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To Study Of Changing Cropping Pattern And Irrigation Facilities In Jind District Of Haryana (2000–2021)

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Abstract
This study investigates the changes in agricultural patterns and irrigation development in Jind district of Haryana from 1990 to 2021. Over the years, Haryana's agriculture has seen various alterations due to technical improvements, government policies, and changing market demands. Jind, being an important agricultural district in the state, has mirrored these developments extensively. The cropping pattern has shifted from traditional crops like pulses, bajra, and oilseeds to intense wheat and rice farming. Similarly, the irrigation system has transformed from traditional canal-based systems to tube well-based irrigation. This research uses government statistics, statistical abstractions, and field insights to analyze how and why these changes occurred. It also explores the repercussions of such changes on groundwater, soil health, production, and sustainability. The study concludes by providing practical approaches for crop diversification and water conservation for guaranteeing long-term agricultural viability in Jind area.
Key words: *Cropping Pattern, Irrigation Development, Agriculture etc.*

INTRODUCTION

Agriculture is the backbone of the Indian economy, especially in areas like Haryana, where a huge part of the population depends on farming for their livelihood. Haryana is noted for its contribution to India's food grain production, especially wheat and rice. Since the Green Revolution in the 1960s, the cropping pattern in the state has switched toward these two crops due to high yield varieties (HYVs), fertilizers, mechanization, and assured irrigation facilities. However, this transition has had both positive and negative repercussions.

Jind district is located in central Haryana and is an agriculturally wealthy region. It features fertile soil, relatively level geography, and a good network of irrigation canals and tube wells. Over the past three decades, the cropping pattern in Jind has witnessed a major alteration. Farmers have changed from planting traditional crops such as bajra (pearl millet), gram (chickpea), and mustard to wheat and paddy due to increased profitability, availability of MSP (Minimum Support Price), and government procurement procedures.

Parallel to this shift in cropping pattern, the irrigation infrastructure in Jind has also undergone a substantial transformation. Earlier, canal irrigation had a major role, but with time, the usage of tube wells and submersible pumps has increased. This has led to over-extraction of groundwater, leading in diminishing water tables and attendant environmental consequences.

Objectives of the Study

1. To examine the changing trends in cropping patterns in Jind district from 2000 to 2021.
2. To study the development and transformation of irrigation methods during the same period.
3. To identify the factors responsible for these changes.
4. To assess the impacts of these changes on water resources, soil health, and agricultural sustainability.
5. To suggest strategies for promoting sustainable agricultural practices in the district.

METHODOLOGY

The study is based on secondary data obtained from various official publications, such as Statistical Abstracts of Haryana, District Census Handbooks, Agricultural Department papers, and research articles. Time-series data from 1990 to 2021 have been utilized to discover trends. In addition, some qualitative comments from field trips and farmer interviews have also been included. Descriptive analysis, percentage change, and trend analysis methods have been employed to interpret the data.

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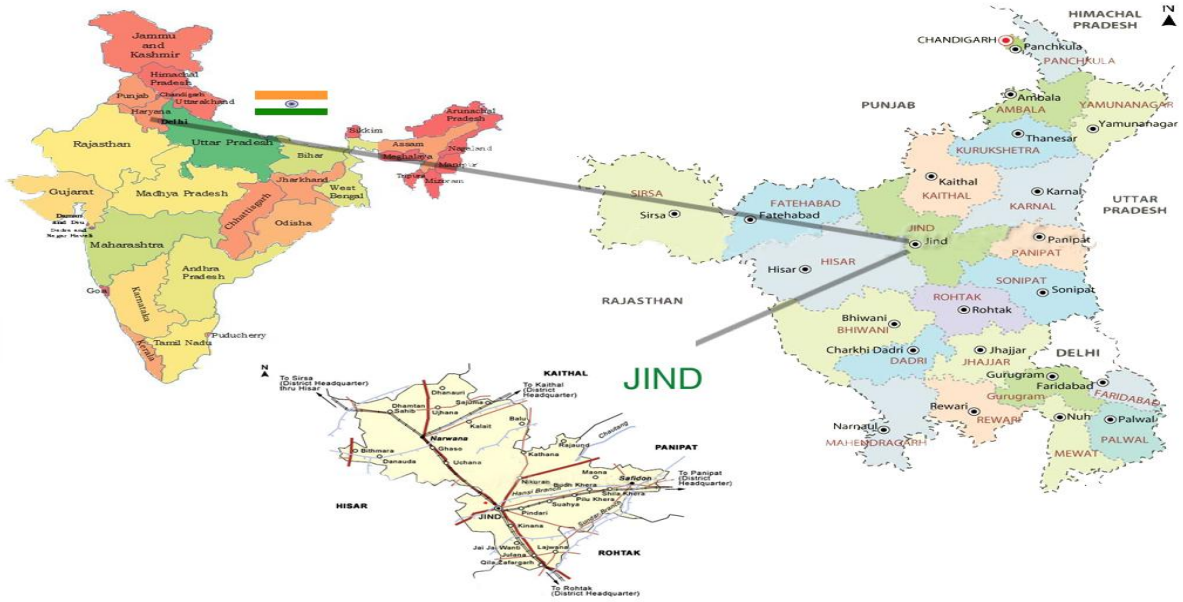
Overview of Jind District

Jind is one of the 22 districts of Haryana, located in the middle section of the state. It comprises a total geographical area of around 3,606 square kilometers. The district encompasses significant blocks such Jind, Narwana, Safidon, and Uchana. Agriculture is the predominant activity of the inhabitants, with over 70% of the population involved in farming and other activities.

