ADOPTION OF DRY FARMING TECHNOLOGY IN DROUGHT PRONE AREA

BY

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B.Sc.(Agri.)

DISSERTATION

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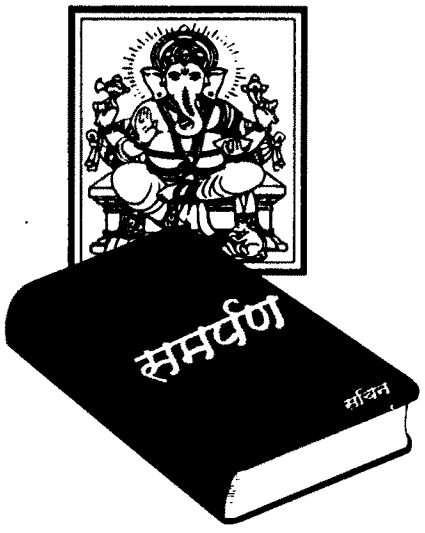

''यशोगगनात भरारी मारण्यासाठी माझ्या चिमुकल्या
परांना बळ देणाऱ्या व ज्यांनी कष्टप्रद जीवन
सोसून माझी जीवनवेल फुलविली
अशा ति. वडील , आई व चुलते
यांच्या चरणी
अर्पण...''

....सचिन

CANDIDATE'S DECLARATION

I hereby declare that the dissertation

or part thereof, has not been

previously submitted by

me for a degree of

any University.

Place : PARBHANI
Date : 23 / 06 /2003

(KADAVKAR S.J.)

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CERTIFICATE-I

This is to certify that the dissertation entitled **"ADOPTION OF DRY FARMING TECHNOLOGY IN DROUGHT PRONE AREA"** submitted by Shri **KADAVKAR SACHIN JAGANNATH** to the Marathwada Agricultural University, Parbhani in partial fulfilment of the requirements for the degree of **MASTER OF SCIENCE (Agriculture)** in the subject of **EXTENSION EDUCATION** is record of original and bonafide research work carried out by him under my guidance and supervision. It is of sufficiently high standard to warrant its presentation for the award of the said degree.

I also certify that the dissertation or part thereof has not been previously submitted by him for a degree of any university.

Place : PARBHANI
Date : 23/06/2003

(K. R. Nadre)
Research Guide
&
Chairman
Advisory Committee

CERTIFICATE-II

This is to certify that the dissertation entitled **"ADOPTION OF DRY FARMING TECHNOLOGY IN DROUGHT PRONE AREA"** submitted by Shri **KADAVKAR SACHIN JAGANNATH** to the Marathwada Agricultural University, Parbhani in partial fulfilment of the requirements for the degree of **MASTER OF SCIENCE (Agriculture)** in the subject of **EXTENSION EDUCATION** has been approved by the student's advisory committee after viva-voce examination in collaboration with the external examiner.

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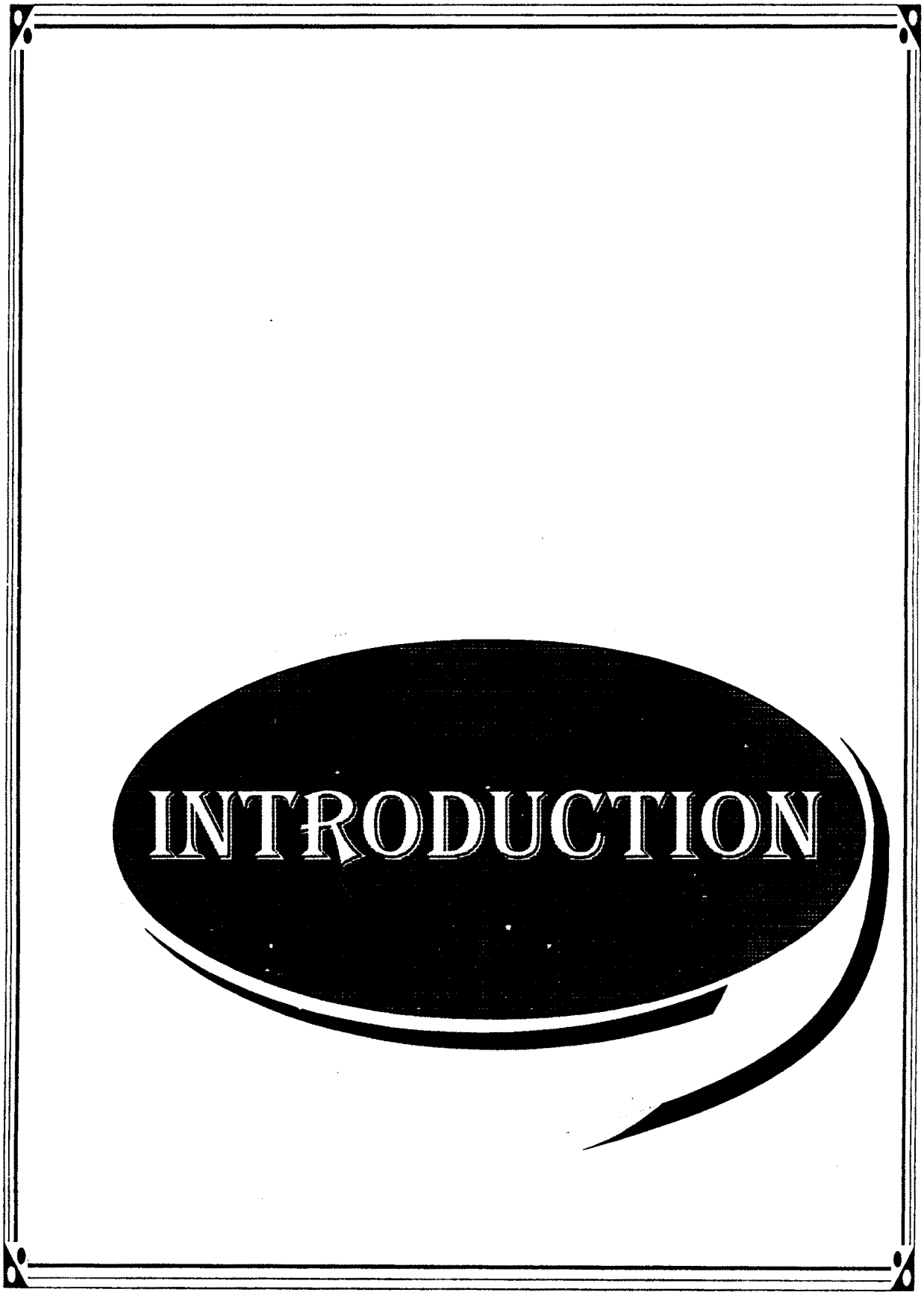
(KADAVKAR S. J.)

CONTENTS

LIST OF TABLES

LIST OF FIGURES


INTRODUCTION

Chapter–I

INTRODUCTION

India is predominately an agricultural country which is characterized by the dry-farming and is gamble in nature. Its fate depends mostly on vagaries of nature. The drought and famine occur frequently, which pose a great threat to the agricultural enterprise.

Agriculture is the main occupation of Indian community and much part of its planning is diverted to the development of agriculture. Agriculture enterprises are the way of life in India. The present agriculture enterprises are entering into an era of science and technology. Today's farmers need more knowledge, skill and modern concepts than their forefathers, Indeed they have to be an innovative to make a living in this competitive world.

Agriculture which plays very crucial role in Indian economy shares approximately 24 per cent in National income, (Pratiyogita Darpan Year book – 2002). Considering occupation of Indian people nearly 68 per cent people are engaged in Agriculture and among them 80 per cent are engaged in dry land farming (India – 2000).

Dryland agriculture occupies an important position in the agriculture scenario of India. Out of 143 million hectares of land under cultivation, 70 per cent is under rainfed and contributes about 42 per cent to the National food basket.

In Maharashtra state only 16 per cent cultivable land is under irrigation and 84 per cent cultivable land rainfed. The situations is still worst in Marathwada where 87 per cent farming depends on rain and only 23 per cent area is under irrigation (Economic survey of Maharashtra 2001).

Maharashtra state was confronted with acute drought for continuous three years during 1970-73. The impact of this phenomenon was that colossal production of food grains was very low. Big land holder to whom hardship was unknown and who had lived well, were forced to work for a living at the relief centers along with members of their families. The economic and social life of the community particularly of the rural population could be said to have been visibly shaken during that three years period. The persons who sought employment in the relief works were the landless, labourers, small holders, marginal farmers, big land holder, artisans, students and other family members. That means all types of population had participated in relief work started by the government. One of the important factor which are taken into consideration, before scarcity is declared in a particular area, is the prevalence of widespread migration of the rural population to urban areas like, Poona, Mumbai, Karad, Vidarbha and so on in search of employment. During the drought period majority of cultivators have taken loan and lost their cattle, land and other house material. Thus, the social and economic life of people was disturbed by severe attack of drought.

As many as 18 districts of Maharashtra state receives normal rainfall less than 1000 mm per annum, comprising 8 districts of Marathwada region. The Osmanabad district of Marathwada region receives normal rainfall about 500-700 mm per annum. The second irrigation commission 1972 and the Sukthankar fact finding committee 1973 had considered Bhoom, Paranda, Osmanabad, Tuljapur and Kallam talukas of Osmanabad district chronically scarcity affected areas in class 'C'.

There is no universally acceptable definition of term drought. The term is used differently by different persons depending on the content and the purpose for which it is being used.

American meteorological society defined drought as a period of abnormally dry weather sufficiently prolonged for lack of water to cause serious hydrologic imbalance (that is crop damage, water supply shortage etc.) in the affect areas.

Agricultural drought is a condition in which there is insufficient soil moisture available for the crops. It exists when the soil moisture in the root zone is at or below permanent wilting percentage.

The territories frequently facing drought conditions are identified as drought prone areas.

Criteria for identification of Drought-prone area.

Based in replies to the questionnaire and discussion with people various criteria have been suggested by the Sukthankar Fact Finding Committee (1973) as follows:

A) **Criteria based on cause of drought.**

1. Precipitation
2. Rainfall with reference to cropping pattern
3. Soil type

Criteria based on the effect of the drought

1. Annewari and suspension of land revenue
2. Declaration of scarcity in the past
3. Out turn
4. Marketable surplus
5. Migration
6. Fluctuation in prices
7. Food grain off take
8. Density of population

Efforts are being made on the part of government to overcome the problem of drought. Although drought prone areas programme (DPAP) has been operation since the fourth plan period. It has taken shapes as an intensive area development programme (IADP) only during the fifth plan. Development of dry farming technology is most essential for ensuring national food security narrowing regional imbalance and creating rural employment. Even currently with low level of production and productivity, the drylands accounts for 45 per cent of our food grain production. Besides being low production in dryland area is highly unstable. It is therefore important that the potential of dryland is judiciously exploited failing which it may not be possible to meet effectively the growing changes of incremental food requirement in the times to come. So it is a prime need to present day to have long term planning in a sphere of dryland agriculture.

Normally the diffusion and adoption of modern technology particularly the dry farming technology in agriculture can only help to boost up crop production and stabilize the population in farming enterprise. Adoption of improved technology gives more yield than usual methods of crop cultivation (Naidu, 1976). Adoption of farming technology may help in a big way to serve the problems of Indian agriculture. Therefore the government has launched special programme as "Drought prone area programme" and "Dryland farming projects". There are certain limitations in the use of dry farming technology and farmers are not properly convinced about its utility. Though the involved dryland technologies are not so intricate and involves simple practices, there are certain factors which hinder the process of adoption. There is a lot of gap between recommend pattern and actual use of the dryland technology.

The critical inputs like high yielding varieties, fertilizers and insecticides are valuable for realizing higher crop yields. But they do not uniformly accepted throughout the country. In general, it is a well known fact that the farmers invariably use fertilizers for irrigated crops while they do not use fertilizer or use below recommended dose for rainfed crop.

The basic factors, which are responsible for widening the gap in adoption of recommended technologies, are erratic rains, aberrant weather conditions and other techno-economic and socio-cultural factors.

If the extent of these constraints operating in our area can be identified, the gap can be bridged and the production per unit area in unit time can be increased by making the best use of all the advances made in the agricultural sciences. In order to increase the adoption of any technology, it is essential that the beneficiaries should be aware of the recent available technology.

The adoption has been defined by (Rogers 1962) as a decision to continue full use of an innovation. One does not adopt as soon as he is aware of an improved farm practice, because adoption process is a mental process, which takes certain time. The adoption process is the mental process from first hearing of an innovation to its final adoption. Adoption of dryland agricultural technology is necessary for increasing agricultural production. It is slow process depending on the environmental, situational and behaviouristic characteristic of those who adopt.

1.1 Statement of the problem

Many studies on adoption brought out pattern of adoption behaviour, factors responsible for adoption and major constraints in adoption of agricultural technologies. Nevertheless what has been explored and realized is the extent of adoption of dry farming technology. Hence, it is important to know adoption and factors contributing to adoption of dry farming technology in drought prone area.

1.2 Objectives

1. To study the personal, socio-economic and psychological characteristics of the farmers.
2. To assess the farmers knowledge of dry-farming technology.
3. To study adoption of dry farming technology in drought-prone area.
4. To study the relationship between personal, socio-economic and psychological characteristics of farmers with adoption of dry farming technology.
5. To study the constraints faced by the farmers in adoption of dry farming technology in drought prone area.

1.3 Significance of the study

The findings of the study will be useful in identifying general trend of adoption of dry farming technology in the area and also may be useful in working out strategies for dryland management in future. It is also expected that barrier to some extent in adoption of dryland technology will be overcome due to utilization of finding of study. It may prove it is useful to extension workers in identifying respondents those who avail the benefit of adopting dryland technology and those who are not availing dryland technology. Similarly, this study attempts to understand the factors promoting and retarding the adoption of dry farming technology.

1.4 Limitation of study

The study was conducted in six villages of Osmanabad district of Maharashtra State. The findings of the study are limited to the farmers having similar eco-system, socio-economic and environmental conditions. The investigator has to depend upon the information given by the respondent farmers and is based on verbal expressions. The findings will have to be tested in other parts of the state to judge its validity on the Universal scale.

1.5 Organization of thesis

This dissertation has been divided into seven chapters as.

1. Introduction
2. Review of literature
3. Methodology
4. Results
5. Discussion
6. Summary and conclusions
7. Implications.


REVIEW OF
LITERATURE

Chapter–II

REVIEW OF LITERATURE

This chapter deals with the comprehensive review of literature which is directly or indirectly relevant to objective of the study. It is one of the important aspects in the research process because it acts as a torch bearer for the researcher. In the view of the above facts and understanding the efforts were made to collect the research findings on the subject possessing the similar characteristics. But as the topic was comparatively new and therefore less literature was available to compare with the finding of the present work, hence directly or indirectly related reference have been presented.

Considering the objective of the study the review of literature of the present investigation has been presented under following heads.

1. Personal , socio-economic and psychological characteristics of the farmers.
2. Farmers knowledge of dry-farming technology.
3. Adoption of dry farming technology in drought-prone area.
4. Relationship between personal, socio-economic and psychological characteristics of farmers with adoption of dry farming technology.
5. Constraints faced by the farmers in adoption of dry farming technology in drought prone area.

