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**A CASE STUDY ON USE OF DRIP  
IRRIGATION TECHNOLOGY**

**BY**  
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*B. Sc. [Agri]*

T 2163



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*Submitted To The Marathwada Agricultural University*  
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**PARBHANI, [Maharashtra] INDIA**  
**1992**



To

My Mother

who have strived to

make me


what I am.

SUNIL



CANDIDATE'S DECLARATION

I hereby declare that the dissertation  
or part thereof has not been  
previously submitted by  
me for a degree of  
any University.

  
( S.H. ULEMALE )

Parbhani

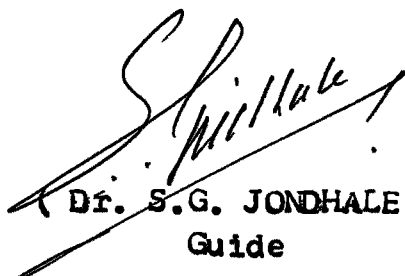
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CERTIFICATE - I

This is to certify that the dissertation  
entitled " A CASE STUDY ON USE OF DRIP IRRIGATION  
TECHNOLOGY", submitted to the Marathwada Agricultural  
University, Parbhani in partial fulfilment of the  
requirement for the degree of MASTER OF SCIENCE  
(Agriculture) in the subject of AGRICULTURAL EXTENSION  
embodies the results of a bonafide research carried  
out by Shri. Sunil Hiroji Ulemale under my guidance  
and supervision. No part of this dissertation has  
been submitted for any other degree of any University.

  
( Dr. S.G. JONDHALE )  
Guide

Parbhani


Dated: 22 July 1992

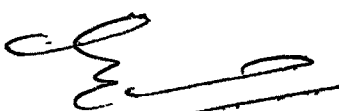



## CERTIFICATE - II

This is to certify that the dissertation entitled " A CASE STUDY ON USE OF DRIP IRRIGATION TECHNOLOGY" submitted by Shri. Sunil Hiroji Ulemale to the Marathwada Agricultural University, Parbhani 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 viva-voce examination in collaboration with the External Examiner.


  
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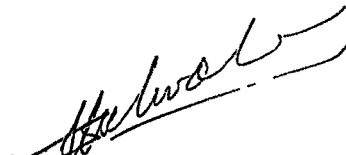
I have no words to express my feelings towards my respectful parents, the blessings of my mother, Sou. Venutai and father Dadasaheb, who gave me inspiration and urge to complete my postgraduation.

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Last, but not the least, the inspiring words and wishful ambition of my mother and father of them are never ignored by me.

  
( S.H. Ulemale )

Parbhani

Dated: 22<sup>nd</sup> July 1992



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# **CHAPTER I**

## **INTRODUCTION**



Among all the resources required for agriculture land and water are the basic resources and are also limited resources. However, if they are linked meaningfully and used efficiently, land can be increased by 2 to 3 times. Intensity of cultivation can be stepped up from the present 112 per cent to ✓ 200 to 300 per cent. But this is possible only if water is made available to take crops for the 2nd or the 3rd time in a year on the same field. It is expected that the entire available water resources of India will be harnessed during next 10 to 12 years. Even then, the total irrigated area will be only about 50 per cent of the cultivated area. Higher productivity and bringing more area under irrigation can be achieved only by introduction of advanced methods and techniques of irrigation. Further the average yield per unit area for all crops is very low and this has to be increased in order to feed the growing population. These two goals can be achieved only by introduction of micro irrigation which may be of drip with emitters, Bwall, micro sprinkler. ✓

Water is a vital input in crop production. Although it is the earth's most abundant compound, yet it is the single important factor affecting



crop production all over the world. Efforts must, therefore, be made to use it most efficiently. For efficient utilization of irrigation water for better yield and maintenance of soil structure in good condition, it is necessary to apply required quantity of water at the time when ~~crop~~ demand.

Maharashtra has hardly 12 per cent area under irrigation. The different reports have estimated that the irrigation in Maharashtra can cover up to 30 to 35 per cent of the total area by tapping all water resources. This can be considerably increased by adopting higher water use efficiency methods like drip. By adopting drip irrigation systems, area can be increased by 2-3 folds. Besides this, increase in yield is also reported to the extent of 20 to 30 per cent. Increase in yield is accounted for the fact that under drip irrigation air moisture ratio in soil is optimumly maintained and since optimum moisture condition prevails nutrient uptake is greatly facilitated.

Among various measures attempted for efficient use of irrigation water, adoption of sprinkler irrigation and drip irrigation systems have attracted the attention of both Government and scientists during the last 4 to 5 years. Drip irrigation has registered itself as a strong factor



for augmenting crop yield under low available irrigation potential. Several research results have established that about 50 to 60 per cent of available water could be saved by adopting drip irrigation system. Therefore, Government of Maharashtra has started giving subsidy for installation of sprinkler and drip irrigation systems. Extension education activities on large scale are also undertaken by the State extension agency and the University scientists to popularise these systems and to enhance their use by the farmers.

Sanyal (1985) stated that drip irrigation, undoubtedly, has many attractive advantages. These advantages are water economy, increased crop yield, less weed growth, less power and labour requirement, saving in cost of levelling, etc.

Pawade (1987) observed that the use of drip irrigation is increasing in water scarcity area for orchards, vegetables and high value crops.

## II Objectives of the study

Considering the growing importance of drip irrigation in this area a study "A case study on use of drip irrigation technology" was undertaken.



The study approach was purposively followed to probe into details of factors from socio-matrix causing failure or non-adoption. Keeping this background in view, study was undertaken with the following specific objectives.

- ✓ 1. To study socio-personal and economic characteristics of drip irrigation users,
2. To study the knowledge and adoption of recommended package of practices of drip irrigation,
3. ✓ To isolate the constraint in use of drip irrigation technology,
4. To obtain the suggestion of farmers to improve the use of drip irrigation technology. ✓

### III Importance of the study

The study will show status of use of drip irrigation technology by farmers. The findings will reflect upon the factors affecting the adoption of drip irrigation technology at the farmers' level. It is expected that these findings will be helpful to the Government, manufacturers of component of



drip irrigation system, as well as to the extension agency. More over the findings can also be utilized as base line situation for further studies on drip irrigation systems.

#### IV        Scope of the study

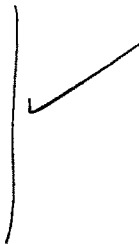
The present investigation could not cover all the aspects related to the drip irrigation system. As stated earlier, the major focus of the study was on the knowledge and adoption of recommended package of practices under drip irrigation system and constraints faced by the farmers and their suggestions to improve the use of drip irrigation technology.

#### V        Limitations of the study

Geographically the study was limited to Parbhani district. This district has its own agro-climatic and socio-economic situation. Therefore, the findings of present investigation may not be applicable to other areas having different situation. More over, drip irrigation sets were installed very recently and therefore, the experience of farmers might be different from those who had long experience about drip irrigation



system. The drip irrigation system in most of the cases was utilized for wide spaced crop. With gradual use, the system will be used for other crops also. Therefore, the present findings may not fit with any changed situation. Data were mostly based on the recollection of the past memory of the respondents.







## **CHAPTER II**

## **REVIEW OF LITERATURE**



A comprehensive review of literature is an essential part of any scientific investigation. It's main function is to determine the previous research work done and assess in delineation of problem area, provide a basis to theoretical framework, provide an insight into methods and procedures, suggest operational definitions of major concepts and provide a basis for interpretation of findings.

Drip irrigation is comparatively a new idea in the Indian situation. Therefore, research on social aspects of drip irrigation is scarce. No empirical studies could be reviewed on social aspects particularly the socio-personal and psychological characteristics of the drip irrigation set owner as well as on their knowledge and adoption level. However, findings of studies on knowledge and adoption of water management practices of drip are presented in this chapter. Empirical studies on benefit of the drip irrigation system have been reviewed rather adequately. The literature having direct and indirect bearing



on the problem under study was reviewed under following heads:

- 2.1 Characteristics of drip irrigation users. ✓
- 2.2 Knowledge and adoption of recommended package of practices of drip. ✓
- 2.3 Constraints in use of drip irrigation technology. ✓
- 2.4 Suggestions of farmers to improve the use of drip irrigation technology. ✓

2.1 Characteristics of drip irrigation users ✓

2.1.1 Education

Gajare (1983) observed that 36.67 per cent of the respondents were educated up to primary level whereas 63.33 per cent respondents were ✓ educated up to secondary level.

Nagare (1989) observed that 37.85 per cent respondents had secondary education, 35.74 per cent respondents had higher education, 18.85 per cent respondents had primary education. The 3.06 per cent respondents were illiterate. ✓



Satpute et al. (1991) stated that large number of respondents (35.81 per cent) were educated up to higher secondary followed by 23.81 per cent graduates and the same number of respondents had passed middle school. This shows that the respondents having better educational background were more attracted towards drip irrigation than illiterate and having formal education upto 4th standard.

#### 2.1.2 Land Holding

Gajare (1988) observed that 69.44 per cent of the respondents were in the category of high land holding, followed by 13.89 per cent medium category respondents and 16.67 per cent respondents from the low category of land holding.

Nagare (1989) found that 69.39 per cent respondents had less than 2.00 hectares land, 21.43 per cent respondents had 2.01 to 4.00 hectares and 9.10 per cent respondents had above 4.00 hectares land.

Ingle et al. (1990) observed that maximum number of respondents i.e. 31.53 per cent had more than 8 hectares/land followed by 26.32 per cent



with 1 to 2 hectares land. However, in this regard it may be noted that the total family holdings were relatively more and for availing subsidy for purchase of drip system, the holding of individual were less.

Satpute et al. (1991) stated that majority of the respondents had the holding of above 6 hectares followed by 42.86 per cent with 2 to 6 hectares. 9.52 per cent respondents had holding up to 2 hectares. It is, therefore, inferred that amongst drip system adopters majority of the farmers had economic holdings.

### 2.1.3 Annual Income

Nagare (1989) observed that 88.78 per cent of respondents had income above Rs. 7,000/-.

Ingle et al. (1990) reported that majority of the respondents (73.63 per cent) had high economic status. These having annual income above Rs. one lakh were 31.58 per cent. It indicates a strong economic base of adopters of drip irrigation system.



#### 2.1.4 Age

Gajare (1983) found that the majority of respondents, 61.11 per cent were from young age followed by middle age group of 38.39 per cent.

Devane (1990) stated that majority of adopters of drip irrigation were from middle age group.

Ingle et al. (1990) reported, half of the respondents were between 31 to 45 years age group and graduates. None of the respondents were illiterate.

#### 2.1.5 Extension Contact

Gajare (1988) observed that majority of the respondents have medium extension contact.

Nagare (1989) found that 63.32 per cent respondents had medium level of extension contact followed by 23.40 per cent having high extension contact and remaining 14.28 per cent respondents had low extension contact.



## 2.2 Knowledge and Adoption

### 2.2.1 Knowledge

Nagare (1989) found that majority (64.30 per cent) of farmers had medium level of knowledge about drip irrigation system. Nearly one-third of the respondents (30.60 per cent) had high level of knowledge.

Devane (1990) reported that majority of respondents were aware about functions of pressure guage, air valve and use of pesticides/fungicides through drip irrigation but it's implementation was partial.

So far as maintenance of drip set was concerned, almost all farmers were aware of acid treatment and flushing out of water through pipe line under pressure, for cleaning their sets. Few of them also reported other tests like treatment of sodium hypochloride treatment, bleaching powder treatment for removing stresses of salts on inner lining of pipe line.

Ingle et al. (1990) stated that on the whole most of the adopters knew various technical aspects



related to the use of drip system. Technique of measuring water pressure was known to 84.21 per cent respondents and all of them used pressure meter. Measure of cleaning choked micro tubes of drippers with chemical and other mechanical means was known to all. ✓

For efficient working of drip system, it is necessary to check main, sub-main and laterals for damage, leakages, etc. These factors were known to all the respondents.

Fertilizer can be applied through drip irrigation system. It was known to 68.42 per cent respondents. Most of the respondents were aware about the correct doses of fertilizer application through drip. Before installing drip system, water testing should be done. It was known to majority of the respondents (84.21 per cent).

#### 2.2.2 Adoption

Nagare (1989) found that 51.50 per cent respondents had medium level of adoption and 43.40 per cent respondents had high level of adoption.

Devane (1990) reported that pre-testing of water for its suitability of drip irrigation,



working out of specification of layout were considered as business of company engineer by the farmer. Varieties of irrigation requirement of crops such as plant type, age, soil, season, growth stage of plant, but they were not capable of working out irrigation requirement of their own crops.

Ingle et al. (1990) stated that adopters knew various technical aspects related to the use of drip system but were adopted by relatively less number of respondents. Technique of measuring water pressure known to 84.21 per cent respondents and also the technique of cleaning choked micro-tube and drippers with chemical and other mechanical means. It was adopted by all the respondents. In 15.79 per cent cases, pressure valves were not fitted. One-fourth of them did not care to check the system regularly. Fertilizer application through drip irrigation system was known to 63.42 per cent respondents. Majority of them (78.95 per cent) did not adopt it. Necessity of water testing was known to majority of the respondents (84.21 per cent). More than half of the respondents (52.63 per cent) did not do that.



