

An Analysis of Change in Cropping Pattern in Haryana

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DOI: <https://doi.org/10.51583/IJLTEMAS.2025.1410000108>

Abstract: The present study explores the shifting trends in cropping patterns in the state of Haryana from the post-Green Revolution period to the present day. Haryana, a primarily agrarian state, has witnessed considerable alterations in its agricultural environment, chiefly driven by technology innovation, government laws, irrigation development, and market demands. Historically, the cropping pattern was more diversified, comprising cereals, pulses, oilseeds, cotton, and sugarcane. However, with the introduction of the Green Revolution in the late 1960s, there was a noticeable shift toward the cultivation of high-yielding kinds of wheat and rice. This transformation was supported by the assured procurement system, minimum support prices (MSP), and canal and tubewell irrigation infrastructure. While this resulted to food security and money creation in the near term, it also contributed to regional imbalances, soil degradation, and groundwater depletion due to monoculture practices. In recent decades, there has been a progressive trend toward diversification, with farmers demonstrating increasing interest in horticulture, oilseeds, and organic farming, especially in response to environmental concerns and sustainability issues. Government efforts supporting crop diversification and natural farming are playing a crucial role in this development.

Key Words: Cropping Pattern, Cultivation, Cropped Area etc.

I. Introduction

Agriculture plays a crucial role in the economy of Haryana, with a considerable portion of the population involved in farming and allied businesses. Since its creation in 1966, Haryana has grown as one of India's major agricultural states, mostly because to the Green Revolution, which brought technological breakthroughs like high-yielding variety (HYV) seeds, chemical fertilizers, pesticides, and enhanced irrigation systems. These adjustments led to a dramatic upheaval in the cropping pattern of the state. (Husain, M. 1996). The traditional diversity of crops, including cereals, pulses, oilseeds, cotton, and sugarcane, progressively transitioned into a wheat-rice dominated monoculture. Government programs such as assured procurement, minimum support prices (MSP), and subsidized inputs further promoted this tendency. Initially, this farming strategy helped attain food security and boosted rural incomes. However, over time, it led to various environmental and economic difficulties. The over-reliance on wheat and paddy produced soil nutrient depletion, groundwater overexploitation, and a loss in crop diversity. Regions with weak irrigation facilities lagged behind in terms of productivity and wealth. Additionally, the inflexible crop choice hindered farmers' capacity to adjust to shifting market needs and climate uncertainty.

"In recent years, the demand for sustainable agriculture has become more critical. Climate change, diminishing water tables, and the rising cost of inputs have compelled policymakers and farmers to reassess their agricultural options" (Singh, 20202). Various steps are now being done by the Haryana government to promote crop variety, natural farming, and organic agriculture. Pilot initiatives have been developed in districts like Kaithal and Gurugram, attempting to minimize the dependence on water-intensive crops and improve soil health through eco-friendly practices.

II. Review of literature

(Kumar 2022) studied "Changing cropping pattern in Sonapat district, Haryana: A study in temporal perspective" A region's economy isn't complete without agriculture. Both the Green Revolution and its aftermath had a profound impact on the agricultural environment. The change in the cropping pattern is the most obvious manifestation of this alteration. This research aims to examine the changes in cropping patterns in the Sonapat district of Haryana between 1970–71 and 2000–01. This is mostly due to the fact that the green revolution began in the nation in the mid-60s and reached the study region in the early-70s. It is astonishing that farmers in the region had such a poor monetary return per hectare in the early seventies, despite the increasing production of numerous crops. This is because the area's crops are farmed at a cheap price level. A mix of land usage and statistical technique forms the basis of the current study's framework. A data set at the district level has been used to investigate the shifting pattern of cropping.

(Rawat and Bala 2021b) studied "Changing Cropping Pattern in Haryana: A Spatio-Temporal Analysis of Major" The local population's eating patterns are influenced by the cropping pattern that is dictated by the number of components in the producing region. Since the Green Revolution in the 1960s and continuing to the present day, Haryana's cropping pattern has seen several alterations. The state of Haryana relies heavily on wheat and rice as main crops, and the green revolution has been a boon to these crops. An analytical analysis of Haryana's wheat and rice harvests is offered in this study piece. Over the study's reference period (2001-2018), analysis shows that planted area and yield under wheat and rice vary both spatially and temporally across Haryana's districts. Since the green revolution increases the output and price of wheat and rice, it influences the thinking of the farmers, which in turn changes the cropping pattern of Haryana. Nonetheless, intensive farming has given way to market-oriented crop shaping for profit-making in Haryana's current style of farming. Crop nutrition, soil fertility, and the ecology have all taken a hit as a result of Haryana's pervasive market-oriented agriculture.

