respondents according to age has been presented in Table 1.

Table 1. Distribution of respondents according to their age

Sr. No.	Age (Year)	Frequency (n=120)	Percentage
1	Young (Upto 35)	38	31.67
2	Middle (36 to 50)	55	45.83
3	Old (51 and above)	27	22.50
	Total	120	100.00

The age wise distribution of respondents in Table 1 shows that relatively higher proportion of the respondents i.e. 45.83 per cent were belonging to middle age group of 36 to 50 years, followed by 31.67 per cent respondents who found in young age category. The percentage of respondents in old age group of above 50 years was found to be only 22.50 per cent. It could be concluded that majority of the respondents were from 36 to 50 years of age group (45.83 %).

These results are in conformity with the findings of Malani (1998), Zade (1998) Dhule (2000) and Kamble (2001) Sarangkar (2001).

5.1.1.2 Education

It is assumed that education plays an important role in possession of knowledge about important dryland technologies and hence it has been considered in this study. The distribution of the respondents according to education has been presented in Table 2.

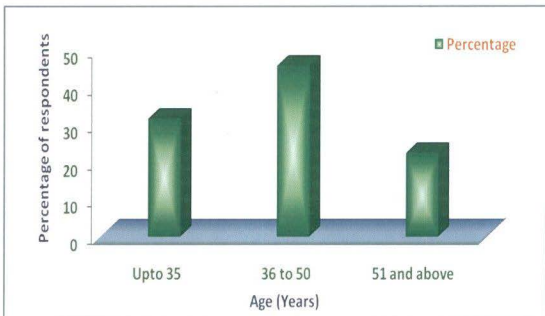


Fig.2 Distribution of respondents according to their age

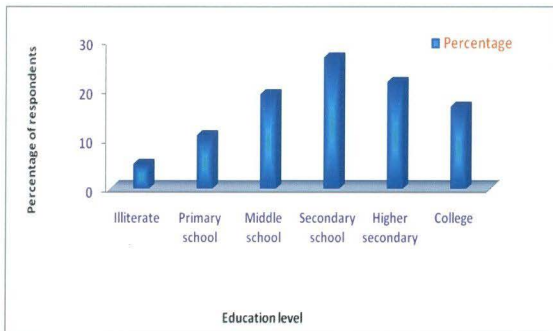


Fig.3 Distribution of respondents according to their education

Table 2. Distribution of respondents according to their education

Sr. No.	Education level	Frequency (n = 120)	Percentage
1	Illiterate	06	05.00
2	Primary school	13	10.83
3	Middle school	23	19.17
4	Secondary school	32	26.67
5	Higher secondary	26	21.67
6	College	20	16.66
	Total	120	100.00

On the basis of formal schooling the respondents were categorized in six categories and the results obtained are given in Table 2. It is noticed from Table 2 that 26.67 per cent of the respondents were educated up to secondary school level, followed by 21.67 per cent who had higher secondary school level education. A small percentage of respondents were educated up to college level, primary school and illiterate i.e. (16.66%, 10.83%, 5.00%) respectively. Thus it could be made out that majority of the respondents (48.34%) were educated up to higher secondary to secondary school level of education.

5.1.1.3 Land holding

It is assumed that land holding is an important factor which may influence adoption of important dryland technologies and hence it has been considered in this study. The distribution of the respondents according to land holding has been presented in Table 3.

Table 3. Distribution of respondents according to their land holding

Sr. No.	Land holding	Frequency (n =120)	Percentage
1	Marginal	16	13.33
2	Small	43	35.84
3	Semi medium	24	20.00
4	Medium	22	18.33
5	Large	15	12.50
	Total	120	100.00

The data in Table 3 revealed that, 35.84 per cent of the respondents had possessed small land holding, followed by 20.00 per cent respondents had semi-medium land holding, followed by 18.33 per cent respondents had medium level of land holding, where 13.33 per cent and 12.50 per cent respondents had possessed marginal and large land holding respectively. It is concluded that majority of the respondents (55.84%) had possessed small to semi medium land holding.

5.1.1.4 Annual income

Adoption of some of the costly dryland technologies is not affordable to marginal farmers due to their income. Annual income prerequisite for adoption of dryland technologies .It is assumed that annual income plays an important role for adoption of important dryland technologies and hence it has been considered in this study. The distribution of the respondents according to their annual income has been presented in Table 4.

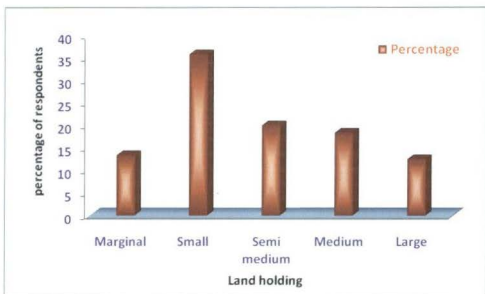


Fig.4 Distribution of respondents according to their land holding

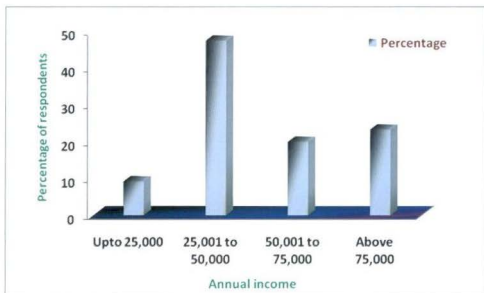


Fig.5 Distribution of respondents according to their annual income

Table 4. Distribution of respondents according to their annual income

Sr. No.	Annual income	Frequency (n = 120)	Percentage
1	Upto Rs. 25,000	11	09.17
2	Rs. 25,001 to 50,000	57	47.50
3	Rs. 50,001 to 75,000	24	20.00
4	Above Rs.75,000	28	23.33
	Total	120	100.00

It seems from the Table 4, that nearly half of the respondents 47.50 per cent had annual income in between Rs.25,001 to Rs.50, 000, followed by 23.33 per cent of the respondents having annual income above Rs.75,000. As much as 20.00 per cent of the respondents belonged to the annual income group of Rs.50,000 to 75,000. Only 9.17 per cent of respondents were having annual income below Rs.25,000. It may be said that majority of the respondents had an annual income between Rs.25,001 to 50,000.i.e.(47.50%).

These results are in conformity with the findings of Dhule (2000) Kamble (2001).

5.1.1.5 Socio-economic status

Socio economic status plays important role in adoption of the important dryland technologies. Hence it has been studied in present case. The distribution of the respondents according to their socio-economic status group presented in Table 5.

Table 5. Distribution of respondents according to their socio-economic status

Sr. No.	Socio-economic status	Frequency (n = 120)	Percentage
1	Very low	46	38.33
2	Low	32	26.67
3	Medium	13	10.83
4	Medium High	20	16.67
5	High	09	07.50
	Total	120	100.00

In the Table 5 with respect to socio-economic status reveals that 38.33 per cent of the respondents belonged to very low socio-economic status group, followed by 26.67 per cent who had low socio-economic status group. The percentage of respondents belonged to medium high was 16.67 per cent. Where the percentage of respondents belonged to medium and high category of socio-economic status was very merge i.e. (10.83% and 7.50% respectively).The respondents in general had low level of standing in the socio-economic status group.

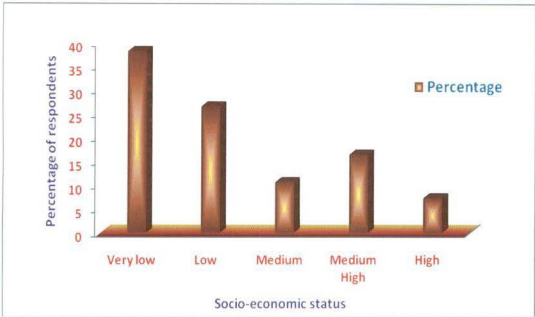


Fig.6 Distribution of respondents according to their socio- economic status

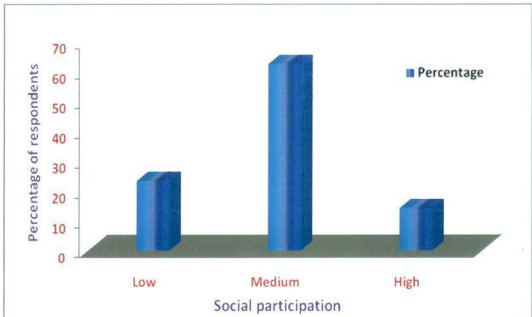


Fig.7 Distribution of respondents according to their Social participation

5.1.1.6 Social participation

Table 6. Distribution of respondents according to their social participation

Sr. No.	Social participation	Frequency (n = 120)	Percentage
1	Low	28	23.33
2	Medium	75	62.50
3	High	17	14.17
	Total	120	100.00

$$\bar{X} = 1.95 \quad \text{S.D.} = 1.66$$

The data in Table 6 indicates that the majority of the respondents 62.50 per cent were found in medium category of social participation. However 23.33 per cent and 14.17 per cent of the respondents were in low and high category of social participation respectively. Thus, majority of the respondents showed medium social participation i.e. (62.50%).

5.1.2. Communication characteristics

5.1.2.1 Sources of information

Table7. Distribution of respondents according to their sources of information

Sr. No.	Sources of information	Frequency (n = 120)	Percentage
1	Low	30	25.00
2	Medium	71	59.17
3	High	19	15.83
	Total	120	100.00

$$\bar{X} = 10.75 \quad \text{SD} = 3.72$$

The data depicted in Table 7 indicated that majority of the respondents 59.17 had medium level of exposure to various sources of information about dry land technologies. One fifth of the respondents (25.00 per cent) were found to be in low level of use of information sources. Whereas 15.83 per cent of the respondents were found to be keeping more contacts with various information sources for acquiring information about dryland technologies. Thus majority of the respondents were found to be using various sources of information about dryland technologies only to medium extent i.e. (59.17%).