2.1 Personal, Socio-economic and psychological characteristics of respondents

2.1.1 Age

Wangikar (1989)[reported that majority of the farmers (42.67per cent) were of middle age followed by young 41.33 per cent and only16.00 per cent of them were in old age category.

Tawade (1991) concluded that majority of the respondents

(52.50 per cent) were from middle age category followed by 32.50 per cent young age category.

Shetay and Pimprikar (1992) noticed that maximum number of respondents (55.29 per cent) were from young age followed by middle 25.88 per cent and very meager percentage of 18.83 per cent were from old age category.

Kulkarni and Sangle (1994) reported that majority of the respondents (46.15 per cent) were young followed by middle and old aged 32.67 and 21.10 per cent, respectively.

Khade (1996) reported that 54.16 per cent of respondent farmers were in middle aged and 24.84 per cent of them in young age category.

2.1.2 Education

Khan (1990) indicated that as much as (44.00 per cent) were educated upto primary level of education followed by secondary education 30.83 per cent. The illiterate farmers were observed to the extent of 22.50 per cent only.

Shetay *et al.* (1990) found that most of the ber growers (42.00 per cent) were illiterate, 25 per cent were educated up to middle school and 38 per cent were educated up to high school and above.

Jagdale and Nimbalkar (1993) stated that majority of respondents were adopting dry land agricultural technology for rabi jowar were having only primary level of education.

Zote (2001) revealed that 32 per cent of respondents were educated up to primary level, 24.67 per cent of respondent were educated up to secondary level 12.00 per cent respondents were educated up to high school and 9.33 per cent were educated up to college level.

2.1.3 Land holding

Bajaj *et al.* (1990) found that 38.34 per cent growers had above 2 ha land. About 23.00 per cent of the growers were having land between 1 to 2 ha and rest of the growers were having the land below one hectare.

Bhople *et al.* (1991) reported that as much as (28 per cent) farmers were small and marginal farmers having upto 2.0 hectare land followed by 18.40 per cent farmers were medium land holders with a farm size of 2.01 to 4.00 ha. The remaining 53.60 per cent of the respondents farmers were found to be possessing more than 4.0 ha land for cultivating dry land crop.

Korewad (1997) stated that majority (56.88 per cent) of the respondents had medium land holding followed by big farmers 26.87 per cent and small farmers 16.25 per cent, respectively.

Ankulwar (2000) pointed out that majority (47.33 per cent) of the respondents had medium land holding followed by 33.33 per cent and 19.3 per cent respondents had small and large land holdings, respectively.

2.1.4 Annual Income

Lokhande (1990) indicated that most of respondents (61.66 per cent) were from medium income group followed by high income group 43.34 per cent, respectively.

Tawde (1991) showed that most of the respondents (57.25 per cent) under study were from low income group followed by high income group 26.25 per cent,respetively.

Khalge (1996) noticed that 63.33 per cent bajra grower were in medium income level and 20 per cent farmers were found to be under low income level.

Deole (1997) reported that 18.78 per cent adopters and 20.00 per cent non-adopter have come under high income group. Majority of the

respondents (60 per cent) adopters and (66.25 per cent_) non-adopters had medium income while 21.25 per cent adopters and 13.75 per cent non-adopters had low income.

2.1.5 Social participation

Tawade (1991) pointed out that majority of the respondents (70.00 per cent) were in the medium level of social participation followed by 16.28 per cent of the respondents were found in low social participation group.

Shetay and Pimprikar (1992) observed that majority of the respondents (92.34 per cent) were the members of co-operative society, while the percentage of member of gram panchyat was 5.88 per cent only. The percentage of office bearers of these organisations was 2.35 per cent.

Jagdale and Nimbalkar (1993) stated that the majority of farmers (41.9 per cent) were under medium level of social participation 32.1 per cent and 28.8 per cent were under low and high level of social participation.

Gharule (1998) reported that more than two third (60.67 per cent respondents were under medium level of social participation, 21.33 per cent having high level of social participation and only 8.00 per cent of them had low level of social participation.

2.1.6 Source of information

Deshmukh (1994) revealed that nearly half of the respondents (46.80) were observed in medium source of information category followed by 31.60 per cent and 21.60 per cent respondents were found in high and low categories of sources of information respectively.

Deole (1997) stated that 22.5 per cent adopter and 26.25 per cent non adopters had high source of information where as 52.5 per cent adopters and 55 per cent non-adopters had medium source of information

while 25 per cent adopters and 18.75 per cent non adopters had low source of information.

Korewad (1997) indicated that 56.75 per cent respondents used medium source of information while 31.00 per cent and 12.75 per cent of the respondents were using low and high levels of source of information, respectively.

Kadam (2000) reported that majority (49.38 per cent) of the respondents used medium source of information while 27.50 per cent and 23.12 per cent of the respondents used low and high source of information, respectively.

2.1.7 Risk orientation

Khan (1990) reported that majority of the respondent (77.33 per cent) had possessed low risk orientation, 16.67 per cent respondents had medium risk orientation and only 10.00 per cent of them high risk orientation.

Lokhande (1990) stated that most of the respondents (47.50 per cent) possessed medium risk orientation followed by 45.83 per cent respondents possessing low risk orientation.

Khalge (1995) found that majority of bajra growers (53.35 per cent) were under medium level of risk orientation followed by 33.33 per cent and 13.32 per cent farmers were came under low and high level of risk preference respectively.

Khade (1996) stated that 66.60 per cent of respondents had medium risk orientation where as 18.34 per cent respondents had low risk orientation while 15 per cent respondents had high risk orientation.

Ankulwar (2000) noticed that majority of the respondents (65.33 per cent) had medium risk orientation followed by 19.33 per cent and 15.33 per cent of the respondents had low and high risk orientation respectively.

2.1.8 **Knowledge**

Bavalatti and Sunderswamy (1991) found that majority of respondents (57.34 per cent) belonged to medium knowledge category. Almost equal number of respondents were in high and low knowledge category as 22.00 and 20.66 per cent, respectively.

Dube and Sawarnkar (1992) stated that about 50.00 per cent small and marginal farmers were having partial knowledge level.

Khalge (1995) found that 20.83 per cent farmers had low knowledge about improved package of practices for bajra. Sixty five per cent farmers were having medium knowledge level and 14.17 per cent farmers were having high knowledge level.

Meti *et al.* (1997) reported that 71.66 per cent of the dry land cotton growers were in the medium knowledge category followed by 15.83 per cent high knowledge category and 12.50 per cent in low knowledge category.

Singh *et al* (1999) inferred that majority of the farmers (48 per cent) had medium knowledge level followed by 35 per cent and 17.00 per cent respondents had low and high knowledge about dry farming technology.

2.2 Extent of knowledge of dry farming technology

Patil *et al.* (1989) stated that most of the bajra growers had knowledge about improved practices of bajra cultivation. All farmers had knowledge about improved seed, seed treatment, recommended seed rate, while 77.77 per cent respondents had knowledge about use of chemical fertilizers, 63.33 per cent farmers were knowing about pest and disease control measures very few farmers 12.72 per cent had knowledge about recommended spacing.

Rade *et al.* (1989) concluded that a large majority of farmers had knowledge about recommended dry farming practices of bajra and

groundnut crops viz. Improved seed. recommended spacing seed rate interculturing operation and use of fertilizer etc.

Nimje *et al.* (1990) showed that 60.00 per cent respondents were having medium knowledge of different dry land cotton technology aspects. Only 20 per cent farmers have high level of knowledge and 20 per cent were found to have low level of knowledge about dry land cotton technology.

Bhople *et al.* (1991) epitomised that majority of respondents (72.90 per cent) respondents were having medium level of knowledge followed by 11.20 per cent and 9.60 per cent
respondents were having medium and high level of knowledge about dry land practices such as soil water conservation. Improved crop husbandry, alternate land use system.

Sunderswamy and Bavalatti (1991) stated that majority of the farmers (57.34 per cent) were adopted dry land technology like strip cropping, contour bunding, application of FYM were belong to medium knowledge category. Almost equal number of respondents had high and low knowledge about dry land technology 22 per cent and 20.66 per cent.

Mahipal and Prasad (1995) found that maximum percentage of respondents were found in medium level of knowledge gained in alternated land use system training program where as minimum knowledge gain in case of crop planning and cropping system under rainfed condition.

Nirmalkumar and Singh (1995) summarised that 70.45 per cent of marginal farmers had poor knowledge about fertilizer use in dryland area while small farmers 54.10 per cent medium farmers, 25 per cent and big farmers (20 per cent) were having poor knowledge.

Patel (1995) stated that equal number of respondents (56.36 per cent) possessed medium knowledge level for both the categories.

Nearly 43.64 per cent progressive farmers possessed high knowledge level about sorghum production technology.

2.3 Extent of adoption of dry farming technology

Wasnik (1988) observed that 64 per cent progressive farmers were using high yielding varieties of jowar 64 per cent farmers were using plant protection measures against insect. Pest and diseases while 76 per cent non-progressive farmers were using hybrid seed of jowar.

Ingle and Wayazawade (1989) stated that sorghum growers (64.93 per cent) were sowing seed within given time and 67.57 per cent were applying fertilizers while intercropping and plant protection measures were used by 60 per cent and 10.46 per cent respondents.

Patil *et al.* (1989) found that 100 per cent respondents were adopting the practices like improved seed, seed treatment and recommended seed rate followed by the use of chemical fertilizer 48.18 per cent. There was no adoption of recommended spacing and control of pest and diseases.

Rade *et al.* (1989) concluded that majority of the farmers were found adopting practices like improved seed, seed treatment and recommended seed rate and interculturing. The practices like recommended spacing for bajra crop, use of proper dose of chemical fertilizer, control of pest and diseases were adopted by less number of farmers.

Bhople *et al.* (1991) stated that 72 per cent respondents were found under medium adoption level followed by 24.80 per cent 3.20 per cent under low and high adoption level about dryland practices respectively.

Bhoite and Girse (1991) stated that majority of respondents(61.25 per cent) had high level and 38.75 per cent respondents had low level of adoption of improved dryland technology for bajra cultivation.

Chandagiri *et al.* (1991) found that majority of the jowar grower having adoption regarding variety (75 per cent) seed rate (86.00 per cent) time of sowing (84.00 per cent) while majority of respondents come under non-adoption and partial adoption level regarding use of chemical fertilizers (54 and 40 per cent) very few respondents were adopting pest control and disease control measures regarding package of practices for jowar.

Girese and Kamble (1991) stated 87.50 per cent farmers were not using plant protection measures for bajra cultivation in dry land area.

Kude *et al.* (1991) reported that majority of the jowar growers adopted dryland practices as preparatory tillage (92.21 per cent) improved varieties (90.90 per cent), timely sowing (90.90 per cent), seed rate (62.34 per cent), intercultural operations (70.83 per cent) and chemical fertilizer (83.12 per cent).

Prasad and Mahipal (1991) epitomised that 80 per cent respondents were adopting moisture conservation practices while 28 per cent respondents were adopting intercropping while only 8 per cent using weed control measures for control of striga and 20 per cent respondents were adopting pest control measure for control of pod borer and ear head bug. Further he stated that 48 per cent farmers were having medium adoption level, 36.00 per cent farmers having low level adoption and only 16 per cent respondent having high adoption category.

Raghuvanshi and Jeulkar (1992) found that 35 per cent farmers were using high yielding varieties 80 per cent farmers were sowing seeds in time, fertilizer application, intercultural operations, plant protection and seed treatment were adopted by 40 per cent , 48.4 per cent, 9 per cent and 72 per cent respondents, respectively.

Sawarankar and Chauhan (1993) stated that more than 50 per cent of small farmers and marginal farmers had medium level of adoption more or less 25 per cent each had high and low adoption level.

Kude (1993) stated that 70.83 per cent of the respondents were found under medium adoption level followed by 15.83 and 13.34 per cent under low and high adoption level in dryland technology of *kharif* jowar.

Khalge (1995) pointed that 83.33 per cent respondents adopted the practices like deep ploughing and 75 per cent farmers adopted practice like 3 to 4 harrowings while 54.30 per cent farmers were using 15 cartload of FYM per ha. Nearly 86 per cent were using improved bajra seed.

Meti and Hanchinal (1995) found that majority (56.66 per cent) of the respondents had fallen in medium adoption category were as high and low adopter respondents were 26.66 per cent and 16.66 per cent respectively

Hanumanaikar *et al.* (1997) revealed that majority (64.50 per cent) of the respondents were in medium level of adoption category followed by 18.50 per cent in low and 17.00 per cent in high level of adoption category.

Farooq *et al.* (1997) stated that all the respondents adopted the drought resistance varieties, chemical fertilizers and intercultural operation while majority of them adopted practices like application of farm yard manure (99.33 per cent) deep ploughing (94.67 per cent), crop rotation (97.33 per cent) and mixed cropping (83.33 per cent). No much variation was observed with respect to the percentage of respondents of various categories (low, medium and high) adopting most of the dry farming practices.

Desai *et al.* (2000) reported that majority of the respondents adopted preparatory tillage (90.50 per cent), use of manure (46.00 per cent), sowing method (44.00 per cent), time of sowing (68.00 per cent), use of chemical fertilizer(47 per cent), interculturing 80.00 per cent and control of pest and diseases (43.00 per cent) in rainfed cotton.

Prasad *et al.* (2000) the findings reveled that majority (76.25 per cent) of the respondents had adopted contour cultivation it also stated that the technologies viz. soil bunds, vegetative barrier (live bunds) were adopted by 53.42 and 0.91 per cent of the respondents, respectively. The findings revealed that farm pond was adopted by only 4.67 per cent of the respondents. Further stated that a large proportion 94.50 per cent had not adopted recommended spacing. He pointed out that majority (96.57 per cent) of the respondents followed recommended time of sowing.

2.4 Relationship between the characterstics of dry land farmer and adoption

2.4.1 Age and adoption

Ingle and Wayazade (1989) indicated that the age was not positively and significantly associated with extent of adoption.

Supe *et al.*(1990) reported that age was negatively significant with adoption of dryland technology of jowar

Kude (1993) stated that age was negatively significant with adoption of recommended technology for rabi jowar.

Deole (1997) stated that age was negatively significant with adoption of dryland technology of bajra.

2.4.2 Education and adoption

Patil *et al.* (1989) stated that education was significantly associated with adoption of improved agricultural practices for bajra.

Raghuvanshi *et al.* (1992) stated that education was positively significant with adoption of improved from technology.

Khalge (1995) stated that education was positively significant with adoption of dryland technology of *kharif* jowar.

Deole (1997) stated that education was positively related with adoption of dryland technology for bajra.

2.4.3 Land holding and adoption

Patil *et al.* (1989) found that land holding had positive significant association with adoption.

Supe *et al.* (1990) revealed that land holding was positively and significantly related with the adoption of jowar practices in dryland areas.

Kude (1993) stated that land holding had positively significant relation with adoption of recommend technology of rabi jowar.

