

P1340 - TH 1048

**A COMPARATIVE STUDY OF MANAGEMENT
SYSTEM OF IRRIGATION IN PILOT PROJECT
AND NON-PILOT PROJECT OF JAYAKWADI
COMMAND AREA**

**BY
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B. Sc (Agri)



A Dissertation

*Submitted To The Marathwada Agricultural University
In Partial Fulfilment of the Requirement
for the Degree of*

**MASTER OF SCIENCE
(Agriculture)**

**IN
AGRICULTURAL EXTENSION**

T 1048


**DEPARTMENT OF AGRICULTURAL EXTENSION
MARATHWADA AGRICULTURAL UNIVERSITY
PARBHANI
1985**

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I, hereby declare that the entire work
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PAREHANI

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Shri Nilkanth Bondraji Ingle has satisfactorily prosecuted his course of research for a period of not less than four semesters and that the dissertation entitled "A COMPARATIVE STUDY OF MANAGEMENT SYSTEM OF IRRIGATION IN PILOT PROJECT AND NON-PILOT PROJECT OF JAYAKWADI COMMAND AREA" submitted by him is the result of original research work and is of sufficiently high standard to warrant its presentation to the examination. I also certify that the dissertation or part thereof has not been previously submitted by him for a degree of any university.

Place : PAREHANI

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CERTIFICATE II

This is to certify that the dissertation entitled,
"A COMPARATIVE STUDY OF MANAGEMENT SYSTEM OF IRRIGATION
IN PILOT PROJECT AND NON-PILOT PROJECT OF JAYAKWADI
COMMAND AREA" submitted by Shri Nilkanth Bondraji Ingle
to the Marathwada Agricultural University in partial
fulfilment of the requirements for the degree of
Master of Science (Agriculture) in the subject of
Agricultural Extension has been approved by the
student's advisory committee after oral examination in
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ACKNOWLEDGEMENT

It is a matter of proud privilege to express my deepest sense of reverence gratitude and indebtedness to Dr G.G. Nandapurkar, M.Sc. (Agri.), Ph.D., Head, Department of Extension Education, College of Agriculture, Marathwada Agricultural University, Parbhani, for his keen and continued interest, able guidance, constructive criticism and constant encouragement right from the selection of this research problem till the final shaping of the dissertation.

I wish to express my gratitude to Prof. C.D. Deole, Department of Economics, M.A.U., Parbhani, Dr. R.R. Kulkarni, Assistant Professor, Department of Extension Education, and Prof. N.W. Dongaonkar, Department of Extension Education, M.A.U., Parbhani, my advisory committee members, for their valuable guidance with keen interest in enlightening my views in the field of my research work during the entire period of investigation.

I would like to place on my record, sincere thanks to Dr C.P. Ghonsikar, Associate Dean and Principal, College of Agriculture, Parbhani for providing necessary facilities.

I am highly indebted to Shri Sureshkumar, I.A.S., Director of Agriculture, M.S. Pune, for granting deputation to the post graduate study.

I express my thanks to Shri S.S. Patil, Superintending Agricultural Officer, Aurangabad, Shri S.U. Deshmukh, Sub-Divisional Agricultural Officer (T & V) Vaijapur, Shri S.N. Pandhare, Sub-Divisional Agricultural Officer (T & V) Aurangabad, and Shri V.Y. Hastak, Subject Matter Specialist (T & V), Aurangabad for their kind cooperation.

I am indeed grateful to my intimate friends Shri S.P. Barbade, Shri V.S. Kale, and Shri A.D. Deshpande for their valuable help during the course of investigation and constant source of inspiration during my stay at Parbhani.

I am also thankful to all the staff members of Extension Department for their kind cooperation during the course of investigation.

I acknowledge the cooperation and help of farmers and field staff of my research area during the course of investigation.

On this occasion, I cannot forget my mother, who although had dreamt of my post graduation, yet could not see her dream fulfilled during her life time. It is with my heavy heart, that I offer my bunch of reverence to the departed soul. My father, Shri Bondraji Ingle is the main source of the inspiration

throughout my life. I offer my grateful respect to him.

My wife, Sau. Vimal, kids Ku. Sunanda, Ku. Anita, Chi. Mahendra, and Chi. Narendra, have been my source of moral strength. I shall be failing in my duty, if I do not record hearty thanks of my family members, for they have patiently waited, sacrificing their own happiness and cheerfully shared the difficulties during the period of two years.

Date: 29th June, 1985


(N.B. Ingle)

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CHAPTER I

INTRODUCTION

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INTRODUCTION

Irrigation is considered as an important input for increasing agricultural production. Availability and use of irrigation in farming not only increases the production but it also results in overall socio-economic development of the farmer. Irrigation is natural but scarce input available to the farmers. Therefore, it is necessary to use it judiciously and efficiently. In order to increase the maximum use of irrigation an efficient on-farm water management is necessary. However, it is a worldwide problem in developed and developing countries. A major concern should be getting the water to the farmer in the right amount at the right place and at the right time. If this happens the farmer, usually does a fairly good job with the water he receives. If the water deliveries are int timely or not in the right amount, irrigation efficiencies suffer. Too much water almost always results in low water use efficiencies. Too little water at the wrong time also results in inadequate usable water and low efficiency. The farmer generally gets blamed for poor water management, but the effective delivery of the water supply is usually beyond his control. A frequent cause of the failure can generally be traced to the delivery system, its management, and

the methods employed. Reliable and equitable delivery of water to farmers is a pre-requisite to good on-farm water management and high irrigation efficiencies".¹

According to the planning commission the total irrigation potential that exists in India is 65.70 million hectares, of which the area under major and medium irrigation projects amounts to 30.05 million hectares, while the area under minor irrigation schemes is some what larger, amounting to 35.65 million hectares. However, the differences in actual uses between the two irrigation systems is even more increasing. The area under major and medium irrigation system is only 25.43 million hectares, while the entire area under minor irrigation system (35.65 m.h) is being actually cultivated.²

Maharashtra is the third largest state in the country with geographical area of 30.8 m.ha; out of which 19.4 m.ha. is under cultivation. At present irrigation facilities are provided to the cultivable area of about 12.5 per cent. Maharashtra has about 34 per cent of its total area under black soil.

1 Bishop et al. (1983) "Irrigation water Delivery for equity between users". Jr. of Irrigation and Drainage Engineering, 109 (4) Dec. 1983.

2 Deccan Herald, Bangalore, 28th December, 1983.

The black soils are well known for high productive potential, but are difficult to manage due to their peculiar properties.

Secondly, the irrigation in the state differs from the irrigation practices in the state of Andhra Pradesh and Tamilnadu. In Maharashtra irrigation is optional where as irrigation in the state of Andhra Pradesh and Tamilnadu is compulsory for one crop viz. paddy. Due to the optional system, irrigation management in this state has become complicated, where long term sanctions and perennial crops like sugarcane, fruit crops etc. are granted alongwith seasonal sanctions on the same canal system.¹

A large irrigation potential is created in Maharashtra state as a result of massive investment in the irrigation projects since independence. However, there is substantial gap between the irrigation potential and its utilization. Bridging the gap between creation of irrigation potential and its utilization requires an integrated, interdisciplinary area development approach. It was with this view that since 1974, Command Area Development Authorities were formed all

1 Gandhi (1981) "History and practice of management of irrigation water in Maharashtra". Water and Land Management Institute, Maharashtra (India) Publication No.1, 11 p.

over India. The Govt. of Maharashtra in consultation with the Govt. of India have setup five Command Area Development Authorities for management of major irrigation projects in the state.

The Jayakwadi Command Area Development Authority is one of the five and was setup in May 1974. Jayakwadi Project, a major irrigation project in Maharashtra, comprises of composite Dam across Godavari river near Paithan town in Aurangabad District and canals on both flanks irrigating a total area of 1,83,000 hectares. The left bank canal, 208 kms in length contemplates to irrigate an area of 1,41,600 hectares, while the right bank canal 132 kms in length contemplates to irrigate an area of 47,700 hectares.

The total irrigation potential for Jayakwadi project created at the start of rabi 1981-82 was 69,429 hectares. However, the utilization of the potential during 1979-80, 80-81, 81-82, 82-83, 83-84, and 84-85 was only 30.84 per cent, 40.47 per cent, 58.64 per cent, 61.75 per cent, 44.05 per cent and 25.65 per cent respectively which is lagged far behind.

The findings of some of the studies indicate the management system of irrigation is one of the major reasons of underutilization of irrigation water.

Mukherjee and Harjindersingh (1966) reported one of the factors of non-utilization is defective water transmission system. Patil (1977) reported that the main factor for underutilization of created potential is the present distribution system which is not "Consumer Oriented". Mathur (1980) found the causes of underutilization as : Poor planning of projects and seepage through the distribution channels.

Narayan and Venkat Reddy (1981) reported the gap between irrigation potential created and the actual utilization is quite high in the Command areas. It is essentially due to the slow progress in land development, non-availability of timely credit, insecure and untimely water supply, non-availability of machinery. Land development is essential for scientific water management on the farm.

Since the utilization of Jayakwadi Project was not picking up as per expectations a detailed study to identify the reasons of underutilization and remedial measures to rectify the situation was taken up in the pilot projects on a limited area of 4,000 hectares on selected seven distributories. In these pilot areas, very careful attention was given to all the on-farm development activities. The land development work done in these areas was fully in accordance with the laid

down standards, all the chaks were carefully designed, and all the efficient water use techniques like 'Varabandi' were put into practice. It was seen that, having improved the system and having thus ensured adequate and timely supply of water, there was a marked improvement in cultivators' involvement and ultimately in the utilization of water. It was observed that utilization increased from 26 per cent in 1970-80 to 63 per cent in 1981-82. Irrigation utilization on distributory PLBC-4 which is under pilot project increased from 34 per cent in 1977-78 to 100 per cent in 1981-82.

In view of this, to know the management aspects and on farm development activities carried out in the pilot project and non-pilot project areas, a comparative study on management system of irrigation is taken up with the following specific objectives.

1.1 Objectives:

- 1) To study the personal characteristics of farmers in pilot and non-pilot project area.
- 2) To study the on-farm development in pilot project.
- 3) To determine the extent of utilization of irrigation water in pilot project and non-pilot project area.

- 4) To study the irrigation management aspects in pilot project and non-pilot project area.
- 5) To study the association between personal characteristics and extent of utilization of irrigation water.

Keeping in view the objectives mentioned above, the following hypotheses were derived.

1.2 Hypotheses:

- 1) Better management system of irrigation, the extent of utilization will be more.
- 2) Better the on-farm development, more will be the utilization.
- 3) More infrastructure facilities, higher will be the utilization of irrigation water.
- 4) There will be variation in the extent of utilization of irrigation water by big, medium and small farmers.

1.3 Limitations of the study:

The present investigation has obvious limitations of time, study area, sample and other research facilities, usually faced by a single student investigator. However, considerable care and thought has been exercised in making the variables as objective as possible. Since the

investigation was conducted in a limited geographical area of one village under a particular environmental condition, the findings emanating from the study would be applicable in areas which offer similar agroclimatic and socioeconomic conditions, while the general conclusions arrived at, may be of value in other spheres subject to local adjustments.

1.4 Organization of the thesis:

This dissertation has been divided into seven chapters. The first chapter deals with a brief introduction and objectives of the study. The second chapter is devoted to review of literature related to the research problem. The third chapter is concerned with the methodology. The fourth chapter deals with results. Discussion is dealt in fifth chapter. Sixth chapter is devoted for summary. Implications and recommendations appear in the seventh chapter.

CHAPTER II

REVIEW OF LITERATURE

CHAPTER II

REVIEW OF LITERATURE

This chapter presents the review of literature related to the study. This has been done under the following sub heads:

1. Factors associated with utilization of irrigation water
2. Problems of utilization of canal irrigation
 - a) on-farm development
 - b) management aspects
3. Extent of utilization of irrigation water

2.1 Factors associated with utilization of irrigation water

2.1.1 Age

The influence of age upon adoption of recommended farm practices was inconclusive. Some studies, pertaining to this aspect clearly indicate that age is negatively correlated with the acceptance, while in other studies positive correlation was found, and some studies indicate that there is no relation between the age of the farmer, and the acceptance of recommended farm practices (here utilization of irrigation water is considered as a recommended practice).

Rahudkar et al. (1959) reported that nearly two third farmers, who adopted the improved farm practices were of middle age.

Bose (1960), Rahudkar (1962), Ratanchand and Gupta (1966), and Matilalkar (1967) indicated that age was negatively correlated with adoption.

Mukherjee (1970), Roger and Shoemaker (1971), Choubey (1972), Singh, Bhati, and Jain (1972), Chattopadhyay (1976), Jetley (1977) and Balasubramanian (1980) did not report significant relationship between age and adoption behaviour of farmers.

Sangle et al. (1972) found positive association between the farmer's age and utilization of irrigation.

Bangale (1974) found that middle aged farmers utilize more canal water. Extent of utilization decreases as age increases. Younger farmers have shown more inclination towards the utilization of canal irrigation water.

Solunke (1975) indicated that there was no relationship between age and the extent of utilization of canal water.

Wattamwar (1976-77) found that the age was not related with the extent of utilization of canal water.

Chate (1983) found the positive relationship of age with the extent of irrigation utilization.

2.1.2 Education

Findings of the studies already completed as regards the influence of the educational level of the farmer on the acceptance of recommended farm practices have a definite conclusive value. The findings are indicative of the association between the adoption behaviour of the farmer and the educational achievement of the farmer. More the education the farmer has, more likely he is to adopt new practices.

Coughenour (1950 and 1955) reported that the years of schooling completed by the farmers was relatively unimportant as the factor which differentiates favourable and unfavourable conditions for the association between practice and adoption scores.

Rahudkar (1959) and Roy (1959) found that more the education the farmer has, more likely he is to adopt new practices.

Mukherjee and Singh (1966) stated that the extent of utilization of tubewell irrigation was affected by the educational standard of the respondents.

Sangle (1972) reported that education was positively related with utilization of irrigation.

Solunke (1975) indicated that irrigation utilization increased with increase in the level of education.

Singh (1975) revealed that education of farmers was found to be significantly related to adoption behaviour of farmers with respect to high yielding varieties of wheat.

Wattamwar (1976-77) found that the education was positively related with the extent of utilization of canal water.

Jetley (1977) reported positive correlation between education of respondent and adoption.

