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# AGRICULTURAL DEVELOPMENT IN MAHARASHTRA : A SPATIAL INTERPRETATION

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## INTRODUCTION

Agricultural development is a much more coprehensive concept than generally understood. It is the manifestation of the combined effect of many factors viz; environmental, technological and institutional. It also implies a process through which the real income of farmers is increased over a long period of time. Obviously, the term agricultural development refers to the growth and overall changes of agriculture resultilng in vertical expansion. The level of agricultural development, therefore, may be considered as the degree to which agrarian structure gets strengthened leading thereby to increased production. Productivity of agricultural is one of the dimensions of agricultural development. In true sense, therefore, agricultural development denotes the quality of agricultural system of region in terms of productivity, diversification and commercialization (Gopal Krishnan, 1981). This also includes increase in the income level of farmers thereby promoting socio-economic transformation.

The study of agricultural development has received attention in agricultural geography recently. There are regional disparities in the levels of agricultural development. The Geographer's role lies in primarily identifying, describing and interpreting the regional variations in the levels and the rate of agricultural development. Balanced regional development has been one of the proclaimed goals of our planning for a long time (S.Shastri, 1988). Besides, the reduction in imblances between various regions has become the foremost objective of planned development in the country (Singh, 1984). Despite many efforts made in this direction, the State of Maharashtra is still witnessing regional imbalances in agricultural development. Emphasis was given on development schemes i.e. soil conservation, plantation of fruit crops, animal husbandary, minor irrigation, road construction and pasture development during 5th and 6th plans. The state government launched comprehensive watershed development programme (COWDEP) by which systematic development of land resources was proposed within watershed zone and followed by suitable cropping pattern. The study of agricultural development is of immense importance in agricultural planning as it helps to indentify 'problem areas' which might give a clue to the planners to adopt proper remedial measures for correcting imbalances. The present paper, therefore, proposses to map and analyse regional disparities in the level of agricultural developments during 1991-95 in the State of Maharashtra.

## INDICATORS OF AGRICULTURAL DEVELOPMENT :

There are different variables which determine the development of agriculture. They can be grouped as environmental, technological and institutional. Among the environmental

variables, the amount and intensity of rainfall can be regarded as fundamental component effecting spatial dimensions of agriculture. Intensity of rainfall refers to the rate at which rain falls is obviously related to problems of runoff, soil percolation, evaporation, soil-erosion, and flood control (Monkhouse and Wilkinson, 1989). The technological variables comprise intensity of irrigation, fertilizer consumption, intensity of farm mechanization and use of HYV seeds etc. Irrigation, however, remains a basic input which stimulates crop output by extending or intensifying cropping pattern and enhancing crop productivity (Bawa and Kainth, 1984). The institutional parametres included proportion of literate rural population, diversification of crops and concentration of agricultural markets and societies. Commercialization of agriculture is an important dimension of agricultural development. The proportion of area under cash crops may be a usseful parameter to measure the rate of commercialization. Moreover, horticultural crops, cotton, sugarcane, turmeric, and chillies contribute a major share in the process of commercialization in the state. Agricultural markets are also playing a significant role in strengthening agricultural developmnet. Besides this, the degree to which market forces have penetrated in an area and the scale on which they operate will be the crucial factors in almost every consideration of agricultural development (Hunter, 1969). In the present study, the following parameters have been selected. They are -

$X_1$ - Intensity of rainfall (mm/day)

$X_2$ - Consumption of chemical fertiliz ers (kg/Hect)

$X_3$ - Percentage of net area irrigated to net area sown

$X_4$ - Use of HYV Seeds (kg/Hect)

$X_5$ - Mechanization of agriculture (No of tractors/per 1000 hect)

$X_6$ - Proportion of cultivators with cultivated land (No of cultivators/ cultivated area)

$X_7$ - Percentage of villages electrified.

$X_8$ - Percentage of Literates among rural population.

