

CANAL WATER MANAGEMENT FOR IMPROVING IRRIGATION EFFICIENCY

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1.0 INTRODUCTION

In 1947 when India woke to freedom, the country was facing stark realities of recurring famines and floods. Based on limited experience and inadequate technological strengths, the country embarked on its journey into water world of the future. Several multi- purpose river valley projects like DVC, Bhakra-Nagal, Nagarjunsagar etc. were completed. India today has about 6,000 major and medium dams with a storage capacity of 300 BCM. India must have more storage since monsoon rainfall lasts only 3-4 months during June-Sept. Fig.1 illustrates the projected growth of population, food requirement and irrigated area in India during 1951-2050. Although India has made significant progress in food production, yield of cereals in India is very poor when compared to other countries in the world (Fig.2)

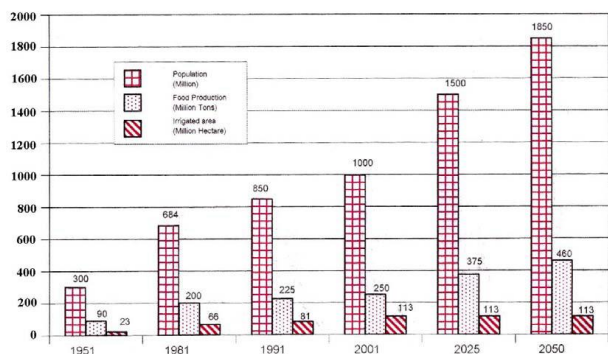


Fig.1 Growth of population, food & irrigation

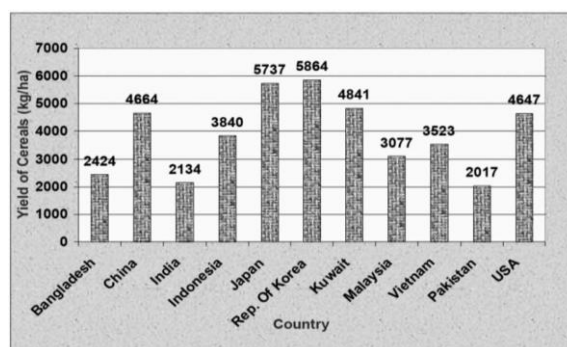


Fig.2 Comparison of productivity

2.0 WATER AVAILABILITY AND DEMAND

As per the assessment done by CWC (1993), the average annual water availability of India from an average rainfall of 1100 mm is 1869 billion cubic meters (BCM) from different river basins in the country. The utilizable water with conventional approach is 1121 BCM which comprises of 690 BCM of surface water and 431 BCM of replenish able ground water (IWRS,2007). Estimated demand of water from different sectors from 2010-2050 is given in Table-1 (INAE,2008). Irrigation consumption is the highest. With rise in population, demand pattern is changing as more water has to be diverted to meet the need of different sectors other than irrigation which currently wastes a lot of water mainly due to heavily subsidized/free water supply policy of the Govt. Table-1 shows that irrigation water requirement is about 70% of total water demand from various sectors in India.

Table-1 Water demand from different sectors

Sl.No.	Total Water Requirement for Different Uses (in BCM)			
	Uses	Year 2010	Year 2025	Year 2050
		High Demand scenario	High Demand scenario	High Demand scenario
1.	Irrigation	557	611	807
2.	Municipal	43	62	111
3.	Industries	37	67	81
4.	Power (Energy)	19	33	70
5.	Others	54	70	111
	Total	710	843	1180

3.0 NEED FOR IMPROVING CANAL IRRIGATION EFFICIENCY

Nearly 65% - 70% of irrigation water was supposed to be delivered through canal irrigation system and remaining 30% - 35% from ground water. But the scenario has changed over the years due to several factors e.g. loss of live storage due to silting (Singh et al, 2021), conveyance and application losses and above all mismanagement of canal water at farm level. Today, canal systems supply only 30% to 35% and rest 65% to 70% are drawn from ground water resulting in emptying of shallow aquifers, declining ground water table, increased pumping cost, land subsidence, ground water pollution etc.

Overall canal irrigation efficiency, also known as project efficiency, is extremely poor in India of the order of 30 to 35% compared to 60% in China and 75% in Japan. Measures must be taken for improving canal water management for improving irrigation efficiency so that water saved can be used for extending irrigation to areas currently under rain fed agriculture as well as for meeting increased demand from other sectors as shown in table-2.

4.0 FACTORS RESPONSIBLE FOR POOR CANAL WATER MANAGEMENT

Bharat Singh (1991) while emphasizing the present day need of intensive irrigation for maximizing yield per unit of area , unit of water and unit of time, identified several shortcomings of canal irrigation e.g.(i) Gap between the creation of irrigation potential and its utilization (ii)Unreliable and inadequate supply (iii) Inequitable distribution of water between head and tail enders (iv) Non-responsive and authoritarian administration (v) Lack of control and increasing malpractices (vi) poor on farm management of irrigation water. Planning Commission (1992), Govt. of India, recognized three major shortcomings responsible for poor performance of irrigation schemes: (a) Unlined channels (b) Lack of land consolidation, improper levelling and sizing of irrigated land and (c) Improper on farm management of irrigation water beyond outlets. Zimermann (1966) examined several drawbacks of protective type extensive irrigation practice being followed in India where

available water is spread over vast areas through a widely spaced unlined canal networks. Mazumder (2016), Mazumder & Kumar (2017) examined different causes of water loss and suggested some remedial measures including use of service reservoirs as recommended by Zimmerman (1966). Several steps to be taken for improving canal water irrigation efficiency are recommended by Mazumder (2007)

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