Chate (1983) found the relationship of education with the extent of irrigation utilization positively.

2.1.3 Family income

Bhutia (1974) stated that the farm income influenced the adoption behaviour of farmers.

Wattamwar (1976-77) found that annual income was positively related with the extent of utilization of canal water.

Jetley (1977) revealed a positive and significant association between non-farm income and innovativeness in highly developed villages.

Singh (1979) and Balasubramanian (1980) reported positive and significant association between extent of adoption and family income.

Chate (1983) found positive relationship of income with the extent of irrigation utilization.

2.1.4 Land holding

Purna Project Problem Ascertainning Committee (1970) stated negative relationship between land holding and extent of utilization of canal irrigation.

Mahajan (1971-72) reported that utilization was more in case of farmers having smaller size holding. The maximum utilization was observed in case of farmers possessing 5 to 10 acres of land. He reported that utilization decreases with increase in size of holding.

However, non-significant relations between farm size and adoption was reported by Singh, Bhati and Jain (1972), Singh (1974) and Buyukcolak (1978).

Sangle et al. (1972-73) observed that utilization of canal irrigation decreased with the increase in size of holding.

Bangale (1974) observed that as the size of holding increased, the extent of utilization decreased.

Solunke (1975) stated that there was no relationship between land holding and extent of utilization.

Chattopadhyay (1976) and Jetley (1977) revealed that size of holding was significantly related to extent of adoption.

Wattamwar (1976-77) found that the size of land was found to be negatively correlated at 0.01 level of significance.

Shadi Jeleh (1978) found a positive and significant relationship between farm size and adoption while viewing the adoption from structural dimension.

Chate (1983) found positive relationship of land holding with the extent of irrigation utilization.

2.1.5 Social participation

The participating farmers have been found to be having favourable attitude towards the recommended farm practices.

Positive association between extent of farmers' social participation and their level of adoption of improved farm practices was reported by Lionberger and Coughonour (1957).

6 Narayan (1968) observed that farmers having membership in social organizations were better adopters than non-adopters.

7 Singh, Bhati and Jain (1972) and Singh (1979) however, expressed that the social participation did not have any impact on the adoption behaviour of farmers.

Ernest (1973) reported that there was a positive association between farmers' social participation and the level of adoption of innovation.

8 Solunke (1975) reported that there was high and positive correlation between the participation in social organization and the extent of utilization of canal water.

9 Supe and Sarode (1975) stated that there was no significant relation between the participation and adoption.

10 Wattamwar (1976-77) found that the social participation was found to be not related with the extent of utilization of canal water.

Mishra (1978) and Balasubramanian (1980) reported positive and significant association between adoption and social participation.

Chate (1983) found the positive relationship of social participation with extent of irrigation utilization.

2.1.6 Extension contact

Moulik (1965) and Dahiwal and Sohal (1965) indicated that contact with institutional agencies had positive association with adoption.

Singh (1971) found that extension contacts of the farmers were highly correlated to agricultural progressiveness. Big farmers had higher extension contact than the small farmers.

Solunke (1975) observed that there was highly positive correlation between extension contacts and the extent of utilization.

Somasundaram (1976) found that contact with extension agency was significantly correlated with the extent of adoption.

Bharswadkar (1976-77) found that the farmers who were having maximum contacts with external information agencies were found to be utilizing maximum canal water.

De (1977) reported positive and significant correlation between contact with extension agency and change in agricultural practices.

Mahajan (1980) reported positive and significant correlation between extension contacts and adoption of agricultural technology.

Chate (1983) found positive relationship of extension contact with the extent of irrigation utilization.

2.1.7 Knowledge of technology

Hoffer and Strangland (1958) found that level of knowledge of farmers regarding the improved practices was a significant factor affecting the adoption of improved practices.

Rogers (1961) found positive association between the farmers knowledge of innovation and the extent of adoption of the same.

A positive significant correlation between knowledge of the farmers about agricultural innovation and their adoption was reported by Jaiswal (1965), Shankariah (1965), Mujumdar and Mujumdar (1967), Rao (1968), Singh (1968), Nair (1969), Singh (1969) and Mishra (1978).

2.1.8 Socio-economic status

Junaghare (1962) studied a sample of 129 farmers from Agricultural College Extension Block, Nagpur.

He found that neither age of the farmer nor his social status was significantly related to adoption of farm practices.

Socio-economic status of the farmers was found to be significantly associated with the adoption. Reddy (1962), Bose (1965), Shankariah (1965), Kolte (1967) and Rao (1968).

2.2 Problems of utilization of canal irrigation

2.2.1 On-farm development

The Programme Evaluation Organization (1961) reported that water was needed but cannot be utilised fully because uneven land or land located upside the irrigable area. As many as 54 per cent of cultivators in random sample group and 62 per cent in knowledgeable group reported that they did not get water in adequate quantity to meet the full needs of their currently irrigated land.

Sinnarkar (1964) cited the following problems regarding use of irrigation water. During 1963 the first year of commencement of irrigation the problems were mostly pertaining to supply of irrigation. Certain survey numbers situated at high levels could not be supplied with water because of position of outlets and siphons.

Programme Evaluation Organization, Govt. of India (1965) while studying the command area of Karapur weir and canal project, reported the following problems:

1. Topography of land
2. Soil condition
3. Alternative irrigation works will go into disuse

Programme Evaluation Organization, Govt. of India (1968) in its report, reported that one of the reasons for underutilization of irrigation was enforcement of prescribed cropping pattern, field channels and preparation of land, non-construction of field channels in time and insufficient length from such works affects the full utilization of their potential.

Lag in construction of field channels, difficulties in construction of field channels have been reported by the farmers of Andhra Pradesh. Two other problems that stand in the way of fuller utilization of irrigation potential are inadequate levelling of fields and insecurity of land tenure.

Purna Project Problem Ascertainning Committee, Dept. of Irrigation and Power, Govt. of Maharashtra (1970) had reported following problems, which prohibit the cultivators to utilise irrigation water.

Unlevelled lands and problem of drainage, lack of finance, inadequate means of communication, inadequate outlets, bridges and canal, inadequate godown facilities, lack of modern farming equipments.

Solunke (1975) reported that lack of financial resources for utilizing canal irrigation, non-availability of supplies like seed, fertilizers and insecticides were the major problems. Some of the minor problems like lack of equipments, lack of technical guidance, want of field channels were also reported by the respondents.

Wattamwar (1976-77) reported the problems of farmers in relation to use of canal water as inadequate availability of inputs, construction and repairing of field channels is very expensive, lack of technical guidance while digging the channels, land is not levelled.

Mukerji (1978) stated that a U.N.D.P. study in India has shown that there is as much as 25 per cent loss of water in the canal system, 22.5 per cent in the water courses and 21.5 per cent in the field giving a total of 69 per cent loss. Further stated that a study by the International Land Reclamation Institute in case of 90 projects in India showed that the efficiency of irrigation is 20-40 per cent from reservoir to the field. It can be said that the efficiency at the canal

head is 50-55 per cent in case of lined and 35-40 per cent in case of unlined canal system.

Sogani (1978) found that the water losses in unlined channels varied from 40 to 67 per cent on charsa operated farms and from 36 to 59 per cent on pump operated farms. On an average 43 to 48 per cent of the total irrigation water was found to be lost in the long runs of unlined channels.

It was found that lining of channels would increase the cropping intensity by 5.64 to 17.64 per cent on charsa operated and 7.60 to 14.18 per cent on pump operated farms. It was also found that by lining the main channels the farmers would get substantial benefits varying from Rs.259 to Rs.1,076 on very small to large farms, respectively. In case of the secondary channels were also lined, the benefits would further increase by 2-3 times.

Ambegaonkar (1979) reported lack of land development programme, lack of communication facilities, lack of loan facilities and need to teach the farmers for adoption of new crop cultivation practices were some of the causes for underutilization.

Mahajan (1980) observed that inadequate credit, low prices to farm produce, non-existence of farm roads,

high cost of fertilizers, marketing and transport facilities, poor drainage system, lack of supply of improved seeds from agricultural universities and unlevelled land were some of the agricultural problems in order of importance faced by the farmers in command area.

Palaniswami (1980) found that the policy issues emerging out of the study related to : Introduction of charges in the present system of water allocation, reduction of seepage losses through lining, conjunctive use of ground and surface water, revision of the existing water rates and pilot demonstration projects with at least 1,000 acres at selected places in the canal command area, preferably at the head, middle and tail portions.

Narayan and Venkata Reddy (1981) found that the gap between irrigation potential created and the actual utilization is quite high in the command areas. It is essentially due to the slow progress in land development. A variety of factors like non-availability of timely credit, insecure and untimely water supply, non-availability of machinery etc. have contributed collectively and individually. Land development is essential for scientific water management on the farm.

Patel (1981) stated following causes of under-utilization :

Drainage facilities, initiation to take up necessary steps for reduction of seepage losses, inadequate land preparation, levelling, grading and sub-division of fields into appropriate strips and other infrastructural facilities. Such as provision of roads, marketing and timely supply of inputs.

Rajmane et al. (1981) reported the causes of underutilization namely non-availability of timely inputs, lack of proper extension services, irregular water supply, inadequate land development, heavy soils.

Sundar and Rao (1981) quoted the reasons for underutilization are :

1. Conveyance losses are heavy in some reaches necessitating lining.
2. The outlets are not always located properly and cannot supply the designed discharge.
3. Water courses and field channels are not constructed even years after the canals are ready. Where constructed, they are not maintained properly.
4. Drainage facilities do not exist.
5. There are no measurement of water to prepare a water budget.
6. The fields are not properly levelled.

Gupta (1982) found that the lining of water courses has led to increase in irrigation, increase in the yield/ha (25 to 30 per cent), shift in cropping pattern, use of manure fertilizer is higher, plant protection measures is also high. The lined water course has led to more efficient employment of family labour/ha.

Chate (1983) reported the problems felt by farmers were heavy soils, undulating lands, lack of technical guidance, inadequate land development, lack of proper field channels, lack of finance as major ones.

Wattamwar (1983-84) reported the difficulty regarding the canal water use expressed by the respondents was :

1. Field channels not operationg well (31.92 per cent).

Parshad (1984) reported that 50 per cent respondents mentioned the problem of surface and or sub-surface drainage. The difficulties cited were :

1. Less availability of water at tail end (35 per cent)
2. Increased salt problem (23.70 per cent)
3. Less number of nakka (turnouts) (14.3 per cent)
4. Faulty bed slope (12.2 per cent)
5. Frequent channel breakage (10.2 per cent)

Not even one farmer mentioned that he had no difficulty.

2.2.2 Management aspects

Sinnarkar (1964) cited following problems regarding use of irrigation water:

The problems that persisted during 1964-65 were mostly about irregular supply of water i.e. farmers reported that they could not get water when it was required. The authorities of irrigation department supply water in a particular sequence which did not suit to certain farmers. In certain cases certain farmers did not allow digging of water channels through their fields. Complaints about unauthorised use of water through field channels were also considerable. Non-availability of technical information for management under irrigation were some of the problems reported.

Patel (1965) observed that farmers were not getting adequate and timely supply of canal water.

Patil (1965) reported that farmers were not having sufficient canal water supply.

Mukherjee and Harjinder Singh (1966) reported following problems:

1. Defective water transmission system
2. Lack of above ground secondary channels
3. Operator influence
4. Water logging appeared to be more significant problem.

Other some significant factors are: high land, defective administrative arrangement for distribution of water.

Vinich Vannasilpa (1968) stated that nearly 65.80 per cent of the farmers experienced non-availability of canal water.

Baldev Singh (1970) stated that main problem of small holders was inadequate and uncertain irrigation.

Ramarao (1970) reported that there was inadequate supply of water to small farmers.

Kadam (1974) found the causes of underutilization of irrigation potential in Ghod project were: Late availability of canal water for kharip sowing, unsuitability of land for irrigation, mismanagement of irrigation by the department, lack of infrastructure conducive for adoption of modern technology, lack of marketing and communication facilities in the area and above all the higher profitability of well irrigated crops over canal irrigated crops.

Solunke (1975) reported inadequate supply of water from irrigation department was the major problem.

Wattamwar (1976-77) reported the problems of farmers in relation to use of canal water as:

1. Water supply is not in time
2. Notice will not receive before given the water
3. Rotation register is not properly maintained
4. Irrigation Engineers are reluctant towards problems of farmers
5. Partial attitude of employees of irrigation department towards difficulties of farmers while taking the canal water.

Jati and Shrivastava (1977) reported that opening and closing of the gate of canal 40 per cent of the respondents stated it to be satisfactory and 60 per cent unsatisfactory.

Patil (1977) reported the main factor for underutilization of created potential would be the present distribution system which is not "consumer oriented". Other problems are inefficient supply of irrigation water, lack of proper distribution organization. Once a farmer's application for irrigation is approved, payment of water charges becomes compulsory even though in absence of assured water supply, timely and adequate deliveries are not made. In this case farmers reluctant to apply, they do not get assurance after apply.

Mathur (1980) reported the causes of underutilization namely, poor planning of projects and seepage through the distribution channels (In Punjab 40 per cent water is lost through seepage).

Jogia (1981) mentioned that lining of water courses is only a first step towards efficient water use management. The next course involves a concerted and sustained inter-disciplinary team efforts with obvious focus on the end user.

Kendrekar (1981) reported that the big farmers expressed lack of irrigation to be the only constraint in use of wheat technology.

Patel (1981) stated the following causes of underutilization:

1. Lack of coordination between irrigation and agriculture department at the time of formulation of irrigation projects.
2. Proper field distribution system.

Rajmane et al. (1981) reported the causes of underutilization namely:

1. Irregular water supply
2. Problem of tail enders and
3. Farm management problems.

Sundar and Rao (1981) quoted the reasons for underutilization:

1. Canals are not maintained properly and do not carry the designed discharge

2. Night irrigation is not practiced in many places.
3. The tail enders do not get their due share.
The farmers at the head reaches of the canal and distributories use more than their share of water.
4. There is wide spread unauthorised irrigation.
5. Irrigation discipline is not there due to which small and marginal farmers suffer.

Gandhi (1982) stated that the water supply in each command should be by rotational system culminating into volumetric use, designing distributories in such a way as to fulfil the committed irrigation in half the rotation period.

