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Inter- District Variation in Selected Crops in Haryana: Especially In Wheat and Rice

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ABSTRACT

Agriculture sector is very important for the development of an economy, specially a developing economy. It not only provides food and employment opportunity to the population but also has important linkages with the other two sectors namely industry and service. Any economy desire of fast and sustainable growth must have a strong agriculture base. The productivity of all major crops has increased manifold since green revolution but now it is more or less stagnating. Hence it will be useful to examine the productivity of major crops in Haryana. The present study is an attempt to make a comparative analyze the extent variability in the agricultural area, production and yield rate in respect of major crops such as wheat and rice for the period of study i.e., 2000-01 to 2016-17. For measuring fluctuation, co-efficient of variance of area, production and yield rate have been used for the study. The study has concluded that Ambala, Kaithal, Karnal, Kurukshetra, Panipat and Jind districts are more consistent in production and productivity of wheat and rice in Haryana than the other districts.

KEY WORDS:- productivity, yield rate, co-efficient of variance, Haryana etc.

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INTRODUCTION

At the time of establishment, Haryana was known as an agriculturally backward state. The per acre production rates were comparatively very low, resulting in low agricultural production. After the success of "Green Revolution" agricultural production is continuously increase due to the adoption of new agricultural technology which includes more extensive irrigation facilities, tractors and others machineries equipment, use of high yielding varieties seeds, use of pesticides and chemical fertilizers. Now, Haryana is one of the richest food grain production states of India. Average productivity of main crops (Wheat and Rice) is much more in Haryana as compared to average productivity of India. Average productivity in different crops may vary in the state from district to district. This fluctuation in crop output depends on many factors i.e., rainfall, temperature, land quality, irrigation facilities and modern inputs etc. Therefore, an attempt has been made in this study to measure the fluctuation in area, production and average yield of two principal food crops i.e., wheat and rice. An attempt has also been made to analyze the variability in the production, area and average yield of food grains crops in the state as well as for selected districts for the period of 2000-01 to 20016-17.

REVIEW OF LITERATURE

Some of the very recent work related to our area of research is a follows.

Chaudhary, M.K. *et.al.* (2000) have analyzed the regional variation in resources development and income from agriculture and responsible factors for the variation in Haryana. For examining the variation in resources development and agriculture income in various regions two time periods 1980-81 and 1996-97 were selected. Gross value per hectare from agriculture is taken as income from agriculture. There existed wide variations in infrastructure development and income from agriculture between different regions of Haryana. The variations in income for agriculture, production and productivity were the direct outcome of irrigation facilities and development of agricultural infrastructure. Polyzos, S. *et.al.* (2005) they investigated the relationship between agricultural productivity and its determinant factors in the interregional differences in Greece. They used the Cobb-Douglas production function. The results have shown that per worker land , per worker used tractors, the total employment in the agriculture sector, the irrigated agricultural area, the geographic position of the cultivated agricultural area, the degree of divisibility of the cultivated agricultural area and the level of training and education of the population are positive related to the agricultural productivity.

Tripathi, A. *et.al.* (2008) analyze the impact of inputs on agricultural productivity growth in India from 1969-70 to 2005-06. They used Cobb-Douglas production function and found labour,

capital and land have positive impact on productivity growth of India's agriculture. Chand, R. *et.al.* (2011) have examined the relationship between farm size and agricultural productivity in India during the year 2002-03. They found that land productivity was inversely related to farm size. Per hectare value of crop output was 25,173 at holding below .4 hectare and 18,921 at holding of size .4 hectare to 1 hectare. As farm size increase than land productivity continuously decrease in India. Kodan, A. S. *et.al.* (2011) have analyzed the growth, spatial pattern and find out determinants of wheat productivity in Haryana during the period from 1966-67 to 2006-07. The multiple linear regression analysis is used to estimate the value of determinants which affects the productivity of wheat in Haryana. The Composite Standard Score indicates that the Kaithal, Karnal, Jind, Hisar, Fathehabad and Sirsa districts have high wheat crop intensity. Ambala, Yamunanagar, Kurukshetra, Panipat, Sonipat, Rohtak, Jhajjar, Panchkula, Faridabad and Mewat have medium wheat crop intensity and three districts Gurugram, Rewari and Mehendergarh have low wheat crop intensity due to the low availability of water and soil nature. Five variables i.e. rainfall, credit- deposits ratio, agriculture laborers, pesticide consumption and no. of tractors have been positively associated with wheat productivity in Haryana and 91.2 per cent variation in wheat productivity explained by 11 selected variables.

