Regional Economic Development Research
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UNIVERSAL WISER PUBLISHER

Case Study

Inter-District Variations in Agricultural Production and Productivity of Jammu Division of Jammu & Kashmir

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Received: 29 March 2021; **Revised:** 23 August 2021; **Accepted:** 24 August 2021

Abstract: Agriculture and its allied activities are the main sources of livelihood in India. Jammu and Kashmir (J&K), a union territory of India is also an agrarian state. More than 70 percent of its population is directly engaged in this sector. Geographically, J&K lies in the Himalayan region and has a huge variation in agro-climate diversity. The climate here varies from sub-tropical in the Jammu division to temperate in the Kashmir division. These climatic variations make it suitable for performing varied cultivation. The productivity of all the major crops in the region has increased manifold since the green revolution but now it is more or less stagnating. Hence, it is useful to examine the productivity of major crops in the union territory. The present paper is an attempt to highlight the overall agricultural production of major food grains crop of J&K from 2000-2001 to 2018-2019. The main focus of the paper is to analyzes the variations in agricultural production and productivity of major crops at the district level in the Jammu division for the period 2010-2011 to 2016-2017. The study is based on secondary data and is empirical in nature. The co-efficient of Variation technique has been used to find out the variations in production and productivity of agricultural crops of the jammu division of J&K. The results show that the overall agricultural production of food grains crops in the region increases over years. It also shows tremendous variations in the production and productivity of the different crops across districts. These variations indicate that there is a need to adopt some specific strategies at the district level for the sustainable development of agricultural growth in the state.

***Keywords*:** production, productivity, variations, growth and sustainable development

1. Introduction

India is considered to be an agrarian economy. It employs the largest share of the workforce i.e., 42 percent in 2019. It contributes 16.5 percent to the total gross domestic product of the country (Economic survey, 2019). Nearby 70 percent of its rural households, still depend primarily on agriculture (World bank, 2019). Agriculture and its allied sector are also important for consumers, as in India an average household spends about 45 percent of his expenditure on food (Aditya et al., 2020). On the other hand, India is the second most Populus country in the world and it is projected that it can surpass China by 2027 (United Nations Population Projection, 2019). This rising population act as a challenge for Indian agriculture to feed this large population especially in the wake of rising new challenges of climate change and exploitation of natural resources. These challenges create a need to make more efforts and developing new strategies for

DOI: https://doi.org/10.37256/redr.222021843

ensuring sustainable agricultural development in the country.

The economic growth and development of a country is directly or indirectly depending upon the development of agriculture. Economic development depends on the rate at which agriculture grows. The agricultural sector contributes products like food, capital for further investment, laborers to other sectors and helps to earn foreign exchange by exporting its surplus. The higher share of agriculture shows the contribution of agriculture towards economic development. Moreover, rural development has a positive relationship with agricultural development while agricultural development is strongly associated with infrastructural development (Ruksana et al., 2009).

The agricultural sector has been a way of life and continues to be the single most important source of livelihood influencing the growth of the Indian economy. In India across decades, the government focusing on self-sufficiency and self-reliance in food grains production has adopted various agricultural policies. During the planning era, some of the State Governments conferred a high priority to agriculture thus leading to the Green Revolution in India when a large amount of the seeds of high-yielding varieties of wheat was imported. Moreover, the Twelve Five Year plans [Five-year plans are economic plans allocate resources of India to fulfil general as well as specific goals planned by government. First five-year plan was launched in 1951 for the period 1951-1956. India has witnessed twelve five-year plans. However, government has discontinued the five-year plan since 2014. They were replaced by three-year action plan.] gave a top priority to the development of agriculture and sufficient increase in agricultural production, especially food grains production.

Indian agriculture has witnessed a remarkable growth path. It takes the country from a food deficit during the 1960s to the food surplus one. In 2019-2020, India's overall food grains production was 292 MMT. India became the net exporter of agricultural products. There are many reasons for this transformation including the adoption of modern techniques, use of high-yield varieties seed, investment and infrastructure including roads, irrigation facilities, availability of the market. Development of institutions like land, water, extension services, credit facilities and soon leads to raising the agricultural production of the country. But on the other hand, the share of the agriculture sector to total GDP shows a declining trend. It was more than 50 percent during 1950-1955 and declining to 16.5 percent in 2019 (Economic Survey, 2019). It employs almost 42.3 percent of the total workforce in 2019-2020. India has achieved self-sufficiency in food grains production but 176 million people are living below the poverty line (Gulati & Juneja, 2018) and 194.4 million as unnourished. India is ranked 94th out of 107 nations in the Global hunger index 2020 and put under the category of serious hunger. Similarly, the growing population and rising urbanization is exploiting the agricultural land by degrading the quality of soil, air and water. Thus, there is a need to make some provisions to meet these challenges and improve food and agricultural policies.

