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Pattern of agricultural development in Karnataka: Regional variations

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Abstract
In order to assess the productivity variations in each of the twenty-seven (including newly created) districts of the state, the best two methods (out of seven) for the evaluation of productivity have been applied, considering all the major food crops grown in the state, namely, Rice, Ragi, Jowar, Bajra, Maize, Wheat, Other Cereals, Tur, Gram, Other Pulses, Groundnut, Sugarcane and Cotton since the beginning of 1993-94 in the state up to 2007-08.

Keywords: agriculture, area, production, productivity Agricultural Worker

Introduction

Agricultural productivity is a multidimensional concept, which includes technological advancement, effective management of available resources and organizational set-up for the agricultural production. These factors in turn affect the relative production in any region.

In as said above, the following two approaches have been adopted for evaluating productivity, viz;

a) Agricultural Productivity Based on Output per hectare of Cropped Land (Price Weighted).
b) Agricultural productivity Based on Output per Agricultural Worker (Price Weighted).

In this section an attempt has been made to test the third 'Hypothesis – H_3: "Regional Imbalances in Agricultural Productivity cause the Underdevelopment of Agricultural Sector". This needs of examining the patterns of Agricultural development in Karnataka keeping in view the existing regional imbalances is agricultural productivity amongst the districts of the Karnataka State.

An examination of growth in area, production and productivity of major crop/crop groups derived from growth function estimates for the period 1993-94 to 2007-08 enables us to group the crops into following four broad categreis, they are (i) crops which have experienced area led growth, (ii) Crops which have experienced Productivity led growth, (iii) Crops which have experienced both area and productivity led growth, and (iv) crops which have not registered any growth. The crops falling in these categories categories during the period 1993-94 to 2007-08 are presented in Table.1

Table 1: Crop/Crop Groups Classified Based on Growth Performance

Period	Area Led Growth	Productivity Led Growth	Both Area and Productivity Growth	No Trend Either
1993– 94 to 2007-08	Tur Bangal gram, Sugarcane	Ragi * Jowar * Bajra * Wheat * All Cereals * Food grains * Cotton *	Rice Maize, Pulses Groundnut Sesamum Saffflower Total Oil Seeds	

Source: Computed by the Researcher

- These crops have registered relativity declining trend in area.

It may be noted from the Table.1, that cereals and food grains have registered productivity led growth during the above period. Though all the Pulses taken together have registered both area and productivity led growth, two major Pulses crops of the state, namely Tur and Bengalgram have registered only area led growth. Both total oil seeds and as well individual oil seed crops like Groundnut. Sesamum and safflower have registered both area and productivity led growth. Among major cereal crops, Rice and Maize have registered area as well as productivity led growth. Ragi, Jowar and Bajra which are mainly grown under rainfed conditions have registered only productivity led growth. Further, analysis in respect of three rainfed cereal crops mentioned above indicates that Jowar and Bajra have registered negative growth in their area and Ragi crop has not exhibited any trend in its area. In respect of two major commercial crops namely Sugarcane and Cotton, growth in production of Sugarcane crop is mainly due to area expansion and growth in production of Cotton Crop is mainly due to increase in productivity and infect it has registered negative growth in its area.

Estimation of Composite Index of Agricultural Development

Empirical works usually carried out to analyze the regional imbalance mainly adopted are, graphical approach, cluster analysis, principal component and factor analysis. However, in the present study statistical technique adopted by Narain Rai and Sarup (1991) is adopted to construct composite

agricultural development index for each district of Karnataka state. The details of the estimation procedure may be in order. The information of K indicators collected over "n" districts can be represented by a matrix (xij), $i = 1, 2,.n$ represent districts and j = 1, 2… k represent group of k indicators. The development indicators considered for the analysis have been expressed in different unit of measurements.

The standardization of these indicators are undertaken as shown below.

$$Zij = \frac{XiJ - \bar{X}\,j}{S\,j}$$

Where

$$S\,j = \sqrt{\sum_{i=1}^{n} \frac{(Xij - xj)^2}{n}}$$

$$\bar{X}\,j = \sqrt{\sum_{i=1}^{n} \frac{Xij}{n}}$$

(Zij) Denotes the matrix of standardized indicators.