Jind has fertile alluvial soil, and the main crops planted are wheat, rice, mustard, cotton, and sugarcane. The climate is semi-arid with scorching summers and freezing winters. The average annual rainfall is roughly 500-700 mm, which is not sufficient to support intensive agriculture. Hence, irrigation plays a key part in the district's agricultural.



Changes in Cropping Pattern (2000–2021)

• Traditional Crops (1990s)

In the 1990s, the cropping pattern in Jind was more diverse. Farmers grew a variety of cereal grains, legumes, and oilseeds. The principal crops included wheat, gram, mustard, bajra, and cotton. Crop rotation was regularly done. The area under paddy was limited due to water constraint and lack of canal extension.

• Shift Toward Wheat and Paddy (2000–2010)

During this period, a significant shift happened. The government started pushing paddy farming due to food security concerns. High-yielding varieties (HYVs) and subsidies made paddy attractive. The area under rice increased substantially, especially in the kharif season. Wheat remained dominating throughout the rabi season. Crops including pulses, coarse grains, and oilseeds dropped in prominence.

• Current Trends (2010–2021)

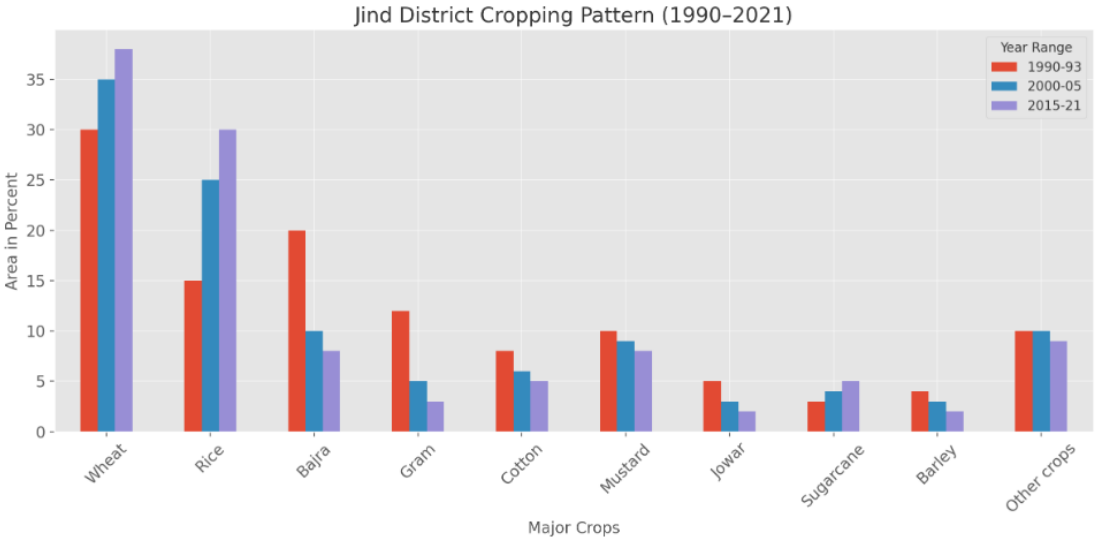
By 2021, wheat and rice combined occupied over 80% of the gross cultivated area. Farmers adopted mechanical farming processes and used additional fertilizers and pesticides. However, the dominance of these two crops created worries about sustainability. Traditional crops were practically destroyed due to lower returns and lack of market support

Changes in Cropping Pattern – Jind District (2004–2019)

Crop	2004–05	2008–09	2012–13	2016–17	2018–19
Wheat	859 kt	1,030 kt	922 kt	1,056 kt	1,126 kt
Rice	201 kt	250 kt	318 kt	349 kt	387 kt
Bajra	67 kt	102 kt	47 kt	34 kt	20 kt
Barley	3 kt	3 kt	4 kt	0 kt	1 kt
Mustard	16 kt	9 kt	8 kt	8 kt	14 kt
Cotton	148 kt	153 kt	244 kt	175 kt	162 kt
Sugarcane	37 kt	11.6 kt	19 kt	38 kt	37 kt

Crop	2004–05	2008–09	2012–13	2016–17	2018–19
Food grains	**1,131 kt**	1,386 kt	1,292 kt	1,440 kt	1,534 kt

Source : https://agriharyana.gov.in



Source : https://agriharyana.gov.in

Irrigation Development in Jind

• **Pre-1990 Scenario**

Irrigation was heavily relied on the canal system. The Western Yamuna Canal and its branches delivered water to different regions of the district. Tube wells were present but not frequently used due to electrical limits and minimal groundwater utilization.

