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MODERNISATION OF IRRIGATION SYSTEMS

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Abstract:
India is the largest agricultural producer in the world. Rain fall and perennial rivers are the major water source for agriculture. About 2/3rd of cultivated land in India are dependent on monsoons. From ancient days onwards various types of irrigation structures are constructed and utilized for agricultural and domestic purposes very successfully. But recent years availability of rain fall in various parts of India are below average and it creates lots of problems in agriculture field. Hence presently we are forced to cultivate the crops with available water. Indian irrigation infrastructure includes a network of canals from rivers, tanks and multipurpose reservoir projects. In this study and research, the various types of water losses are analyzed in the existing irrigation system. Hence it is concluded that Rehabilitation and modernization of irrigation systems are a better way to reduce the wastage of water.

1. Introduction:

One of the major issue in developing countries is water. Increasing rate of population growth, various domestic activities, better living standards, industrial developments and agricultural activities for increased food production increases more water demand. At the same time available rain fall in various parts of india are below average because of various activities of highly increased growth of population. Presently infra structure development in our country increases deforestation. For example lot of trees were removed for widening highways. Deforestation and various environmental pollutions increases the atmospheric temperature. This temperature variation influences the condensation processes in precipitation, which results in less amount of rain fall and its un even distribution.

2. The Important Sources of Irrigation Available in India:

In India there are three major sources of irrigation systems. They are canal irrigation, Lift irrigation (wells and tube-wells) and Tank irrigation. Canal irrigation has its maximum development in the Great Plains and in the Mahanadi, Godavari, Krishna deltas in the eastern coastal plains. Wells and Tubewells are popular in the alluvial plains. Tank irrigation is common in eastern and southern states.

3. Lift Irrigation System:

In this method of irrigation ground water is lifted with pumps or any other means. Approximately 8% of irrigation is done by lift irrigation. The major advantages of lift irrigation system are possibilities of irrigation at higher level,less land acquisition problem, lower percentage of water loss and less man power.

4. Canal Irrigation System:

Canals are net work of artificial streams to carry water from source to usage area. Mainly these open channels are used for supplying water from rivers, tanks and reservoirs. Based on the supply of water through the year there are two different types of Canal systems one is Inundation canals and other is Perennial canals. Inundation canals are taken out directly from the rivers whenever water is available and water level is sufficient for supply with out any additional structures like weir, diversion head works and etc.. These types of Canals are generally found on the Sutlej-Ganga plains and Brahmaputra valley. Perennial canals maintain its flow of water throughout the year even during winter season and draw their water either from rivers or from reservoirs of the river projects. A diversion head work is used for diverting water from rivers or major canals. Most of the canals in our country belongs to this category. This type of canal irrigation is widely practiced in uttar Pradesh, Haryana, Rajasthan, Punjab and more than 63% of total canal irrigated area of country lies in these areas. Canal irrigation system have many advantages with this, we can be able to develop Un-irrigated wastelands, It is economical compared to other types of irrigation methods. It is a permanent structure, hence only maintenance is required for getting its benefits for a long time, This system provides multi-purpose usage where apart from irrigation hydro electricity generation, navigation, drinking water supply and fishery development can also be done. At the same time canal irrigation system have a greater disadvantage of loss of water due to seepage when it is unlined and evaporation.

5. Need for Reduced Usage of Water:

Scarcity of water in agricultural productivity forces us to reduce the usage of water and increase the productivity. Many more latest technologies for supplying water to crops are available. The methods which are in practice are drip irrigation, sprinkler irrigation and sub surface irrigation methods. Due to very less rain fall in the last few year, more problem is created for supply water from dams and reservoirs for growing crops in its command areas. Hence there is no way to achieve required agricultural production as well as fodder crops for live stocks. Various researches regarding monsoon and rainfall pattern in India warned of extreme weather conditions in future. They have also found that there is substantial variability within the monsoon season, including fluctuations between periods of heavy rainfall and low rainfall."These fluctuations can cause extreme wet and dry regional conditions that adversely impact agricultural yields, water resources, infrastructure and human systems".

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6. Importance of Modernization in Canal Irrigation System:

Considering canal irrigation more loss is by seepage loss and evaporation loss. Hence it is necessary to save water and reduce the loss of water during its supply through canals. Seepage losses are high at the time of improper and insufficient maintenance of lining in existing canal systems. Unlined canal systems and high temperature during summer seasons also contribute to seepage loss. Some of the existing canal networks are not lined and some of the lined canal networks are not properly maintained. Due to this approximately 30 percentage of water loss occurs.

Figure 1: Existing canal networks

Figure 2: Existing canal networks without maintenance

Figure 3: Existing canal networks without maintenance

Rehabilitation and maintenance of existing canal system reduces these losses considerably and improves duty of the command area. But modernization techniques like water conveyance through pipe line network system is necessary to minimize all types of losses and also it improves duty.

7. Conclusion:

Based on the literature studies and experiences, water losses through canal irrigation system can be reduced and controlled by modernization. Considering this point of view, if we are implementing modernization programme in canal irrigation system, we can achieve high agricultural productivity.

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