(Rawat and Bala 2021a) studied “Changing Cropping Pattern in Haryana : A Spatio- Temporal Analysis of Major Food Crops” Differences in the current distribution and the variables that impact cropping pattern across time effect cropping pattern, which is defined as the percentage of land under different crops at any given moment. The safety of food and people's means of subsistence in South Asi are greatly impacted by rice-wheat (RW) initiatives. The average yield of rice and wheat grown using the increasingly common double-cropping rotational pattern varies greatly from one region to another. Rising demand is a direct result of population, urbanization, and economic development, all of which need substantial expansion. To compare the efficiency of mechanically transplanted rice (MTR) under no-till and non-puddled conditions to that of conventionally transplanted rice (CPTR), a plethora of field experiments were conducted in Haryana.

(Yadav 2019) studied “Status of Changing Cropping Pattern in Haryana” The term "cropping pattern" describes the proportion of an area that is used for growing different crops at any particular moment. Conventional overall cropping patterns in Haryana and India have been transformed by the country's new agricultural system, according to historical accounts of Indian agriculture. The green revolution, minimum support prices, and new economic reforms are just a few of the many developments that have taken place in Haryana's agricultural sector. Every one of these shifts has had a major effect on Haryana's overall cropping pattern. The agricultural practices in Haryana are the primary subject of our present investigation. This study addresses several questions about the cropping patterns in Haryana as it focuses on them. The present cropping pattern in Haryana, together with any changes from 1966–1969, 1990–1993, and 2009–2012, will be explained by the study. We can improve the agricultural pattern in Haryana by using this study to find the numerous modifications or regulatory aspects.

(Sangwan 2024) studied “Impact Of Cropping Pattern Changes On Groundwater In Haryana” The goal discovers that groundwater levels have been steadily declining since the green revolution. The state was once able to grow more than only wheat and rice, but that changed when the green revolution brought forth a new approach to farming. Massive groundwater extraction has occurred as a consequence of the state's solitary rice-wheat cultivation pattern. This research relies on secondary sources of information and makes use of linear and step-wise regression, as well as the weaver's crop combination technique. In the districts of Kurukshetra, Karnal, Kaithal, Bhiwani, Fatehabad, Panipat, Rewari, Sirsa, and Mahendragarh, the research found that growing rice and wheat significantly depletes the groundwater table. The statistical evidence points to the expansion of rice fields as the primary driver of the state's declining groundwater table. Therefore, sustainable and environmentally friendly farming practices, including crop diversity, are an absolute must.

(ta et al. 2017) studied “Changing Pattern of Area, Production and Productivity of Principal Crops in Haryana, India” The research relied on secondary data culled from a variety of sources, including past and present volumes of the Statistical Abstracts of Haryana. According to the findings, the state's cropping pattern has changed significantly throughout the years. While pulses had negative trends in all three metrics, area, production, and productivity for food grains increased at a compound yearly rate of 0.56 percent, 2.56%, and 1.93% for the whole research period (1993–2013). Only three crops—rice, wheat, and barley—had an increase in average area over the research period; jowar, bajra, maize, cotton, sugarcane, and others saw a drop. The cultivation of rice and wheat has become the dominant agricultural pattern. Because more land is being devoted to paddy, the growing area for pearl millet and sugarcane has decreased, while the area for gram has decreased as more land is being devoted to wheat.

