Water in India with Reference to Agriculture and Population: Some Issues and Patterns – Dynamic Approaches Needed for Development*

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ABSTRACT: In this paper an attempt is made to present some facets of status of water for agriculture and population in India. The issues are basic in nature which have been focused by scholars all over time and again. The materials are gathered from various sources to highlight and to consider a plea in the context of population-hydrological regions of the country to develop water potentials. Some characteristic mapping has also been conducted showing the main parameters of water utilization, need and spatial issues regarding consumptive use of water during agricultural operations as per the seasons prevalent in India. A relation is also established with the drought areas leading to assess the need for water. The human problems specially in relation to the safe drinking water is also projected in relation to distributional qualities with reference to natural regions by districts. The study does not claim a full assessment of the water issue due to paucity of statistics on water use, generation and potentials but it does indicate in many ways the geographical problems as an important study for further research by all concerned.

Introduction

Water studies have been both academic and interpretative for generations of economic potentials for agriculture, human consumption and survival. This includes dimensions of irrigation requirements, assessment of dryness in soils and to forecast water resources development leading to water policy. Water can’t be manufactured. It is a Godly gift to the Earth through groundwater, snow melts, run through rivers, and rainfall which to a greater extent help replenishment of ground-water and preservation of water in the artificial or natural reservoirs, tanks, ponds, etc. Excessive and unprudent use of water make shortage, exhaustion and even complete lack of this item. Hence, it is so much essential, specially in the contemporary situation when population is growing and the need of water is increasing. Instances are quite well known regarding desiccation, uprooting of civilizations and intermittent droughts in countries and continents due to lack of water. A watch over the rational use of water over periods and development of same in the regional set-up are most important, specially these days, when the water needs have increased for agricultural and population needs and to readjust the ecological set-up and environs in relation to these parameters. It is, hence, monitoring of the global climates, change in climates and weather forecasting for short and long term periods are essential as well.

The rising population in regional frames of geographical environments have made this hypothesis more challenging which may bring such studies and dimensions to focus water need in perspective terms. Moreover, the inherent basics of natural responses to the surface conditions in terms of potential evapotranspiration, moisture indexing, measuring annual water surplus and deficit leading to floods and droughts respectively and accordingly water need evaluations remained a matter of logical considerations for water prospects to the agricultural fields in the frame of either smaller catchments or even broad river basins. Such dimension remained only as a tool of micro level assessment for fugitive success to tackle water need of a single aspect to agriculture. On the other front, it is so striking to note that the Govt. of India in particular assessed the situation of human settlement policy in the country by AD 2001 but no attempt was made to assess the water requirement for the expansion of settlements and human use of water (TCPO 1975). Rather, development strategy for water to populations at specific locations throughout the country remained precisely acute. The
water policy, in other words, is not correlative to population requirements.

In gradual process, this is to be interlinked with various phenomena and reasoning such as consumptive use of water for crops (Dastane et al. 1966), isopan determinations, catchment planning, ground-water exploration and development. In particular terms in India, the climate regime as established earlier (Subrahmanyan 1955) has been the indicator of variations which still hold a bench mark in measuring these variables. But the climatic repercussions also accompany to distort the system at regional level from time to time. A good hope may indicate some outcome from the weather forecasting research currently planned by satellites and super computers. The results are awaited in due course.

On the other hand, water is vital to human beings for drinking and sanitation and the safe water is a matter for sympathetic consideration to develop it, in terms of population distribution. Rural and urban areas suffer likewise. However, prospecting in terms of perspective evaluation of water to population is a complex issue, both economic and political. In view of this, the paper also outlines some basic issues and urges for rigorous plans by concerned agencies in terms of population-hydrological regions of India. Urban locations and population content for concentrated demands are another challenging issue as outlined above. Some of the stray interpretations are given here which are not complete on all counts to the existing and growing problems. Water-pollution is not covered in this paper at this stage, being a separate issue of evaluation and judgement. As outlined earlier, the main constraint being non-availability of data in synchronous way, is the greatest limiting factor to analyse the effect of micro-situations and hence, the target in this paper is placed to evaluate the national or macro level repercussions on agriculture by transforming climate, and water-balance synthesis in crop-regions. In addition, by utilising the lately available data on safe drinking water to populations, specially in the rural areas, has been discussed. Here also, the definition of safe drinking water availability to the households in the Census of India (1981) may be said as “fluid” because the analysis of water as used for drinking drawn from the sources (both natural and artificial) may not be free from pollutions according to chemical analysis of such waters, if taken up. The readers may be advised to go further for scientific field assessments for their inference. However, it is not denied that this exposition of the issues by visuals renders a lot of information for further research and orientations. The paper, hence focuses the interpretation of water problems in two sections, viz., (i) water in agricultural scenario and (ii) water in population scenario.

**Water Scenario in Agriculture**

Water balance is one of the scientific systems to understand the problem. It is a complex issue to generate data depending on infra-structure and the level of economy reacting even at individual field level and water supply in different crop regions of India. Over the present periods of planning phases in India since the First Five Year Plan (1951), vigorous attempts have been made to reach objectives in water production and regulate consumption in agriculture and for the population needs. With various phases of reorganisation, land renovations, modernisation of agriculture, land-laws and land use rationalization alike, and above all mans' participation and urge, it is seen that the production of grains (1978–79) of 132 million tons surely has gone up to 151.5 million tons in 1983–84. Fluctuations and intermittent droughts also sometimes have taken up their upper hands in the country and hence such fluctuations present our economy one of the random type mostly due to climatic variations in agriculture (Ramgopal 1970).

On the other count, it is believed that during the Seventh Plan, large surface storage projects may create 58 million ha or a little more than 50% of the maximum irrigation potential of 113 million ha by the turn of the century. About 30.5 million ha of which 20.8 million ha was created during the years 1951–85 at the cost of Rs. 15, 206 Crore. It is expected to create potentiality of 27.5 million ha during the next years (Vohra 1986). It is expected to develop extensive data and precise estimates of inputs and planning. In this state of generalisation, it is remarked that micro-level estimates in the production and planning of water need is most scanty mainly because of gaps in data, specially from climate, ground-water, and irrigation needs at field level. Although mechanization in agriculture is slowly emerging in India, yet family based agriculture may continue to contribute national development which is to be strengthened precisely.

Water need at field level for efficient agriculture hence has to be made more vigorous from the point of view of agronomic evaluations, fertility enhancements and watch of the trends in physical planning of field-management of high yields and to check desiccation (Money 1982). Any negligence in environmental and management factors influencing yield may create substantial loss in development input of agriculture. A very characteristic situation in this regard effecting the agricultural system is noted on the front of ameliorating wastelands productive both economically and environmental regenerative (Roy 1988).

The parameters of positive and negative hopes as addressed in the above paragraphs on the front of water in agriculture, it may be essential to review certain systems of agricultural regionalisation and evaluation of water in them. India presents a complex system or crop-regions and the requirement of water for their healthy growth is most important. Let us have a view of the crop-regions as presented in Fig 1 evolved earlier by the author (Roy 1972). All the 82 crop-regions as defined on the map have a close relationship with macro climatic regions of the country in particular combined with the