$X_9$ - Yields of foodgrains (Kg./Hect)

$X_{10}$ - Percentage of cash crops (With net area sown)

$X_{11}$ - Proportion of agricultural markets with the population (no of markets/ population)

$X_{12}$ - Proportion of agricultural credit societies with population (No of markets/ population)

## OBJECTIVES, DATA BASE AND METHODOLOGY :

The objectives of the paper are -

(i) to map and analyse the regional pattern of the levels of agricultural development in Maharashtra State;

(ii) to examine the interrelationships of those variables which influence the levels of agricultural development.

The data have been obtained mainly from published records viz. population census, agricultural census, district socio-economic abstracts for 1991-95. The reports of Meteorological Department, Pune, were used for rainfall data. In order to get an accurate and average results of the levels of agricultural development, the statistics of five years, i.e. 1991-95, have been considered. The present district level study pertains to 25 districts

(before the recent reorganisation of some districts) and Greater Bombay district has been excluded due to its typical urban character.

For computation of composite index rank value of each variable for each district were added. Then they were divided by the number of variables. Thus, districts have been ranked in terms of each variable and further these ranks have been added and averaged to produce composite index.

The index values were computed for each of the twelve parameters selected for analysis. Further composite index values were calculated to develop integrated picture, for each district, by employing following formula. The empirical expression of measurement is -

$$\frac{X_1 + X_2 + X_3 + X_4 \ldots\ldots + X_{12}}{12}$$

The composite index values of the districts (Table 2) were classed and arranged in descending order to delineate the zones indicating the levels of agricultural development viz. High, Medium and Low (Table 1). Further, correlation matrix is attempted to highlight interrelationships of selected variables by employing Pearson's product Method of Co-efficient of correlation and ' r ' values were computed (Table 3).

Despite the spatial variations whithin the limits of each district the study proposes to present aggregate picture of each district as an areal unit.

## THE REGION

The State of Maharashtra covers 307, 762 sq.km area and extends between 16° 04' and 22° 01' N latitude and 72 06' and 80° 10' E longitude. The state constitutes major part of Deccan plateau bordered by the hill ranges of Western Ghats on its Wn side separating coastal lands on the west. The Ghats present a steep slope on the west. Some ridge lines are extended eastwards on the plateau dividing major river basins. These river valleys happen to be the productive pockets of the state, associated with recent development of irrigation. The major part of net sown area (82.53%) of the state depends upon the scanty and uncertain monsoon rainfall, resulting in the subsistence nature of agriculture. The regional disparities in agricultural development correspond with the spatial pattern of rainfall. The irrigated tracts, in the river valleys, however have attained agricultural development despite poor rainfall largely because of irrigation.

## EXPOSITION

Three distinctive zones have emerged which indicate the differences in the level of agricultural development in the study area. They are-

### A : Zone of High Level Development

This zone comprises the districts of Kolhapur, Sangli, Satara, Ahmednagar, Nasik and Jalgaon (Table 1). The former three fall in the Upper Krishna basin where irrigation facilities are developed considerably (20.7%). Ahmednagar, lying in Godavari valley, has also attained development (19.03%) in irrigation. The districts of Nasik and Jalgaon have shown an increase in irrigation facilities promoting the cultivation of banana and sugarcane. In the first four districts, sugarcane has dominated almost the entire irrigated area leading to the establishment of sugarcane industries which, in turn, promote an overall agricultural development. Healthy co-operative movement, availability of credit facilities from co-operative banks, increasing trend of mechanisation, close network of communication and transportation, overall awareness of farmers, effective market organization have all contributed to agricultural