Acharya, S.P. *et.al.* (2012) examine the growth in the area, production and productivity of different crops in Karnataka by using the compound growth function. They have used secondary data from 1982-83 to 2007-08 and find significant positive growth in area, production and productivity under pulses and fruits, while growth in area and production in vegetables was significant and positive but productivity was insignificant and negative. Kumar, S. *et.al.* (2013) have been analyzed the growth of rice production in Haryana and exposed the determinants of rice productivity during the time period from 1970-71 to 2009-10. They used Cobb- Douglas production function to analyze the determinants which affected the agricultural productivity and average compound growth rate used to analyzed the growth trends of rice crop. They found that the R- Square value was 0.823 and irrigation intensity, pesticides, dairy cooperatives are positively, while no. of tractors per hectare is negatively and significantly to rice productivity. Education and labor are positively linked to rice productivity, but not significant to rice productivity. Nadeem, N. *et.al.* (2013) have analyzed the relationship between agricultural productivity and investment in extension, irrigation, agricultural research, and rural roads in Punjab province, Pakistan during the time period 1970-2005. They use total factor productivity decomposition method and found that expenditure on extension, irrigation and rural roads significantly affect agricultural productivity. Granger- Causality test shows that there is unidirectional relationship from agricultural research to agricultural productivity. Sule, B.M. *et.al.* (2014) have examined the impact of irrigation on growth of agricultural productivity in the Solapur

district of Maharashtra during 2008-09. The Kendall's ranking coefficient method is used for measurement of agricultural productivity and found that higher the availability of irrigation there will be higher the agricultural productivity and low productivity caused by the lack of irrigation facilities in the study area.

Aggarwal, P.K. *et.al.* (2015) examined the structural change and performance of agriculture sector in Haryana during the time period from 1966-67 to 2013-14. The result of the study was that technological development in agriculture observed that the density of tractors, intensity of cropping, intensity of irrigation and use of fertilizers show the positive sign of the development of agriculture sector in Haryana. Karki, S.*et.al.* (2015) have analyzed the impact of agricultural inputs in agricultural productivity improvement in Haryana during the time period from 1988 to 2008. The use of agricultural inputs i.e. irrigation, area under HYVs, fertilizers, tube wells, pump sets, credit, tractors and budget on agriculture by government of Haryana has increased, While pesticide was decreased during the study period. The trends were observed by calculating compound growth rates and the impact of inputs on agricultural GDP was found by regression analysis using Cobb-Douglas production function. They found that tube wells and pump sets had a positive and significant impact on agricultural GDP and irrigation and budget by government of Haryana have positive effect on the agricultural GDP. Warsi, A. Z.*et.al.* (2015) have analyzed the determinants of agricultural production and productivity of 81 countries for the period of 2002-2013. The ordinary least square method is used to estimate cross- country regression coefficients. They found that agriculture- labor and land input are positively related with agricultural production. Moreover, it was found that tractor and fertilizers enhance the land labor productivity and education improved the agricultural- output and productivity of general labor force employed in agricultural sector. Hanumanthappa, K.M. (2016) has analyzed the relationship between input and output to determined the spatial variations in agricultural productivity of the districts of Karnataka during the time period from 1993-94 to 2007-08. The Cobb-Douglas production function used to analyze and found that regional variation in agricultural productivity of Karnataka are due to the variation in the development of important agricultural inputs.