Khalge (1995) reported that land holding had positive and significant association with adoption of bajra.

2.4.4 Annual income and adoption

Ingle and Wayzawade (1989) stated that annual income was positively significant with adoption of agricultural technologies of cotton and sorghum.

Patil *et al.* (1989) stated that annual income had significant association with adoption of improved agcultural practices for bajra.

Bhoite and Girse (1991) showed statistically significant relationship between annual income and adoption of improved dryland practices for bajra.

Khalge (1995) revealed that annual income had significant association with adoption of agricultural technology of bajra.

2.4.5 Social Participation and adoption

Khan (1990) found that there was positively significant association between social participation and adoption of dryland technology for rabi jowar.

Supe *et al.* (1990) found that social participation was significantly related with adoption of jowar technology

Girase *et al.* (1991) reported that social participation was significantly associated with recommended grounding cultivation practices.

Dube and Sawarnkar (1992) reported that social participation was significantly associated with adoption.

2.4.6 Source of information

Sawarnkar and Chauvan (1993) observed that source of information had significant association with adoption of rice production technology among small farmer.

Khalge (1995) found that there was significant relationship between source of information and adoption of percentage of practices of bajra.

Khade (1996)) found that source of information was positively significant with adoption of dryland technology of *kharif* jowar.

Deole (1997) stated that source of information had significant association with adoption of dryland technology for bajra.

2.4.7 Risk orientation and adoption

Kadam and Borse (1992) reported that risk orientation had significant correlation with adoption.

Kude (1993) stated that risk orientation was a significantly and positively related with adoption of recommended technology by the farmers.

Khade (1995) reported that risk preference of the respondent was found to have significant relationship with adoption of recommended package of practice of bajra.

Deole (1997) stated that risk preference was found to be significantly and positively related with adoption of recommend dryland technology to bajra.

2.4.8 Knowledge and adoption

Sunderswamy and Bavalatti (1991) stated that there was positive and significant relationship between knowledge and adoption of dry farming practices.

Khalge (1995) found the knowledge was positively and significantly related with package of practices of bajra.

Khade (1996) reported that knowledge was positively and significantly related with adoption of dryland technology of *kharif* jowar.

Gharule (1998) revealed that knowledge was positively and significantly related with adoption of package of practices of *kharif* jowar.

2.5 Constraints in adoption of dry farming technology

I.C.A.R. (1979) reported that most common reason for non adoption of dry farming practices were lack of knowledge about the practices not being practicable and lack of proper guidance which ranked first, second and third respectively.

Patil *et al.* (1989) observed that nearly three fourth i.e. (72.72 per cent) respondents did not adopt improved farming practices due to scanty and inadequate rainfall in the region. Nearly 59.00 per cent do not adopt fertilizer and pesticides due to not timely availability of these commodities. About 58.00 per cent reported that they did not possess improved implements of recommended spacing.

Bhoite and Thorat (1985) stated that non-availability of seed in time and complexity in seed treatments were the constraints expressed by 56.21 and 45.17 per cent of the respondent farmers.

Among the constraints responsible .the farmers expressed that there is a fear and heavy looses in case of failure of crops due to lack of rains. Second important constraint reported by 70 per cent of the farmers was high prices of the fertilizers and 67 per cent farmers reported, shortage of capital.

Wasnik (1988) summarized following constraints for non-adoption of dry farming technology. Near about 90 per cent non-progressive farmers stated that they were not adopting improved dry farming practices due to inadequacy of capital. Nearly 32 per cent non-progressive farmers state that there were non availability of inputs like improved seeds, fertilizer, pesticides, lack of improved implements was the problem stated 44 per cent progressive and all non progressive farmers. Nearly 44 per cent respondents said that rains were scanty and inadequate in the region hence they could not go in for adoption of improved practices.

Umale and Bhople (1989) stated that stated lack of knowledge, high cost of fertilizers, insecticides and non availability of seed in time were the major constraints faced by the rainfed wheat growers..

Bhople *et al.* (1991) reported that 87.20 per cent farmers had faced a problem of easy breakage of bunds constructed for checking rain water runoff and soil conservation.

Mundhva and Patel (1991) reported that lack of knowledge regarding latest improved variety seed, not available in required quantities there after he stated that lack of improved equipment and lack of necessary guidance is the major constraints faced by the rainfed wheat growers. Further he reported that most of the farmers were facing difficulties about high cost of fertilizers.

Patel and Nandapurkar (1991) reported that constraints faced by farmers were non availability of inputs in time 43.16 per cent. shortage of skilled labour 14.82 per cent, lack of knowledge about improved technology of sorghum 37.27 per cent.

Prasad *et al.* (1991) stated that lack of credit was major constraint expressed by majority of respondents.

Grise and Kamble (1991) found that nearly about 35 per cent respondents stated that fertilizers were costly. Lack of knowledge regarding

use of fertilizer were stated by 15 per cent farmers 35 per cent respondents said that plant protection measures was costly practice.

Shivramu *et al.*(1995) reported that erratic rainfall scarcity of inputs and fragmented dry land holdings were the major constraints faced.

Rai *et al.* (2000) reported that the major constraints expressed by the farmers are lack of information about suitable crop rotation and mulching technique.

METHODOLOGY

Chapter-III

METHODOLOGY

The chapter deals with the description of procedure followed for carrying out investigation. It contains the tools and techniques for the data collection. The sampling procedures adopted as well as devices used for analysis of data are also explained. The explication process for measurement of dependent and independent variables under study are also incorporated in this chapter.

3.1 Locale of the study

3.2 Research design

3.3 Method of sampling

3.4 Variable and their measurement

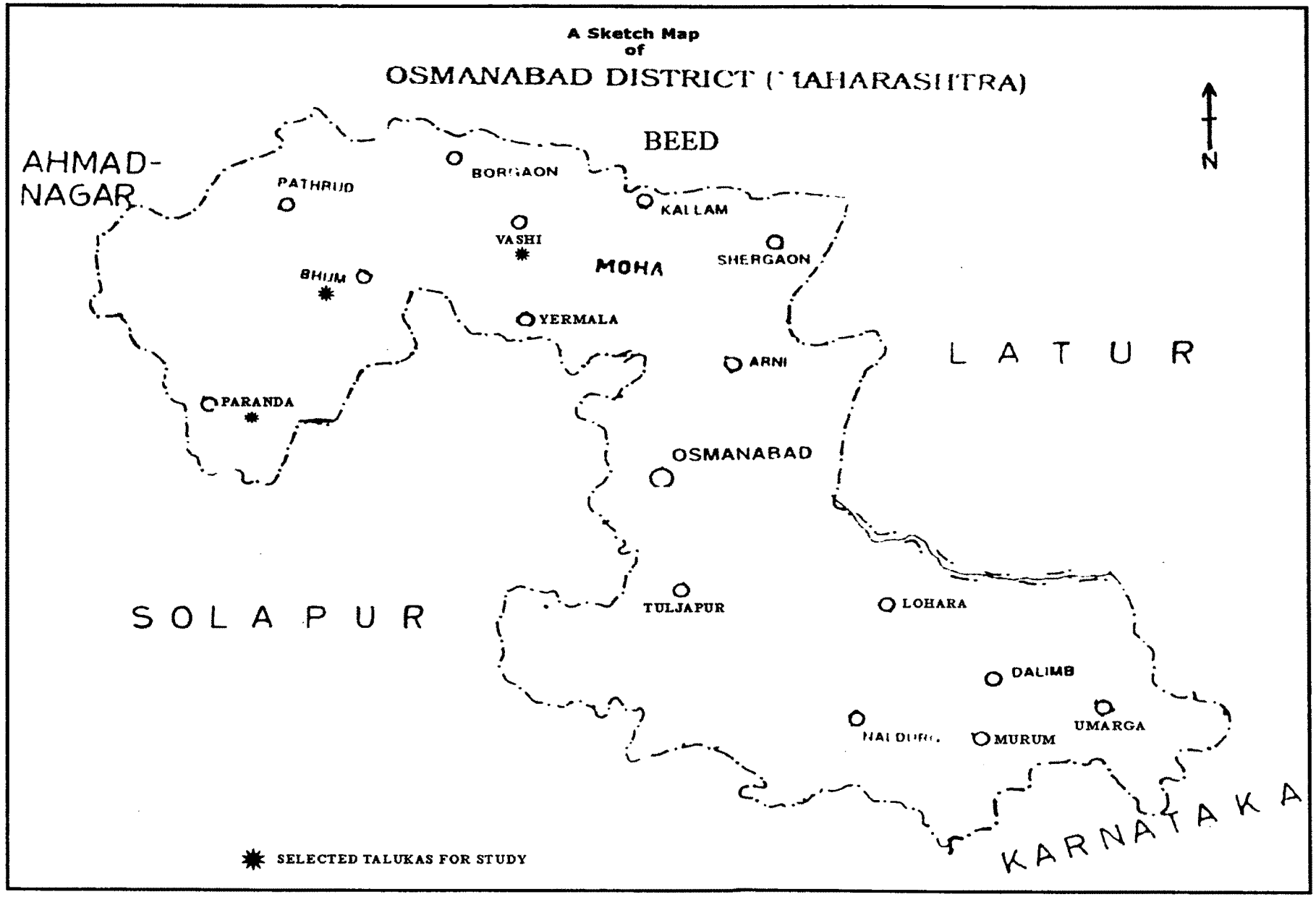
3.5 Statistical test used

3.1 Locale of study

The present study was conducted in Osmanabad district of Marathwada region of Maharashtra State. The Bhoom, Paranda and Washi talukas receiving lowest rainfall were selected out of the six identified drought prone talukas in Osmanabad district as the fact finding committee, (1973) identified, Bhoom, Paranda, Tuljapur, Osmanabad, Kallam and Washi which is newly developed taluka from Kallam as drought prone.

3.1.1 Physiography

Osmanabad district is situated between parallels of 17.35° and 18.4' North latitude and between meridians of 75.16° and 76.4' East longitude. The Bhoom, Paranda and Washi taluka are comprised of 296 villages. The total geographical area is 748478 hectares. The area under cultivation is 598188 hectares. The total population is 1472256 out of which 1239009 is rural and 233247 is urban (2000-2001 census).


A Sketch Map
of
OSMANABAD DISTRICT (MAHARASHTRA)
N
AHMAD-
NAGAR
BEED
PATHRUD
BORGAON
KALLAM
VASHI
MOHA
SHERGAON
BHUM
YERMALA
ARNI
LATUR
PARANDA
OSMANABAD
SOLAPUR
TULJAPUR
LOHARA
DALIMB
UMARGA
MURUM
KARNATAKA
SELECTED TALUKAS FOR STUDY

3.1.2 Soil

The soil of Bhoom, Paranda and Washi is light and light to medium not capable of retaining moisture which is suitable only for the growth of *kharif* crops.

3.1.3 Climate

The climate of Osmanabad district is tropical. The temperature ranges between 8.0°C to 38°C in winter and maximum 42.5°C in summer. The hot season starts from February and continues upto beginning of June. The monsoon after the hot season starts in month of June and lasts till month of September and accounts for rainfall 700.00 mm.

The main *kharif* crops grown in the area are jowar, tur, soybean, mung, udid and in some part groundnut is cultivated. Major crops grown in *rabi* are rabi jowar, safflower, sunflower, linseed and wheat, gram are cultivated on small scale.

The horticultural crops like mango, grapes, custard apple, ber, pomegranate are grown in some part of the district. Cattle and buffaloes are kept for duel purpose like drought / milch and farm yard manure. Sheep, goat and poultry keeping are the subsidiary occupations of the people. Landless labours are mostly engaged in agricultural and nearby industries.

3.2 Research design

Ex-post-facto research design was used for the present study. Kerlinger (1964) stated that ex-post-facto research design is worthy to apply when the independent variable has already acted upon.

3.3 Method of sampling and size of sample

The data from the present study was collected from the area of Bhoom, Washi and Paranda taluka of Osmanabad district.

From each taluka two villages were purposively selected where dryland area is more. From these villages a list of farmers who were doing a dryland agriculture was obtained from village extension workers of the respective villages. After preparing the list of dryland farmers 20 respondents were selected from each villages with the help of random sampling. Thus in all 120 respondents were selected as a sample for the investigation.

The names of selected villages and number of farmers selected for study are given in Table 1.

Table 1: Village wise distribution of the respondents

Sr. No.	Name of village	Number of farmers
1.	Terkheda	20
2.	Gojawada	20
3.	Sonari	20
4.	Bhoinga	20
5.	Wangi (K.D.)	20
6.	Asta	20
	Total	120

3.3.1 Construction of interview schedule

Considering the objectives set forth and various aspects proposed to be studied; the interview schedule was prepared. While formulating the questions for the schedule, the author secured the help and technical guidance from available literature and teaching staff of the department.

3.3.2 Tools and techniques used

The basic instruments used for the collection of required data were interview schedule. It was decided to collect information through personal interview so as to get valid and complete responses. Keeping the

objectives of the study in view, an interview schedule was prepared and data was collected.

3.3.3 Pretesting the schedule

The interview schedule, which was originally prepared in English, was translated into Marathi i.e in local language, so that a common farmer in the village could easily understand it. The interview schedule was pre-tested on a sample of 20 randomly selected farmers in a non-sample area so as to remove ambiguous items. In the light of pre-testing the interview schedule was suitably modified.

3.4 Variables and their measurement

Operational definitions and methods used to measure variables are given below.

3.4.1 Age

Age refers to the chronological age of the respondents at the time of interview. The respondents according to the age were classified into three categories as below

Sr. No.	Category	Age (years)
1.	Young	Upto 35
2.	Middle	36 to 55
3	Old	56 and above

3.4.2 Education

It refers to the formal education of the respondents, the scores of which were given below.

Sr. No.	Category	Score
1.	Illiterate	0
2.	Only read and write	1
3	Primary level	2

4	Secondary level	3
5	Higher secondary level	4
6	Graduate level	5

3.4.3 Land holding

Land holding is defined as the number of hectares of land possessed by the respondents. The following categories were formed by using mean ± S.D. formula.

Sr. No.	Category	Land holding (ha)
1.	Small	Upto 2.52
2.	Medium	2.53 to 7.35
3	Big	7.36 and above

Mean = 4.93 S.D. = 2.42

3.4.4 Annual income

Annual earning of the family from all sources was taken as the annual income. One score was given for one thousand rupee income. The respondents were classified into three categories on the basis of mean ± S.D.

Sr. No.	Category	Annual income
1.	Low	Upto Rs. 36611
2.	Medium	Rs. 36612 to 94654
3	High	Rs. 94655 and above

Mean = Rs. 65633 S.D. = Rs. 29022

3.4.5 Social participation

Social participation is defined as the individual involvement in the activities of formal and informal organization as a member or office bearer.

Each of the respondents was assigned one score if he was a member of one institution and was assigned two score if he held any post like Chairman, Sarpanch, President, Vice-President, etc. of the organization. The above score was multiplied by number of years, the respondents participated in the institution.

On the basis of total score obtained respondents were grouped into following categories keeping mean and S.D. as check.