Lele (1982) emphasised the several physical constraints in the delivery system of Girna canals. The minors and distributories were designed for inadequate capacities though the chaks are of large size even at the tail end of distributory. Due to this, it was not possible to supply the water to the planned area within the rotation.

Rao (1982) highlighted the lack of rapport between the departmental staff and irrigators and said, "The only communication which the departmental staff have with irrigators seems to be relating to receipts of application for irrigation to their fields, finding out unauthorised irrigation and irregularities".

Satpute (1982-83) reported that underutilization was due to administrative problem, situational constraints and managerial problems.

Varudkar (1982) stated that the management of black soils related to water conveyance (canal distributory, field channel establishment) and water distribution (irrigation layout) is the major constraint.

Srinivas (1984) stated that there is wide spread unauthorised irrigation which is difficult to prevent in existing socio-potential setup.

Magar and Shinde (1985) stated that the problem of water management becomes more aggressive in the region of black soils, especially like Mangalvedha region of Bhima command in Maharashtra, where soils are very deep. Brief inferences drawn were:

1. Communication regarding opening and closing of canal, irrigation rotation, availability of water flow to the farms, etc. between the users and irrigation management authority is rather inadequate.
2. The demands for water for seasonal crops from the farmers are accepted at late dates. The water share sanctioned is communicated to the farmers ultimately at a very late date.

3. Major bottleneck for water management system is the perfect scheduling of irrigation under variable factors of soil types, cropping pattern and their sowing time and distribution of water conveyance systems.

4. The farmers are not aware of advanced methods of farm irrigation systems.

2.3 Extent of utilization

Programme Evaluation Organization (1961) reported the extent of utilization of canal irrigation in three different states in the year 1959 as under:

Madhya Pradesh	36.50 per cent
Andhra Pradesh	52.10 per cent
Uttar Pradesh	66.30 per cent

Sinnarkar (1964) reported that utilization of water in village Matha was about 10.5 per cent and at Golegaon about 22 per cent.

✓ Mukherjee and Harjinder Singh (1966) reported that only 50 per cent respondents utilised full irrigation water and 17 per cent respondents were in non-use category.

✓ Mahajan (1972) reported that the extent of utilization was only 50.82 per cent. He reported that utilization was more in case of small farmers. Maximum



utilization was observed in case of farmers possessing 5 to 10 acres of land. Utilization was found to decrease with increase in size of holding.

~ Sangle et al. (1972) reported that the extent of utilization was only 18.48 per cent in the Purna command area.

(Bangale (1974) reported that maximum utilization (70 per cent) was by farmers possessing land upto 10 acres and it progressively decreased with increase in size of holding.

{ —Kadam (1974) stated that utilization of irrigation potential of Ghod project showed that the maximum amount of water was available in Kharip season but the utilization was the lowest during the same season. Irrigation potential was underutilised in kharip as well as in Rabi season, but it was overutilised during hot weather.

✓ Mishra and Vivekanand (1975) reported that the extent of irrigation utilization was based on availability of irrigation in the year and size and operational land holding of the farmers.

. Solunke (1975) reported that 50 per cent farmers utilised canal irrigation below 50 per cent of the potential and the remaining utilised above 50 per cent of the irrigation potential.

Ambegaonkar (1979) reported that the irrigation utilization was 74.28 per cent in First Five Year Plan, it declined to 69.35 per cent in Second Five Year Plan, slightly increased in Third Plan i.e. upto 70.95 per cent, again it declined in three one year plans (1967 to 1969) upto 56.57 per cent and again it increased in Fourth Plan upto 59.62 per cent or 60 per cent.

Annual Administration Report 1981-82 of Command Area Development Authority, Jayakwadi project, Aurangabad reported that the utilization of the potential during 79-80, 80-81, and 81-82 was only 30.84 per cent, 40.47 per cent and 58.64 per cent respectively. However, the utilization increased from 26 per cent in 1970-80 to 63 per cent in 1981-82 in pilot project area.

Chate (1983) reported that majority (51.33 per cent) respondents from all the three categories were utilising irrigation from 51-75 per cent.

CHAPTER III

MATERIALS AND METHODS

CHAPTER III

METHODOLOGY

This part of the dissertation discusses methods and procedures used in this study. This has been done under the following sections.

- a. Locale of research
- b. Sampling procedure
- c. Selection of variables
- d. Operationalization of the variables and their empirical measurements
- e. Tools and techniques of data collection and
- f. Statistical procedure used for the analysis of data.

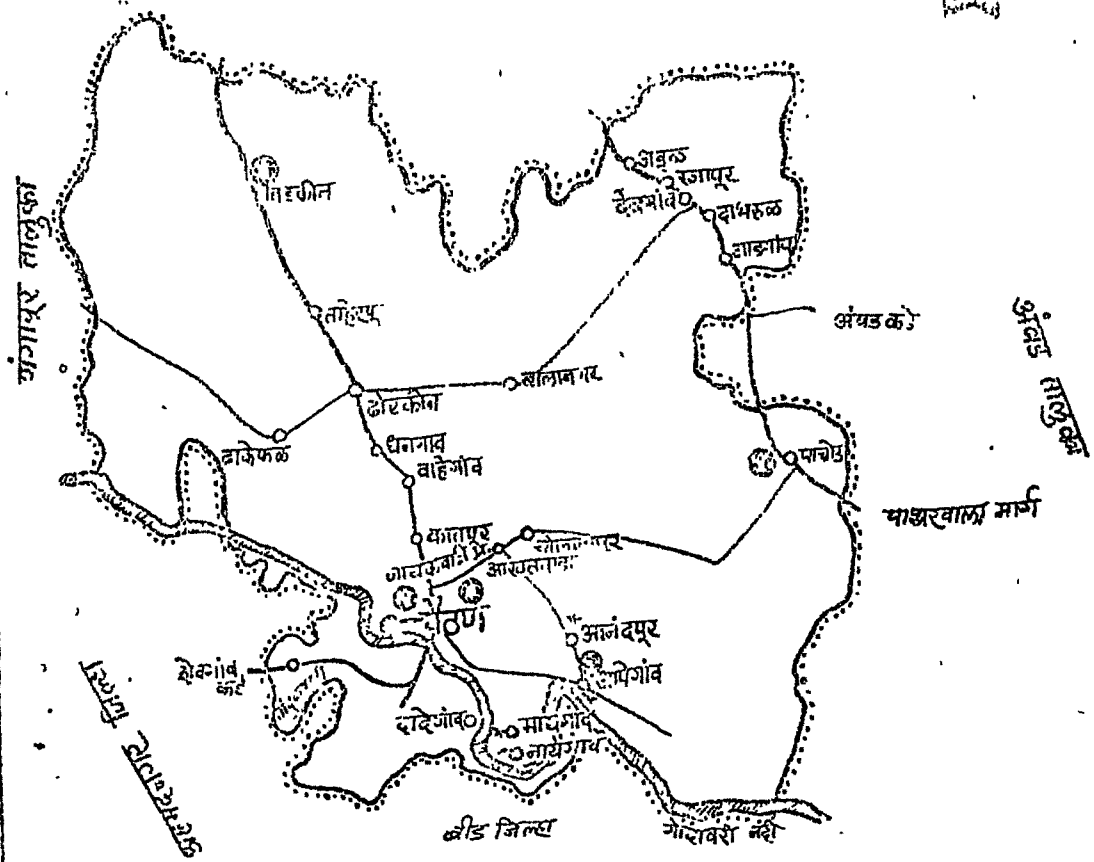
3.1 Locale of research

3.1.1 Selection of area

For getting desired and satisfactory response from the farmers, the respondents under study, it is essential to develop a confidence and faith of the farmers about the researcher. In other words, it aims at building up good rapport and ensuring free and frank dialogue through two way communication between the interviewer and the interviewee. With this basic consideration in view, Paithan taluka of Aurangabad district was chosen for the study. The study was conducted in Jayakwadi Command Area of Paithan taluka of Aurangabad district. Jayakwadi project is constructed

पैठण तालुका

औरंगाबाद जिल्हा



सूचि

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|---------------------------|---------------------------|
| १. तालुक्याची सीमा | ५. कच्च्या राडका |
| २. तालुक्याचे मुख्य ठिकाण | ६. नदि |
| ३. धार्मिक क्षेत्र | ७. विज्ञान धाम |
| ४. पक्क्या राडका | ८. निरीक्षण केलेली गावे * |

Fig. 1.

across Godawari river near Paithan. In this area, in addition to the previous available infrastructure the Command Area Development Authority has developed an infrastructure through the coordination of different institutions, in order to help the farmers of the command area.

In Paithan tahsil out of the cultivable area 33 per cent area is irrigated from Jayakwadi project.

CADA is directly responsible for the implementation of the following activities.

1. Execution of on-farm development works.
2. Execution of drainage works.
3. Execution of modernization works.
4. Execution of special projects such as pilot projects and farmers projects.
5. Execution of infrastructural works such as roads, markets, buildings etc.
6. Operation and maintenance of completed dams, canals and distribution system.
7. Irrigation management.
8. Providing extension service to the farmers.

In addition, it plays a coordinating role in respect of following activities.

1. Supply of inputs such as seed, fertilizers and pesticides.
2. Supply of credit.
3. Development of markets and agricultural industries.

3.2 Sampling procedure

Paithan taluka was selected purposively as it comes under the pilot project area in Aurangabad district.

Secondly, the researcher has established a good rapport with the locality and the extension staff working in the area. This will help the researcher to collect the data objectively.

3.2.1 Selection of village

Ten villages were reaping the advantage of the pilot project. Out of ten villages one village namely Akhatwada was selected randomly.

A brief description of village Akhatwada is given in the following paragraph.

Village Akhatwada is situated in Paithan taluka about 12 kms to the east side of Paithan. It is on the Paithan-Jalna metal road about 1 km interior. Nearest railway station is Aurangabad which is 60 kms away.

Population of the village is 1185, out of which 116 belong to scheduled caste and 37 to scheduled tribes. The geographical area of the village is 1136 ha out of which 1130 ha area is under cultivation. Total command area is 31.59 per cent. Soil type is medium to heavy. The crops grown are Bajra, Kharip jowar, Mung, Tur, Wheat, Rabi jowar, Gram, Safflower and Sugarcane. The school facility upto 7th standard is available. The village is electrified. Nearest primary health centre and family planning centre is at Paithan. Other infrastructure facilities are not available in the village.

3.2.2 Selection of respondents

Two separate lists (i.e. farmers under pilot project and non-pilot project) were obtained from the irrigation department. Then the farmers were categorised as small, medium and big on the basis of size of land holding. The farmers owning land upto 2 hectares were categorised as small farmers, 2.1 to 4 hectares as medium and 4.1 and above as big farmers.

→ From each group the farmers were selected randomly by using lottery method on the basis of proportional allocation method.

A sample of 75 respondents was drawn from the list of pilot project and 75 respondents were selected from

the non-pilot project area from the above three categories from one village of the command area.

The details of sample are given in Table 1.

Sr. No.	Farm size	Pilot project area	Non-pilot project area	Total
1.	Below 2 hectares	16	10	26
2.	2.1 to 4 hectares	39	33	72
3.	4.1 hectares and above	20	32	52
Total		75	75	150

3.3 Selection of variables

A detailed description of the variables selected for this study along with their conceptual frame work and empirical measurement has been dealt in this section. This selection of the variables included in the study was done on the basis of an extensive review of literature, discussion with the experts. Only those variables which were having some relevance with the study were finally selected.

The list of variables along with the instruments used for their measurement is presented as follows:

Sr. No.	Variable	Measurement
1.	Age	Chronological age of the respondent
2.	Education	Scores assigned as per SES scale developed by Bawajir and Nandapurkar (1984)
3.	Income	Gross annual income
4.	Land holding	Scores assigned as per SES scale developed by Bawajir and Nandapurkar (1984)
5.	Social participation	Scores assigned as per SES scale developed by Bawajir and Nandapurkar (1984)
6.	Irrigated farming experience	Total years of experience
7.	Extension contact	Schedule developed for this study
8.	Knowledge level	Scores assigned on the basis of Teacher made test
9.	Socio-economic status	Scores assigned as per SES scale developed by Bawajir and Nandapurkar (1984)
10.	Extent of utilization	Utilization index was developed for this study
11.	Land development	Scores assigned on the basis of teacher made test
12.	Agricultural extension service	Scores assigned on the basis of teacher made test
13.	Infrastructure facilities	Scores assigned on the basis of teacher made test
14.	water management	Scores assigned on the basis of teacher made test
15.	Constraints	Scores assigned on the basis of teacher made test

3.4 Operationalization of variables and their empirical measurements

The specific variables of this study and their measurement procedures are discussed below:

3.4.1 Age

The number of years completed by the respondents at the time of enquiry was considered as his age for the study.

The respondents were classified into three groups as,

1. upto 30 years
2. 31 to 45 years
3. 46 years and above

3.4.2 Education

Education was operationalised as the number of years of formal education attended by the respondents. The scoring system followed by Bawajir and Nandapurkar (1984) in their socio-economic status scale was followed to quantify the educational status of the respondent.

The scoring was as follows:

Sr. No.	Category	Score
1.	Illiterate	1
2.	Can read only	2
3.	Can read and write	3
4.	Primary school level	4
5.	Middle school level	5
6.	High school level	6
7.	College level	7

3.4.3 Income

The gross family income referred to the total amount earned in the year from the farm and non-farm sources. The gross family income as reported by respondents was taken into consideration to measure this variable.

3.4.4 Land holding

Land holding is defined as number of acres of land owned and operated by the respondents.

The land holding was categorised and scoring pattern was followed as below:

Sr. No.	Extent of land	Score
1.	upto 0.40 hectare	1
2.	0.41 to 2 hectares	2
3.	2.1 to 4 hectares	3
4.	4.1 to 6 hectares	4
5.	6.1 to 8 hectares	5
6.	8.1 hectares and above	6

3.4.5 Social participation

This refers to the participation of the respondent in social institutions as a member or office bearer. The social participation of farmers was quantified on the basis of scoring system followed by Bawajir and Nandapurkar (1984). The scoring was as follows:

Sr. No.	Participation in organization	Score
1.	Membership is one organization	1
2.	Membership in more than one organization	2
3.	Office holder	3
4.	Distinctive feature (M.L.A., M.P., President, Zilla Parishad etc.)	4

3.4.6 Irrigated farming experience

Actual experience of irrigated farming in number of years was considered to quantify this variable.