Madhu and Karan (2016) have studied the agricultural performance in terms of the important agricultural factors affecting agriculture production and productivity during the period of 2000-01 to 2008-09 in Haryana. This study found that Haryana has been almost constant intensity of irrigation, the density of tractors are continuously increasing, the fertilizers consumption increased, pesticides in the state has declining, the intensity of cropping continuously increasing and the use of High Yielding Varieties of seeds is continuously increasing during the study period. With the help of above indicators we find that there is more use of technological changes in agricultural production

and increasing productivity. Umer, J.B. *etal.* (2016) have measured the impact of climate change on agricultural production in Haryana over the period 2000-2012. Multiple regression models used to find the effect of climatic change on agricultural production, they found that increase in temperature and decrease in rainfall has a negative impact on agricultural production of Haryana. Temperature does not show any significant impact on the production of wheat while the rainfall has significant impact on the production of wheat in Haryana.

Kumar, N. *etal.* (2017) have studied the farm mechanization level of different operations for major crops in Haryana. The study was conducted in 40 villages from four districts namely Karnal, Fatehabad, Bhiwani, Mewat and five farmers from each village were randomly selected, in total, 200 farmers were selected for the study. They concluded that the adoption level of farm machinery was different for different crops at the different level of land holding category. Moreover, they found that the adoption level of different farm machinery was increase with increase in land holding in all the crops and paddy crop have lowest level and cluster bean has highest in adoption of farm machines. Ram, K. (2017) has used Bhalla 1989 index to compute the level of agricultural productivity of Haryana's districts. He concluded that Gurugram district has lowest agricultural productivity and Sirsa district has highest productivity during the study period from 2012 to 2015 in Haryana. Sunita. *etal.* (2017) observe that there has been a substantial change in the cropping pattern of the Haryana state. Area under cultivation has increased in case of rice, wheat and barley and decreased under other crops like jowar, bajra, maize, cotton and sugarcane during the study period 1993-2013. The area, production and productivity of food grains has shown increasing trend while for pulses this was negative.

OBJECTIVE OF THE STUDY

The major objectives of the study are:

1. To analyze the variation in area, production and productivity in districts of Haryana.
2. To analyze inter- districts disparities in agricultural productivity of Haryana.

SCOPE OF THE STUDY

The area of the study is whole Haryana state which is includes 17 districts out of 22 namely Panchkula, Ambala, Kurukshetra, Yamunanagar, Karnal, Kaithal, Panipat and Sonipat. Sirsa, Fatehabad, Hisar, Jind, Rohtak, Faridabad, Bhiwani, Jhajjar, Gurugram,

HYPOTHESES

1. There is no variation in the productivity (Average Yield) of food grain crops across Haryana.

RESEARCH METHODOLOGY

The study has been based on secondary data which is collected from Statistical Abstract of Haryana (various issues), Department of Economic and Statistical Analysis, Government of Haryana, Chandigarh. It has been collected also from various sources like Economic Survey of Haryana, Agricultural Statistics at a Glance and publications of Department of Agriculture and Irrigation, Government of Haryana and other published and unpublished documents, reports at the national and state level.

The study has taken up a period from 2000-01 and 2016-17. The data will be analyzed with the help of different statistical tools such as compound growth rate, arithmetic mean, standard deviation and co-efficient of variance is used to measure fluctuation (variation).

RESULTS AND DISCUSSION

Inter-district variation in area, production and yield rate major food grains during the period 2000-01 to 2016-17 of selected districts of Haryana, (Co-efficient of variance in percentage) A= Cropped (Sown) area, P= Production, Y= Average Yield per hectare

