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Trends in Area, Production and Productivity of Wheat—A Time-Series Analysis

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Abstract— *An attempt has been made in this paper to examine the status in terms of area, production and productivity of wheat in India, Himachal and Kangra district by using time-series data of the recent past two decades (2001-02 to 2022-23). Over recent years, India has shown a positive trend in wheat production and productivity, largely due to high-yielding varieties and supportive government policies. In contrast, Himachal Pradesh and Kangra district exhibit more varied trends, with some areas showing a decline in cultivation area due to a shift towards commercial crops like fruits and vegetables, while productivity in certain regions has increased due to improved farming practices. The total area under wheat cultivation in India has shown an overall decreasing trend, growing from approximately 44,904 thousand hectares in2001-02 to 41,401 thousand hectares in 2022-23. Production has increased significantly, reaching a record 113,500 thousand tonnes in 2022-23 in India. The national average productivity has marginally improved, reaching approximately 2.74 MT/ha. Major wheat-growing states like Punjab and Haryana generally have higher productivity than the national average. In Himachal Pradesh, the area under wheat cultivation has experienced a fluctuating trend. While wheat remains the principal food grain crop covering a significant portion of the total cultivated area, there is a general trend of shifting cultivated land towards non-food grain or commercial crops in some areas. Production has also fluctuated in Himachal, reaching a high of 687.45 thousand tonnes in 2004-05 but decreasing in subsequent years before rising to 609.31 thousand tonnes in 2022-23. The state's average yield was reported at 1.91 MT/ha in 2023-23. Kangra has historically been a leading wheat-growing district in the state. However, similar to the broader state trend, some studies indicated a decline in the proportionate area under wheat, with farmers shifting to more remunerative options like vegetables and fruits. The district Kangra consistently ranks in the high-productivity zone within Himachal Pradesh, benefiting from favorable climatic conditions and effective water management. Declining farm sizes due to fragmentation, urbanization, and a shift in some areas to high-value commercial crops pose a challenge to sustained wheat area and production.*

Keywords— *Area, Production, Productivity, wheat, India, Himachal, Kangra distrct.*

I. INTRODUCTION

Wheat is one of the most widely cultivated and consumed cereal in the world, serving as a staple food for a large part of the global population. In 2023, it was grown on 224 million hectares worldwide, with a total production of around 799 million tonnes (FAO, 2024). In India, wheat is the second-most important food grain after rice in terms of area, production and consumption. During 2024–25, wheat was cultivation on 32.8 million hectares, with a total production of 113.3 million tonnes and an average yield of 3.56 tonnes per hectare (USDA, 2024). India is the second-largest wheat producer globally, following China.

India has an extensive agriculture landscape, with wheat considered as a major Rabi crop. It forms a key component of the country's food grain basket and is extensively grown across the Indo-Gangetic plains, which include major states like Uttar Pradesh, Punjab, Haryana, Madhya Pradesh, Rajasthan, and Bihar. Area under wheat cultivation in India is 32.8 million hectares, yielding a total production of 113.3 million tonnes (USDA, 2024). The average yield has been reported 3.56 tonnes per hectare, with variations across states depending on soil quality, irrigation access, input use and climate conditions (DAC&FW, 2024).

The production trends in recent years show a steady increase due to improved varieties, timely sowing, and better technology and management practices. However, there are significant regional disparities in productivity. Punjab and Haryana report yields above 4.5 tonnes per hectare, while states like Madhya Pradesh and Rajasthan report yields vary between 2.8 to 3.5 tonnes (ICAR, 2023). These differences draw attention to the need for targeted interventions in input distribution, technology adoption, and extension services. Moreover, the wheat sector in India is influenced by factors such as the Minimum Support Price (MSP), procurement policies, which play a key role in production decisions and market flows (CACP, 2024).

Although wheat production in India has shown steady growth, there is still a massive disparity between per capita demand and supply due to massive waste, which largely results from poor storage facilities, insufficient transport infrastructure, and poor post-harvest practices. It is estimated that post-harvest losses in wheat was found 4 to 6 per cent of total production (NABARD, 2023). Damage caused by rodents, insects, moisture, and rough handlings are commonly reported, especially due to lack of modern storage facilities (Singh et al., 2023).

Despite being a net exporter in certain years, India has had to occasionally reduce wheat exports to manage domestic availability and control inflation. This highlights the delicate balance between surplus production and internal demand. In this context, ensuring efficient production, processing, and marketing systems, along with value addition, is essential not only for food security and farmer welfare but also for stabilizing domestic supply and enhancing export potential.