2. Scenario of agriculture in Jammu and Kashmir

Jammu and Kashmir (J&K) are considered a paradise on earth with abundant water resources such as lakes, rivers, and glaciers besides groundwater. The main rivers flowing through the state are Jhelum, Chenab, Indus, and Tawi. J&K has a hilly topography blessed with naturally occurring micro agro-climatic regions suitable for the cultivation of a wide range of agri-horticultural crops with a great potential for development. Thus, there are large possibilities for agriculture expansion and development in J&K.

Agriculture in J&K has a significant history. The agricultural sector sustains the livelihood of 70 percent of the population. It is the main source of income and employment for the majority of the population in the state. Overall, the economic upliftment of the union territory (UT) is closely related to prosperous agriculture. The development of agriculture in our UT becomes more significant in the context of little progress made in the secondary sector. In comparison to other states and the rest of the country, the current situation of agriculture in the state of J&K is not as satisfactory as the farmers are losing their interest in the farming sector (Kaloo & Choure, 2015). The impact of these aspects of agriculture varies district-wise of J&K. There are distinct variations in the magnitude of these concepts over both space and time.

The J&K is divided into two divisions i.e., Jammu Division and Kashmir Division. Each division is comprising of 10 districts. Each has its specific geo-climatic condition, which determines the cropping pattern and productivity. Rice is the chief crop of the Kashmir division, followed by maize, barley and wheat. Jammu region dominates both in maize and wheat production. The production of three important food crops, namely, rice, maize and wheat, contributes a major

portion of the food grain in the state and accounts for 84 percent of the total cropped area.

The level of agricultural development is also not the same throughout the districts of the Jammu division comprising of ten districts namely Jammu, Samba, Kathua, Udhampur, Rajouri, Reasi, Poonch, Ramban, Doda, and Kishtwar. This is because the area is geographically different. The nature of land used for cultivation by the farmers also varies from area-to-area district-wise. Some districts of the region are very fertile which are used for the cultivation of various kinds of vegetables and food grains, while some are covered by sand and silt and are used for growing crops like oilseeds, pulses, maize, jute, etc. thus, the present paper tries to analyses the overall production of food grains in the J&K over years. An attempt is also made to find out the inter-district variation in production and productivity of crops in the region.

3. Review of literature

The agriculture sector considered to be the largest public sector has sought a lot of attention from the leading authors and economists. The focus has been made to bring out the trends, growth rate, the pattern of cropping, land usage patterns, determinants of growth in agricultural productivity and problem associated with these determinants and their impact on agriculture. Various studies have been conducted regarding the trends in the growth rate in terms of area, production and productivity under various crops and found a negative trend. Thus, highlighting the variabilities in the growth of productivity. These variabilities continue to persist across various districts in a state (Kumar & Jain, 2013).

Ahmed et al. (2008) made an attempt to estimate the growth in total factor productivity in the agriculture sector in Pakistan and found that Pakistan has grown at an annual average of 0.28 percent. Further, a study conducted in the Romanian region found that the agricultural productivity growth among Romanian regions and determinants of productivity variations in dynamic and territory showed the sign of an upward trend of agricultural performance in all Romanian regions (Burja & Burja, 2016). Imahe and Alabi (2005) studied the factors of agricultural productivity in Nigeria and found that arable land, per capita, average rainfall, fertilizer distribution, the value of food imports, agriculture capital expenditure and the loans by commercial banks to the agricultural sector contributed significantly to the systematic variation in agricultural productivity and output. Murgai et al. (2001) made an attempt to determine the long-term productivity of irrigated agriculture in the India and the Pakistan Punjab region. It is estimated using total factor productivity from the start of the green revolution period. It founded that Indian Punjab has overall better growth than Pakistan Punjab.

