

# Agricultural Practices and Challenges in District Sangrur, Punjab: A Geographical Analysis of Post-Green Revolution Transformations

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## Abstract

This research examines the agricultural geography of Sangrur, a district in Punjab, India, with a focus on its importance to the state's agrarian economy. The region, once a cornerstone of the Green Revolution, has seen both achievements and setbacks in its agricultural techniques over time. The study highlights significant factors influencing agricultural production in Sangrur by analysing current farming practices, cropping patterns, and soil types, such as climate change, soil degradation, and groundwater depletion. It also investigates the socio-economic effects of these issues, like the migration, declining landholdings, and changes in agricultural profitability. Furthermore, the study also covers the changing importance of livestock and animal husbandry in the district's mixed farming system. The findings highlight the importance of sustainable agricultural methods such as crop diversity, organic farming, and enhanced water management measures. The report finishes with policy suggestions to improve the flexibility and profitability of agriculture in Sangrur, assuring long-term sustainability for the region's farmers.

**Keywords:** Agricultural Geography, Sangrur, Sustainable Practices, Farming Practices, Agricultural Challenges, Green Revolution, Punjab Agricultural Department

## Introduction

Punjab is located in the northern part of India. It is actually considered one of the smallest states of the country. The state geographically covers 1.5 percent area of India, yet has the power to nourish about 2.5 percent of its population. The state holds a special place among the other states in the country due to its agricultural

development. After Punjab was reorganised in 1966, a set of policies was undertaken, which paved the way to the state becoming a dominant agro-based economy (Gulati et al., 2021). The main reason behind its development is the introduction of Green Revolution which witnessed a tremendous growth of the state in the agricultural field. An agrarian economy, consolidation of landholdings, reclamation of new agricultural lands, development of irrigation facilities, use of inputs with high-yielding variety seeds, chemical fertilisers, insecticides, and mechanical inputs were among the important factors which helped Punjab agriculture in making rapid strides. Overwhelmed with green revolution success such as those taking place in Punjab, Bourlag announced in his 1970 Nobel prize speech that, "never before in the history of agriculture has a transplantation of high-yielding varieties coupled with an entirely new technology and strategy been achieved on such a message scale, in so short period of time, and with such a great success" (Dhillon, 2013). The Punjab state comprising only 1.5 percent of the total geographical area of country contributed 13–14 percent towards the total food grain production of the country. The agriculture sector in Punjab is advanced and progressive as the proper use of land and water resources facilitated Green Revolution. From the point of view of agricultural production, Punjab is a surplus agricultural state. The agricultural development in Punjab mainly depends on two crops, that is, wheat and rice (Khurana & Chouhan, 2015). Punjab heralded the green revolution and introduced operation flood strategy which is commonly known as white revolution to increase income and diversify rural economy through white revolution (Shergill & Singh, 2017). Agriculture

