# Performance of Agriculture Sector in Punjab: Lack of Diversity in Agricultural Production

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**Abstract-The present study is conducted to explore the cropping pattern in Punjab. Punjab has become a dominant agro-based economy since the 1960s. It is found in the study that the cropping pattern of Punjab has been highly dominated by food grains cultivation specifically by rice and wheat due to the secure income in terms of Minimum Support Price to the farmers. The crop-husbandry and is contributing more than 50 per cent and livestock sector is contributing 40 per cent to the overall Gross Value Added of the agriculture sector in Punjab. The cropping intensity in Punjab has been increasing due to mechanization of agriculture, availability of modern inputs and high variety yielding seeds, highest consumption of fertilizers and highest area under irrigation. The study revealed that area under horticultural crops such as fruits and vegetables is very less as compared to other tradition crops. The state-wise comparison shows that in Punjab area under horticultural crops is very insignificant. The study concluded that regardless of availability of resources to agriculture sector, the agricultural production has been confined to monoculture of food crops and the contribution of other sectors especially of horticulture sector is very insignificant. The policymakers should revisit the appropriate policies regarding the diversification of agricultural production. Government should provide the infrastructure and procurement facilities so as to encourage the farmers towards the diversification on agriculture sector.**

**Keyword: Cropping pattern, Cropping-intensity Food crops, Horticultural crops, Diversification**

## I.INTRODUCTION

Punjab is one of India's most important northern agrarian states. It has made India food self-sufficient through its contributions to agriculture and the Indian economy. In spite of the fact that the agrarian economy of Punjab has been enduring structural conversion, but still the reliance of rural population in general and rural labor in participation for earning livelihood from agrarian economy continue. Even though the State contributes a large portion of rice and wheat to the national pool, agriculture has become a non-profitable occupation for small and marginal farmers. Being the food basket of India the state of Punjab, with 1.53 percent of the country's land area, provided 21percent of rice and 38 percent of wheat to the country's central food grains in 209-20 (GOP, 2020-21). Punjab has been a pioneer of the Green Revolution in India, setting the pace in terms of agricultural development. The state is home to some key industries such as cycle, sports goods, and hosiery, in addition to being India's best producer of cotton, wheat, and rice. In 1976, the state accomplished its goal of 100 percent electrification and made significant investments in basic infrastructure including roads, safe drinking water, school education, and health care for its population, far ahead of other states. This supplied the necessary drive for rapid growth in the 1960s and 1980s. Despite its geographical location, Punjab has always played a significant role in the nation's political and cultural imagination. Punjab itself was considered the most dynamic and progressive state in the country, owing to its accomplishments in the agrarian sector. The green revolution was found successful in other parts of India as well, but it is most closely associated with Punjab.

Punjab is recognized as India's breadbasket because it has been playing a key role in providing food security and self-reliance in food grains for the country. Despite accounting for only 1.53% of India's total geographical area; it has made a considerable contribution to the central pool of rice and wheat, particularly during the Green Revolution. It provided 21percent of rice and 38 percent of wheat to the country's central food grains in 209-20 (Economic Survey of Punjab 2021-0-21). Agriculture and related activities, like the national economy, persist to contribute a major percentage of the state`s overall value-added, outnumbering industry. In 202-21, agriculture and its allied sectors are anticipated to contribute 31.6 percent of Punjab's GSVA in 2020-21, up from 28.7 percent in 2019-20(GOP, 2020-21). The sector remains the engine of Punjab's economy, boosting the state's manufacturing and service sectors. The Green Revolution's economic development in Punjab attests to the sector's significance in building Punjab one of the richest states in the country. The economy of the state remains agrarian, and preliminary research indicates that agriculture plays a significant role in fueling growth in

other industries. It's also worth noting that when agricultural revenue rises, so does the demand for items from industry and the services sector, strengthening the overall economy. The agriculture sector is the economic axis, having a significant impact on other sectors and propelling the economy. As a result, it's no coincidence that farmer households in Punjab had the highest average monthly income (Rs. 23,133), followed by Haryana (Rs. 18,946), as per the NABARD All India Rural Financial Inclusion Survey (NAFIS) 2016-17. Due to chronic problems such as stagnant yield, increasing cultivation costs, and huge debts, the agriculture industry, which is the mainstay of the rural population, is undergoing its worst crisis, and farmers are being urged to commit suicide. Although the State contributes a large portion of rice and wheat to the national pool, agriculture has become a non-profitable occupation for small and marginal farmers who are heavily in debt. The excessive concentration on the rice-wheat cropping cycle, as well as overexploitation of land, has resulted in several unanticipated and complex issues. Multiple health difficulties have resulted from the fast diminishing water table and high toxicity of soil due to overuse of fertilizers and pesticides, as seen by the high prevalence of cancer and organ failures. As a result, the attention should be transferred from agriculture to agro-processing, floriculture, tourism, industry, and other sectors.