The trends in agricultural productivity at the national and state levels in different periods and different states analyzed that the growth of the sector of Indian agriculture has been highly rough across time and regions. The post-reform period witnessed a slowing down of growth in the production of the major crops and as a whole, the use of primary inputs in agriculture also slowed downward path, resultant in the stagnation of overall yield (Chand & Parappurathu, 2012). Isah et al. (2015) in their study founded that the production and productivity of cereal in India show relatively slow but positive growth whereas a very slow growth rate in terms of area under cereals has been founded. Sengupta and Kundu (2008) investigated the factor contribution and productivity growth in agriculture in West Bengal. it founded a wide variation in the input-wise efficiency changes for agriculture. The use of modern varieties of seeds, irrigation and fertilizers have greatly contributed to higher crop production growth in the country. Kannan (2009) using the output growth model and found that enhanced capital formation, better irrigation facilities, normal rainfall and improved fertilizer consumption will help boost crop output in the country.

Murtaza and Masood (2020) using the district-level data to examine the spatial variation in agricultural productivity in the last four decades. It has founded initially productivity in the most states was low which over time improved significantly. It increases fastest during the period of the green revolution (1971-1991). From the period 1971-2010, agricultural productivity grew at 2.1 percent annually as a whole. Since the green revolution was introduced around 50 years ago but still there exists variation in the growth of agriculture. Several studies were conducted which mainly focuses on the regional disparities in Indian agriculture and most of them were relying on the state-level data (Mukherjee & Kuroda, 2003; Ghosh, 2006; Nayyar, 2008; Poudel et al., 2011; Chand & Parappurathu, 2012; Banerjee & Kuri, 2015; Binswanger & D'Souza, 2015; Chatterjee, 2017). The states vary differently in terms of size, population, geographical conditions, type of soil, etc. The state-level statistics cannot able to capture these variations. Therefore, it is essential to study the district-level variation in agricultural production and productivity to find out the main reasons behind the

variations in the growth of the sector.

Hiremath and Katarki (2005) made an attempt to find out the factors responsible for regional disparities in agriculture using a development index. They founded that there was a wide variety of regional disparities using Bartlett's V-Statistic. Rather (2014) investigate the trends in the area, production, and productivity in different districts of J&K and found that the area and yield in effects although not equal but had a contribution to the total change in output growth.

It is important to understand the causes and nature of variations in the levels of development across regions is important because inequality in any respect gives rise to inequivalent negative effects on subsequent growth and development and worsens economic, social and political tensions among regions leading to misallocation of resources (Newar & Sharma, 2017). There was a vast variation in productivity of the crop sector across districts in the country and most of the states and cross-classification of districts according to their productivity and other factors (Chand & Parappurathu, 2012). Dorfman and Foster (2018) measured the Productivity growth by using suitable Coefficients of variation. It showed considerably lower estimates of productivity growth than the traditional notion of total factor productivity. The new flexible technical change measure suggests a lower rate of productivity growth whereas the total factor productivity suggests no downturn or upturn in the rate of progress.

Dayal (1984) examined a study to identify and interpret regional agricultural productivity patterns in India. The study has examined the regional variations in the land, labor and agricultural productivity in India. The association between urban-industrial development and land productivity showed a positive influence of market and social organization on agriculture. It has also been concluded that there is an improvement in the profitability of agriculture but profits have not been passed on the workers. Bhalla and Tyagi (1989) highlighted the spatial pattern of levels and growth in agricultural output in the country and the variations in labor productivity at the state level. It was found that with the adoption of new seed-fertilizer technology, agriculture in major parts of India has undergone a significant transformation. Hu and Antle (1993) examined the relationship between agricultural policy and agricultural productivity. The results validated that the relationship between agricultural productivity and agricultural policy varies according to the degree of taxation or subsidization.

Very few research works are so far done regarding the agricultural production and productivity at the regional level in J&K. The climate of J&K has a wide variation from sub-tropical to the temperate zone. There is no such study especially focused on estimating the inter-district variation in the production and productivity of agricultural crops in J&K. The present study is an attempt to highlights the overall food grain production of J&K. It also analyzes the inter-district variation in production and productivity of crops of the jammu division of J&K.

4. Significance of the study

Since the main source of livelihood in J&K is the agriculture sector. There is a need to highlights the production, productivity of various crops grown in the region in order to improve the overall yield, farmer's income, and their way of life. Also, for the adoption of appropriate planning and strategies for agricultural development, an in-depth study of the inter-district variation in respect to agriculture in the Jammu region is highly needed. The study will be helpful to identify districts on which special treatment should be given and design appropriate policy particularly for agricultural and infrastructural development.