These results are in closed conformity with the findings of Kamble (2001).

By and large, the respondents were found to be not using various sources of information to acquire the information about dryland technologies to maximum extent and hence indicate the need to emphasize for increase in exposure to different source of information about dry land technologies.

5.1.2.2 Distribution of respondents according to utilization of sources of information

The data regarding various sources of information used by the respondents is presented in Table 8. From amongst the personal contact, majority of the respondents were found to be contacting the input dealer (60.00%), friends (55.83%), relatives (55.83%), progressive farmers (55.00%) and local leaders (40.83%), sometimes for acquiring information about dryland technologies. Gram panchayat members (70.00%), neighbours (46.67%) were not at all contacted by majority of the respondents for getting information about dry land technologies.

Table 8. Distribution of respondents according to utilization of sources of information

Sr. No.	Sources of information	Frequency of Use (n=120)		
		Always	Sometime	Never
1	Personal contact			
	1. Neighbours	18 (15.00)	46 (38.33)	56 (46.67)
	2. Friends	22 (18.33)	67 (55.83)	31 (25.84)
	3. Relatives	11 (9.17)	67 (55.83)	41 (34.1)
	4. Progressive farmer	33 (27.50)	66 (55.00)	21 (17.50)
	5. Gram panchayat members	00 (0.00)	36 (30.00)	84 (70.00)
	6. Local leader	11 (9.17)	49 (40.83)	42 (35.00)
	13 (10.83)	72 (60.00)	35 (29.17)	
	7. Input dealer			

2	Personal cosmopolite			
	1.Agriculture supervisors	00 (0.00)	04 (3.33)	116 (96.67)
	2.Group discussions	09 (7.50)	73 (60.83)	38 (31.67)
	3.Trainings	13 (10.83)	34 (28.33)	73 (60.84)
	4.Demonstration	12 (10.00)	43 (35.83)	65 (54.17)
	5.Tours	09 (7.50)	36 (30.00)	75 (62.50)
3	Mass-Media			
	1.Radio	40 (33.33)	56 (46.67)	24 (20.00)
	2.Television	28 (23.33)	38 (31.67)	54 (45.00)
	3.News paper	23 (19.17)	37 (30.83)	60 (50.00)
	4.Agriculture literature	08 (6.67)	26 (21.67)	86 (71.66)
	5.Internet	00 (0.00)	00 (0.00)	120 (100.00)

Among personal cosmopolite sources majority of the respondents tried to acquire the information occasionally from group discussions (60.83%) for getting the information about dry land technologies. However majority of the respondents did not contacting

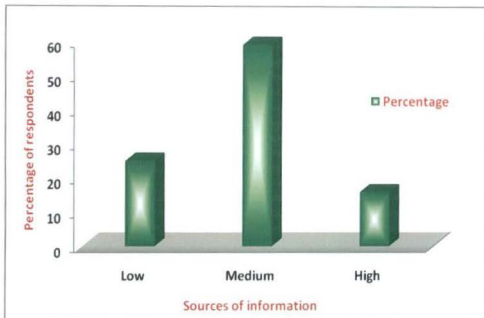


Fig.8 Distribution of respondents according to their Sources of information

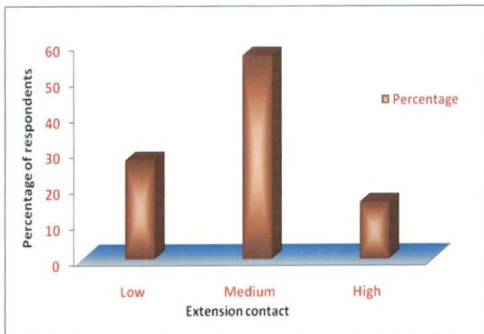


Fig.9. Distribution of respondents according to their extension contact

agricultural supervisors for getting information who is a good and faithful person for getting source of information, did not participated in tours and trainings, visit to demonstration i.e. (62.50%, 60.84%, and 54.57%) respectively for obtaining information about dryland technologies.

Among mass media sources, majority of the respondents tried to acquire the information occasionally from radio (46.67%) by exposing to farm radio programme. However majority of the respondents not trying to get information from agriculture literature (71.66%), news paper (50.00%) and television (45.00%). none of the respondent made use of internet sources for getting the information about dryland technologies (100%).

The above results tend to conclusion that the respondents used to obtain information about dryland technologies through input dealer (60.00 %), friends (55.83%), relatives (55.83%), progressive farmers (55.00%), local leader (40.83%)and participated in group discussion (60.83%) ,listening radio (46.67%) sometimes for acquiring information on dryland technologies. However majority of the respondents did not getting information from agriculture supervisors, did not participated in trainings and tours, visit to demonstration, agriculture literature (71.66%), news paper (50.00%) and television (45.00%). None of the respondent made use of internet source for getting the information about dryland technologies. Farmers should ensure to participation in training and tours, demonstration. The publication on dryland technologies may be broad about and made available to farmers for their use.

These results are in conformity with the findings of Kamble (2001), Khillare (2004), Bhugul *et al.* (2009)

5.1.2.2 Extension contact

Extension contact helps the farmers in seeking information about new dryland practices and dryland technologies, which help in the decision making about use of them. The distribution of the respondents according to contact with extension personnel has been presented in Table 9.

Table 9. Distribution of respondents according to their extension contact

Sr. No.	Extension contact	Frequency (n = 120)	Percentage
1	Low	33	27.50
2	Medium	68	56.67
3	High	19	15.83
	Total	120	100.00

$$\bar{X} = 3.79$$

$$S.D. = 1.77$$

The data presented in Table 9 indicates that relatively higher proportion 56.67 per cent of respondents had medium level of extension contact, followed by 27.50 per cent of the respondents who had low level of extension contact. However, respondents having higher level of extension contact were 15.83 per cent. Thus, it could be concluded that majority of the respondents possessed medium extension contact with different sources (56.67%).

This results are in conformity with the findings of Sakharkar (1991) Pathan(1999) and Shetwad (2000) Thakur (2007).

Table 10. Distribution of respondents according to frequency with different extension contact sources.

Sr. No.	Extension contact sources	Frequency of contact (n=120)		
		Always	Sometime	Never
1	Gramsevak	07 (5.83)	32 (26.67)	81 (67.50)
2	Agriculture assistant	00 (0.00)	14 (11.67)	106 (88.33)
3	Extension worker of panchayat samiti	0.00 (0.00)	38 (31.66)	82 (68.34)
4	Agriculture officers	02 (1.67)	13 (10.83)	105 (87.50)
5	University scientist / kvk scientist	00 (0.00)	25 (20.83)	95 (79.17)
6	Krishi melava	15 (12.50)	57 (47.50)	48 (40.00)
7	Agricultural exhibition	14 (11.67)	70 (58.33)	36 (30.00)

Among all extension contacts, majority 58.33per cent of the respondents tried to contact for acquire the information occasionally from visit to agricultural exhibition and participate in krishi melava 47.50 per cent.

However majority did not contact with agriculture assistant 88.33 per cent, agriculture officer 87.50 per cent, university scientist / kvk scientist 79.17, extension worker of panchayat samiti 68.34 per cent, gramsevak 67.50 per cent for obtaining information about dryland technologies.

The above results tend to conclusion that the respondents used to obtain information about dryland technologies through visit agricultural exhibition (58.33%), and participate in krishi melava (47.50%). The extension workers of panchayat samiti, agriculture officer, gramsevak, and university / kvk scientist should therefore, try to increase their contacts with the farmers for making available with information about dryland technologies.

5.1.3 Psychological characteristics

5.1.3.1 Innovativeness

Table11. Distribution of respondents according to innovativeness

Sr. No.	Innovativeness	Frequency (n = 120)	Percentage
1	Low	20	16.67
2	Medium	77	64.17
3	High	23	19.16
	Total	120	100.00

$$\bar{X} = 12.75$$

$$S.D. = 2.59$$

The data presented in Table 11 indicates that relatively higher proportion 64.17 per cent of respondents had medium level of innovativeness, followed by 19.16 per cent of the respondents who had high level of innovativeness. However, respondents having low level of Innovativeness were 16.67 per cent.

These results are in conformity with the findings of Gawande (1997) and Kamble (2001).

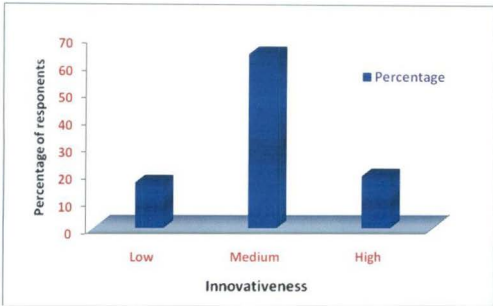


Fig.10 Distribution of respondents according to innovativeness

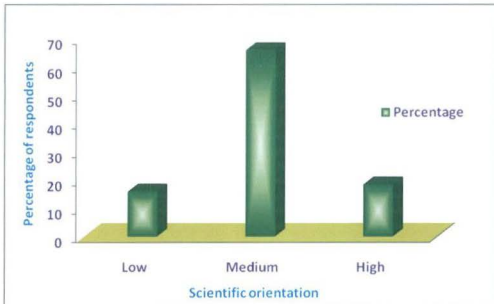


Fig.11 Distribution of respondents according to scientific orientation

5.1.3.2 Scientific orientation

Table 12. Distribution of respondents according to scientific orientation

Sr. No.	Scientific orientation	Frequency (n = 120)	Percentage
1	Low	19	15.83
2	Medium	79	65.84
3	High	22	18.33
	Total	120	100.00

$$\bar{X} = 19.77$$

$$S.D. = 2.92$$

The data presented in Table 12 indicates that relatively higher proportion 65.84 per cent of respondents had medium level of scientific orientation, followed by 18.33 per cent of the respondents who had high level of scientific orientation. However, respondents having low level of scientific orientation were 15.83 per cent.