## 2.4 Constraints

### 2.3.1 Technical constraints

Deshpande et al. (1983) in their study revealed the following constraints. (1) After paying full attention towards the cleaning of laterals get clogged due to silting and further it have to be replaced by new one. (2) Problem of protection of valuable material by rat, fire and theft of Emitter and lateral was the problem.

Dhumal (1988) observed that due to continuous point application of water, salts are accumulated on the periphery of the wetted zone. They may get leached away in rainy season. But in scanty rainfall zone, these salts may create problem.

Rodge et al. (1988) found following constraints:

1. Sensitivity to clogging
2. Moisture distribution problems
3. Salinity hazards
4. High costs
5. High skill is required for design, installation and operation



6. Clogging of Emitters
7. Improper design and layout
8. Lack of knowledge regarding time of application
9. Attempts to use local material low quality with a view to reduce cost
10. Damage of laterals by rats, squirrels, plant roots and other wild animal.

Ingle (1989) reported several constraints inhibited the successful use of drip irrigation system, it is mainly due to clogging, of Emitters, faulty design and layout, lack of knowledge required to operate it, efficiently and damage due to rodents. It confirms the observations of Rodge et al. (1988), Fry (1985) and Sekhan (1988).

Jadhav (1989) stated that major problems were lack of technical knowledge and chemical treatment. Rat control was also a major problem reported by majority of the farmers to overcome the problem faced by drip irrigation system they have to use same precaution and daily required operation.



Ingle et al. (1990) revealed that most of the respondents experienced constraints of checking of drippers and micro tube and damages by rodents 84.21 per cent and 78.98 per cent, respectively. The other important constraints in adoption were inferior quality of spare parts (52.63 per cent), cracks to the pipe (42.10 per cent), pipe joint leakage (36.84 per cent), filter breakages (26.32 per cent). The constraint such as faulty layout of water do not reach to the tail were expressed by 15.79 and 10.53 per cent respondents. These constraints have been found to be most important.

Magar (1990) observed following constraints.

1. Personal care and management is necessary in order to keep the system up to date.
2. Accumulation of salt near the root zone.
3. Root developed in limited area
4. High initial cost
5. Blockage of dripper and laterals according to World Food and Agricultural Organization, following are the reasons and their percentage of blockage of micro-tube.
 

1. Biological	37%
2. Chemical	22%
3. Physical	31%
4. Unknown	10%
6. Mechanical damage to the laterals.



### 2.3.2 Social Constraint

Dhumal (1988) found that some of the horticultural crops required water stressed as a 'Bahar treatment'. Cultivators and extension workers experienced some difficulties in giving this treatment in the orange orchard being irrigated by drip.

Ingle et al. (1990) reported that inadequacy of perfect technical information about drip irrigation system. The other important information constraint was inadequate guidance from the dealer. These constraints were responsible for lack of conviction about the utility of drip irrigation system.

### 2.3.3 Economic Constraint

Deshpande et al. (1988) stated that basic capital expenses is more in drip irrigation system as compared to other methods of irrigation. It is due to the monopoly of few manufacturing companies due to less competition among them.

Devane (1990) in his case study revealed the problems like political influence in functioning D.D.B and L.D.B. and difficulties in getting finance through them was not the problem of respondent



farmers but in their opinion it was problem for common man in getting finance, starting of immediate recovery of instalment was the problem for few respondent farmers.

Ingle et al. (1990) observed that economic aspects did not influence the installation of drip irrigation system. It was due to the fact that the adopters studied were economically sound and also that advantages of Government subsidy was taken by them. Only one respondent (5.26 per cent) expressed the economic constraint.

## 2.4 Suggestion

### 2.4.1 Suggestion

Ulemale (1987) opioned that if a capital outlay about Rs. 15,000 to 10,000 is made available to cultivators, he can be induced to become an irrigated farmer and go in for a small orcnard, beside thinking of giving protective irrigation in kharif if need be.

Dhumal (1988) suggested that we must prepare a ready reckoner which can be followed by the farmers to cultivate their own water requirement, for higher yield and better quality. It is the



responsibility of Agricultural Universities to design drip system that can be easily operatable by even semi-literate farmer. Design of sprinkler/drip involves many mathematical engineering calculation, farmer has to depend upon dealers/manufacturers. In order that service can be given to the farmers, the Agricultural Universities should train a large number of educated unemployees as well as progressive farmers, so that they can design system for themselves or check the design made available by the dealer/manufacturers and also give independent consultancy services for farmers, intending to set up drip system.

He further suggested that they could then harness their strains to make the drip system designed for one acre, render services for large areas by merely shifting the laterals. The Universities need to take into account this fact and develop system which suits the large farmers. The highly intensive system will have limited capability.

Ingle (1989) opined the intensive extension efforts through result demonstrations, field trips to successful farmers and continuous after sales service and technical guidance are necessary.



Jadhve (1989) suggested that lacking of Emitters and orifices, ignorance in use of proper filtering units can be reduced by using the sand filter. This problem can also be reduced by better management, the regular flushing of flush valves, after each irrigation, use of chemical like technical hydrochloric acid of 36 per cent nitric acid treatment, etc. for controlling of rat clean cultivation, removal of weed regularly, well reduce the rodenticides used well reduce the problem.

Devane (1990) suggested the following points.

1. Farmers using drip irrigation technology could be given orientation training of district level, in order to improve their skill and knowledge useful in efficient utilization of drip irrigation technology.
2. Particularly, small farmers need to be helped in getting finance from bank.
3. The efforts should be in the direction to demonstrate effective functioning of drip irrigation on small farmers holding in order to built his confidence.



Ingle et al. (1990) pointed out that the important suggestions made by the respondents were that the material should be of good quality (52.63 per cent), Raw material should be available in open market (52.03 per cent), regular visit of the dealers (36.84 per cent) and subsidy on purchases on cash payment (26.30 per cent).

1. Intensive guidance of training should be given to the farmers so that they will be able to repair the fault in the system.
2. The dealer should continuously guide the farmers until atleast one complete season, so that farmers will be able to see successful working of drip system.
3. The damage due to the rodents, leakages, chocking, etc. may be minimised if good quality material is made available.





## **CHAPTER III**

## **MATERIALS AND METHODS**



### 3.

### METHODOLOGY

The present chapter deals with materials and methods. "A case study on use of drip irrigation technology" was carried out in the Parbhani district of Marathwada region of Maharashtra State.

The research procedure and technique followed for the study have been presented under the following heads.

- 3.1 Locale of study
- 3.2 Method of sampling
- 3.3 Method of data collection
- 3.4 Research design

#### 3.1 Locale of study

The study was conducted in the Parbhani district of Marathwada region of Maharashtra state.

The Parbhani district is situated at 403 meters above mean sea level, it lies between  $13^{\circ}.50'$  and  $13^{\circ}.75'$  North latitude and  $77^{\circ}.10'$  and  $77^{\circ}.25'$  East longitude demarkating the boundaries of Latur, Bhir, Jalna, Yeotmal and Nanded. It is one of the seventh district of the Marathwada region



and lies in Godavari basin. The district comprise 1450 villages having rural population 10.31 lakh and urban 2.13 lakh. The average rainfall received annually is 835.8 mm.

### 3.2 Method of Sampling

#### 3.2.1 Selection of District

The study was conducted during the month of April to May, 1992. For the present study, Parbhani district was purposively selected. It consists of 7 talukas viz. (i) Parbhani, (ii) Hingoli, (iii) Kalamnuri, (iv) Jintoor, (v) Pathri, (vi) Basmath and (vii) Gangakhed.

Parbhani district has a better potential for agricultural development by the Jayakwadi irrigation project, Purna command irrigation, having installed maximum drip irrigation sets in the district. Most of the farmers having irrigation source were turning towards the horticultural plantation by installing drip irrigation sets on them.

#### 3.2.2 Selection of the cases

A random sample of ten farmers using drip irrigation were drawn from Parbhani district.



### 3.3 Method of Data Collection

#### 3.3.1 Preparation of Interview Schedule

A specially designed interview schedule was used for interviewing respondents, keeping the objectives in view schedule was prepared for data collection (Appendix I). The questionnaire was intended to obtain information regarding the socio-personal and economic characteristics, knowledge and adoption, constraints, suggestion, etc. The questionnaire was prepared in local language (Marathi).

#### 3.3.2 Collection of Data

The data were collected with the help of these interview schedule by personal interview method with respondents. Generally the respondents were interviewed at their home/or on the field. The respondents were taken into confidence by establishing a rapport with them.

### 3.4 Research Design

In spite of incentives from the Government side on the use of drip irrigation technology, its use is not familiarising amongst farming community. A case study approach has purposively followed to probe into details of factors from socio-matrix causing failure or non-adoption.



### Definition -

Case study - The case study is a form of qualitative analysis involving the very careful and complete observation of a person, a situation or an institution.

Advantage - Importance - The methods of scientific social research may broadly be divided into two parts - the statistical methods and the case study method. The statistical methods are based on intensive study of comparatively fewer persons, sometimes confined to a very small number of cases only. The case study is thus more intensive in nature. The field of study is comparatively limited but has more of depth in it. It aims at studying everything about something, rather than something about everything as in case of statistical methods.

Unit of study may be an individual, a family, an institution, a culture group or an entire community. It may also be an abstract thing like a set of relationship or processes viz. family crisis, adjustment to disease, friendship formation, etc. Case study aims at deep and detailed study of the unit whether it be an



individual or an organization, the question of generalization does not arise. The controls are excellent because only single unit is involved and there is no variability due to inclusion of other units.

Importance of case study - Case study helps in formulating valid hypothesis. When various cases are thoroughly studied and carefully analysed, the researcher can arrive at various generalization, which may be developed into useful hypothesis. In fact, study of relevant literature and case study are the only two potent sources of hypothesis.

Case study is useful in framing questionnaire, schedule or other forms, if a questionnaire is drafted after thorough case study, we can know the peculiarities of the group as well as individual units. The type of response like to be available, pet linkage and aversions of the people.

Case study is helpful in stratification of the sample. By studying the individual units thoroughly we can put them indefinite classes or types. Thus it is helpful in perfect stratification of the sample.



It is possible to locate deviant cases. Deviant cases are those units that behave against the proposed hypothesis. A general tendency is to ignore them, but for scientific analysis they are very important. The analysis of such cases may lead to a lot of clarification of theory itself.

Where the problem under study forms a process rather than one incident, e.g. courtship process, clique formation, etc. case study is the suitable method. The case data is essential for valid study of such problems.

Case study enlarges the range of personal experience of the researcher. In statistical methods, generally a narrow range of topic is selected and the researcher's knowledge is limited to the particular aspect only. In case study, the whole range of subject's life is studied and the range of knowledge is naturally enlarged. The researcher gets an intimate knowledge of many other aspects.

Case study helps to find the significance of the recorded data within the life of individual and later on within the life of the classes of individuals.





## **CHAPTER IV**

## **RESULTS**



Ten cases were selected for the study. Cases have been described in this chapter.

Case No. 1

Shri. R.M. Shelke  
At. Tq. Dist. Parbhani

Shri. R.M. Shelke was a young farmer of 36 years, an Engineering (Electrical) graduate with high socio-economic status and progressive outlook. He took over the farming since last eleven years. He was the member of joint family. But given information as a nuclear family and also the less income/year than the actual. He was authorised Government Electrical Contractor and also Chairman of Co-operative Society. He also posses 5 shops in market, 3 shops were engaged by the retain sale purchase of oilseeds like groundnut, these shops were looked after by his father and remaining two shops were used as a office and show-room for electrical goods, pump sets, fittings and also having dealership of drip irrigation sets of Premier Irrigation Company and Irrigation Engineering Company. His brothers were also having education and were helping the family in looking after the farm and office-cum-shop as and when required.



The respondent has installed the drip irrigation set of Jain Company in 1989 for his horticultural crop and sugarcane crop by dripper drip and micro-tube, respectively. After some days he had taken dealership of above said companies and installed their sets on banana and horticultural crops like orange and lemon on medium type of levelled land. The total area covered by drip sets is 3 acre horticultural crops, 3 acre banana and 2 acre sugarcane. Arrangement of irrigation water is by means of well with the help of electric motor pump. Cost of drip set was Rs. 12,000 per acre. Firstly he had convinced by agent of Jain Irrigation about the utility of drip irrigation. He got guidance and information from I&V Extension Officer and Agricultural Officer, Marathwada Agricultural University scientists and progressive farmers. Financial assistance is taken from Bank and Government.

This set has screen filter without fertilizer applying ventury. Main P.V.C. pipe line, main sub-main pipe line has diameter of about 75 mm and 63 mm with 500' and 1000' length respectively buried/underground parallel to the slope of soil balance plough layer.





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Layout for sugarcane is at 6' x 6' ring method. Banana planting at 9' x 9' pit method and orange and lemon at 13' x 13' spacing.

There are three sub-main and 40 laterals/ sub-main of 12.5 mm diameter and having length about 200' with 25 to 30 dripper on one lateral. Size of micro tube is 4 mm and 1 mm, the discharge is about 4 lit/hr., number of dripper or micro-tube/plant is 3 in case of orchard, one dripper/4 plant of banana and 1 dripper/pit of sugarcane having diameter 3 feet. He run drip set every day for banana 3 hours and 6 hours; for sugarcane 3 hours and 7 hours for orchard 2 hours and 4 hours in winter and summer respectively. He used 3'x3' surface area as a criteria for irrigation by a single dripper. He know the solution over the chocking of dripper and micro-tube, by cleaning the dripper, micro-tube and filter with fresh water and acid treatment. He used it to clean this at the interval of 30 days. He know how to check the discharge of water from the main line, lateral and sub-main at equal interval of 90 days.