Depending upon the direction of the indicator, the maximum/minimum standardized value is identified to reflect the best district for each indicator. Deviation of the value for each district is taken from the best district value for all indicators in the following manner.

$$Ci = \left[\sum_{j=I}^{k} (Zij - Zoj)^2\right]^{\frac{1}{2}}$$

Where. Zoë is the standardized value of j^{th} indicator of best district. Ci is pattern of the development of i^t district (i = 1, 2… 27 districts)

Following formula provides composite index of agricultural development.

$$Di = \frac{Ci}{C}, i = 1, 2, \ldots\ldots\ldots\ldots 27\ districts$$

Where $Ci = C + 2\,S$.

$$C = \sqrt{\sum_{i=1}^{n} \frac{Ci}{n}}\ and$$

$$\bar{X}\,j = \sqrt{\sum_{i=1}^{n} (Ci - C)^{\frac{2}{n}}}$$

n = Number of districts

The value of composite index lies between zero and one. If the value of index is closer to zero, it reflects higher level of development, while the value of index closer to 1 and above indicates the lower level of development.

Development Indicators Used

Composite index for agricultural development is constructed with the help of 21 indicators reflecting the various facet of agricultural development. The average data on the following indicators are collected over for two periods of time viz., 1950-65 and 1993-2008.

1 Number of holding under marginal and small farms
2 Area (in ha) under marginal and small farms.
3 Area under Cerela crops (hect)
4 Area under Pulses Crop (hect)
5 Area under Oil Seeds Crop (hect)
6 Area under Cotton Crop (hect)
7 Area under Sugar cane (hect)
8 Productivity of Cereals Crop (kgs./ha).
9 Productivity of Pulses Crop (Kgs./ha)
10 Productivity of Oil Seed Crop (Kgs/ha)
11 Productivity of Cotton Crop (Kgs/ ha)
12 Productivity of Sugarcane Crop (Kgs./ha)
13 Percentage of Gross irrigated area to gross sown area (G.S.A)
14 Cropping Intensity.
15 Per- hectare consumption of fertilizers (Kgs./hect.)
16 Number of electric pumps per lakh hect. Of GSA.
17 Number of tractors per thousand hect. Of GSA.
18 Road length in kms per thousand hect. Of GSA.
19 Number of Primary Agricultural Credit Societies per thousand hect. of GSA.
20 Number of Commercial Banks per thousand hect. Of GSA.
21 Number of regulated markets per lakh hect. Of GSA.

The districts having composite index equal of less than Mean – 2 SD (Standard Deviation) are classified as Developed districts. The districts whose composite index lie between Mean $\pm$ 2 SD are classified as Developing districts and districts where composite index is greater than mean +2 SD are classified as Poorly developed districts (Perm Narain, S.C., Rai and V.K. Bhatia., 1977).

Empirical Analysis

The agricultural development index constructed on the basis of 21 indicators is presented in Table 6.15 for the period 1950-65 and 1993-2008. The Table 6.15 indicates that the value of index ranges from 0.40 to 0.56 during the period 1950-65 and its range varied from 0.81 to 1.23 during 1993-2008. The relative positions of districts during 1950-65 indicate the fact that Uttar Kannada district ranked first and Mandya District ranked last in terms of agricultural development. On the other hand during 1993-2008. Shimoga district stood at first place and Tumkur occupied last position. As indicated earlier the districts are classified into High, Medium and Low development districts based on Mean and Standard Deviation of composite index. The classification of districts under these category are presented in table 6.16.

The districts, Shimoga and Kodagu which found place under high development category during 1950-65, continued their status even during 1993-2008. On the other hand Bellary, Chikkamanglur and Dakshina Kannada districts which were categorized under districts having high level of development during 1950-65, moved down from high category to low development category during the above periods. During the both the periods, Bangalore (U), Hassan and Mysore districts have remained as medium development category districts

with regard to agricultural development. Five districts namely, Dharwad (including Gadag and Haveri) Gulbarga, Kolar, Tumkur and Bangalore (R) have shifted from medium development category to low development category during the latter period. Bidar is the only district which has moved from medium category of development to high category of development during this period as per data. Except Raichur district which has low development status during both the periods, the other four districts viz., Belgaum, Bijabur (Including Bagalkot) and Mandya districts, have occupied position under high category during 1993-2008, the Chitradurga districts has moved from low to medium category during these periods. One need to exercise caution while classifying Uttar Kannada district under low development category. This is also true in the case of Dharwad (Including Gadag and Haveri) districts which was moved to low development category. The indicator selected to construct agricultural development index to not take into account the major changes that have occurred in these districts during the recent past.