(Reviewed, Open, and International 2024) studied “Double-Blind Peer Reviewed Refereed Open Access International Journal” The cropping pattern is a key component in identifying an area's agricultural transition, making it an essential component of any geographical research. By analyzing the state's cropping pattern from 1966–67 to 2020–21 at four different time intervals (i.e., 1990–91, 2000–01, 2010–11, and 2020–21), this research aims to analyze the trends and variations in an area under significant crops in Haryana. As a result of advances in agricultural technology, cereal crops—especially wheat and rice—now account for the majority of the state's cropped land, whereas pluses, sugarcane, bajra, maize, barley, and jowar have seen their areas farmed decrease. Two related facts are generated by the changing structure of irrigation and the change in cropping pattern. The first is that more rice fields mean more water needs. Additionally, the water supply in the canals has decreased due to lack of maintenance, and tubewells provide their own benefits in terms of irrigation dependability and flexibility, thus groundwater irrigation is becoming more and more important to meet the increased demand for water. Additionally, the results make it clear that the study region has to diversify its crops since the amount of tubewell irrigation is directly proportional to the area devoted to rice crops. This puts a lot of strain on groundwater resources.

III. Methodology

Secondary data gathered from reliable institutional and government sources forms the basis of the current research. Publications from the Government of Haryana's Department of Agriculture and Farmers Welfare, the Haryana Economic Survey, the Statistical Abstract of Haryana (different issues), and the Agricultural Census of India are some of the primary sources of information. The research spans the years 1966–2021, which correspond to the time after the Green Revolution and into the current stage of agricultural development. We gathered and evaluated data on the areas farmed by important crops in the state, including wheat, rice, bajra, pulses, oilseeds, cotton, and sugarcane, to observe how the pattern of farming changed over time and across different regions. The variations over time were interpreted using descriptive and comparative statistical approaches. In order to quantify the change in crop area and dominance, trend analysis and percentage share methodologies were used. Charts and maps were created to show how things have changed throughout time and how different regions are from one another. A comparison was made between the changes in crop area and the growth of canal and tubewell irrigation to evaluate the link between the two. To put the trends into

perspective and learn about the environmental, social, and economic effects of these shifts, we also looked at relevant policy papers and literature.

Study Area

The state of Haryana, which is located between coordinates 27°39' and 30°55' N and longitudes 74°28' to 77°36' E, is the topic of the current investigation (Fig.1). The state's native geographic limits are the Yamuna River in the east, the Ghaggar River in the west, and the Shivalik Hills in the north. The region of Aravalli hills that spans through southern Delhi and the Gurgaon district up to Alwar in Rajasthan acts as the southwest boundary. The State of Haryana makes up 1.4 percent of the nation's overall territory with a 44212 sq km area. The State boasts an impressively diversified geography and soil richness. (Krishnan 1972). Haryana encircles Delhi, the nation’s capital, on three sides. Himachal Pradesh is Haryana's northern neighbour. Uttrakhand, Uttar Pradesh, and Delhi are its eastern neighbours. Rajasthan is Haryana's southern and western neighbour. The province has a subtropical, semi-arid to subhumid, continental environment with a monsoon pattern. The state receives 560 millimetres of rainfall on average, with fluctuations from less than 300 mm in the south-western parts to more than 1000 mm in the mountainous Shivalik Hills. Morgan (W. B. and Munton R. J. C. 1971).The soil of Haryana is categorized into 10 main units notably Shivalik Hill Soil, Aravalli Hill Soil, Old Alluvial Plain Soil, Active Alluvial Plain Soil, Aeofluvial Plain Soil, Aeolian Plain Soil. Haryana is highly cultivated, lacking in natural forests. Forests are predominantly found in the northeastern and southeastern areas. There are three types of forests, tropical dry deciduous in the east, moist tropical deciduous in the Shivalik region and tropical thorn forest in the western section of the country.

