
FACTOR ANALYSIS OF REGIONAL IMBALANCES IN CROP YIELD LEVELS AND TRENDS IN ANDHRA PRADESH**¹Priya, ²Dr. Divya Parashar****Department of Geography****^{1,2}OPJS University, Churu (Rajasthan) – India****Abstract**

As far back as the start of the 'Green Revolution', Indian agribusiness has accomplished a critical leap forward in the change of cropping design, numerous cropping, per hectare trim yield levels and harvest creation. Clearly, this new agricultural bundle has possessed the capacity to break the chains of under-sustenance and food deficiencies in numerous parts of the nation. Thus, the agricultural creation circumstance in Andhra Pradesh has staggeringly enhanced and turned into a surplus State and called as 'Annapurna' regarding food grains generation in Southern States of India. Be that as it may, incomprehensibly the products of 'Green Revolution' have not been shared similarly by every one of the yields and by every one of the areas in the State. Out of the considerable number of harvests, paddy development has picked up a stupendous force while different harvests as yet battling with undesirable patterns in their spatial spread, yield levels and generation designs. Similarly the flooded pockets have been risen as unique and created agricultural development focuses while the other considerable rain bolstered zones keep on wallowing in stagnation and tricky condition.

1. INTRODUCTION

The present Indian agricultural policy is attempting to regard and perceive the farming as industry and contend it with the International scale and exchange. In this procedure of change of agribusiness, the present policy of modernisation of farming is to be an incredible degree connected up with the issue of diminishment of provincial lopsided characteristics in per hectare trim yield levels and agricultural frameworks. At that point just it accomplishes the solid and dynamic pattern of agricultural success of the State. Here, the issue emerges how to build the per hectare yield levels and gross generation of specific harvests in the districts which have so far lingered behind in the race of agricultural development. At this crossroads, the local examinations focussing upon the changing spatial examples and incongruities in the per hectare yield levels and yield holes between the harvests and the districts are fundamental to discover the weaker agricultural zones and products whose exhibitions and achievements are assorted. Such an examination gives a sane premise and advance future procedure in agricultural policy and making arrangements for the lessening of territorial lopsided characteristics in agricultural improvement [1].

- **Area, Yield and Production of Paddy:** Paddy is the most prevalent crop involved first position in zone of Andhra Pradesh covering a zone of 3812.8 thousand hectares amid 1994-97. Over the most recent 23-year time span i.e., between 1971-74 and 1994-97 the region under paddy was tremendously expanded by 697.2 thousand hectares. The areal development of paddy development is recorded in Coastal Andhra and Telangana locales, while shrinkage in Rayalaseema district.
- **Area, Yield and Production of Wheat:** Wheat is the slightest vital oat crop in the State developing in a zone of 11.4 thousand hectares in 1994-97 as against to 20.9 thousand hectares in 1971-74. It demonstrates that the dietary propensities for the general population of Andhra Pradesh are not loved for the cultivation of wheat other than having appropriate agro-geographic conditions. Wheat cultivation is essentially missing in the Coastal locale, where as in Telangana and Rayalaseema areas, the hectarage under the crop is getting declined in each region [2].
- **Area, Yield and Production of Jowar:** As far as hectarage, jowar is the fourth biggest crop in the State developing in 894.5 thousand hectares in 1994-97. While in 1971-74, it was the second biggest crop with a zone of 2707.7 thousand hectares. In the most recent year multi year time span, jowar. Has lost significant spatial spread to the tune of 1812.9 Thousand hectares. It is extremely fascinating to express that, this is the main Crop which has marvelous spatial shrinkage and positioned first among the crops which lost in their developing territory. Regarding crop zone, Mahabubnagar area has the most noteworthy hectarage taken after by Adilabad , Kurnool, Medak and Ranga Reddy which were exclusively had in excess of one lakh hectares under jowar cultivation. In these zones, the nearness of dark soil cover is more in charge of across the board cultivation of jowar under rainfed conditions.
- **Area, Yield and Production of Bajra:** In 1994-97, bajra cultivation possessed fourteenth rank as far as cropped territory of the State, while it was involved fourth rank in 1971-74. It demonstrates that, there was a sharp decrease in its spatial spread i.e., from 53.7 thousand hectares in 1971-74 to 13.4 thousand hectares in 1994-97, demonstrating a net decay of 40.3 thousand hectares. By jowar, bajra is the second imperative crop which has lost greatest size of cropland in the State. The reduction in the bajra crop region is recorded in all the three areas of the State. The greatest decrease of bajra crop zone is seen in the customary developing regions of Nalgonda, Anantapur, Mahabubnagar, Guntur, Chittoor, Visakhapatnam and Prakasam areas.
- **Area, Yield and Production of Ragi:** As far as crop region, ragi cultivation possessed seventeenth rank in 1994-97 as against to eleventh rank in 1971-74. It demonstrates that the crop has lost its noteworthiness as vital millet in the eating routine of poorer strata. As far as hectare, the territory under ragi cultivation has diminished from 255.5 thousand hectares in 1971-74 to 125.6 thousand hectares in 1994-97 demonstrating a net areal decrease of 129.9 thousand hectares over the most recent 23 years time frame. The lessening in ragi crop is found in all the three locales of the State. Diminishing in ragi crop territory is more in the