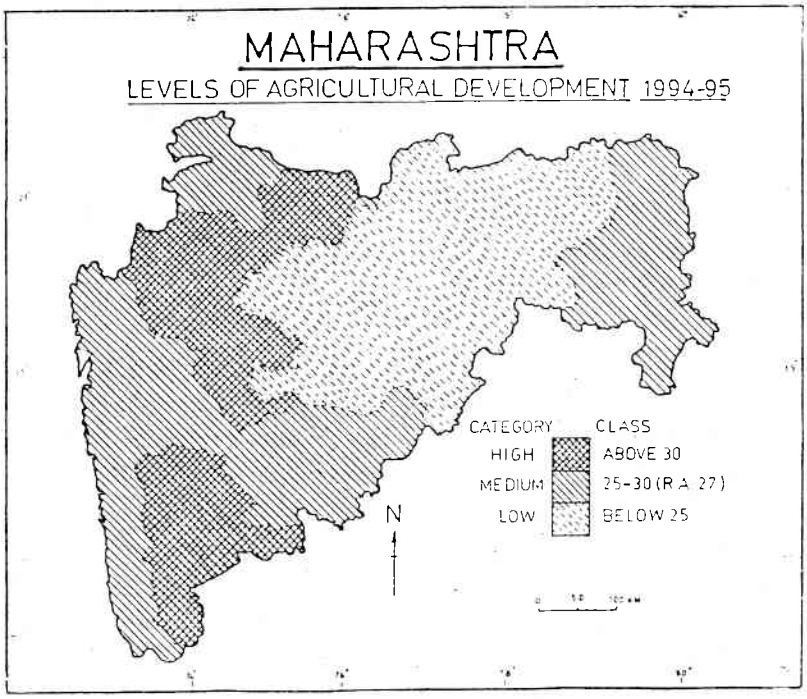


**Fig.** : Maharashtra -Levels of Agricultural Development 1994-95

development. Yet interdistrict disparity is obsserved in this part resulting from spatial variations in the conditions determining agricultural productivity. Besides this, it is also obsesrved that irrigated valleys have experienced partial fruiots of green revolution.

**B : Zone of Medium Level Development :**

The medium level of agricultural development is observed in three coastal and six plateau districts which cover 31.24 percent area (Table 1). The zone presents contrasting physical environment and includes rugged relief and hot humid climate of the konkan in the west, and relatively dry climate of Solapur, Dhulia and Osmanabad in the east. Chandrapur and Bhandara districts have poor soils and a relatively high rainfall. Though some parts in konkan are horticulturally rich, in general this zone has poor irrigation facilities (6.94%) and low level of modern technology as compared to the above zone.

**C : The Zone of Low Level Development :**

Low level of agricultural development apreads over atleast of ten districts of the state (Fig. 1 & Table 1). The zone comprises a major part of Marathwada and Vidharbha region covering about 45.60 percent area of the state. Barring some irrigation pockets, the entire belt has been characterised by adverse conditions like soils with low fertility status, poor irrigation facilities, low level of mechanization and high variability (over 30%) of rainfall. These have led to low level of agricultural development. This part of the state, therefore, may be regarded as under developed zone which needs suitable measures to promote agricultural development.

**Table 1**

**Zones showing the levels of agricultural development in Maharashtra State, 1991-95.**

| Sr. No. | Index Value | Level of Agril.development | Districts |
|---|---|---|---|
| 1. | 30 | High (23.16) | Kolhapur, Sangli, Satara, Ahmednagar, Nasik & Jalgaon - 06 |
| 2. | 25 - 30 | Medium (31.24) | Thana, Raigarh, Ratnagiri, Pune, Solapur, Osmanabad, Dhulia, Bhandara & Chandrapur - 09 |
| 3. | 25 | Low (45.60) | Aurangabad, Parbhhani, Beed, Nanded, Buldhana, Akola, Amaravati, Yeotmal, Wardha & Nagpur - 10 |

***Note :*** *Figures in brackets indicate proportion of area in percentage.*

***Source :*** *Compiled by the author, 1996.*

## CORRELATION ANALYSIS

The interrelationships between some of the important varibles, analysed earlier are brought out by the correlation matrix given in Table 3. These correlations are related to the entire state in the year 1990-91.