• **Expansion of Tube Wells (1990–2010)**

As canal water proved insufficient for increasing demand, farmers began building shallow and later submersible tube wells. Government subsidies and free or cheap electricity encouraged this. Tube well irrigation increased from 40% in 1990 to over 70% by 2010.

• **Present Irrigation Scenario (2021)**

Now, most of the irrigation is done via deep tube wells. Canal irrigation has become secondary. However, over-dependence on groundwater has led to substantial water table depletion in numerous blocks. Water-intensive paddy has compounded the situation.

Trends in Irrigation Development

Period	Major Irrigation Source	Characteristics
Pre-1990	Canal irrigation	Low irrigation intensity, crop diversity, canal dependency
1990–2010	Shallow tube wells	Expansion of HYVs, subsidy support, crop shift to wheat/paddy
2010–2021	Submersible/deep tube wells	Over-extraction, falling water tables, rising input costs
Post-2021 (Goal)	Water-saving technologies	Policy shift to sustainability, micro-irrigation promotion

7. Factors Influencing These Changes

• **Government Policies**: MSP for wheat and rice, crop procurement, and input subsidies played a major role.

• **Market Access**: Farmers preferred crops with assured markets.

• **Technology**: Use of HYV seeds, tractors, harvesters, and irrigation pumps promoted monocropping.

• **Climate Change**: Irregular rainfall and rising temperatures discouraged rain-fed crops.

• **Water Availability**: Areas with better groundwater shifted to water-intensive crops.

Factor	Influence
Government Policies	Encouraged wheat-rice with MSP, procurement, and subsidies
Market Access	Increased preference for cash crops with guaranteed buyers
Technology	Enabled high yields and multi-cropping with modern equipment
Irrigation	Assured water availability allowed water-intensive crops
Climate	Unreliable rainfall pushed farmers to controlled irrigation crops
Profitability	Wheat and paddy gave more income than pulses or oilseeds
Extension Programs	Encouraged HYV adoption, mechanization, and new methods
Social Change	Peer imitation and youth shift to modern farming methods

Impact of Changes

The alteration in farming patterns and irrigation practices in Jind district from 1990 to 2021 has led to a wide range of impacts, some good and others deeply troubling. On one hand, higher production, enhanced irrigation access, and modernization of farming techniques have helped many farmers in the near term. On the other side, these changes have posed major environmental, economic, and social sustainability issues. The long-term impact of these developments needs to be rigorously considered to design policies that can maintain the environment while preserving agricultural livelihoods.

One of the most serious repercussions of these changes is the over-extraction of groundwater resources. As canal irrigation grew less reliable and farmers turned to water-intensive crops like paddy, the usage of tube wells and submersible pumps expanded substantially. With government-subsidized or free power, farmers drew groundwater freely without much supervision, resulting to a significant decrease in the water table across many blocks of Jind. In other locations, shallow wells dried out, prompting farmers to invest in deeper and more expensive borewells. This tendency has not only increased the expense of farming but also posed a severe threat to the future supply of groundwater. If this continues unchecked, the district may confront significant water scarcity, hurting agricultural sustainability and rural life.

- **On Water Resources**

Uncontrolled use of groundwater for paddy and wheat has led to falling water tables. This has increased the cost of irrigation and energy consumption.

- **On Soil Health**

Monoculture, heavy use of fertilizers, and reduced crop rotation have degraded soil health. Soil nutrients are getting depleted, and salinity is rising in some areas.

- **On Biodiversity**

Loss of crop diversity has impacted agro-ecological balance. Pollinators and natural pest control systems are being disrupted.

- **On Farmers' Income**

Initially, farmers benefited from high yields and good prices. But gradually, input costs rose, and income stagnated. Small and marginal farmers are more vulnerable.

CONCLUSION

The analysis demonstrates that from 1990 to 2021, Jind district underwent a considerable change in farming patterns and irrigation methods. Wheat and paddy replaced traditional crops due to policy backing, technological improvement, and market assurance. Tube wells became the major source of irrigation. While these innovations boosted food grain output, they also led to major challenges relating to groundwater depletion, soil health degradation, and environmental stress. Sustainable farming techniques, crop diversification, and water-saving technologies are the need of the hour. Policymakers, researchers, and farmers must work together to secure long-term food security and environmental balance in Jind and related places. In conclusion, the changes in agricultural and irrigation techniques in Jind district have been driven by a mix of government incentives, market pressures, contemporary technologies, changing climate, economic necessities, and social behaviors. These variables worked

together to encourage farmers to transition away from traditional, low-input farming to more commercial and intensive agriculture.

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