Sr. No.	Category	Score
1.	Low participation	Upto 18.67
2.	Medium participation	18.68 to 31.18
3	High participation	31.19 and above

Mean = 24.93 S.D. = 6.26

3.4.6 Sources of information

It is an index, which refers to the degree of individual exposure to the different communication media.

Information sources used by farmers were measured by taking into consideration all the possible sources available to the farmer. Each respondent was asked to indicate from which source he got the information about the use of technology. The score was given as below.

Sr. No.	Frequency of exposure	Score
1.	Always	2
2.	Sometime	1
3	Never	0

On the basis of total score obtained respondents were grouped into following categories on the basis of mean $\pm$ S.D.

Sr. No.	Category	Score
1.	Low	Upto 15.20
2.	Medium	15.21 to 22.25
3	High	22.26 and above

Mean = 18.73 S.D. = 3.53

3.4.7 Risk orientation

It is the degree to which farmers are oriented towards risk and uncertainty and has courage to face the problems in farming. It was measured with the help of risk orientation scale developed by (Supe 1969). This scale consisted of six items of which item number one and five were negative and rests were positive. These items were rated in five points response categories ranging from strongly agree to strongly disagree. The scoring procedure was as follows.

Score	Responses				
	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Positive items	5	4	3	2	1
Negative items	1	2	3	4	5

The total score on this scale had the range of 6 to 30. The final score was calculated by simple addition of all the scores and the respondents were categorized by using mean $\pm$ S.D. formula.

Sr. No.	Category	Score
1.	Low risk orientation	Upto 17.43
2.	Medium risk orientation	17.44 to 22.50
3	High risk orientation	22.51 and above

Mean = 19.97 S.D. = 2.54

3.4.8 **Knowledge**

In the present study, it has been operationally defined, as the knowledge possessed by an individual respondent about the recommended practices of dry farming technology. Knowledge is one of the four functions in innovation decision process.

There were 15 items included in the teacher made knowledge test. If the respondent answers the question correctly, one score was given to each item and if he answer wrongly zero score was assigned. The total score obtained by each respondent was worked out. The knowledge level of the respondents was categorized on the basis of mean $\pm$ S.D. formula as below.

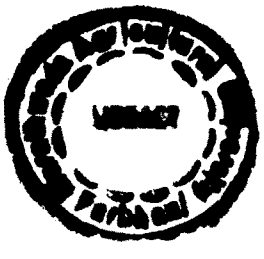
Sr. No.	Category	Score
1.	Low	Upto 9.65
2.	Medium	9.66 to 13.20
3	High	13.21 and above

Mean = 11.43 S.D. = 1.78

3.4.9 Adoption

Adoption is a mental process through which an individual passes from hearing about to final adoption. It is operationalized as the extent of the use of dry farming practices by respondents. For studying the adoption of recommended practices of dry farming technology important practices like preparatory tillage, application of FYM, contour bunding, sowing, use of chemical fertilizers, use of mulches, use of antitranspirants, intercultural operations and plant protection were considered for the study with the consultation of scientists of Marathwada Agricultural University, Parbhani and literature available.

The extent of adoption was based on the score given to the recommended practices followed by the farmers. If farmers adopt the



recommended practice fully 2 score was given, while for partial adoption 1 score was given and for non-adoption zero score was given.

The level of adoption of recommended practice was decided and respondents were grouped into following categories based on mean ± S.D.

Sr. No.	Category	Score
1.	Low	Upto 55.65
2.	Medium	55.66 to 75.82
3	High	75.83 and above

Mean = 65.74 S.D. = 10.09

The extent of adoption level of each respondents was calculated by using following formula.

$$\text{Extent of adoption} = \frac{\text{Total score obtained on all practices}}{\text{Total obtainable score}} \times 100$$

3.4.10 Constraints

The meaning of the term constraints according to Oxford Dictionary is confinement, restriction of liberty or compulsion of circumstances or compulsion put upon the constraints are, therefore, the factor that limit the adoption process and hence these cannot be overloaded.

In the present study, constraints have been operationally defined as the problems encountered or perceived by the farmer with regard to adoption of recommended practices of dry farming technology. The constraints found during pre-testing were structured according to the recommended dryland practices. The number and percentage of each constraint was worked out to measure the constraints encountered by the respondents.

3.5 Statistical tests used

Following statistical methods were used for effective analysis and interpretation of data.

1. Frequency and percentage
2. Coefficient of correlation
3. Multiple regression analysis

3.5.1 Frequency and percentage

Frequencies and then percentage were used for making simple comparisons. To calculate the percentage, the frequency of particular category was multiplied by 100 and divided by total number of respondents in that particular category.

3.5.2 Coefficient of correlation

This statistical test was used to find out zero order correlation between dependent and independent variables to see the nature of relationship existed.

The formula used for relationship test is as given below:

$$r = \frac{\Sigma XY - \dfrac{(\Sigma X) - (\Sigma Y)}{n}}{\sqrt{\left[\Sigma X^2 - \dfrac{(\Sigma X)^2}{n}\right] \times \left[\Sigma Y^2 - \dfrac{(\Sigma Y)^2}{n}\right]}}$$

Where,

r = correlation coefficient

X = score of independent variable

Y = score of dependent variable

n = number of observations

3.5.3 Multiple regression analysis

This technique was used to know the partial and complete influence of independent variables on dependent regression equation was used as follows.

$$Y1 = a + b1X1 + b2X2 \ldots\ldots\ldots bnXn$$

Where,

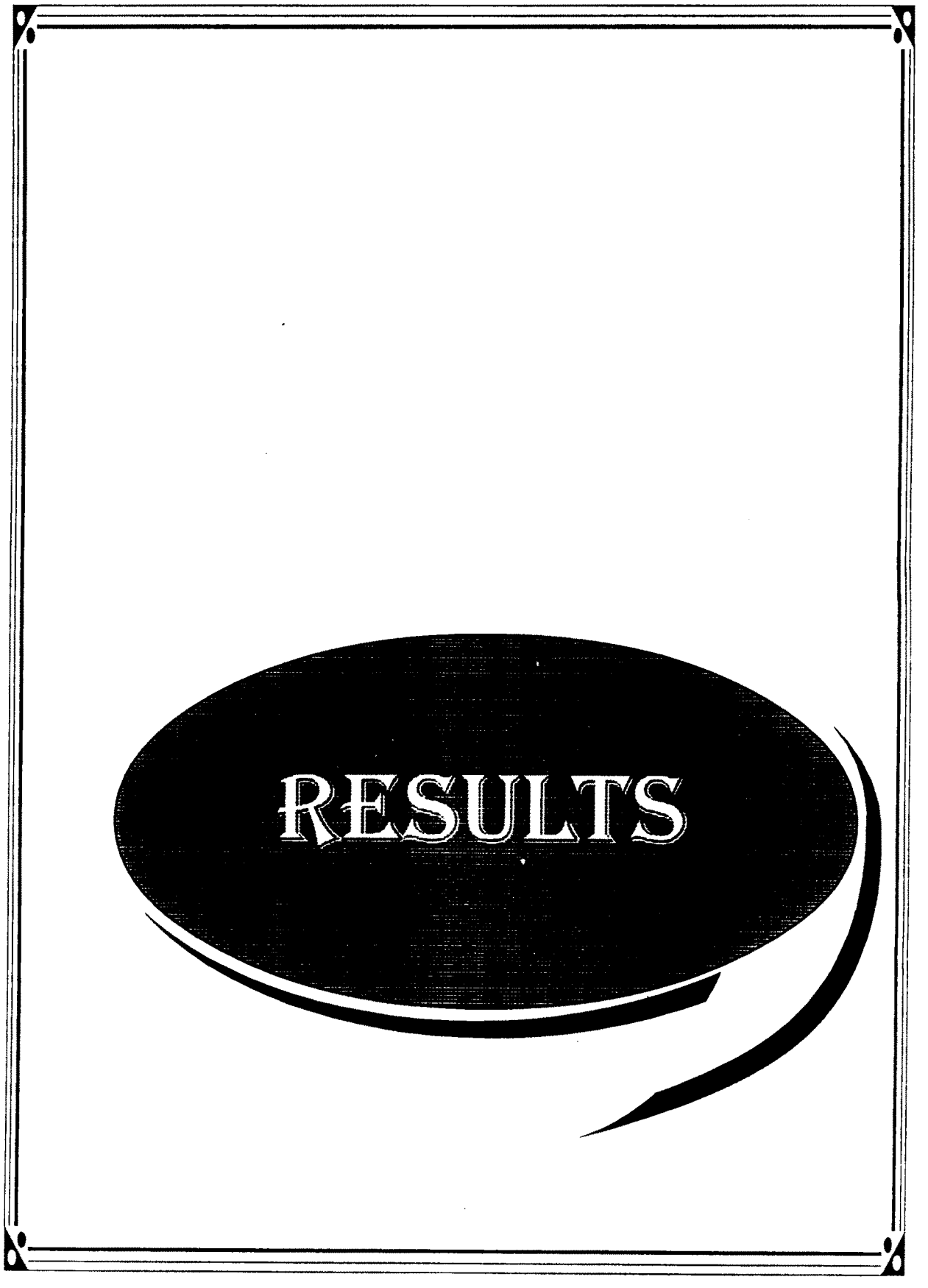
Y1 = dependent variable expected/estimated

X1..Xn= independent variable

a = constant value : intercept

b1..bn = the partial regression coefficient for the respective variables

R^2 = Coefficient of multiple determination.


RESULTS

Chapter-IV

RESULTS

Present investigation entitled "Adoption of dry farming technology in drought prone area" was conducted with a view to study extent of adoption of dry farming technology and their problems in adopting dry farming practices. The findings of the study are presented under following major heads.

1. Personal, socio-economic and psychological characteristics of the farmers.
2. Knowledge of dry-farming technology.
3. Adoption of dry farming technology in drought-prone area.
4. Relationship between personal, socio-economics and psychological characteristics of farmers with adoption of dry farming technology.
5. Constraints faced by the farmers in adoption of dry farming technology in drought prone area.

4.1 Personal, socio-economic and psychological characteristics of the respondents

4.1.1 Age

Table 2. Distribution of respondents according to their age.

Sr. No.	Category	Frequency	Per cent
1.	Young	46	38.33
2.	Middle	50	41.67
3.	Old	24	20.00
	Total	120	100.00

It is observed from Table 2 that 41.67 per cent of the respondent farmers were middle aged followed by young 38.33 per cent and only 20.00 per cent of them in old age category.

4.1.2. Education

Table 3. Distribution of respondents according to their education

Sr. No.	Category	Frequency	Per cent
1.	Illiterate	11	9.16
2.	Only can read and write	13	10.84
3.	Primary	34	28.34
4.	Secondary	26	21.66
5.	Higher secondary	20	16.67
6.	Graduate level	16	13.33
	Total	120	100.00

It is revealed from Table 3 that majority of the respondents (28.34 per cent) had education up to primary school followed by 21.66 per cent had education up to secondary school, 16.67 per cent had education up to higher secondary, 13.33 per cent were educated up to graduate level, 10.84 per cent can read and write only and 9.16 per cent were illiterate.

4.1.3. Land holding

Table 4. Distribution of respondents according to their land holding.

Sr. No.	Category	Frequency	Per cent
1.	Small	23	19.17
2.	Medium	77	64.16
3.	Large	20	16.67
	Total	120	100.00

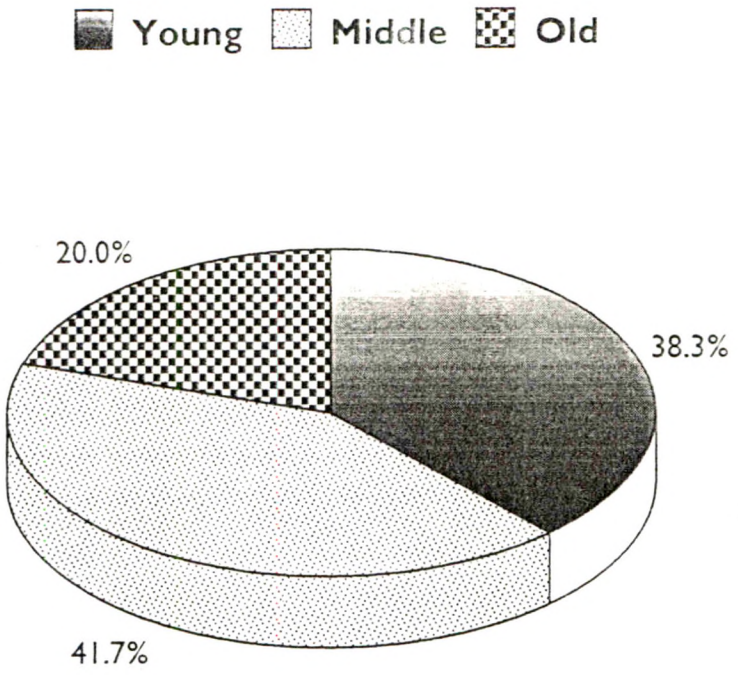


Fig. 2.Distribution of the respondents according to their age.

