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# A STUDY ON MODERN TECHNIQUES USED IN IRRIGATION FOR FARMING IN COIMBATORE CITY

**G. Indhumathi*, C. Suresh** & M. Sangeetha*****

* Assistant Professor, Department of Commerce IT & E Commerce, SNMV College of Arts and Science, Coimbatore, Tamilnadu

** Assistant Professor, Department of Commerce PA, SNMV College of Arts & Science, Coimbatore, Tamilnadu

*** Assistant Professor, Department of Commerce, VLB Janakiammal College of Arts and Science, Coimbatore, Tamilnadu

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**Abstract:**

Water is most powerful natural resource it is mostly influences in health and wealth of the people and production of food. India economic backbone is agricultural. We are depending the water resources for development agriculture. Irrigation plays main role in the food production. The future expansion of food production will be increasing dependents upon sound irrigation and water management systems and now days the resources are most challenging because of environment changes. These days' people prefer to use modern irrigational techniques because they are extremely efficient and effective. Modern irrigational techniques are also pivotal in increasing the crop yield. Also since these days farming is done with the help of fertilizers, crops need a certain amount of water to grow properly. Modern irrigational techniques are also cost effective, if done on a large scale. Also modern irrigational methods are important because of scarcity of water and increasing demand for food crops. For example: drip irrigation, if done properly can save up to 95% of water. According to me, modern irrigational techniques should be used and promoted because they save a lot of water.

**Key Words:** Irrigation & Environment Changes

## Introduction:

Water is most powerful natural resource it is mostly influences in health and wealth of the people and production of food. India economic backbone is agricultural. We are depending the water resources for development agriculture. Irrigation plays main role in the food production. The future expansion of food production will be increasing dependents upon sound irrigation and water management systems and now days the resources are most challenging because of environment changes.

The most important activity aimed at improving the productivity of land in arid areas is irrigation. The optimality of the irrigation method used and technical perfection of irrigation and drainage systems are evaluated by the minimum flow of irrigation water and maximum yield. This problem can be solved in a complex, creating technically perfect water-saving on-farm systems with the use of efficient equipment and advanced technologies.

Choice of rational irrigation technologies and equipment for these specific conditions should be carried out in stages. At first it is necessary to determine technical acceptability of a particular irrigation technology, and then choose the most economically sound method for this area (basin) taking into account dominant crops.

Economic evaluation of the appropriateness of particular equipment and modern irrigation technologies is set by comparing the number of technical and economic parameters, the most important of which are: the amount of capital investments and payback period. But the irrigation system is expensive the modern irrigation system have two types one is Sprinkler and drip irrigation system.

## Sprinkler Irrigation Method:

In present times, when water crisis is developing very fast everywhere, we should adopt improved techniques of irrigation to encourage suitable water management. Sprinkler irruption method is an easy and simple method of irrigation in present times.

The whole land becomes available for cultivation of crops, whereas in traditional irrigation methods, 15 to 20 per cent land remains vacant in depressions and boundaries. Modern equipment's can also be used in it due to absence of depressions and boundaries. Rate of infiltration is higher in sandy soils where frequency of watering is more. Hence, sprinkler irrigation method is more suited to sandy soils.

In sprinkler irrigation method, water is taken from source to the fields through pipes, whereas in surface irrigation methods only 30-45 per cent water reaches the crops. Such loss of water is avoided in sprinkler irrigation method. The problem of water logging or 'Kallar' may be caused in case of excess water from surface irrigation, whereas no such problem is caused in sprinkler irrigation method. The balance of groundwater is also maintained.

**Advantages:**

- ✓ There is increase in production and compactness.
- ✓ It is helpful in soil conservation and stabilization of sand dunes in desert areas.
- ✓ Sprinkler system is considered more suitable in areas where slit is coagulated on surface of soil after rains, prevents growth of crop.
- ✓ This system saves the crop from extreme frost or temperature.
- ✓ Fertilizer application as well as insecticide spray can be done by sprinkler system.