5. Objectives of the research paper

1. To analyze overall agricultural production of major food grains crop from 2000-2001 to 2018-2019.

2. To analyze the inter-district variation in production and productivity of agricultural crops of jammu division of J&K (i.e., from the period 2010-2011 to 2016-2017).

6. Methodology of the study

6.1 *Sources of data*

The present paper is based on secondary data. The main sources of secondary data include Statistical Digest of J&K 2018-2019, Directorate of Agriculture (J&K) and Economic Survey of J&K 2016. Other sources include the Ministry of Agriculture and Farmers Welfare, Government of India; Digest of Statistics, Directorate of Economics and Statistics, Government of J&K; and various other published reports, books, journals, websites, and official records. The inter-district variation in the production and productivity of agricultural crops of jammu division is based on the data available from 2010-2011 to 2017-2018. A period of 7 years is taken for the study due to the unavailability of the relevant and desirable data.

6.2 *Selection of the study area*

The present paper is focused on the territory of J&K. Geographically it lies in the Himalayan region. The climate of Jammu & Kashmir varies greatly owing to its rugged topography. The territory of J&K comprises of two divisions namely Jammu division and Kashmir division. The Jammu division of J&K consists of 10 districts namely, Jammu, Samba, Kathua, Rajouri, Poonch, Reasi, Udhampur, Ramban, Doda and Kishtwar. Geographically, the Jammu division majorly lies in the middle Himalayas and Shiwaliks. It has its geo-climatic conditions that made it suitable for the production of various crops. The Jammu division has a total area of 2,629,300 hectares. It has 694,640 hectares of gross cultivated area and 372,534 hectares of net sown area. As far as irrigation is concerned, 32 percent of the gross cultivated area is not irrigated.

The agricultural development of a state is contributed by its districts. Each district of a state represents quite varying characteristics that have a significant impact on the agricultural development of a district. The diversity in the agro-climatic environment and resource endowment has created significant differences in agricultural development across regions in the state.

6.3 *Major crops of the region*

The J&K is mainly the grain-growing region. The main crops grown in this region mainly includes Rice, Wheat, Maize, pulses, fodder and oilseeds.

6.4 *Tool and techniques*

In order to examine the overall production of different food crops in J&K, the data is taken from the Statistical digest of J&K 2018-2019. Using the data, the average growth rate is also determined. Descriptive statistics is also used to extract the average overall production in the region.

Average Value: An average value is a single number taken as representative of a list of numbers. It represents a group of values simply and concisely so that the general size of the individuals in the groups can be easily understood. A mean/average value is calculated using the following equation:

$$\bar{X} = \frac{1}{N} \sum_{i=1}^{n} Xi$$

Where,

$\bar{X}$ = Average value

$\sum Xi$ = Sum of all observations

N = Total number of observations

Fluctuations in crop output may cause growth instability. In order to get a comprehensive scenario of inter-district variations in production and productivity of agricultural crops secondary data of major crops produced in the area are taken for the period of seven years from 2010-2011 to 2016-2017 had been collected due to lack of availability of sufficient data. Co-efficient of Variation technique has been used to find out the variation in production and productivity of crops of Jammu division of J&K.

Coefficient of Variation (CV): The coefficient of variation is a measure of relative variability. It is the ratio of the standard deviation to the mean. The higher the coefficient of variation, the greater the level of dispersion around the mean. It is generally expressed as a percentage. Without units, it allows for comparison between distributions of values whose scales of measurement are not comparable. The formula for the coefficient of variation is:

$$CV = \frac{\sigma}{\mu} \times 100$$

Where,

CV = Coefficient of Variation

σ = the standard deviation

μ = the mean

It is a useful statistic for comparing the degree of variation from one data series to another, even if the means are drastically different from one another.

7. Data interpretation and analysis

7.1 *Scenario of overall agricultural production of major food grains crop from 2000-2001 to 2018-2019*

The Table 1 shows the overall agricultural production of major food grains crops of J&K. It shows the overall production from 2000-2001 to 2018-2019. The table shows that the overall food grains production in J&K increases over years. The year 2014-2015 shows a decline in the overall production of food grains i.e., 17,250 (in 000 Quintals.) 2013-2014 to 10,481 in 2014-2015. This substantial decline in production is due to the floods in September 2014 which destroy the crops resultant in a huge decline in overall production. The year also witnesses the overall minimum production of rice (3,450) and maize (3,600). As far as the wheat is concerned, its production is minimum in the year 2000-2001 (1,487) whereas it is maximum in 2018-2019 (6,718). This shows that the overall production of wheat increases over the year in J&K. also, the production of pulses shows a sliding increase over the years.