customary ragi developing zones of Rayalaseema, south Coastal Andhra and north Coastal Andhra. Amid 1994-97, ragi cultivation is more noteworthy in Visakhapatnam, Vizianagaram and Srikakulam locale of north Coastal Andhra; Chittoor and Anantapur regions of Rayalaseema and Mahabubnagar and Ranga Reddy regions of Telangana districts [3].

2. THE DATA

After cautious thought in the present study, 25 factors at region level were chosen which were believed to be pertinent for the evaluation of the levels of agricultural improvement in Andhra Pradesh. The rundown of factors decided for the analysis is given in Table 1 [4].

The present study is restricted to two purposes of time in particular 1973-74 and 1993-94. In perspective of restrictions about the degree of data accessibility, the study is made at region level covering 22 locale of Andhra Pradesh. Since Hyderabad is the most urbanized region in Andhra Pradesh, where agricultural action is extremely insignificant, the area has been converged with Ranga Reddy locale with the end goal of analysis.

The data entered in the analysis identify with 1973-74 and 1993-94 and data at the area level have been separated from the narrative wellsprings of the Department of Economics and Statistics of the Government of Andhra Pradesh, particularly from the Statistical Abstracts and Season and Crop Reports. The variable set is the same for both 1973-74 and 1993-94. Most data have been rates (11 factors), while a couple have been interim (7 factors) and proportion (5 factors) data. The factors (Table 8.1) identify with essentially contributions to horticulture, while there have been data on precipitation, extent of booked stations/planned clan populace, thickness of populace and education as these are considered as important with regards to analysis. Yearly precipitation has been incorporated into the analysis with a view to see whether this makes any commitment to the level of agricultural development in the State, as the horticulture is subject to rainstorm [5].

Land and water as sources of info have been incorporated into an assortment of factors entered in the analysis. For instance, arrive has been differently considered as net sown zone to add up to topographical territory, force of cropping, flooded zone to net sown zone, and power of irrigation. Different data sources have been incorporated into the analysis with different factors: seed technology by high yielding assortments, mechanical technology by furrows and tractors, control by pumpsets and power expended, work contributions by people (cultivators, workers) and creatures (draft creatures) and furthermore different factors, for example, level of cultivators to add up to specialists, agricultural workers to add up to specialists, planned station/booked clan populace to add up to rustic populace (as this populace is for the most part occupied with wage and connected work in the ranches). Crops and cropping have been represented by foodgrain crops, business crops and cropping power. Efficiency has been represented both foodgrains and

aggregate agricultural yield. At long last, statistic factors have been incorporated as thickness of populace and education of the cultivators. Therefore, the factors contribution to the analysis have been particular and pertinent in the estimation of agricultural development [6].