3.4.7 Extension contact

This refers to the contact made by the farmer with extension agency in or outside the village.

This variable was measured in terms of frequency of contact by the farmers with the change agent.

The responses were obtained and scored on a 4 point scale namely 'weekly', 'fortnightly', 'monthly', and 'more than month'.

The scoring system followed as below:

Sr. No.	Frequency of contact	Score
1.	Weekly	8
2.	Fortnightly	4
3.	Monthly	2
4.	More than month	1

3.4.8 Knowledge about technology

Knowledge function is one of the four functions in the innovation decision process. In this study knowledge was defined as comprehensive understanding

of cultivation practices of agricultural technology and use of irrigation water.

In order to study the knowledge about technology a simple procedure on the line of teacher made test was followed. Suitable questions on selected practices were framed to get the responses and their understanding of the technology that they gained. The answer of the respondents to each of the questions was marked correct, incorrect. There were 10 questions. To a correct answer a score of one and to an incorrect answer the score of zero was assigned.

3.4.9 Socio-economic status

Socio-economic status is the position of an individual in family occupies with reference to the prevailing average standards of cultural possessions, effective income, material possession, and participation in the community.

The respondents were classified on the basis of socio-economic status score as:

Sr. No.	Category	Total scores
1.	Low	upto 38
2.	Medium	39 to 59
3.	High	60 and above

3.4.10 On-farm development

This includes the development of field channels and field drains within the command of each outlet, land levelling, enforcement of proper system of warabandi and fair distribution of water to individual fields, supply of inputs and services including credit.

The responses were obtained and scored on a 3 point scale namely 'most satisfactory', 'satisfactory', and 'not satisfactory'.

The scoring system was followed as under:

- | | |
|----------------------|---|
| 1. Most satisfactory | 3 |
| 2. Satisfactory | 2 |
| 3. Not satisfactory | 1 |

3.4.11 Providing extension service

This includes the demonstrations of seasonal crops, training and visit type of extension, inducing cultivators for giving water applications, plant protection campaigns etc.

The responses on this variable were obtained and scored on a 2 point scale like 'Yes' and 'No'. For the 'Yes' response one score was assigned and to 'No' response zero score was given.

3.4.12 Infrastructure facilities

This includes the facilities of roads, markets, storage, transportation and market rates to the agricultural produce.

This variable was quantified on a 3 point scale like "most satisfactory", "satisfactory" and "not satisfactory".

The scoring system was followed as below:

- | | |
|----------------------|---|
| 1. Most satisfactory | 3 |
| 2. Satisfactory | 2 |
| 3. Not satisfactory | 1 |

3.4.13 Water management

This includes, the intimation about the submission of water applications, filling of water applications, intimation about sanction for the application, receipt of passes for water, intimation about irrigation rotation, crop measurement, importance of irrigation committees and group leader, irrigation to heavy soils and maintenance of field channels.

This variable was measured on the basis of the information complete as mentioned above. Under water management there are ten items. If organization fulfils all the items well in advance in that case three points

were given as a weightage. If 50 per cent items are covered, two points were given as weightage and if less than 50 per cent items are covered, one point was given.

3.4.14 Constraints

This refers to the problems that are faced by the farmers while utilizing the irrigation water.

According to Websters dictionary constraint means compulsion or restraint.

The responses were obtained and scored on a three point scale like "Important", "Less important", and "Not important".

The scoring system was followed as below;

- | | |
|-------------------|---|
| 1. Important | 2 |
| 2. Less important | 1 |
| 3. Not important | 0 |

3.4.15 Extent of utilization of irrigation water

This refers to the actual utilization of irrigation water in kharip; rabi and summer season as against the potential.

Extent of utilization of irrigation water was calculated as follows:

$$\text{Extent of utilization} = \frac{\text{Actual irrigated area}}{\text{Total irrigable area}} \times 100$$

3.5 Tools and techniques of data collection

Main tool used in the present study was interview schedule, with the scales for measuring dependent, independent and intervening variables.

The final draft of the schedule (given in appendix) was used as the instrument for collection of the data.

The entire schedule was pretested in the field on a separate sample of farmers. On the basis of pretesting, necessary modifications were made in the final draft. The respondents were individually contacted for the interview. The usual precautions for interviewing the farmers were carefully observed. The assistance of the local VEW (T & V) was availed for locating the farmer respondents of the sample.

3.6 Statistical procedure used for the analysis of the data

The following statistical tests were used besides frequencies and percentages.

3.6.1 'Z' test

This test was used for testing the difference between two means of variables. The formula used was:

$$Z = \frac{\bar{X} - \bar{Y}}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

where,

\bar{X} = Mean of scores of beneficiaries of pilot project area

\bar{Y} = Mean of scores of beneficiaries of non-pilot project area

$\frac{s_1^2}{n_1}$ = Sample variance for \bar{X}

$\frac{s_2^2}{n_2}$ = Sample variance for \bar{Y}

3.6.2 Correlation coefficient

This statistical method was used for identifying the association between two variables. The data were computed and 'r' value was obtained.

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

Where,

X = Independent variable

Y = Dependent variable

N = No. of observations

\sum = Summation

r = Coefficient of correlation

CHAPTER IV

RESULTS

CHAPTER IV

RESULTS

The main purpose of the present study was to evaluate the special efforts undertaken by the management authority of Jayakwadi command area in pilot project. Therefore, a comparative sample from pilot project and non-pilot project area was selected to draw the conclusions. Similarly, this study has focussed on the important problems which are the stumbling blocks in utilization of irrigation water.

Present chapter, therefore, presented under six sections pertaining to the well objectives of the study as follows. The findings of each section have been discussed thoroughly.

1. Personal characteristics of farmers.
2. On-farm development activities.
3. Irrigation management aspects.
4. Extent of utilization of irrigation water.
5. Problems faced by the irrigators, and
6. Characteristics of farmers and their relationship with extent of utilization of irrigation water.

4.1 Distribution of the respondents on the basis of personal characteristics

In this section comparative study of socio-personal characteristics of respondents under pilot project and

non-pilot project area have been presented.

4.1.1 Age

Table 2A: Distribution of respondents according to age

Sr. No.	Category	Pilot project		Non-pilot project	
		Freq- uency	Percen- tage	Freq- uency	Percen- tage
1.	Upto 30 years	12	16.00	10	13.33
2.	31 to 45 years	47	62.67	51	68.00
3.	46 years and above	16	21.33	14	18.67
	Total	75	100.00	75	100.00

From Table 2A it is conspicuous that majority of the respondents (more than 62 per cent) from both the categories were observed from middle age group, whereas, very meagre percentage was observed from young and old group i.e. 13.33 per cent and 18.67 per cent from non-pilot and 16.00 per cent and 21.33 per cent from pilot area respectively.

Thus it can be concluded that majority of respondents from both the categories were from middle age group.

Table 2B: Comparison of mean age scores on the pilot project and non-pilot project area

Sr. No.	Sample	Mean score	Mean difference	'Z' value
1.	Pilot project area	40.92	1.08	0.760 NS
2.	Non-pilot project area	39.84		

From the Table 2B it is observed that there was no significant difference between the age group of the respondents from pilot and non-pilot area as indicated by 'Z' value.

4.1.2 Education

Table 3A: Distribution of respondents as per level of formal education

Sr. No.	Category	Pilot project		Non-pilot project	
		Freq- uency	Perce- ntage	Freq- uency	Perce- ntage
1.	Illiterate	25	33.33	20	26.67
2.	Primary	15	20.00	19	25.33
3.	Middle school	24	32.00	24	32.00
4.	High school	11	14.67	12	16.00
5.	College	-	-	-	-
		75	100.00	75	100.00

Analysis of the data in Table 3A clearly disclosed that majority of the respondents under pilot project (33.33 per cent) were illiterate, whereas, 32 per cent of respondents from non-pilot area were observed to be having education upto middle school level; followed by 26.67 per cent illiterate and 25.33 per cent educated upto primary level. Similarly 16 per cent of them had education upto high school level. In case of pilot project area 32 per cent respondents were having education upto middle school level, followed by 20 per cent and 14.67 per cent respectively educated upto primary level and high school level.

Table 3B: Comparison of mean education scores on the pilot project and non-pilot project area

Sr. No.	Sample	Mean score	Mean difference	'Z' value
1.	Pilot project area	3.67	0.32	1.06 NS
2.	Non-pilot project area	3.99		

Table 3B indicates that there was no significant difference between the means of these two groups in respect of education level.

4.1.3 Income

Table 4A: Distribution of the respondents according to annual income

Sr. No.	Category	Pilot project		Non-pilot project	
		Freq- uency	Percen- tage	Freq- uency	Percen- tage
1.	Upto 3500	5	6.67	3	4.00
2.	3501 to 4800	42	56.00	27	36.00
3.	4801 and above	28	37.33	45	60.00
Total		75	100.00	75	100.00

As indicated in the Table 4A the annual income of 60 per cent of the respondents from non-pilot area was more than Rs.4801. Whereas, the income of 56 per cent of the respondents from pilot area was ranging between Rs.3501 to Rs.4800, followed by 37.33 per cent, and 6.67 per cent of respondents ranging between Rs.4801 and above and upto Rs.3500 respectively. In case of non-pilot project area 36 per cent respondents were having annual income between Rs.3501 to Rs.4800, and only four per cent respondents were earning upto Rs.3500.

Table 4B: Comparison of mean scores of income on pilot project area and non-pilot project area

Sr. No.	Sample	Mean score	Mean difference	'Z' value
1.	Pilot project area	50.16	2.85	1.81 NS
2.	Non-pilot project area	53.01		

It is seen from Table 4B that these two groups were not differ significantly in their means of income scores.

4.1.4 Land holding

Table 5A: Distribution of respondents according to land holding

Sr. No.	Land holding	Pilot project		Non-pilot project	
		Freq- uency	Percen- tage	Freq- uency	Percen- tage
1.	Upto 2 ha	16	21.33	10	13.33
2.	2.1 to 4 ha	39	52.00	33	44.00
3.	4.1 ha and above	20	26.67	32	42.67
Total		75	100.00	75	100.00

Table 5A illuminates the possession of the land holdings by the respondents. It is seen from the above table that 52 per cent of the respondents under pilot project area were found to be owing the land between 2.1 to 4 ha, whereas, 44 per cent respondents from non-pilot area were having the land in this group.

The data from above table leads to conclusion that majority of the farmers from non-pilot area possessed more holding than their counterparts.

This statement is supported by the 'Z' value given in the Table 5B, which indicate significant difference

in possession of land holding. The details are furnished in Table 5B as below.

Table 5B: Comparison of mean land holding on pilot and non-pilot area

Sr. No.	Sample	Mean score	Mean difference	'Z' value
1.	Pilot project area	3.04	0.55	3.23**
2.	Non-pilot project area	3.59		

** Significant at 0.01 level of probability.

4.1.5 Social participation

Table 6A: Distribution of the respondents according to social participation

Sr. No.	Social participation	Pilot project		Non-pilot project	
		Freq- uency	Percen- tage	Freq- uency	Percen- tage
1.	No participation	11	14.67	3	4.00
2.	Low (member of one organization)	49	65.33	46	61.33
3.	Medium (member of more than one organization)	14	18.67	17	22.67
4.	High (office holder)	1	1.33	9	12.00
Total		75	100.00	75	100.00

It is seen from Table 6A that 65.33 per cent and 61.33 per cent respondents from pilot and non-pilot area respectively were having low level of social participation. However, 18.67 per cent of the respondents from pilot and 22.67 per cent from non-pilot area had medium level of social participation. Very meagre percentage was observed in the category of high level of social participation from both the groups.

The comparison of mean scores in respect of social participation is given in Table 6B, which indicated significant difference between two groups.

Table 6B: Comparison of mean social participation scores on pilot and non-pilot project area

Sr. No.	Sample	Mean score	Mean difference	'Z' value
1.	Pilot project area	1.11	0.62	3.14**
2.	Non-pilot project area	1.73		

** Significant at 0.01 level of probability.

4.1.6 Extension contact

Table 7A indicates that the majority of the respondents from both the groups had medium contacts with the extension agencies, i.e. 64 per cent from pilot area and 66.67 per cent from non-pilot area. However,

Table 7A: Distribution of the respondents according to extension contact

Sr. No.	Extension contact	Pilot project		Non-pilot project	
		Freq- uency	Perce- tage	Freq- uency	Perce- tage
1.	Low	14	18.67	17	22.67
2.	Medium	48	64.00	50	66.67
3.	High	13	17.33	8	10.66
Total		75	100.00	75	100.00

the high contacts were observed from the respondents to the extent of 17.33 per cent, and 10.66 per cent from pilot and non-pilot area respectively. The percentage of low contact was more in case of respondents from non-pilot area than their counterparts.

From the above table it can be concluded that the medium contacts were more in both the categories.

Table 7B: Comparison of mean extension contact scores on the pilot and non-pilot area

Sr. No.	Sample	Mean score	Mean difference	'Z' value
1.	Pilot project area	11.81	0.66	1.21 NS
2.	Non-pilot project area	11.15		

It is evident from Table 7B that there was no significant difference between the mean of these two groups in respect of extension contact, as indicated by 'Z' value.

4.1.7 Socio-economic status

Table 8A: Distribution of the respondents according to socio-economic status

Sr. No.	Socio-economic status	<u>Pilot project</u>		<u>Non-pilot project</u>	
		Freq- uency	Percen- tage	Freq- uency	Percen- tage
1.	Low (upto 38)	32	42.67	19	25.33
2.	Medium (39 to 59)	38	50.67	45	60.00
3.	High (60 and above)	5	6.66	11	14.67
Total		75	100.00	75	100.00

It is revealed from Table 8A that majority of the respondents (60 per cent) from non-pilot and (50.67 per cent) from pilot area were possessing medium level of socio-economic status, whereas, 42.67 per cent and 25.33 per cent respondents from pilot and non-pilot area respectively were having low level of socio-economic status. A meagre percentage of respondents were under high category.

From this data it can be concluded that the respondents from non-pilot area were having better position than their counterparts in respect of socio-economic status.

The comparison of mean scores of socio-economic status is given in Table 8B which indicates significant difference between two groups.