In Himachal Pradesh, wheat is grown predominantly during the Rabi season (October to April). Due to the state's diverse agro-climatic zones, wheat is cultivated across mid-hills, low-hill sub-tropical, and high-hill temperate regions. The major wheat-producing districts of Himachal Pradesh include Kangra, Mandi, Hamirpur, Una, and Bilaspur. Among these regions, Kangra has consistently ranked first in both area and production of wheat. Wheat was cultivated over 319.47 thousand hectares in the state during 2022–23, producing 609.31 thousand metric tonnes (Department of Economics and Statistics Himachal Pradesh, 2023). The average yield of wheat across the state was 1.91 MT per hectare, lower than the national average due to terrain-related constraints and limited mechanization (Agricultural Statistics at a Glance, 2023).). In Kangra district, wheat production reached 137.4 thousand tonnes over 66.80 thousand hectares in 2022–23, accounting for nearly one-fifth of the state's total output (Department of Economics and Statistics Himachal Pradesh, 2023). The dominance of wheat in the cropping pattern is largely due to its compatibility with the local climate, soil fertility, and availability of assured irrigation from canal and groundwater sources. With this background in view an attempt has been made in this paper to examine the trends in terms of area, production and productivity of wheat in India, Himachal and Kangra district. Such an analysis would have direct implication on entire agriculture.

II. SOURCES OF DATA AND ANALYSIS

For the analysis of data over the year on area, production and productivity of wheat in India, Himachal and Kangra district, relevant data were collected from the various government offices of the state and the various international sites such as FAO, USDA. While the data for the leading producers of the world were taken from the FAO STAT, 2022; the time-series data required for conducting this study over a span of recent past two decades were collected and taken from the Directorate of Economics and Statistics, Government of Himachal Pradesh (2022-23); Statistical Abstract of Himachal Pradesh; and Ministry of Agriculture & Farmers Welfare, Government of India (2022).

III. RESULTS AND DISCUSSION

3.1 Status of wheat production at global level:

The global wheat production scenario of 2022–23 highlights China as the world's largest producer, accounting for 136.6 million tonnes, followed closely by India with 134.3 million tonnes as presented in Table 3.1 Together, these two countries dominate the global wheat market, contributing more than one-third of total production. Russia at the third position with 110.5 million tonnes, highlighting its growing role as a major exporter.

Among developed economies, the United States (91.0 million tonnes) and France (49.3 million tonnes) maintain significant shares; Canada (33.8 million tonnes) continues

to play a crucial role as a reliable wheat supplier in international trade. In South Asia, Pakistan ranks seventh with 28 million tonnes, telling its importance for regional food security. Turkey and Ukraine, producing 25.5 million tonnes and 23.4 million tonnes respectively and are also exporters. Germany contributes 19.5 million tonnes, making it the tenth-largest producer globally.

Table 3.1: Leading Wheat Producers Worldwide (2022–23)

Rank	Country	Production (000' MT)
1	China	136,590
2	India	134,300
3	Russia	110,554
4	United States	91,000
5	France	49,314
6	Canada	33,824
7	Pakistan	28,000
8	Turkey	25,500
9	Ukraine	23,400
10	Germany	19,500

