

Short communication

Agricultural Growth Achieved by Irrigation Development in India

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Agro-climatic conditions in India are very suitable for growing tropical and temperate crops, provided irrigation facilities are available to the farmers. The rain fall water has been exploited to increase the surface and ground water irrigation potential to increase the food grains production to 296.65 million tonnes in 2019-20. However, yield of food grains has not been uniform in all the states and few recorded lower yield due to limited irrigation facilities. The agriculture growth in hilly regions and North-Eastern regions has been lower even though average rain fall is higher but irrigation very poor. An analysis has been made based on the published data of Government of India to review the water availability for irrigation and yield of food grains. This will help in planning for future growth of agriculture.

Keywords: Food grains production, water resources, ground water recharge.

INTRODUCTION

There has been phenomenal growth in agriculture with the adoption of bio and chemical technology advocated since 'Green Revolution' in 1960s. The high yielding varieties of seeds, better water management and area under cultivation enabled the farmers to increase the food grains production from 50.82 million tons in 1950-51 to 296.65 million tons in 2019-20 (5.82 times)^{1, 2}. The wheat crop has recorded the highest increase in the production during this period (16.65 times) followed by oilseeds (6.48 times) and rice (5.75 times). The state of Punjab has recorded the highest yield of cereals (4672 kg/ha) and the state of Maharashtra achieved only 1489 kg/ha average yield due to poor irrigation (2019-20). The highest average yield of pulse crop was recorded 2054

The cultivated area under food grains during 1950-51 was only 97.32 million hectares which has increased to 127.59 million hectares in 2018-19. The irrigated area under food grains in 1950-51 was only 18.10%; the farmers depended upon rain fall which was accumulated in lakes, ponds, wells reservoirs and rivers ^{1, 2}. Measures were initiated to develop the water resources as a result irrigated area under food grains has increased to 52.16% in 2016-17 ^{1, 2}. Major increase in irrigated area has been due to increase in tube wells irrigation. About 24.27 million diesel and electric operated irrigation pumps are estimated to be in use. Irrigation by canals and dug wells are almost constant and tanks are limited and not preferred ^{3, 4, and 5}. Water resources in India

A major source of water in India is from rainfall which is accumulated in water bodies. The total availability is estimated 3896 billion cubic meters

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(bum) based on average annual rainfall of 1170 millimeters, snowfall and glacier melts. But there is a considerable spatial variation in rainfall distribution ranging from less than 100 mm in the Western Rajasthan to more than 2500 mm in North-Eastern regions 1, 2. The rainfall is also not uniform throughout the year but concentrated in few months. Almost 80% of rainfall occurs in the four monsoon months of June to September with high intensity due to which run off is very high. Of all the rain that falls on the land, some evaporates back in to the atmosphere, some percolates in the ground and some is used by the plants. The remaining that flows into the rivers is less than 50% of the total precipitation.

Management of water resources

The country has a network of rivers and rivulets. During rainy season these overflow and water runoff to bigger rivers and ultimately to the sea. Water arresting in catchment areas (check dams, percolation ponds, farm ponds, village tanks etc.), increasing ground water recharge, reducing water wastage in irrigation system, pricing system of use of water to avoid excessive use, crop selection, and adoption of precision irrigation are the major issues that needs to be addressed by adopting integrated approach. The consumption of water by the industries has increased and these are polluting water. The polluted water is harming river eco-system and bio-diversity. The Global Warming is affecting rainfall precipitation and distribution. This necessitates proper management of water resources including proper treatment of wastewater generated from domestic uses and the industries 6, 7, 8, 9, 10. The issues that require attention are: (i) water harvesting by promoting ground water recharge and storage, (ii) reduce the gap between water resource potential created and utilized, (iii) precision irrigation to conserve water and increase water use efficiency, (iv) address the issues related to quality of water by arresting pollution from the various sources and (v) recycling and reuse of

waste water.

Satellite based technology can help in assessment of total availability of surface and groundwater 6, 7. The rainwater harvesting and ground water recharge needs to be supplemented by creation of rain-fed small-sized reservoirs/water bodies, including farm ponds and dug wells to impound rainwater. The Union government has launched a comprehensive flagship programmer called Prada Mantra Kristi Sin chai Yolanda 5 or “more crops per drop”. Under the programmer, financial assistance of up to 55 per cent is available for small and marginal farmers and 45 per cent for other farmers for adoption of irrigation technology: The scheme includes:

- Construction restoration of ponds, dug wells, reservoirs, with use of plastic lining;
- Pipes and precast distribution;
- Pump sets up to 10 hops
- Drip and sprinkler sets.

Conclusions

In future, demand for food and other agricultural produce will increase due to increased population. This will require more water for agriculture, industries and domestic sectors. Measures have to be taken to increase the water resources and use it judiciously such as:

- Arresting water in catchment areas (check dams, percolation ponds, farm ponds, new village tanks),
- Increasing ground water recharge, and water storage;
- Crop selection, reducing water wastage in irrigation system, and adoption of precision irrigation; and
- Water governance and pricing system of use of water to avoid excessive use;
- Reuse of waste water.

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