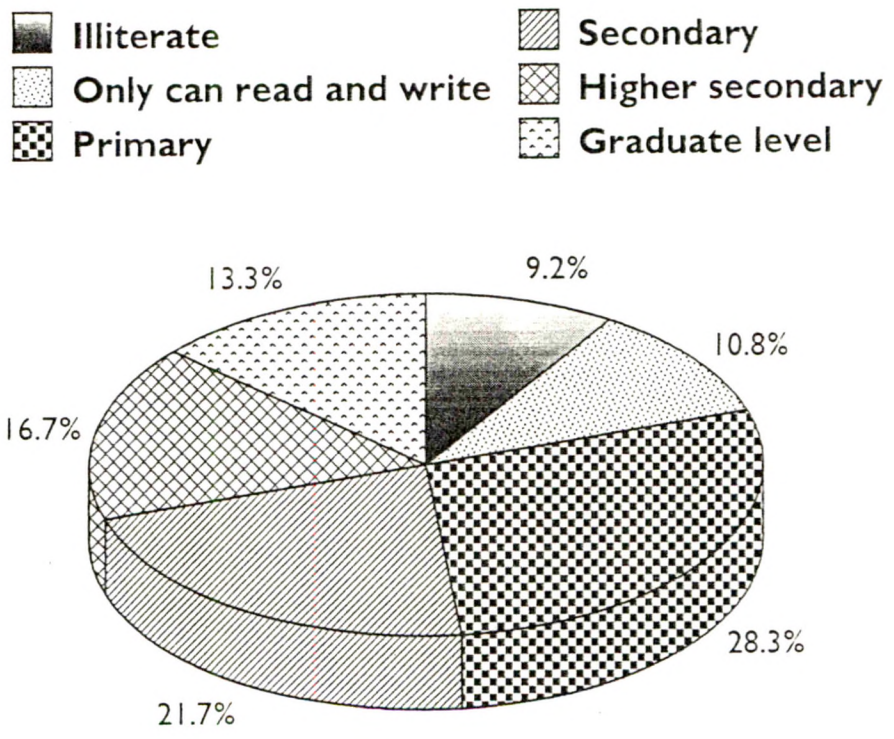


Fig. 3. Distribution of the respondents according to their education

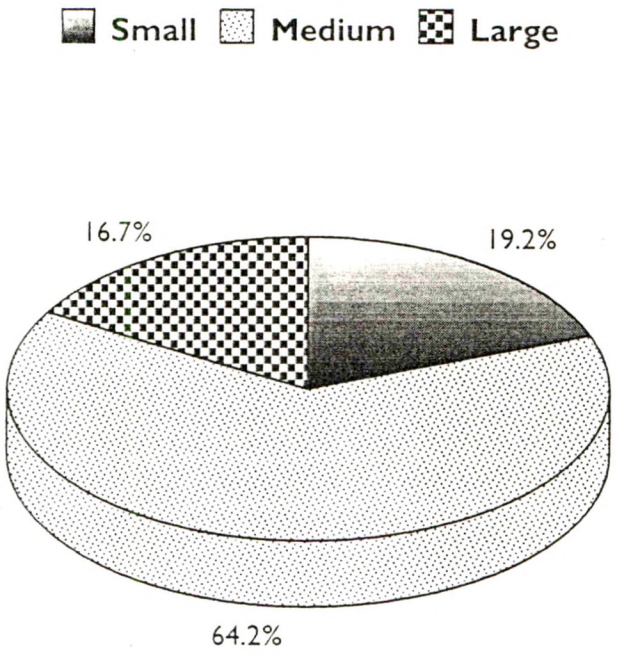


Fig. 4 .Distribution of the respondents according to their land holding

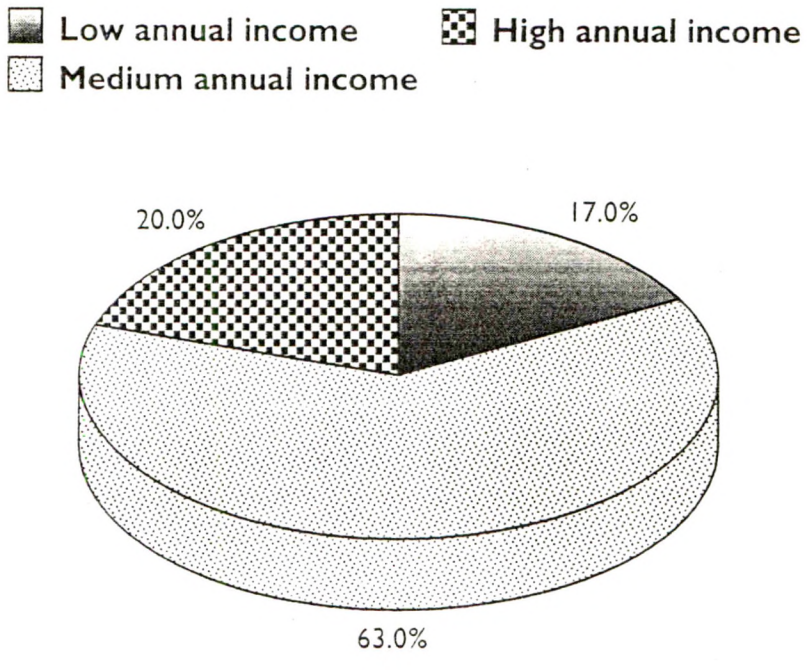


Fig. 5.Distribution of the respondents according to their annual income

Table 4 shows that majority of the respondents (64.16 per cent) were from medium land holding categories followed by 19.17 per cent and 16.67 per cent were small and big land holders, respectively.

4.1.4. Annual income

Table 5. Distribution of respondents according to their annual income

Sr. No.	Category	Frequency	Per cent
1.	Low annual income	20	17.00
2.	Medium annual income	76	63.00
3.	High annual income	24	20.00
	Total	120	100.00

Table 5 indicated that majority of the respondents (63.00 per cent) were in medium income group followed by high income 20.00 per cent and low income 17.00 per cent, respectively.

4.1.5. Social participation

Table 6. Distribution of respondents according to their social participation

Sr. No.	Category	Frequency	Per cent
1.	Low social participation	28	23.34
2.	Medium social participation	73	60.83
3.	High social participation	19	15.83
	Total	120	100.00

Table 6 revealed that quite a good chunk of the respondents (60.83 per cent) had medium social participation followed by 23.34 per cent and only 15.83 per cent of them had low and high social participation, respectively.

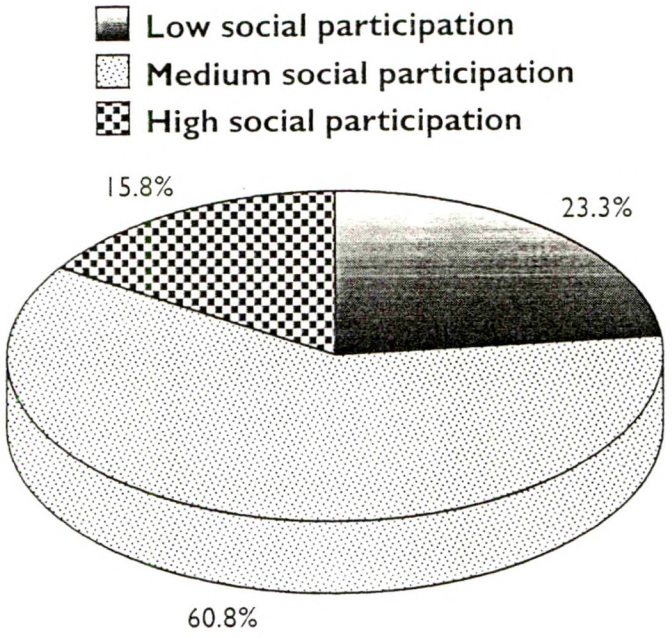


Fig. 6 .Distribution of the respondents according to their social participation

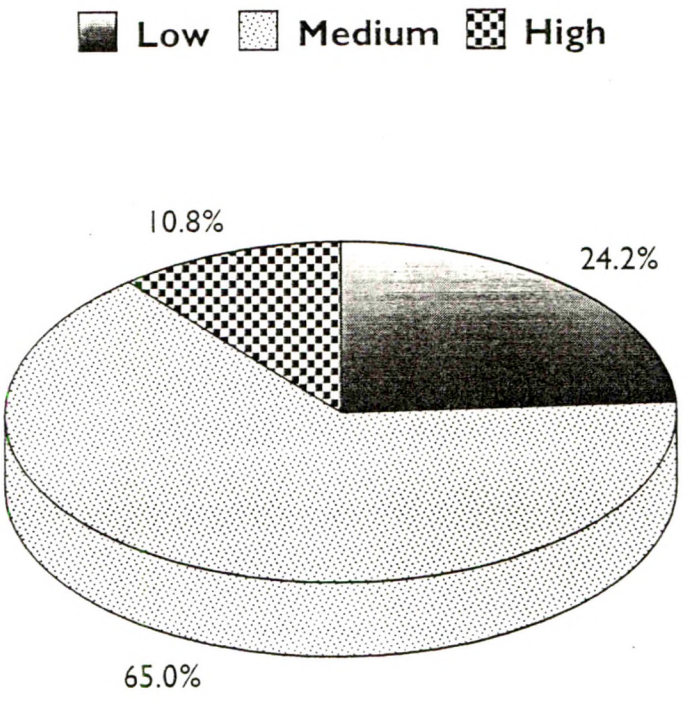


Fig. 7.Distribution of the respondents according to their sources of information

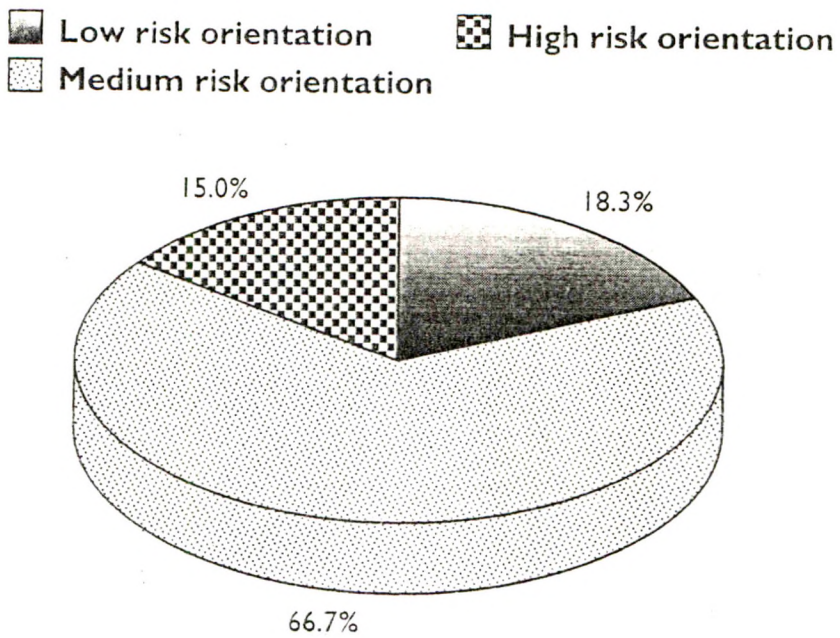


Fig.8 .Distribution of the respondents according to their risk orienation

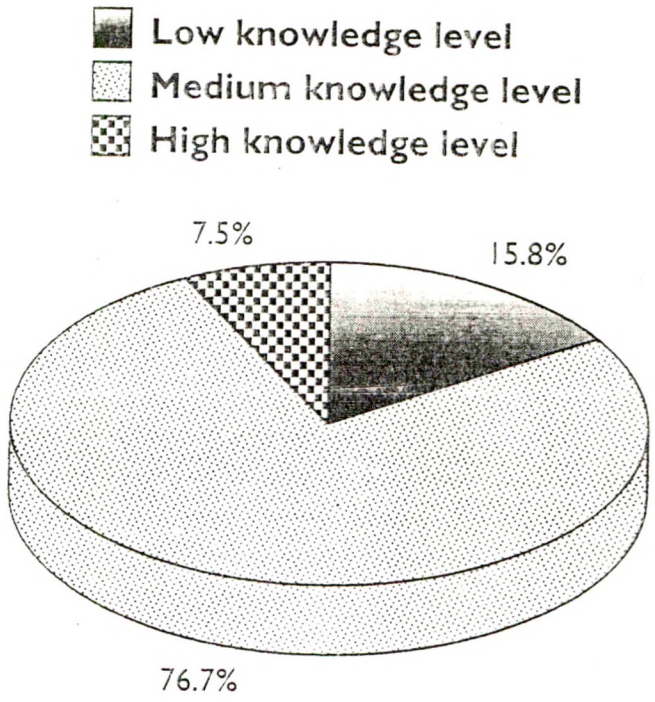


Fig. 9.Distribution of the respondents according to their knowledge level

4.1.6. Sources of information

Table 7. Distribution of respondents according to their source of information

Sr. No.	Category	Frequency	Per cent
1.	Low	29	24.16
2.	Medium	78	65.00
3.	High	13	10.84
	Total	120	100.00

Table 7 indicated that 65.00 per cent of the respondents used medium sources of information while 24.16 and 10.84 per cent of the respondents used low and high levels of sources of information, respectively.

4.1.7. Risk orientation

Table 8. Distribution of respondents according to their risk orientation

Sr. No.	Category	Frequency	Per cent
1.	Low risk orientation	22	18.34
2.	Medium risk orientation	80	66.66
3.	High risk orientation	18	15.00
	Total	120	100.00

From Table 8, it was observed that 66.66 per cent of the respondents had medium risk orientation, whereas 18.34 per cent respondents had low risk orientation, and 15.00 per cent respondents had high risk orientation.

4.2. Knowledge level of dryland farmer

Knowledge is one of the important factor that influences on adoption of recommended practices. The adoption of any practice depends upon accurate and up to date knowledge a person has about it. The

respondents possessing knowledge level were grouped in to three categories i.e. low, medium and high as per their knowledge level presented in table 9.

Table 9. Distribution of respondents according to their knowledge of dryland agricultural practices.

Sr. No.	Category	Frequency	Per cent
1.	Low knowledge level	19	15.83
2.	Medium knowledge level	92	76.66
3.	High knowledge level	09	7.50
	Total	120	100.00

Table 9 revealed that nearly three-fourth of the respondents (76.66 per cent) had medium knowledge whereas 7.50 per cent respondents had high knowledge level and 15.83 per cent respondents possessed low knowledge of dryland agricultural technology.

4.3. Extent of adoption of dry farming technology

4.3.1. Adoption of recommended practices of dry farming technology

Adoption is a decision making process and important to the dryland farmers in receiving maximum production from dryland. Looking to the importance of adoption, respondents adoption of recommended practices of dryland farming have been studied and data in this regard have been presented in Table 10.

It was observed that overwhelming majority 100.00 per cent of the respondents adopted recommended yearly ploughing and three to four harrowings as per recommendations. As regards the use of 10-15 cartloads of farmyard manures the data revealed that 66.66 per cent respondents did full adoption of FYM whereas 15 per cent and 18.34 per

cent respondents not adopted and partially adopted FYM as per recommendation respectively.

Table 10. Distribution of respondents according to their practice wise adoption of recommended dry farming practices.

Sr No	Practices	Full adoption		Partial adoption		No adoption	
		Freq ency	Per cent	Freq ency	Per cent	Freq ency	Per cent
A.	Preparatory tillage						
1.	Ploguhing	120	100.00	--	--	--	--
2.	Three to four harrowing	120	100.00	--	--	--	--
3.	Use of 15 CL of FYM	80	66.66	22	18.34	18	15.00
B.	Bunding	20	16.67	53	44.17	47	39.16
C.	Seed and sowing						
1.	Selection of varieties	76	63.34	34	28.33	10	8.33
2.	Timely sowing	99	82.50	21	17.5	--	--
3.	Dry sowing	21	17.50	29	24.17	70	58.33
4.	Sowing direction (South North)	96	80.00	24	20.00	--	--
5.	Contour sowing	09	7.5	19	15.84	92	76.66
6.	Seed treatment	92	76.67	24	20.00	4	3.33
7.	Recommended seed rate and spacing	88	73.34	32	26.66	--	--
D.	Thinning	27	22.5	43	35.84	50	41.66
E.	Intercropping	108	90.00	7	5.83	5	4.17
F.	Use of mulch	--	--	42	35.00	78	65.00
G.	Use of fertilizer	89	74.17	19	15.83	12	10.00
H.	Intercultural operation (3 hoeings and 2 weedings)	101	84.16	11	9.17	8	6.67
I.	Use of antitranspirants	00	00	00	00	120	100.00
J.	Plant protection	78	65.00	11	9.17	31	25.83

Further the data from Table 10 indicated that 16.67 per cent of the respondents adopted a bunding practice to avoid soil erosion and conserve the water and 44.17 per cent respondents of them adopted partially while 39.16 per cent not adopted bunding practice.

The data indicated that the majority of the respondents (63.34 per cent) adopted improved varieties for sowing and 28.33 per cent of them used partially. The data presented in the Table 10 revealed that majority of the respondents (82.50 per cent) adopted timely sowing fully. Data further revealed that majority of the respondents (58.33 per cent) do not adopt the dry sowing practice and 24.17 per cent respondentswere partial adopters whereas only 17.50 per cent respondents were fully adopted the dry sowing practice.

