Trans. Inst. Indian Geographers
Vol. 7, No. 1, January 1985

CROP PRODUCTIVITY IN RELATION TO CROPLAND IN ANDHRA PRADESH -- A SPATIAL ANALYSIS

V. Vidyanath

ABSTRACT : The paper, while presenting a review of different techniques for crop productivity, demonstrates that the ratio between the rate of increase of cropped land and the crop production provides the index of increasing, normal or decreasing productivity. A higher rate of increase in crop-land vis-a-vis crop production means lower productivity and vice versa.

Agricultural productivity is taken as the most important indicator to show the spatial pattern of agricultural development in any region. Such a study would help the planners in preparing the future perspective agricultural development plans on a rational basis to lessen the regional disparities. Studies on crop productivity are so important in a country where food requirements need constant attention due to the rapid growth of population. Increase in crop production is a must in India since areal spread of cropland has almost reached its saturation limit. Crop productivity is a function of several variables pertaining to physical, socio-economic, technical and organisational aspects. Besides, it is frequently associated with attitudes towards work, thrift, industriousness and aspirations for higher learning (Jasbir Singh, p. 225).

Several statistical techniques have been adopted by social scientists in determining agricultural productivity. One of the earliest methods is that of Kendall (1930) who used the yield of crops to determine agricultural productivity by calculating rank coefficients. The main defect in this method is that areal strength of crop has not been taken into consideration while determining the agricultural productivity. Kendall's method was used by Stamp (1958), Shafi (1960) and others.

Bhatia (1967) used a modified technique by taking into consideration the areas of crop along with their yields. Sapre and Deshpande (1964), Enyedi (1964) Thambald (1965), Buck (1967), Sinha (1968), Jasbir Singh (1976) and several others also used different techniques for determining crop productivity.

The author in this paper adopted a different method to find out the degree of relationship between cropland and crop productivity. Normally, crop production should proportionately increase with cropland area. If the crop production rate of increase is higher than cropland rate of increase the crop productivity is said to be higher and vice-versa. If the crop produc-

tion rate of increase is more or less equal to that cropland area rate of increase, the productivity is considered to be normal.

The ratio index between production share of crops, and cropland area share has been worked at the distant level.

The method is summarised as follows:

$$C_{Er} = Ca_1 + Ca_2 + \ldots\ldots Ca_n \ldots\ldots \quad \ldots \quad (1)$$

$$C^{oo}_{Sa_1} = \frac{Ca_1}{C_{Er}} \times 100 \quad \ldots \quad (2)$$

$$P_{Er} = Pa_1 + Pa_2 + \ldots\ldots Pa_n \ldots\ldots \quad \ldots \quad (3)$$

$$P^{oo}_{Sa_1} = \frac{Pa_1}{P_{Er}} \times 100 \quad \ldots \quad (4)$$

$$R^{i}_{a_1} = \frac{P^{oo}_{Sa_1}}{C^{oo}_{Sa_1}} \quad \ldots \quad (5)$$

Ca_1, Ca_2 etc. = Total cropped in the areal units a_1, a_2 etc.

C_{Er} = Total cropped area of the entire region.

$C^{oo}_{Sa_1}$ = Percentage share of the cropped area of the areal unit in the entire region's cropped area.

$Pa_1 + Pa_2$ etc. = Total production of crops in the areal unit a_1, a_2 etc.

P_{Er} = Total production of crops in the entire region.

$P^{oo}_{Sa_1}$ = Percentage share of the production of crops of the areal unit in the entire region's productions of crops.

$R^{i}_{a_1}$ = Ratio index between production share of crops and cropland area share of the areal unit a_1.

PHYSICAL AND AGROSTRUCTURAL SETTING

A brief comprehensive picture about the physical and agrostructural setting of the state would help the spatial analysis of crop production and cropland relationship. Andhra Pradesh* is primarily an agricultural state. The importance of agriculture can be assessed from the fact that nearly 80% of state's population depends upon agriculture.