These results are in conformity with the findings of Gawande (1997) and Sarangkar (2001).

5.1.3.3 Risk preference

Ability of an individual to take risk in adoption of new agricultural technologies has been founded by various researches to be positively correlated with adoption. Hence in the process of adoption of dryland technologies, acceptance of risk involved is very vital and decision making factor for the farmers. Hence investigation is made in this aspect. Distribution of the respondents according to their risk preference has been presented in Table 13.

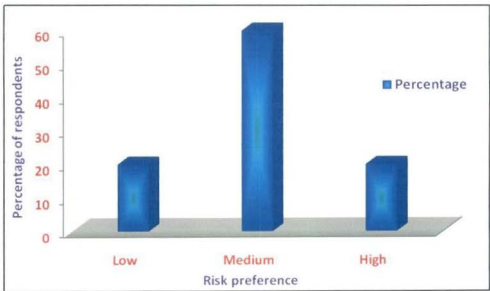


Fig.12. Distribution of respondents according to risk preference

Table13. Distribution of respondents according to risk preference

Sr. No.	Risk preference	Frequency (n = 120)	Percentage
1	Low	24	20.00
2	Medium	72	60.00
3	High	24	20.00
	Total	120	100.00

$$\bar{X} = 18.2$$

$$S.D. = 2.92$$

It was observed that relatively higher proportion of respondents 60.00 per cent had medium level of risk preference, followed by 20.00 per cent of the respondents who had high level of risk preference. However, respondents having low level of risk preference were 20.00 per cent. Thus it could be concluded that majority of the respondents possessed medium level of risk preference with dryland technologies.

5.2 Knowledge

Knowledge about the recommended dryland technologies is important for adoption of various dryland technologies. Knowledge of the recommended dryland technologies has been reported to be positively related to adoption of dryland technologies. To investigate the level of knowledge about dryland technologies recommended by Dr.Panjabrao Deshmukh Krishi Vidyapeeth, Akola and study its effect on adoption, study of knowledge has been undertaken. The distribution of the respondents according to their knowledge about the recommended dryland technologies has been presented in Table 14.

Table 14. Distribution of respondents according to their level of knowledge.

Sr. No.	Knowledge	Frequency (n = 120)	Percentage
1	Low	37	30.83
2	Medium	59	52.50
3	High	24	16.67
	Total	120	100.00

The distribution in Table 14 reveals that majority of the respondents 52.50 per cent belong to the medium category of knowledge. As much as 30.83 per cent of the respondents were having low level of knowledge. Only 16.67 per cent of the respondents were observed in high knowledge category. The farmers in general were thus found to be medium in knowledge about recommended dryland technologies (52.50%).

These results are in closed conformity with the findings of Singh *et.al.* (1991).

The practice wise knowledge of the respondents about dry land technologies has revealed in Table 15 that majority of the respondents were aware about deep ploughing 99.16 per cent, leveling of farm land 93.33 per cent, while majority of respondents having knowledge of practices such as in-situ moisture conservation 85.83 per cent, cultivating land across the slope 85.83 per cent, frequent hoeing during dry spell 85.33 per cent, inter-cultural operation 85.00 per cent, timely sowing 80.00 per cent, FYM / vermicompost / compost application 77.50 per cent, intercropping of cotton + black gram / green gram (1:1) 76.66 per cent, use of weedicides 72.50 per cent, sowing across the slope of land 72.50 per cent, contour cultivation 72.50 per cent, small earthen bunds 71.66 per cent, dry seeding in cotton 71.66

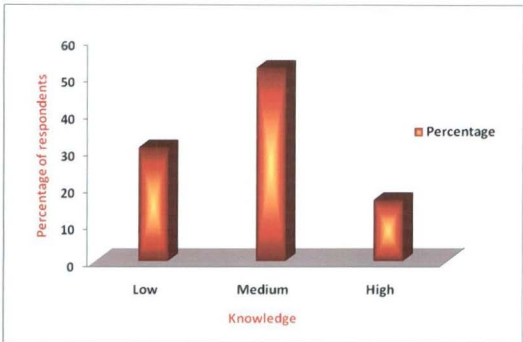


Fig.13 Distribution of respondents according to their level of knowledge

per cent, live contour bund 70.83 per cent, farm ponds 70.83 per cent, mulching 67.50 per cent, gap filling & thinning 66.66 per cent, integrated nutrient management 65.83 per cent, double cropping of safflower after green gram 63.33 per cent, opening of furrow after every 2 rows at 30 DAS 61.66 per cent, integrated pest management 59.16 per cent, sequence cropping of gram after jowar / soybean 55.00 per cent, use of drought resistant varieties of crops 53.33 per cent, rain water harvesting management 51.66 per cent.

It is worthwhile to note further that about 50.00 per cent of the respondents were found to aware about sowing tur, sunflower, maize, bajra, sesamum, castor under contingent crop planning and tur + black gram / green gram (1:1) respectively, use of biofertilizer 46.66 per cent, broadbed and furrow 45.83 per cent, crop rotation 45.00 per cent, application of fertilizer through spraying 40.00 per cent, cotton + jowar + tur + jowar (6:1:2:1) 35.00 per cent, sowing along with contour lines 32.50 per cent, protective irrigation 31.66 per cent, integrated disease management 26.66 per cent, shelter belts 26.66 per cent, crop management done on the basis of depth of soil 23.33 per cent, green manuring – spreading of 4.5 tones glyricidia / subabhul green leaves per ha 22.50 per cent, topo cropping of cotton, soybean, gram 9.16 per cent; strip cropping 2.50 per cent.

Table15. Distribution of respondents according to practice wise knowledge possessed by them.

Sr. No.	Dry land technologies / Dry land Practices	Knowledge (n=120)	
		Number	Percentage
1	Leveling of farm land	112	93.33
2	Broadbed and furrow	55	45.83
3	Farm ponds	85	70.83
4	In-situ Moisture conservation	103	85.83
5	Shelter belts	32	26.66
6	Crop management done on the basis of depth of soil	28	23.33
7	Cultivating land across the slope	103	85.83
8	Deep ploughing	119	99.16
9	Rain water harvesting management	62	51.66
10	Opening of furrow after every 2 rows at 30 DAS	74	61.66
11	Frequent hoeing during dry spell	103	85.83
12	Mulching	81	67.50
13	Interculturing	102	85.00
14	Protective irrigation	38	31.66
15	Small earthen bunds	86	71.66
16	Contour cultivation	87	72.50
17	Live contour bund – vetivera / leucaena bunds / khass grass bunds	85	70.83
18	Use of drought resistant varieties of crops	64	53.33
19	Timely sowing	96	80.00
20	Sowing across the slope of land	87	72.50
21	Sowing along with contour lines	39	32.50
22	Crop rotation	54	45.00
23	Dry seeding in cotton	86	71.66
24	Integrated nutrient management	79	65.83
25	Gap filling & thinning	80	66.66
26	Use of weedicides	87	72.50
27	Application of fertilizer through spraying	48	40.00
28	Use of biofertilizer	56	46.66
29	FYM / vermicompost / compost application	93	77.50
30	Green manuring –spreading of 4.5 tones gyricidia / Subabul green leaves per ha.	27	22.50
31	Integrated disease management	32	26.66
32	Integrated pest management	71	59.16
33	Strip cropping	03	2.50
34	Double cropping of safflower after green gram	76	63.33
35	Sequence cropping of gram after jowar soybean	66	55.00
36	Topo cropping of cotton, soybean, gram	11	9.16
37	Intercropping Cotton + Black gram / green gram (1:1)	92	76.66
38	Tur + Black gram/ green gram (1:1)	60	50.00
39	Cotton + Jowar + Tur + Jowar (6:1:2:1)	42	35.00
40	Sowing tur, sunflower, maize, bajra, sesamum, castor under contingent crop planning.	60	50.00

Conclusively, it could be said that the respondents in majority were aware about most of the dryland technologies. However majority of them did not know about broad bed and furrow, crop rotation, application of fertilizer through spraying, intercropping of cotton + jowar + tur + jowar (6:1:2:1), sowing along with contour lines, protective irrigation, integrated disease management, shelter belts, crop management done on the basis of depth of soil, green manuring-spreading of 4.5 tones glyricidia / subabhuil green leaves per ha, topo cropping of cotton, soybean, gram; strip cropping. Equipping the farmers with the knowledge of these technologies through short duration trainings and guidance is therefore essential.

5.3 Adoption of dryland technologies

The distribution of respondents according to the level of adoption of Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola recommended dryland technologies, given in Table 16.

Table16. Distribution of respondents according to level of adoption of dryland technologies.

Sr. No.	Adoption	Frequency (n = 120)	Percentage
1	Low	32	26.66
2	Medium	67	55.84
3	High	21	17.50
	Total	120	100.00

The data from Table 16 indicates that 55.84 per cent respondents had medium level of adoption of dryland technologies .While 26.66 per cent had low level of adoption. The respondents with high adoption level were 17.50 per cent.