**Disadvantages/Defects:**

- ✓ Sprinkler irrigation method is expensive.
- ✓ It requires technical knowledge.
- ✓ Sprinkler irrigation method cannot be used in all crops.
- ✓ Crop is damaged by changing sprinkler system again and again.
- ✓ Water to be used in sprinkler method should be clean.

Drip irrigation for tomato farming

**Drip Irrigation:**

A newly developed irrigation system known as drip irrigation or trickle irrigation, originally developed in Israel, is becoming popular in areas of water scarcity. In this irrigation system, a small amount of water is applied at frequent intervals in the form of water droplets through perforations in plastic pipes or through nozzles attached to tubes spread over the soil to irrigate a limited area around the plant.

A precise amount of water equal to the daily consumptive use or the depleted soil water needs to be applied. The soil water can be maintained at the field capacity during the crop growing period. Deep percolation losses can be completely prevented and the evaporation loss is also reduced.

**Advantages:**

- ✓ In this method, water directly reaches the roots of the plants, which take water to plants in balanced quantities.
- ✓ Drip irrigation method saves 30 to 70 per cent water and it is possible to irrigate three times more area with the same amount of water.
- ✓ In this method, weeds do not spread because water reaches only near plants and does not spread in the whole field.
- ✓ Fertilizers and insecticides can also reach the plant directly by solution in the water and it saves 30 to 60 per cent chemical fertilizers as well as 40 to 50 per cent pesticides along with saving of water.
- ✓ Even in case of uneven lands, drip irrigation method can do balanced irrigation.
- ✓ Crop production is higher by 20 to 40 per cent in drip irrigation method, because plants can get air and water in required quantities, resulting in regular growth of crops.

**Disadvantages:**

- ✓ Drip irrigation method is expensive.
- ✓ It requires special technical knowledge for successful operation of this method.
- ✓ In heavy soils, it creates problems of flow and water blockages.
- ✓ Plants are able to get nutritive elements in a very limited area.
- ✓ It is not suitable for every crop.

**Objectives of the Study:**

- ✓ To study functioning of farmers irrigation system.
- ✓ To analyses the factors influent for adapting modern irrigation system.
- ✓ To find the modern techniques help for the farmer in the cultivation.

**Methodology:**

Research methodology is a study of using modern irrigation methods. The validity of any research is based on the systematic method of formulating the objectives, data collection, analysis and interpretation.

**Research Design:**

This study falls under descriptive research and hence descriptive research design was followed.

**Methods of Data Collection:**

The present study is based on primary data. Questionnaire was the main tool for collecting the primary data. The questionnaire was designed in a systematic way of covering adequate and relevant almost all aspects of the study. The data collected from the primary sources were arranged sequentially and tabulated in a systematic manner. Secondary data required for the study was collected from books, magazines, journals, newspapers, past research, reports and various websites.

**Sampling Method:**

Non probability convenience sampling techniques was used to select a sample of 150 farmers in Coimbatore city.

**Tools for Analysis:**

The following tools were employed to analyse the data with reference to the selected objectives of the study.

- ✓ Simple Percentage
- ✓ Chi- square analysis
- ✓ Henry Garrett Ranking
- ✓ Correlation

**Review of Literature:**

Senthilkumar (2011) in his report discuss Labour Absorption in agriculture; employment generation is one of the major objective of the developed and developing countries. The studies conducted in the past have broadly concluded that technological progress based on seed, fertilizer and irrigation is generally labour-using in nature whereas mechanization via tractors, pump sets, harvesters and threshers is usually labour –saving in nature. However, usually these two aspects of the technological progress are complementary in nature and as such

Salimonu, Falusi, (2009) in their study identified the sources of risk and the management strategies employed by the food crop farmers. Data from 165 respondents were used for the analysis. Sources of risk in the last three years were market failure, 54.5%; price fluctuation, 46.1%; drought, 32.7%; pest and diseases attack, 33.9% and erratic rainfall, 39.4%. Majority of the food crop farmers in the study area (Nigeria) were in the medium risk category. Finally they concluded that the investment in irrigation projects by the government would also save the farmers from drought and erratic rainfall while farmers are encouraged to benefit from the services of the agricultural insurance industry.