Agriculture contributes to over 50% of State's income and thereby constitutes the most important economic activity of the state. Over 75% of the cropped area is under food crops. Rice, millets, tobacco, sugarcane, groundcane, groundnut, castor, cotton and chillies are principal crops. Over 1/3 of the net sown area is irrigated. Canal irrigation is predominant in Krishna-Godavari delta tract.

The state has an average rainfall of 896 mm. About two thirds of its normal rainfall occurs in southwest monsoon period (June to October). The rainfall is fairly high in northern and north-eastern districts and decreases towards west and south-west particularly in the districts of Rayalaseema (Fig.1).

A major portion of the state is covered by red soil. These are generally deficient in organic matter and plant nutrients and rich in phosphatic contents. The greater part of Telangana and Rayalaseema and upland portions of the coastal districts are covered by loamy and red sandy soils. The next important soil covering a large portion of Rayalaseema region is the black soil. Next comes the coastal alluvium and loamy soils occurring mostly in Nellore, Guntur and Srikakulam districts. The most important soil, the deltaic alluvium is limited in extent and is concentrated in Krishna-Godavari delta. This soil is very fertile and yields a good paddy crop. The last one is laterite soil which is poor in organic matter and plant nutrients. Laterite pockets occur in Srikakulam, Nellore districts They are well suited for horticulture.

An analysis of Fig. 2 showing the relationship between crop production and cropland reveals that very high crop production and cropland reveals that very high crop production cropland ratio index values are found in the three coastal districts, i.e. Visakhapatnam, East Godavari, West Godavari and Nizamabad districts of Telangana plateau region. In these districts, the production share of crops when compared to cropland are share is much higher. This high productivity is due to high fertility of alluvial and red soils, intensive cultivation and assured water supply due to canal irrigation. In most of these districts the gross cropped area and gross irrigated area are over 50%.

Besides these four districts, with very high crop productivity, three districts, Krishna, Chittoor, Medak show high crop productivity. These districts fall under the Category II since their crop production, cropland ratio index values fall within 2 and 1. In these districts also the percentage share of crop production is higher than cropland area share. The soil fertility is comparatively less, and the percentage of gross irrigated area to gross cropped area is less than 50.

Eight districts (Srikakulam, Vizianagaram, Guntur, Nellore, Cuddapah, Karimnagar, Warangal, Rangareddy) show medium crop productivity and fall under Category III. In these districts, the crop production share is less than cropland area share. As such, the crop production, cropland ratio index values fall within 1.0 and 0.5. In these

---

* Andhra Pradesh has an area of 2,75,968 per km and a population 5,35,92,605 according to 1981. It has 23 districts falling in three regions in Telangana (10 districts), Rayalaseema (4 districts), and Coastal Andhra (9 districts).

TABLE – I

S. No.	District	Gross Cropped Area in Hectares (G. C. A.)	Total Production of Crops in Metric Tons	% Share in the Regions Gross Cropped Area	% Share in the Region's Total Production of all Crops	Ratio between % Share in the Total Production % Share of the Gross Cropped
1.	Srikakulam	382553	704081	3.13	2.91	0.93
2.	Vizianagaram	356599	628330	2.91	2.61	0.90
3.	Visakhapatnam	366929	1788741	3.00	7.41	2.47
4.	East Godavari	568666	2361301	4.64	9.78	2.12
5.	West Godavari	576931	4417743	4.71	18.30	3.89
6.	Krishna	736108	1799790	6.01	7.45	1.24
7.	Guntur	754446	1272991	6.16	5.27	0.86
8.	Prakasam	662954	630437	5.42	2.61	0.48
9.	Nellore	349246	467824	2.85	1.94	0.68
10.	Kurnool	870412	578173	7.11	2.39	0.34
11.	Anantapur	867402	642748	7.09	2.66	0.38
12.	Cuddapah	356353	459718	2.91	1.90	0.65
13.	Chittoor	485205	1707317	3.96	7.07	1.80
14.	Ranga Reddy	334856	379354	2.74	1.57	0.57
15.	Hyderabad	1791	887	0.01	0.003	0.30
16.	Nizamabad	357788	2013027	2.92	8.33	2.85
17.	Medak	480619	1201839	3.93	4.96	1.26
18.	Mahbobnagar	958727	589484	7.83	2.44	0.32
19.	Nalgonda	653761	549049	5.34	2.27	0.43
20.	Warangal	544102	561233	4.45	2.32	0.52
21.	Khammam	454992	340997	3.70	1.41	0.38
22.	Karimnagar	505371	733805	4.12	3.04	0.74
23.	Adilabad	613489	305892	5.01	1.26	0.25
	A. P.	12239303	24134765			