These results are enclosed conformity with the findings of Kamble (2001) and Khillare (2004).

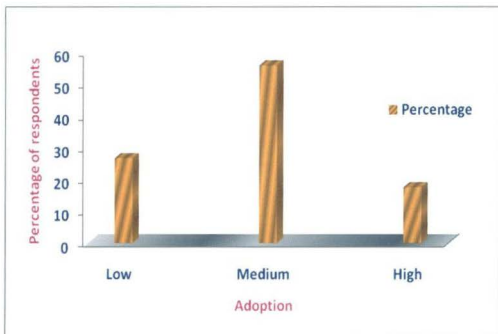


Fig.14 Distribution of respondents according to level of adoption

Table17. Distribution of respondents according to practice wise adoption.

Sr. No.	Dry land technologies / Dry land Practices	Adoption of respondents (n=120)		
		Fully	Partial	No adoption
1	Leveling of farm land	18 (15.00)	59 (49.16)	43 (38.84)
2	Broadbed and furrow	03 (2.50)	32 (26.66)	85 (70.84)
3	Farm ponds	07 (5.83)	–	113 (94.17)
4	In-situ moisture conservation	35 (29.16)	61 (50.84)	24 (20.00)
5	Shelter belts	00 (0.00)	15 (12.50)	105 (87.50)
6	Crop management done on the basis of depth of soil	00 (0.00)	23 (19.16)	97 (80.84)
7	Cultivating land across the slope	24 (20.00)	–	96 (80.00)
8	Deep ploughing	100 (83.33)	18 (15.00)	02 (1.67)
9	Rain water harvesting management	25 (20.84)	–	95 (79.16)
10	Opening of furrow after every 2 rows at 30 DAS	26 (21.66)	–	94 (78.34)
11	Frequent hoeing during dry spell	63 (52.50)	–	57 (47.50)
12	Mulching	06 (5.00)	38 (31.67)	76 (63.33)
13	Interculturing	31 (25.84)	64 (53.33)	25 (20.83)
14	Protective irrigation	18 (15.00)	23 (19.16)	79 (65.84)
15	Small earthen bunds	46 (38.34)	–	74 (61.66)
16	Contour cultivation	00 (0.00)	33 (27.50)	87 (72.50)
17	Live contour bund – Vetivera / Leucaena bunds / khass grass bunds	00 (0.00)	40 (33.33)	80 (66.67)
18	Use of drought resistant varieties of crops	20 (16.66)	61 (50.84)	39 (32.50)
19	Timely sowing	31 (25.83)	–	89 (74.17)
20	Sowing across the slope of land	30 (25.00)	–	90 (75.00)
21	Sowing along with contour lines	00 (0.00)	25 (20.84)	95 (79.16)
22	Crop rotation	25 (20.84)	57 (47.50)	38 (31.66)
23	Dry seeding in cotton	24 (20.00)	44 (36.67)	52 (43.33)
24	Integrated nutrient management	11 (9.16)	56 (46.67)	53 (44.17)

25	Gap filling & thinning	21 (17.50)	40 (33.33)	59 (49.17)
26	Use of weedicides	16 (13.33)	35 (29.17)	69 (57.50)
27	Application of fertilizer through spraying	05 (4.16)	12 (10.00)	103 (85.84)
28	Use of biofertilizer	11 (9.17)	82 (68.33)	27 (22.50)
29	FYM / vermicompost / compost application	25 (20.84)	56 (46.66)	39 (32.50)
30	Green manuring; spreading of 4.5 tones glyricidia / subabhuil green leaves per ha.	00 (0.00)	00 (0.00)	120 (100)
31	Integrated disease management	07 (5.84)	22 (18.33)	91 (75.83)
32	Integrated pest management	13 (10.83)	57 (47.50)	20 (16.67)
33	Strip cropping	00 (0.00)	01 (0.84)	119 (99.16)
34	Double cropping of safflower after green gram	29 (24.16)	53 (44.17)	38 (31.67)
35	Sequence cropping of gram after jowar / soybean	14 (11.66)	53 (44.17)	53 (44.17)
36	Topo cropping of cotton, soybean, gram	00 (0.00)	00 (0.00)	120 (100)
37	Intercropping Cotton + Black gram/green gram (1:1)	16 (13.33)	68 (56.67)	36 (30.00)
38	Tur + black gram / green gram (1:1)	02 (1.67)	00 (0.00)	118 (98.33)
39	Cotton + Jowar + Tur + Jowar (6:1:2:1)	05 (4.16)	14 (11.67)	101 (84.17)
40	Sowing tur, sunflower, maize, bajra, sesamum, castor under contingent crop planning.	19 (15.84)	57 (47.50)	44 (36.66)

The practice wise adoption of the respondents about dryland technologies has revealed in Table 17 that majority of the respondents was completely adopted deep ploughing 83.33 per cent and frequent hoeing during dry spell 52.50 per cent, while the majority of the respondents adopted partially the dryland technologies such as use of biofertilizer 68.33 per cent, intercropping of cotton + black gram/green gram (1:1) 56.67 per cent, interculturing 53.33 per cent, use of drought resistant varieties of crops 50.84 per cent, in-situ moisture conservation 50.84 per cent.

A sizeable percentage of the respondents partially carried leveling of farm land 49.16 per cent, while sowing tur, sunflower, maize, bajra, sesamum, castor under contingent crop planning,

150390

integrated pest management and crop rotation practices partially carried out by 47.50 per cent respondents respectively, the practice namely integrated nutrient management 46.67 per cent, FYM / vermicompost / compost application 46.66 per cent, sequence cropping of gram after jowar / soybean 44.17 per cent, double cropping of safflower after green gram 44.17 per cent carried out by respondents.

It is also observed that majority of the respondents were not adopting the practices of top cropping of cotton, soybean, gram ; and spreading of 4.5 tones glyricidia / subabul green leaves per ha 100.00 per cent respectively.

Most of the respondents not adopting the practices i.e. strip cropping 99.16 per cent, tur + black gram / green gram (1:1) 98.33 per cent, farm ponds 94.17 per cent, shelter belts 87.50 per cent, application of fertilizer through spraying 85.84 per cent, intercropping of cotton + jowar + tur + jowar (6:1:2:1) 84.17 per cent, crop management done on the basis of depth of soil 80.84 per cent, cultivation land across the slope 80.00 per cent, sowing along with contour lines 79.16 per cent, rain water harvesting management 79.16 per cent, opening of furrow after every 2 rows at 30 DAS 78.34 per cent, integrated disease management 75.83 per cent, sowing across the slope of land 75.00 per cent, timely sowing 74.17 per cent, contour cultivation 72.50 per cent, broadbed and furrow 70.84 per cent, live contour bund 66.67 per cent, protective irrigation 65.84 per cent, mulching 63.33 per cent, small earthen bunds 61.66 per cent, use of weedicides 57.50 per cent, gap filling and thinning 49.17 per cent, dry seeding in cotton 43.33 per cent.

By and large it could be said that the farmers were using some of the practices recommended under dry land technologies. Most of the practices found to be poor and has to be increased. Concerned efforts should make for full utilization of these practices by extension agencies upto the grass root level.

5.4 Relational analysis with adoption

To find out the relationship of selected personal, socio-economic, communication and psychological characteristics of respondents with adoption correlation analysis was undertaken.

5.4.1 Correlation analysis

In order to ascertain the relationship of the characteristics of dryland farmers with their adoption the data were subjected to correlation analysis and the results emerged are presented in Table 18.

The findings of correlation analysis depicted in Table 18 reveals that the selected personal and socio-economical characteristics namely education, land holding, annual income, socio-economic status, of the respondents were observed to be positive and significant in relation with adoption of dry land technologies. Whereas the age and social participation of the respondents non significant with the adoption of dry land technologies respectively. This shows that with the increase in education, land holding, annual income, socio-economic status, there had been an increase in adoption of recommended dry land technologies by the dry land farmers. The reason may be that the education, land holding, annual income, socio-economic status helps in developing progressive outlook in the dry land farmers to adopt the different dry land technologies.

Table18. Coefficients of correlation between selected characteristics of respondents with adoption

Sr. No.	Characteristic	' r ' value
A	Personal and socio-economic	
1	Age	-0.151
2	Education	0.211*
3	Land holding	0.267**
4	Annual income	0.299**
5	Socio-economic status	0.256**
6	Social participation	0.130
B	Communication	
1	Sources of information	0.227**
2	Extension contact	0.133
C	Psychological	
1	Innovativeness	0.241**
2	Scientific orientation	0.113
3	Risk preference	0.165
4	Knowledge	0.204*

* Significant at 0.05 level of probability

** Significant at 0.01 level of probability

The above findings are in consonance with the observations reported by Kamble (2001) that researcher concluded non significant relation between age and adoption of dryland technologies. In case of education similar findings were reported by Bhoite and Girase (1991) and Singh (2001), in case of land holding similar with the findings of Chopade (2000) and Prasad (2002), findings

of annual income similar with findings reported by Ingle & Wayazade (1989) and Shetwad (2000). The result of socio-economic status are in closed conformity with the findings of Sarakar and Bandopadhyay (1996) and Chawane (2004), social participation similar to the result of Bhoite and Thorat (1984) and Bhonde (1990).

In case of communicational characteristic i.e. extension contact did not show significant relationship with adoption of the dryland farmers. The null hypothesis in case of this variable has therefore, to be rejected. The non-significant relationship of these variables with adoption of the dryland farmers indicates that these variables did not affect the adoption of different dryland technologies by the dry land farmers. While sources of information observed positive and significant in relation with adoption of dry land technologies.