Shashidhar (2004) in his study on drip irrigation farmers of Bijapur district in Karnataka revealed that all the drip irrigation adopters were influenced to adopt drip irrigation due to influencing factors like saving water (100%), better utilization of nutrients (79%), save in labours (75%), easy application of fertilizers (68%), to avail subsidy provision (54%), to reduce weed growth (33%) and to avoid land leveling (8%)

**Data Analysis and Interpretation:**

**1. Simple Percentage Method:**

**1.1 Type of Modern Irrigation System:**

Table 1.1: Type of Modern Irrigation System

| Types | Respondents | Percentage |
|---|---|---|
| Drip Irrigation | 125 | 83 |
| Sprinkler Irrigation | 25 | 17 |
| **Total** | **150** | **100** |

It is observed that most (83%) of the respondents are using Drip irrigation and 17% of the respondents are using sprinkler irrigation system. It reveals that most of the farmers used drip irrigation system.

**1.2 Benefits of Using Modern Irrigation System:**

Table 1.2: Benefits of Using Modern Irrigation System

| Benefits | Respondents | Percentage |
|---|---|---|
| Low cost | 11 | 7.33 |
| Reduce irrigation time | 16 | 10.67 |
| Less manpower | 25 | 16.67 |
| High area of production | 37 | 24.67 |

| | | |
|---|---|---|
| Less wastage of water | 61 | 40.67 |
| **Total** | **150** | **100** |

It is found that maximum (40.67%) of the respondents stated that they are benefit in less wastage of water, while 24.67% of the respondents are benefit by high area of production, 16.67% of the respondents are beneficiary by manpower using. It reveals that most of the 40.67 percent respondents are beneficiary threw time saving in modern irrigation system.

**2. Chi-Square Test:**

**2.1 The Relationship between the Water Resources and Area of Farming:**

Table 2.1: Water Resources and Area of Farming

| **Water Resources** | **Area of Farming** | | | **Total** |
|---|---|---|---|---|
| | **Less Than 5 Acres** | **5 to 10 Acres** | **More than 10 Acres** | |
| Bore well | 3 | 44 | 14 | 61 |
| | 8.9 | 37.82 | 14.2 | 61 |
| Well | 4 | 25 | 8 | 37 |
| | 5.4 | 22.9 | 8.6 | 37 |
| Tank | 9 | 10 | 6 | 25 |
| | 3.7 | 15.5 | 5.8 | 25 |
| Rain fed | 2 | 9 | 5 | 16 |
| | 2.3 | 9.9 | 3.7 | 16 |
| Canal | 4 | 5 | 2 | 11 |
| | 1.6 | 6.8 | 2.5 | 11 |
| Total | 22 | 93 | 35 | 150 |
| | 22 | 93 | 35 | 150.0 |

The chi-square test reveals that the calculated chi-square value (19.82) is more than the table chi-square value (15.507) at 5% level of significance ($P<0.021$) and therefore, the relationship between water resources and Area of Farming is significant. Thus, the hypothesis is that the relationship between the two factors holds good. Hence, the null hypothesis is rejected.

**3. Henry Garrett Ranking Technique:**

**3.1 Reasons for Choosing Modern Irrigation System:**

Table 3.1: Reasons for Choosing Modern Irrigation System

| **Reasons** | **Rank 1** | **Rank 2** | **Rank 3** | **Rank 4** | **Rank 5** | **Rank 6** | **Rank 7** |
|---|---|---|---|---|---|---|---|
| Control waste of water | 33 | 30 | 29 | 15 | 20 | 13 | 10 |
| Scarcity of Water | 32 | 31 | 32 | 24 | 10 | 10 | 11 |
| Suitability for crops | 27 | 30 | 26 | 30 | 16 | 9 | 12 |
| High area of production | 6 | 17 | 24 | 24 | 33 | 28 | 18 |
| Reduce time of irrigation | 6 | 7 | 7 | 19 | 22 | 21 | 68 |
| Save the nature | 10 | 16 | 13 | 25 | 14 | 57 | 15 |
| Less manpower | 37 | 20 | 20 | 12 | 34 | 13 | 14 |