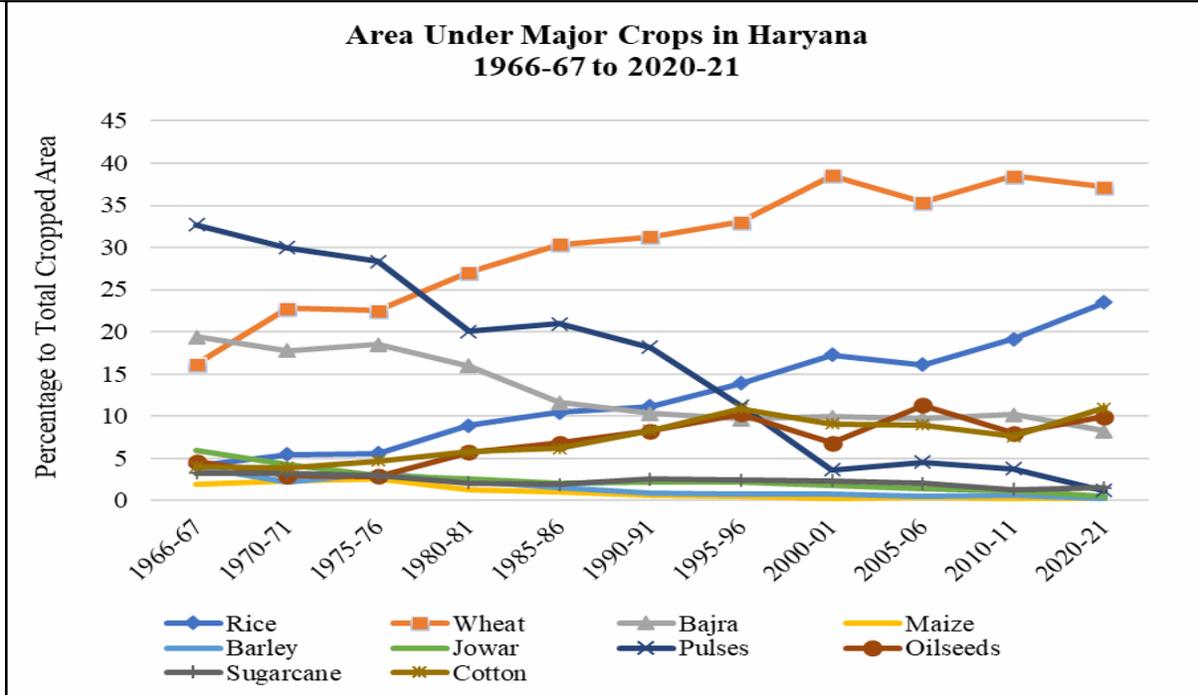
Objective:

1. To examine the temporal changes in cropping patterns in Jind district from 1990 to 2021,
2. To assess the development and transformation of irrigation infrastructure
3. To analyse the relationship between irrigation development and changes in cropping patterns
4. To evaluate the socio-economic and environmental implications



Cropping Pattern Changes in Haryana

The study area's cropping pattern shows that it has changed from 1966–67 to 2020–21. The types of changes in cropping patterns are one of the most important factors in an area's agricultural income. (Singh, J. and Sharma, V.K. 1985). There have been big changes in the way crops are grown in the state since the green revolution. Figure 1.3 shows that the area of land planted with wheat and rice is growing faster than that of other cereals and cash crops. “The amount of land used for wheat farming has grown from 16.16 percent in 1966–67 to 37.18 percent in 2020–21. The amount of land used for rice farming has grown from 4.17 percent to 23.46 percent” (Baiuds, 2022).



Source: Statistical Abstract of Haryana, (Various Issues)

Historical Trends (1966–2021)

The cropping pattern in Haryana has seen dramatic modifications between 1966 and 2021, mostly determined by technological, economic, policy, and environmental variables. At the time of its establishment in 1966, Haryana had largely an agrarian economy with a reasonably diverse cropping structure. Farmers grew a variety of grains (wheat, rice, bajra), pulses (gram, moong, masoor), oilseeds (mustard, groundnut), cotton, sugarcane, and vegetables, relying mostly on monsoon rains and traditional agricultural practices. (Menon V.P. 1956). However, the post-independence era, especially the late 1960s and early 1970s, witnessed the onset of the Green Revolution in India, and Haryana became one of its focal areas due to the state’s fertile soil, favorable agro-climatic conditions, and relatively better irrigation potential compared to many other states. (Gulati A. 2002). This period saw the beginning of a severe and long-lasting shift in the state’s cropping pattern, with the introduction of high-yielding varieties (HYVs) of wheat and paddy, greater use of chemical fertilizers, and rapid construction of canal and tubewell irrigation facilities.