## II.METHODS AND MATERIALS

The present study is purely based on secondary data. The study is taken into consideration only agriculture sector of Punjab. The secondary is taking from the published reports of Government of India as well Government of Punjab such as Central Statistical Organization, Handbook of Statistics on Indian States, Reserve Bank of India, Statistical Abstract of Punjab, Economic Survey of Punjab and Agricultural Statistics at a Glance.

## III.RESULTS AND DISCUSSION

After the reorganization of Punjab in 1966, various policy measures were undertaken, as a consequence, the state has become a dominant agro-based economy. While India was a food-scarce economy post partition, the primary purpose was to attain food grain self-sufficiency. To do so, the green revolution strategy was implemented, with the initial concentration on Punjab, Haryana, and Western Uttar Pradesh. Punjab economy was achieved high growth path because of the adoption of modern agricultural know-hows consisting of high yielding varieties of seeds especially of wheat, chemical fertilizers and pesticides as well as irrigation facilities. From 1971–72 to 1985–86, the primary sector of Punjab grew at a rate of 5.70 per cent each year depicted in table 1. The growth rate fell to 3 per cent from 1986–87 to 2004–05, and then to 1.9 per cent from 2005–06 to 2018–19, which is about half of the all-India average of 3.7 per cent as illustrated in table.

*Table 1: Growth of Agricultural Sector: Punjab v/s India (in percentage)*

| Time Period | Punjab | India |
|---|---|---|
| 1971-72 to 1985-86 | 5.7 | 2.3 |
| 1986-87 to 2004-05 | 3.0 | 2.9 |
| 2005-06 to 2018-19 | 1.9 | 3.7 |

Source: Government of India, Central Statistical Organization

The State Gross Value Added of agriculture sector is declining in Punjab as illustrated in table 2. It has been declined to 28.4 per cent in 2019-20 from 32.5 per cent in 2004-05. There are wide disparities in the share of state gross value added among the various allied activities of agriculture sector. The crop husbandry is playing a significant role in the contributing to state gross value added following by livestock sector. Other sectors like forestry and fishing is contributing very less share in the overall state gross value in Punjab.

*Table 2: Percentage distribution of agriculture and allied activities to Gross State Value Added in Punjab (in percentage)*

| Year | Crops (A) | Livestock (B) | Forestry (C) | Fishing (D) | Agriculture & allied activities (A+B+C+D) |
|---|---|---|---|---|---|
| 2004-05 | 21.1 | 9.9 | 1.2 | 0.2 | 32.5 |
| 2005-06 | 20.6 | 9.8 | 1.1 | 0.3 | 31.8 |
| 2008-09 | 21.5 | 8.6 | 1.6 | 0.2 | 31.9 |
| 2009-10 | 20.6 | 8.5 | 2.1 | 0.3 | 31.4 |
| 2010-11 | 19.7 | 8.3 | 1.9 | 0.2 | 30.1 |
| 2011-12 | 19.7 | 8.0 | 2.8 | 0.2 | 30.8 |
| 2016-17 | 17.2 | 9.4 | 2.3 | 0.4 | 29.2 |
| 2017-18 | 16.9 | 9.8 | 2.2 | 0.3 | 29.2 |
| 2018-19 | 16.4 | 9.9 | 2.1 | 0.3 | 28.7 |
| 2019-20 | 15.5 | 10.5 | 2.1 | 0.3 | 28.4 |

Source: Various issues (Statistical Abstract of Punjab)