The another dry farming practice as sowing direction (South North) was fully adopted by 80 per cent respondents and only 20 per cent respondents are partially adopters. Only 7.5 per cent of the respondents fully adopted contour sowing and 15.84 per cent respondents adopted partially.

The findings indicated that majority respondents (76.67 per cent) adopted seed treatment whereas only 20.00 per cent farmers were a partial adopter.

Recommended seed rate was adopted fully by 73.34 per cent, whereas 26.66 per cent of the respondents were partially adopter. In case of thinning only 22.8 per cent of the respondents fully adopted it and 35.84 per cent respondents adopted partially, whereas 41.66 per cent respondents not adopted this practice. Most of the respondent farmers (90 per cent) adopted intercropping whereas only few respondents 5.83 per cent and 4.17 per cent were partial adopters and non-adopters, respectively.

From the above table. it was indicated that none of the respondent farmers used soil moisture conservation practice fully such as mulching. Only 35 per cent respondents were partially adopter whereas 68 per cent of respondents farmers not used mulching practice.

It was observed that use of recommended fertilizers was adopted completely by 74.17 per cent respondents, while 15.83 per cent adopted partially whereas 10 per cent were not adopted this practice either, fully or partially.

Intercultural operations like 2-3 hoeings and 1-2 weedings was adopted fully by 84.16 per cent respondents whereas 9.17 per cent of them were partial adopters.

The data further revealed that not a single respondent used antitranspirant to avoid the crop failure from drought. The data further revealed that majority (65.00 per cent) respondents used plant protection measures fully whereas 9.17 per cent respondents used partially plant protection measures to avoid the pests.

4.3.2 Levels of adoption

Overall adoption of recommended practices was worked out on the basis of expressed opinions of dryland farmers.

Table 11. Distribution of respondents according to their level of adoption of dry farming technology

Sr. No.	Category	Frequency	Per cent
1.	Low	23	19.16
2.	Medium	79	65.84
3.	High	18	15.00
	Total	120	100.00

It was revealed from Table 11 that majority of the respondents (65.64 per cent) had medium level of adoption, where as 19.16

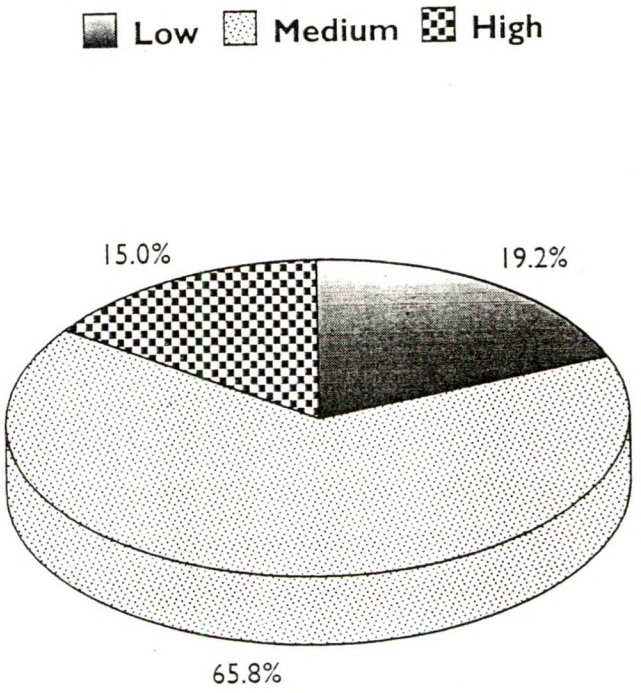


Fig. 10 .Distribution of the respondents according to their adoption level

per cent of them had low level of adoption and 15.00 per cent of them had high level of adoption.

4.4. Relationship between characteristics of dryland farmers and adoption of dry farming technology

An attempt has been made in the present study to find out the relationship between personal, socio-economic and psychological characteristics of dryland farmers with adoption of dry farming technology.

4.4.1 Coefficient of correlation

Information regarding the relationship between independent variables and adoption is given in Table 12

Table 12. Relationship of independent variable and dependent variable

N=120

Sr. No.	Personal characteristics	Coefficient of correlation 'r'
1	Age	-0.433**
2	Education	0.791**
3	Land holding	0.512**
4	Annual income	0.597**
5	Social participation	0.654**
6	Source of information	0.829**
7	Risk orientation	0.735**
8	Knowledge	0.906**

** Significant at 0.01 level of probability.

It was observed from Table 12 that education, land holding, annual income, social participation, source of information, risk orientation and knowledge were found to be positively and significantly related with adoption of recommended dry farming technology, whereas age was found to be negatively significant with the adoption of dry farming technology.

4.4.2 Multiple regression analysis

Coefficient of correlation analysis indicates coexistence between two variables but it does not focus on interaction effects. Adoption of dry farming practices was considered as a function of social, economic and psychological variables. This is not influenced solely when any of these variables taken in isolation. Based on this, the multiple regression analysis was carried out to know the important variables with their predictive ability in explaining the variation in the adoption of dry farming technology. The details of the analysis are given in Table 13.

Table 13. Multiple regression analysis for adoption.

Sr. No.	Independent variables	Regression coefficient 'b' value	Standard error	't' value
1	Age	0.154	0.056	2.720**
2	Education	0.583	0.560	1.042
3	Land holding	0.303	0.209	1.449
4	Annual income	-0.018	0.023	-0.783
5	Social participation	-0.062	0.146	-0.427
6	Source of information	0.829	0.241	3.443**
7	Risk orientation	-0.546	0.303	-1.799
8	Knowledge	4.518	0.517	8.730**

R2 = 0.850 F value = 78.37

** Significant at 0.01 level of probability

It was revealed from Table 13 that the multiple regression analysis showed 85.00 per cent variation in extent of adoption of dry farming practices caused by 8 independent variables selected for study.

From the regression analysis it was also revealed that out of 8 independent variables three variables namely age, source of information and knowledge had significant effect of extent of adoption.

4.5 Constraints faced by the dryland farmers with respect to adoption of recommended dry farming practices

One of the objectives of the study was to identify constraints in the use of recommended dry farming practices. The various constraints faced by the dryland farmers are given in Table 14.

Table 14 revealed that for non-adoption of practice of yearly deep ploughing and three to four harrowings the reason of high cost of ploughing and harrowing, large area cannot be covered within a time has been attributed by 20.00 and 22.5 per cent respondents, respectively.

As regards the constraints in adoption of application of 10-15 cartloads of FYM shortage of FYM was the major constraints quoted by significant percentage of respondents i.e. 77.50 per cent. Regarding the non-adoption of the bunding of the land, reason for non-adoption was costly practice, lack of convention and lack of labour were crucial constraints reported by 69.16, 51.66 and 47.5 per cent respondents, respectively.

For selection of variety, lack of knowledge regarding drought resistant varieties and high cost of seeds were constraints reported by 30.83 and 35.83 per cent respondents, respectively.

With regard to the method of sowing the difficulties like rainfall is not at proper time, lack of knowledge of dry sowing, unawareness of sowing direction, complexity of contour sowing, lack of knowledge about seed treatment and unawareness of recommended seed rate and spacing were quoted by 47.5, 38.33, 23.34, 40.83, 13.33 and 26.66 per cent, respectively.

Table 14. Constraints faced by the farmers in adoption of dry farming technology.

Sr. No.	Problems	Frequency	Per cent
1.	Ploughing and harrowing		
i)	High cost of ploughing and harrowing	24	20.00
ii)	Large area cannot be covered within time	27	22.50
2.	Application of FYM		
a)	Shortage of FYM	67	77.50
3.	Bunding		
a)	Costly practice	83	69.16
b)	Lack of conviction	62	51.66
c)	Lack of labours	57	47.50
4.	Selection of variety		
a)	Lack of knowledge regarding drought resistant varieties	37	30.83
b)	High cost of seeds	43	35.83
5.	Sowing		
a)	Rainfall is not at proper time	57	47.5
b)	Lack of knowledge of drysowing	46	38.33
c)	Lack of knowledge of sowing direction	28	23.34
d)	Complexity of contour sowing	49	40.83
d)	Lack of knowledge about seed treatment	16	13.33
f)	Unawareness of recommended seed rate and spacing	32	26.65
6.	Thinning		
a)	Unawareness of plant population	63	52.5

b)	Shortage of labour	53	44.16
c)	Expenditure was not remunerative	55	45.83
7.	Mulching		
a)	It is not economical and labour consuming process	89	74.16
b)	Mulching material is not available of required quantity	77	64.16
8.	Chemical fertilizers		
a)	Lack of knowledge regarding application of chemical fertilizers	24	20.00
b)	High cost of fertilizers	47	39.16
C)	Fear of heavy losses in case of failure due to lack of rains	31	25.83
9.	Interculture operations		
a)	Moisture is limiting factor no operation is undertaken	28	23.33
b)	Shortage of labour and expenditure was not remunerative	36	30.00
10.	Use of antitranspirants		
a)	Lack of knowledge of antitranspirants	98	81.66
b)	High cost of antitranspirants	87	72.50
c)	Lack of necessary guidance	69	57.50
11.	Plant protection measures		
a)	High cost of chemicals	48	40.00
b)	Lack of knowledge regarding plant protection	37	30.83
c)	High cost of plant protection equipments	24	20.00

As regards the non-adoption of thinning practice the difficulties like unawareness of plant population, shortage of labour and

expenditure was not remunerative were expressed by 52.5, 44.16 and 45.83 per cent respondents, respectively.

With reference to the mulching, the major constraints faced by the non-adopters were it is costly and labour consuming practice and required quantity of mulching material is not available was reported by 74.16 and 64.16 per cent of respondents, respectively.

For not restoring the use of chemical fertilizers, the constraints like lack of knowledge regarding application of chemical fertilizers, high cost of fertilizers and fear of heavy losses in case of failure due to lack of rains were expressed by 20.00, 39.16 and 25.83 per cent respondents, respectively.

With reference to intercultural operations, the 23.33 and 30.00 per cent respondents ascribed the constraints like moisture is limiting factor and shortage of labour and expenditure was not remunerative. For non-adoption of practice regarding the use of antitranspriants constraints like lack of knowledge about antitranspirants, high cost of antitranspirants and lack of necessary guidance has been expressed by 81.66, 72.50 and 57.50 per cent respondents, respectively. With reference to controlling the pest and disease, 40.00, 30.83 and 20.00 per cent ascribed the constraints like high cost of chemicals, lack of knowledge regarding plant protection and high cost of plant protection equipments.


DISCUSSION

Chapter-V

DISCUSSION

The results of the present study on research findings given in previous chapter are discussed in this chapter in the following order.

1. Personal socio-economic and psychological characteristics of the farmers.
2. Knowledge of dry-farming technology.
3. Adoption of dry farming technology in drought-prone area.
4. Relationship between personal, socio-economic and psychological characteristics of farmers with adoption of dry farming technology.
5. Constraints faced by the farmers in adoption of dry farming technology in drought prone area.

5.1 Personal, Socio-economic and psychological characteristics of the farmers

5.1.1 Age

Age of the respondent is an important factor in determining adoption of recommended practices. It was observed from result that majority of the respondents were from middle age group. The possible reason might be that middle aged persons are more experienced, enthusiastic, keen to adopt and avail technologies, there by acting as head of house hold and engaged in farming Similar findings were quoted by Wangikar (1989), Tawade (1991), Shety and Pimprikar (1992), Kulkarni and Sangle (1994) and Khade (1996).

5.1.2 Education

It was observed that substantial higher number of respondents were educated upto primary level education followed by high school level.

The reason for low level of education might be due to inadequate facilities available to rural people beyond secondary school and heavy percentage of drop out due to failure level similar findings were found by Khan (1990), Shetay *et al.* (1990), Jagdale and Nimbalkar (1993) and Zote (2001).

5.1.3 Land holding

It could be conclusively putforth that majority of the respondents were middle land holders followed by small land holder. Probable reason might be that land holding is being reduced continuously due to fragmentation. Similar findings were quoted by Bajaj *et al.* (1990), Bhople *et al.* (1991), Korewad (1997) and Ankulwar (2000).

5.1.4 Annual income

It was revealed that majority of the respondents had medium level of annual income followed by high level of income. The probable reason might be that in rural areas most of the people had medium land holding and agriculture as their main source of income. These findings are in line with the findings of Lokhande (1990), Tawade (1996), Khalge (1996) and Deole (1997).

5.1.5 Social participation

Majority of the respondents were having medium level of social participation followed by low and high level of social participation, respectively. The probable reason might be the respondents being the farmers are always engaged in farming and they find little time to participate in different formal and informal social organization. They participate only when subject matter is of their importance and interest. Many times the village do not have adequate formal and informal organization for participation. Findings of Tawade (1991), Shety and Pimprikar (1992), Jagdale and Nimbalkar (1993) and Gharule (1998) are in line with these findings.

4.1.6 Sources of information

Majority of the respondents (65.00 per cent) used medium sources of information for dry farming technology, while 28.00 and 10.00 per cent respondents used low and high sources of information, respectively. This could be due to moderate availability and access of source of information at village. These findings are in line with the findings of Deshmukh (1994), Deole (1997), Korewad (1997) and Kadam (2000).

4.1.7 Risk orientation

It is revolved from Table 8 that majority of the respondents were having medium risk orientation followed by low risk orientation. It means that they are moderately able to cope with uncertainty and risk. Farmers are prone to take moderate risk and face the challenges to get maximum return.

These findings were supported by Lokhande (1990), Khalge (1995), Khade (1996) and Ankulwar (2000).

5.2 Knowledge level of the dryland farmers in respect to dry farming technology

As far as the knowledge of recommended practices of dry farming, it was observed that majority of the respondents had medium level of knowledge followed by low and high level of knowledge. Thus it could be concluded that majority of the respondents had medium level of knowledge about dry farming technology. The knowledge level of the respondents was not satisfactory due to low education and low use of printed media and also low social participation and low extension contact.

These findings are in line with the findings of Bavalatti and Sunderswami (1991), Khalge (1995), Meti *et al.* (1997) and Singh *et al.* (1999).

5.3 Extent of adoption of dry farming technology by dryland farmers

It is apparent from result that majority of the respondents were having medium level of adoption of recommended dry farming technology followed by low and high level of adoption.

Regarding practice wise adoption it is observed from Table 10 that the recommended practices of dryland technology was fully adopted by the respondents as deep ploughing (100 per cent), 3 to 4 harrowing (100 per cent), use of FYM (66.66 per cent), bunding (16.67 per cent), selection of variety (63.34 per cent), timely sowing (82.15 per cent), dry sowing (17.50 per cent) sowing direction (80.00 per cent), contour sowing (7.5 per cent), seed treatment (76.06 per cent) seed rate and spacing (73.33 per cent), thinning (22.80 per cent), intercropping (90.00 per cent), use of fertilizers (74.17 per cent), intercultural operations (84.16 per cent)., plant protection (65.00 per cent). Non of the respondents adopted the practice of mulching and use of antitranspirants. Many economical, resources, technical and situational constraints are responsible for low adoption of dry farming technology.

