



## Source of Irrigation : A Case study of Koderma District

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### ORIGINAL ARTICLE



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Received on : 17/03/2024  
Revised on : -----  
Accepted on : 18/05/2024  
Overall Similarity : 08% on 10/05/2024



Plagiarism Checker X - Report

Originality Assessment

Overall Similarity: **8%**

Date: May 10, 2024

Statistics: 151 words Plagiarized / 1966 Total words

### ABSTRACT

*Irrigation is the most important instrument of the development of agriculture. Irrigation means to provide water for sustainable crop production in agriculture with the help of artificial sources without rain water. For ex.-dam, canal, tubewell etc. in artificial irrigation. Irrigation plays an important role in changing cropping pattern, of absorption of modern inputs, i.e. high yield variety seeds, chemical fertilizers, pesticides etc. It raises gross income and promotes consumption and investment expenditure of farmers. Indirectly irrigation increases social status, such as education level & knowledge, change in the attitude of the farmers etc. It also helps to gives push to the growth of tertiary sector.*

### KEY WORDS

*Dam, Canal, Cropping Pattern, Pesticides, HVY seed, Chemical Fertilizers.*

### INTRODUCTION

Water is available or it may be supplied to agricultural tract artificially by human efforts. According to Khullar (2008) 'The process of supplying water to crops by artificial means e.g. canals, wells, tube-wells, tank etc from the sources of water like rivers tanks, ponds or undergrounds water is called "Irrigation"

Irrigation is the artificial application of water to the agricultural land or soil mainly used in the dry areas during period of inadequate rainfall.

### Objective

The main objective of the present study is to study source of irrigation with approach of artificial as well as natural resources.

### Data and Methodology

The required data of irrigation sources like

dam, rivers, tank and ponds, canals, wells, tube wells etc. is from irrigation Deptt. Koderma district, Jharkhand.

## Need of Irrigation

- (i) The Study area falls in Monsoon rainfall region, where irrigation is indispensable for sustainable agricultural development. Our rainfall is ‘uncertain, unreliable, distributed.
- (ii) Apart from the vagaries of monsoonal rainfall, there are certain crops such as rice, sugarcane, cotton, chillies etc. which require more water which is provided with irrigation even in areas of heavy rainfall. Again with the introduction of High Yielding varieties (HYV) of seeds and application of heavy dose of chemical fertilizers since the second half of 1960s, irrigation has been a very important ingredient of our agriculture.
- (iii) To cope with the unequal distribution of rainfall.
- (iv) To maximize agricultural production.
- (v) To get efficient use of utilizable fallow land.
- (vi) To meet the supplemental needs in certain areas.

Participation of State Governments, NGOs, farmers and the public is the need of the hour to strengthen and develop irrigation infrastructure and its equitable distribution.

Irrigation has proved beneficial to the country as a whole. Actually, “Irrigation forms the datum line for sustained successful agriculture”. (Manoria, 1982, 225)

## Source of Irrigation

The major sources of irrigation are:

- (i) From rivers which is of the nature of continuous supply of water as river Barakar in the study area,
- (ii) Tanks and reservoirs which may be filled during rain and,
- (iii) The underground supply tapped through the artesian well in especially suited regions as in Australia and South Africa or through the ordinary dug out wells in India. The last two sources are more easy and cheaply exploited than the first one where costly hard works have to be constructed before effective supply in the canals is possible. Again the construction of artesian wells is also a complex and expensive problem and is confined only to below localities where the underground rock formation is such as to accumulate the underground streams of water in large basins (Dugey, 1068, 86). Irrigation is limited chiefly by available water and “topography”

**Table: Sources of Irrigation – 2020-21**

Total Irrigated Area	23,34,776	Hectares	60.44%
Un-irrigated Area	15,27,228	Hectares	39.56%
Total Agriculture land	38,62,004		
<b>Tank and Ponds</b>	<b>Canals</b>	<b>Wells (Tube + well)</b>	<b>Other</b>
7,06,191 Hec.	6,15,910 Hectare	5,75,810 Hectare	4,36,666 Hectare
32.29%	26.48%	24.60%	18.63%

