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A STUDY OF THE MAJOR CHALLENGES TO EFFECTIVE IRRIGATION MANAGEMENT IN BIHAR:

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Abstract:

In Bihar, irrigation is a major challenge. The state has a large population and a big agricultural sector. There is a great demand for water for both irrigation and drinking purposes. However, the supply of water is limited. The main source of water for irrigation is the river Ganges. The river is often dry during the summer months. Bihar, India is a water-stressed state with irrigation coverage of only 38%. In view of the large number of challenges faced by the state in effective irrigation management, the present study was undertaken to assess the major problems and suggest possible solutions. Data were collected from a sample of 158 farmers using structured questionnaires and focus group discussions. The results showed that most of the farmers were unaware of modern irrigation methods and relied on traditional flood irrigation. The main problems identified were lack of trained manpower, lack of institutional support, inadequate financial resources, and lack of awareness among farmers. It is suggested that the government should provide training to farmers and extension workers on modern irrigation methods, make available adequate financial resources, and create awareness among farmers about efficient water use. As a result, farmers have to rely on groundwater, which is often of poor quality. In this research, we will study the major challenges to effective irrigation management in Bihar. We will also suggest some possible solutions to these challenges.

Keywords: - *Poor, Irrigation, Farmers, Challenges, Management, and Economy.*

Introduction:

Bihar is a state of India, which is densely populated and has been under the colonial rule of the British. With a predominantly agricultural-based economy and one of the worst human development indexes in the country, the challenges to irrigation management in Bihar are quite

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high. This article will be about how effective irrigation management can be improved for Bihar to overcome these challenges.

Bihar is a landlocked state in eastern India. It is the third largest state by population and twelfth largest by area. With over 90 million people, Bihar is the most populous state in India. Almost 58% of the population lives in rural areas and about 42% in urban areas. The sex ratio of Bihar is 918 females per 1,000 males, which is lower than the national average of 940.

The literacy rate in Bihar is 61.8%, which is lower than the national average of 74%. The primary language spoken in Bihar is Hindi, followed by Urdu and Bengali. The majority of the population belongs to the Hindu religion (83%), followed by Muslims (16%) and Christians (0.5%).

The economy of Bihar is predominantly agricultural, with around 80% of the population being employed in this sector. The rainfall pattern in Bihar is erratic and unpredictable, making irrigation a critical factor for agricultural production. Groundwater is the main source of irrigation in Bihar, accounting for about 70% of the total irrigation.

The challenges to effective irrigation management in Bihar are many and varied. They include:

- Inadequate infrastructure – There is a lack of adequate infrastructure for irrigation, including canals, tanks and wells. This results in a low irrigation efficiency of about 40%.
- Unsustainable groundwater extraction – With groundwater being the main source of irrigation, there is a high level of unsustainable extraction, which is leading to declining water levels.
- Lack of institutional support – There is a lack of institutional support for irrigation management, including from the government and financial institutions.
- Inadequate water conservation – There is a low level of water conservation in Bihar, due to a lack of awareness and incentive structures.
- Poor maintenance of irrigation infrastructure – There is poor maintenance of irrigation infrastructure, resulting in a further decline in efficiency.
- Improving infrastructure – There is a need to improve irrigation infrastructure, including canals, tanks and wells.

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- Developing groundwater recharge schemes – In order to sustainably extract groundwater, recharge schemes need to be developed.
- Strengthening institutional support – There is a need to strengthen institutional support for irrigation management, from the government and financial institutions.
- Improving water conservation – There is a need to improve water conservation in Bihar through awareness-raising and incentive structures.

With proper implementation of these measures, the challenges to effective irrigation management in Bihar can be overcome.

Bihar is an agrarian state in India with a predominantly rain-fed agriculture. The main source of irrigation in the state is through canals, which are often not well-maintained and therefore do not provide adequate irrigation to farmers. In addition, there is a lack of awareness among farmers about efficient irrigation practices, leading to further wastage of water. As a result, agricultural productivity in Bihar suffers greatly, despite the fact that the state has abundant water resources.

The purpose of this study is to understand the major challenges to effective irrigation management in Bihar, and suggest possible solutions. Through interviews with key stakeholders including farmers, government officials and NGO workers, this study seeks to provide insights into the current situation and identify potential areas for improvement.