The practices of adoption were worked out on the basis of expressed opinions. This indicated that overall adoption of recommended practices by farmers was medium to low, inspite of concious efforts made by extension agency to motivate farmers to adopt modern agricultural technology. This is nationwide phenomenon and Marathwada or Osmanabad districts are not exception to it. These findings are in line with Bhople *et al.* (1991), Prasad and Mahipal (1991), Bhoite and Girse (1991), Sawarnkar and Chauhan (1993), Kude (1993), Meti and Hanchinal (1995), and Hanumanaikar *et al.* (1997).

5.4 Relationship between characteristics of dryland farmers and adoption of dry farming technology

5.4.1 Age and adoption

The age of respondents is crucial factor in determining their adoption behaviour the results presented in early chapter revealed that age of respondents was negatively and significantly related with adoption of dry farming technology.

The negative trend indicated that as the age of respondents increased the adoption level of dry farming technology decreased. The older farmers tend to be too traditional and security conscious to take the risk of adopting dry farming practices. Young age farmers and middle aged farmers were found to be relative more aware of the problems in dry farming technology which might be resulted in increased adoption.

These findings are in conformity with that of Ingle and Wayazade (1989), Supe *et al.* (1990), Kude (1993) and Deole (1997).

5.4.2 Education and adoption

Education had established positive significant relationship with adoption dry farming technology. The positive trend indicated that as education level of respondents increased their was corresponding increase in adoption of dry farming technology education enables the farmer to use the print media for information on dry farming technology, store them for future use and retrieve them when needed. This helps the farmers to be aware about dry farming technology relatively early and use sources of information which are technically more accurate. Early awareness and technically accurate information of dry farming technology lead to rapid adoption. The second most important way in which education contributed to the adoption behaviour of farmer is by expanding the horizon of his awareness and conscious which makes him relatively more rational and innovate, in farming activities.

These findings are supported by Patil *et al.* (1989), Raghuvanshi *et al.* (1992), Khalge (1995) and Deole (1997).

5.4.3 Land holding and adoption

It was observed that land holding possessed by respondents had positive and significant relationship with adoption of dry farming technology. It is indicated that adoption behaviour of respondents increased with increase in land holding. Adoption of dry farming technology required substantial economic resources. The owners and adopters of large sized farm are generally sound in economic condition and can offered to take the risk involved in technology adoption. Small farmers often lack of resources needed, which keep them away from adoption of dry farming technology. Similar findings were also reported by Patil *et al.* (1989), Supe (1990), Kude (1993) and Khalge (1995).

5.4.4 Annual income and adoption

It was revealed that the annual income of respondents had positive and significant relationship with adoption of dry farming technology. The positive trend indicated that the adoption was increased with the increase in annual income of respondents. Annual income is indicator of strong economic condition of farmers. Farmers with higher income are more capable to invest on items and followed most recommended practices. The results were supported by Ingle and Wayazade (1989), Patil *et al.* (1989), Bhoite and Girse (1991) and Khalge (1995).

5.4.5 Social participation and adoption

The results of the study indicated that social participation of respondents had positive and significant relationship with adoption of recommended dry farming practices. It means that as social participation of the respondents increased adoption of dry farming technology also increased.

Participation in social and organization activities is expected to have on indirect effect on adoption behaviour of farmers. It links the farmer to large society and exposes to variety of new ideas. This exposure makes him positively predisposed towards innovative ideas and practices indeed positive relationship between social participation and adoption of dry farming technology. These findings are in conformity with the findings of Farooq (1990), Supe *et al.* (1990), Girse *et al.* (1991), Dube and Sawarnkar (1992) and Jagdale and Nimbalkar (1993).

5.4.6 Source of information and adoption

It was observed that sources of information used by the respondents were positively and significantly related with adoption of recommend dry land technology. It indicated that higher was the level of use of sources of information by the respondents higher was the adoption of dry farming technology. The sources of information led farmers' thorough understanding of concepts of technology and there by motivate to adopt the technology. Similar findings were also reported by Sawarnkar and Chauhan (1993), Khalge (1995), Khade (1996) and Deole (1997).

5.4.7 Risk orientation and adoption

The present study revealed that there was positive and significant relationship between risk orientation of the respondents and adoption of recommended dry farming technology. The reason might be that the farmers with more risk orientation are prone to take risk and face the challenges to get maximum returns indicated positive trend between risk orientation and adoption of dry farming technology. Similar results were stated by Kadam and Borse (1992), Kude (1993), Khade (1995) and Deole (1997).

5.4.8 Knowledge and adoption

Present study revealed that knowledge of respondents had positive and significant relationship with adoption of dry farming

technology. The positive trend indicated that as the knowledge level of the respondents increased there was corresponding increase in adoption level. Adoption of dry farming technology depend upon accurate and up to date technique knowledge. Good knowledge of various dry farming practices where the prerequisites therefore its can be concluded that knowledge of dry farming technology can be a good source of motivation and booster for adoption of recommended dry farming technology. These findings are inline with the findings of Sunderswamy and Bavalatti (1991), Khalge (1995), Khade (1996) and Gharule (1998).

5.4.9 Prediction analysis of adoption level for the respondents

It could be highlighted from Table 13 that selected 8 variables have contributed 85.00 per cent variation in the adoption of recommended practices of dry farming technology by the farmers. Variables namely age, source of information and knowledge were found to be significant in exercising the impact on the adoption of dry farming technology, which appears to be logical.

5.5 Constraints faced by dry land farmers with respect to adoption of recommended practices

It was observed from Table 14 that high cost of ploughing and harrowing and more time required for covering a large area was expressed by 20.00 and 22.5 per cent of the respondents, respectively for application of FYM the constraints mainly shortage of FYM were expressed by 55.83 per cent. Regarding the bunding, the constraints faced by the farmers were costly practice, lack of convection and lack of labourers were expressed by 69.16, 51.66 and 47.5 per cent of the respondents, respectively.

As far as the selection of variety, lack of knowledge regarding drought resistant varieties and high cost of seed were expressed by 30.83 and 35.83 per cent respondents.

Regarding the method of sowing, rainfall is not at proper time, lack of knowledge about dust sowing, unawareness of sowing direction, lack of knowledge about seed treatment, unawareness of recommended seed rate and spacing are the constraints were expressed by 47.5, 38.33, 23.34, 13.33 and 26.65 per cent respondents, respectively.

From the above table, it indicated that in thinning, the constraints faced by the farmers were unawareness of plant population, shortage of labour and expenditure was not remunerative were expressed by 52.8, 44.16 and 45.83 per cent respondents, respectively.

It appears that majority of respondents expressed different constraints as discussed above while adopting dry farming technology.

With reference to the mulching, high cost of mulching and non-availability of required quantity of mulching material were the constraints expressed by 74.16 and 64.16 per cent of the respondents, respectively.

As far as the use of fertilizers was concerned the constraints faced by the farmers were lack of knowledge, method of fertilizer application, high cost of fertilizer and fear of heavy losses in case of failure due to lack of rains were expressed by 20.00, 39.16 and 25.83 per cent of the respondents, respectively.

Regarding interculturing operations moisture is a limiting factor and shortage of labourers are the constraints were expressed by 23.33 and 30.00 per cent of the respondents.

With reference to the use of antitranspirants lack of knowledge, high cost of antitranpirants and lack of necessary guidance about antitranspirants were expressed by 81.66, 72.50 and 57.50 per cent of the respondents, respectively.

In adoption of recommended plant protection measures the constraints faced by the farmers were high cost of chemicals. lack of

knowledge regarding plant protection and high cost of plant protection equipment were expressed by 40.00, 30.83 and 20.00 per cent of the respondents, respectively.

This might be due to medium economic condition of the farmers, shifting of labour from Agriculture to other sectors and there is no special scheme from which adequate training and follow up regarding dry farming technology could be provided to the farmers.

These findings are in conformity with the findings of ICAR (1979), Bhoite and Thorat (1988), Umale and Bhople (1989), Wasnik (1988), Bhople *et al.* (1991), Mundhva and Patel (1991), Patel and Nandapurkar (1991), Prasad *et al.* (1991) and Rai *et al.* (2000).

SUMMARY AND CONCLUSION

Chapter-VI

SUMMARY AND CONCLUSION

The present study was undertaken in Osmanabad district, which is selected purposively because much part of the district is under the drought prone area. Six villages from Bhoom, Paranda and Washi talukas were selected by random selection method for the purpose of collection of relevant data and 20 farmers from each selected villages were also taken by random method. Thus a total of one hundred and twenty farmers constituted sample for the present study. The data pertaining to the objectives of the study were collected with the help of a specially structured schedule. The data thus collected were subjected to the statistical analysis by using frequency, percentage, and statistical test such as coefficient of correlation and multiple regression for assigning the relationship of the independent variables with dependent variables.

Main focus of the study was on the assessment of extent of adoption of dry farming technology and causes that lead to low use of dry farming technology.

The study was therefore, conducted with following specific objectives.

1. To study the personal, socio-economic psychological characteristics of the farmers.
2. To assess the farmers knowledge of dry-farming technology.
3. To study adoption of dry farming technology in drought-prone area.
4. To study the relationship between personal, socio-economic and psychological characteristics of the farmers with adoption of dry farming technology.

5. To study the constraints faced by the farmers in adoption of dry farming technology in drought prone area.

The salient features of the findings are summarized below

6.1 Personal, socio-economic and psychological characteristics of the respondents

6.1.1 Age

Most of the respondents were observed in middle age (41.67 per cent) followed by young age.

6.1.2 Education

Most of the farmers (28.34 per cent) were educated upto primary level followed by 21.67 per cent educated upto secondary level while 9.16 per cent were illiterate.

6.1.3 Land holding

It was observed that most of the respondents (64.16 per cent) had medium land holding followed by small and big land holding (19.17 and 16.17 per cent), respectively.

6.1.4 Annual income

Majority of the respondents (63.00 per cent) were having medium annual income followed by high and low annual income levels.

6.1.5 Social participation

It was revealed that majority of respondents (60.83 per cent) had medium social participation followed by 23.34 per cent and 15.83 per cent had low and high social participation.

6.1.6 Source of information

Maximum number of respondents (65.00 per cent) utilized medium level of sources of information followed by 24.16 per cent of them had low level of sources of information.

6.1.7 Risk orientation

It was noticed that maximum number of the respondents (66.66 per cent) had medium risk orientation followed by 18.34 per cent had low risk orientation ability.

6.2 Knowledge level of respondents about dry farming technology

It was found that majority of the respondents had medium level of knowledge (76.66 per cent) followed by 15.83 per cent had low level of knowledge.

6.3 Adoption of recommended practices of dry farming technology

It was found that majority of the respondents (65.84 per cent) had medium level of adoption followed by 15.00 per cent had high level of adoption.

6.4 Relationship between personal, socio-economic and psychological characteristics of respondents and adoption of dry farming technology

It could be conclusively put forth that the characteristics like education, land holding, annual income, social participation, source of information, risk orientation and knowledge were positively and significantly related with adoption of dry farming technology, whereas age was negatively and significantly related with adoption dry farming technology.

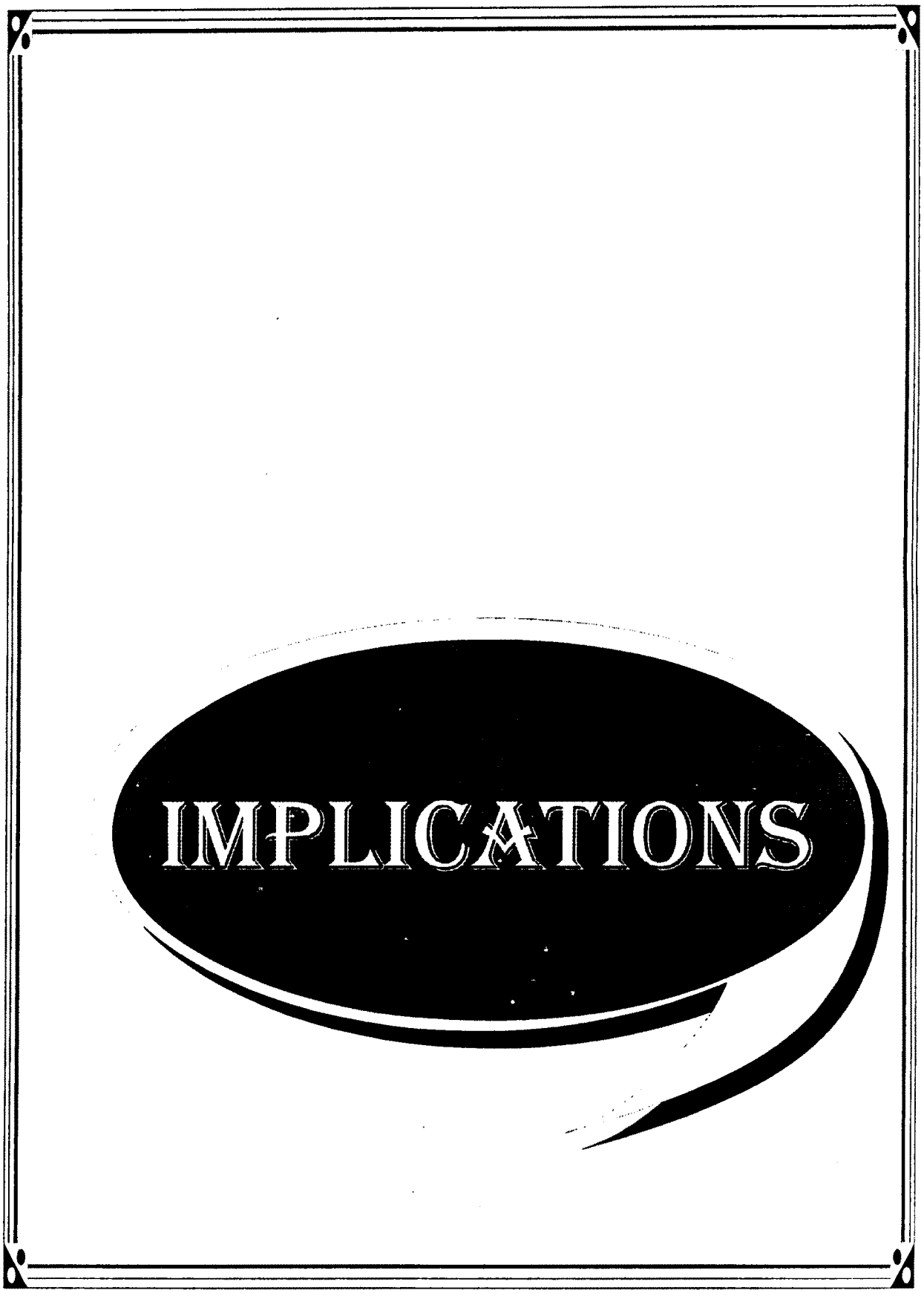
Multiple regression analysis

Results of multiple regression analysis indicated that 85.00 per cent variation in adoption of recommended dry farming technology was explained by the multiple regression analysis about 15.00 per cent of variation was unexplained which may be due to the factors beyond the scope of study. From the regression analysis, it was seen that age, source

of information and knowledge had significant contribution to the adoption of recommended dry farming practices.

