

1. INTRODUCTION :

An attempt has been made to assess the impact of irrigation on crop productivity, fertilizers and mechanization in the last chapter. The present chapter deals with the study of levels of agricultural development. Agricultural development implies maximum economic utilization of land and this means land has to be provided with adequate water and fertilizers along with multi-cropping which may lead to increased yields and income from the land (Shinde, 1980). Agro-technical determinants like irrigation, fertilizers, high yielding varieties of seeds and agricultural mechanization together form a developed kind of agricultural landscape and provides a framework to measure the level of agricultural development of a region (Rajapati Ram, 1979). The studies pertaining to the levels of agricultural development, though affected by many factors, the irrigation remains to be dominant to determine agricultural development. Since it reflects integrated impact of many factors, the present study is undertaken. Besides this, we can compare the region's agricultural development with the spatial pattern of irrigation facilities. Thus, the interrelationship can be established between irrigation and agricultural development.

2. METHODOLOGY :

The development of a region may be assessed in several ways. One is to assess the annual rate of growth of national

income in relation to growth rates of other economies. The development of various inputs-outputs is another approach. This approach has been used by Datta and Sengupta (1969) for assessing the agricultural development of West Bengal. Sharma (1973) has also used this method for agricultural regionalization of India.

In order to find out the level of development in the study region, selected indicators were measured for each circle. The following variables are considered for determining the levels of agricultural development in Phaltan tahsil.

- i) Percentage of net area irrigated to net area sown.
- ii) Percentage of cultivated area to geographical area.
- iii) Farm workers per 1000 hectares of cultivated area.
- iv) Fertilizer consumption in tonnes per 1000 hectare area.
- v) Tractors available per 100 hectares of cultivated area.
- vi) Electrical pumps available per 100 hectares of cultivated area.
- vii) Oil-pumps per 100 hectares of cultivated area.
- viii) Road length per 100 sq. kms area.
- ix) Percentage of literate among rural population.
- x) Percentage of agricultural credit societies.
- xi) Percentage of cultivators to rural population
- xii) Percentage of electrified villages to total villages.

The method adopted here consists of two stages. Firstly the index values were calculated for each circle in terms of each

variable and secondly the composite index of development is computed of each circle considering all variables into account.

The co-efficient of levels of development of the circles, in terms of single variable can be expressed as follows.

$$CDvi = pv/MPV \times 100 \quad \dots\dots\dots (I)$$

Where, CDvi = The co-efficient of development of variable 'i'.

pv = Value of the variable 'i'.

MPV = Mean value of variable 'i' in the whole region.

In order to develop a composite index, which reflects the composite effect of indicators enumerated above, the following equation is applied.

$$cd = \frac{CDvi_1 + CDvi_2 + CDvi_3 + \dots + CDvi_n}{N}$$

Where, cd = Composite index of development

N = Number of variables

The composite index values of each circle were further arranged in descending order and classes were considered as high, moderate and low levels of agriculturally developments.