Result of extension contact was in conformity with the findings of Joshi (1999), as well as the result of sources of information was conformity with the findings of Gowda *et. al.* (1997) and Prasad (2004).

In case of psychological characteristics such as knowledge and innovativeness possess positive and significant correlation with the adoption of different dry land technologies. Where as scientific orientation, risk preference were observed to be non significant in relation with adoption of the dryland farmers. The null hypothesis in case of these variables had therefore to be rejected.

These results of knowledge are in conformity with the findings of Khillare (2004) and in case of innovativeness with Akolkar (1989), in case of scientific orientation with Gawande (1997), in case of risk preference similar to the findings of Kale (1990) and Sakharkar (1991).

5.5 Constraints faced by respondents in adoption of dry land technologies.

The constraints faced in adoption of dryland technologies by the respondents were ascertained by the researcher. The problems related to various aspects of adoption identified by obtaining response of individual respondents.

The relevant data in this regard and formulated into the frequency basis in the Table 19.

Table 19. Constraints faced by respondents

Sr. No.	Constraints	Frequency	Percentage	Rank
1	Uncertainty of weather	107	89.16	I
2	Non availability of rain water at proper time	103	85.83	II
3	Inadequacy of capital	101	84.16	III
4	Non availability of labours	95	79.16	IV
5	Dry seeding in cotton is not possible due to uncertainty of rains and soil type(black cotton soil)	86	71.66	V
6	Contour sowing or contour bunding operation not adopted due to difficulty in cultivation	83	69.16	VI
7	Non availability of vetiver grass for planting on contour	81	67.50	VII
8	Non availability of improved implements	76	63.33	VIII
9	Lack of proper guidance	65	54.16	IX
10	Inconvenience in intercropping in contour sowing.	61	50.83	X
11	Lack of knowledge about the practice	55	45.83	XI
12	Non availability of quality seed	49	40.83	XII
13	Intercrop of tur does not perform well when intercropped with jawar.	48	40.00	XIII
14	Mung does not perform well in jawar	37	30.83	XIV
15	Uneconomic land holding	24	20.00	XV

From the above Table 19, it is seen that the uncertainty of weather 89.16 per cent, non availability of rain water at proper time 85.83 per cent, inadequacy of capital 84.16 per cent, non availability of labours 79.16 per cent, dry seeding in cotton is not possible due to uncertainty of rains and soil type (black cotton soil) 71.66 per cent, contour sowing or contour bunding operation not adopted due to difficulty in cultivation 69.16per cent, non availability of vetiver grass for planting on contour 67.50 per cent.

Non availability of improved implements 63.33 per cent, lack of proper guidance 54.16 per cent, inconvenience in intercropping in contour sowing 50.83 per cent were the important constraints faced by majority of the farmers in adoption of dryland technologies.

Also it has been observed that lack of knowledge about the practice 45.83 per cent, non availability of quality seed 40.83 per cent, intercrop of tur does not perform well when intercropped with jawar 40.00 per cent, mung does not perform well in jawar 30.83 per cent, uneconomic land holding 20.00 per cent were the major constraints faced by the farmers in adoption of dry land technologies.

These results are in conformity with the findings of Bhugul *et al.* (2009).

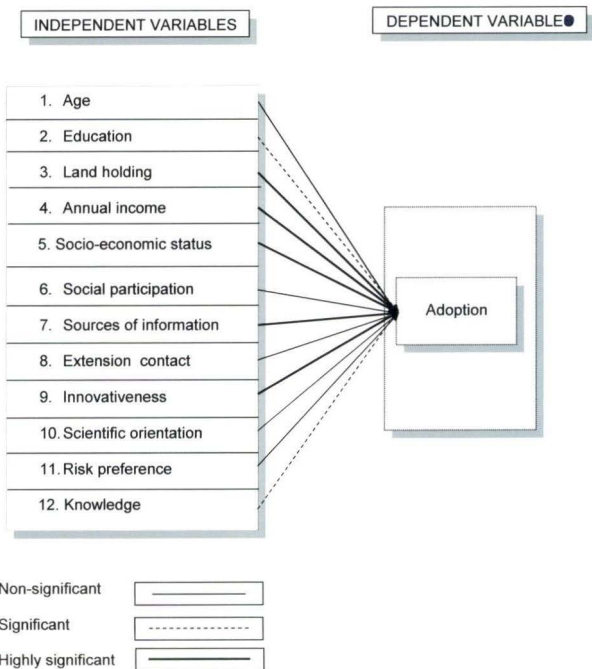


Fig.15: Empirical Model of research



Chapter VI

*Summary and
Conclusions*



CHAPTER VI

SUMMARY AND CONCLUSIONS

Dry lands occupy an important place in Indian agriculture. They constitute about 70 per cent of total cultivated area of 143.8 m ha and constitute to 44 per cent of total food grains production as also more than 90 per cent of pulses and oilseeds production in India. The Productivity levels are very low and unstable in dry lands due to the vicissitudes of monsoon rainfall which is erratic, unpredictable and also higher fluctuating over years under different agro-climatic conditions. In such situation there is need of application of different useful dry land technologies. The present study proposed to be conducted in Akola district. Most of the area in this region depends upon rain water. The study was planned to know the extent of knowledge, adoption of dry land technologies with the following objectives.

6.1 Specific objective of study

1. To study the personal, socio-economic, communication and psychological characteristics of farmers.
2. To study the adoption of dry land technologies by the farmers.
3. To find out the relationship between selected characteristics of the farmers with their adoption of dry land technologies.
4. To study the constraints faced by farmers in adoption of dry land technologies.

6.2 Methodology

The study was undertaken in Akola and Akot panchayat samities of Akola district in Maharashtra State. A sample of 120 respondents was taken from ten selected villages, with the help of simple random sampling. Thus 12 farmers were selected from each village as respondents for the study. The data were collected by interviewing the respondents personally, with the help of specially developed and pre-tested interview schedule. The variables studied were age, education, land holding,

annual income, social participation, socio-economic status, sources of information, extension contact. Innovativeness, scientific orientation, risk preference and knowledge as independent, extent of adoption as dependent variables. The data were then tabulated, analyzed by employing appropriate statistical methods.

6.3 Findings

The results of this study were summarized as below.

6.3.1 Characteristics of respondents

It was revealed that relatively larger proportion of respondents 45.83 per cent were belonging to middle age group of 36 to 50 years, 26.67 per cent of the respondents were found to be educated up to secondary school level, followed by 21.67 per cent who had higher secondary school level education. Majority of the respondents (35.84 per cent) possess small level of land holding with a farm size 1.01 to 2 ha and 47.50 per cent respondents had annual income ranging from 25,001 to Rs.50, 000.

Larger proportion of the respondents 38.33 per cent belonged to very low socio-economic status group, followed by 26.67 per cent who had low socio-economic status group. Majority of the respondents 62.50 per cent were found to be in medium level category of social participation.

Majority of the respondents 59.17 had medium level of exposure to sources of information followed by 25.00 per cent who were found to be in low level of use of information sources. Majority of the respondents 56.67 per cent had medium level of extension contact followed by 27.50 per cent had low level of extension contact.

It was revealed that relatively higher proportion 64.17 per cent of respondents had medium level of Innovativeness. Majority of the respondents 65.84 per cent had medium level of scientific orientation followed by 18.33 per cent who had high level of scientific orientation.

Relatively higher proportion of respondents 60.00 per cent had medium level of risk preference.

6.3.2 Extent of knowledge and adoption about dry land technologies

Majority of the respondents 52.50 per cent belong to the medium category of knowledge. As much as 30.83 per cent of the respondents were having low level of knowledge about dry land technologies. 55.84 per cent respondents had medium level of adoption of dryland technologies followed by 26.66 per cent had low level of adoption of dry land technologies.

6.3.3 Relational analysis

Personal and socio-economical variables namely educations, land holding, annual income, socio-economic status, of the respondents were observed to be positive and significant in relation with adoption of dry land technologies. However age of the respondent found to negatively non significant with the adoption of dry land technologies and social participation did not shows significant relationship with adoption of dry land farmers.

In case of communicational variables namely, extension contact did not show significant relationship with adoption of the dry land farmers. While sources of information observed positive and significant in relation with adoption of dry land technologies.

In case of psychological characteristics such as knowledge and Innovativeness possess positive and significant correlation with the adoption of dry land technologies, while scientific orientation and risk preference was found to be non significant in relation with extent of adoption of the farmers about dry land technologies.

6.3.4 Constraints

The uncertainty of weather, non availability of rain water at proper time, inadequacy of capital, non availability of labours, dry seeding in cotton is not possible due to uncertainty of rains and soil type, contour sowing or contour bunding operation not adopted due to difficulty in cultivation, non availability of vetiver grass for planting on contour, non availability of improved implements, lack of proper guidance, inconvenience in intercropping in contour sowing were the important constraints reported by the farmers in adoption of dry land technologies.



Chapter VII

Implications

CHAPTER VII

IMPLICATIONS

Based on findings of the present study following suggestions in the form of implications are offered. The implications are presented in two parts. The implication for action and the implication for future research work.