He knows that fertilizers can be given through the system to the crops. He knows the liquid fertilizer and water soluble fertilizer like urea



is used to give it but doesn't know proportion and technique. But he used the traditional method of fertilizer application. He knows water analysis is must before installation of set. He had not analysed the water because as per his opinion, water is clean, clear and algae free. Salty and turbulent water require soil testing. He knows the remedy over their problem by flushing the drip set regularly and acid treatment. Slope of the land was considered before underlining the laterals. He knows the diameter of lateral is depend upon the crop type, number of dripper and micro tube/plant. He decided the diameter of materials as per requirement.

He knows the function of air release valve to release air from the main pipe line. He used it. He knows the function of pressure guage to measure the pressure over sub-main. He used to measure it  $1\frac{1}{2}$  kg/cm<sup>2</sup> pressure. He gives 20 per cent less fertilizer if irrigation given by drip set. He does not know that pesticide and fungicide can apply through the drip. He had highly favourable opinion towards the drip irrigation technology which was evident from his agreement or strong agreement with positive statement and disagreement or strong disagreement with negative statement.



Positive statement he agreed upon were about suitability of set for undulating land, saving in labour requirement, easy cultivation of land, in subsequent season, no adverse effect on soil productivity, increased yield, improvement in crop quality, early harvesting, saving of water, less infestation of weed, easier inter-cultivation, readjustment is easier, easy availability of technical person for readjustment of set, increase acreage under irrigation, availability of water in required quantity to root system and stoppage of soil erosion, reduction in fertilizer requirement, quality services from company agent, spare parts easily available.

Negative statements he disapproved were easier application of water soluble fertilizer, infestation of insect pest and diseases, saving of insecticide and pesticide, problem while replacement of spare parts, technological loss by person handling it, care for leakage of laterals, requirement of technical training, complexity in use of technology, clean and clear water required for application.

While reporting on constraints, one has to face in use of technology he said, high cost for spare parts, damage due to rat and squairrel,



faulty layout, detail knowledge of drip set. He further added that investment against drip is for five years if it is calculated by comparing depreciation with yield it gives definite economic benefit. He also said, there was no significant big technical problem if farmers give personal attention towards the system. He said drip irrigation is successful in his field. He had given benefit as follows:

Water saving 50 per cent; labour saving 25 per cent, inter-culture operation expenses 50 per cent. Quality of crop - better, crop yield increased by 20 per cent. For more popularising and usefulness of drip irrigation sets, he had given some suggestions:

1. Guidance to the people at village level
2. At least one set for one village
3. On experimental basis, University should show the demonstration on every crop for farmers information
4. Minimise the cost of drip set.



Case No. 2

Shri. N.S. Samale  
At. Fakli-Kumbhkarn  
Tq. & Dist. Parbhani

Shri. Samale was the farmer of 46, and educated up to M.Sc. (Chemistry). After completion of education he turned to farming. Having farming experience about 24 years, he is the member of nuclear family. He was hesitant to reveal information in economic aspect of the family, but having progressive outlook, he possesses total land holding of about 26 acres. The land under irrigation, dryland, and barren land is about 6 acres, 15 acres, and 5 acres, respectively. Seven members were in the family and having education, middle school, high school and college by one son and daughter, wife and one son and two daughter, respectively. Not interested in social participation. Well is the only source for irrigation. He used old coupled motor having low R.P.M. as a irrigation motor.

He installed drip set in 1990 by taking financial assistance from Bank and Government worth Rs. 30,000/- of dripper drip type drip set of Jain Irrigation company. He was not convinced by any Government or private agency to install the set.



Basically he was interested in drip irrigation. He possesses medium type of levelled land. He installed drip for mango, (1 ha), coconut (1 ha) and banana (1.32 ha) having plantation at spacing of 30'x30', 25' x 25' and 5' x 5', respectively.

His drip set is having screen filter with fertilizer applying ventury. P.V.C pipe line having diameter about 90 mm, 75 mm and 50 mm as a main pipe line and sub-main of 540', 75' and 540' buried underground parallel to the slope of soil below plough layer, respectively.

There are three sub-main and 27 laterals, per sub-main at one side, having 10,000' length, of size 12.5 mm and 16.00 mm diameter for banana and coconut, mango. Discharge of dripper is 4 lit/hour, 3 lit/hour, respectively. Number of dripper/plant is one. He runs the drip set for 24 hours in summer. Soil type of surface area is not the criteria for irrigation, but the discharge is the criteria for irrigation.

He knows the technique of measuring pressure by pressure gauge but he had not used it, as the coupled pump set had low pressure and



discharge hence there is no pressure on the line to measure it. As regards the knowledge of the solution over the chocking of dripper and micro-tube by cleaning the dripper, micro-tube and filter with fresh water and acid treatment. He used it to clean at the interval of 3 days. Was known to the user cultivators. He knows the necessity to check the discharge of water from the main line, lateral and sub-main at equal interval, but he had not used to check it due to less pressure and less discharge in coupled motor.

Fertilizers can be applied through the system was noticed by the farmer, but only water soluble fertilizers were like urea can be given through it, but doesn't know the proportion and technique. He used the traditional method for application of fertiliser. He knows that the water analysis is must before installation of set. He had not analysed the water because as per his opinion, water is clean, clear and algae free. Salty and turbulant water require soil testing, he was knowing the remedy over this problem by cleaning the drip sets regularly and by acid treatment cleaning. He knows that the diameter of lateral is



depend upon the crop type, number of dripper and micro-tube/plant. He decided the diameter of laterals as per requirement. The function of air release valve to release air from main pipe line was known to him, but his set do not contain air release valve, due to low pressure generated by the electrical motor used by him. ✓

He gives equal fertilizer in traditional and drip method. He know the pesticide and fungicide can be applied through it. But had not applied through it due to low pressure motor pump. He had highly favourable opinion towards the drip irrigation technology which was evident from his agreement or strong agreement with positive statement and disagreement or strong disagreement with negative statement. ✓

Positive statement he agreed upon were about suitability of set for undulating land, saving in labour requirement, easy cultivation of land in subsequent season, no adverse effect on soil productivity, increased yield, improvement in crop quality, early harvesting, saving of water, water soluble fertilizer applied easily, reduction in fertilizer requirement, no blockage of micro-tube



and laterals, no problem while replacement of spare parts, no technological loss by person handling it, no care for leakage of material, spare parts easily available, requirement of technical training, increase acreage under irrigation, availability of water in required quantity to root system, stoppage of soil erosion.

Negative statement he disapproved were less infestation of weed, easier inter-cultivation, readjustment is easier. Easily availability of technical person for readjustment of set, quality service from company agent. Set is costly, use of drip is complicated thing, clean and clear water required for application, roots ill developed. He had not made any statement about infestation of pests and diseases, less quantity of fungicide and pesticide required.

Constraints he faced in use of drip irrigation system includes high cost for spare parts, high cost of acid, chemical, blockage of dripper, damage due to rat and squirrel and fox, leakage on ground. No water discharge at end of lateral. Lack of guidance by concerned dealer and extension worker at right time.



He further added that the lack of follow up by the seller and Zilla Parishad person. Even the bond giving in writing by the farmer but he was always in problem. He opined that maintenance branch must be separate by the company or the Government. He said drip irrigation was successful on his farm. He had given benefit as follows: Water saving upto 40 per cent, labour saving 20 per cent, inter-culture operation expenses 20 per cent, quality of crop is better, crop yield increased by 20 per cent.

To make more popular and useful of drip sets, he had given some suggestions.

1. ✓ Follow up by Government over the maintenance of drip set by company.
2. ✓ Restriction over the dealer for after sales service to the customers for better working of sets.

Case No. 3

Shri. M.D. Jawale  
At. Aasola,  
Tq. & Dist. Parbhani.

Shri. Jawale is Agriculture postgraduate with high socio-economic status and progressive outlook with 15 years farming experience. He is



simultaneously working as a Professor in this University was of 40 years age. He headed the nuclear family, number of member in his family was six and children were having education as illiterate, primary, middle school, high school and college, by mother, son, daughter and wife, daughter and self, respectively. He was Director of Marathwada Agricultural University workers co-operative stores. He posses total 35 acres of land and arrangements for irrigation ia a well and canal. With the help of motor pump he used to irrigate it. Having annual income from farming and service is Rs. 1,00,000/- and Rs. 60,000/-, respectively.

The respondent has installed the drip irrigation set from Jain company in 1990-91 without taking financial assistance from financial agency. Cost of set is Rs. 46,000/-. He has not convinced by any Government or private agencies to install the set. By visiting to different place he believed on drip technology and installed it.

He posses medium type of levelled land. Under irrigation land is about 8 acre. Crop under drip was sweet orange and orange were 6 acres and 2 acres, respectively by drip irrigation type.



This set posses screen filter with fertilizer applying ventury. P.V.C. pipe line with diameter of 90 mm and 63 mm as a main pipe line and sub-main of 2000' and 300' long respectively. All pipe line burried under ground parallel to the slope of soil below plough layer. There are three sub-main and 40 laterals per sub-main, each measure about 360' naving 16 mm diameter. Discharge of dripper is 8 lit/hour, number of dripper per plant is 3. Number of dripper on each lateral is 60. He run the drip set for 5 hours.

Soil type and 90 cm weted surface area as a criteria for irrigation by a single dripper. He knows the technique of measuring pressure by pressure guage but he did not use the measure guage because every lateral and dripper giving the discharge of water. He opined that the blockage of dripper and micro-tuber by cleaning the dripper, micro tuber and filter with acid treatment and fresh water. He used it to clean at the interval of 30 days.

He knows the necessity to check the discnarge of water from the main line, laterals and sub-main at equal interval. He used it to check at interval of 10 to 15 days.



He knows that fertilizer can be applied through drip system, urea can be given through it. Proportion of fertilizer is 10 kg urea/day by means of ventury. He gives fertilizer by traditional method. ✓

He does not know that analysis of water is must before installation. He had not analysed the water because as per his opinion water is clean, clear and algae free. Salty and turbulent water required soil testing, but water is not salty.

Slope of the land was considered before underlining the laterals. He knows the diameter of lateral is depend upon the crop type, number of dripper/plant, he decided the diameter of laterals as per requirement.

He was unknown about the function of the air release valve. It was not included in his set. He gives less fertilizer if irrigation is given by drip set.

Farmer had highly favourable opinion towards drip irrigation technology such as it do not require even land, it saves labour requirement, easy cultivation of land in subsequent season, it do not



affect soil fertility and soil productivity increases production, improves quality of crop, reduce maturity time, saves water, less infestation of weed, easy inter-cultivation, easy application of water soluble fertilizer, require less quantity of fertilizer, less infestation of pest and disease, saving in pesticides and fungicides, easy to install, special care and management to reduce damage, quality service, easily availability of spare parts, no high cost of drip set, use of drip irrigation is not complicated thing, increase coverage under irrigation, availability of water in required quantity to root system, stopage of soil erosion, not required clean and clear water.

He disapproved negative statement were, early crop maturity, problem of replacement of spare parts, technological loss by person handling it, necessity of short term training, high cost of set, limited root development. He could not decide upon rearrangement of drip set, availability of technical person for reinstallation, blockage of micro-tube.

Constraints faced by him in use of drip irrigation technology were:



1. Yield increased was not in the proportion of investment. ✓
2. Problem in interculture operation
3. Lack of technical knowleldge
4. Lateral theft problem
5. Open lateral may be break by rat and squirrel.

He said drip irrigation was successful in his field. Benefit are as follows: Water saving 50 per cent, labour saving 20 per cent, interculture operation expenses 30 per cent, better crop quality, crop yield increased by 40 per cent, saving in fertilizer, less plant protection.

To make more popular and useful of drip sets, he had given some suggestions.

1. Reduce the cost of sets to attract people
2. Technical guidance to the farmers.
3. Laterals have to underground to avoid damage.
4. Proportion of insecticides, pesticides and fertilizer must be known to the farmers.
5. N.P.K. fertilizer must be in liquid form for easier application through it.



Case No. 4

Shri. D.D. Nirmal  
At. Kharba  
Tq. Pathri, Dist. Parbani

Prof. Nirmal, a postgraduate in Plant Pathology, middle aged person with long experience in farming (17 years) headed the nuclear family. He is also working as Professor in University having a 52 ha land at his control with a well and electric motor. Having annual income from farming and service Rs. 20,000 and Rs. 60,000/-, respectively.

The respondent had installed the drip set of Jain company in 1990 by taking financial assistance from bank and Government. Cost of set was Rs. 40,000/-. He was convinced to adopt the drip irrigation system by his friends. He possesses light type of levelled land. Santra and mosambi crops were irrigated by drip method. This set had screen filter with fertilizer applying ventury. P.V.C. pipe line having diameter of 75 mm and 50 mm as a main pipe line and sub-main of 500' and 340' buried under ground parallel to the slope of soil below plough layer.