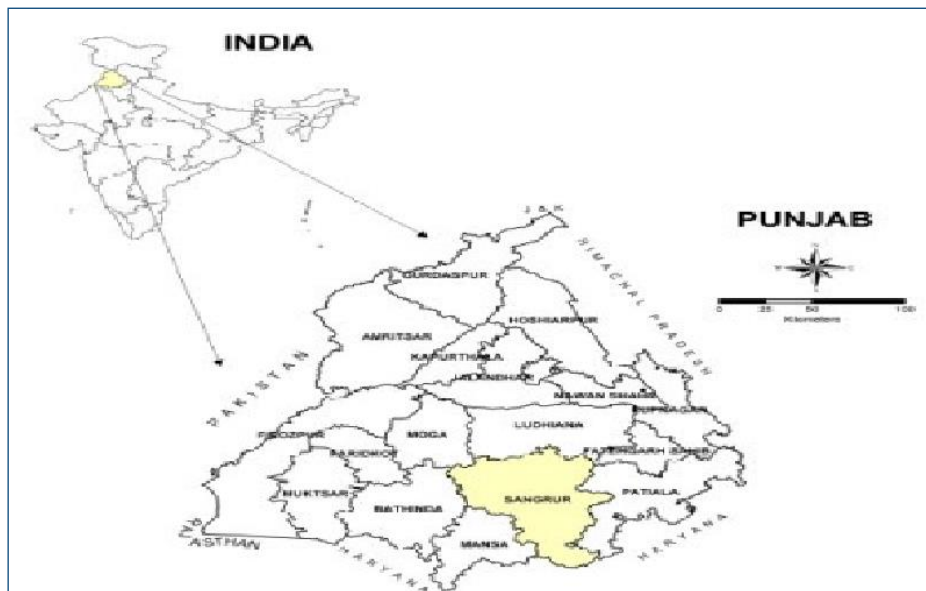
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in Punjab, particularly in districts like Sangrur, has historically been the backbone of India's food security, earning the state its reputation as the "Granary of India". In Punjab the cropping system is dominated by wheat, rice, and cotton but the market for these commodities, including the food grains, is lacking. In the 1960s, 1970s, and to some extent in the 1980s, the shortage of food grains in other parts of India was the major source of absorption of the surplus produced in Punjab. However, in the 1990s the deficit in other states, particularly in the northern and northeast states of India have reduced due to increased agricultural productivity in those areas and the market for excess supply of foodgrains from Punjab has declined (Gulati, 2002). This study aims to explore the interplay of the factors by examining the district's agricultural practices, socio-economic challenges, and environmental pressures. It seeks to provide insights into sustainable agricultural practices that could mitigate these issues. Through a combination of quantitative data analysis and qualitative insights, this research will contribute to a more nuanced understanding of Sangrur's agricultural landscape.

## Study Area

The district of Sangrur, located in the state of Punjab, India, serves as the focal area of this research. With a total size of around 3,625 square kilometres and seven tehsils and four sub-tehsils, Sangrur is well-known for its rich agricultural history. Each of these entities contributes to the district's agricultural environment. Its location, which is surrounded by important rivers like the Beas and Satluj, has historically encouraged a reliance on agriculture, which is supported by rich soils and vast irrigation systems installed during the Green Revolution. According to the 2011 Census, the demographic profile shows that the majority of the population lives in rural areas, with over 68 percent working in agriculture. But throughout time, Sangrur has had to deal with issues related to agriculture, such as salinity of the soil, groundwater depletion, and socioeconomic changes brought on by urban migration. One must note that Malerkotla, which is currently the 23<sup>rd</sup> district of Punjab, was under the district of Sangrur till June 2021. Most of the research shows data for both the districts according to Census 2011.



Source: <https://www.mapsofindia.com/maps/punjab/districts/sangrur.htm>

**Map 1: Location of District Sangrur, Punjab**

## Objectives

- The report aims to offer a thorough examination of the agricultural activities in Sangrur, covering traditional and modern farming practices.
- The main objective of this report is to analyse the lasting consequences of the green revolution on Sangrur's farming environment, specifically its influence on soil quality and variety of crops.

- The study explores the social economic obstacles that farmers face including, the fluctuating income, migration patterns, and unstable markets in assessing governmental assistance. Analysing the challenges related to environment and climate is also an essential part of this report.
- The report ends with some suggestions to improve agricultural resilience and sustainability by promoting crop diversity, increasing organic farming, and improving water management.

## Data Sources and Research Methodology

The data for this research was collected from a range of reliable sources, to construct a thorough understanding of Sangrur's agricultural landscape, socio-economic dynamics, and environmental challenges. Primary data mainly includes an interview conducted with Mr. Hardeep Singh, a Statistical Officer from the Agriculture and Farmers Welfare Department in Sangrur. The other interview was conducted with an officer at Department of Animal Husbandry, Sangrur. The interviews basically provided me with firsthand insights into current agricultural practices and policy impacts. Secondary data sources are extensive and mainly includes governmental and institutional websites, such as the Department of Agriculture & Farmer Welfare's official website for Sangrur. Demographic data for the district was obtained from the Census of India (2011), detailing population statistics that contextualise the district's labour structure and rural demographic profile. Further information on income levels and farmer demographics, where provided by the members of the department. District-level agricultural profiles were accessed from PAU-KVK Sangrur. Academic literature, including Performance of Agriculture in Punjab by Gulati, Roy, and Hussain (2021), and Livestock Economy of Punjab by Shergill and Singh (2017), contributes to understanding the broader economic and agronomic factors affecting Punjab's agricultural sector. Methodologically, this study used a mixed-methods approach, integrating quantitative data on land use, crop yields, and economic indicators with qualitative insights from interviews and observational data. Statistical analysis was conducted on quantitative data, while qualitative responses were

