CHANGING PATTERN OF IRRIGATION AND ITS THREAT TO ENVIRONMENT

Introduction

Agriculture is considered as the bedrock of Indian economy. It provides growth stimulus to all other sectors, such as trade, transport, industry, banking and insurance. The dependence of Indian agriculture on the monsoon rainfall and its consequent vulnerability has been recognized from the earliest times. There is evidence that even during the Vedic Period (1400 - 400 B.C.), people irrigated their corps with dug wells or inundated canals. With ever-increasing population, there arose the need for acquiring more and more lands for both habitation, as well as food production. This necessitated the extension of irrigational facilities. It is a historical trend noticeable in the later Hindu, Muslim and British periods also.

While the irrigation potential, created through the major and medium irrigation projects, has about a four-fold increase, the irrigation potential augmented through ground water schemes such as wells and tube-wells which are mostly executed and managed by the farmers themselves have recorded about a seven-fold increase in India since Independence. As per the available latest reassessment, made by the Central Water Commission of India, the surface water potential of the country as a whole, is 18 billion cubic meters, which works out to 2200 cubic meters per capita.

However, the State of Tamilnadu is not endowed with perennial rivers and other adequate water resources both for irrigation and drinking water. It has among the states, the lowest percapita availability of water with 0.03 m.cft. as against 0.09 m.cft for the whole country. The agricultural prosperity of Tamilnadu depends, therefore largely upon the behaviour of the uncertain rainfall, accounting for 981.3 mm per annum on an average[1] Hence, the scope for new major and medium irrigation projects is very much limited. Tamilnadu, indeed ranks 11th in size in the country with 13

D. **RUDRAPPAN**, Dept. of Economics, Presidency College, Chennai - 5.

million hectares of land area. The land area bears a share of 4% and the water resources account for a meager 1.26% of the country. The percentage of net area irrigated to net area sown is only around 47% and the rest of the 53% of the sown area in the State is still under the mercy of rainfall[2].

Canals, tanks, tube-wells and wells are the main methods of irrigation besides a few drip irrigation and sprinkler irrigation system here and there. Along with these, other supporting sources include, inter-alia (1) bunds, (2) regulators (3) anaicuts (4) irrigation channels (gravity flow irrigation) and lift irrigation from river and streams.

When the use of tanks and canals dominated in Tamilnadu, there was collective ownership in water. Though there used to be problems for the tail-end users, still water was held as a collective property. Well-irrigation and the ownership of wells, tube-wells along with pump sets by individuals have resulted in private ownership of a social good. The poor tiny and marginal farmers, who are not in a position to deepen their wells have lost their ownership in water. The modern technology in deepening the well has thrown out the tiny marginal farmers and to an extent, the small farmers as well, from the ownership of water. This has created 'water-lords' along with landlords. The water lords are in a position to manipulate the decision making power of small and marginal farmers with regard to the latter choice of a particular crop to be cultivated in their land.

The area irrigated by tank and canal system shows a relatively declining trend from 75% at the beginning of the 20th century to 50% at the turn of the century. Consequently, farmers resorted to over-exploitation of ground water leading to an increase in the irrigated area from 23% to 49%. This clearly establishes the fact that ground water as a long-term sustainable source for irrigation warrants monitoring and controlled expansion.

The decline of tank irrigation may be due to several physical reasons : heavy silt accumulation in tank bed and inlet canal, encroachment in the catchments areas, poor tank bed, frequent occurrence of droughts and damaged conditions of the regulatory structures, such as sluices and surplus weirs.

Apart from the dwindling tank irrigation, another growing environmental threat emanating from the changing pattern of irrigation and changing pattern of land use and faster rate of ground water utilization is the fall in the recharge capacity of wells and tube-wells. Besides over-exploitation of ground water surfaced harmful fluorides and salts affecting the cultivation of crops. Thus, soil health is being deteriorated posing threat to sustainable agricultural development. For instance, in the State of Tamilnadu, the estimated extent of soil affected by salinity and alkalinity alone is estimated at 2.2 lakhs ha. per annum. Another phenomenon observed in the process is the intrusion of seawater affecting good quality ground water in the coastal areas. Further, the changing pattern of irrigation to more dependable ground water irrigation has led to increasing adoption of high-yielding techniques of production. Chemical fertilizers and pesticides usage grew enormously while the fertilizer robbed the soil of its natural fertility and made the soil salty and marshy, the increasing usage of pesticides has damaged the eco-systems destroying the microbes, the insects and other living organisms. This has caused permanent damage to the environment.

Environmental Protection : Strategy

Added to this, is the process of increasing urbanization and modernization in the State. It is estimated that in India , nearly 15 million hectares have been taken away annually from cultivation and used for creating townships, housing colonies, roads, schools and hospitals. The State of Tamilnadu is not an exception in this regard. As a result, the natural rainwater percolation deep into the earth is arrested causing flooding in the nearby areas and drinking water problems in summer season due to destroying up of wells. Further to produce more food, the same piece of land has to be used more and more. This leads to ever increasing use of fertilizers and pesticides, causing effects like environmental pollution, residual toxicity, resurgence of pests and irreparable environmental degradation of the available lands. All the above facts necessitate that a new strategy is to be evolved to popularize eco-friendly economic plant nutrition system, use of compost, bio-conversion of

agricultural water, application of enriched farm yard manure and other bio-fertilizers such as blue green algae, green manure and legumes and bio-pesticides such as vitex plant neem oil, neem cake etc. The rectification of the drawbacks of the tank system would lead to rejuvenation of old tanks. To replenish further the aquifer regime which is under stress, surface storage structures (percolation tanks) could also be build up across stream as water harvesting structures to impound rainwater and to retain it for a longer time for increasing infiltration. The water storage is expected to induce percolation and replenish the aquifer. which is being exploited through wells on the down gradient.

Conclusion

In the existing scenario of competing demand for water, both surface and ground water should be tapped and conserved to the optimum level. Increasing water harvesting techniques, water conservation, modernization of tank and other irrigation systems, exploitation of minor irrigation and adoption of micro-irrigation techniques, water use efficiency and irrigation management should receive high priority in the coming years. Eco-systems restoration is possible with sustained rain water harvesting programmes and effective community management of available ground water resources. Thus, restoring public irrigation sources such as tanks and canals back to their position along with new and additional capacity building popularization of bio-fertilizers and bio-pesticides have become the most urgent requirements.

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