Source: FAO STAT, 2022

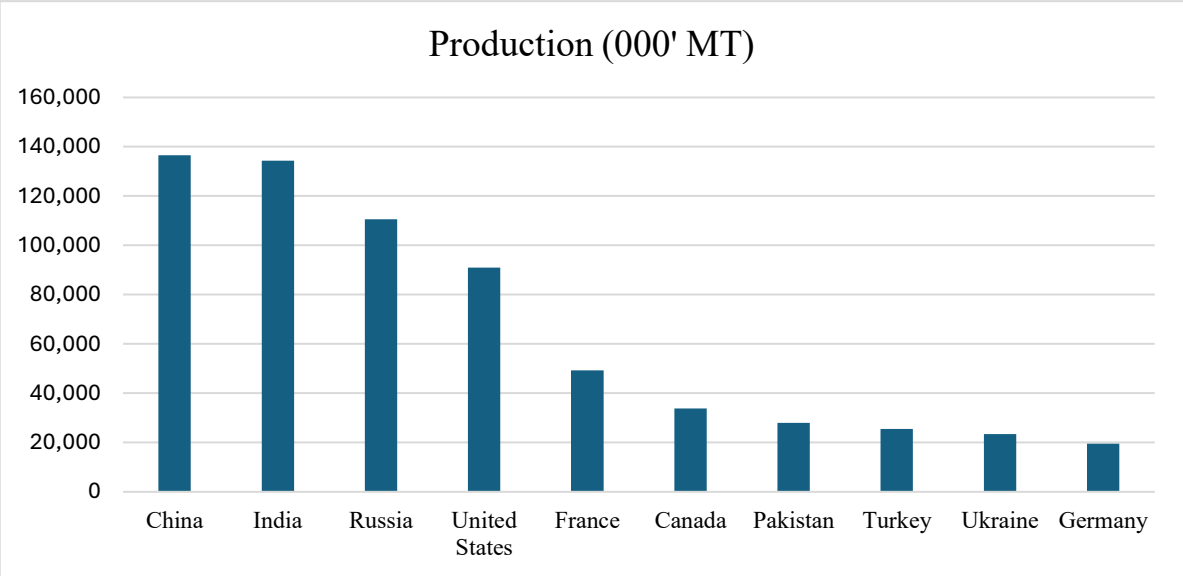

Fig.1: Leading Wheat Producers Worldwide (2022–23)

3.2 Area under Wheat Cultivation

Table 3.2 presents the trend in area under wheat cultivation across India, Himachal Pradesh, and Kangra district. At the national level, wheat acreage has largely remained stable, varying between 39 to 45 million hectares during the last two decades. A marginal decline was observed after 2015-16, though the area again improved in 2022-23, reaching 41.40 million hectares. In Himachal Pradesh, wheat area has shown more variation, moving from 366.50 thousand hectares in 2001-02 to 319.47 thousand hectares in 2022-23. This reduction reflects a gradual shift of land towards horticultural crops and other remunerative enterprises. In Kangra, the area under wheat has also been consistently declining, from 79.6 thousand hectares in 2001-02 to only 66.8 thousand hectares in 2022-23, indicating pressure on land resources and diversification away from wheat cultivation.

Table 3.2: Area under Wheat in India, Himachal Pradesh and Kangra

('000 hectares)

Year	India	Himachal Pradesh	Kangra
2001-02	44,904	366.50	80.10
2002-03	41,176	366.50	78.90
2003-04	42,593	363.40	77.30
2004-05	41,907	369.80	76.50
2005-06	43,660	358.45	75.20
2006-07	43,814	362.25	74.10
2007-08	43,914	366.59	73.80
2008-09	45,537	360.07	73.20
2009-10	41,918	352.52	72.60
2010-11	42,862	357.24	72.00
2011-12	44,006	355.87	71.50
2012-13	42,754	354.27	71.00
2013-14	44,136	371.06	70.20
2014-15	44,111	330.38	69.80
2015-16	41,466	341.05	69.20
2016-17	40,220	338.28	68.90
2017-18	39,651	342.68	68.50
2018-19	39,319	319.00	68.10
2019-20	41,357	319.10	67.70
2020-21	41,125	333.15	67.40
2021-22	40,459	320.22	67.00
2022-23	41,401	319.47	66.80

Source: Directorate of Economic & Statistics, Government of Himachal Pradesh (2022-23), Statistical Abstract of Himachal Pradesh; Ministry of Agriculture & Farmers Welfare, Government of India (2022)

3.3 Production of Wheat

As presented in Table 3.3 the production trend showed a steady increase in wheat output at the national level. From 72.77 million tonnes in 2001-02, India's wheat production rose gradually to 113.50 million tonnes in 2022-23, reflecting significant growth largely driven by productivity improvements. In Himachal Pradesh, production fluctuated more noticeably. It increased from 637.07 thousand tonnes in 2001-02 to a peak of 685.44 thousand tonnes in 2013-14, before showing a slight decline and settling around 600–620 thousand tonnes in recent years. Kangra district, though smaller in scale, also displayed moderate variability. Output rose from 119.5 thousand tonnes in 2001-02 to 137.4 thousand tonnes in 2022-23, but the pace of increase remained slower than the national trend, largely due to stagnating or declining sown area despite gradual improvements in yield levels.

Table 3.3: Production of Wheat in India, Himachal Pradesh and Kangra

('000 tonnes/MT)

Year	India	Himachal Pradesh	Kangra
2001-02	72,766	637.07	119.5
2002-03	65,761	495.56	112.4
2003-04	72,156	496.56	121.8
2004-05	68,637	687.45	118.9
2005-06	69,355	365.88	123.5
2006-07	75,807	596.49	125.6
2007-08	78,570	562.01	126.2
2008-09	80,679	381.18	124.9
2009-10	80,804	414.41	128.3
2010-11	86,874	546.47	132.6
2011-12	94,882	629.09	130.8
2012-13	93,506	671.94	133.5
2013-14	95,850	685.44	129.6
2014-15	86,527	646.45	135.2
2015-16	87,000	667.62	131.4
2016-17	98,510	605.18	137.5
2017-18	99,870	598.32	134.6
2018-19	103,600	682.63	136.2
2019-20	107,860	627.96	132.8
2020-21	109,586	575.57	138.9
2021-22	104,000	642.24	135.6
2022-23	113,500	609.31	137.4