Table: 1

District	RICE			WHEAT		
	A	P	Y	A	P	Y
Ambala	7.56	16.40	10.23	3.52	14.23	11.18
Bhiwani	39.52	39.62	20.40	17.40	21.55	11.00
Faridabad	48.53	56.38	10.76	65.26	62.54	11.45
Fatehabad	21.23	27.82	12.12	15.60	20.02	20.74
Gurugram	37.46	34.12	10.72	48.89	39.80	13.47
Hisar	31.48	38.81	12.90	6.25	12.80	8.16
Jhajjar	41.14	55.18	26.92	7.90	14.44	13.45
Jind	15.20	21.34	11.02	2.45	9.23	8.53
Kaithal	3.27	11.53	11.90	2.96	8.13	7.30
Karnal	2.82	9.84	9.22	4.24	9.40	8.64
Kurukshetra	5.31	11.13	10.52	2.13	7.24	7.31
Panchkula	17.91	25.90	13.79	4.17	21.44	19.24
Panipat	8.65	8.47	7.44	2.62	10.45	9.07
Rothak	42.20	9.07	21.08	7.35	15.10	10.80
Sirsa	27.90	30.36	8.94	9.32	20.16	11.77
Sonipat	20.64	26.56	12.21	4.94	14.83	10.41
Yamunanagar	13.13	20.68	10.37	12.28	22.73	12.40
Haryana	**11.78**	**16.72**	**8.26**	**4.61**	**11.99**	**8.67**

Source: Estimated from data collected from Statistical Abstract of Haryana (Various Issues), Department of Economic and Statistical Analysis, Haryana.

Inter- district variation of area, production and yield rate of selected district of Haryana has been studied by the co-efficient of variation of selected food grain crops during the study period. The lower value of co-efficient of variation means that more consistency in production, area and yield rate which is indicates consistency in production is due to better inputs, agricultural infrastructure

and modern implement. From the table 1 it is observed that in rice production Panipat district is highly consistent (lowest C. V: 8.47 per cent) during the study period which is less (Approx.50 per cent) less than state level variability (16.72 per cent) and highest variability is recorded in Fatehabad district (56.38 per cent) follows by Jhajjar district (55.18 per cent). Variation in yield rate of rice during the study period is lowest in Panipat district (7.44 per cent) which is less than the state variability (8.26 per cent) follows by Sirsa district (8.94 per cent) and the highest variation in yield rate of rice is observed in Jhajjar district (26.92 per cent) which is approx. 3 time more than the state level variability (8.26 per cent). In variation of sown area under rice crop Karnal is most consistent district with lowest variation of 2.82 per cent which is followed by Kaithal district (3.27 per cent) and the highest variation in Faridabad district is 48.53 per cent which is very high than the state level variation (11.78 per cent).

In case of wheat, the most consistent district in production is Kurukshetra with 7.24 per cent variation during the study period which is very less than the state level (11.99 per cent) and the highest variation is recorded in Faridabad district (62.54 per cent). Most consistent district in sown area of wheat is Kurukshetra district (2.13 per cent) and the highest variation in Faridabad district (65.26 per cent). The co-efficient of variation in yield rate of wheat crop is lowest in Kaithal and Kurukshetra districts (7.30 per cent) and the highest in Fatehabad district (20.74 per cent).

In case of sown area of rice crop five districts namely Ambala, Kaithal, Karnal, Kurukshetra and Panipat are more consistent than the state level variability and in production of rice six districts namely Ambala, Kaithal, Karnal, Kurukshetra, Panipat and Rohtak are more consistent than the state level variability. In case of yield rate of rice only Panipat district is more consistent than the state level variability.

In case of sown area of wheat seven districts namely Ambala, Jind, Kaithal, Karnal, Kurukshetra, Panchkula and Panipat are more consistent than the state level variability and five districts namely Jind, Kaithal, Karnal, Kurukshetra and Panipat are more consistent than the state level variability in the production of wheat. In case of yield rate of wheat five districts Hisar, Jind, Kaithal, Karnal and Kurukshetra are more consistent than the state level variability.

CONCLUSION

The study has revealed that co-efficient of variation shows sharp fluctuations in the districts of Haryana state during the study period in major crops such as wheat and rice. The study has concluded that In case of sown area of rice crop five districts namely Ambala, Kaithal, Karnal, Kurukshetra and Panipat are more consistent than the state level variability and in production of rice six districts namely Ambala, Kaithal, Karnal, Kurukshetra, Panipat and Rohtak are more consistent

than the state level variability. In case of yield rate of rice only Panipat district is more consistent than the state level variability. In case of sown area of wheat seven districts namely Ambala, Jind, Kaithal, Karnal, Kurukshetra, Panchkula and Panipat are more consistent than the state level variability and five districts namely Jind, Kaithal, Karnal, Kurukshetra and Panipat are more consistent than the state level variability in the production of wheat. In case of yield rate of wheat five districts Hisar, Jind, Kaithal, Karnal and Kurukshetra are more consistent than the state level variability.