Between 1966 and 1980, wheat emerged as the dominating crop in the rabi (winter) season, and paddy in the kharif (monsoon) season. The government supported this shift with procurement regulations, assured minimum support prices (MSP), subsidized agricultural inputs, and infrastructure for storage and sale. As a result, the area under wheat rose considerably, notably in areas like Karnal, Kurukshetra, and Ambala. Similarly, the area under paddy expanded significantly, often replacing traditional crops like bajra, jowar, pulses, and coarse cereals. This time can be regarded as the “monoculture phase” of Haryana’s agriculture, where the diversity of crops gave way to specialization in two key staples: wheat and rice. Though this contributed greatly to national food security and rural economic growth, it also started sowing the seeds of unsustainable farming practices.

During the 1980s and 1990s, the wheat-paddy rotation became strongly ingrained in the state’s farming systems. By 1990, wheat and paddy together accounted for more than 75% of the gross cultivated area in Haryana. (Gulati A. 2002). The economic benefits from these two crops were comparatively consistent and predictable, particularly due to government procurement systems. The surge in cropping intensity, made possible by secured irrigation and availability of modern inputs, allowed farmers to take numerous crops in a year. However, this also led to rising pressure on groundwater supplies and degradation of soil health due to excessive use of fertilizers and lack of crop rotation. In these decades, crops like pulses and oilseeds dropped drastically, both in area and importance. Pulses, formerly a staple feature of Haryana's agrarian environment, became marginal due to decreasing yields, market instability, and lack of government procurement support. Similarly, traditional coarse cereals such as bajra and jowar suffered a continuous reduction in acreage as they were regarded less profitable and less input-responsive compared to wheat and rice.

The era from 2000 to 2010 saw the height of cereal-centric agriculture in Haryana. According to agricultural statistics, food grains accounted for roughly 90–95% of the total planted area in the state during this time. (Asok Gulati A. and Kelly T. 2001). The wheat-rice cropping cycle dominated the central and eastern regions of the state, with areas like Kaithal, Karnal, and Kurukshetra having unusually high cropping intensity (sometimes above 180%). In the southern and western districts like Hisar, Bhiwani, and Mahendrakar, cotton and mustard remained substantial, but their proportion in the overall cropping pattern remained limited. The economic logic behind this skewed trend was strong: MSP for wheat and rice, coupled with public purchase, assured income security for farmers. (Griffith K.B. 1974). However, this triumph came at an ecological cost. The over-exploitation of groundwater,

particularly in rice-growing areas, became a major concern. The water table began to plummet at worrying rates in several districts. Moreover, persistent production of cereals without proper fallow intervals or crop diversification led to depletion of micronutrients in soil, insect resistance, and increased sensitivity to climate change.

Recognizing these rising concerns, the period from 2010 to 2021 witnessed a gradual shift in policy focus and farmer awareness toward crop diversification and sustainable agriculture. Although wheat and rice still kept supremacy in the cropping pattern, there was a clear move by the state and national governments to encourage alternative crops such as maize, pulses, oilseeds, and horticulture crops. Several efforts like as the “Crop Diversification Program,” “Paramparagat Krishi Vikas Yojana (PKVY),” and “Pradhan Mantri Krishi Sinchayee Yojana (PMKSY)” were established to encourage farmers to adopt more sustainable and less water-intensive crops. In 2019, the Haryana government introduced a strategy to transfer farmers away from paddy production to other crops in over-exploited groundwater zones. (Singh G. B. 1999). Despite these attempts, change on the ground remained minimal due to structural restrictions, such as market infrastructure, lack of procurement for non-cereal crops, and established agriculture techniques.

More recently, the concept of natural farming and organic agriculture has attracted policy attention in Haryana. In 2025, the state initiated a trial project in Kaithal district encouraging natural farming on government land, seeking to cut input costs, increase soil health, and alleviate environmental harm. (Bhalla G. S., Singh G. 2001). Similarly, organic marketplaces have been built in towns like Gurugram and Hisar to promote chemical-free products and create a viable marketing ecosystem for varied commodities. These efforts highlight a potential turning point in Haryana’s cropping trajectory, signifying a slow but essential trend away from grain monoculture toward more environmentally and economically balanced agriculture.

the historical trends in cropping patterns in Haryana from 1966 to 2021 demonstrate a clear move from diversified agriculture to cereal monoculture, driven by Green Revolution technologies, regulatory incentives, and market pressures. (Chand, R., & Pandey, L. M. 2008). While this shift provided great increases in food production and rural lives, it also led to serious ecological and sustainability issues. In recent years, a growing understanding of the constraints of the wheat-rice system has led to a renewed focus on crop diversification, sustainable agriculture, and natural farming practices. The future of Haryana’s agriculture will rely on how effectively these newer trends are integrated into mainstream farming through institutional support, farmer training, and market changes.