Two sub-mains were used with 14 laterals on each sub-main having 16 mm diameter and measure 300' in length, 4 lit/hour discharge by one dripper,



3 drippers on each plant at 90 cm apart, 54 drippers on each lateral. He run the drip set for four hours a day. Soil type and 100 sq. cm. surface area is the criteria for irrigation by one dripper.

He knows the solution over the chocking of dripper and micro-tube, by cleaning the dripper, micro-tube and filter with fresh water and acid treatment. He used to clean at the interval of 90 days.

He knows the necessity to check the discharge of water from the main line, sub-main and laterals at equal interval. He used to check at 30 days interval.

He knows that fertilizer can be given through the system to the crops. He knows the water soluble fertilizers like urea can be given through it. Proportion of urea is as per requirement, it is applied through ventury, he used to apply the fertilizer.

He knows that water analysis is must before installation of set. He had not analysed the water because water is not salty. He knows the salty and turbulent water require regular cleaning of set.



Slope of the land was considered before underlining the laterals. He knows the diameter of lateral is depend upon the crops type, number of dripper and micro-tube/plant. He decided the diameter of laterals as per requirement.

He knows the function of air release valve to release air from main pipe line. He used it.

He knows the function of pressure guage to measure the pressure over sub-main. He used to measure it  $1\frac{1}{2}$  kg/cm<sup>2</sup> pressure. He gives lesser fertilizer if irrigation given by drip set.

He knows that pesticide and fungicide can be applied through it. But he had not applied through it because mosambi and santra do not require such treatments.

He had highly favourable opinion towards the drip irrigation technology which was evident from his agreement or strong agreement with positive statement and disagreement as strong disagreement with negative statement.

Positive statement he agreed upon were about suitability of set for undulating land, saving in labour requirement, no adverse effect on soil



productivity, increased yield, improvement in crop quality, early harvesting, saving of water, less infestation of weed, reduction in fertilizer application, easier inter-cultivation, water soluble fertilizer applied easily, less infestation of pests and diseases, minimum plant protection, readjustment is easier, easily availability of technical person for readjustment of set, no blockage of micro-tube, no problem while replacing spare parts, no technical loss by person handling it, no care for leakage of lateral, spare parts easily available, requirement of technical training, use of drip was not so complicated, increase acreage under irrigation, availability of water in required quantity, clean and clear water is not essential, normal growth of roots.

Negative statements he disagreed were easy cultivation of land in subsequent season, blockage of micro-tube, quality service, high cost of drip, stopage of soil erosion.

Constraints faced by him in use of drip irrigation technology were:

1. Costly spare parts ✓
2. Less profit as compared to investment ✓



3. Blockage of dripper
4. Damage of laterals by rat and squirrels and fox
5. Leakage on joints
6. Cracks on pipe line
7. Lack of equal water discharge
8. Damage to filter sieves
9. Difficult inter-culture operation
10. Fruit agents were not ready to purchase the garden fruits
11. No definite life of laterals.

He said drip irrigation was successful in his field, he had given information on: water saving upto  $\frac{2}{3}$ , labour saving more than 50 per cent, inter-culture operation expenses less than  $\frac{3}{4}$ , improved crop quality, saving in fertilizer.

To make more popular and useful of drip sets he had given some suggestions:

1. Good quality material at reasonable rate must be available
2. ✓ Technically perfect installation of drip set.
3. ✓ Special technical training to the farmers and workers.
4. ✓ Delay in follow up by Panchayat Samiti and Zilla Parishad so it must be shortened.



5. Instead of giving subsidy to farmer, price of set have to be reduced at low cost in the local market, it will result into minimising long sanctioning and follow up procedure through Panchayat Samiti, Zilla Parishad and Talathi.

Case No. 5

Shri. M.S. Deshmukh  
At. Zari,  
Tq. & Dist. Parbhani

Shri. Deshmukh was a high school student studying in 12th standard was of 18 years of age. He was the member of joint family. He was not looking after the farm, he was holding land in his name only. Actually his father, a Plant Pathologist in the University was looked after the farm whenever required. Actually land holding of the family is more, but to get benefit of subsidy the land was divided and M.S. Deshmukh became the land owner. He has 2 ha irrigated land, by means of the bore well with motor pump. He was not interested in social participation, education of family members were primary, middle school and college level by his sister, mother and sister. His father had progressive outlook. Annual income of father and field was Rs. 72,000/- and 15,000/-, respectively.



He is the oldest adopter of drip irrigation system (1989). He installed the drip system of Jain company and was convinced by MAU scientists in the adoption process. He possess medium type of levelled land under irrigation land is about 2 ha. Crops under drip was 1 ha. Banana and orange were the crops under the dripper drip type. This set posses sand filter without fertilizer applying ventury. Having P.v.C. pipe line of diameter 75 mm and 63 mm as a main pipe line and sub-main pipe line it measures 300' and 280' long, respectively. All pipe line burried underground parallel to the slope of soil.

There are four sub-main and 40 laterals on each sub-main. Each measures about 190' having 12 mm diameter discharge of dripper in 8 lit/hour, number of dripper/plant is two, number of dripper on each lateral is 38, the distance between two dripper is 60 cm. He run the drip set for five hours a day.

Soil type and 90 cm surface area is the criteria for irrigation by one dripper.

He knows the solution over the chocking of dripper and micro-tube, by cleaning the dripper,



micro-tube and filter with fresh water and acid treatment and flushing. He used to clean at the interval of 30 days.

He knows that fertilizer can be given through the system to the crops. He knows the water soluble fertilizer like urea can be given through it. He do not know the proportion and technique of application. He apply fertilizer by traditional method.

Slope of the land was considered before underlining the laterals. He know the diameter of lateral is depend upon the crop type, number of dripper and micro-tube/plant. He decided the diameter of laterals as per requirement.

He knows the function of pressure guage to measure the pressure over sub-main. He used to measure it  $1\frac{1}{2}$  kg/cm<sup>2</sup> pressure.

He gives less fertilizer if irrigation given by drip set.

He knows that pesticide and fungicide can be applied through it. But he had not applied through it because no need felt by him.



He had highly favourable opinion towards the drip irrigation technology which was evident from his agreement or strong agreement with positive statement and disagreement or strong disagreement with regative statement.

Positive statement he agreed upon were about suitability of set for undulating land, saving in labour requirement, easy cultivation of land in subsequent season, no adverse effect on soil productivity, increased yield, improvement in crop quality, early harvesting, saving of water, less infestation of weed, water soluble fertilizer applied easily, reduction in fertilizer requirement, readjustment is easier, no blockage of micro-tubes and no problem while replacement of spare parts, no technical loss by person handling it, no care for leakage of laterial, spare parts easily available, requirement of technical training, use of drip is not complicated, increases acreage under irrigation, availability of water in required quantity to root system, clean and clear water for drip, stopage of soil erosion.

Negative statement he disapproved were difficulty in inter-cultivation, easily availability



of technical person for readjustment, quality service, high cost of set, limited growth of roots.

He had not made any statement about less infestation of pest and diseases, saving of pesticide and insecticides.

While reporting on constraint one has to face in use of technology he said:

1. Profit and investment is equal
2. Damage of lateral by rat and squirrel.
3. Unequal distribution of water from dripper and micro-tube
4. Difficulty in inter-culture operation
5. Fruit agent were not ready to purchase the garden
6. Lack of technical information
7. Immediate recovery of loan by bank.
8. Long process of sanctioning loan and subsidy.

He said, drip irrigation was successful in his field. He had given benefit as follows: water saving 50 per cent, labour saving 60 per cent, expenses over inter-culture operation is quite less, better crop quality, yield 20 per cent, fertilizer saving 30 per cent, saving on plant protection - 40 per cent.



To make more popular and useful of drip sets he had given some suggestions:

1. Live demonstration for farmers to know the working and its importance. ✓
2. Supply perfect technical knowledge ✓
3. Guidance to the farmers at taluka level.

Case No. 6

Sayed Salim Sayed Ismail  
At. Tq. Dist. Parbhani

Mr. Salim, was the farmer of 30 and educated upto 10th. He was the member of joint family with high economical status and progressive outlook and very hard worker, having farming experience about 10 to 12 years. Having shop in the vegetable market of commin agent, he was hesitant to reveal information in economic aspects of the family. Number of members in the family were 4 women and 5 men. His two daughters were studying in K.G. and wife was illiterate, remaining family members were educated upto middle school and high school. All members of the family were engaged in the commission agent shop holding strong position in the market. Total land holding is 10 acre irrigated and 10 acre dryland with well as a source of irrigation with electric motor pump on it. Having annual income Rs. 20,000/-. He was not intrested in social participation.



The respondent installed the drip set in 1989 by taking financial assistance from bank and Government, cost of set was Rs. 50,000/-.

He was convinced by other University person and tried on 5 acre pomegranate and 1 acre grape by dripper drip type on levelled light type of soil.

This set has screen filter without fertilizer applying ventury. 1500' main pipe line and 1000' sub-main of 75 mm and 63. mm diameter, respectively. All pipe line was underground and parallel to the slope of the soil.

There are four sub-main and 17 laterals on each sub-main at one side, the size of lateral is 16 mm and each measures 200', 54 dripper on each lateral. Discharge of dripper is 4 lit/hour, 2 dripper/plant, he runs drip set for 3 hours a day.

Soil type of 100 cm surface area is the criteria for irrigation by one dripper.

He knows the solution over the chocking of dripper and micro-tube, filter with fresh water and acid treatment, flushing, he used to clean at the interval of 30 days.



He knows the necessity to check the discharge of water from the main line, sub-main and lateral at equal interval. He used to check at 180 days interval.

He does not know the fertilizer can be given through it and he had not applied fertilizers.

He knows water analysis is must, before installation of set. He had not analysed the water because water is not salty. He knows the salty and turbulent water require regular cleaning of set.

Slope of the land was considered before underlining the laterals.

He knows the diameter of lateral is depend upon the crop type, number of dripper, micro-tube size per plant. He decided the diameter of laterals as per requirement.

He knows the function of air release valve, to release air from main pipe line. He used it.

He knows the function of pressure guage, to measure the pressure over sub-main, he used to measure it  $1\frac{1}{2}$  kg/cm<sup>2</sup> pressure.



He gives equal fertilizer if irrigation given by drip.

He do not know that pesticide and fungicide can be applied through it. He do not know now and when to apply the same.

He had highly favourable opinion towards the drip irrigation technology which was evident from his agreement or strong agreement with positive statement and disagreement or strong disagreement with negative statement.

Positive statement he agreed upon were about suitability of set for undulating land, saving in labour, requirement, easy cultivation of land in subsequent season, no adverse effect on soil productivity, increased yield, improvement in crop quality, early harvesting, saving of water, less infestation of weed, easier inter-cultivation, readjustment is easier, easy availability of technical person for readjustment of set, blockage of micro-tube, no problem while replacing spare parts, technological loss by person handling it, care for leakage of laterals, quality service, spare parts easily available, use of drip technology is a



complicated thing, increase acreage under irrigation, equal water supply to roots, stoppage of erosion, limited root developed.

Negative statement he disapproved were less infestation of pest and disease, saving of pesticide and insecticide, requirement of technical training, higher cost of set, clean and clear water required for drip.

He had not made any statement about easier application of water soluble fertilizer, saving of fertilizer, less infestation of pest and diseases.

While reporting on constraint one had to face in use of technology he said:

1. Blockage of dripper
2. Damage to the laterals by rat and squirrels
3. Fruit agent were not ready to purchase the garden.

He said drip irrigation was successful in his field. He had given benefit as follows: water saving 50 per cent, labour saving 50 per cent, saving in inter-culture operation 50 per cent, better crop quality, increased yield by 25 per cent.



To make more popular and useful of drip set he had given some suggestions:

1. We have to show the actual demonstration to the farmers.
2. University have to work on transfer of technology and have to built confidence in farmer by giving demonstration plot in farmers field, because farmer believe on farmer.
3. Private agency have to give good services.

Case No. 7

Shri. B.S. Mundada  
At. Brahmangaon  
Tq. & Dist. Parbhani

Shri. Mundada was a graduate of Arts and Law with high socio-economic status and progressive outlook. He took over the farming since last 35 years and was of 62 years of age. He was the member of joint family. He is a Income Tax Practitioner and with good social participation by holding the post like Director of Sahyog Cooperative Society, Parbhani, Zilla Sanghsanchalak of Rashtriya Swayamsevak Sangh, participation in Bhajani mandal. He is the Trustee of Dattadham, Parbhani and Late Motiram Maharaj At-Fala. His family was well educated, his wife



passed middle school and son and daughter were studying in college. Annual income is about Rs. 80,000/- from his practice and farm. All land is irrigated by means of well with motor pump.

He installed drip set in 1991-92 by taking financial assistance from bank and Government and self of Rs. 14,000/-, Rs. 14,000/- and Rs. 17,000/-, respectively. He was convinced by his friend and installed Jain company dripper drip set on banana crop area covered under it 3 acre 30 R.

He possess heavy type of slidely sloppy land.

This set was screen filter without fertilizer applying ventury. With 500' main line and 300' sub-main of 90 mm and 63 mm diameter, respectively. It is burried/underground parallel to the slope of soil.