Table 8B: Comparison of mean socio-economic status scores on the pilot project and non-pilot project area

Sr. No.	Sample	Mean score	Mean difference	'Z' value
1.	Pilot project area	41.12	7.57	4.14**
2.	Non-pilot project area	48.69		

** Significant at 0.01 level of probability.

4.1.8 Knowledge level

Table 9A: Distribution of respondents according to level of technical knowledge

Sr. No.	Knowledge level	Pilot project		Non-pilot project	
		Freq- uency	Percen- tage	Freq- uency	Percen- tage
1.	Low (upto 5)	22	29.33	27	36.00
2.	Medium (6 to 7)	34	45.33	32	42.67
3.	High (8 and above)	19	25.34	16	21.33
Total		75	100.00	75	100.00

It is indicated from Table 9A that 45.33 per cent respondents from pilot area and 42.67 per cent from non-pilot area secured score in between 6 and 7, followed by 36 per cent and 29.33 per cent respondents from non-pilot and pilot area, who secured scores upto five respectively. More than 21 per cent respondents were observed in high level knowledge category from pilot and non-pilot areas respectively.

It is therefore, concluded from the above table that maximum percentage of respondents from both the groups had medium level of knowledge.

Table 9B: Comparison of mean knowledge scores on the pilot project area and non-pilot area

Sr. No.	Sample	Mean score	Mean difference	'Z' value
1.	Pilot project area	6.28	0.15	0.625 NS
2.	Non-pilot project area	6.13		

Data given in Table 9B did not indicate significant difference between two categories as indicated by 'Z' value.

4.2 On-farm development activities

This part deals with the various land development activities undertaken in the pilot project area.

The management authority has taken special efforts to construct, maintain, and modify the irrigation system in this area. Therefore, it was decided to evaluate the opinions of the farmers regarding the various on-farm activities.

4.2.1 Land development work

Table 10A: Distribution of respondents according to land development work

Sr. No.	Land development work	Pilot project		Non-pilot project	
		Freq- uency	Percen- tage	Freq- uency	Percen- tage
1.	Not satisfactory (upto 16)	11	14.67	51	68.00
2.	Satisfactory (17 to 25)	38	50.67	24	32.00
3.	Most satisfactory (26 and above)	26	34.66	-	-
Total		75	100.00	75	100.00

Table 10A gives the information regarding the general feeling of the on-farm development activities of the respondents in the form of three categories i.e. most satisfactory, satisfactory and not satisfactory.

A perusal of Table 10A clearly indicates that 68 per cent respondents from non-pilot area and only 15 per cent from pilot area were not satisfied regarding land development work.

It was also interesting to note that more than 34 per cent of respondents from pilot project area were most satisfied as far as development activities are concerned. None of the respondents was observed in this category from non-pilot project area.

Similarly 50 per cent respondents had shown medium satisfaction regarding the various activities from pilot project area.

Thus it can be concluded that more than 80 per cent respondents from pilot area are satisfied in respect of land development work.

In order to compare the satisfaction of both groups regarding land development work, data were subjected to 'Z' value. The calculated 'Z' value was significant indicating that there was significant difference between the two categories of the respondents as far as the land development activities are concerned.

The details are given in Table 10B.

Table 10B: Comparison of mean scores of land development work on the pilot project and non-pilot project area

Sr. No.	Sample	Mean score	Mean difference	'Z' value
1.	Pilot project area	24.68	9.68	4.11 **
2.	Non-pilot project area	15.00		

** Significant at 0.01 level of probability.

4.2.2 Agricultural extension service

Extension service plays an important role in development activities. Therefore, it was decided to evaluate the role played by extension service in pilot and non-pilot area.

Table 11A: Distribution of respondents according to availability of agricultural extension service

Sr. No.	Agricultural extension service	Pilot project		Non-pilot project	
		Freq- uency	Percen- tage	Freq- uency	Percen- tage
1.	Low (upto 4)	15	20.00	41	54.67
2.	Medium (5 to 9)	50	66.67	30	40.00
3.	High (10 and above)	10	13.33	4	5.33
Total		75	100.00	75	100.00

It is conspicuous from the Table 11A that extension service has played important role in pilot area as indicated by 80 per cent of the respondents. As far as the non-pilot area is concerned more than 50 per cent respondents indicated low extension service, followed by medium extension service.

Table 11B gives picture regarding the mean difference of both categories and it is evident from the calculated 'Z' value that there was a significant

difference in extension service.

Table 11B: Comparison of mean scores of agricultural extension service on the pilot project and non-pilot project area.

Sr. No.	Sample	Mean score	Mean difference	'Z' value
1.	Pilot project area	6.43		
2.	Non-pilot project area	4.89	1.54	4.05 **

** Significant at 0.01 level of probability.

Thus, it can be concluded that extension service has played important role in pilot project area than non-pilot project area.

4.2.3 Infrastructural facilities

Infrastructure is an important component of any development system. Therefore, an attempt has been made to study the infrastructural facilities made available by the irrigation authorities to pilot and non-pilot area.

Data in this regard are given in Table 12A and indicated that infrastructural facilities were upto satisfactory mark as indicated by more than 50 per cent of the respondents from both categories. One fifth of the respondents were most satisfied about infrastructural facilities from pilot project area as against four per cent respondents from non-pilot area.

Table 12A: Distribution of respondents according to infrastructural facilities

Sr. No.	Infrastructural facilities	Pilot project		Non-pilot project	
		Freq- uency	Perce- tage	Freq- uency	Perce- tage
1.	Not satisfactory (upto 3)	18	24.00	26	34.67
2.	Satisfactory (4 to 6)	40	53.33	46	61.33
3.	Most satisfactory (7 and above)	17	22.67	3	4.00
Total		75	100.00	75	100.00

The data were further subjected for 'Z' value. Calculated 'Z' value gave significant difference indicating that more infrastructural facilities were made available in pilot project area than non-pilot area.

The details are presented in Table 12B as follows.

Table 12B: Comparison of mean score of infrastructural facilities on pilot project and non-pilot project area

Sr. No.	Sample	Mean score	Mean difference	'Z' value
1.	Pilot project area	5.07	1.02	3.92 **
2.	Non-pilot project area	4.05		

** Significant at 0.01 level of probability.

4.3 Irrigation management aspects

The focal point of the present study was to appraise the management system working in the pilot project area. The management system refers in the present study to various items such as helping the respondents in filling the water applications, intimation regarding submission of water applications, information about irrigation rotation, crop measurement etc. This system plays crucial role in the pilot project area. Therefore it was decided to examine the management role played by the authority. The information in this regard is delineated in Table 13A and 13B.

Table 13A: Distribution of respondents according to the assistance given about water management aspects

Sr. No.	Water management aspects	Pilot project		Non-pilot project	
		Freq- uency	Percen- tage	Freq- uency	Percen- tage
1.	Low (upto 8)	23	30.67	29	38.67
2.	Medium (9 to 13)	35	46.67	44	58.67
3.	High (14 and above)	17	22.66	2	2.66
Total		75	100.00	75	100.00

From Table 13A it was observed that more than 30 per cent respondents from both the categories received

low assistance whereas, more than 45 per cent respondents from both the areas received medium assistance. As far as high assistance is concerned, 22 per cent respondents from pilot area indicated that they received high assistance of management as against more than 2 per cent from non-pilot area.

Table 13B: Comparison of mean scores of water management aspects on pilot project and non-pilot project area

Sr. No.	Sample	Mean score	Mean difference	'Z' value
1.	Pilot project area	10.59		
2.	Non-pilot project area	9.32	1.27	3.02 **

** Significant at 0.01 level of probability.

Table 13B has given significant difference in the management assistance rendered by the authority in pilot and non-pilot area.

4.4 Extent of utilization of irrigation water

The main purpose of the present study was to assess the extent of use of irrigation water in pilot and non-pilot area.

Table 14A gives an information regarding water utilization of both the categories.

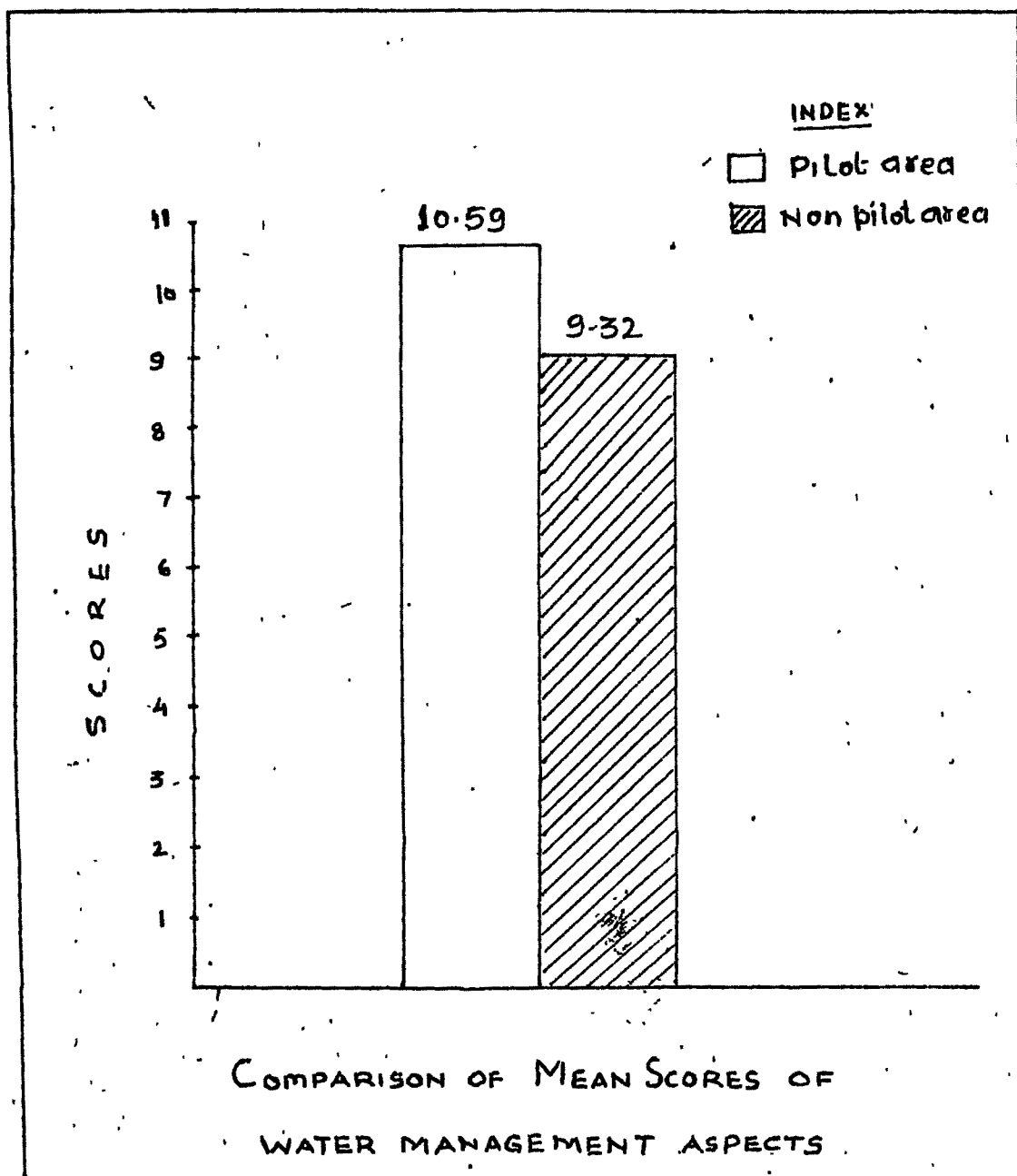


FIG- 2

Table 14A: Extent of utilization of irrigation water according to levels

Sr. No.	Extent of utilization	Pilot project		Non-pilot project	
		Freq- uency	Percen- tage	Freq- uency	Percen- tage
1.	Low (upto 72.56 %)	7	9.33	37	49.33
2.	Medium (72.57 to 165.61%)	55	73.33	32	42.67
3.	High (165.62% and above)	13	17.34	6	8.00
Total		75	100.00	75	100.00

As far as pilot project is concerned more than 73 per cent respondents had medium use of extent of utilization followed by 17 per cent who had high extent of irrigation utilization; as against 42 per cent and 8 per cent respectively from non-pilot area.

Table 14B: Comparison of mean extent of utilization score on the pilot project area and non-pilot project area

Sr. No.	Sample	Mean score	Mean difference	'Z' value
1.	Pilot project area	119.09	42.00	5.30 **
2.	Non-pilot project area	77.09		

** Significant at 0.01 level of probability.

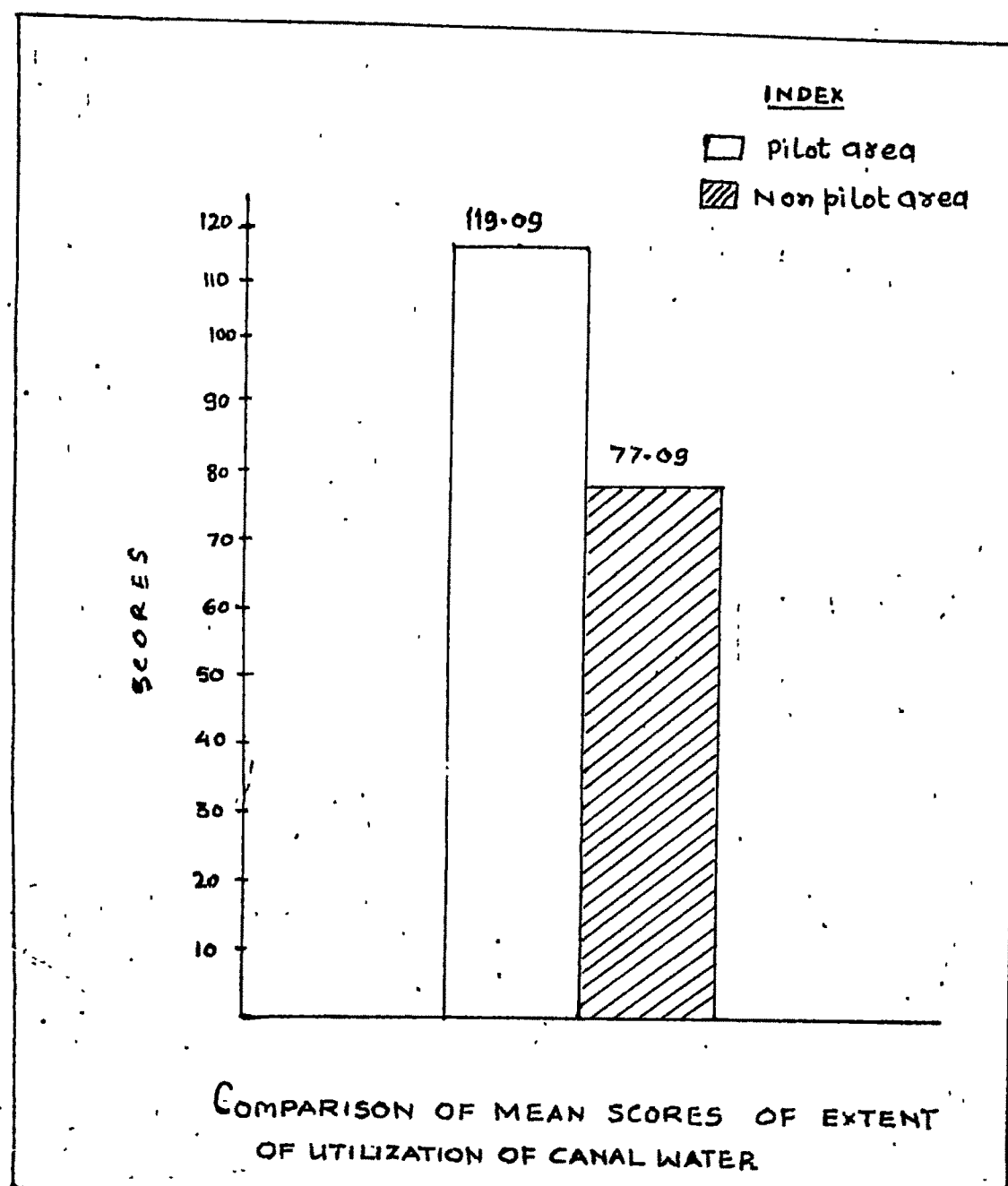


FIG. 3

Table 14B clearly indicated that there was significant difference in extent of use of irrigation water between pilot and non-pilot area.