3. THE COMMON FACTOR ANALYSIS (CFA)

The motivation behind factor analysis is to translate the structure inside the change covariance networks of the multivariate data gathering made on the farming of Andhra Pradesh. The fundamental numerical task in factor analysis might be expressed as takes after (Davis, 1986; Harman, 1961; Johnston, 1978; Eummel, 1967; and Yeates, 1974):

$$Z_j = a_{j1}P_1 + a_{j2}P_2 + \dots + a_{jm}P_m \text{ where}$$

$$Z_j = D_j - X_{\text{mean}} / O_j \text{ or standardised variable}$$

$$P_i = (i = 1, 2, \dots, m) \text{ are the principal components and}$$

$a_{ji} = (i = 1, 2, \dots, n)$ are the coefficients or factor loadings of $(i = 1, 2, \dots, m)$ jth variable relating to the ith component.

In other words, each factor is nothing but a linear combination of weighted variables which can also be expressed as:

$$P_i = a_j X_j \text{ where}$$

$$A_j = \text{factor loadings of } j \text{ variables } (j = 1, 2, \dots, m).$$

Therefore, in factor analysis, a data framework containing estimations on 'm' variables for every one of 'n' perceptions is examined.

The system utilizes extraction of the eigen esteems and eigen vectors from the lattices of relationships or covariances. The fundamental numerical activity in factor analysis is finished with numerous embellishments on the systems. Normal Factor Analysis is a profound and complex methodology. It is a standout amongst the most broadly utilized multivariate methodology. The model depends on a few one of a kind suppositions. For one, the exact number of factors is accepted earlier is expected preceding the analysis. The factors removed, or rather the quantity of factors, are approved by the variances with the expanding number of factor measurements. The first or the principle factor measurement has the most astounding of the aggregate change clarified and the bipolar the following most astounding et cetera, bringing about logically declining variances [7].

4. FACTOR ANALYSIS FOR THE STUDY OF THE DISPARITIES IN AGRICULTURAL DEVELOPMENT

Factor Analysis is a Multivariate Statistical method used to look at the intelligent ramifications of a few related variables. In the present study there are 25 variables, which are all not free but rather related. An examination of their between relationships would uncover the idle or concealed factors, which could clarify the varieties in the data on the economic development. Such factors will be not as much as the real number of variables. It would then be anything but difficult to deal with these few factors rather than every one of the variables.

Procedure of Factor Analysis

The locale insightful data on every one of the 25 variables frames the contribution for factor analysis. Since the diverse variables are estimated in various units, they are institutionalized to make them free of units. Each factor is a direct mix (weighted entirety) of the variables and the ID of such factors is called factor extraction.

Factors are separated in a steady progression by a technique called important segments. The commitment made by every factor to a factor is called factor stacking. It is the connection coefficient between one unique variable and the recently inferred factor. A high estimation of the stacking suggests a high relationship of that variable on the factor.

At whatever point a factor is removed, an esteem called eigen esteem is computed. It is a list of the extent of the aggregate fluctuation represented by that factor. As a useful run, a factor is viewed as just if its eigen esteem is more noteworthy than 1.

Alongside the eigen esteem, another measure called the mutuality of a contributing variable in each factor is ascertained.

Regional Imbalances in Agricultural Development of Andhra Pradesh -1973-74

The Factor analysis in view of 25 variables on 21 regions has really removed Six Factors among which, the initial Four Factors have a noteworthy commitment regarding the rate fluctuation clarified. The staying two factors could just clarified under 10 for every penny of the variety. So they have been overlooked and just the initial four factors have been considered. Table 8.2 presents the aftereffects of the Factor analysis utilizing the data for 1973-74. As the factor framework proposes, there is a Four-Factor dimensional development of agribusiness at full scale level in Andhra Pradesh amid 1973-74. The primary factor clarifying 39.5 for every penny of the aggregate fluctuation took after by second factor clarifying 16.6 for each penny difference, third factor clarifying 12.3 for each penny change and the fourth factor clarifying 10 for every penny fluctuation. All together these four critical factor measurements clarified an aggregate fluctuation of 78.4 for each penny. The novel variances of the variables stacking factually

fundamentally are very high running from around 71 for every penny to 98 for each penny. The consideration of variables in the held factors are approved by the fluctuation is separately clarified in the given factors.

5. FACTOR SCORES AS MEASURES OF DEVELOPMENT

The contribution made by each district to each of these four factors is given the factor scores. A positive score indicates development with respect to that factor and a negative score indicates backwardness.