(Source: Irrigation Deptt. Koderma District, Jharkhand)

From the above table, it is obvious that total irrigated area of the district arable land was 60.44% in 2020-21, which is irrigated by different means. The highest irrigation land 7,06,191 hectares or 30.29% is by means of tank and ponds. Next means of irrigation is canals 6,15,910 hectares and 30.29% is by wells and tube-wells (5,75,810 hectares or 24.60%). Other sources comprise 4,34,666 hect or 18.22%).

## Tank and Pond Irrigation

Tanks and reservoirs (AHAR) generally comprise such storage schemes which impound water of streams and river for irrigation purposes. Tank has been developed constructing a small bund of earth or stone built across a river. Construction of tank is feasible mostly in areas where streams can be dammed or banded.

In the study-area, due to the rocky and undulating nature of the terrain in most part tanks are a popular source of irrigation for the following reasons:

- The undulating relief and hard rocks make it difficult to dig canals and wells.
- There is little percolation of rain water due to hard rock structure.
- Most of the small rivers of the area are small and dry up in summer seasons.

In the study types of tank are three:

- (i) TAL (tank) or POKHAR (pond) or dug out reservoirs filled in by rain water.
- (ii) The natural depressions and down warped land conducting rains or flood water and.
- (iii) AHAR or artificial elongated reservoirs fetched by streams or rain water (Prasad, 2000, 163)

## Limitations of Tank Irrigation

- (i) Some of these tanks have been constructed centuries ago and do not confirm the latest standard.
- (ii) There is a loss of water by evaporation and percolation.
- (iii) Many Tanks dry up during dry seasons and become useless to provide irrigation when it is needed the most.
- (iv) Use of tank water and tank bunds also sometimes cause quarrels and violence among the villagers which has resulted in impoverishment of the whole village community (Manoria 1982, 245-48).

## Canal Irrigation

Canal was the most important source of irrigation up to 1960s, but in the 1970s, well and tube-wells ranked first surpassing canal irrigation. Canal is the effective source of irrigation in areas of low relief, deep fertile soils, perennial source of water and extensive command area.

Various dams on different sites are under construction in the northern part of Koderma district. This will brighten the possibilities of adequate irrigation facilities in this area-the southern part of Nawada district (in Bihar) and the northern part especially in Satgawan C.D block of Koderma district. It is proposed to collect water of various subsequent streams originating from the southern Chhota Nagpur plateau behind these dams and to distribute water through canals in the down stream areas. A high dam is likely to be laid in the upper reaches of the Sakri River on its completion. Water for Irrigation will be supplied to the different anchals of Nawada district as well as the Satgawan block area of Koderma district. Some canal irrigation is also done by the river Barakar, Dhadhar and Barson.

## Merits of Canal Irrigation

- (a) Most of the canals provide perennial irrigation by supply of water as and when needed, this helps the crops from drought and increases farm output.
- (b) Canals carry good amount of sediments with its water the sediment is deposited in the agricultural field. This adds to fertility of the soil.

The obvious inadequate and defective system of irrigation in several area can be improved as follows. (Rego 1999, 10-76):

- (i) Facilities of irrigation should be developed in relation to the availability of rainfall. Generally the requirement of irrigation is more acute in areas of low and medium rainfall.

- (ii) **Increasing cost of irrigation potential:** It is deduced that over the last fifty years, per hectare, expenditure for creating irrigation potential has increased progressively.
- (iii) **Problem of water logging:** One of the major problem of various irrigation project is water-logging. Water-logging results in shift in cropping pattern, ultimately to inefficient. use of land, a part of land becoming totally uncultivable.
- (iv) **Poor O and M:** Poor condition of operation and maintenance of irrigation system is a common problem.
- (v) Extensive flow of water in the field, raises the ground water level.