Thus, from the table, it is clear that the overall agricultural production of food grains crops have increased over years. Since J&K is an agrarian economy as majority of its population is engaged in this sector. There is a need to focus more in order to raises the overall production of food grain which ultimately raise the welfare of people.

The Table 2 shows the descriptive value of different food grains crop from 2001 to 2019. The average production of rice in this period in J&K is 5,289.63. It was the maximum in the year 2015-2016 and is amount 6,646. Whereas, the average production of wheat is 5,094.31 which is the maximum in 2008-2009 and minimum in 2014-2015. Also, the average production of wheat is 4,617.26. it is maximum in the year 2018-19 and minimum in 2000-2001. The average overall food grains production is 15,344.74 which is maximum in the year 2018-19 and minimum in 2014-2015.

Table 1. Agriculture production of food grains (000 Quintals) from 2000-2001 to 2018-2019

Year	Rice	Maize	Wheat	Pulses	Other cereals	Total food grains	Growth rate in total production
2000-01	4153	5258	1487	170	128	11196	19.31
2001-02	4223	5381	3430	198	125	13357	-0.69
2002-03	4214	4651	4055	203	142	13265	15.53
2003-04	5048	5326	4596	225	132	15325	-1.944
2004-05	4928	4922	4782	243	152	15027	-0.47
2005-06	5574	4535	4575	201	135	15020	5.039
2006-07	5546	4869	4983	238	141	15777	-0.44
2007-08	5620	4745	4559	230	153	15707	9.307
2008-09	5637	6331	4835	227	139	17149	-23.30
2009-10	5011	4870	2899	233	172	13185	15.41
2010-11	5447	5277	4663	231	169	15217	4.30
2011-12	5447	4745	5003	231	141	15872	-1.59
2012-13	5465	5123	4646	250	144	15619	10.44
2013-14	5567	5305	6018	222	138	17250	-39.24
2014-15	3450	3600	3143	195	93	10481	66.09
2015-16	6646	5237	5449	163	93	17408	-2.72
2016-17	5725	5411	5485	211	101	16933	-100
2017-18	6641	5462	6402	187	106	18798	11
2018-19	6161	5744	6718	229	112	18964	0.875

Source: Statistical digest of J&K 2018-2019

Table 2. Descriptive statistics of various food grains from 2001 to 2019 (000 Quintals)

	Rice	Maize	Wheat	Pulses	Other Cereals	Total food grains
Mean	5289.63	5094.31	4617.26	215.10	132.42	15344.74
Maximum	6646	6331	6718	250	172	18964
Minimum	3450	3600	1487	163	93	10481

Source: Statistical digest of J&K 2018-2019

The Figure 1 shows the overall growth rate in the production of food grains in J&K. It shows that the growth rate of food grains shows a negative rate in few years like 2006-2007, 2008-2009, 2011-2012, 2013-2014, 2014-2015 and 2015-2016. While in the other years, it remains positive.

