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IRRIGATION REQUIREMENTS AND DEVELOPMENTS IN MAHARASHTRA

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ABSTRACT : Maharashtra has primarily an agrarian economy where the requirements of irrigation facilities must be met uniformly on a sub-regional priority basis. It is in this context that an analysis of the needs of irrigation facilities is made vis-a-vis the development of the same.

Maharashtra has tropical location and as such variations in the potential evapotranspiration are small. It is the rainfall variations which become a major constraint in the agricultural operations and determine the need for irrigation facilities.

An equation has been developed by using three variables namely, annual rainfall, percentage of area cultivated of each taluka to derive an index of irrigation need. The ratios when plotted and compared with the actual irrigated areas shows anomalies in the distribution of irrigation facilities in Maharashtra.

INTRODUCTION

Irrigation is an ageold practice in the cultivation of crops. Irrigation implies a provision of water by artificial means, to regulate the growth of plants and increase the yield per hectare. As man climbed the ladder of civilization, he has improved upon the methods of irrigation by adopting the appropriate technology. The rapid growth of population demands larger quantities of agricultural produce. The increased agricultural production is possible by combination of improved agricultural practices.

India has a traditional society and an agrarian economy, whose progress and economic well being is influenced by the fluctuations in Monsoon spells. Even though India has adequate water resources throughout its length and breadth, the irrigation facilities are not developed sufficiently as per requirements. It is in this context that an analysis of the development of irrigation in Maharashtra is made against its requirements.

OBJECTIVES

The problems of disparities in the development of irrigation facilities could be

analysed by taking into consideration the need of the same. Therefore the objectives of the present study are:

1. to develop a method by which to quantify the need for irrigation facilities;

2. to identify the areas of varying irrigation requirements;

3. to locate the areas of varying degree of development of irrigation facilities.

EXPLANATIONS

In every inhabited area whether a micro- and macro- region there exist water resources, agriculture and production of food crops. Well, lift, canal and tank irrigation are the practices in that order in Maharashtra. The rainfall is primarily during the Monsoon season (June to Sept.). Maharashtra has a larger eastwest extension. As a consequence the rainfall decreases rapidly from West to East. However, the Konkan lowland and Western Ghat section, Maval Tract (a zone immediately east of crestline of the ghats) and the eastern most districts namely Bhandara, Chandrapur, and Gadchiroli. The rainfall in these parts has a low variability i.e. more assured rain. Agriculture in these areas, therefore, is more secure. The farmers in these areas obtain at least one crop in a year, for obtaining this one crop, there is no need to depend upon irrigation facilities. There are different methods for evaluating the irrigation need based upon evapotranspiration, potential evapotranspiration, precipitation effectiveness, thermal efficiency and soil texture and structure. But these methods are more abstract and empirical in nature, because the determination of requirement of irrigation facility must also include the rural population which largely implies the farming community and the extent of cultivated area. Both these elements vary considerably in Maharashtra depending upon relief, forests, soils, aridity and the general economic development. When it is said that, irrigation is needed, it must be in relation to rural population density and the cultivated area and also the average rainfall. It can be argued that when the rainfall is more in one season, there is not much justification for the irrigation facilities for the time being. Similarly, the need for irrigation could be under played when the rural population is sparse and same thing could be applied when the size of cultivated area is less.

In view of the above explanations it is pertinent to identify the areas which require irrigation facility most urgently. This can be done by considering the available irrigation facilities, and degree of irrigation need by using the equation in this paper.

A cursory glance at the map of present irrigation facilities (Fig. 2) reveals that some areas in Western Maharashtra with assured rainfall have more irrigation facilities than they actually deserve, and some areas in interior Maharashtra have only the large river beds whose waters have been sucked up in the further west. This has created an anomaly of agricultural prosperity by excess water use and its consequent problems in some parts and non-availability of water in the rivers and wells in other parts.

METHODOLOGY

There are many studies dealing with the measurement of water need, but the studies dealing with the requirements of irrigation facilities of a region depend, in our opinion, upon three basic factors namely: annual average rainfall, rural population density and percentage of area cultivated. There are other factors like seasonal temperature, relief, soil, etc. But the three fac-

SCHEME FOR DETERMINING PRIORITY

Actual Irrigation Development		Need of Irrigation		Priority
1)	Very high Irrigation	Very high High Moderate Low	=	No
2)	High Irrigation	Very high High Moderate Low	=	Third No Third No
3)	Moderate	Very high High Moderate Low	=	Second Third No No
4)	Low	High High Moderate Low		First First Third No

tors mentioned earlier reflect upon the other factors. It is largely true that greater the annual rainfall lower is the need for irrigation, simultaneously greater the rural population density and larger the percentage of area cultivated, greater is the need for irrigation facilities. By statistical manipulation an equation was derived to measure the irrigation requirements. The equation was derived in such a way that it gave a lowest index for areas of minimum requirement and a highest one for the areas of maximum requirement. The equation is:

$$In = \frac{-Pr \times Ac}{R}$$

Where In = Irrigation need of the area.