Source: Directorate of Economic & Statistics, Government of Himachal Pradesh (2022-23), Statistical Abstract of Himachal Pradesh; Ministry of Agriculture & Farmers Welfare, Government of India (2022)

3.4 Productivity of Wheat

The productivity trends presented in Table 3.4 indicate consistent improvements across India, Himachal Pradesh, and Kangra, though the extent of progress varies. At the national level, wheat productivity increased gradually from 1.62 MT/ha in 2001-02 to 2.74 MT/ha in 2022-23, reflecting the impact of high-yielding seed varieties, increased mechanization, and better input management. Himachal Pradesh also witnessed gains, with yields improving from 1.74 MT/ha in 2001-02 to 1.91 MT/ha in 2022-23. Despite this progress, productivity in the state remains below the national average due to agro-climatic challenges and the prevalence of fragmented landholdings. In Kangra district, productivity advanced from 1,492 kg/ha in 2001-02 to 2,056 kg/ha in 2022-23, experiencing increase in productivity. Although land constraints continue to limit large-scale expansion, the adoption of improved practices and high-yielding varieties has supported these gains. Even so, both Himachal Pradesh and Kangra continue to lag national productivity levels, indicating the need for region-specific interventions to close the gap.

Table 3.4: Productivity of Wheat in India, Himachal Pradesh and Kangra

Year	India (MT/ha)	Himachal Pradesh (MT/ha)	Kangra (kg/ha)
2001-02	1.62	1.74	1492
2002-03	1.60	1.35	1425
2003-04	1.69	1.37	1576
2004-05	1.64	1.86	1554
2005-06	1.59	1.02	1642
2006-07	1.73	1.65	1695
2007-08	1.79	1.53	1710
2008-09	1.77	1.06	1706
2009-10	1.93	1.18	1767
2010-11	2.03	1.53	1842
2011-12	2.16	1.77	1830
2012-13	2.19	1.90	1880
2013-14	2.17	1.85	1846
2014-15	1.96	1.96	1937
2015-16	2.10	1.96	1898
2016-17	2.45	1.79	1997
2017-18	2.52	1.75	1965
2018-19	2.63	2.14	1999
2019-20	2.61	1.97	1961
2020-21	2.66	1.73	2060
2021-22	2.57	2.01	2023
2022-23	2.74	1.91	2056

Source: Directorate of Economic & Statistics, Government of Himachal Pradesh (2022-23), Statistical Abstract of Himachal Pradesh; Ministry of Agriculture & Farmers Welfare, Government of India (2022)

IV. CONCLUSION

The study on area, production and productivity of wheat in India, Himachal and Kangra district brought/ put forth the following points: First, at national level the wheat acreage mostly remained stable, varying between 44,904 thousand hectares in 2001-02 to 41,401 thousand hectares in 2022-23 during the last two decades. In H.P., wheat acreage shown more variation moving from 366.50 thousand hectare in 2001-02 to 319.47 thousand hectares in 2022-23. While the area under wheat in Kangra district has also been consistently declining indicating pressure on land resources and diversification away from wheat cultivation. Secondly, at national level production trend appeared a steady increase in wheat output while; wheat production in Himachal Pradesh showed a fluctuating trend. It increased from 637.07 thousand tonnes in early 2001-02 to a peak of 685.44 thousand tonnes in 2013-14 before showing a slight decline and settling around 609.31 thousand tonness in 2022-23.Thirdly, productivity of wheat in Himachal Pradesh improved from around 1.74 MT/ hectares in 2001-02 to 1.91 MT/ hectares in 2022-23, though still lower than the national average which was 2.74 MT/hactares in 2022-23 that points to untapped potential through better irrigation, seed quality and mechanizations.And lastly, in Kangra district, the productivity advanced from 1,492 kg/ha in 2001-02 to 2,056 kg/ha in 2022-23 resulting in an increase in productivity over two decades. Himachal Pradesh (HP) and Kangra district generally lag behind national trends in wheat growth, showing slower increases or even declines in area, production, and productivity, primarily due to significant challenges like rain

dependency, moisture stress, and less irrigation. Both Himachal Pradesh and Kangra continue to lag the national productivity levels suggesting that there is a need for region specific interventions to close this gap.

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