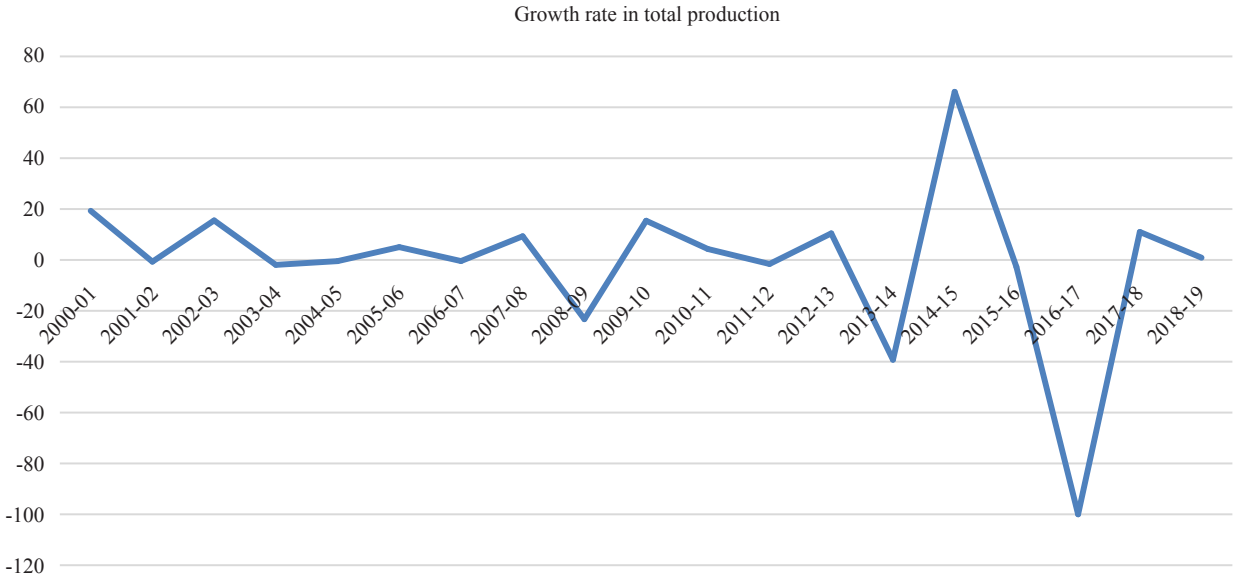

Figure 1. Growth rate in food production

Source: Statistical digest of J&K 2018-2019

7.2 *Inter-district variations in agricultural productivity of the Jammu region of J&K*

The Table 3 represents the inter-district coefficient of variation in terms of the area of major crops. In the case of rice, the highest variation in terms of area is seen in Ramban, Reasi and Rajouri district of J&K. Whereas Kathua remains consistent with the lowest variation. Kathua and Samba districts also show some consistency with small variation in term of the area under wheat. The highest variation in Maize is seen in Jammu, Samba and Reasi district. Similarly, huge variation in terms of bajra is seen in Udhampur and Kishtwar districts. Again, in terms of area under pulses, Poonch district shows much higher variation than any other district of jammu division of J&K. Kishtwar remains more consistent in terms of area under pulses crop.

Table 3. Inter-district coefficient of variation in terms of area of major agricultural crops of Jammu division of J&K from 2010-2011 to 2016-2017

Districts	Rice	Wheat	Maize	Bajra	Oilseeds	Pulses
Jammu	14.03	12.44	39.00	59.88	51.08	56.21
Samba	23.42	2.08	19.82	13.81	21.79	26.96
Kathua	7.93	3.82	17.32	11.52	24.03	34.39
Udhampur	14.86	6.73	3.08	88.33	12.40	18.31
Ramban	93.38	34.71	10.48	N.A.	N.A.	N.A.
Doda	13.14	6.51	0.89	0	N.A.	33.76
Kishtwar	17.92	20.74	4.61	66.28	N.A.	16.00
Rajouri	30.70	3.91	3.90	18.32	63.38	36.68
Poonch	8.68	4.60	0.60	N.A.	N.A.	71.16
Reasi	65.78	7.44	19.60	47.11	73.69	37.02
Total	11.90	4.67	2.37	25.27	11.37	24.33

The Table 4 shows the inter district variation in the production of various crops produce in the Jammu division of J&K. The table shows that Kathua and Jammu remain the highly consistent district with low variation in terms of production of rice is concerned. Whereas, Reasi and Rajouri show the high level of variations. In the case of production of the Wheat crop, Ramban and Kishtwar district shows high variation whereas Doda and Poonch remains consistent in production. Poonch and Rajouri districts remain consistent in the production of maize with low variation over the period whereas Jammu district represents the huge variation in the production of maize. Doda is most consistent in the production of Bajra with no variation whereas Udhampur district shows huge variations. Reasi shows huge variation in production of oilseeds whereas Udhampur remains the least variated district. Kishtwar remains the most stable district in terms of production of pulses followed by Reasi and Samba.