Pr = % of Rural Population.

Ac = Percentage of cultivated area of the areal unit.

R = Annual average rainfall.

The equation was used to compute the irrigation need index, for each taluka. The indices were arrayed and quartiles were obtained. The values were mapped to show the varying talukawise requirements of irrigation. By interpolation of this map with the map showing the irrigation development, areas were demarcated with different combination and assigned priority for development of irrigation facilities.

RESULTS

Fig. 1 shows the regional disparities in the requirement of irrigation facilities in Maharashtra. The areas of very high requirement (above 48 index value) are recorded in eastern part of Kolhapur, Sangli and Satara and some part of Solapur and Ahmednagar districts. This is due to high rural population density and high percentage of cultivated area and lower rainfall. The low and moderate requirement of

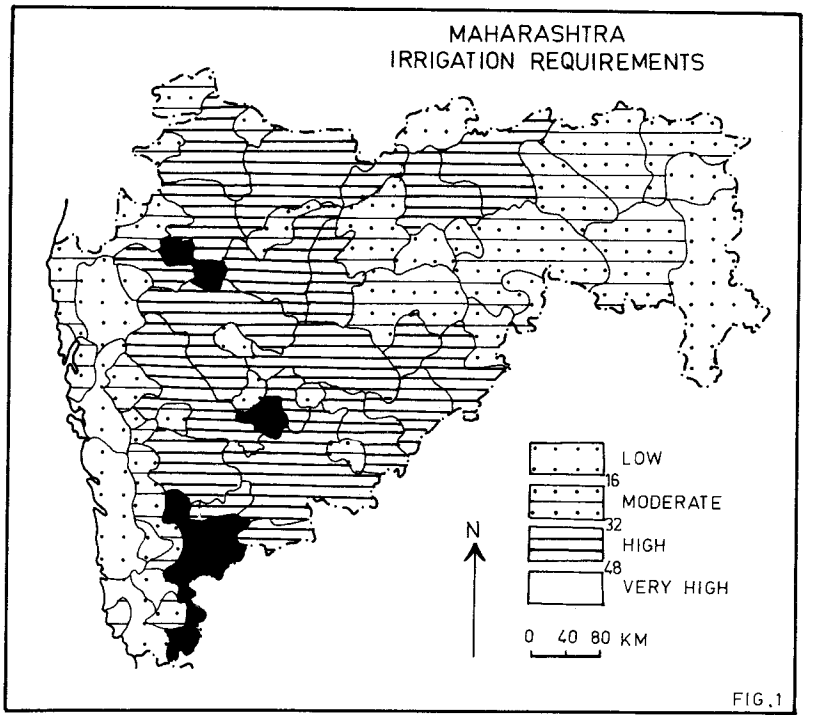

MAHARASHTRA
IRRIGATION REQUIREMENTS
LOW
16
MODERATE
32
HIGH
48
VERY HIGH
N
0 40 80 KM

FIG.1

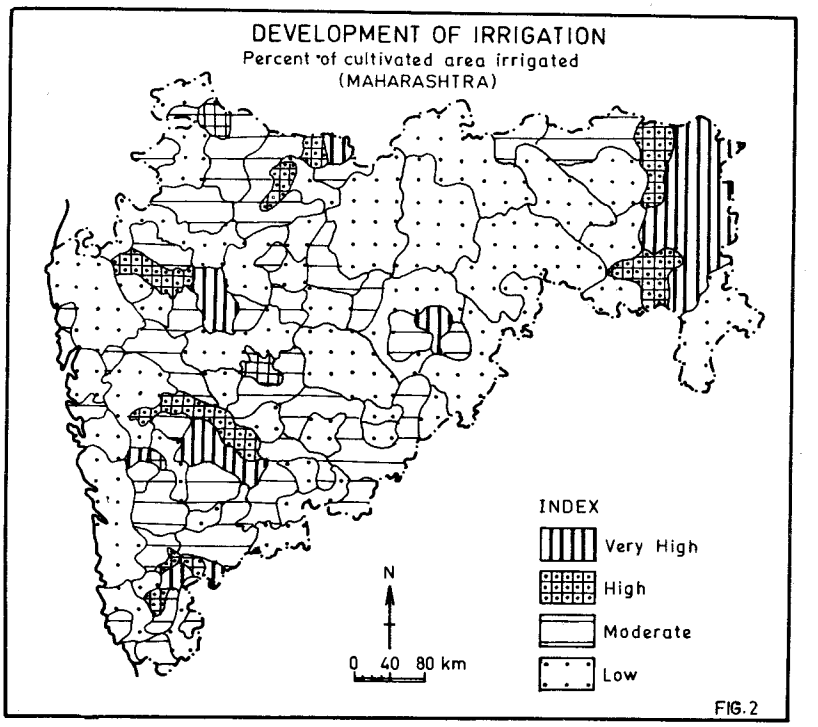

DEVELOPMENT OF IRRIGATION
Percent of cultivated area irrigated
(MAHARASHTRA)
INDEX
Very High
High
Moderate
Low
N
0 40 80 km

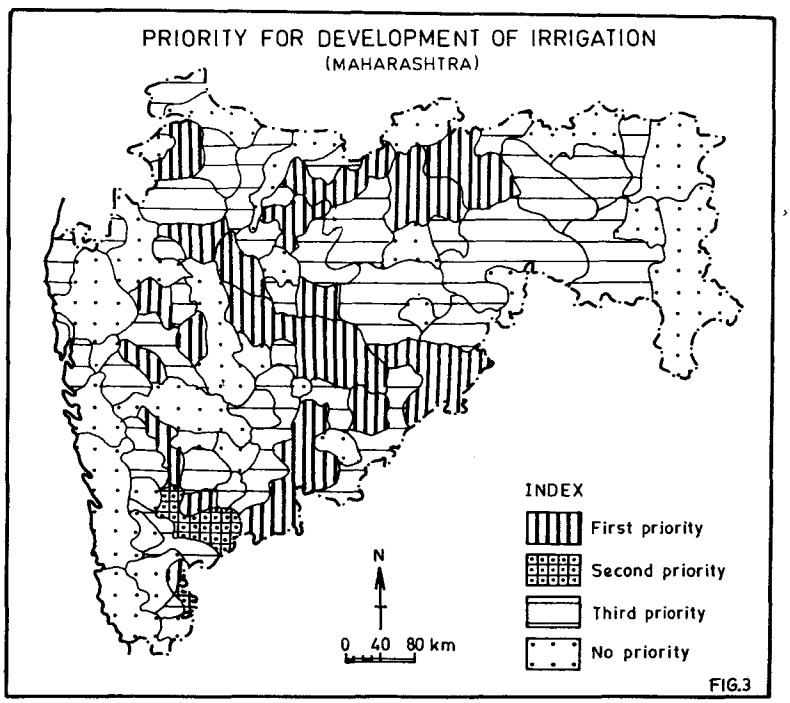
FIG.2

irrigation is mainly observed in high rainfall, low density and low percentage of cultivated area such as Konkan, and some districts of Vidharbha. In the remaining part i.e. some districts of Western Maharashtra and Marathwada the requirement of irrigation is more due to low rainfall and high proportion of cultivated area.