Table 3: Districts Classified Based on Different Levels of Agricultural Development

Level of Development	1950-65	1993-2008
High	Bellary	Shimoga
	Chikamangalur	Belgaum
	D. Kannada	Mandya
	Kodagu	Kodagu
	Shimoga	Bidar
	U. Kannada	Bijapur (Including Bagalkot)
Medium	Bidar	Chitradurga (Incl. Davangere)
	Bangalore	Chikamanglur
	Dharwad	Bellary
	Gulbarga	D.K. (Including Udupi)
	Hassan	Hassan
	Kolar	Mysore (including Chamarajnagar
	Mysore	Bangalore (U)
	Tumkur	
Low	Belgaum	Bangalore (R)
	Bijapur	Dharwad (Including Gadag and Haveri)
	Chitradurga	Raichur (including Koppal)
	Mandya	Gulbarga
	Raichur	Tumkur
		U. Kannada
		Kolar

Source: Directorate, Economic & statics, Bangalore

In order to examine how far the level of development achieved by districts have its influence on the overall agricultural development of the state[1], relative share of high, medium and low developed districts in terms of net sown area, Percentage of area under irrigation, food grains production, extent of rural population, rural work force and allocation of funds are being calculated for the two periods and the figures are presented in Table 6.16. It can be read from the table that there is a significant increase in net sown area, rural workforce and rural population covered by highly developed districts during 1993-2008, when compared the periods 1950-65. On the other hand there is only marginal increase in contribution of food grains by highly developed districts. Relative share of area under irrigation accounted for by the high category of districts has marginally declined.

It may be noted from the above analysis, the during 1990's nearly 40 percent of the districts are classified under low agricultural development category and the other 35 percent of the districts are found their position under medium category, only about 25 percent of the districts are found in the high level of agricultural development category. This shows that there is greater regional imbalances existing in the state of Karnataka with regard to agricultural productivity and agricultural development, and caused the state agriculturally less prosperous when compared to other developed states like Punjab in the country.

Table 4: Average Percentage Share of Major Indicators under Different Levels of Development in Karnataka.

Level of Development		Average Percentage of the Total						
		Net sown	Area Under irrigation	Food Grains	Rural Work	Rural Production	Allocation of Fund	No. of. Districts
High	1950-1965	14.29	34.95	23.47	11.59	22.58	-	6
	1993-2008	21.57	30.44	28.3	31.13	34.6	32.86	6
Medium	1950-1965	44.63	38.82	47.34	69.75	46.73	-	8
	1993-2008	45.08	46.8	45.58	40.32	37.99	39.26	7
Low	1950-1965	41.08	26.23	29.17	18.65	30.69	-	5
	1993-2008	33.35	33.35	22.76	29.12	28.55	27.41	7

Source: Computed from calculated values by the research

[1] Sarker. P.C. 1994, Regional imbalances in Indian Economy over plan periods" "Economic and political weekly, Vol. XXIX, No. 11 March, 1994.

As such, the above foregoing analysis has supported our Third Hypothesis**:** H_3 that "Regional Imbalances in Agruclutural productivity has caused the under development of Agriculture in Karnataka State". Hence, H_3 is established.

Conclusion

From the above, it is clear that regional variation is existing in Karnataka in respect of agricultural development. Regional imbalance in agricultural productivity caused the undevlopment of agriculture in Karnataka state Regional imbalances in agricultural productivity are due to special variations in the availability of important agricultural inputs. Provision of agricultural input along with the development of basic infrastructure will help to develop agriculture. Further diverting of human labour pressure from agriculture sectors to some non –agricultural sector will increase the productivity of agricultural sector and contributes positively towards the agricultural development in the state.

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