PHALTAN TAHASIL

Level of agricultural development 1993-94

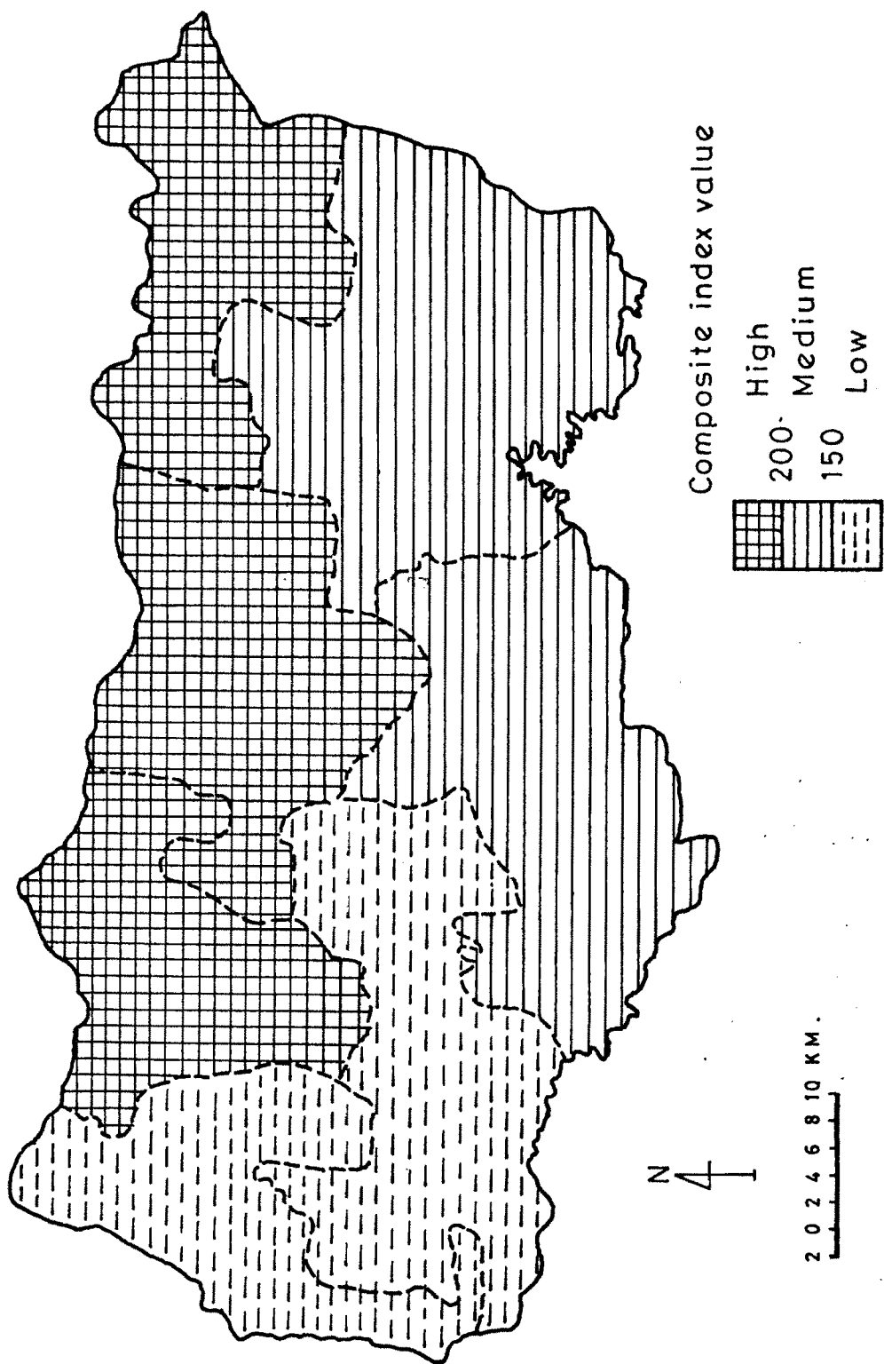


FIG.5.1

3. REGIONAL DISPARITIES IN THE LEVELS
OF AGRICULTURAL DEVELOPMENT :

Based on the composite values three distinctive zones have emerged out in the region showing high, medium and low levels of agricultural development. Fig.5.1 reveals the regional disparities in the levels of agricultural development during 1993-94 which may be attributed to physical, social and economic conditions. It is also evident from the superimposition of Fig.2.5-A (intensity of irrigation) and Fig.4.1, that there is high positive correlation between these two variables. The entire region has been grouped into three levels of development. These zones are -

1) High level of development :

This zone consists of three circles namely Hole, Phaltan, Aussu confining to the northern parts of the study region (Fig. 5.1). The tract records high level of development. There is comparatively high proportion (above 65%) of the irrigated area by the canal (Fig.3.1-A). The area has relatively more favourable environmental conditions. Pedologically, this tract is endowed with fertile black soil cover (Fig.2.2). Irrigation facilities have responded high use of fertilizers (Fig.4.3-A). Sound development of mechanization (Fig.4.3-B), agricultural credit societies issuing loans for the development of agriculture, favourable network of transport facilities all have lead to high level of agricultural development.

ii) Zone of moderate level of development :

Moderate level of development is observed in Barad and Girvi circles of the study regions (Fig.5.1). In Barad circles 55 percent area is irrigated by the canal and wells. More than 65 percent area is under well irrigation. The Girvi circle is endowed with irrigation, mainly from wells. It has moderate use of fertilizers and modern implements, agricultural finance through co-operative societies and moderate transport facilities. This has resulted into moderate development of agriculture.

iii) Low level of development :

Adarki and Taradgaon circles are included in the zone of low level of agricultural development. The poor proportion of irrigation (below 15%), hilly and undulating topography, infertile soils, unfavourable watertable, have all set the limits for the development of irrigation. Besides this, inadequate irrigation facilities (Fig.3.4-A) is the main constraint. These circles have relatively poor use of fertilizers (Fig.4.3-A). Low level of mechanization (Fig.4.3-B), poor road density and rural electrification and inadequate number of farm workers are responsible for such poor development of agriculture in this zone.

4. CORRELATION ANALYSIS :

The correlation matrix is attempted here by using Pearson's co-efficient and correlation (r). The formula is -

$$r = \frac{\sum xy - \frac{\sum x \cdot \sum y}{N}}{\sqrt{\frac{\sum x^2 - (\sum x)^2}{n}} \cdot \sqrt{\frac{\sum y^2 - (\sum y)^2}{n}}}$$

Where, x = Independent variable
 y = Dependent variable
 n = Number of observation

The following indicators were selected to work out the correlation matrix.