Thus it is concluded that respondents from pilot project area are taking maximum use of irrigation potential as compared to non-pilot area.

Table 14C indicates that the majority of the farmers from all the categories under pilot project had medium use of irrigation water. However, high extent of utilization was reported by small and medium farmers i.e. 31.25 and 20.51 per cent respectively. None of the farmers from large category had reported high extent of utilization of irrigation water. Similarly majority of the small farmers (90 per cent) from non-pilot area had medium use of irrigation water, whereas the percentage of the respondents from medium and large categories was less as compared to small farmers. The high extent of utilization was reported by 12.13 per cent respondents from medium category as against 6.25 per cent from large category of farmers.

From this it can be concluded that the farmers of different categories differ in utilization of irrigation water. The small farmers were found to be more utilizers of irrigation water as compared to other categories of farmers.

Table 14C: Extent of utilization of irrigation water according to categories of farmers

Sr. No.	Extent of utilization	Pilot project			Non-pilot project		
		Small	Medium	Large	Small	Medium	Large
1.	Low (upto 72.56%)	2 (12.50)	4 (10.26)	1 (5.00)	1 (10.00)	16 (48.48)	20 (62.50)
2.	Medium (72.57 to 165.61%)	9 (56.25)	27 (69.23)	19 (95.00)	9 (90.00)	13 (39.39)	10 (31.25)
3.	High (165.62% and above)	5 (31.25)	8 (20.51)	-	-	4 (12.13)	2 (6.25)
Total		16 (100.00)	39 (100.00)	20 (100.00)	10 (100.00)	33 (100.00)	32 (100.00)

(Figures in parentheses indicate percentage)

4.5 Problems of farmers in utilization of irrigation water

Table 15:

Sr. No.	Problems	Pilot project		Non-pilot project	
		Score	Rank	Score	Rank
1.	<u>Physical</u>				
	1) Unlevelled lands	65	IV	133	I
	2) Problems of field channels	78	III	110	III
	3) Drainage problem	98	II	95	IV
	4) Large holding	14	V	19	V
	5) Heavy soils	116	I	133	II
	Total	371		490	
2.	<u>Administrative</u>				
	1) Lack of proper planning	34	III	32	III
	2) Lack of coordination	61	I	58	I
	3) Lack of extension	61	II	58	II
	Total	156		148	
3.	<u>Technical</u>				
	1) Non-availability of technical information	101	I	126	I
	2) Training facilities	91	II	110	II

Continued

Table 15 (continued)

Sr. No.	Problems	Pilot project		Non-pilot project	
		Score	Rank	Score	Rank
	3) Non-availability of water responsive varieties	47	III	79	III
	Total	239		315	
4. <u>Socio-economic</u>					
	1) Lack of finance	125	II	100	II
	2) Non-availability of credit in time	131	I	105	I
	3) High water rates	68	IV	69	IV
	4) High rate of interest	65	V	31	V
	5) High cost of inputs	109	III	82	III
	Total	498		387	
5. <u>Infrastructural facilities</u>					
	1) Non-availability of market facilities	83	III	93	II
	2) Non-availability of storage facilities	76	IV	89	III
	3) Roads	110	II	79	IV
	4) Non-availability of inputs in time	139	I	129	I
	Total	408		390	

From the perusal of the data presented in Table 15, it was observed that socio-economic problems, such as

non-availability of credit in time, lack of finance etc. followed by infrastructural problems such as non-availability of inputs in time and proper roads were the most important constraints expressed by the respondents from pilot project area. Third rank was given to physical constraint like heavy soils, drainage problem etc. Technical problem such as non-availability of technical information and training facilities and administrative problems were placed at fourth and fifth rank respectively.

As regards the problems of respondents from non-pilot area, physical constraints like unlevelled lands, heavy soils and problem of field channel were the most important problems followed by infrastructural problems such as non-availability of inputs in time and market facilities. Third rank was given to socio-economic problems viz. non-availability of credit in time, lack of finance, high cost of inputs etc. Technical and administrative problems were placed at fourth and fifth rank as in case of pilot area.

4.6 Characteristics of farmers and their relationship with extent of utilization of irrigation water

It is revealed from Table 16 that there was no relationship between personal characteristics of the farmers and extent of utilization of irrigation water.

Table 16: Correlation between personal characteristics of farmers and extent of utilization of irrigation water

Sr. No.	Personal characteristics	'r' value
1.	Age	-0.031
2.	Education	0.134
3.	Income	0.073
4.	Land holding	-0.057
5.	Social participation	0.061
6.	Extension contact	0.182
7.	Socio-economic status	-0.023

Table 17: Relationship between water management system and extent of utilization of irrigation water

Sr. No.	Water management system	'r' value
1.	Water management system	0.356 **

** Significant at 0.01 level of probability.

One of the important hypotheses to be tested in the present study was that better the management system of irrigation, more will be the extent of utilization of water.

In order to test present hypothesis, data were subjected to 'r' value. The calculated 'r' value was significant at one per cent level and therefore present hypothesis is accepted.

Thus it can be recapitulated that management system plays an important role in extent of use of irrigation water in pilot project area.

CHAPTER V

DISCUSSION

CHAPTER V

DISCUSSION

The present investigation was undertaken to know the extent of use of irrigation water in Jayakwadi command area. The extent of use of irrigation water has immense importance from production per unit of area in particular and to increase overall production in general. So far number of studies have been conducted to know the extent of utilization of irrigation from Jayakwadi and Purna command area. From the various reports, it was observed that the use of irrigation water is only 40 to 50 per cent, which is far low than expectations. In order to maximise the extent of utilization of irrigation water in Jayakwadi command area, special efforts have been undertaken in pilot project area i.e. on distributory PLBC-4. Therefore, it was decided to analyse the special management efforts undertaken by CADA authorities. The present research study was conducted in Akhatwada village of Paithan taluka. From this village 75 respondents from the pilot project area and from the same village 75 respondents from non-pilot area were selected for the study. Thus the total sample was comprised of 150 respondents.

The findings of the present study may help the CADA Administrator, the extension workers and planners

to overcome the various constraints identified in the present study by restructuring and planning the fields, policies, decisions and management system as a whole, so as to make the maximum use of irrigation water.

In order to see the differences in socio-personal and economic characteristics of the respondents from pilot and non-pilot area, 'Z' test was used. Similarly in order to understand the relationship between the personal, social and economic characteristics of the respondents from pilot area and their extent of utilization, a coefficient correlation test was employed. This test was also used to see the relationship between the management system and extent of use of irrigation water in CADA area and the results were discussed below:

5.1 Socio-personal and economic characteristics of the respondents

5.1.1 Age

Majority of the respondents (more than 62 per cent) were found in the middle age category. There was no significant difference in the age group of the respondents from pilot and non-pilot area.

5.1.2 Education

More than 25 per cent of the respondents from both the categories were illiterate whereas, more than

50 per cent respondents had education from primary to middle school, while more than 10 per cent respondents attended education upto high school level. There was no significant difference in the educational level of the respondents from pilot and non-pilot areas.

5.1.3 Annual income

In the pilot project area 56 per cent respondents had annual income from Rs.3500 to 4800 as against 36 per cent from non-pilot area, whereas, 60 per cent of the respondents from non-pilot project area reported annual income more than Rs.4800 as against 37 per cent from pilot project area. In fact the respondents from pilot project area should have more annual income as compared to non-pilot area, but income is a multidimensional factor which depends on not only maximum use of irrigation water but also it depends on the possession of land, type of soil, topography of the soil, environmental conditions, use of seed, fertilizer and pesticides and infrastructural facilities with the farmers. Therefore, in the present study it may be due to these factors, significant differences in the income of the farmer did not exist.

5.1.4 Land holding

About 20 per cent and 52 per cent farmers from pilot area possessed land holding from two ha to four ha

respectively, whereas, more than 26 per cent respondents had land holding above 4.1 ha, while 44 per cent respondents from non-pilot area possessed land between 2.1 to 4 ha and more than 42 per cent reported land holding above 4.1 ha. Thus there was significant difference in the possession of land holding of the respondents. The respondents from non-pilot area had larger land holding than respondents from pilot area and this is a clearcut evidence that the income of the respondents from non-pilot area was more than the respondents from pilot area. But it is also encouraging that the small and medium farmers from pilot project area are reaping the benefits of the irrigation potential made available than the respondents from non-pilot area. Now the question regarding the income of the respondents from the pilot project area may attribute other factors as discussed earlier.

5.1.5 Social participation

Social participation of the respondents plays an important role in getting acquainted with the administrators, planners, extension workers and also gathering the more information regarding the new technology and it also keeps aware regarding the new advancement and policies adopted by different developmental agencies. Therefore it is hypothesised that the farmers who are better in social participation may adopt more improved

practices. Therefore, in the present study social participation variable was included and studied.

More than 65 per cent respondents from the pilot area observed with a low social participation as against 61 per cent from non-pilot area. Similarly more than 18 per cent and 22 per cent respondents from pilot and non-pilot area had medium social participation, whereas, 12 per cent respondents from non-pilot area were observed in high category of social participation as against only one per cent from pilot project area. Here also findings are showing negative trend and it may be due to the possession of land holding. Land holding is an important attribute which determines social, economical and political status of the individual in rural areas. It may be due to because of this factor as majority of the respondents from pilot area had medium to low land holding lack in social participation. Therefore, a challenge to the extension worker to motivate the beneficiaries to have more participation in various development agencies to accrue the benefits of the technology.

5.1.6 Extension contact

About 64 per cent respondents from both the categories were observed in medium extension contacts, whereas, more than 18 per cent and 22 per cent

respondents from pilot and non-pilot area reported low extension contacts respectively. Little more percentage of the respondents from pilot project area was observed who had high extension contacts. But the mean difference was not significant. Thus it seems that pilot project authorities did not give proper attention to motivate the farmers of this area to have more extension contacts.

5.1.7 Socio-economic status

About 50 per cent and 60 per cent respondents were observed in medium socio-economic category from pilot and non-pilot areas respectively. Fourteen per cent respondents had high socio-economic status from non-pilot area as against more than 6 per cent from pilot project area. About 43 per cent respondents from pilot project area had low socio-economic status as against 25 per cent from non-pilot area. There was a significant difference in the socio-economic status of the respondents who were from non-pilot area. Even though the respondents from pilot area observed from medium to low socio-economic category, but these are the farmers who are taking more advantage of the irrigation water and this may be with the intention that they might be aspiring to increase the production and thereby to elevate the socio-economic status.

5.1.8 Knowledge level

More than 70 per cent respondents possessed medium to high technical knowledge from pilot project area, while about 63 per cent respondents from non-pilot area were observed in this category. There was no significant difference between the respondents from pilot and non-pilot areas as far as the technical knowledge is concerned. Here also it was supposed that the respondents from pilot project area may be better in technological knowledge than non-pilot area. But the situation is altogether different and it leads to the conclusion that there is an urgent need to organise training programmes and group discussions in pilot project areas to upgrade and update the technological knowledge of the respondents, in order to take maximum benefits of the irrigation potential.

5.2 On-farm development activities

One of the major hypotheses framed in present study is that, better the on-farm development activities, more will be the utilization of irrigation water.

5.2.1 Land development work

As far as the land development work is concerned, the development authorities have taken special efforts

in this area, which is evident from the data. About 50 per cent respondents were satisfied regarding the land development work in pilot project area, whereas, 32 per cent respondents were satisfied from non-pilot area. More than 34 per cent respondents were observed from most satisfactory category in respect of land development work from pilot area; and none of the respondents was observed in this category from non-pilot area. There was significant difference between these two groups in respect of land development work.

Therefore, it is concluded that authorities have paid more attention on land development work in pilot project area.

5.2.2 Agricultural extension service

One of the objectives of CADA is to provide agricultural extension service to the farmers under command area. About 80 per cent of the respondents from pilot area was received medium to high extension service as against 45 per cent from non-pilot area were found in this category. Whereas, 50 per cent respondents indicated low extension service from non-pilot area as against 20 per cent from pilot area. There was significant difference between these two groups. This difference in providing agricultural extension service may be due to the special efforts taken by the

extension agency in pilot area, which is a good indication of the help rendered by the CADA authorities. However, it needs to be further intensified; as very less percentage of the farmers could get the benefit of high extension service.