Table 4. Inter-district variations in terms of production of major agricultural crops in Jammu division of J&K from 2010-2011 to 2016-2017

Districts	Rice	Wheat	Maize	Bajra	Pulses
Jammu	10.72	24.03	65.51	59.92	54.91
Samba	12.50	34.14	30.05	13.86	26.82
Kathua	7.97	23.11	24.47	11.52	35.81
Udhampur	18.93	23.38	19.30	87.84	29.85
Ramban	89.40	39.04	37.07	N.A.	N.A.
Doda	33.90	6.67	18.84	0	37.27
Kishtwar	44.05	34.89	28.45	66.25	20.30
Rajouri	39.36	23.86	16.76	18.32	40.09
Poonch	17.65	15.94	11.82	N.A.	58.62
Reasi	40.98	30.96	44.03	47.10	24.75
Total	8.77	20.74	14.37	25.48	16.37

Source: Directorate of agriculture, J&K

Table 5. Inter-district Variations in productivity of major agricultural crops in Jammu division of J&K from 2010-2011 to 2016-2017

Districts	Rice	Wheat	Maize	Bajra	Oilseeds	Pulses
Jammu	11.29	31.81	29.14	53.65	47.66	62.57
Samba	29.97	33.98	19.42	0.41	24.03	0.68
Kathua	11.49	23.59	23.70	0.00	0.01	2.80
Udhampur	12.57	19.76	17.31	5.02	26.64	18.46
Ramban	57.98	36.12	39.30	N.A.	N.A.	N.A.
Doda	29.68	6.66	18.27	0	N.A.	60.64
Kishtwar	41.86	31.16	30.33	134.12	N.A.	6.97
Rajouri	35.91	25.85	15.31	0.01	51.98	11.11
Poonch	18.80	13.25	11.51	N.A.	N.A.	55.02
Reasi	28.44	28.82	32.99	0.01	4.79	8.78
Total	9.54	23.49	13.81	12.34	3.33	13.18