The priority for development of irrigation facilities is represented on map (Fig. 3). The map shows four regions of First priority, Second priority, Third priority and No priority. First priority regions are observed in central part of Maharashtra where there is low irrigation development and very high and high need of irrigation. The third preference areas are located in the districts of Vidharbha namely Akola, Yeotmal, Wardha, Nagpur, Chandrapur, Gadchiroli and Bhandara, and Parbhani of Marathwada. There are also small patches of third priority areas scattered in Western Maharashtra. The dotted areas on the map represent no priority areas due to high irrigation development of low need of irrigation or high irrigation and high need, or moderate irrigation and moderate need.

RECOMMENDATIONS

In a socialistic planning process, there has to be an equilibrium, as far as possible, in the distribution of resources. The disparities in the irrigation development lead to imbalances in the income and food production and this cannot be continued or allowed to persist. To achieve an equilibrium in agricultural production and availability of foodgrains in subsistance agricultural region, the imbalances in irrigation facilities must be reduced. This can be done by assigning greater priority to irrigation development in those areas which need it most. It could even be done at the cost of agriculturally prospering areas. The areas with greater need and no irrigation facilities must get the highest priority for irrigation development. The next priority should be to those areas



with moderate irrigation development and high need and the last priority could be given to those areas with fairly good amount of irrigation facilities and moderate irrigation need. All those areas with low need of irrigation could wait for further irrigation development till all other areas get their due share, as the capital resources are very much limited in our country. The objective has to be the benefit and survival of all the farmers.

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