- X₁ - Net area irrigated to net area sown
- X₂ - Percentage of cultivated area to geographical area
- X₃ - Farm workers per 1000 hectares or cultivated area
- X₄ - Fertilizers in tonnes per 1000 hectares area cultivated
- X₅ - Tractors per 100 hectare cultivated area
- X₆ - Electrical pumps per 100 hectare of cultivated area
- X₇ - Oil pump per 100 hectare of cultivate area
- X₈ - Road length per 100 sq.kms area
- X₉ - Percentage of literate among rural population
- X₁₀ - Percentage of agricultural credit societies
- X₁₁ - Percentage of cultivators to rural population
- X₁₂ - Percentage of electrified villages to total villages

The interrelationship between irrigated area and various other factors have been attempted in Table 5.1. The correlation matrix indicates how significantly or insignificantly different factors are correlated with irrigated area in the region.

There is insignificant correlation between cultivated area (0.17) and irrigated area. Same thing is observed in case of farm workers (0.00), fertilizer (0.20), tractors (0.15), oil-pumps (0.08), road length (0.16), literacy (0.19) and number of cultivators (0.08). The positive relationship is well established between irrigated area and electric pumps (0.28) and agricultural credit (0.43). This reveals the fact that the electric pumps are necessary to promote irrigation facilities. Besides this, the credit facilities have always strengthened irrigation in the region.

The cultivated area has negative correlation with road length (-0.00) and electrified villages (-0.00). However, it has positive relationship with the rest of the attributes. There is sound correlation between farm workers and number of tractors (0.31), electric pumps (0.22) and oilpumps but it is negatively correlated with road length (-0.02).

It is interesting to note that fertilizer consumption is significantly correlated with tractors (0.62), but it is negatively correlated with road length (-0.01) and electrified villages (0.64) except oilpumps, the rest of the parameters are

Table 5.1 : Correlation Matrix.

X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}	X_{11}	X_{12}
1.00	0.17	0.00	0.20	0.15	0.28	0.08	0.16	0.19	0.43	0.08	0.00
	1.00	0.07	0.18	0.10	0.07	0.10	-0.00	0.00	0.01	0.02	-0.00
		1.00	0.16	0.31	0.22	0.22	0.02	-0.00	0.10	0.02	0.05
			1.00	0.62	0.02	0.19	-0.01	0.01	0.07	0.02	-0.64
				1.00	0.02	0.55	0.03	-0.03	0.14	0.00	-0.08
					1.00	0.18	-0.02	-0.00	0.06	0.13	0.02
						1.00	-0.14	-0.08	0.13	0.07	0.02
							1.00	-0.11	0.02	0.14	-0.00
								1.00	0.00	0.00	0.00
									1.00	0.02	0.02
										1.00	0.00
											1.00

SOURCE : Compiled by the author, 1993-94.

significantly correlated with irrigated area. Tractors have also shown positive correlation with oilpumps (0.55) and agricultural credit (0.14). Further electric pumps have recorded either insignificant or negative correlations with the other factors. It is negatively correlated with road length and literacy (Table 5.1). Oilpumps have also shown similar pattern. It has also positive relationship with agricultural credit (0.33).

The above analysis reveals that there are many factors responsible for promoting irrigation facilities in the region. However, the intensity of the relationship is varying. It is important to note that the development of irrigation in the region has been determined by some basic sets of factors like agricultural credit, electric pumps, oil-pumps and especially, rural electrification.

SUMMARY :

Agricultural development implies maximum utilization of land associated with multicropping and the use of modern techniques leading to increasing yields and finally upgrading the economic levels of farmers. The levels of agricultural development refers to the degree at which various factors are combined together to yield maximum from the land resources. The regionalization based on the study of the levels of agricultural development is very useful parameter for agricultural planning.

There are various factors which combinantly affect the development of agriculture. However, these combination is varying in the context of space and time. Thus, the regional variations in agricultural development takes place in the region. Phaltan tahsil can be divided into three zones with high, medium and low levels of agricultural development. The spatial variations in physical, social and economic factors is reflected in the regional differences in agricultural development. The zone with high level of agricultural development is confined to fertile tract along Nira river course in the north having substantial irrigation facilities from canal. The southern most region, being hilly in nature, has attained low levels of agricultural development. The interrelationship of various factors indicate that no single factor in isolation, is responsible for agrarian development but there should be positive relationship. However, irrigation remains to be deciding factor.

R E F E R E N C E S

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