TABLE – II

S. No.	District	Gross Cropped Area	Gross Irrigated Area	% of Gross Irrigated Area, Gross Cropped Area
1.	Srikakulam	389704	192953	49.51
2.	Vizianagaram	357210	136949	38.33
3.	Vishakhapatnam	368742	122670	33.27
4.	East Godavari	593306	387701	65.34
5.	West Godavari	582492	478467	82.14
6.	Krishna	736539	433534	58.86
7.	Guntur	754534	350753	46.48
8.	Prakasam	662998	172166	25.97
9.	Nellore	349314	242387	69.39
10.	Kurnool	870497	147091	16.89
11.	Anantapur	867947	148856	17.15
12.	Cuddapah	356458	111755	31.35
13.	Chittoor	486440	169832	34.90
14.	Ranga Reddy	334859	54437	16.26
15.	Hyderabad	1792	1582	88.28
16.	Nizamabad	357788	187552	52.42
17.	Medak	480620	112393	23.39
18.	Mahboobnagar	958730	159503	16.63
19.	Nalgonda	653766	192514	29.45
20.	Warangal	544103	171182	31.46
21.	Khammam	454996	111814	24.57
22.	Karimnagar	505371	202130	39.99
23.	Adilabad	613489	53340	8.69

rainfall (Fig. 1). Cuddapah and Ananthapur districts get very low rainfall and hence become drought prone areas (697 mm/544 mm respectively). Due to low rainfall, irrigation facilities are very poor. In most of the districts, the percentage of gross irrigated area to gross cropped area is less than 20. Thus, the spatial pattern of crop production in relation to cropland area in Andhra Pradesh is largely influenced by soil fertility, rainfall and irrigation.

districts the gross irrigated area is less than 40%. Low soil fertility is another important contributing factor.

Low crop productivity is noticed in the remaining districts, i.e. (Mahboobnagar, Kurnool, Ananthapur, Cuddapah, Prakasam, Nalgonda, Khammam and Adilabad, Hyderabad). Except Adilabad and Prakasam, all other districts receive very low

REFERENCES

Bhatia, S.S. (1968). "A New Measure of Crop Efficiency in U. P.", *Economic Geography*, Vol. 43, No. 3.

Buck, J. L. (1937). *Land Utilisation in China*, Vol. I, Nanking.

Enyedi, G. Y. (1964). *"Geographical Types of Agriculture"*, Applied Geography of Hungary.

Ganguley, B. N. (1968). *Trends of Agriculture and Population in the Ganges Valley*, London.

Kendall, M. G. (1939). "The Geographical Distribution of Crop Productivity in England" *Journal of Statistical Society*, Vol. 162.

Sapre, S. G., and Deshpande, V. D. (1960). "Inter District Variations in Agricultural Efficiency in Maharashtra State", *Indian Journal of Agricultural Economics*, Vol. 19.

Stamp, L. D. (1958), "The Measurement of Land Resources", *Geographical Review*, Vol. 48, No. 1.

Singh Jasbir (1976). "Regional Imbalances in the Levels of Food Crops Production", *An Agricultural Geography of Haryana.*

Sinha, B. N. (1968). "Agricultural Efficiency in India", *The Geographer*, Vol. XXI.

Thambald, S. B. (1965). "Spatial and Temporal Variations in Agricultural Productivity in Mysore State", *Indian Journal of Agricultural Economics*, Vol. **10**, No. 4.

Noor Mohammod (1981). *Perspectives in Agricultural Geography*, Vol. **IV**, Concept Publishing Company Ltd., Delhi.

Singh, J. and Dillion, S. S. (1984). *Agricultural Geography*, Tata Mcgraw Hill & Co. Ltd.