The intensity of rainfall ($X_1$) is positively correlated with fertilizer consumption (0.08), cultivaators (0.61), intensity of irrigation (0.41), intensity of cropping (0.89) and proportion of cash crops (0.93). This indicates that rainfall is the key factor in determining agricultural development. It has also shown negative correlationship with the use of high yielding varieties (–0.51), agricultural markets (–0.41) and agricultural credit societies (–0.25). The proportion of cash crops ($X_{10}$) and percentage of land under irrigation ($X_3$) are positively correlated with all variables except the number of agricultural markets. This shows the importance of irrigation in an overall agricultural development.

The intensity of high yielding varieties ($X_4$) has also a positive correlationship with all other parameters reflecting its role in enhancing agricultural produce. But it is negatively correlated with the number of cultivators (–0.67). The level of mechanization ($X_5$) has shown its positive correlationship with the intensity of irrigation (0.74), HYV (0.26), foodgrain productivity (0.45), markets (0.58) and credit societies.

Obviously, the proportion of cultivators (X6) is positively correlated with the intensity of rainfall (0.61), intensity of irrigation (0.41), foodgrain production 0.57) and cash crop productions. However, it is negatively correlated with HYV (–0.67), markets (–0.49) and number of societies (–0.86). Thus, the levels of agricultural development is an integrated impact of different variables.

## CONCLUSION

The foregoing analysis reveals that the State of Maharashtra has witnessed regional disparities

**Table 2**

**Districtwise composite indices of agricultural development, 1991-95, (Maharashtra)**

| Sr.No. | District | Composite Index values | Rank |
|---|---|---|---|
| 1 | Thana | 27.763 | 13 |
| 2 | Raygad | 25.987 | 14 |
| 3 | Ratnagiri | 26.321 | 13 |
| 4 | Nasik | 30.310 | 06 |
| 5 | Dhulia | 29.025 | 08 |
| 6 | Jalgaon | 31.039 | 05 |
| 7 | Ahmednagar | 32.816 | 04 |
| 8 | Pune | 29.053 | 07 |
| 9 | Solapur | 27.219 | 11 |
| 10 | Satara | 34.092 | 02 |
| 11 | Sangli | 33.483 | 03 |
| 12 | Kolhapur | 45.484 | 01 |
| 13 | Aurangabad | 25.071 | 15 |
| 14 | Parbhani | 23.430 | 10 |
| 15 | Beed | 19.704 | 25 |
| 16 | Nanded | 24.236 | 17 |
| 17 | Osmanabad | 25.019 | 16 |
| 18 | Buldhana | 20.214 | 14 |
| 19 | Akola | 22.107 | 21 |
| 20 | Amravati | 23.801 | 18 |
| 21 | Yeotmal | 20.838 | 23 |
| 22 | Wardha | 22.460 | 20 |
| 23 | Nagpur | 20.921 | 22 |
| 24 | Bhandara | 27.732 | 10 |
| 25 | Chandrapur | 28.324 | 09 |

*Source : Compiled by the author, 1991-95.*

in the levels of agricultural development. Based on spatial analysis three broad zones viz. high, medium and low levels of agricultural development have been identified (Fig. 1). High level of agricultural development zone comprises 6 districts which are favourably endowed with physical, institutional and organisational factors. Although irrigation has become the key factor for promoting high level of agricultural development. There are areas which record backward stage of agricultural development within this zone. The regional disparities in rainfall distribution, in general, are correspondingly related to the spatial variations in agricultural development. The river valleys, endowed with fertile soils and irrigation facilities, have attained significant development in agricultural. The major part of Marathwada and Vidarbha, comprising the 10 districts possess low level of agricultural development. In fact, occupying about 45.60 percent area, this tract could be regarded as the under developed zone in terms of agricultural development. High rainfall variability, inadequate supply of water for irrigation, poor adoption of mechanization and persistence of subsistence economy are the major constraints for agricultural development in this tract. For this, micro level assessment of resources, in each watershed area, is essential, and based on the nature and extent of local problems, suitable measures should be adopted to utilize agricultural potential. The correlation analysis reveals the fact that the levels of agricultural development is an outcome of the integrated impact of various parameters.

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