*Table 3: Crop wise percentage share of cropped area*

| Crop | 1980-81 | 190-91 | 2000-01 | 2018-19 | 2019-20 |
|---|---|---|---|---|---|
| Paddy | 17.5 | 26.9 | 31.3 | 39.6 | 40.1 |
| Wheat | 41.6 | 43.6 | 43.1 | 44.9 | 45 |
| Pulses | 5 | 1.9 | 0.7 | 0.4 | 0.5 |
| Cotton | 9.6 | 9.3 | 7.6 | 3.4 | 3.2 |
| Maize | 5.6 | 2.5 | 2.1 | 1.4 | 1.5 |
| Bajra | 1 | 0.2 | 0.1 | 0.1 | 0.03 |
| Barley | 0.9 | 0.5 | 0.3 | 0.1 | 0.12 |
| Oilseeds | 3.7 | 1.5 | 1.1 | 0.5 | 0.6 |
| Sugarcane | 1 | 1.3 | 1.8 | 1.2 | 1.2 |
| Vegetables | 1.1 | 0.7 | 1.3 | 3.3 | 3.3 |
| Fruits | 0.4 | 0.8 | 0.5 | 1.1 | 1.1 |
| Other crops | 12.6 | 10.8 | 10.1 | 2.1 | 3.6 |

Source: Various issues (Statistical Abstract of Punjab)

The table 3 describes that the cropping pattern of Punjab has been highly dominated by food grains cultivation specifically by rice and wheat. In financial year 2019-20, more than 90 per cent of cropped area used for the cultivation of food-grains including cereals and pulses.

Owing to secure income in terms of Minimum Support Price to the farmers from cultivation of wheat and rice, their proportion has been increasing over the years in the total cropped area. The monoculture of wheat and paddy is more profitable than other crops in Punjab and their production as well as marketing risks are negligible (Sidana and Kumar, 2021). On the other hand, the share of pulses, maize, oilseeds and the other crops has declined in Punjab. Area under commercial crops like cotton and sugarcane has been decreasing gradually. Although the yield of crops such as maize, cotton, and pulses rose over time, the cropping pattern had switched mostly in favor of wheat and paddy crops (Rani et al., 2021). Besides, due to high marketing and production risks, horticultural crops like fruits and vegetables have been growing on a very small share of the total cropped area. Very negligible share of cropped area reported for the cultivation of cotton and sugarcane in the recent years. In 2019-20, cotton and sugarcane was cultivated only 3.2 per cent and 1.5 per cent respectively of the total cultivated area in Punjab. The area under cotton cultivation has been negatively affected by waterlogging and pest infestation in Punjab's cotton belt (Sidhu, 2005). In recent decades cultivation of cotton crops have been progressively substituted by paddy and this move from cotton to paddy reflects capital deepening in response to Punjab's mature capitalist agricultural circumstances, but it also creates new conflicts and political axes (Sinha, 2022).

*Table 4: Cropping Intensity in Punjab and All India*

| Year | Punjab | All India |
|---|---|---|
| 1990-91 | 177.9 | 130 |
| 1995-96 | 187.3 | 131.8 |
| 2000-01 | 186.8 | 131.1 |
| 2005-06 | 187.7 | 136.5 |
| 2010-11 | 189.6 | 139.6 |
| 2015-16 | 190.3 | 141.3 |
| 2016-17 | 189 | 143.6 |
| 2017-18 | 188.6 | 147.2 |
| 2018-19 | 190.6 | 148.7 |

Source: Handbook of Statistics on Indian States, RBI

Table 4 displays that the cropping intensity in Punjab is increasing gradually. In contrast to the national level (148.7 per cent) cropping intensity in the state is much higher. It has been increased to 190.6 per cent in 2018-19 from 177.9 per cent in 1990-91. There are so many factors responsible for the highest cropping intensity in Punjab. Mechanization of agriculture, availability of modern inputs and high variety yielding seeds, highest consumption of fertilizers and highest area under irrigation are affecting the cropping the cropping intensity in Punjab. The availability of irrigation facilities in Punjab is the one of the most significant reason behind the highest cropping intensity in the country. According the Handbook of Statistics of Indian States in Punjab, 98.35 per cent of the gross cropped area covers with irrigation facility. The tractors may aid in increasing agricultural intensity by allowing farmers to save time and so cultivate an additional crop or devote more land to existing ones. Similarly, a key advantage of tube well irrigation over canal irrigation is its capacity to support more intense cropping by ensuring a consistent water supply throughout the year and allowing for more precise control over irrigation quantity and timing. These would be significant elements in a farmer's decision about what to cultivate and how much acreage to plant in a given season (Aggarwal, 1984). Mechanization of agriculture in terms of utilization of various power sources as well as advanced agricultural tools and equipment has incrased the cropping intensity (Verma, 2006). In state of Punjab net sown area has reached at its saturation point, so, there is very little scope to add to the net sown area. Hence, the cropping intensity is the only possibility to add to the cropped area (Grewal and Rangi, 1983). Around 85% of the state's land is cultivated, with a cropping intensity of above 190 percent, so, it could have the negative implication towards the environment. Irrigation water consumption has increased dramatically as a result of the paddy–wheat crop cycle. Due to unreliable surface water sources and excessive groundwater pumping caused by free power and agricultural practices, the state's groundwater has declined at a rate of 41.6 cm per year (Baweja et al., 2017).