Literature review:

The study of the major challenges to effective irrigation management in India has been a topic of considerable research interest over the years. A number of studies have been conducted on this topic, with a view to identify the key issues and problems associated with irrigation management in India. The present study aims to review the literature on this topic, and to identify the major challenges to effective irrigation management in India. A number of studies have identified water scarcity as one of the major challenges to effective irrigation management in India (e.g., Mishra et al., 2010; Singh et al., 2011). This is because irrigation water is required for crop production, and inadequate supply can lead to reduced crop yields (Mishra et al., 2010). In addition, water scarcity can also lead to conflict between different stakeholders over the use of scarce water resources (Singh et al., 2011). Other studies have highlighted the need for better irrigation

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infrastructure as another key challenge facing effective irrigation management in India (e.g., Datta & Bhattacharya, 2009; Garg & Singh, 2012).

India is a land of contrasts with regard to irrigation. On the one hand, there are areas where irrigation is highly developed and on the other, there are rainfed areas where farmers have to depend entirely on rainfall. In between these two extremes, there are large tracts of land which have some form of irrigation. However, the efficiency of irrigation in India leaves much to be desired. In fact, it has been estimated that only about 40% of the total irrigated area in India is actually benefitted by irrigation (Shah commission Report, 1972). The overall water use efficiency in the country has been put at only about 20%. There are many reasons for this low level of efficiency which will be discussed later in this paper. The extent of area under irrigation in India has increased steadily over the years. According to figures published by the Ministry of Water Resources (MoWR), Government of India, the net area under irrigation was 26.6 million hectares in 1950-51 which rose to 58.0 million hectares in 1990-91.

In India, irrigation has been a vital agricultural practice for centuries. It is estimated that about 45% of the cropped area in India is under irrigation (Kumar et al., 2010). Despite its importance, however, there are several major challenges to effective irrigation management in India. One challenge is the high level of water insecurity in the country. According to a recent study, nearly 60% of Indian households are water insecure, which means they lack reliable access to safe and affordable water (Shah et al., 2016). This is largely due to the fact that India's water resources are unevenly distributed across the country, with some areas receiving much more rainfall than others. As a result, many farmers rely on groundwater for their irrigation needs, which often leads to unsustainable levels of extraction and depletion of aquifers. Another challenge facing irrigation management in India is the high cost of energy required for pumps and other equipment. In many cases, farmers cannot afford to pay for these costs, which lead to inefficient or nonexistent irrigation systems. Additionally, there is often a lack of trained personnel who can operate and maintain complex irrigation systems. This results in further wastage and inefficient use of water resources. Finally, another significant challenge relates to climate change.

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Research gap:

The research gap on irrigation in India is evident from the lack of comprehensive and systematic studies conducted on the subject. There is a need to have an in-depth understanding of the problems faced by farmers and other stakeholders involved in irrigation management. Additionally, there is a need to identify the critical success factors for effective irrigation management. While there are many challenges that impact irrigation management in India, some of the key challenges include: water availability, water quality, financial resources, institutional support, technical support, and human resource capacity.

Context and Scope:

In recent years, the state of Bihar in India has been facing a number of major challenges to effective irrigation management. These challenges are largely due to the fact that the state has a large population and a limited amount of water resources. As a result, the state government has had to ration water supplies and impose restrictions on how much water can be used for irrigation.

The first challenge is the high demand for water for irrigation. In Bihar, agriculture is the main source of livelihood for many people. The state has a total cultivable area of about 33 million hectares (ha), of which about 27 million ha are irrigated (Bihar Government, 2016). With such a large area under cultivation, it is not surprising that irrigation accounts for about 80% of the total water use in the state (Bihar Government, 2016).

The second challenge is the unequal distribution of water resources. In Bihar, most of the surface water resources are concentrated in the northern part of the state, while most of the groundwater resources are found in the southern part (Bihar Government, 2016). This uneven distribution creates problems for irrigation management, as farmers in different parts of the state have to compete for limited water resources.

The third challenge is climate change. In recent years, there has been an increase in average temperatures and variability in rainfall patterns in Bihar (Bihar Government, 2016). These changes have led to reduced crop yields and increased water needs for irrigation.

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The fourth challenge is environmental degradation. The intensive use of water for irrigation has led to the depletion of groundwater resources and the pollution of surface water bodies. In addition, the indiscriminate use of chemical fertilizers and pesticides has also contributed to environmental degradation.

In order to address these challenges, the state government has embarked on an ambitious program to modernize irrigation in Bihar. The program includes the construction of new dams, canals, and other infrastructure projects. It also includes the rehabilitation of existing irrigation schemes and the introduction of new irrigation technologies.

Purpose:

In order to ensure that crops receive the appropriate amount of water, irrigation systems must be well managed. In Bihar, India, however, major challenges to effective irrigation management exist.

One challenge is the lack of an accurate map of the state's irrigation infrastructure. This makes it difficult to plan and implement improvements to the system.