coded and thematically analysed, providing a thorough understanding of Sangrur's agricultural sustainability and socio-economic resilience.

## Results and Discussions

In order to make the study in a more simple and cohesive manner, the results for the research will be presented in different parts. The first part deals with the demographic structure of Sangrur followed by the agricultural importance of the district, with a thorough discussion on the different agricultural activities, types of crops that are harvested, as well as types of soils that are present in the district. The research also included the study of factors that generally affects the agricultural status of Sangrur. The last part includes a small discussion on other activities like animal husbandry and livestock rearing.

### Demographic Structure

If we talk about the demographic structure of the district, according to the Census 2011, the district had a population of 1,655,169 of which males and females were 878,029 and 777,140 respectively. Out of the total Sangrur population for 2011 census, 31.17 percent lives in urban regions of district, while 68.83 percent population lives in rural areas of villages. This demographic structure gives an imaginary image of the occupational structure of the district. Although there is a major change in the stats, yet a high amount of rural population is involved in agriculture (Table 1).

**Table 1: Demography of Sangrur**

| Description                     | 2011          | 2001          |
|---------------------------------|---------------|---------------|
| Population                      | 16.55 Lakhs   | 14.73 Lakhs   |
| Actual Population               | 1,655,169     | 1,473,242     |
| Males                           | 878,029       | 787,795       |
| Females                         | 777,140       | 685,447       |
| Population Growth               | 12.53 percent | 18.36 percent |
| Area Sq. Km                     | 3625          | 3685          |
| Density/km <sup>2</sup>         | 457           | 400           |
| Proportion to Punjab Population | 5.97 percent  | 6.05 percent  |
| Average Literacy                | 67.99         | 59.90         |
| Sex Ratio                       | 885           | 870           |

Source: <https://www.census2011.co.in/census/district/606-sangrur.html>

## Agricultural Importance: Cropping Patterns and Soils

Taking into account the agricultural importance of Sangrur, the total geographical area is 2,92,359 hectares. The net sown area is 2,55,500, out of which cultivated land accounts for 2,57,800 hectares. About 2300 hectares of land left as fallow land. There are about 397 under the district of Sangrur. All of these figures are approximate values for the year 2022–23 provided by the department itself and are not yet published.

The main agricultural activities mainly include modern farming techniques as 95 percent of the state follows modern agriculture methods. Mr. Hardeep Singh, Statistical Officer at Punjab Agriculture and Farmers Welfare Department, Sangrur shared that almost all of the villages in the district are involved in agriculture. Sangrur, in general does have a low proportion of small farmers. The farmers here are quite development, rich and own large land holdings. Zamindars constitute a large set of population. Most of the people do commercial farming. Traditional Farming techniques are not a part of this agricultural system anymore. Organic Farming has also started growing in the state, although the proportion of it is quite low. The land must be left fallow for about 3 years without the use of fertilisers and pesticides, in order to be declared as one practicing organic farming, according to the Punjab Agro Department, Sangrur (Table 2). The past few years have seen a major setback in the field due to the low ground water level, low market prices, and an increase in migration. The district has mainly three cropping seasons—Rabi, Kharif and Zaid. Kharif—the monsoon season, Rabi- the winter season and the short cropping season between Kharif and Rabi is known as Zaid (Table 3). Table 4 shows the production of major crops in 2022–23 in hectares in the district of Sangrur and Malerkotla (the tehsil under its governance).