The factor scores on each of the 21 districts offers a valuable information regarding the level of development or backwardness of a district. These scores have been classified according to the following scheme

Factor score range	Category
Less than - 2.00	Very Backward (VB)
- 2.00 to 0.00	Backward (B)
0.00 to +2.00	Developed (D)
+2.00 and above	Highly Developed (HD)

Dimension-I: Irrigated Agriculture and Foodgrain Farming

The First Factor has 12 variables stacking fundamentally on the factor score aside from one variable i.e., normal size of land per 100 property in hectares, all the rest of the variables have positive and high stacking (Table 8,2). The measurement uncovers that the efficiency of foodgrain in kgs/hectare was the overwhelming variable with high stacking (0.9074). There was additionally a predominance of paddy cultivation (stacking 0.9040) since it is the stable foodgrain crop in Andhra Pradesh. Irrigation described the horticulture (stacking, 0.8838), despite the fact that there are territories of cultivation which were strongly dry land. The cultivators and agricultural workers have various or thickly dispersed (stacking 0.8568) and it was so far escalated farming required workers. There was a predominance of little and minor property (stacking 0.8462), they being bigger numbers. The farming, the principle measurement shows was essential under impacting of Green Revolution as the data sources were of current agribusiness. The region under high yielding assortment cultivation was generally high (stacking 0.8383) as was the utilization of utilization of the composts (stacking 0.7072), agricultural profitability (stacking 0.824) in money related terms was additionally high. With the development of irrigation, the power of cropping was high (loading 0.7969) [8].

Dimension-II: Irrigated Agriculture and Foodgrain Farming

The First Factor has 12 variables stacking fundamentally on the factor score aside from one variable i.e., normal size of land per 100 property in hectares, all the rest of the variables have positive and high stacking (Table 8,2). The measurement uncovers that the efficiency of foodgrain in kgs/hectare was the overwhelming variable with high stacking (0,9074). There was additionally a predominance of paddy cultivation (stacking 0.9040) since it is the stable foodgrain crop in Andhra Pradesh. Irrigation described the horticulture (stacking, 0.8838), despite the fact that there are territories of cultivation which were strongly dry land. The cultivators and agricultural workers have various or thickly dispersed (stacking 0.8568) and it was so far escalated farming required workers. There was a predominance of little and minor property (stacking 0.8462), they being bigger numbers. The farming, the principle measurement shows was essential under impacting of Green Revolution as the data sources were of current agribusiness. The region under high yielding assortment cultivation was generally high (stacking 0.8383) as was the utilization of utilization of the composts (stacking 0.7072), agricultural profitability (stacking 0.824) in money related terms was additionally high. With the development of irrigation, the power of cropping was high (loading 0.7969).

Dimension-III: Commercial and Food Crops

The four variables with huge loadings on the third dimension are a gathering that assistance to assign the decreased dimension as that of business and food crops. This dimension represents an aggregate fluctuation of 12.2 for each penny. Region under business crops to the aggregate cropped zone has an adversely essentially stacking (- 0.8534), while foodgrain crops have enrolled with a high positive stacking (0.6926). Both the variables are found with high remarkable variances of 94.1 for every penny and 93.6 for each penny separately. It deduces that still foodgrain crops hold great position in the crop situation of the State and business crops are not that sufficiently solid to contend the food crops in the State. Force of cropping is found with a moderate stacking (0.6498) showing the vertical extension of farming for ideal usage of arable land asset with the development of irrigation.

Normal size of land per 100 property in hectares is appeared with negative stacking (- 0.6387) connotes that there is a declining pattern in the agricultural land accessible per holding because of increment and fracture of land possessions.

6. CONCLUSION

The study has also revealed that in the process of crop transformation and competition existed between foodgrains and commercial crops, some of the inferior crops like millets have lost their importance and getting eliminated from the cropping pattern. In the process of crop transformation, the high remunerative and commercial value crops like paddy, oil seeds,

sugarcane, pulses, cotton and maize have consolidated their spatial spread. A dynamic feature of the crop combinations in the State has been the shift from subsistence foodgrain oriented crops to commercial oriented crops like oil seeds, cotton, sugarcane and fruit farming. As the process of change in cropping pattern is progressed a greater degree of uniformity, stability and sustainability are brought about in the crop-based agricultural economy of the State.

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