7.1 Implications for action

1. The findings of the present study reported that the annual income and socio-economic status of the respondents were belonging to very low category i. e. 56.67 per cent and 38.33 per cent respectively. Therefore it is implied that the respondents should be encouraged for subsidiary occupation and government should provide subsidy on the agricultural inputs. It will helpful for respondents in increasing their annual income and socio-economic status which will affect on the adoption of dry land technologies.
2. The present study revealed that there was medium level of information sources (59.17 per cent) and extension contacts (56.17 per cent) utilized by respondents for getting information about dry land technologies. They contact regularly to input dealer, friends, relatives, progressive farmers and local leaders for getting information regarding dry land technologies. However contacts with agriculture supervisor, agriculture assistant, agriculture officer, university scientist / KVK scientist found to be very low. Therefore it is suggested that the extension agencies should be take efforts to get higher participation of farmers in extension activities. Farmers forums and Self Help Groups should be established to have collaborative and cooperative efforts for increasing awareness about dry land technologies among farmers.
3. Many of the recommended dry land technologies like broad bed and furrow, crop rotation, intercropping of cotton + Jowar + Tur + Jowar (6:1:2:1), spreading of 4.5 tonnes of glyricidia / subabul green leaves

per ha, zero cropping of cotton, soybean, gram etc. were not known by majority of respondents. Thus it is suggested that the extension agencies should arrange demonstrations of such dry land technologies on farmers fields and at university farms to impart knowledge about these dry land technologies through frequent farm visits, farm trainings, exhibitions, and study tours etc.

4. More than fifty per cent of the respondents possessed medium level of knowledge and adoption about dry land technologies. Therefore in order to increase the awareness and adoption of dry land technologies among farmers it is implied that the extension workers as well as agricultural university scientist, KVK scientist and agriculture officers may undertake need based training and organized motivational programmes like result and method demonstrations, study tours, exposure visits and agricultural exhibitions so as to make the farmers aware about dry land technologies and to convince them to adopt the feasible dry land technologies.
5. The respondents expressed the constraint as non availability of rain water at proper time (85.83 per cent) therefore it is implied that respondents should be encourage and motivate about water harvesting techniques and water conservation techniques by State department of agriculture and agricultural university should have to organize different trainings on soil and water conservation techniques so that they can save their crop due to uncertainty of rain or monsoon vagarious.
6. Inadequacy of capital is also major constraint faced by the majority (84.16 per cent) of the respondents in adoption of dry land technologies; hence nationalized banks should take efforts for making easy and sufficient credit capital available to the farmers for dry land technologies. Similarly farmers should make aware about crop insurance scheme through different extension agencies as extension workers, agriculture officer etc. so as to it will useful for increasing adoption of dry land technologies.

7. Non availability of labour is also constraint faced by majority of farmers (79.16 per cent) in adoption of dryland technologies; hence mechanized farming should be encouraged amongst big farmers in dry land areas.

7.2 Implications for future research

1. Adoption level is found to be medium regarding the dry land technologies therefore the studied should be undertaken to find out casual factors for non adoption of dry land technologies.
2. Since this study conducted only in two tahsils of Akola district with reference to knowledge, adoption and constraints therefore it is also necessary to undertake the similar studies in other area in order to generalize findings in other area of Vidarbha region.
3. It will be better if more independent variables could be selected for such type of studies in future.

A decorative graphic consisting of a vertical line and a horizontal line, each composed of three parallel red lines. The lines intersect to form a cross shape. The vertical line is on the left side of the page, and the horizontal line is positioned below the text.

Chapter VIII

Literature Cited

CHAPTER VIII

LITERATURE CITED

- Ajore, R. and A. P. Singh 1992. Relationship between extent of participation and adoption gap in reclamation technology of sodic soils. Maharashtra J. Extn. Edu. IX: 330-333.
- Akolkar, M.P. 1989. Constraints in adoption of improved practices in PKV Hy-2 cotton. M. Sc. (Agri.) Thesis (Unpub.), Dr. PDKV, Akola.
- Anonymous 2000. Proceeding of the National Symposium on Rainfed Agriculture. Manage Extn. Res. and Rev., I (1):58-61.
- Bagadi, G. L.; J. S. Sharma and V. Kumar 2001. Adoption of soil and water conservation technologies by the farmers of Sardar Sarovar Project Catchment, Gujrat State. Indian J. Soil Cons. 29 (1):65-66.
- Baitule, A. J., 1984. Factors related with adoption of improved Jowar practices among farmers in dry farming among farmers in dry farming Area. M. Sc. (Agri) Thesis (Unpub.), Dr. PDKV, Akola.
- ✓ Bembridge, T. J. 2008. Technology transfer in small-scale dryland crop production: future challenges. Res. paper, Univ. of Fort Hair, Alice (South Africa).
- Bhaskaran, K. and Praveena 1982. Adoption of improved dryland agricultural technology in an Integrated Dryland Agricultural Development Project in A. P., Indian J. Extn.Educ. XVII (3-4): 32-39.
- Bhoite, H.S. and K.A. Girase 1991. Relationship between farmers socio personal traits and adoption of improved dry land technology. Maharashtra J. Extn. Edu. X (1): 117-118.
- Bhoite, H.S. and S.S. Thorat, 1984. A Multivariate analysis of technological gap of the farmers in adoption of Rabi jowar. Maharashtra J. Extn Educ. 111, 19-27.
- Bhoite, H.S. and Y.S. Nimaje 1983. Study of adoption of dry land agricultural technology. Maharashtra J. Extn.Edu. 11: 93-98.
- Bhonde, S.M. 1990. A study of knowledge and perception of dry farming technology by Jowar growers. M.Sc. Thesis (Unpub.) Dr. PDKV, Akola.

- Bhople, R. S. 1997. Adoption of soil and water conservation technologies by farmers. *J. Maharashtra Agric. Univ.* 22 (2): 246-247.
- Bhople, R. S.; S. K. Satpute and V. R. Vaidya, 2003. Prevailing intercropping system among farmers and reasons for adoption. *AGRESKO Report.*: 31.
- Bhople, R.S.; M.A. Sagne and D.M. Nikhade 1991. Constraints in adoption of dry land technology. *Maharashtra J. Extn.Edu.*, X (1): 61-67.
- Bhugul, M. K.; S. N. Rajput and U. R.Chinchmalatpure 2009. Technological gap in adoption of Dr. PDKV recommended dryland technology. *RRC Report, Dr.PDKV, Akola.*: 113-124.
- Chawane, C. B.; R. S. Bhople and G. S. Ingle 2004. Knowledge of farmers about soil and water conservation technology and its determinants. *J. Soil and Crops.* 14 (1): 91-94.
- Chopde, V. B. 2000. Knowledge and adoption of Integrated Weed Management practices by the farmers. *M.Sc. (Agri.) Thesis (Unpub.)*, Dr. PDKV, Akola. : 72-73.
- Deshmukh P.R., R.P.Kadam and V.N. Shinde 2007. Knowledge and adoption of agricultural technologies in Marathwada. *Indian Res. J. Extn. Edu.* 7 (1): 41-42.
- Deshpande, V. G.; S. A. Mankar and R. S. Bhople 1998. Analysis of time of adoption of agriculture innovations. *Maharashtra J. Extn. Edu.* Vol. XXII, pp.: 1-5.
- Dharmale, R. V. 1993. Analysis of adoption behavior of soybean growers in Amaravati district. *M. Sc. (Agri.) Thesis (Unpub.)*, Dr. PDKV, Akola.
- Dhule S. S. 2000. Adoption of biocontrol practices for pest management in cotton by farmers. *M. Sc. (Agri.) Thesis (Unpub.)*, Dr. PDKV, Akola.
- Dube, S. K.; V. K. Swarankar and H. G. Chaudhary 1988. Socio-economic constraints in adoption of the recommended dry farming technology of wheat among small and marginal farmers. *Maharashtra J. Extn. Edu.* VII, pp.: 217-219.
- Farooq, M.; L. Mankunath and S. G. Jondhale 1997. Adoption of dry farming practices in drought prone area. *Maharashtra J. Extn. Edu.*, XVI : 330-331.
- Gawande, G. S. 1997. Attributes of improved varieties of major crops influencing their adoption. *M. Sc. (Agri.) Thesis (Unpub.)*, Dr. PDKV, Akola.

- Girase, K. A. And H. S. Bhoite 1986. A study of adoption of improved dryland agriculture technology in an Integrated Dryland Agriculture Development Project in M. S., Thesis Abstract M.P.K.V. pp.:177.
- Gowda, B. G.; Anand T. N. and Krishna, K. S. 1997. Relationship between selected characteristics of big and small groundnut growers and their knowledge and adoption towards dryland farming technology. Mysore J. of Agril. Sci.
- Gupta V.; P.K.Rai and R. Nanda 2009. Soil conservation competencies of the farmers in the watershed area of Vijaypur block of Jammu. Indian Res. J Extn. Edu. 9(2): 125-127.
- Ingle, P. O. and N. R. Kude 1991. Evaluation of comprehensive watershed development programme in Maharashtra. Yojana; 34 (4): 17-19 and 29.
- Ingle, P. O. and Wayazade 1989. Adoption of agriculture technology in rainfed farming project, Maharashtra J. Extn. Edu. VIII: 189-192.
- Jaitawat G. S.; S. S. Sisodia and B. S.Bhimawat 2007. Constraints in adoption of improved fennel cultivation technology. Indian Res. J. Extn. Edu. 7 (2&3): 52-53.
- Jawanjal A. B. 2003. Knowledge and adoption of intercropping practices in dryland farming.M. Sc. (Agri.) Thesis (Unpub.), Dr. PDKV, Akola.
- Jeet I. and R.K. Kushawaha 2007 Problems associated with watershed development programme in district Jalaun of U.P., Indian Res. J. Extn. Edu. 7 (2&3): 62-64.
- Joshi, A. P. 1999. Impact of crop failure on adoption behaviour of farmers. M. Sc. (Agri.) Thesis (Unpub.), Dr. PDKV, Akola.
- Kadam, J. R.; M. S. Bhairamkar and V. G. patil 2001. Adoption of soil and water conservation practices in watershed development project. Indian J. Extn. Edu. 37 (3-4): 188-189.
- Kalaskar, A.P. 1998. Adoption of integrated test management practices by cotton grower. M.Sc. (Agri.) Thesis (Unpub.), Dr. PDKV, Akola.
- Kale, N. M. 1990. Adoption gap of recommended technology (PKV-Hybrid-2) among small and big cotton growers. M. Sc. (Agri.) Thesis (Unpub.), Dr. PDKV, Akola.
- Kamble R. P. 2001. Adoption behaviour of farmers about dryland technology. M. Sc. (Agri.) Thesis (Unpub.), Dr. PDKV, Akola.