**Table 2: Crops Harvested in Kharif Season**

|           |        |
|-----------|--------|
| Rice      | 291529 |
| Maize     | 344    |
| Cotton    | 1870   |
| Pulses    | 208    |
| Vegetable | 1641   |

**Table 3: Crops Harvested in Rabi Season**

|                     |        |
|---------------------|--------|
| Wheat               | 290880 |
| Sunflower Oil seeds | 2077   |
| Spices              | 33     |
| Fodder              | 14159  |
| Vegetables          | 2883   |

Source: Primary Field Interview, 2024.

**Table 4: Soil Types in Sangrur**

| Soil Type                            | Characteristics  | Area in ha |
|--------------------------------------|--|------------|
| Sandy loam soil with saline sodicity | Soil is sandy loam with moderate to severe saline sodic nature, water logged, flood prone      | 1,22,503   |
| Sandy                                | Sandy soil, part of Sangrur district is severely saline sodic in nature                        | 1,12,497   |
| Sandy loam soil with sodicity        | Soil is sandy loam with moderate to severe saline sodic nature, water logging and salt problem | 1,14,000   |
| Sandy Loam                           | Sandy loam soils, salt affected in patches   | 12,000     |

Source: <https://kvksangrur.com/district-profile/>

## Factors Affecting Agricultural Activities in Sangrur

- *Climatic Change*: The change in climate is expected to have a significant impact on agriculture. Rising temperatures are the primary driver of change, and most of the crops see a decrease in productivity as temperatures increase. Crop yields are expected to decrease by 1–13 percent by 2050, and the negative impact is expected to increase over time. The most affected crops are rice, maize, and cotton.
- *Decrease in Groundwater Level*: The shift from wheat-maize to water intensive crops like paddy and wheat has led to increased groundwater exploitation. Paddy is particularly water-intensive crop, requiring up to 5000 litres of water to grow one kilogram of grain.
- *In-Field Burning of Crop Residuals*: This is the major problem faced in the district of Sangrur. In-field burning of crop residuals is an extractive practice that completely degrades the soil. Other than that, is also affects the air quality of the area which leads to major eye problems and respiratory problems.

- **Migration of Young Generation to Other Countries:** The migration of students from Punjab to Canada is a complex issue that has affected various things like agricultural profitability, lack of help from families to grow crops. Shrinking landholdings are contributing factors. In rural areas, farming is being given up, and young people are migrating, leaving the villages deserted.
- **MSP and Subsidies:** These two are the root causes of Punjab's farm crisis. Farmers want the government to fix the minimum selling price (MSP) and procure all of their rice and wheat produce, so that large farmers/zamindars cannot exploit them. Also, the revenue generated is quite low than the amount of capital which is spent on the inputs like fertilisers, pesticides, electricity, labour, hybrid seeds and required machinery.
- **High Bank Loans:** Small farmers have been struggling with financial hardships, resulting in their income being significantly low. Some farmers have abandoned agriculture, while others are unable to do so as they lack training for other jobs, resulting in instances of farmer suicide. Rural families' financial situation can be disrupted by either crop failure or significant expenses. This is evident by the substantial debt load carried by farmers. According to the NSSO survey, Punjab's agriculture sector faces a heavy burden, ranking just below Andhra Pradesh and Tamil Nadu in the country (Sharma, 2017).

### Income of the Farmers and Land Holdings

The income generation of the farmers majorly depends on the type of crop they grow. Wheat and Rice are the major crops that are grown and are highly in demand. The minimum selling price is the other major factor that decides the proportion of profit earned by the farmer. According to the stats given by the department, the MSP for the wheat and paddy is 2125 and 2183 per quintal respectively for the year 2022–23. The approx. total gross income for the paddy (77.28 quintal per hectare) is around Rs.168702 and for wheat (56.78 quintal per hectare) is around Rs.120657.