6.5 Constraints faced by the respondents in adoption of recommended dry farming technology

Most of the dryland farmers expressed some of the constraints like high cost of ploughing and harrowing, shortage of FYM, bunding is costly practice and lack of laborers required, lack of knowledge regarding drought resistant varieties, high cost of seed, irregular commencement of monsoon, complexity in contour sowing, unawareness of recommended seed rate and spacing, shortage of labour for thinning, non-availability of mulching material of required quantity, high cost of fertilizers, fear of heavy losses in case of failure due to lack of rains, moisture is limiting factor and shortage of labour for intercultural operations, lack of knowledge of antitranspirants, high cost of antitranspirants, high cost of insecticides and pesticides and lack of knowledge regarding plant protection.


IMPLICATIONS

Chapter-VII

IMPLICATIONS

In present study "Adoption of dry farming technology in drought prone area" an emphasis was given on finding out the extent of adoption of dry farming technology and causes for its inadequate use. It is aptly hoped that the findings will help the administrators, extension workers, scientists and policy makers for accelerating the adoption of recommended dry farming technology. Implications of this study and suggestions to improve level of adoption are given below.

The results of the present investigation clearly indicated that personal, socio-economic and psychological characteristics of the respondents viz., education, annual income, land holding, social participation, sources of information, risk orientation and knowledge were having significant relationship with adoption of respondents. It is therefore suggested that the extension workers should consider these variables to increase the knowledge and adoption level of the dryland farmers. Further there is need to convince the farmers and motivate them to adopt the recommended dry farming technology for reaping more benefit to get additional income. The extension workers should establish frequent contacts and expose the farmers with different sources of information which will help them to get more knowledge and are motivated to adopt the recommended practices fully for better yields which in turn help them to get more profit.

It was revealed from the present study that knowledge of the respondents regarding dry farming technology was medium. Hence, it becomes imperative to increase the knowledge of the farmers to increase the adoption for this purpose, it is suggested to use different teaching

methods so that the respondents can get the adequate knowledge so that they can increase their adoption level.

Adoption of dry farming technology like Ploughing, harrowing, sowing etc. was found to be 1:00 % . But special attention needs to be given to improve the adoption of dry farming practices like dry sowing, contour sowing, mulching, antitranspirints plant protection measures etc. The above mentioned efforts to increase knowledge of respondents of dry farming technology will help in use of dry farming practices. But in addition to these, special programmes need to be launched such as group discussion, farm visits, meetings and demonstrations particularly the result demonstrations in the same locality will help to convince the farmers of the utility of dry farming technology. Also the farmers need to be initiated to participate in social organisations and fostering in them such qualities as scientific orientation may help in increase in the adoption of dry farming technology.

The constraints in the use of dry farming technology need to be removed through joint efforts of those who are involved in development of agriculture. The constraints faced by the respondents while adopting recommended dry farming technology includes lack of knowledge of dry farming technology non-availability of quality FYM, lack of knowledge about drought resistant varieties, high cost of seeds and fertilizers and non-availability of finance to purchase the fertilizers. In order to overcome these difficulties it is suggested that short duration training be organized in the villages to teach farmers about scientific compost making techniques as well as method of application of fertilizers to the crop. Few methods and result demonstrations may also be arranged in the villages on large aspects which will educate the farmers to learn them and motivate them to adopt on their farms.

Findings of these factors serve as a guideline to the extension workers and administrators to take suitable action to overcome these difficulties.

Further the government may think to review the subsidies on fertilizers, insecticides, plant protection appliances and also provides interest free loan for dry land farmers.

The above efforts will lead to increased adoption of dry farming technology and stabilizing the population in dry farming in drought prone area.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APPENDIX

विस्तार शिक्षण विभाग
मराठवाडा कृषि विद्यापीठ, परभणी

संशोधनाचा विषय : कोरडवाहू शेती तंत्रज्ञानाच्या अवलंबनाचा अभ्यास

प्रश्नावली

संशोधकाचे नांव : कडावकर एस.जे. प्रश्नावली क्र.--------
मार्गदर्शकाचे नांव : डॉ. के. आर. नादरे भरण्याचा दिनांक :

1. शेतक-याचे नांव :
2. गांव : ता. : जि. : उस्मानाबाद
3. वय : वर्ष
4. शिक्षण
   - अ. अशिक्षित
   - ब. फक्त लिहता वाचता येते
   - क. प्राथमिक
   - ड. माध्यमिक
   - इ. उच्च माध्यमिक
   - ई. महाविद्यालयीन
5. जमिन धारण :
   - अ. कोरडवाहु : हेक्टर
   - ब. पडित : हेक्टर
   - एकूण : हेक्टर
6. वार्षिक उत्पन्न
   - अ. शेती :
   - ब. दुग्ध व्यवसाय :

क. कुकूटपालन :

ड. शेळी पालन :

इ. नोकरी :

एकूण :

7. **सामाजिक सहभाग :**

आपण सामाजिक संस्थेत भाग घेता काय ? होय /नाही

होय असल्यास, खालीलपैकी कोणकोणत्या संस्थेशी आपला संबंध आहे.

अ.क्र.	**संस्था**	**सभासद**	**पदाधिकारी**
1.	ग्रामपंचायत		
2.	सहकारी सोसायटी		
3.	युवक मंडळ		
4.	पंचायत समिती		
5.	जिल्हा परिषद		
6.	नभोवानी मंडळ		
7.	शेतकरी संघ		
8.	भजनी मंडळ		
9.	महिला मंडळ		
10..	इतर (नमुद करा)		

8. **शेतीच्या सुधारीत पध्दती विषयी आपण कोणाकडून माहीती मिळवता.**

अ. क्र.	साधने	नेहमी	कधी कधी	कधीच नाही
1.	शेतकरी प्रशिक्षण वर्गात भाग			
2.	कृषि प्रदर्शनास भेट			
3.	स्वत:च्या शेतावर पिक प्रात्यक्षिक			
4.	इतर ठिकाणी पिक प्रात्यक्षिक पाहणे			
5.	वर्तमान पत्रातील लेख वाचणे			
6.	शेतीविषयक मासिके वाचणे			
7.	रेडीओ वरील कार्यक्रम ऐकणे			
8.	दुरदर्शन वरील कार्यक्रम पहाणे			
9.	शेतकरी मेळाव्यात भाग घेणे			
10.	कृषि विद्यापीठास / विद्यापीठाच्या केंद्रास भेट देणे			
11.	प्रगत शेतक-याच्या शेतास भेट			
12.	खते व औषधी दुकानदाराकडून माहिती घेणे			
13.	नावतेवाईकाकडून माहिती घेणे			
14.	मित्राकडून माहिती घेणे			
15.	शेजा-याकडून माहिती घेणे			

9. जोखीम पत्करण्याची क्षमता :

जोखीम विषयक खाली काही विधाने दिली आहेत त्या बद्दल कृपया आपले मत सांगा.

अ. क्र.	विधाने	अगदी सहमत	सहमत	सांगता येत नाही	असहमत	अगदी असहमत
1.	शेतक-यानी जास्त पिके पेरावी व एक किंवा दोन पिकाच्या पेरणीमुळे होणा-या नुकसानीचा धोका टाळावा.					
2.	शेतक-याने साधारणपणे चांगली संधी साधुन जास्त नफा मिळवावा पण धोका नसलेल्या कमी उत्पन्नातून समाधान मानू नये.					
3.	जो शेतकरी साधारण शेतक-यापेक्षा जास्त धोका पत्करण्यास तयार असतो तो आर्थिक बाबीत यशस्वी होतो.					
4.	जेंव्हा यशस्वी होण्याची शक्यता जास्त असते तेंव्हा धोका पत्करावा.					
5.	इतर बहुतांशी शेतक-यांनी यशस्वीपणे नविन पध्दतीचा वापर केल्यावर शेतक-याने तीचा अवलंब करणे चांगले.					
6.	शेतीत अगदी नविन पध्दतीचा अवलंब करण्यात जोखीम असते परंतु अशी जोखीम साध्य मोलाची असते					

10. ज्ञान चाचणी

1. कोरडवाहू शेतामध्ये नांगरणी किती खोल करावी ?

   6 इंच / 9 इंच

2. कोरडवाहू शेतीमध्ये किती वखरणी कराव्यात ?

   1 / 2 ते 3

3. जमिनीची बांधबंदिस्ती केल्याने पावसाचे पाणी जमिनीत मुरवण्यास मदत होते काय ?

होय / नाही

4. जमिनीचा पृष्ठभाग सपाट नसल्यास पेरणी कशी करावी ?

उताराच्या दिशेने / उताराच्या विरुध्द बाजुने

5. धुळपेरणी म्हणजे काय ते सांगा ?

पाऊस येण्यापुर्वी पेरणी करणे / पाऊस आल्याबरोबर पेरणी करणे.

6. कोरडवाहू शेतीमध्ये खरीप पिकाची पेरणी केंव्हा करावी ?

पाऊस सुरु झाल्यानंतर 8 दिवसांच्या आंत / 8 ते 15 दिवसात.

7. कोरडवाहू शेतीमध्ये पाण्याचा तान सहन करण्यासाठी कोणत्या वाणाची निवड करावी?

स्थानिक वाण / सुधारीत व संकरीत वाण

8. पिकाची विरळणी म्हणजे काय ?

जास्तीच्या रोपांची संख्या कमी करणे / पिकातील रिकाम्या जागी बिया लावणे

9. कोरडवाहु शेतीमध्ये अंतरमशागतीची कामे जमिनीत वापसा असतांना करत गेल्यास जमिनीवरील पृष्ठभाग भुसभुशीत राहून जमिनीतील ओलावा जास्त वेळा टिकून राहण्यास मदत होते काय ? होय / नाही

10. अंतरपिकाम्हणून कडधान्य पिकाचा समावेश केल्याने जमिनीतील नत्राचे प्रमाण वाढते / कमी होते ?

11. कोरडवाहू शेतीमध्ये आंतरपिक घेतल्याने मुख्य पिकाच्या नुकसानीचा होणारा संभाव्य धोका कमी होतो काय ? होय / नाही

12. रासायनिक खताची एकूण मात्रा ही ओलीताच्या मात्रा ऐवढी आहे काय ?

होय / नाही

13. कोरडवाहू शेतीमध्ये खते देण्यांची पध्दत कोणती वापरता ?

फेकूण / पेरुन

14. अच्छादणांचा वापर कशासाठी करतात

जमिनीचा ओलावा टिकवण्यासाठी / ओल कमी करण्यासाठी

15. कोरडवाहू शेतीमध्ये दरवर्षी एकाच जमिनीत सलग एकच पिक घेणे योग्य आहे काय

होय / नाही

11. पुरस्कृत नविन कोरडवाहू शेती पध्दतीचे अवलंबन:

आपण पुरस्कृत नविन कोरडवाहू शेती पध्दतीचे अवलंबन कसे व किती करता ते सांगा, करन नसाल तर अवलंबनात येणा-या अडचणी सांगा.

अ. क्र.	शिफारस पध्दती	अवलंबन			अवलंबनात येणा-या अडचणी
		पुर्ण	अंशत:	नाही	
	पूर्वमशागत :				
अ.	आपण दर वर्षी नांगरणी व वखरणी केली काय? होय/नाही (करणे आवश्यक)				
ब.	दरवर्षी नांगरट केली नसेल तर किती वर्षांनी केली वर्ष				
क.	कुळवाच्या किती पाळया दिल्या? (3 ते 4 आवश्यक)				
2.	**शेणखत**				
अ.	आपण आपल्या शेतात शेणखत /खत वापरले काय ? होय / नाही				
3.	जमिनीची बांधबंदास्ती				
अ.	आपल्या जमिनीत बांध बंदिस्ती केली आहे काय ? होय/नाही केली असेत तर एकूण किती हेक्टरात बांदबंदिस्ती केली आहे ? हेक्टर				
4.	वाणांची निवड :				

अ.	आपण पेरणीसाठी पाण्याचा ताण सहन करणा-या वाणांचा वापर केला काय ? होय / नाही				
ब.	केला असल्यास कोणत्या पिकासाठी व कोणत्या जाती वापरल्या अ.क्र. जात वाण 1. 2. 3.				
5.	**पेरणी**				
अ.	आपण खरीप पिकाची पेरणी योग्य वेळेवर केली काय ? होय/नाही (7 जून ते 15 जूलै)				
ब.	आपण धुळ पेरणी केली काय ? होय / नाही				
क.	केली असल्यास किती क्षेत्रावर हेक्टर				
ड.	आपण पिकाची पेरणी साधारणः दक्षिणोत्तर केली की पुर्व पश्चिम दक्षिणोत्तर /पुर्वपश्चिम				
इ.	आपण कंटूर पध्दतीने पिकाची पेरणी केली काय ? होय/नाही				
ई.	विविध पिकाचे बिजप्रक्रिया केलेले बियाणे वापरले काय ? होय/नही				
उ.	प्रति हेक्टरी बियाणे व पेरणीचे अंतर शिफारशी प्रमाणे ठेवले काय ? होय/नाही				

6.	विरळणी				
अ.	आपण पिकाची विरळणी करुन हेक्टरी ताटांची संख्या योग्य ठेवली काय ? होय/नाही				
7.	**आंतरपिक :**				
अ.	आपण आतंरपिक घेतले काय ? होय/नाही				
ब.	घेतले असाल तर मुख्य पिक व आंतरपिक सांगा अ.क्र. मुख्य पिक आंतरपिक 1. 2. 3.				
8.	ओल टिकवण्यासाठी अच्छादणाचा वापर				
अ.	ओलावा टिकवण्यासाठी आपण अच्छादणाचा वापर केला काय ? होय / नाही				
ब.	केला असेल तर किती क्षेत्रावर केला हेक्टर				
9.	रासायनिक खताचा वापर				
अ.	आपण रासायनिक खताचा वापर केला काय ? होय/नाही				
ब.	केला असेल तर खालील पिकांना किती प्रमाणात खत दिले अ.क्र. पिक खताची हेक्टरी				

	मात्रा प्रमाण 1. 2. 3.				
10.	**आंतरमशागत :**				
अ.	आपण आंतरमशागत केली काय ? होय /नाही				
ब.	केली असेल तर आंतरमशगतीसाठी किती निंदनी व कोळपणी केल्या ? (2 निंदणी 3 कोळपण्या आवश्यक)				
11.	बाष्परोधकाचा वापर				
अ.	बाष्परोधकांचा वापर केला काय ? होय / नाही				
ब.	केला असेल तर आपण कोणते वापरले व किती प्रक्षेपत्रावर वापरले ?				
12.	**पिक संरक्षण :**				
अ.	आपण पिक संरक्षणासाठी किटकनाशकाचा वापर केला काय ? होय / नाही				
ब.	केला असेल तर पिक व वापरलेले किटकनाशक नमुद करा. अ. क्र. पिक किटक किटक नाशक 1. 2. 3.				