- Khatik, G.L. 1999. Adoption of soil and water conservation technologies. *Indian J. Extn. Educ.* 35 (1 and 2): 47.
- Khedkar, V. L. and P. O.Ingle 1994. Awareness and adoption of soil and water conservation practices by farmers in saline tract of Purna Vally. *Agril. Extn. Rev.* (24): 14-17.
- Khillare, A.D. 2004 Adoption of dry land technology by the farmers. M.Sc. (Agri.) Thesis (Unpub.) Dr.PDKV, Akola.
- Krishna, M. R. and K. Chandra Kandan 1996. Consequences of adoption of soil conservation practices. *Indian J. Extn.Educ.* 26: 99-102.
- Kulkarni, M. M. 1992. Knowledge and attitudes of farmers towards dryland horticulture. M. Sc. (Agri.) Thesis (Unpub.), Dr. PDKV, Akola.
- Mahajan, N. and B. S. Hanava 1991. Status of rainfed farming in Punjab. International Conference on Extension Strategy for Minimizing Risk in Rainfed agriculture.
- Makode V. V. 1987. Adoption of high yielding varieties in relation to socio-economic status of farmers. M.Sc. (Agri.) Thesis (Unpub.), Dr. PDKV, Akola.
- Malani R. N. 1998. Knowledge and adoption of dryland cotton production technology. M.Sc. (Agri.) Thesis (Unpub.), Dr.PDKV, Akola.
- Meti S. K. and S. N. Hachinal 1995. Adoption of dryland technologies recommended for cotton crop. *Maharashtra J. Extn.Educ.* Vol. IX. pp. 181-183.
- Padmaiah, M. and M. S. Rama Mohan Rao 1997. Determinant of awareness knowledge, attitude and adoption behavior of farmers of Integrated Watershed Dev. Programme. *Indian J. Soil Conservation*, 25 (3): 250-252.
- Pal S.B.; A.K. Singh and L. Singh 2009. Communication pattern in dry lands of Uttar Pradesh, *Indian Res. J. Extn. Edu.* 9 (1): 54-55.
- Pande, G. and R. P.Singh. 1997. Appropriate technology for sodic waste land management advances in Wastelands development: 10-11.
- Patel, R. C.: A. S. Saiyad and N. B. Chauhan 2002. Watershed management technology adoption in Kheda district. *Agril. Extn. Rev.:* 5-8.
- Pathan, M. R. A, 1999. Knowledge and adoption of farmers about NHH-44 cotton cultivation. M.Sc. (Agri.) Thesis (Unpub.), Dr.PDKV, Akola.

- Patil P. S.; M.B. Kibey and B. R. Desai 1989. Adoption dryland agriculture technology recommended for bajra and groundnut Maharashtra. *J. Extn.Educ.* VIII: 59-62.
- Patil, S. L. 1992. A study on extent of adoption of recommended cultivation practices of DTH-32 cotton by farmers and its economic in Malprabha command area of Dharwad district. *Karnataka J. Agri. Sci.* 2 (2): 209.
- Prasad, M. S.; M. V. Padmanabhan and N. N. Nimbole 2004. Role of transfer of technology in dryland agriculture. *Indian J. Dryland Agril. Res. and Dev.* 19 (1) : 64-67.
- Prasad, R. 2002. Farmers knowledge of sodic soil reclamation technology and the extent of adoption of Amendments. *Indian J. Extn.Educ.* XXIII (1-2): 38-42.
- Rai D.P. and K. Singh 2008. Awareness, attitude and training needs of farmers about recommended practices in watershed development programme. *Indian Res. J. Extn. Edu.* 8 (2&3):89-91.
- Ramchandra, P. and K. B. Sripal 1991. Adoption of dryland technology in cotton. Abstract of International Conference on Extension Strategy for Minimizing Risk in rainfed agriculture. : 50.
- Rao, I. S. 2008. A study on the constraints in adoption of soil and moisture conservation technology by dry land groundnut growers. *Orissa J. of Agril. Res.*
- Rastogi, B. K. 1979. Cropping patterns, and economics of major crops in selected dryland farming regions in India. All India Coordinated Research Project for Dryland Agriculture, Hyderabad- 19-23.
- Reddy Y. T.; Mallikarjuna and K. Venkataraju 1993. Knowledge and adoption level of modern technology of dryland and irrigation agriculture in Anantpur district. *APAU Res. J.* 21 (3): 156-159.
- Reddy, T. R. and K. Bhaskaran 1991. Association between personal and socio-economic characteristics and extent of influence of selected extension methods on acceptance of improved practices. *Mysore J. Agric. Sci.* 25: 94-99.
- Sakharkar, V.S. 1991. A study of knowledge and adoption of improved practices of soybean cultivation in Umred block of Nagpur district. *M. Sc.(Agri.) Thesis (Unpub.)*, Dr. PDKV, Akola.
- Sarangkar, P. D. 2001. Adoption of P.D.K.V. recommendation about cotton technology by Gram panchayat members. *M. Sc. (Agri.) Thesis (Unpub.)*, Dr. PDKV, Akola.

- Sarkar, A. and A.K. Bandyopadhyaya 1996. Adoption of scientific farm innovation in red laterite zone of west Bengal. *Agril. Extn. Review.* 6: 19-21.
- Sekar, C. 1990. Dryland farming: Problems and Prospects. *Yojana.*, 34 (8) 31-32.
- Sharma R., J. Chauhan and B.S. Meena 2007. Problems experienced by farmers and project officers in watershed management, *Indian Res. J. Extn. Edu.* 7 (2&3): 23-24.
- Sharma R., J. Chauhan and B.S. Meena 2008. Impact of participatory approach in management of watershed practices in Jammu, *Indian Res. J. Extn. Edu.* 8 (1): 19-20.
- Sharma Y.K.; G.S. Bangarva and S.K. Sharma 2008. Farming system based constraints faced by farmers, *Indian Res. J. Extn. Edu.* 8 (1): 57-59.
- Sharma, L. 1999. A study on knowledge and adoption behavior of rainfed Maize growers in Jammu District of J and K state M. Sc. (Agri.) Thesis (Unpub.), UAS, Dharwad.
- Shetwad, B. T. 2000. Adoption of improved practices of cotton. M.Sc. (Agri.) Thesis (Unpub.), Dr. PDKV, Akola.
- Shinde, J. S. 2000. Knowledge and adoption of weedicide in Soybean by the farmers. M.Sc. (Agri.) Thesis (Unpub.), Dr. PDKV, Akola.
- Shivanappan, R. K. 1997. Integrated Watershed Development and Food security. *Kisan World.*24(2):17-19.
- Shrivastava, K. K.; J. D. Sarkar and L. S. Baven 1996. Impact of soil conservation programme on improved farm practices in Jabalpur. *Agril. Extn. Rev.*, 3: 14-15.
- Singh S.N, V.K. Singh, and R.K. Singh 2007. Adoption constraints of pigeonpea cultivation in Lucknow district of central Uttar Pradesh. *Indian Res. J. Extn. Edu.* 7 (1): 34
- Sinha, H. S.; A. K. Sinha and K. Sinha 1984. A study of attitude of farmers of Chotanagpur towards soil conservation programme. *Indian J. Extn. Educ.* XX (3-4): 9.
- Sundarswamy, B. and V. G. Bavalatti 1991. Knowledge and Adoption pattern of Dryland farming practice by farmers of Bijapur District. *Maharashtra J. Extn. Edu.* 10: 138.
- Supe, S. V., P. B. Parde and N. R. Kude 1990. Factors related with adoption of improved jowar practices among farmers in dry farming area. *Maharashtra J. Extn. Edu.* IX: 275.

- Suryawanshi; I.R. 2002. Knowledge and adoption of package of practices of paddy by the farmers. M.Sc. (Agri.) Thesis (Unpub.), Dr.PDKV, Akola.
- Tailor, R. S.; R. K. Pande and Y. C. Sanoria 1998. Socio-personal correlates of knowledge and adoption of dryland farming practices of farmers of W.S. area. Madhya Pradesh J. Extn. Edu. 1 (1): 20-25.
- Thakur ,S. D. 2007. Prospects of soil and water conservation practices in drought prone areas of western vidharbha M. Sc. (Agri.) Thesis (Unpub.), Dr. PDKV, Akola.
- Urade, P.N.; R.S. Bhople and D.P. Choudhary 1991. Adoption of dry land Horticultural technology. Maharashtra J. Extn.Educ. X (2): 121-124.
- Valekar, R. B. 1997. Adoption behaviour of rainfed maize grower. M. Sc. (Agri.) Thesis (Unpub.), Dr. PDKV, Akola.
- Vijyarahvan, K. and V.S. Subramaniam 1981. Information source credibility of Garden land and dry land farmers. Indian J. Extn.Educ. XVII (1-2): 92-94.
- Wabhitkar, P. H. 1997. Adoption of high yielding varieties. M. Sc. (Agri.) Thesis (Unpub.), Dr. PDKV, Akola.
- Zade, P. N. 1998. Constraints in adoption of soybean production technology by farmers. M.Sc. (Agri.) Thesis (Unpub.), Dr.PDKV, Akola.