Moreover, the study has concluded that Ambala, Kaithal, Karnal, Kurukshetra, Panipat and Jind districts are more consistent in production and productivity of wheat and rice in Haryana than the other districts.

REFERENCES

1. Acharya SP, Kunnal LB, Mahajanashetti SB, Bhat ARS, Basavaraja H. Growth in area, production and productivity of major crops in Karnataka. Karnataka J. Agric. Sci 2012; 25(4): 431-436.
2. Aggarwal PK, Moudgil A. Structural change and growth of agriculture in Haryana. International Journal of Applied Research; 2015; 1(13): 133-139.
3. Chand R, Prasanna PAL, Singh R. Farm Size and Productivity: Understanding the Strengths of smallholders and improving their Livelihoods. Economic and Political Weekly Review of Agriculture: 2011; 46(26/27): 5-11.
4. Chaudhary MK, Madan YP. Regional Variation in Development and Income from Agriculture in Haryana. Agric. Sci. Digest; 2000; 20(4): 215-218.
5. Hanumanthappa KM. Determinants of Agricultural Productivity in Karnataka. International Journal of Applied Research; 2016; 2(2): 667-669.
6. Karki S, Mehta VP, Padhyoti Y. A study on impact of Agricultural inputs on Agricultural Productivity. Agriculture Development Journal; 2015; 11: 88-95.
7. Kodan AS, Yadav A, Kumar V, Mehra S. Determinants of Wheat Productivity with Special Reference to Haryana. Adv. Res. J. Crop Improv; 2011; 2(1): 70-75.
8. Kumar N, Mukesh S, Bhardwaj S. Farm Mechanization Level in Different Operations of Major Crops in Haryana State. International Journal of Agricultural Science and Research; 2017; 7(1): 305-312.
9. Kumar S, Somjit. Trends in Growth and Determinants of the Rice Productivity in Haryana: An Empirical Study. International Journal of Advanced Research in Management and Social Sciences; 2013; 2(9): 140-149.

10. Madhu, Karan. A Study of Indicator's associated with Agricultural Growth in Haryana. International Journal of Science Technology and Management; 2016; 5(8): 550-555.
11. Nadeem N, Mushtaq K, Dawson PJ. Impact of Public Sector Investment on TFP in Agriculture in Punjab, Pakistan. Pakistan Journal of Social Sciences; 2013; 33(1): 137-147.
12. Polyzos S, Arabatzis G. Labor Productivity of the Agricultural Sector in Greece: Determinant Factors and Interregional Differences Analysis; Discussion Paper Series; 2005; 11(12): 209-226.
13. Ram K. Level of Agricultural Productivity in Haryana State 2012-2015. International Journal of Interdisciplinary Research in Arts and Humanities; 2017; 2(2): 228-232.
14. Statistical Abstract of Haryana (various issues).
15. Sule BM, Barakade AJ. An Impact of Irrigation on Agricultural Productivity in Solarpur District with References to Case Studies in Selected Villages: A Geographical Analysis. European Academic Research; 2014; 2(3): 3328-3339.
16. Sunita, Sanjay, Kavita, Bhatia JK, Mehta VP. Changing Pattern of Area, Production and Productivity of Principal Crops in Haryana, India. International Journal of Current Microbiology and Applied Sciences; 2017; 6(12): 1654-1661.
17. Tripathi A, Prasad AR. Agricultural Productivity Growth in India. Journal of Global Economy an International Journal 2008; 01-09.
18. Warsi AZ, Mubarik MS. Determinants of agricultural productivity: A cross – country Sensitivity analysis. South Asian Journal of Management Sciences; 2015; 9(2): 32-42.