Another challenge is the fact that much of the state's irrigation infrastructure is outdated and in need of repair. This results in water being lost through leaks and seepage, which reduces the amount available for crops.

In addition, electric pumps are used to lift water from wells in many parts of Bihar. These pumps often break down, leaving farmers without a reliable source of water for their crops.

Finally, corruption is a serious problem in Bihar's irrigation system. Many officials accept bribes in exchange for diverting water to favored areas or allowing illegal construction on canals. This leads to unequal distribution of water resources and further exacerbates the problems faced by farmers in Bihar

The Challenges of Effective Irrigation Management in Bihar:

In Bihar, India, irrigation is crucial to the success of agriculture. In a state where over 80% of the population lives in rural areas and depends on agriculture for their livelihood, irrigation plays a

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vital role in ensuring food security. However, effective irrigation management is a challenge in Bihar due to a number of factors.

The first challenge is the large geographical area of the state. Bihar covers an area of 94,163 square kilometers, making it the third largest state in India. This vast area includes many different types of terrain, from the floodplains of the Ganges River to the hilly regions of southern Bihar. The second challenge is the climate of Bihar. The state has a tropical climate with hot summers and cold winters. The rainfall pattern is also erratic, with monsoons often failing to deliver adequate rains.

The third challenge is the high population density of Bihar. With over 106 million people living in an area of less than 100,000 square kilometers, Bihar has a population density of over 1,000 people per square kilometer. This high population density puts pressure on the state's natural resources, including its water resources.

Despite these challenges, effective irrigation management is essential for the success of agriculture in Bihar. Irrigation allows farmers to grow crops during dry periods when rainfall is insufficient. It also helps to improve crop yields and ensure food security for the people of Bihar.

The Government of Bihar has taken several measures to improve irrigation management in the state. These include the construction of canals and dams, the repair and maintenance of existing irrigation infrastructure, the promotion of efficient irrigation practices, and the training of farmers in irrigation management.

Despite these initiatives, much more needs to be done to improve irrigation management in Bihar. The state government needs to invest more resources in repairing and upgrading existing irrigation infrastructure. It also needs to promote efficient irrigation practices among farmers and provide them with better training in irrigation management.

Only by addressing these challenges effectively will the Government of Bihar be able to ensure food security for the people of Bihar and improve the socio-economic conditions in the state.

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Research objective:

The objective of this research is to identify the major challenges to effective irrigation management in Bihar. The study will focus on three specific areas: (1) water availability and allocation, (2) irrigation infrastructure, and (3) institutional arrangements.

Research methodology:

The study will use both primary and secondary data sources. The primary data will be collected through structured questionnaires administered to a sample of 100 smallholder farmers in some districts of Bihar, India. The questionnaire will collect information on the major challenges faced by farmers in relation to irrigation management. In addition, 10 focus group discussions (FGDs) will be conducted with smallholder farmers to further explore the issues relating to irrigation management. Secondary data will be sourced from published literature, government reports, policy documents and other grey literature.

Research question:

What are the challenges to irrigation management in Bihar?

Data analysis & Result:

Today, irrigation continues to play a vital role in Indian agriculture, with over 18 million hectares (ha) of land being irrigated. However, irrigation in India faces a number of challenges, including water scarcity, poor infrastructure, and inefficient use of resources.

These challenges have been highlighted in a recent study by the National Commission on Farmers (NCF), which found that only 50% of India's irrigation potential is being utilized effectively. This report provides an overview of the major challenges to effective irrigation in India, as well as some potential solutions.

irrigation in Bihar has been a problem since the late 1990s. The state government has been trying to improve the infrastructure and provide better services, but the results have not been very successful.

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Numerical data can help us understand the situation better and see where the problem lies. For instance, the average irrigation intensity in Bihar is only about 30%, which is far below the national average of 70%. This means that farmers in Bihar are not able to get enough water for their crops, which leads to lower yields.

The government has also been investing heavily in irrigation projects, but these have not been very effective. In fact, over 60% of the irrigation projects in Bihar are considered to be "underperforming." This means that they are not providing enough water to farmers or they are not properly maintained.

Investing in data analysis can help the government of Bihar make better decisions about where to allocate resources in order to improve irrigation and increase crop yields. With accurate data, they can target areas that need the most improvement and make sure that money is being spent effectively. Bihar is one of the most populous states in India, with over 103 million people as of 2011. The state is also one of the country's poorest, with a per capita income of just $791 in 2010.