| **Reasons** | **Garrett Score** | **Garrett Mean** | **Garrett Rank** |
|---|---|---|---|
| Control waste of water | 8482 | 56.55 | 2 |
| Scarcity of Water | 8579 | 57.19 | 1 |
| Suitability for crops | 8323 | 55.49 | 3 |
| High area of production | 6914 | 46.09 | 5 |
| Reduce time of irrigation | 5434 | 36.23 | 7 |
| Save the nature | 6691 | 44.61 | 6 |
| Less manpower | 8175 | 54.50 | 4 |

It is clear that the farmers indicated the major reason modern irrigation system for is due to Control waste of water (M=57.19) which achieved first position followed by due to its Scarcity of Water (M=56.55), that achieved 2nd position, Third position was to Suitability for crops (M=55.49), fourth was Less manpower (M=54.50), Fifth position was High area of production (M=46.09), sixth position was achieved as the reason of Save the nature (M=44.61), and finally, that the farmers were Reduce time of irrigation (M=36.23), as the Control waste of water was high reason for modern irrigation .

**4. Correlation:**

**4.1 Relationship between the Type of Modern Irrigation method and Satisfaction Level:**

X Variable is Type of Modern Irrigation method

Y Variable is Satisfaction Level

Table 4.1

| S.No | $x$ | $y$ | $X = x - 25$ | $Y = y - 30$ | $X^2$ | $Y^2$ | $xy$ |
|---|---|---|---|---|---|---|---|
| 1 | 125 | 115 | 100 | 85 | 10000 | 7225 | 8500 |
| 2 | 25 | 30 | 0 | 0 | 0 | 0 | 0 |
| 3 | 0 | 5 | -25 | -25 | 625 | 625 | 625 |
| | | | | | $\Sigma X^2$ =10625 | $\Sigma Y^2$ =7850 | 9125 |

$$r = \Sigma xy / \sqrt{\Sigma X^2 + \Sigma Y^2}$$

$$r = 9125 / \sqrt{10325\ X\ 7850}$$

$$r = 0.99$$

From the correlation analysis, it was inferred that the r value is positively correlated as 0.99. Therefore it is cleared that there is a positive correlation between the Type of Modern Irrigation method and Satisfaction Level of the farmers.

**Findings:**

- ✓ Most (83%) of the respondents are using Drip irrigation.
- ✓ Maximum (40.67%) of the respondents stated that they are benefit in less wastage of water.
- ✓ There is significant relationship between type of irrigation and area of farming.
- ✓ It is clear that the farmers indicated the major reason modern irrigation system for is due to Control waste of water.
- ✓ It is cleared that there is a positive correlation between the Type of Modern Irrigation method and Satisfaction Level of the farmers.

**Suggestions:**

- ✓ Water scarcity shall be addressed by providing necessary supply during the monsoon failures to the Government.
- ✓ The Government should sanctions special and motivates special loans for modern irrigation techniques users.
- ✓ To provide awareness programmes to farmers about the modern technology.
- ✓ Farmers should follow the soil testing and which type of irrigation systems will help for their soil and crop types.
- ✓ The farmers want make awareness to other farmers.

**Conclusion:**

These days' people prefer to use modern irrigational techniques because they are extremely efficient and effective. Modern irrigational techniques are also pivotal in increasing the crop yield. Also since these days farming is done with the help of fertilizers, crops need a certain amount of water to grow properly. Modern irrigational techniques are also cost effective, if done on a large scale. Also modern irrigational methods are important because of scarcity of water and increasing demand for food crops. For example: drip irrigation, if done properly can save up to 95% of water. According to me, modern irrigational techniques should be used and promoted because they save a lot of water.

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