Drivers of Change in Cropping Pattern in Haryana

The movement in cropping patterns in Haryana from a complex agricultural structure to a wheat-rice dominated system, and now toward restricted diversification, has been affected by many socio-economic, technological, environmental, and policy-related forces.

1. Green Revolution and Technological Advancement

The most significant force of change was the Green Revolution, introduced in the late 1960s. Haryana, with its fertile alluvial soil, access to irrigation, and strategic placement near national markets, became one of the early benefactors of this drive. High-Yielding Varieties (HYVs) of wheat and rice were promoted intensively, along with the use of chemical fertilizers, insecticides, and enhanced farming equipment. (Singh Malik. 2020). These innovations dramatically enhanced productivity and income, encouraging farmers to focus more on wheat in the rabi season and rice in the kharif season. Over time, this developed to a monoculture pattern, displacing traditional crops including millets, pulses, and oilseeds.

2. Government Policy and Price Support Mechanisms

Another significant factor has been the Minimum Support Price (MSP) system and assured procurement policies. The Food Corporation of India (FCI) and Haryana State agencies acquired huge quantities of wheat and rice at government-declared prices, providing a guaranteed income to farmers. (Asok Gulati A. and Kelly T. 2001). This encouraged the concentration of acreage under these two crops, especially in locations where water supplies were not appropriate for rice growth. Moreover, subsidies on fertilizers, energy, and irrigation significantly reduced the cost of grain production, making wheat and paddy more profitable and less risky compared to other crops.

3. Irrigation Expansion and Cropping Intensity

Irrigation infrastructure plays a major impact in defining planting choices. Haryana built a vast canal network and later experienced widespread installation of tubewells, enabling farmers to grow water-intensive crops like paddy. (Singh, J. and Sharma, V.K. 1985). This led to a large increase in cropping intensity — from roughly 150% in the 1970s to around 200% in recent years. With access to irrigation, farmers were able to plant two or more crops a year, usually focused on cereals due to market and legislative incentives. However, this over-reliance on water-intensive crops began stressing the groundwater table, especially in central and northern areas.

4. Market Demand and Economic Returns

The planting pattern was also impacted by market signals and economic viability. Wheat and rice have maintained consistent demand due to their importance in the Public Distribution System (PDS) and as staple foods. (Morgan W. B. and Munton R. J. C. 1971). Farmers considered these crops more predictable in terms of price realization, financial access, and marketing outlets. In

contrast, crops like pulses, coarse grains, and oilseeds did not enjoy similar government backing or strong market linkage, making them commercially undesirable despite their lower input requirements.

5. Environmental Degradation and Resource Stress

The long-term repercussions of extensive grain farming started to appear in the form of soil nutrient depletion, water table drop, pesticide resistance, and ecological imbalance. These environmental challenges encouraged both experts and policymakers to reevaluate the sustainability of Haryana's conventional cropping pattern. (Husain, M. 1996) In recent years, increasing concerns over environmental degradation have stimulated governmental interventions supporting sustainable agriculture, crop rotation, and diversification toward less water-intensive and eco-friendly crops like millets, legumes, and oilseeds.

6. Policy Interventions for Diversification

Recognizing the ecological concerns, the Haryana government and central agencies created different incentives to encourage farmers to move from paddy to alternate crops. Programs such as the Crop Diversification Programme (CDP), Paramparagat Krishi Vikas Yojana (PKVY) for organic farming, and direct benefit transfers for non-paddy crops in water-stressed areas were launched. (Morgan W. B. and Munton R. J. C. 1971). These projects attempted to relieve demand on groundwater and enhance soil health by supporting crops like maize, pulses, sunflower, and vegetables. Pilot programs encouraging natural farming in Kaithal district and the construction of organic markets in Gurugram and Hisar are recent examples of this change.