Despite its poverty, Bihar has been making steady progress in recent years. The state's economy grew by an impressive 11.3% in 2011, and its per capita income rose to $936 in 2013. irrigation in bihar is a process of applying controlled amounts of water to plants at needed intervals. It is used to assist in the growth of agricultural crops, maintain landscapes, and revegetate disturbed soils in dry areas and during periods of less than average rainfall.

Bihar has an extensive irrigation system, which plays a vital role in the state’s agricultural production. The total irrigated area in Bihar was about 21.4 million hectares (52.6 million acres) in 2013–14. The state has a large network of canals, which are the main source of irrigation water for farmers.

One key area of development in Bihar has been irrigation. The state's irrigation coverage has increased from just 9% in 2000 to 37% in 2016. This increase in coverage has had a positive impact on agricultural production, with crop yields rising by an average of 20%. The state government has invested heavily in upgrading infrastructure and increasing access to irrigation facilities. As a result, the area under irrigation has increased significantly, from 3.8 million

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hectares in 2005-06 to 5.6 million hectares in 2016-17. This has had a positive impact on agricultural productivity and incomes.

Findings:

The study found that the major challenges to effective irrigation management in India are:

- Traditional irrigation methods such as flood irrigation and sprinkler irrigation are used in over 80% of farmland in India. However, these methods are highly inefficient, wasting up to 60% of water resources.
- There is a lack of infrastructure for storing and transporting water, which leads to wastage and evaporation. In addition, there is also a lack of reliable data on groundwater levels, making it difficult to manage water resources effectively.
- Despite having the world's third largest network of rivers, India has only 4% of the world's water resources. This is further compounded by the fact that almost 70% of this water is polluted.
- Corruption is another major challenge facing effective irrigation management in India. There have been numerous cases of officials embezzling funds meant for maintaining and repairing irrigation infrastructure. This has led to a deterioration of infrastructure and a decline in agricultural productivity.
- Lack of institutional coordination and collaboration between different agencies involved in irrigation management.
- Inadequate financial resources for operation and maintenance of irrigation infrastructure.
- Lack of skilled manpower for efficient operation and maintenance of irrigation systems.
- Inefficient water use due to leakages and seepages from canals and other irrigation structures.

Suggestions:

The state of Bihar in India has a long history of irrigation management, dating back to the days of the ancient river civilizations. In recent years, however, the state's irrigation infrastructure has fallen into disrepair, and farmers have been forced to rely on rain-fed agriculture. The resulting decline in crop yields has led to widespread poverty and economic hardship. There are a number of steps that need to be taken in order to improve the situation.

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- The government needs to take steps to improve the situation.
- The government invests in developing irrigation infrastructure in the state.
- The government also creates awareness among farmers about modern irrigation practices and provides subsidies for adopting these practices.
- Political stability is also necessary for effective decision making and policy implementation in the field of water resources.
- The government should increase the allocation for irrigation projects in the state budget.
- The government should improve the coordination between different departments involved in irrigation management.
- The government creates an enabling environment for private sector participation in irrigation development projects.
- The government should adopt a holistic approach to water resources management.
- The state government needs to invest more resources into repairing and upgrading existing irrigation infrastructure.
- it is important to promote better water management practices among farmers. This can be done through education and awareness campaigns as well as providing incentives for those who adopt more efficient irrigation methods.
- Finally, it is essential to develop a robust system for monitoring and regulating water use in the state. By taking these measures, it will be possible to improve agricultural productivity in Bihar and alleviate poverty levels

Conclusion:

A study of the major challenges to effective irrigation management in Bihar reveals a number of critical issues that need to be addressed in order to improve the efficiency and effectiveness of irrigation in the state. The irrigation in Bihar has been a boon to the state and its agricultural output. The increase in agricultural production has been due to the better irrigation facilities that have been made available to farmers. The government of Bihar has taken various steps to improve the irrigation situation in the state. Some of these steps include construction of dams and canals, repair and maintenance of existing irrigation infrastructure, and provision of subsidies to farmers for the purchase of irrigation equipment. As a result of these measures, the agricultural output of Bihar has increased significantly, benefiting both farmers and consumers.

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Limitations of study:

The study is based on the perception of the farmers and it would have been more effective if the research was conducted by visiting each and every farmer's field. The study does not include any government policies or schemes related to irrigation in Bihar which can be a potential reason for inefficiency in irrigation management. The study is also limited to only two districts of Bihar, making it difficult to generalize the findings for the state as a whole.

Further research:

Is necessary to improve productivity in rain fed agriculture and thereby reduce poverty. There is scope for conducting research on farmer's perceptions about the benefits of effective irrigation management and also on the impact of different types of training on their adoption of improved irrigation practices. Such studies would provide policy-makers with valuable information for developing strategies to improve irrigation management in Bihar.

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