If we talk about the classes and divisions based on the land holdings in hectares, there are 5 types of farmers. Marginal, Small, Semi-Medium, Medium and Large. They are further divided into social groups like institutional groups like NGOs and religious groups, scheduled caste, and others (Table 5).

**Table 5: Land Holdings by Different Social Groups**

| Size Class ( In ha) | No. of Operational Holdings |
|---------------------|-----------------------------|
| Marginal (<1)       | 6524                        |
| Small ( 1–2)        | 12971                       |
| Semi Medium (2– 4)  | 33557                       |
| Medium (4–10)       | 24545                       |
| Large (10–above)    | 2916                        |

Source: Primary Field Interview, 2024.

### Animal Husbandry and Livestock Status

Livestock economy of Punjab, a region which is a stark example of integrated farming system that enjoyed the heights of Green Revolution, nevertheless faced an agrarian crisis at the other end. Punjab stopped the green revolution and introduced a new operation which is commonly known as white revolution to increase income and diversify rural economy through white revolution. The composition of livestock population is changing because of increasing mechanisation of agriculture. There has been a major shift from cattle rearing to milch rearing since long after the implementation of green revolution in Sangrur. There is a decrease in animal husbandry and livestock rearing due to low availability of land and labour. The expenses needed for these activities are more than the acquired profit. Large amount of information is not available regarding this field due to failure in presence of online website for the district.

Animal husbandry is an integral component of Indian agriculture supporting livelihood of more than two-thirds of the rural population. Animals provide nutrient- rich food products, draught power, dung as organic manure and domestic fuel, hides and skin, and are a regular source of cash income for rural households. They are a natural capital, which can be easily reproduced to act as a living bank with offspring as interest, and an insurance against income shocks of crop failure and natural calamities.

**Table 6: Livestock Status of the District and its Tehsils**

| Tehsil     | Cattle | Buffalo | Sheep | Goat  | Pig  | Total  |
|------------|--------|---------|-------|-------|------|--------|
| Malerkotla | 37531  | 80793   | 890   | 11935 | 318  | 131467 |
| Dhuri      | 23869  | 63618   | 221   | 5448  | 1232 | 94388  |
| Sunam      | 28334  | 87476   | 479   | 4095  | 766  | 121150 |
| Moonak     | 28853  | 87311   | 1707  | 2885  | 804  | 121560 |
| Sangrur    | 41900  | 83277   | 887   | 6217  | 2781 | 135062 |
| Total      | 160487 | 402475  | 4184  | 30580 | 5901 | 603627 |

Source: Primary Field Survey, 2024.

The major issues in maintaining the livestock status includes the costs of veterinary care, feed and fodder as well as labour costs (Table 6). Market fluctuations can lead to financial instability. The increase in artificial milk production has led to the decrease in demand for the milk provided by small farmers through their small dairies. Outbreaks of diseases like foot and mouth diseases can devastate livestock population. Veterinary services are quite high and taking care of the animals can be quite tiresome and problematic for farmers who can't afford such high-paid services.

## Conclusion and Recommendations

The historical background of Sangrur district has strongly influenced its agricultural sector and has experienced notable changes, particularly following the Green Revolution. Nevertheless, the current situation of farming in the area shows a combination of positives and negatives. Although modern farming methods are commonly used and there is a dominance of large-scale commercial farming, there are numerous challenges endangering the long-term viability of agriculture. Some of the primary obstacles consist of decreased groundwater levels and soil erosion from excessive irrigation. Furthermore, the agricultural base of the district has been compromised by the younger generation moving away from farming and the decreasing size of landholdings. While there have been advancements in organic farming, it still represents a small portion of the total agricultural sector.

The efficiency and environmental friendliness can be improved by changes. Crop diversification and expanding the practice of organic farming could also help improve soil health. Additionally, enhancing the profitability of small and marginal farmers can be achieved through investments in modern irrigation techniques like drip

and sprinkler systems, as well as increased availability of financial assistance and market stability. In conclusion, establishing additional sources of income by raising livestock and practicing animal husbandry, with the help of available veterinary services, can enhance economic stability and resilience in the farming industry.

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