Table 5 illustrates the productivity of major crops in the state of Punjab since 1960s. Productivity of wheat and paddy has increased drastically. It has been increased by almost four times from 1960-61 to 2019-20 as mentioned in the above table. The yields of cereals, pulses and oilseeds in Punjab are higher in comparison to all India. Yield of food grain is the highest in the country (RBI, 2021) as shown in table 6. Productivity of major crops most remarkably paddy and wheat have been increased significantly afterwards the introduction of Green Revolution in Punjab in 1960s (Gill, 1983). It was owed to use of high yield varieties of seeds, rigorous use of fertilizers and pesticides alongside with the use of highly mechanized farm implements and expansion of irrigation (Dhawan and Singh, 2015). Excessive use of fertilizers and increased irrigation facilities are the major factors responsible for highest agricultural yields in Punjab. More than 98 per cent of gross cropped area is irrigated and consumption of fertilizers is highest in Punjab (243 kg/ha.) (RBI, 2021). The adequate supply of fertilizers increased the production of wheat by three times between 1966 and 1971 in Punjab (Gill, 1983). Besides, the

agriculture production sector of the state is highly mechanized and capital intensive (Singh, 2000).

*Table 5: Crop-wise productivity of some major crops in Punjab (kg/hectare)*

| Year/Crop | Rice | Wheat | Maize | Sugarcane | Cotton |
|---|---|---|---|---|---|
| 1960-61 | 1009 | 1244 | 1135 | 33956 | 269 |
| 1970-71 | 1765 | 2237 | 1555 | 40442 | 371 |
| 1980-81 | 2733 | 2730 | 1602 | 49739 | 309 |
| 1990-91 | 3229 | 3715 | 1784 | 55369 | 463 |
| 2000-01 | 3506 | 4563 | 2793 | 60844 | 430 |
| 2010-11 | 3828 | 4693 | 3707 | 70059 | 641 |
| 2018-19 | 4132 | 5188 | 3639 | 81857 | 776 |
| 2019-20 | 4034 | 5004 | 3581 | 80244 | 829 |

Source: Economic Survey of Punjab, 2020-21

*Table 6: Crop-wise productivity in Punjab and India (in kgs/hectare)*

| Year | Cereals | | Pulses | | Oilseeds | |
|---|---|---|---|---|---|---|
| | Punjab | All India | Punjab | All India | Punjab | All India |
| 1990-91 | 1906 | 900 | 740 | 578 | 958 | 771 |
| 2000-01 | 2846 | 1027 | 740 | 544 | 1010 | 810 |
| 2010-11 | 3635 | 1531 | 910 | 691 | 1203 | 1193 |
| 2015-16 | 3688 | 1579 | 965 | 655 | 1318 | 968 |
| 2016-17 | 3802 | 1750 | 887 | 786 | 1386 | 1195 |
| 2017-18 | 3693 | 1934 | 876 | 853 | 1482 | 1284 |
| 2018-19 | 3604 | 1944 | 938 | 757 | 1499 | 1271 |
| 2019-20 | 3572 | 1991 | 871 | 823 | 1472 | 1224 |

Source: Handbook of Statistics on Indian States, RBI

*Table 7: Cumulative area under fruits and vegetables in Punjab (in 000' hectares)*

| Year | Area under Fruits(A) | Area under Vegetables (B) | Total (A+B) | Percentage of Net Sown Area |
|---|---|---|---|---|
| 1990-91 | 68.8 | 54.6 | 123.4 | 2.9 |
| 2000-01 | 34.2 | 110.3 | 144.5 | 3.4 |
| 2010-11 | 69.8 | 102.9 | 172.7 | 4.2 |
| 2015-16 | 79.1 | 142.8 | 221.9 | 5.4 |
| 2016-17 | 80.1 | 136.7 | 216.8 | 5.2 |
| 2017-18 | 83.7 | 136.6 | 220.3 | 5.3 |
| 2018-19 | 86.8 | 119.2 | 205.9 | 5.0 |
| 2019-20 | 90.5 | 114.6 | 205.1 | 5.0 |