7. Climate Change and Weather Uncertainty

Climate variability, including erratic monsoons, high temperatures, and decreased winter chill, has rendered particular crops riskier to farm. Paddy, for instance, is particularly susceptible to delayed monsoons and requires substantial water. (Gulati A. 2002). This has caused farmers in drought-prone areas reassess their crop selections, notably in districts like Mahendragarh and Bhiwani. Climate change is increasingly being recognized as a cause that will influence future cropping patterns by influencing water availability, growing seasons, and crop viability.

8. Changing Consumer Preferences and Global Trends

The desire for organic and chemical-free produce is expanding among urban customers. This trend is slowly pushing farmers in peri-urban parts of Haryana to experiment with horticulture, organic veggies, and medicinal crops. (Asok Gulati A. and Kelly T. 2001). Additionally, global food market trends and export potential for cotton, basmati rice, and horticulture produce have also played an influence in crop selection in various areas.

9. Educational Outreach and Farmer Awareness

Farmer awareness initiatives, Krishi Vigyan Kendras (KVKs), NGOs, and agricultural institutions have also influenced crop selections by educating farmers about the long-term implications of monoculture, benefits of crop rotation, water conservation, and organic practices. Capacity building through workshops and demonstrations is gradually influencing perceptions and driving a move to more sustainable and varied agricultural systems.

10. Technological Innovations and Mechanization

Finally, access to farm gear like laser land levelers, happy seeders, and drip irrigation systems has opened up possibilities for adopting new crops and conservation agriculture. Mechanization has made it easier to farm crops that were before labor-intensive, while also helping cut input costs, so making alternate cropping methods more attractive. (Griffith K.B. 1974).

IV. Discussion

The findings of this study highlight that Haryana's agriculture has undergone a significant structural transformation since the onset of the Green Revolution. The expansion of wheat and rice cultivation, supported by technological advances and government procurement policies, has undoubtedly enhanced productivity and food security. However, this shift toward monoculture has created serious ecological and economic challenges that now threaten the long-term sustainability of the state's agricultural system. The dominance of wheat and rice in the cropping pattern has led to heavy dependence on canal and tubewell irrigation, resulting in alarming groundwater depletion, particularly in districts like Kaithal, Kurukshetra, and Karnal. The results of the present analysis align with the observations of Sangwan (2024), who reported that increased rice cultivation has been the primary cause of groundwater decline across Haryana. Similarly, the decline in the acreage of pulses, coarse cereals, and oilseeds indicates a loss of biodiversity and a narrowing of the agricultural base, which has implications for soil fertility and resilience. The temporal trend analysis shows that while wheat and rice area expanded from 1966 to 2010, a marginal diversification has been observed in the last decade, driven by both government initiatives and farmer awareness. Programs such as the **Crop** Diversification Programme (CDP), Paramparagat Krishi Vikas Yojana (PKVY), and Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) have begun to influence farmers' decisions, but the pace of diversification remains slow. Structural barriers such as lack of procurement mechanisms for alternative crops, market risks, and inadequate storage and transport facilities have restricted the adoption of sustainable alternatives like pulses, maize, and oilseeds.

V. Conclusion

The evolution of cropping patterns in Haryana reflects a dynamic interaction between technological innovation, government policy, and environmental constraints. The Green Revolution successfully transformed Haryana into a major contributor to India's food security by promoting high-yielding varieties of wheat and rice supported by assured procurement and irrigation expansion. However, this success came at the cost of ecological imbalance, groundwater depletion, and declining crop diversity. The overdependence on water-intensive cereals has also made agriculture in the state increasingly unsustainable under current climatic and resource conditions.

In recent years, there has been a gradual realization of these challenges, prompting both policy interventions and shifts in farmer attitudes. Government initiatives such as the Crop Diversification Programme (CDP), Paramparagat Krishi Vikas Yojana (PKVY), and Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) mark a conscious effort toward sustainability. The promotion of pulses, oilseeds, horticulture, and organic farming indicates a positive direction, though large-scale adoption still faces barriers related to market access, infrastructure, and institutional support. The study concludes that the future of Haryana's agriculture lies in adopting a more balanced and diversified cropping system—one that conserves water, restores soil fertility, and provides stable incomes to farmers. Strengthening extension services, developing value chains for alternative crops, and integrating climate-resilient practices are essential to ensure that Haryana's agricultural transformation moves from short-term productivity gains toward long-term sustainability and resilience.

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