There are three sub-main and 100 laterals on each sub-main of 12 mm diameter, each measure length about 150'. Discharge of dripper is 4 lit/hour, number of dripper/plant is one, number of dripper on each lateral were 35. He run the drip set for 6 hours a day



Soil type and 100 cm surface area is the criteria for irrigation by a single dripper.

He knows the technique of measuring pressure by pressure guage and he used to measure it.

He know the solution over the chocking of dripper and micro-tube by cleaning the dripper, micro-tube and filter with fresh water and acid treatment. He used to clean this at the interval of 50 to 60 days.

He knows the necessity to check the discharge of water from the main line, laterals and sub-main at equal interval. He used it check at the interval of 15 days.

He knows that fertilizer can be given through the system to the crops. He knows the liquid fertilizer and water soluble fertilizer urea is used to give it but does not know the proportion and technique. But he used the traditional method for fertilizer application.

He knows water analysis is must before installation of set. He had not analysed the water beecause as per his opinion, water is clean, clear



and algae free. Salty and turbulent water require soil testing. He know the remedy to overcome this problem by cleaning the drip set regular and acid treatment.

Slope of the land was considered before underlining the lateral.

He know that the diameter of lateral is depend upon the crop type, number of dripper and micro-tube/plant. He decided the diamater of laterals as per requirement.

He does not know the function of air release valve. He had not used it, because he does not have that air release valve.

He gives less fertilizer if irrigation given by drip set.

He knows the pesticides and fungicides can be applied through it. But he had not applied through it because no necessity to banana crop.

Farmer had highly favourable opinion towards drip irrigation technology, which was evident from his agreement or strong agreement with positive



statement and disagreement or strong disagreement with negative statement.

Positive statement he agreed upon were about suitability of set for undulating land, saving in labour requirement, easy cultivation of land in subsequent season, no adverse effect on soil productivity, increased yield, improvement in crop quality, early harvesting, saving of water, less infestation of weed, easier inter-cultivation, water soluble fertilizers applied easily, reduction in fertilizer requirement, less infestation of pests and diseases, saving in pesticides and insecticides, readjustment is easier, easily availability of technical person for readjustment of set, quality service, availability of spare parts, necessity of short term technical training, use of drip is complicated, increase acreage under irrigation, availability of water in required quantity to root system, clean and clear water for drip, stopage of soil erosion, limited root development of plant.

Negative statement he disapproved were blockage of micro-tube, technical losses by person handling it, care for avoid leakage to the laterals, high cost of drip set.



He had not made any statement about difficulty in replacement of spare parts.

While reporting on constraint one has to face in use of technology he said, high cost for repairing, high cost of spare parts, high cost of chemicals, blockage of dripper, damage by rat and squirrel to the lateral, excess R.P.M. motor required problem while inter-culture operation, fruit merchant were not ready to purchase the crop, lack of technical information.

He says drip irrigation was successful in his field. He had given benefit as follows: water saving 60 per cent, labour saving 60 per cent, saving in inter-cultivation, 60 per cent, better crop quality, yield increased by 25 per cent, fertilizer saving, 50 per cent.

To make more popular and usefulness of drip sets he had given some suggestions:

1. Reduce the cost of drip set
2. Price of drip set increased and selling on price is varied from crop to crop and also subsidy is given on the basis of holding of land. So people get very less advantage of it. As price of drip set increased the subsidy limit must be increased on land holding. Crop-wise limitation must have to increase.



Case No. 8

Shri. P.B. Magar  
At. Saunna,  
Tq. Pathri, Dist. Parbhani

Shri Magar was a graduate of commerce and member of joint family was of 35 years of age. With high socio-economic status and progressive outlook, he took over the farming since last 13 years. The land holding is about 36 acres with irrigation facilities by well and lift irrigation from Dudhana river with the help of electric motor pump and oil engine, about 9 acre land is irrigated by well with the help of drip and 2 acre by lift irrigation. About 25 acre land is dryland.

He installed drip set of Jain company in 1986, it costs about Rs. 30,000/-. It was the first set in Pathri taluka. He got the subsidy by the Panchayat Samiti, Zilla Parishad and company. Finance taken by him from the bank, Government and remaining money is from self, for orange (2.20 acre), mosambi (1.30 acre), lemon (0.30 R), grape (1.20 acre) guava (1 acre), pomegranate (1.20 acre) and having 2 acre of sugarcane on flood irrigation. On light type of levelled land by dripper drip and micro-tube on the advice of frield, Village Development Officer, MAU scientists and progressive



farmer who was awarded by Rashtrapati Puraskar. Hard worker farmer himself interested in social participation, he was the active member of Gram Panchayat, Co-operative society, Shetkari Sanghatana, Youvak Mandal of same aged group of farmers to solve their problem by them, Member of Walmiki Cooperative Sugar Factory and Draksha Bagayatdar Sangh, Pune.

In 1991 he was awarded by Vasantrao Naik Krishi Pratishthan, Bombay as a 'Shetinishta Shetkari' with Zonal prize of Rs. 10,000/-, medal and certificate.

His grand mother and mother was illiterate, grand father had passed up to 4th standard, father and his wife was passed up to middle school. His son and daughters were studying in middle school, his one brother was postgraduate of commerce, and was doing job of Professor and second one was doing postgraduation in Agriculture (Horticulture). Having annual income of about Rs. 80,000/- from horticultural crops and Rs. 50,000/- from dryland cultivation.

This set possesses both type of filter i.e. sand filter and screen filter, with fertilizer applying ventury. Having P.V.C. pipe line 2000' main and 1030' sub-main of 75 mm and 63 mm, respectively. All pipe line was underground and parallel to the slope of soil.



There are four sub-main and 30 laterals on each sub-main. Each measures about 190' having 16 mm diameter, with 26 dripper and 13 laterals on one lateral at 100 cm apart. He used 2 dripper and micro-tube for one plant, the discharge of dripper per hour is 8 lit. He run the drip set for 3 hours a day.

Soil type and 100 cm surface area is the criteria for irrigation by a single dripper.

He knows the technique of measuring pressure by pressure guage and he used to measure it  $1 \text{ kg/cm}^2$  pressure.

He know the solution over the chocking of dripper and micro-tube, by cleaning the dripper, micro-tube, filter back wash of sand filter with fresh water and acid treatment. He used it to clean this at the interval of 30 days.

He knows the necessity to check the discharge of water from the main line, laterals and sub-main of equal interval. He used it to check at the interval of 30 to 45 days.



He knows that fertilizer can be given through the system to the crops. He knows the water soluble fertilizer like urea can be given through it. He do not know the proportion of and technique of application. He apply fertilizer by traditional method.

He knows water analysis is must before installation of set. He had analysed the water. He knows the salty and turbulent water require regular cleaning of set.

Slope of the land was considered before underlining the laterals.

He knows that the diameter of lateral is depend upon the crop type, number of dripper and micro-tube/plant. He decided the diameter of laterals as per requirement.

He knows the function of air release valve to release air from the main pipe line. He used it.

He gives less fertilizer if irrigation given by drip set.



He know that pesticide and fungicide can be applied through it. But he had not applied through it, because no need felt by him.

He had highly favourable opinion towards the drip irrigation technology which was evident from his agreement or strong agreement with positive statement and disagreement or strong disagreement with negative statement.

Positive statement he agreed upon were about suitability of set for undulating land, saving in labour requirement, easy cultivation of land in subsequent season, no adverse effect on soil productivity, increased yield, improvement in crop quality, water saving, less infestation of weed, no problem in inter-cultivation, less fertilizer required, readjustment is easier, technical person easily available, no problem in replacement of spare parts, quality service, spare parts easily available, short term training is essential, high cost of subsidy, no complication in use of drip set, increase acreage under irrigation, equal water distribution to the root zone, clean and clear water is not required to use, stops rain erosion, limited root development.



Negative statement he disapproved were early harvesting, less chance of infestation of pests and diseases due to drip, saving in pesticides and fungicides, blockage of micro-tube, technical loss while handling drip set, more precaution to avoid leakage.

He had not made any statement about easier application of soluble fertilizers.

While reporting on constraints he said:

1. Yield increased in proportion of expenses on drip.
2. High cost for repair
3. High cost for spare parts
4. High cost of acid and chemical
5. Blockage of dripper and micro-tube
6. Damage due to rabbit and squirrel
7. Leakage on joint
8. Fruit merchants were not ready to purchase the fruit on drip.

He satisfied that drip irrigation was successful in his field. Benefit he observed are as follows: water saving more than 50 per cent, labour saving 20 per cent, better crop quality, yield increased by 20 per cent.



To make more familiar and useful of this system, he had given some suggestions:

1. Training to the farmers in the village or at taluka level by Zilla Parishad or company or University.
2. Common subsidy for every farmer
3. No delay in providing finance if that farmer has orchard.
4. Standard pressure guage is required
5. If this system can run on sewage water
6. Quality ventury required.

Case No. 9

Shri. G. Ambegaonkar  
At. Marwat, Dist. Parbhani

Shri. Ambegaonkar was of 27 years of age and educated upto graduation level. Land holding is about 90 acre. His brother was managed by him. The joint family of six brother of respondent posses the holding is at two villages, one of his brother was Chairman of Sugar factory who use to look after the management of his nolding 43 acre at one village. His another brother was managing the farm of 47 acres at another village. Amongst



his remaining three brothers one was Professor, cloth shop was run by another and third was Junior Engineer in sugar factory having education of Diploma in Civil Engineering. Respondent was not independently managing the farm, but he was helping his two brothers in farming and in management of the farm.

At one village where farm of 43 acres was located, drip irrigation set of Jain company was installed for 4 acres of grape and 4 acres of orange and sweet orange. Other crops under irrigation were 18 acres of sugarcane and 6 acres of groundnut.

Respondent's one relative was dealer of drip irrigation agency. His Professor brother and his access to other sources of information such as Extension staff of Zilla Parishad, progressive farmers, etc. caused his conviction about usefulness of technology.

Crops under drip irrigation were 4 acre of grape, 2 acre of sweet orange and 2 acre of orange. The drip irrigation system were spread over an area mentioned above through 75 mm. main line measuring 153 m and 50 mm 4 sub-main line measuring 277 m. Two sub-main lines were spared for grape, one for orange, one for sweet orange. Size of lateral was 16 mm.



So far as his knowledge about application of water requirement was concerned, he knows various factors affecting irrigation requirement and knows specification worked out by the drip in getting to the small farmers and high initial cost in installation of drip irrigation set.

Case No. 10

Shri. B. Chaval  
At. Maregaon,  
Shelo, Pathri,  
Dist. Parbhani

Shri. Chavan was of 25 years of age educated up to 10th standard. After completion of education he turned to farming. His father was 55 years of age and was also helping to him in management of farm. He had one younger brother and one elder brother who were helping him in farm management. Both were educated up to matriculation. Though the respondent was active participant of this managerial unit at proper place all the important decision were taken under the guidance and counselling of his father who was awarded 'Shetinishtha Shetkari' by the State Government and working as if public relation officer to the family.



Family holds about 200 acres of land of heavy medium and light type of which he had 20 acre under irrigation. Because of large holding and scarce resources in terms of water and availability of labour, he made his mind to concentrate on irrigated holding and for crop requiring less intensive care and management such as plantation of tictonagrandis and eucalyptus on light soil. He had 2½ acres of tictona plantation and about 2 acre eucalyptus plantation rest of his holding was under rainfed management.

His 20 acre irrigated holding, he brought 17 acres under drip irrigation. He posses drip irrigation sets of Jain company and Caromandal company. He had cultivation of grapes since last 30 years on small holding. Prior to installation of drip irrigation he had 2 acre of grape and 2½ acre of orange cultivation. He had great desire to bring his more holding under irrigation but water is the only scarce resource for him. He tried to tap the water resources from nallah by using ponds in nallah. Finally this will be bringing more land under irrigation made him to think of drip irrigation. His father have very good social contact with progressive farmers and scientist,



farmers' organization etc. through which he could be convinced usefulness of drip irrigation for his situation. He had  $2\frac{1}{2}$  acre orange, 2 acre pomegranate, 7 acre of sweet orange, 4 acre grape,  $1\frac{1}{2}$  acre lemon, it aggregate 17 acres under drip irrigation. Dealer, he has provided 2 drippers per grape vine and 3 dripper per plant of orange and sweet orange. The out flow of per dripper was 4 lit. per hour and he operates his irrigation set for 2 hours per day under  $1 \text{ kg/cm}^2$  pressure. He knows function of pressure of air valve set on sub-mains and uses it for the purpose for which they have been provided.

As per his understanding about maintenance of drip irrigation set it was revealed that respondent knows various treatment for cleaning the pipe line such as treatment of sodium hydrochloride, bleaching powder treatment and flushing out water from pipe line with pressure. He was practicing in all of these treatment. Flushing out of water from pipe line was carried out at the interval of 5 days.

He used to apply DAP and urea to the crop through drip irrigation set. However, he has never applied pesticides/fungicides to the crop through drip irrigation.



Overall he had highly favourable attitude towards drip irrigation. He expressed favourable attitude towards various aspect such as, it do not require even lands, saves labour requirement, easy cultivation of land in subsequent season, increases in yield, improvement in quality of crops, early harvesting, saving of water, less infestation of seed, easy inter-cultivation, easy application of water soluble fertilizers, reduction in fertilizer requirement, easy readjustment of drip irrigation set, easy availability of technical personnel for readjustment, availability of services from sales agency, easy availability of spare parts, increases in acreage under irrigation, application of irrigation water to root zone in required quantity and reduction in soil erosion.