5.2.3 Infrastructural facilities

The CADA is expected to provide infrastructural facilities, in order to increase the irrigation utilization in command area. Infrastructural activities include market facilities, storage facilities, roads, and supply of inputs in time etc. It was observed that infrastructural facilities were upto satisfactory mark as expressed by more than 50 per cent of the respondents from both the categories. One fifth of the respondents were most satisfied from pilot area as against four per cent from non-pilot area. The significant difference was observed between these two categories in respect of infrastructural facilities. This disparity observed may be due to the fact that the management authority may have given due attention to this aspect in pilot area. However, still there is a need to enhance this facility as only 22 per cent respondents were most satisfactory about this facility.

5.3 Management of irrigation

Irrigation management includes the assistance to be rendered by the officials in respect of helping the

farmers in filling the water application, submission of application, information regarding the irrigation rotation, crop measurement etc.

Particularly small and medium farmers, they do need the assistance even in filling the applications for getting finance, crop rotations, and other related aspects. Thus the authority has to play a crucial role in this regard.

About 46 per cent farmers from pilot area received medium assistance in this respect as against 58 per cent from non-pilot area. Whereas, more than 22 per cent respondents from pilot area reported high assistance as against three per cent from non-pilot area. The mean difference was found significant. This may be due to that in order to increase the extent of utilization of irrigation water in pilot area, the management authority has played an efficient role in helping the farmers in pilot area. Still, there is a need to enhance this help as a very low percentage of farmers received high assistance.

5.4 Extent of utilization of irrigation water

The main purpose of the present investigation was to assess the extent of use of irrigation water in pilot and non-pilot area.

It was observed that more than 73 per cent respondents had medium use of irrigation water from pilot area as against 40 per cent from non-pilot area. The high extent of utilization was reported by the farmers from pilot area i.e. 17.34 per cent as against only eight per cent from non-pilot area. Similarly, the majority of the farmers from all the categories i.e. small, medium, and large had medium use of irrigation. However, high extent of utilization was reported by small and medium farmers i.e. 31.25 per cent and 20.51 per cent respectively from pilot area. The mean difference was found significant in respect of extent of utilization of irrigation water. This may, due to the fact that in pilot area, very careful attention was given to all the on-farm development activities by the management authority of CADA.

However, majority of the farmers from pilot and non-pilot area had not utilized the canal water upto the desired level. It may be due to the fact that majority of the farmers continue to grow crops which can thrive well under rainfed conditions, ignorance of importance of irrigation and different methods of irrigation and lack of on-farm development activities. It was also learnt that the soils possessed by some of the respondents were so rich and their water holding capacity was so high that they were not in a position

to harvest good yields if they irrigate their land. These findings are supported by the following studies : Sinnarkar (1964), Mukherjee and Harjindersingh (1966), Mahajan (1972), Sangle et al., (1972), Bangale (1974), Kadam (1974), Mishra and Vivekanand (1975), Solunke (1975), Ambegaonkar (1979), and Chate (1983).

5.5 Problems of farmers in utilization of irrigation water

The present study has focussed on the important problems which are the stumbling blocks in utilization of irrigation water.

It was found that socio-economic problems such as non-availability of credit in time, lack of finance, and high cost of inputs, followed by infrastructural problems like non-availability of inputs in time, proper roads, and market facilities were the most important constraints expressed by the respondents from pilot area; whereas, physical, technical and administrative problems were given least importance in order of merit.

The respondents from non-pilot area expressed the physical problem viz. unlevelled lands, heavy soils, and problems of field channels etc. followed by infrastructural problems as most important.

The socio-economic problems, technical and administrative problems were given third, fourth and fifth rank respectively. The differences in perception of these constraints by these two groups may be due to overall socio-economic status of both the groups.

Problems summarised above are also reported by : The Programme Evaluation Organization (1961, 1965), Sinnarkar (1964), Purna Project Problem Ascertainning Committee (1970), Solunke (1975), Wattamwar (1976-77), Ambegaonkar (1979), Mahajan (1980), Narayan and Venkat Reddy (1981), Patel (1981), Rajmane et al., (1981), Sundar and Rao (1981), Chate (1983), Wattamwar (1983-84), and Parshad (1984).

5.6 Relationship of personal characteristics with extent of utilization of irrigation water

Under the present study, seven independent variables were examined. It was found that there was no relationship between personal characteristics of the farmers and extent of utilization of irrigation water. However, significant relationship between water management aspects and extent of utilization of irrigation water was observed. One of the important hypotheses to be tested in the present study was that better the management system of irrigation, more will be the extent of utilization of water.

In order to test present hypothesis, data were subjected to 'r' value. The calculated 'r' value was found significant at one per cent level and therefore present hypothesis is accepted. Thus it can be concluded that the management system plays an important role in extent of use of irrigation water in pilot area. Lack of proper water management system results in underutilization of canal water. The underutilization of canal water due to this factor is reported by many of the researchers. The researchers are :
 Simmarkar (1964), Patel (1965), Patil (1965), Mukherjee and Harjindersingh (1966), Vinich Varnasilpa (1968), Baldevsingh (1970), Ramarao (1970), Kadam (1974), Solunke (1975), Wattamwar (1976-77), Jati and Shrivastava (1977), Patil (1977), Mathur (1980), Jogia (1981), and Magar and Shinde (1985).

5.6.1 Age

It is observed that the age of the respondent and the extent of utilization of canal water was not significantly correlated. It is probably because the management of farming is a joint responsibility of all the members of the family. The findings are in the confirmation with those reported by Junaghare (1962), Mukherjee (1970), Roger and Shoemaker (1971), Choubey (1972), Singh, Bhati, and Jain (1972), Chattopadhyay (1976), and Jetley (1977). They did not report

significant relationship between age and adoption. Similar findings were reported by Solunke (1975), and Wattamwar (1976-77).

5.6.2 Education

The education of the farmer is not found significantly correlated with the extent of utilization of irrigation water. This may be due to the fact that few years of early formal education is sufficient to increase their ability to absorb information necessary for utilization of irrigation water. This finding is in the line of the finding reported by Coughenour (1950, 1955), Krishna et al. (1972), and Deshpande (1980).

5.6.3 Income

It is found that the income of the farmer was not related with the extent of use of irrigation water. This may be due to the unfavourable conditions for utilization of irrigation water i.e. physical problems such as unlevelled lands, drainage problem, heavy soils etc. This finding is in consonance with the finding reported by Deshpande (1980). He found non-significant association between income and adoption.

5.6.4 Land holding

The land holding of the respondents was not found related with the extent of use of irrigation water.

This finding is also supported by Singh, Bhati and Jain (1972), Singh (1974), Buyukcolak (1978), and Solunke (1975). They found that there was no relationship between land holding and extent of utilization.

5.6.5 Social participation

It is observed that the social participation of the farmers was not related with the extent of utilization of canal water. This finding is in the line of the findings quoted by Supe and Sarode (1975), Wattamwar (1976-77), Chole (1974) and Deshpande (1980). They found that there was no significant relation between the social participation and adoption.

5.6.6 Extension contact

The extension contact is found to be not related with the extent of utilization of irrigation water.

This may be due to the unfavourable conditions such as heavy soils, unlevelled lands, problem of field channels etc. This finding is contradictory with the findings reported by Solunke (1975), Somasundaram (1976), Bharaswadkar (1976-77), De (1977), Mahajan (1980), and Chate (1983).

5.6.7 Socio-economic status

The significant relation between socio-economic status of the farmer and the extent of use of canal

water was not observed. This finding is supported by Junaghare (1962) while studying a sample of 129 farmers from Agricultural College Extension Block, Nagpur. He found that neither age of the farmer nor his social status was significantly related to adoption of farm practices.

CHAPTER VI

SUMMARY

CHAPTER VI

SUMMARY

Present study entitled "A comparative study of management system of irrigation in pilot project and non-pilot project of Jayakwadi command area", was undertaken in Paithan taluka of Aurangabad district with the following specific objectives :

- 1) To study the personal characteristics of farmers in pilot and non-pilot project area.
- 2) To study the on-farm development in pilot project.
- 3) To determine the extent of utilization of irrigation water in pilot project and non-pilot project area.
- 4) To study the irrigation management aspects in pilot project and non-pilot project area.
- 5) To study the association between personal characteristics and extent of utilization of irrigation water.

Ten villages from Paithan taluka were reaping the advantage of pilot project. Out of these villages, one village namely Akhatwada was selected randomly. From this village 75 respondents from pilot project area and 75 respondents from non-pilot area were selected randomly. Data were collected through personal interview with the help of structured interview schedule. The data were

analysed by using frequencies, percentages and statistical tests like 'Z' test and coefficient of correlation for assessing the difference between two groups and relationship of independent variable with the dependent variable. The salient features of this study are summarised as under.

6.1 Characteristics of respondents

6.1.1 Age

It was observed that majority of the respondents were found in the middle age category. There was no significant difference in the age group of the respondents from pilot and non-pilot area.

6.1.2 Education

One third farmers from both the groups did not report any formal education. More than 50 per cent respondents from both the groups had education from primary to middle school. While more than 10 per cent respondents attended education upto high school level. There was no significant difference in the educational level between the respondents from pilot and non-pilot area.

6.1.3 Annual income

More than 50 per cent respondents from pilot area had annual income from Rs. 3501 to 4800 as against

36 per cent from non-pilot area. Whereas 60 per cent of the respondents from non-pilot area reported annual income more than Rs.4800 as against 37 per cent from pilot area. It was observed that there was no significant difference in the annual income of the farmers from both the areas.

6.1.4 Land holding

About 20 per cent and 52 per cent farmers from pilot area possessed land holding from two ha to four ha respectively, whereas more than 26 per cent respondents had land holding above 4.1 ha. While 44 per cent respondents from non-pilot area possessed land between 2.1 to 4 ha and more than 42 per cent reported land holding above 4.1 ha. Thus there was significant difference in the possession of land holding of the respondents.

6.1.5 Social participation

Majority of the respondents from both the categories (i.e. more than 80 per cent) had low to medium social participation. However, high participation was observed (12 per cent) in case of the respondents from non-pilot area as against only one per cent from pilot area. There was significant difference in the social participation of the respondents.

6.1.6 Extension contact

More than 75 per cent of the respondents from both the categories were observed in medium to high level of extension contacts. Whereas about 18 per cent and 22 per cent respondents from pilot and non-pilot area reported low extension contacts respectively. The mean difference was non-significant.

6.1.7 Socio-economic status

About 50 per cent and 60 per cent respondents were observed in medium socio-economic category from pilot and non-pilot areas respectively. Fourteen per cent and six per cent farmers had high socio-economic status from non-pilot and pilot area respectively. Low socio-economic status was observed in case of respondents from pilot area as compared to non-pilot area. Analysis of the data indicated significant difference in the socio-economic status of the two groups.

6.1.8 Knowledge level

More than 70 per cent respondents possessed medium to high technical knowledge from pilot area while about 63 per cent respondents from non-pilot area were observed in this category. There was no significant difference between the respondents of these two groups as far as knowledge level is concerned.

6.2 On-farm development activities

6.2.1 Land development work

About 50 per cent respondents were satisfied regarding the land development work in pilot area, whereas, 32 per cent farmers were satisfied from non-pilot area. More than 34 per cent respondents were observed from most satisfactory category from pilot area and none of the respondents was observed in this category from non-pilot area. Analysis of the data indicated the significant difference between these two groups.

6.2.2 Agricultural extension service

About 80 per cent of the respondents from pilot area ~~was~~ received medium to high extension service as against 45 per cent from non-pilot area. Whereas, 50 per cent respondents indicated low extension service from non-pilot area as against 20 per cent from pilot area. There was significant difference between these two groups in respect of agricultural extension service.

6.2.3 Infrastructural facilities

It was observed that infrastructural facilities were upto satisfactory mark as expressed by more than 50 per cent of the respondents from both the categories. One fifth of the respondents were most satisfied from

pilot area as against four per cent from non-pilot area. The significant difference was observed between two groups.

6.3 Management of irrigation

About 46 per cent farmers from pilot area received medium assistance in respect of irrigation management viz. intimation about submission of water application, its sanction, and rotation of water etc. as against 58 per cent from non-pilot area. Whereas, more than 22 per cent respondents from pilot area reported high assistance as against three per cent from non-pilot area. The mean difference was found significant.

6.4 Extent of utilization of irrigation water

It was observed that, more than 73 per cent respondents had medium use of irrigation water from pilot area as against 40 per cent from non-pilot area. The high extent of utilization was reported by the farmers from pilot area i.e. 17.34 per cent as against eight per cent from non-pilot area. The mean difference was found significant in respect of utilization of irrigation water.

6.5 Problems of farmers in utilization of irrigation water

It was found that socio-economic problems, followed by infrastructural problems were the most important

constraints expressed by the respondents from pilot area. Whereas, physical, technical, and administrative problems were given least importance in order of merit. The respondents from non-pilot area expressed the physical problem followed by infrastructural problem as most important. The socio-economic, technical, and administrative problems were given third, fourth, and fifth rank respectively.

6.6 Relationship of personal characteristics with extent of utilization of irrigation water

It was found that there was no relationship between personal characteristics of the farmers and extent of utilization of irrigation water from pilot area.

The significant relation between water management aspects and extent of utilization of canal water was observed in pilot area.

CHAPTER VII

IMPLICATION

CHAPTER VII

IMPLICATION

Present investigation was undertaken to evaluate the special efforts taken by the management authority of Jayakwadi command area in pilot project, and to know the extent of utilization of irrigation water. Similarly this study has focussed on the important problems which are the stumbling blocks in utilization of canal water. For this study, 75 prespondents from pilot area, and 75 from non-pilot area were selected from Akhatwada village of Paithan taluka.

Based upon facts presented earlier the following implications emerge which need immediate attention of the policy planners, extension agencies, and CADA authorities to recast their programme to attain maximum use of irrigation water, and to overcome various constraints identified in the present investigation by restructuring and planning the fields, policies, decision and management system as a whole, in order to get maximum output per unit area; as this study has indicated significant relationship between management system and use of irrigation water.

- 1) On-farm development which include, land shaping, levelling, provision of drainage, and providing agricultural extension service has to be attended to

on top priority basis before the release of irrigation water.

2) The water courses lining may be undertaken by the CADA agency in order to lessen economic burden of this aspect of the farmer, which will motivate the farmer for more adoption.

3) Rotational distribution of water is essential for equitable distribution of irrigation supplies, and it should operate with considerable flexibility if it is to be truly efficient. It should be based on consumptive use of water at different stages of crop growth, which needs effective coordination between CADA and Agricultural University.