Canal irrigation is suitable only in plain areas and irrigation is found mainly along the rivers of Sakri, Barakar and their tributaries in the C.D. block of north Satgawan, northern part of Chandwara, Jai nagar and Markacho blocks of the district.

### **Diversion Weirs and Small Irrigation Schemes**

These involve partial raising of the level of water in the stream leading it out through canal head or outlets, open or fitted with gate shutters, into irrigation channels run along suitable alignments.

Where water-supplies are available throughout the year, canals can be taken off from such streams on perennial flow basis, otherwise inundation canals are in vogue.

### **Demerits of Diversion Weirs**

- (i) Such channels are insatiable due to frequent silting.
- (ii) These are usually difficult to approach and are subject to landslides, cattle trespass and rain cuts.
- (iii) Inadequate capacity of works to cope with targets aimed.
- (iv) They have to be maintained at heavy cost, sometimes to be replaced year after year, (Manoria 1982, 248-49)

### **Well-Irrigation**

A well is a hole dug in the ground to obtain the subsoil water. It may be kuccha or brick-built. An ordinary well up to 15 meters (bricks) are also built. Well irrigation is widely used in areas where sufficient sweet ground water is available like in river basins.

Tube well is a deeper well, generally more than 15 meter deep from, where water is lifted with the help of a pumping set operated by on electric motor or a diesel engine.

There should be sufficient quantity of ground water as a tube well can generally irrigate 2 hectares of land per day against 0.2 hectare per day irrigated by on ordinary well.

Tube well irrigation in the district is generally seen in comparatively plain and fertile land. Due to its utility its number is growing in the study area, particularly the C.D block having river basins and plain agricultural lands.

### **Merits of well and Tube-well Irrigation**

- (i) Well is the most simple and cheap source of irrigation.
- (ii) A number of chemicals e.g. -nitrate, chloride, sulphate etc. are generally mixed with well water which add to the fertility of the soil.
- (iii) Besides, a farmer has to pay regularly for canal irrigation which is not with the case of well irrigation.

### **Demerits of well and Tube-well Irrigation**

- (i) The well may dry up in summer season and also be useless for irrigation when excessive water is liberated of it.

- (ii) Tube-well can draw (suck-up) ground water from its surrounding areas.
- (iii) With the application of well irrigation, multiple crops are grown with greater dominance of variety of vegetables and early peas and tomatoes (Prasad 2000, 104)

Well irrigation is a very important and popular source of irrigation in the river basin and plain areas of the district. Some well-stoned welled shallow wells, may also be seen in the north terrain area of Koderma, northern part of Jai nagar, Markachho blocks.

### **Other Drip Irrigation**

It is a water saving irrigation scheme. This system of irrigation has been introduced in the study area in river basins and other plain tracts.

### **Dobha Irrigation Scheme**

It is like a small farm pond constructed and managed by individual farmer. It is an old traditional method of storing and utilizing rain water in dry areas which has regulated into ground water recharge as well as provide water during post-monsoon times for irrigation. The scheme of Dobha irrigation was launched under Jharkhand Chief Minister vision of “*Village Water In Village And Farm Water In Farm*”. In the financial year of 2016-17 with an aim of one lakh Dobha throughout the state, a total expenditure of Rs. 200 crores was sanctioned.

### **CONCLUSION**

Irrigation helps to grow crops, maintain landscape and revegetate disturbed soils in dry area and during times of below-average rainfall. In addition to these uses, irrigation is also employed to protect crops from frost. There are many negative impacts of irrigation like downfall of water table, problem of water logging, many social disputes, but afterall, irrigation is used to cool livestock, reduce dust, depose of sewage. Irrigation suppresses weed growth in grain fields and prevents soil consolidation.

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