Source: Directorate of agriculture, J&K

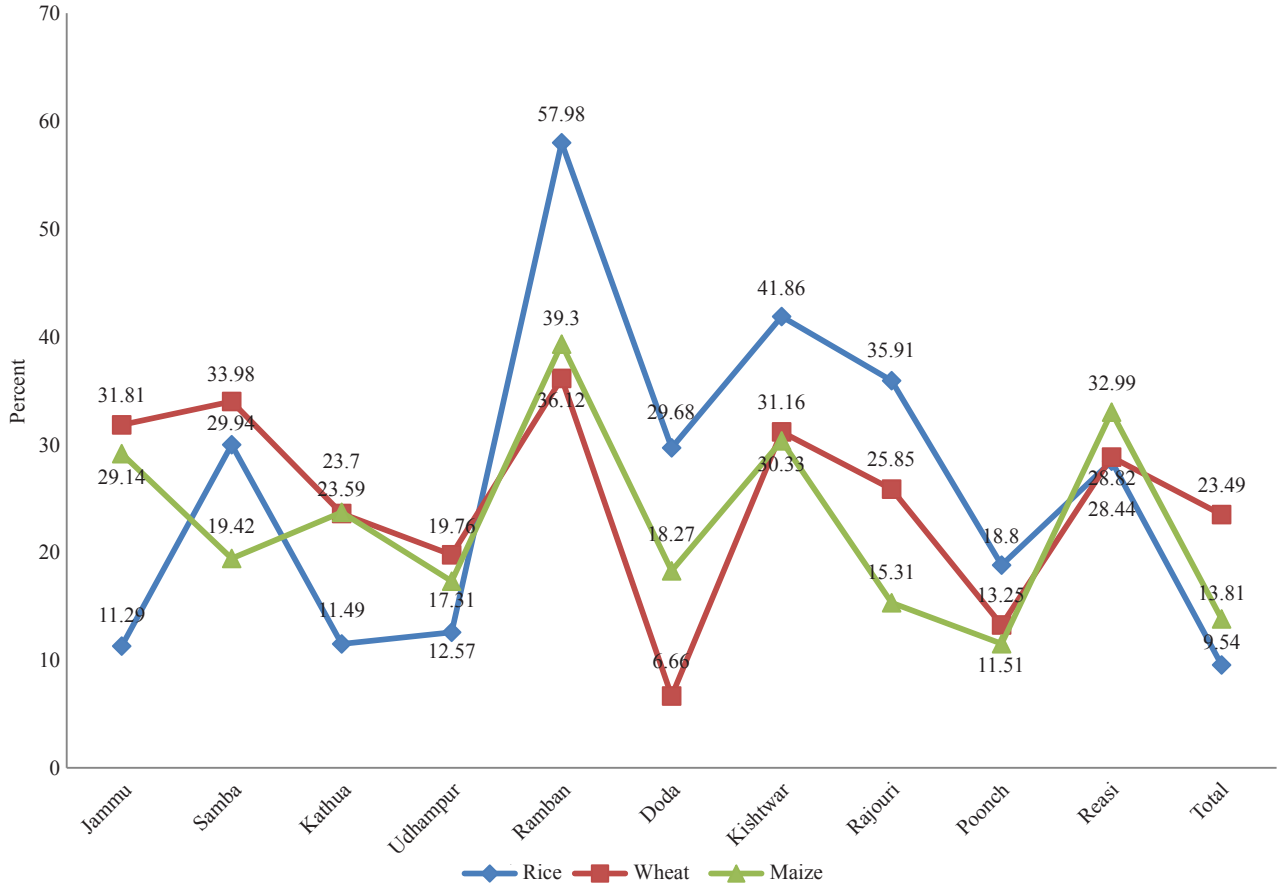

Figure 2. The graphs below show the inter-district variations in productivity of major crops in Jammu region from the period 2010-2011 to 2016-2017
Source: Directorate of agriculture, government of J&K, 2017 (complied by scholar)

The Table 5 shows the inter-district variation in the productivity of agricultural crops of Jammu division of J&K. The table shows that productivity of rice in the study period remain consistent in Jammu and Kathua with some small variation. Whereas it is highest in case of Ramban and Kishtwar district. In case of Wheat, Doda and Poonch are most consistent districts whereas Ramban and Jammu districts shows maximum variations. In case of Maize, the highly consistent district is Poonch followed by Rajouri. Kishtwar district show a very huge variation in productivity rate of bajra crop, whereas zero variation is seen in Kathua district. The coefficient of variation in productivity rate of Pulses was observed as lowest in Samba district (0.68 percent) followed by Kathua district (2.80 percent) and Kishtwar (6.97 percent).

Figure 2 shows that Ramban district shows the maximum variation in terms of productivity of all the three major crops. It is followed by the Kishtwar and Reasi district. On the other hand, Poonch and Udhampur districts remains as consistent as far as productivity of wheat rice and maize is concerned. Thus, it is clear from the table that there is some kind of variation is found even in every district of the jammu division.

8. Conclusion

Fluctuations in crop output happen to be a regular feature in agriculture in Jammu and Kashmir. The focus of the study is to analyze the inter-district variation in production and productivity of agricultural crops of Jammu division of J&K. the stud is based on secondary data and the coefficient of variation technique is used to extract results. It is found that the overall agricultural production of food grains crops in the J&K increases over years. It also shows tremendous

variations in the production and productivity of the different crops across districts. These variations indicate that there is a need to adopt some specific strategies at the district level for the sustainable development of agricultural growth in the state. The main reason for this is the dependence on nature i.e., rainfall for the cultivation crops in Jammu and Kashmir. Natural hazards like floods and droughts are also responsible for such fluctuations. Most of the districts of Jammu and Kashmir are hilly areas with inadequate irrigation facilities and erosion has further compounded the problem in the state. The economic development of the state can sustain a reasonable growth rate of development if the productions of main crops attain a consistent return over the years.

9. Policy implications & suggestions

The policy of evolving an agricultural system with due importance on the development of subsistence farming, intensive farming and mixed farming is likely to be very effective in agricultural planning.

1. Focus should be given in order to improve the infrastructure of the agriculture sector. Still, the traditional and poor techniques were used by the farmer. Improving the infrastructural facilities like provision of high yield varieties seeds, modern equipment, better irrigational facilities can increase the productivity of agriculture in the state.

2. Provision should be made for providing modern technology to the farmers so that it automatically raises their output.

3. Efforts should be made in order to maintain the fertility of the soil by spreading awareness to the farmers.

4. Efforts should be made to counter soil erosion. Since J&K is a hilly reason and soil is one of the major reasons for the low productivity of agricultural crops.

5. There is a need of government intervention to expand the technical knowledge among the farmers for achieving high yield increment in yield rate.

6. The cropping of two or more crops one after within a year is an important way to provide strength to farmers.

To conclude, the varying disparities in the crop sector at the district level have emerged the need for developing specific strategies for ensuring sustainable and inclusive agricultural growth in the region. The policy framework and impacts of various agricultural policies can be evaluated by working out changes in agricultural productivity during that period.

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