Source: Various reports (Statistical Abstract of Punjab) & RBI, 2021

As mentioned earlier, more than 90 per cent of total cropped area comes under the cultivation of food grains including pulses and cereals. Table 7 depicts that area under horticultural crops such as fruits and vegetables is very less as compared to other tradition crops. It was just 2.9 per cent of net sown area in Punjab. It has been increased to 5 per cent, but this proportion is very negligible. Farmers are neglecting to diverse their cropping pattern towards crops which have not been assured in form of minimum support price; so, due to production and marketing risks they prefer to cultivate traditional crops. In Punjab, Central Sponsored Scheme of National Horticulture Mission was implemented in 2005-03 in order to address the issues regarding holistic development of horticulture in the state. Since 2005-06 to 2019-20, the production of fruits and vegetables has been increased from 3.2 million tonnes to 7.6 million tonnes with 5.9 per cent of compound annual growth rate (RBI, 2021). But area under these crops is very small as a proportion of net sown are and started declining since 2018-19 in the state.

*Table 8: Percentage share of major state in area and production of horticultural crops in India 2019-20*

| State | Area Under Horticultural Crops | Share in Production of Horticultural Crops |
|---|---|---|
| Karnataka | 9.0 | 6.1 |
| Uttar Pradesh | 8.7 | 11.8 |
| Madhya Pradesh | 8.0 | 9.8 |
| West Bengal | 7.5 | 10.2 |
| Maharashtra | 7.1 | 8.1 |
| Gujarat | 7.0 | 7.4 |
| Kerala | 6.1 | 3.2 |
| Rajasthan | 5.9 | 1.3 |
| Andhra Pradesh | 5.8 | 8.7 |
| Tamilnadu | 5.4 | 5.9 |
| Odisha | 5.0 | 3.3 |
| Bihar | 4.5 | 6.5 |
| Chhatisgarh | 3.1 | 3.1 |
| Assam | 2.7 | 2.1 |
| Haryana | 1.8 | 2.3 |
| Telangana | 1.7 | 1.5 |
| Jharkhand | 1.6 | 1.5 |
| Punjab | 1.6 | 2.4 |
| Jammu & Kashmir | 1.5 | 1.2 |
| Himachal Pradesh | 1.3 | 0.9 |
| All India | 100 | 100 |

Source: Agricultural Statistics at a Glance, 2020

Table 8 describes the contribution of major states in the area as well as production of horticultural crops. Karnataka and Uttar Pradesh have the first rank in area under cultivation of horticultural and in production of horticultural crops respectively. Punjab is far behind in terms of area under as well as in production of horticultural crops. Horticultural crops constitute only 1.6 per cent of total area under horticultural crops in the country. In the production of horticultural crops in India, contribution of Punjab is very negligible. Punjab`s contribution in only 2.4 per cent in the total production of horticultural crops in India in 2019-20.

## IV.CONCLUSION

After the reorganization of Punjab in 1966, various policy measures were undertaken, as a consequence, the state has become a dominant agro-based economy. Punjab economy achieved high growth path in the post green revolution because of the adoption of modern agricultural know-hows consisting of high yielding varieties of seeds especially of wheat, chemical fertilizers and pesticides as well as irrigation facilities. The cropping intensity in Punjab is increasing gradually. In contrast to the national level cropping intensity in the state is much higher. Mechanization of agriculture, availability of modern inputs and high variety yielding seeds, highest consumption of fertilizers and highest area

under irrigation are significantly affecting the cropping the cropping intensity in the state. The crop husbandry is playing a significant role in the contributing to state gross value added following by livestock sector while other sectors like forestry and fishing are contributing very less share in the overall state gross value added. The cropping pattern in Punjab has been highly dominated by the monoculture food grains cultivation specifically by rice and wheat due to the secure income in terms of Minimum Support Price to the farmers. The area under commercial crops has been decreasing gradually. The area under horticultural crops is very less as compared to other tradition crops. Farmers are neglecting to diverse their cropping pattern towards crops which have not been assured in form of minimum support price; so, due to production and marketing risks they prefer to cultivate traditional crops. Thus, it is found that Punjab is far behind in terms of area under as well as in production of horticultural crops. It is very urgent for the policymakers to revisit the appropriate policies regarding the diversification of agricultural production for the sustainable development of the agriculture sector. Government should provide the infrastructure and procurement facilities so as to encourage the farmers towards the diversification on agriculture sector. So, to shift the agricultural narrative towards the diversification government should ensure the farmers to provide the adequate price and timely procurement of the marketable surplus produced by them.

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