4) There is urgent need to organise training programmes, and group discussions in order to upgrade and update the technological knowledge of the farmers, so as to enable them to take maximum benefit of the irrigation potential.

5) There is a need to develop network of roads and market facilities in the jurisdiction of command area on the basis of local needs. Similarly, other infra-structural facilities like timely supply of inputs, and credit should be provided.

6) There should be vigorous extension work by the Agriculture Department to educate the farmers on scientific farming, and water management and to motivate them to have more participation in various development agencies to accrue the benefit of the technology.

7) In order to enhance the participation of the farmers, well planned educational programme to familiarise the beneficiaries need to be launched. The technical personnel involved in implementation and dealing with the beneficiaries should be exposed to various social sciences concepts specially communication process and extension education methods, so as to build in them the skills for working effectively.

To achieve voluntary participation of people more emphasis should be laid on intrinsic motivational approach, through increasing their socio-economic status by adopting the recent technology on larger scale.

8) Suitable cropping pattern based on soil type and other agroclimatic conditions needs to be introduced in command area.

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APPEND IX

जायकवाडी लाम्हेनातील पथदर्शक प्रकल्पांमार्गीत व प्रकल्प बांधव शेतक-यांचे
शेतीच्या पाणी वापराबाबतच्या व्यवस्थापन पद्धतीचा अभ्यास.

मुलाखत परिशिष्ट

१. सर्वसाधारण माहिती :

१. शेतक-याचे नांव : श्री.

२. गांव :

ता. :

जिल्हा :

३. वय :

वर्ष :

जात :

४. ओलीत शेती व्यवस्थापनाचा अनुभव :

वर्ष :

५. आपली शेती पथदर्शक प्रकल्पाखाली येते काय?

होय/नाही.

२. सामाजिक व आर्थिक दर्जा :

१. व्यवसाय : मजुरी/जातीवाचक धंदा/व्यापार/शेती/नौकरी

२. शिक्षण : अशिक्षित/वाचू शकतो/ वाचू व लिहू शकतो/ ग्रायमरी/ मिडल/
हायस्कूल/ पदवीधर

३. [अ] कुटुंब प्रकार : ऐकत्रीत/विभक्त

[ब] कुटुंबातील व्यक्तींची संख्या : पाच पर्यंत/पाच व त्यापेक्षा जास्त

४. वार्षिक उत्पन्न : अ] रु. १२०० ते १८००

ब] रु. १८०१ ते २४००

क] रु. २४०१ ते ३५००

ड] रु. ३५०१ ते ४८००

इ] रु. ४८०१ व त्यापेक्षा जास्त

५. सामाजिक संस्थेतील सहभाग : ऐका संस्थेचा समास/ऐकापेक्षा जास्त संस्थेचा
समासव/ पदाधिकारी/लोकनेता

६. जमीन धारणा : अ] ऐक ऐकर पेक्षा कमी

कोरडवाहू ओलीत

ब] १.१ ते ५ ऐकर

क] ५.१ ते १० ऐकर

ड] १०.१ ते १५ ऐकर

इ] १५.१ ते २० ऐकर

ई] २०.१ ते त्यापेक्षा जास्त

७. घर : झोपडी/संमीम/पक्केघर/बंगला

अ] दिव्याची सोय : विजेचा दिवा/केरोसिनचा दिवा

ब] घराची मालकी : स्वताचे घर / भाड्याचे घर

८. मालकिये साहित्य : १. लोखंडी नांगर

२. बी व ब्लौ पेरणीची लोखंडी तिफण

३. दातेरी कोळ्ये

४. साधे कोळ्ये

५. रोप टोपण यंत्र

६. रिपर

७. डस्टर

८. त्रुअर

९. धान्य साठवण्याची लोखंडी कोठी

१०. सायकल

११. मोटर सायकल

अ] माहिती मिळविण्याचे साहित्य : रेडीओ/वर्तमानपत्र/वेळीचे मासिक/
वेळी प्रकाशन

ब] इलेक्ट्रीक मोटार

क] टँक्टर

९. जनावरे : एक बैलजोडी/दोनबैल जोड्या/तीन बैल जोड्या

अ] संकरित गाई

ब] कुक्कूट पालन

१०. आपण थकवाकीदार आहात काय? होय/नाही

११. इतर वैयक्तिक वैशिष्ट्ये : बिजोत्पादक/प्रगतीशिल शेतकरी/बक्षिस विजेते/
विकास संस्थेचे सभासद/कुषि पंडीत.

१२. कृषि विस्तार कार्यकर्त्यांविरुद्ध भेटी :

अ.क्र. कृषि विस्तार कार्यकर्ते

भेटी व मार्गदर्शन

आठवड्यात प्रथमवाडा महिन्यात महिन्या
नंतर

१. ग्राम सेवक
२. ग्राम विस्तारक [प्र व भे]
३. कृषि मदतनीस [कडा]
४. कृषि पर्यवेक्षक [कडा]
५. कृषि अधिकारी [कडा]
६. कृषि अधिकारी [प्र व भे]
७. कृषि अधिकारी [पंत]
८. विषय विशेषज्ञ [प्र व भे]
९. कु.वि. अधिकारी [जि.प]
१०. गटविकास अधिकारी [पंत]
११. प्रमुख कृषि अधिकारी [प्र व भे]
१२. कृषि उपसंचालक [कडा]
१३. लैकेचे अधिकारी
१४. सहकारी संस्थेचे तज्ञ
१५. म.कु.वि. चे तज्ञ
१६. इतर [नावासहित]

१३ [अ] शेती विकासाची कामे :

१. शेत चा-या व जल निस्तारण चा-या खोदल्या आहेत काय? होय/नाही
होय असल्यास तांत्रिकदृष्ट्या कशा आहेत. अगदी योग्य/योग्य/अयोग्य
२. जमिनीचे सपाटीकरण झाले आहे काय? होय/नाही
होय असल्यास तांत्रिक दृष्ट्या कसे झाले? अगदी योग्य/योग्य/अयोग्य

३. आवश्यकतेनुसार पाणी मिळण्याची सोय केली आहे काय? होय/नाही
होय असल्यास पाणी कसे मिळते? आवश्यकतेनुसार/कमी प्रमाणात.
४. बाराबंदी पध्दतीनुसार पाणी मिळते काय? होय/नाही
होय असल्यास ही पध्दत कशी वाटते? चांगली/बरी/वाडव.
५. बियाणाचा पुरवठा कसा होतो? योग्यप्रमाणात/कमी प्रमाणात/होत नाही.
६. बियाणाचा पुरवठा वेळेवर होतो काय? योग्यवेळी/उशिरा/होत नाही.
७. रासायनिक खताचा पुरवठा कसा होतो? योग्य प्रमाणात/कमी प्रमाणात
होत नाही.
८. खताचा पुरवठा योग्य वेळी होतो काय? योग्यवेळी/उशिरा/ होत नाही.
९. किटक नाशक औषधीचा पुरवठा कसा होतो? योग्य प्रमाणात/कमी प्रमाणात/
होत नाही.
१०. औषधीचा पुरवठा योग्य वेळी होतो काय? योग्य वेळी/ उशिरा/होत नाही.
११. कर्जाचा पुरवठा कसा होतो? योग्य प्रमाणात/कमी प्रमाणात/होत नाही.
१२. कर्जाचा पुरवठा योग्य वेळी होतो काय? योग्य वेळी/उशिरा/होत नाही.
१३. क्षेत्रा-याचे लायनींग झाले काय? होय/नाही
झाले असल्यास तांत्रिक दृष्ट्या कसे झाले? अगदी योग्य/योग्य/अयोग्य.
१४. पाण्याचा नियंत्रण होण्यासाठी चर खोदले काय? होय/नाही.
झाले असल्यास तांत्रिक दृष्ट्या कसे झाले? अगदी योग्य/योग्य/अयोग्य

[ब] कृषि विस्तार सेवा :

१. नविन पिकाचे व वाणाचे प्रात्यक्षिका बाबत माहिती मिळाली काय? होय/नाही.
२. पिक संरक्षण मोहीमेबाबत माहिती मिळाली काय? होय/नाही.
३. ओलीताखाली देण्यात येणा-या पिका बाबत माहिती मिळाली काय?
होय/नाही.
४. पाणी वापरण्याच्या पध्दतीची माहिती मिळाली काय? होय/नाही.
५. पिकाला पाणी देण्यासाठी जमिनीच्या आखणी बाबत माहिती दिल्या
गेली काय? होय/नाही.

[क] शेती मालाचे वितरण, साठवण, वाहतूक इत्यादी :

१. शेती मालाचे वितरण करण्यास बाजार पेठेची सोय कशी आहे?

अत्यंत सोड्यी/सोड्यी/गेरसोड्यी.

२. शेती माल साठवणूकीची सोय कशी आहे? चांगली/बरी/वाईट.

३. माल वाहतूकीची साधने कशी आहेत? चांगली/बरी/वाईट

४. माल वाहतूकीसाठी रस्त्याची सोय कशी आहे?

चांगली/बरी/वाईट.

५. मालास बाजार भाव कसा मिळतो?

जास्त/साधारण/कमी.

१४. पाण्याचे व्यवस्थापन :

१. आपणास पाणी अर्ज भरण्याची आधी सुचना दिली जाते काय?

होय/नाही.

२. पाणी अर्ज आपण स्वतः भरता काय? होय/नाही.

३. पाणी अर्ज मंजूर झाल्याची सुचना दिली जाते काय? होय/नाही.

४. आपणास पाणी पाळी पत्रक आधी मिळते काय? होय/नाही.

५. पाण्याच्या पाळी संबंधी आधी सुचना दिली जाते काय? होय/नाही.

६. पाणी वापरलेल्या क्षेत्राचे मोजमाप कसे होते?

योग्यप्रकारे/अयोग्य/नाही.

७. पाणी वाटप कमेटीव्दारे पाण्याचा पुरवठा करणे कितपत आवश्यक आहे.

अगदी आवश्यक/आवश्यक / नाही.

८. पाणी वाटप करण्यासाठी ग्रुप लिडरची कितपत आवश्यक आहे. अगदी आवश्यक/

९. भारी जमिनीला पाणी देणे कितपत अवघड जाते? आवश्यक/नाही.

सोपे/कठीण/अगदीकठीण.

१०. सार्वजनिक चराची निगा आपण कितपत राखता?

चांगली/बरी/नाही.

१५. पाटाच्या पाण्याचा वापर :

अ.क्र.	पीक	वाण	खरीप	रबी	उन्हाळी
		लामखेव	पाणी	वापरलेले	
		मिळण्या	योग्य	पाणी.	

१. खरीप

ख. ज्वारी

बाजरी

मुहसुग

कपाशी

मुग

तुर

चारा

२. रबी

गहू

र. ज्वारी

हरमरा

करडी

सूर्य फुल

३. उन्हाळी

उ. मुहसुग

मुग

चारा

झतार

१६. ज्ञान चाचणी :

१. जायकवाडी धरणाचे पाणी आपल्या गावात केव्हापासून उपलब्ध झाले. वर्ष
२. आपल्या शेतास किती दिवसांनी पाण्याची पाळी येते. एक आठवडा/दोन आठवडे/त्या पेक्षा जास्त
३. उसाच्या पिकास पाण्याच्या पाळ्या ५ ते ६, ६-८, १०-१२ दिवसांच्या अंतराने घाव्यात.
४. उन्हाळी मुळमुगास पाण्याच्या पाळ्या ८ ते १०, १० ते १२, पंधरा दिवसांनी घाव्यात.
५. भाजीपाला काढणीपूर्वी ७ ते १०, ८ ते १२ किंवा १५ दिवसांनी पाणी बंद करावे.
६. बागायती गव्हाला ४/५/६ पाण्याच्या पाळ्याची गरज आहे.
७. गव्हाला कौणकोणत्या अवस्थेत पाण्याची अंत्यत गरज आहे.
८. गव्हाला फुटवे फुटल्यावर/गहु कांड्यावर येत असतांना/गहु पोट-यात येत असतांना/गहु फुली-यात असतांना/ हुरड्यात असतांना.
९. संकरित ४ कपाशिला फुले लागण्यापासून बोंडे फुट्टे पर्यंत अधिक/कमी पाणी लागते.
१०. रबी ज्वारीला पहिले पाणी मीक २५ ते ३० / ५० ते ५५ दिवसाचे असतांना घावे.
१०. लाभ क्षेत्रात प्रायोगिक प्रक्षेत्र [टीसीडी] कोठे आहे? पैठण / नवगाव / विहामांडवा.

पाटाचे पाणी वापरण्यात येण-या अडकणी गुणांनुक्रमे अनुक्रमांक देवून सांगा.

तपशिल	महत्त्वाचे	कमी महत्त्वाचे	नाही
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१. भौतीक अडकणी उदा.

चिमड जमीन, जमीनीचा चढउतार
पणा, चा-याचे प्रश्न, चा-या फुटणे,

तपशिल

महत्वाचे कमी महत्वाचे नाही

पाण्याचा निचरा, अधिक जमीन
धारणा, औजाराचा अभाव, शेत
पारीच्या शेवटी असणे भारी जमीन.

२. व्यवस्थापनातील अडचणी : उदा.

योग्य नियोजनाचा अभाव,
अप्रशिक्षित कर्मचारी, समन्वयाचा
अभाव, पाठपुरावा न होणे,
विस्तार सेवेचा अभाव, अपुरा
कर्मचारी वर्ग, कर्मचा-यांच्या
वारंवार बदल्या होणे.

३. तांत्रिक अडचणी उदा.

जमीनीचे सफाटीकरण, तांत्रिक
माहिती वेळेवर न मिळणे,
प्रशिक्षण न मिळणे, पाण्याला
प्रतिसाद न देणा-या पिकाचे
वाण.

४. सामाजिक व आर्थिक अडचणी.

उदा. शेजारचे लोक पाणी
वापरत नाहीत, पाटाचे पाणी
योग्य नसते, आर्थिक अडचण, कर्ज
वेळेवर न मिळणे, पाण्याचे दर जास्त,
कर्जावरील जास्त व्याज, निविदाच्या
अधिक किंमती. मालाला योग्य
बाजार भाव नसणे.

तपशिल

महत्वाचें कमी महत्वाचें नाही

५. उपलब्धतेच्या अडचणी : उदा.

बाजारपेठा, साठवणी, रस्त्याची
सौय, निविदाची उपलब्धता नसणे.