Appendix

APPENDIX INTERVIEW SCHEDULE

Research Topic: - Adoption of dry land technologies by the farmers in the Akola district.

Name of the Researcher: - Vijay Jagannath Bahiram
M.Sc. (Agri.) II Year,
Department of Extension Education,
Dr. PDKV, Akola.

General Information

Name of Respondent:- _____

Village: - _____ **Taluka: -** _____ **District:-** _____

Part-I

1. Age : ----- years

2. Education : -----standard

3. Occupation: I. Main: ----- II. Subsidiary: -----

4. Land Holding : -----ha

Rainfed : -----ha

Irrigated : -----ha

Total : -----ha

5. Annual Income

From Agriculture : Rs. -----

From Subsidiary occupation : Rs. -----

Total : Rs. -----

6. Source of information:-

Sr.no.	Information Sources utilization	Regular	Sometime	Never
A)	Personal Contact			
1)	Neighbors			
2)	Friends			
3)	Relatives			
4)	Progressive Farmer			
5)	Gram Panchayat Members			
6)	Local leader			
7)	Input dealer			
B)	Personal Cosmopolite			
1)	Agriculture supervisors			
2)	Group Discussions			
3)	Trainings			
4)	Demonstration			
5)	Tours			

C)	Mass-Media			
1)	Radio			
2)	Television			
3)	News paper			
4)	Agriculture literature			
5)	Internet			

7) Material Possession

A)	Material Possession	
a)	Farm implements / Equipments	
1)	No Farm implements / Equipments	0
2)	Harrow	1
3)	Hoe	1
4)	Wooden plough	1
5)	Wooden seed-drill	1
6)	Mould-bould plough	2
7)	Ferti-hoe	2
8)	Iron seed-cum-fertilizer drill	2
9)	Duster	3
10)	Sprayer	3
11)	Diesel engine	4
12)	Electric pump	4
13)	Thresher / Harvester	5
b)	Animal possession	
	Farm animals (Bullock)	
1)	No Farm animals	0
2)	Non discrete (Domestic)	1
3)	Discrete (Breeds)	2
	Milch animals	
1)	No Milch animals	0
2)	Non discrete (Domestic)	1
3)	Discrete (Breeds)	2
	Goat /Sheep	
1)	No Goat /Sheep	0
2)	Non discrete (Domestic)	1
3)	Discrete (Breeds)	2
	Poultry	
1)	No poultry possession	0
2)	Possession poultry	1

8) Social Participation

Sr no.	Name of the organization	Office bearer	Member
A)	Formal Organization		
1)	Grampanchayat		
2)	Panchayat Samiti		
3)	Zilla parishad		
4)	Service co-operation		
5)	Other		
B)	Informal Organization		
1)	Youth Club		
2)	Bhajani Mandal		
3)	Farmer Organization		
4)	Self Help Group		
5)	Any other (specify)		

9) Cropping pattern

S. n.	Crop sown	Variety grown	Area in acre			Total production (Qtl.)	Productivity (Qtl./ha.)	Rate received	Total production (Rs.)
			Rainfed	Irrigated	Total				
(A)	Seasonal								
1)	Kharif								
	I.								
	II.								
	III.								
	IV.								
2)	Rabi								
	I.								
	II.								
	III.								
3)	Summer								
	I.								
	II.								

10) Extension Contact

Sr.no.	Sources	Always	Sometime	Never
1)	Gramsevak			
2)	Agriculture assistant			
3)	Agriculture Extension officer			
4)	Agriculture officers			
5)	University scientist / kvk scientist			
6)	Melava			
7)	Exhibition			

11) Innovativeness

Scale by Singh, 1972

Sr.no.	Statements	Agree	Undecided	Disagree
1)	I feel restless still I try out a new dryland practice, I have heard about.			
2)	They talk of many new dryland practices these days but who knows if they are better than the old once.			
3)	After all our forefathers were wise in their dryland farming practices & I do not see any reason for changing this old method.			
4)	Often new dryland farm practices are not successful, however if they are promising, I would surely like to adopt them.			
5)	Form time to time, I have heard of several new dryland farm practices & I have tried most of these in the last few years.			
6)	Some how, I believe that the traditional ways of dryland farming are best.			

12) Scientific Orientation**Scale by Supe, 1969**

Sr.no.	Statements	SA	A	UD	DA	SDA
1)	New Methods of farming give better results to farmer than old methods.					
2)	The way of farmer forefathers farmed is still the best way to farm today					
3)	Even a farmer with lots of experience should use new methods of farming.					
4)	Through it takes time for a farmer to learn new methods in farming it is worth the efforts.					
5)	A good farmer experiments with new ideas in farming.					
6)	Traditional methods of farming having to be changed in order to raise the level of living of a farmer.					

SA = Strongly Agree, A = Agree, UD = Undecided, DA = Disagree, SDA = Strongly Disagree.

13) Risk Preference**Scale by Supe, 1969**

Sr.no.	Statements	SA	A	UD	DA	SDA
1)	A farmer should grow large number of crops to avoid risk involved in growing one or two crops.					
2)	A farmer should rather take more of a change in making a big profit than to be content with smaller but less risky profits.					
3)	A farmer who is willing to take greater risk than the average farmer usually does better financially.					
4)	It is good for farmers to take risk when he knows his chance of success is fairly high.					

5)	It is better for farmer not to try new farming methods unless most other farmers have used them with success.					
6)	Trying entirely new methods in farming by a farmer involves risk but if may get benefited.					

SA = Strongly Agree, A = Agree, UD = Undecided, DA = Disagree, SDA = Strongly Disagree.

14) Constraints:-

Sr. no.	Constraints	
1)	Dry seeding in cotton is not possible due to uncertainty of rains.	
2)	Contour sowing or contour bunding operation not adopted due to difficulty in cultivation	
3)	Non availability of vetiver grass for planting on contour	
4)	Inconvenience in intercropping in contour sowing.	
5)	Mung does not perform well in jawar	
6)	Intercrop of tur does not perform well when intercropped with jawar.	
7)	Non availability of labours	
8)	Non availability of improved implements	
9)	Non availability of quality seed	
10)	Inadequacy on capital	
11)	Uneconomic land holding	
12)	Uncertainty of weather	
13)	Lack of knowledge about the practice	
14)	Lack of proper guidance	
15)	Non availability of rain water at proper time	

15) Knowledge and Adoption

Sr. no.	Statements / Dry land Practices	Knowledge		Adoption		
		Yes	No	Fully	Partial	No adoption
s1	Levelling of farm land					
2	Broadbed and furrow					
3	Farm ponds					
4	In-situ Moisture conservation					
5	Shelter belts					
6	Crop management done on the basis of depth of soil.					
7	Cultivating land across the slope					

8	Deep ploughing				
9	rain water harvesting management				
10	Opening of furrow after every 2 rows at 30 DAS				
11	Frequent hoeing during dry spell				
12	Mulching				
13	Interculturing				
14	Protective irrigation				
15	small earthen bunds				
16	Contour cultivation				
17	Live Contour Bund – Vetivera / Leucaena bunds / khass grass bunds				
18	Use of drought resistant varieties of crops				
19	Timely sowing				
20	Sowing across the slope of land				
21	Sowing along with contour lines				
22	Crop rotation				
23	Dry seeding in cotton				
24	Integrated nutrient management				
25	gap filling & thinning				
26	use of weedicides				
27	application of fertilizer through spraying				
28	use of biofertilizer				
29	FYM/ Vermicompost / Compost application				
30	Green manuring –Spreading of 4.5 tones glyricidia / subabhul green leaves per ha.				
31	Integrated diseases management				
32	Integrated pest management				
33	Strip cropping				
34	Double Cropping of Safflower after Green gram				
35	Sequence Cropping of Gram after Jowar / Soybean				
36	Topo cropping of cotton, soybean, gram				
	Intercropping				
37	Cotton + Black gram/greengram (1:1)				
38	Tur + Black gram / greengram (1:1)				
39	Cotton + Jowar + Tur + Jowar (6:1:2:1)				
40	Sowing Tur, Sunflower, Maize, Bajra, sesamum, castor under contingent crop planning.				



Vita

VITA

1. Name of student : **Bahiram Vijay Jagannath**
2. Date of Birth : 12th Oct. 1986.
3. Name of the college : Post Graduate Institute, Dr. Panjabrao
Deshmukh Krishi Vidyapeeth, Akola.
(M.S.).
4. Residential Address : 36, Rane nagar,
At / Post -Nijampur,
Tal - Sakri, Dist - Dhule,
Maharashtra.
Pin. - 424305.
Mobi.- 9503368944
Email ID - vijubahiram@gmail.com
5. Academic Qualification :

Sr. No.	Name of Degrees awarded	Year in which obtained	Division / Class	Name of awarding University	Subjects
1.	B.Sc.(Agri.)	2008	Second Class	Dr. P.D.K.V., Akola.	Agriculture and Allied Sciences

6. Research paper Published (if any) : Nil
7. Field of Interest (In which you desire to work) : Extension Education

Place: Akola

Date: 31/05/2010


Signature of student