He disapproved that drip irrigation is costly. It needs intensive care, difficult adjustment of spare parts. However, he could not decide anything about reduction in soil erosion, damage to set from persons handling it, less infestation of pests and diseases, saving of pesticides and fungicides and effect on soil fertility and productivity of soil.



In his opinion drip irrigation increases acreages 4 times, saves labour requirement to the extent of 75 per cent, improvement in quality crop product and facilitates effective utilization of fertilizers.

Respondent farmer had to face problems like difficulties he expanded drip irrigation for  $3\frac{1}{2}$  acre more, 4 acre orange, 2 acre guava and  $2\frac{1}{2}$  acre grape in last two years.

He installed drip irrigation set in the year 1989 with the help of state bank. He had laid 75 mm main line and 2 sub-main of  $1\frac{1}{2}$ " dia and one sub-main of  $1\frac{1}{2}$ " diameter. Total length of sub-main were 250 m. In all 90 lateral were attached to the sub-main line each measuring 250 ft. The diameter of laterals was 16 mm. However, his set do not had approaches for fertilizer and pesticide application. He preferred to have screen filter instead of sand filter in his set which could save money and sand filter was not considered necessary owing availability of pure clean water.

The discharge of each dripper 4 lit/hour. He had provided 2 drippers for a grape line and 3 drippers for each plant of sweet orange, orange and pomegranate.



In order to apply required quantity of water to each plantation he used to decide on time of operation of irrigation set considering the specification given by the company Engineer.

So far as maintenance of the set was concerned he knows and follows acid treatment at the interval of one month and flushing out water through pipe line at the interval of 10 days. He cleans filter daily. He use to inspect set after every 10 days for leakages, chocking etc.

He knows functions of air valve and pressure guage but failed to report correct specifications of water pressure. He knows that fertilizer, pesticide and fungicide could be applied through the sets but he had not applied the same since his sed do not had necessity to apply it. In his opinion, testing of water and deciding specification of lay out was the business of company Engineer and had nothing to do with it.

He had highly favourable attitude towards drip irrigation and having positive attitude towards various aspects drip irrigation like



suitability of irrigation to uneven land, saving of labourers, easy cultivation of land in subsequent season, productivity and fertility of soil remain unaffected, increase in yield, improvement in quality, possibility of early harvesting of the crop, saving of water, less infestation of weed, no difficulty in inter-cultivation, easy application of fertilizer, easy reinstallation, easy availability of technical person, availability of good services from dealer, easy availability of spare parts, increase in acreage under irrigation, availability of water to root zone in required quantity, checks soil erosion. He also perceives that micro-tube and laterals does not chock frequently, replacement of spare part was not difficult, persons handling system do not cause much damage, system was not too costly and technology was not much complicated. However, he could not decide upon that drip irrigation reduce infestation of insect pests and diseases, saves pesticide and fungicides and it requires pure water. According to him, drip saves water to the extent of 2/3rd of irrigation water require for food irrigation, reduce labour requirement to the extent of 50 per cent, improve quality of fruit and facilitate effective utilization of fertilizer while reportong on problems he expressed utilizauon of fertilizer while



reporting on problems he expressed that there is chocking of dripper, rats and squirrel chews rubber tube, bursting screen filter and unavailability of proper guidance and services from the sales agency are other source. However, he considers himself as a resourceful personality and manage to get it from this or that agency. Fluctuation in electricity supply during day time was his another problems which he use to overcome by irrigation his field during night hours. He also opined that company personnel do not core much in providing services to the customer and works out design of irrigation set costing more to the farmer. They do not provide quality material over all installation cost is high in his opinion and therefore, every farmer should get equal subsidy to the small farmers are more.

An attempt was also made to sought suggestions from the respondent. While suggesting for efficient management of drip irrigation set and popularization of its use he opined that technical know-how should be made available by the Government and easy approach are the door of farmer in order to test the feasibility economic competency of farmer in order to test the feasibility economic



competency of irrigation set advocated by company personnel and there should not be discrimination in extending subsidies to adopter of this technology as small farmers, marginal farmers and big farmers. Such provision should be extended atleast to the farmers from Marathwada region being they are most poverty stricken.





## **CHAPTER V**

## **DISCUSSION**



The findings described in the previous chapter are discussed in the context of general objective in order to determine meaningful conclusion.

The present study was undertaken "A case study on use of drip irrigation technology" was conducted to know the knowledge, adoption, problem in use of drip irrigation technology. This study was also attempted to understand various factors contributing the consideration of attributes by drip irrigation users. This chapter deals with discussion of result under following heads.

5.1 Socio-personal and economic characteristics

5.2 Knowledge and adoption

5.3 Constraints in use of technology

5.4 Suggestions by the users

5.1 Socio-personal and Economic Characteristics

It was noticed from the detailed probe that the majority of the respondents were of middle aged , educated up to at least graduate level except two respondent, high land holding, substantial



financial position, high social status, belongs to high caste and joint family with high extension contacts.

Drip irrigation system is a latest technology in irrigation with high cost and complicated in nature. Extension research in past showed that more the complexity lesser was the adoption and adopters of such costly practices naturally belongs to high income, social status and high extension linkage.

One person who introduce new technology in the area called as innovator and innovators have above qualities. This was proved in all the cases studied. These findings are in accordance with the finding of Gajare (1988), Nagare (1989), Devane (1990), Ingle et al. (1990) and Satpute et al. (1991).

## 5.2 Knowledge and Adoption

### 5.2.1 Knowledge

It was observed from the cases under study that though the use of drip irrigation system involve complicated technology and skill all of the respondents were aware about the functioning of

✓



pressure guage, air release valve, acid treatment, flushing out of water through pipe line under pressure, for cleaning the sets, filter cleaning, use of pesticides/fungicides through drip irrigation for removing stresses of salts on inner lining of pipe line. This finding is in the line of Devane (1990) and Ingle et al. (1990).

But some of them had not used it, Shri. Samale could not use the pressure guage as the pressure developed by his motor was less. Most of them have not used fertilizer and insecticides through the system except in case of nitrogen application through urea.

It is but natural when one have to invest costly inputs and equipment costing about or more than the cost of land, he undergoes in deep investigation, get mastery over the operational details to avoid the risk of failure.

#### 5.2.2 Adoption

It was evident that adopters knew various technical aspects related to the use of drip irrigation technology, but implementation was



partial. Half of the respondents were high adopters and remaining were low adopter of recommended drip irrigation technology package of practices. These findings were supported by Devane (1990) and Ingle et al. (1990).

### 5.3 Constraint in use of drip technology

#### 5.3.1 Economic constraint

As regards to problems, it was indicated like that:

1. High cost of spare parts
2. Yield increased in the proportion of investment
3. High cost of chemical and acid for acid treatment
4. High expenses on repair
5. Rich farmers get only the benefit of subsidy
6. Immediate recovery of loan by the bank
7. Long sanctioning process of loan and subsidy.

These findings are in accordance with the findings of Deshpande et al. (1988), Devane (1990) and Ingle et al. (1990).



### 5.3.2 Technical constraint

It was found from the result that these constraints have been found to be most important were:

1. Chocking/blockage of dripper and micro-tube
2. Damage of laterals by rat, squirrels, fox.

The other important constraint in adoption were:

3. Difficulties in inter-culture operation
4. Leakages in joint
5. Uneven discharge at the apex of lateral and dripper
6. Bursting of filter screen
7. Cracks to pipe line
8. High R.P.M. motor required
9. Low quality material
10. Faulty lay out
11. No definite life of laterals
12. Fluctuation in electricity supply during day time was the problem.

These findings are in the line of Fry (1985), Deshpande et al. (1988), Rodge et al. (1988), Sekhan (1988), Ingle (1989), Jadhav (1989), Ingle et al. (1990) and Magar (1990). F.A.O.



### 5.3.3 Social Constraint

It was revealed from the findings presented in the earlier chapter that:

1. Fruit agents were not ready to purchase the garden fruits where drip irrigation was followed. It is mis-belief among some of the fruit sale agents that due to drip system water is given to tree and quality of fruit may be changed. Such mis-beliefs may be further studied.
2. Lack of technical knowledge
3. Lack of guidance at right time by concerned dealer and extension worker
4. Not believed on usefulness of this technology
5. Lack of detail knowledge about drip technology
6. Theft of laterals
7. Lack of attention by the dealer and Zilla Parishad person towards the respondents' complaint about drip set.

These findings are in accordance with the findings of Dhumal (1988), Sivanappan (1988) and Ingle et al. (1990).



#### 5.4 Suggestions by the users

An attempt was made to sought suggestions from the respondents while suggesting for efficient management of drip irrigation and popularization of its use, he opined that:

1. On experimental basis, University have to show the demonstration on every crop for farmers' knowledge. ✓
2. University have to develop low cost drip set with easier technology.
3. Restriction over the dealer by the Government for better after sale service
4. Reduce the cost of set to attract the farmers to adopt this technology.
5. Liquid fertilizer have to be made available in the market
6. Special technical training about drip technology to the farmer and worker by the University, company or by the Government for better working of drip set.
7. Live demonstration of drip irrigation set on farmers' field to know the actual working, benefit and importance because one farmer believe another farmers actual experience.



8. Subsidy is given on the basis of land holding, crop-wise per acre fixed maximum limit and also maximum limit on total subsidy is there also. The rate of drip set increased but no change in subsidy on land holding or crop-wise/acre cost, it have to change in that proportion.
9. Common or equal subsidy for every farmer
10. Quality and standard pressure guage is required.
11. Good quality ventury required.
12. Efforts should be made by the scientists to make this technology workable on sewage water.
13. Government have to install minimum one drip set at taluka place for the farmer's knowledge and experiencing the actual working.
14. University have to work on transfer of drip irrigation technology to the farmers door.

#### Benefits of drip irrigation technology

It was observed from the findings in previous chapters that, drip irrigation was successful in all the respondents field, its benefits are as follows:



1. Water saving - 40 to 70 per cent
2. Labour saving - 20 to 75 per cent
3. Saving in inter-culture operation - 20 to 60%
4. Quality of crop - better
5. Increased crop yield - 15 to 25%
6. Saving in fertilizer quantity - very less
7. Saving in plant protection measures - very less.

These findings are in accordance with the findings of Fry (1984), Bankar (1987), Hinge (1987), Kulkarni (1987), Deshpande et al. (1988), Kataria et al. (1988), Khade (1988), Pawade (1988), Rodge et al. (1988), Singh (1988), Sivanappan (1988), Umrani (1988), Hapre (1989), Nagare (1989), Patil (1989) and Magar (1990).

#### Attitude/opinion towards technology

It was revealed from the findings presented in the earlier chapter that majority of respondents had highly favourable opinion towards the drip irrigation technology, which was evident from his agreement or strong agreement with positive statement and disagreement or strong disagreement with negative statement.

Positive statement agreed upon by all respondents were:



1. Suitability of set for undulating land
2. Saving in labour requirement
3. No adverse effect on soil productivity
4. Increased yield
5. Improvement in crop quality
6. Saving of water
7. Spare parts easily available
8. Increase acreage under irrigation
9. Water get available to the root in required proportion.

Positive statement agreed upon by majority  
of respondents were: ✓

1. Easy cultivation of land in subsequent season
2. Less infestation of weed
3. Reduction in fertilizer application
4. High cost of drip set
5. Stopage of soil erosion

But only one respondent disagreed the:

1. Easy cultivation of land in subsequent season
2. Less infestation of weed
3. High cost of drip set
4. Stopage of soil erosion.



He had not made any statement about:

1. Reduction in fertilizer application
2. Easy cultivation of land in subsequent season.

Positive statement agreed upon by most of the respondent were:

1. Early harvesting ✓
2. Easier inter-cultivation ✓
3. Readjustment of drip set is easier
4. Limited growth of roots.

But only two respondent disagreed the:

1. Early harvesting ✓
2. Earlier cultivation ✓
3. Readjustment of drip set is easier
4. Limited growth of roots.

They had not made any statement about readjustment of drip set is easier.

Positive statement agreed upon by most of the respondents were:

1. Easily availability of technical person for readjustment



2. No problem while replacing spare parts
3. Quality service from dealer
4. Use of drip was not so complicated.

But only two respondent disagreed about:

1. Easily availability of technical person for readjustment
2. No problem while replacing spare parts
3. Use of drip was not so complicated.

Three were disagreed quality service from dealer and further had not made any statement in easily availability of technical person for readjustment, no problem while replacing spare parts, use of drip was not so complicated.

Positive statement agreed upon by majority of respondent were:

1. Easier application of soluble fertilizer
2. No technical loss by person handling it, requirement of technical training.

Disagreed by three respondent no technical loss by person handling it, requirement of technical



training, no statement made on technical loss by person handling it, requirement of technical training.

Negative statement he disagreed by half of the respondent were, extra care to avoid damage to the laterals.

Negative statement he disagreed by majority of the respondent were:

Less infestation of pest and diseases,  
 Saving of pesticide and fungicide,  
 Blockage of micro-tube,  
 Drip require clean and clear water.

One respondent not made any statement on blockage of micro-tube, drip require clean and clear water.

Three respondent not made any statement on saving of pesticide and fungicide.

Four respondent not made any statement on less infestation of pest and diseases.





## **CHAPTER VI**

### **SUMMARY**



6.

## SUMMARY AND CONCLUSION

It was observed during data collection that 4/5 members from joint family had availed this facility of subsidy by Government on the basis of land holding by making fragmentation of land to take advantage of 50 per cent subsidy and installed one unit. Thus there were hardly 40 to 45 units, of drip irrigation functioning in the district. It has observation recorded from the record of Zilla Parishad, Parbhani that Government had extended subsidy to about 112 cases in last 6 years in Parbhani district.

Seven (7) of the adopters of drip irrigation technology were member of big joint family and had large farm in possession. They were having strong substantial financial position. The income was derived from farming, service and side business by the drip irrigation adopters. They had good social relationship with those holding stronger position in politics and society. Their high social status, a sufficient exposure to source of information, knowledge and higher level of education.



Their venturesomeness for increasing acreage under irrigation and hard working were some of the important determinants of motivation of farmer to use drip irrigation technology by taking advantage of Government subsidy upto 50 per cent and benefit.

So far as knowledge level of farmers about installation of set was concerned, it was observed that necessity of pretesting of water i.e. water analysis for its suitability to drip irrigation to avoid blockage of micro-tube, dripper and salt accumulation in soil surface.

Necessity of soil testing to find the soil property and its pH, to make the soil property and make essential change in the set design were known to the people but most of the respondents avoided this water analysis and soil testing.

Before installation of drip set, company Engineer surveyed the field, field situation, type of crops, age of crop, land slope, existing irrigation facilities, motor pump house power, type of pipe line, diameter of it; it is useful for



outlining the design and future water management practices which have to adopt by the farmer as a guideline. But most of the farmers were using the soil type and surface area covered by the dripper in the criteria for irrigation i.e. 90 to 100 cm.

Six farmers posses medium type and posses light type soil and one posses heavy type of levelled land but all type of main and sub-main pipe line is underground parallel to the land slope.

Nine respondents having screen filters with fertilizer applying ventury to half of the respondents, one respondent is able to functioning of it and not believe in its functioning actually noticed for single time.

All respondents were using P.V.C. pipes as a main pipe line and sub-main pipe line with 63 mm to 90 mm and 50 mm to 75 mm, respectively.

Mostly, number of sub-main observed were 2 to 5 with 30 to 50 laterals on each sub-main with 1 to  $1\frac{1}{2}$  kg/cm<sup>2</sup> pressure.



Technology was not perceived as much complicated by the farmers for its operation and maintenance. But in their view for its efficient working, personal care in following specifications laid down by the agency is important. Majority of respondents were aware about functions of pressure guage, air valve and use of pesticide/fungicide through drip irrigation, but its implementation was partial.

So far as maintenance of drip irrigation set was concerned, all farmers were aware of acid treatment and flushing out of water through pipe line under pressure, for cleaning their sets. Few of them were also reported other test like treatment of sodium hypochloride treatment, bleacning powder treatment for removing stress of salts on inner lining of pipe line.

Almost all the respondent of case study had highly favourable attitude towards drip irrigation technology. In their opinion, technology save labour requirement to the extent of about 20 to 60 per cent, increase acreage under irrigation about 2 to 4 times, improves quality of crops,



interculture operation saving upto 50 per cent, yield increased by 20 per cent, saves fertilizer, minimise crop protection measures and have many other advantages.

As regards the problems faced by the respondents were concerned, it was observed that all of them had no major problems in adoption and use of technology. However, one have expressed problems like difficulty in getting finance (very lengthy procedure), damage of laterals by rabbit, squirrels, fox and high cost of spare parts, wrong lay out, lack of knowledge about drip and high cost of chemical and acid for cleaning the set, fruit merchant were not ready to purchase the gardens on contract basis, lack of timely advice by the dealer, one side inter-cultivation is stopped due to laterals and lack of exact technical knowledge, uneven discharge of water from the apex end of apex dripper, yield increases as the investment also increases in proportion.

To make drip irrigation system more familiar and useful and successful, respondent had given some suggestions:

1. On experimental basis extension agency should show the demonstration on every crop for farmers' knowledge.



2. University may develop low cost drip set with easier technology
3. Restriction over the dealer by the Government for better after sales service
4. Reduce the cost of set to attract the farmers to adopt this technology
5. Liquid fertilizer must be made available in the market
6. Special technical training about drip irrigation technology to the farmers and workers by the University, Company or Government for better working of it
7. Live demonstrations of drip irrigation set on farmers' field to know the actual working and its benefit, importance, because one farmer believe another farmer's experience.
8. Subsidy is given on the basis of land holding, crop-wise/acre fixed, maximum limit and also maximum limit on total subsidy in there. The rate of drip increased, but no change in subsidy on land holding or crop-wise/acre cost. It have to change in that proportion.
9. Common or equal subsidy for every farmer



10. Quality and standard pressure guage is required.
11. Good quality ventury required.
12. Efforts should be made by the scientists to make this technology workable on sewage water.





## **Chapter VII**

### **IMPLICATION**



BASED on findings of the study, some suggestions could be given to improve the use of drip irrigation technology. The suggestions implemented will help to make drip irrigation technology more popular and useful to the farmers.

7.2 Majority of the respondents from middle age group, having farming experience about minimum 10 years, they understood the farming in all respect and now they tried to become a horticulturist and created their something special identity with substantial financial position by making the real use of their knowledge, education, social participation, extension contact, man power from joint family and land posses jointly were installed such costly drip set. By showing the land is fragmented in the name of every member of the family and fifty per cent subsidy advantage is taken by them so actually they got it in free of cost, i.e. why the variation in Zilla Parishad record and actual position of sets in the district installed.



If the less land holding farmer go for drip, he has to pay from his pocket which he could never afford. It is, therefore, suggested that the cost of set/acre should be reduced, the criteria for subsidy should be common also the subsidy rate must be increased with removing ceiling on maximum subsidy limit, crop-wise per acre cost limit is also changed. Also reduce the excise on the drip material, it gives very cheaper drip set.

7.3 Most of the respondents were having higher level of education. Education makes them to understand the drip irrigation technology very easily and also its working, maintenance and management, so all respondents shown very high knowledge about its recommended package of practices.

But contrast between knowledge and adoption, half of the majority had shown higher adoption of recommended package of practices and remaining half were low adopters. It is due to the over-confidence among the respondents having higher level of education. They never paid serious attention towards the working and actual working and adopting of recommended package of practices.



The respondents having lower level of education shown enthusiastic curiosity about understanding and working of drip irrigation, recommended package of practices and they adopted it.

A few reported the problem of low R.P.M. motor pump to get the said benefit of recommended package of practices.

It is, therefore, suggested that the University has to develop the model of drip like P.K.V. model. It has also some drawbacks in it, but if some attention and research is made on it to become a cheaper, easier and problem free model of drip set for the small and marginal farmers.

The self pressure compensating dripper needs to be developed. It is needed to avoid the complication in the technology by removing pressure guage, air valve, ventury, seheader valve and flushing out of filter.

7.4 Many of the constraints faced by the respondents were supported by the many researchers like Technical, Economic, and social constraints.



It is therefore, suggested that personal care and management is essential, strict watch over the quality control and after sales service on the company by the Government. This situation arised due to no competition among the drip set produces, because of less drip irrigation set producer company and demand is high in the market.

Further it is suggested that, the effort should be made in the direction of water recharging, i.e. raising water table in the soil for abundant irrigation source by practicing plantation of khus grass across the slope to increase the water table in the soil. Construction of bandh, bandhara, gabian structure in the small nallah/river to increase water table in the soil also fill the rain water, root water in the soil, make the farm ponds (snet tale) in the fields. Use of sand filter will reduce the blockage problem.





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## APPENDIX



## प्रश्नावली

१. शेतक-याचे नांव :- \_\_\_\_\_  
गावाचे नांव :- \_\_\_\_\_  
तालूका :- \_\_\_\_\_  
जिल्हा :- \_\_\_\_\_
२. शेतक-याचे वय :- \_\_\_\_\_ वर्ष \_\_\_\_\_
- ३] शेतक-याचे शिक्षण :- \_\_\_\_\_  
अ] अशिक्षित  
ब] प्राथमीक  
क] माध्यमीक  
ड] उच्च माध्यमीक  
ई] महाविद्यालयीन
- ४] शेतक-याचा धंदा :- \_\_\_\_\_  
अ] फक्त शेत  
ब] शेत - - व्यापार  
क] शेत - - तोकरी  
ड] शेत - - शेतीला पूरक व्यवसाय  
इ] शेत - - मजूर  
ई] शेत - - राजकारण
- ५] जमोण धारणा  
अ] वागायत  
ब] कोरडवाहू  
क] पडोत  
ड] सडुण



६. ओलीताच्या सोयी

अ] वीहीर

ब] कॅनॉल

क] बोअर वेल

ड] नदी

ई] नाला

फ] उपसा यंत्रण

७. ओलीताचे साधन

अ] मोटर ~~यंत्र~~ पंप

ब] इंजिन

क] तायफन

ड] झतर

८. कुटुंबाचा प्रकार

अ] एकत्र

ब] विभक्त

९. कुटुंबातोल व्यक्तींचो तंट्या

अ] स्त्री

ब] पुरुष

१०. कुटुंबातोल व्यक्तींचे शिक्षण [पत्नी, मुलगा, मुलगी, झतर]

अ] अशिक्षित

ब] प्राथमीक

क] माध्यमीक

ड] उच्च माध्यमीक

इ] महाविद्यालयीन

११. कुटुंबाचे उत्पन्न

अ]

ब]

क]

ड]



१२. सामाजिक सहभाग

आपण सामाजिक कार्यात भाग घेता काय ?

होय / नाही

होय असल्यास खालील पैकी कोणकोणत्या संस्थाशी आपला संबंध आहे.

अ. क्र.	संस्था	सभासद	पदाधिकारी
१.	ग्राम पंचायत		
२.	सहकारी सोसायटी		
३.	जेतकरी संघ		
४.	युवक पंडळ		
५.	पंचायत समिती		
६.	जिल्हा परोषद		
७.	नमोदानो पंडळ		
८.	भ्रजणो पंडळ		
९.	पहोला पंडळ		
१०.	इतर		

१३. ठिबक सिंचन संचा विषयी माहिती.

अ] ठिबक सिंचन संच अवलंबणाचे वर्ष

ब] संचाची किंमत

क] आर्थिक मदत कोण पिळाली.

अ] बँक

ब] शासन

ड] स्वतः

ड] सल्ला व मार्गदर्शन कोठून मिळाले.

अ] मित्र

ब] शेजारी

क] नातेवाईक

ड] पिस्तार अधिकारी

इ] कृषि अधिकारी



फ] ग्राम विस्तारकै

ज] ग्राम सेवक

च] प. कृ. वि. शास्त्रज्ञ

छ] स्थानीक पुढारी

झ] प्रगल्भश्रीत शेतकरी

म]

इ] ठिबक सिंचन संघ प्रकार

अ] बायवॉल

ब] ड्रोपर ड्रीप

क] पायफ्री ट्यूब

ङ] पायफ्री स्प्रींकलर

फ] ठोबक सिंचन संघ कंपनी

अ] ए. जैन

ब] पगती

क] प्रोमोयर

ङ] वॉटमन

ई] व्होल्टास

फ] ई. पी. सी.

ज] किलोस्कर

च] इतर

कोरे / सेंट्रल

ज] कोणत्या पोकाकरीता, वापरता व त्याखाली भिजणारे

पोके

क्षेत्र

अ] भाजी वर्गीय

ब] फळे वर्गीय

क] प्लान वर्गीय

ङ] दूध वर्गीय

च] १२०० लिट्रनाखाली भिजणारे स्कुण क्षेत्र. हेक्टर / एकर

छ] जलजोचन प्रकार

हलक्या / मध्यम / भारी



त] जमोन सपपातळीपध्ये / उताराची

१४. ठिबक सिंचनाचो तांत्रिक माहोतो.

अ] फोल्टर:- १] वाळूचे २] जाळोचे

ब] खत देण्याचे सयंत्र आहे काय ? होय / नाही

क] मुख्य पाईप लाईन

अ] तोळंडी ब] पी. व्ही. सी. क] अल्काथीन

ड] पाईपचा व्यास [मुख्य पाईप लाईन]

लांबी [मीटर]

अ] ७५ मी. मी.

ब] ६३ मी. मी.

क] ५० मी. मी.

ड] ४० मी. मी.

इ] ३२ मी. मी.

इ] जमोनोचे आत / जमोनीचे वर

फ] सवणेनचा व्यास व एकूण लांबी

अ] ६३ मी. मी.

ब] ५० मी. मी.

क] ४० मी. मी.

ज] मेन लाईन उतारानुसम / उतारा विरुद्ध

च] सवणेनचो संध्या :

छ] प्रत्येक सवणेनवर उपनळीची संध्या

प] सवणेनची पांडणी: उतारानुसम / उतारा विरुद्ध

न] उपनळीची [ ] लांबी मी. जाडी इंच

त] प्रत्येक लॅटरस्वर सुक्ष्म नळीची [इन्मीटरची] संध्या ———

थ] सुक्ष्मनळी [इन्मीटर्स] इतर / झायफोट्यूब / डबलव्हा / पाईप

न] प्रत्येक सुक्ष्मनळीमधून पाण्याचा प्रवाह लि / तास

म] सुक्ष्म नळी मधील अंतर ————— से. मी.

स] प्रत्येक झाडाला इन्मीटरची संध्या —————

थ] दररोज ठिबक सिंचन किती तास सुरु असते —————



११] ठिबक सिंगन संच त्याचा वापर व पिकाचे पाणी व व्यवस्थापन ह्या संबंधीचे ज्ञान व अवबोधन.

१] अ] जमिनीच्या प्रकार [उदा उथळ, पध्यप, खोळ] ..

विचार करून रोपाभोवती क्षेत्र भिजविता काय ? होय / नाही

ब] असल्यास क्षेत्रफळ किती ते सांगा. \_\_\_\_\_ से. मि.

क] नसल्यास त्याची कारणे काय ते सांगा ?

२] अ] ओढन नजोतील पाण्याचा दाब दाबपापकाचे सहाय्याने मोजण्याचे तंत्र

आज पास माहित आहे काय ? होय / नाही

ब] असल्यास त्या प्रमाणे दाब मोजता काय ? होय / नाही

क] नसल्यास त्याची कारणे सांगा.

१] \_\_\_\_\_

२] \_\_\_\_\_

३] \_\_\_\_\_

३] अ] तोटो व सूक्ष्म नळ्या चोक झाल्यास [चादल्यास] साफ करण्यासाठी

कोणते उपाय योजावेत हे आपणास माहित आहे काय? होय / नाही

ब] असल्यास कोणते उपाय ते सांगा ?

१] \_\_\_\_\_

२] \_\_\_\_\_

३] \_\_\_\_\_

क] सापैकी आपण कोणते उपाय योजता?

१. \_\_\_\_\_

२. \_\_\_\_\_

३. \_\_\_\_\_

ड] किती दिवसांनी आपण तोटो व सूक्ष्म नळ्या साफ करता ते सांगा ?

\_\_\_\_\_ दिवस.

इ] नसल्यास त्याची कारणे सांगा ?

१. \_\_\_\_\_

२. \_\_\_\_\_

३. \_\_\_\_\_



- ४] अ] पुख्य नळो, उपनळ्या व बाजूच्या नळ्या हयांच्या पाळ्या पधून मधून तपासून पाहणे आवश्यक आहे. हे आपणांस माहित आहे काय ?

होय / नाही.

ब] असल्यास आपण किती दिवसांना तपासणी करता ? \_\_\_\_\_ दिवस.

क] तपासणी करित नसल्यास त्याची कारणे सांगा ?

१. \_\_\_\_\_
२. \_\_\_\_\_
३. \_\_\_\_\_

- ५] अ] निष्क सिंचनाद्वारे दिल्या जाणा-या पाण्यापासून पिकांना खत देत। देते हे आपणांस माहित आहे काय ? होय / नाही

ब] पाहिती असल्यास कोणती खते देतात ते सांगा ?

१. \_\_\_\_\_
२. \_\_\_\_\_
३. \_\_\_\_\_

क] खताचे प्रमाण काय असावे ते सांगा ?

\_\_\_\_\_

ड] खत देण्याचे तंत्र सांगा \_\_\_\_\_

इ] आपण खत देता काय तर सांगा ? होय / नाही

फ] देत नसल्यास त्याची कारणे सांगा ?

१. \_\_\_\_\_
२. \_\_\_\_\_
३. \_\_\_\_\_

- ६] निष्क सिंचनाचा वापर करावयाचा असल्यास पाणी तपासून घेणे आवश्यक आहे हे आपणांस माहित आहे काय ? होय / नाही

माहित असल्यास आपण पाण्याची तपासणी [पृथःकरण] करून घेतले आहे काय ? होय / नाही

पाणी तपासून घेतली नसल्यास कारणे सांगा ?

१. \_\_\_\_\_
२. \_\_\_\_\_
३. \_\_\_\_\_



ड] पापी खारट / गौचूल असल्यास काय काळजी घ्यावी ?

१. \_\_\_\_\_
२. \_\_\_\_\_
३. \_\_\_\_\_

इ] पापी खारट / गौचूल असल्यास जमिनीचो तपासणी करणे आवश्यक असते हे आपणास माहित आहे काय ? होय/नाही

उ] उपनळ्या टाकताना जमिनीच्या उताराचा विचार करणे जरूर असते हे आपणास माहित आहे काय ? होय / नाही.

ब] माहित असल्यास आच्छादन अशा विचार करून उपनळ्या टाकल्यास काय ? होय / नाही

क] नतल्यास त्याची कारणे सांगा ?

१. \_\_\_\_\_
२. \_\_\_\_\_
३. \_\_\_\_\_

८] अ] पिकाचा प्रकार व एकुण वापरल्या जाणा-या तोट्यांची व सुक्ष्म नळ्यांची संख्या याचा विचार करून उपनळ्यांचा व्यास ठरवितात हे आपणास माहित आहे काय ? होय / नाही

ब] आपण असा विचार करून उपनळ्यांचा व्यास ठरविला आहे काय ? होय / नाही

९] अ] हुंदेच्या झडपेचे कार्य आपणास माहित आहे काय? होय / नाही

ब] असल्यास कार्य काय ते सांगा ?

१. \_\_\_\_\_
२. \_\_\_\_\_
३. \_\_\_\_\_

ज] आपण तोंग वापर करता काय ?

होय / नाही

ड] करित नसल्यास तगाचो कारणे सांगा ?

१. \_\_\_\_\_
२. \_\_\_\_\_
३. \_\_\_\_\_



१०] अ] ताब तापल व्हडपेचे कार्य काय ते सांगा ?

१. \_\_\_\_\_
२. \_\_\_\_\_
३. \_\_\_\_\_

ब] आपण त्याचा उपयोग [वापर] करता काय ?

होय / नाही

क] नसल्यास त्याची कारणे सांगा ?

१. \_\_\_\_\_
२. \_\_\_\_\_
३. \_\_\_\_\_

११] ङिडक सिंचन संचाने पाणो दिल्यास खते नेहमी स्वढोच देता काय ?

१. होय
२. काही देतो
३. जास्त देतो.

१२] अ] ङिडक सिंचनव्द्वारा पाणो देताना रोगनाशके / किटक नाशके पाण्यात मिसळून देतात हे आपणास माहित आहे काय ?

होय / नाही

ब] असल्यास आपण देता काय ?

होय / नाही

क] नसल्यास त्याची कारणे सांगा ?

१. \_\_\_\_\_
२. \_\_\_\_\_
३. \_\_\_\_\_



## ठिबक सिंचना विषयी शेतकऱ्यांचा दृष्टीकोन

अ.क्र.	विधान	संकेतित	संकेतित	संकेतित	असह
१.	२.	३.	४.	५.	६.
१.	ठिबक सिंचनासाठी जागेन सापातळीत अक्षणे जखमीचे नाही.				
२.	ठिबक सिंचनामुळे जुराचो बचत होते.				
३.	ठिबक सिंचन क्षेत्रात दुस-या हंगामात शेतोज भागात सोपी होते.				
४.	ठिबक सिंचनाचा जमिनीच्या पोतावर उत्पादन क्षमतेवर काही परिणाम होत नाही.				
५.	ठिबक सिंचनामुळे उत्पादन वाढते.				
६.	ठिबक सिंचनामुळे पिकाचा दर्जा सुधारतो.				
७.	ठिबक सिंचनात पिक तवकर तयार होते.				
८.	ठिबक सिंचनात पाण्याचो बचत होते.				
९.	ठिबक सिंचनामुळे तण कमी होते.				
१०.	ठिबक सिंचनामुळे आंतराशागत करायला जड जात नाही.				
११.	ठिबक सिंचनात विरघळणारी खेते देणे सोपे जाते.				
१२.	ठिबक सिंचनामुळे प्रखताच्या मात्रा कमी लागतात.				
१३.	ठिबक सिंचनामध्ये फिडो व रोगाचा प्रारंभ होण्याची शक्यता कमी असते.				
१४.	ठिबक सिंचनामुळे फिटकनायकाचो/पुरवो नाशकाची लागू होते.				
१५.	ठिबक सिंचनाचो मूर्ज रचना करणे सोपे आडे.				



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४.

५.

६.

१६. ठिबक सिंचन संचाचो पुर्नरचना करण्यास त्हा व्यक्तो सहज मिळतात.
१७. सुक्ष्मनळोका व बारीक नळया लवकर चोंदतात.
८१८. ठिबक सिंचन संचाचे सुटे भाग अदला-बदल करण्यास त्रास जातो.
१९. ठिबक सिंचन हाताळणा-या व्यक्तो-कडून तांत्रिक नुकसान होते.
२०. ठिबक सिंचनात नळयांना गळती लागू नये याचो फार काळजी घ्यावो लागते.
२१. ठिबक सिंचनास विक्रेत्याकडून उत्तम सेवा मिळते.
२२. ठिबक सिंचन संचाचे सुटे भाग सहज मिळतात.
२३. ठिबक संच कार्यान्वित करण्यासाठी अल्पमुदती प्रशिक्षणाची आवश्यकता आहे.
२४. ठिबक सिंचन संच महाग आहे.
२५. ठिबक सिंचन संचाचा वापर हो गुंतागुंतीचो वाव आहे.
२६. ठिबक संचाच्या वापरानुळे कांय पाण्यात जास्त मोन ओलोताखाली आणता येते.
२७. ठिबक सिंचनानुळे पिकाच्या मुळांना योग्य प्रमाणात पाणो मिळते.
२८. ठिबक सिंचन संचाने ओलीत करावयाचे अन्त्यास त्यास शुध्द पाणो पाहीजे.
२९. ठिबक सिंचनानुळे जमिनीचो धुप थांबते.
३०. ठिबक सिंचनानुळे झाडाच्या मुळांची वाढ विधीष्ट मर्यादित होते.



ठिबक सिंचनाच्या वापरतात येणा-या अडचणी [उदाहरणासहोत माहितो घात]

**अ] आर्थिक अडचणी:**

१. ठिबक सिंचनामुळे उत्पादनातील वाढ हो गुंतवणूकीच्या प्रमाणात होत आहे.
२. दुरुस्तोकरिता खर्च जास्त येतो.
३. सुट्या भागाचो किंमत जास्त आहे.
४. नव्या स्वच्छ करण्यास लागणा-या रसायनाचो किंमत जास्त असते.
५. ठिबक सिंचनाचे अनुदान फक्त श्रौपंत शेतक-यांनाच मिळते.
६. इतर

**ब] तांत्रिक अडचणी:**

१. रुक्ष नळ्या / डोपर बंद होणे.
२. उंदोर / खार हयानो नळ्या कुरतडणे.
३. जोडावर पाणी गळणे.
४. पार्श्वला भेगा पडणे.
५. शेवटच्या रुक्ष नळ्या व डोपर पर्यंत पाणी न पोहचणे.
६. आवश्यकते पेक्षा व जास्त क्षपतेची विद्युत पोटार.
७. फिल्टरच्या जाळ्या फाटणे.
८. साठान निवृळट प्रतीचे असणे.
९. चुकीचो आखणो
१०. ठिबक सिंचन संघ वेळी ठरावोक पिकासाठोच वापरता येतो.
११. जांतर मशागत करता येत नाही.
१२. इतर

**क] मानवी अडचणी:**

१. ठिबक सिंचनाचे उपयोगीतेवर विश्वास बसत नाही.
२. फलदाचे जाबतीत व्यापारी माल घेण्यास तयार नसतात.
३. संबंधीत विक्रेत्याकडून व विस्तार कार्यकर्त्याकडून मार्गदर्शन वेळेवर मिळत नाही.
४. ठिबक सिंचना विषयो संपूर्ण ज्ञान नाही.
५. तंतोतंत तांत्रिक माहितीचा अभाव
६. इतर



उ) इतर उत्तरे:

१. \_\_\_\_\_
२. \_\_\_\_\_
३. \_\_\_\_\_

ठिबक सिंचन आपल्या शेतीत यशस्वी झाले असे आपणास वाटते काय? होय/नाहो  
होय असल्यास खालील बाबींवर माहितो सांगा.

अ.क्र.	बाब	पूर्वी	आता
१.	भाण्यांचो वयत	_____	_____
२.	पजुराचो वयत	_____	_____
३.	आंतर यशस्वीतोचा खर्च	_____	_____
४.	पिकाचो प्रत	_____	_____
५.	पिक उत्पादन	_____ हे.	_____ हे.
६.	नपिन पुंशरणा	_____	_____
७.	खतांचो वयत	_____	_____
८.	पिक संरक्षणादरील खर्च	_____	_____
९.	इतर	_____	_____

अयशस्वी झाले असल्यास गहत्वाची कारणे कोणती ?

१. १. \_\_\_\_\_
२. २. \_\_\_\_\_
३. ३. \_\_\_\_\_
४. ४. \_\_\_\_\_

ठिबक सिंचन पध्दती आपणास उपयोगी व्हातो यासाठी आपल्या काय सूचना  
आहेत

१. \_\_\_\_\_
२. \_\_\_\_\_
३. \_\_\_\_\_
४. \_\_\_\_\_
५. \_\_\_\_\_