



Structural Changes in Haryana Agriculture

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

The present investigation was carried out for Haryana state for the period 1970-2021. Economic growth has been defined as a structural transformation process in which the contribution of industry and services sectors increased and agriculture's relative proportion of national production decreased. Statistical averages, percentages and CAGRs, were computed. Sectoral labor shares, capital formation, and sectoral output composition are the chosen metrics to evaluate structural change in the state. Agricultural performance was evaluated using key indicators of development, such as crop yields, cropping intensity, irrigation intensity, tractor density, and fertilizer consumption. Although Haryana is primarily an agricultural state, it has also seen significant growth in the industrial and service sectors. The main conclusions indicate that Haryana's structural changes align with those of India's national economy. However, the agricultural sector requires greater focus from policymakers to encourage the adoption of new farming innovations.

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1. INTRODUCTION

Structural change indicates qualitative transformation and evolution of the economic systems, usually marked by technological progress and organizational changes. Technological factors, knowledge and institutions are all elements that contribute to the process of structural change. The process of combining economic growth with shifting the relative contributions of various sectors to the GDP and labor force is known as structural change [1-4]. It proceeds in the order of agriculture to industry to services. The nations must change their labor-intensive industrial sectors from agriculture, which has low labor productivity, to industries with high labor productivity [5-9]. A higher share of domestic revenue originating from the agricultural sector is characteristic of underdeveloped economies. As these economies grow, the industrial sector's contribution increases, while the agricultural sector's share decreases. With further development, the services sector expands. These shifts in structural composition and sectoral shares influence both employment and domestic output. As structural transformation and economic development progress, the relative importance of agriculture diminishes, while the shares of the secondary and tertiary sectors rise. This shift often leads to an undervaluation of agriculture's role in economic development [10-12]. Despite being primarily agrarian, Haryana's economy has progressed in both industrial and agricultural sectors [13-17]. The present paper is an attempt to comprehend the structural change and performance of agriculture in Haryana. **The present study is divided into following sections: Section 1 Introduction Section 2 Methodology of research. Section 3 presents results and discussions. Section 4 mentions the conclusions and suggestions.**

2. METHODOLOGY

It is generally accepted that structural change is closely linked to economic growth, with the share of agriculture declining as development progresses, while the industrial and service sectors expand. This study aims to determine whether this pattern is present in Haryana's economy. Key indicators of structural change include labor distribution across sectors, capital formation, and sectoral output composition. The

effectiveness of agriculture is evaluated using indicators of agricultural development, such as crop yield, cropping intensity, irrigation intensity, tractor density, and fertilizer consumption. Data from published sources like Economic Survey and Statistical Abstract of Haryana were collated for last five decades (1970-2020). Statistical average, percentage, growth rate and compound annual growth rate (CAGR) were worked out.

2.1 Profile of Haryana

Haryana, part of the north Indian plains, is characterized by Shivalik foothills in the north and Aravalis in the south, with an elevation ranging from 200 to 300 meters bordering Punjab, Himachal Pradesh, Uttar Pradesh, Rajasthan. The climate features three main seasons i.e. summer, monsoon, and winter with temperatures varying from -2°C in winter to 49°C in summer, and rainfall ranging from 300 mm to 1000 mm annually. The state has a reported area of 37.58 lakh ha, with 95.20 percent as net sown area. Its fertile alluvial soil supports crops like rice, wheat, cotton, pearl-millet, mustard and sugarcane, though pockets of saline and alkaline soils exist. Small and medium land holdings dominate with 65.30% of total holdings. Mechanization and use of modern inputs like fertilizers and high-yield seeds have greatly augmented since the introduction of Green Revolution in the state. Irrigation area covers 80.45% of net sown area, with tube wells and canals as primary sources. Forest cover has lessened significantly to 0.73% of total geographical area. Livestock farming is prominent with large number of murrh buffalo having milk production of 105.14 lakh tonnes in 2020-21 with extensive animal care and treatment units.

3. RESULTS AND DISCUSSION

Agriculture sector contributed 60 per cent of total economy in 1970-71, gradually declining to 17.71 per cent in 2020-21 while contribution of industry sector inclined from 21 per cent to 31.29 per cent in same period [18]. The share of service sector amplified manifold from 19 per cent in seventies to 51 percent in 2020-21 indicating more than two and half times. Compound Annual Growth Rates (CAGR) of these sectors in last thirty years (1990-2021) showed varying growth trajectories [19,20,21]. This shift reflects Haryana's economic

diversification and development, with growth in industry and services driven by factors such as policy reforms, infrastructure development, and increased investment.

3.1 Status of Gross State Domestic Product in Haryana

The gross state domestic product (GSDP) at current prices increased from 1.00 thousand crores in 1970-71 to 758.51 thousand crores in 2020-21. Agriculture GSDP declined from 60 per cent in 1970-71 to 17.71 per cent in 2020-21 at current prices. CAGR for GSDP at constant prices was 13.89 per cent (1990-2021), indicating robust economic growth due to industrialization and expansion of information technology (IT) sector.

3.2 Status of Rural and Urban Population in Haryana

Haryana's population increased from 100.36 lakh in 1971 to 253.51 lakh in 2011. Rural population decreased from 82.33 per cent in 1971 to 65.12

per cent in 2011 while urban population touched to 34.88 per cent of total population in 2011 owing to migration of labour from other states particularly in NCR of Haryana. Literacy rate in Haryana improved from 35.70 per cent in 1971 to 69.30 per cent in 2011 indicating doubling of literacy in last fifty years as result of opening of large number of educational institutions and motivational of girl education in the state. Rural literacy increased from 15.25 per cent in 1971 to 101.58 per cent in 2011 [22,23]. Urban literacy increased from 11.74 per cent in 1971 to 64.40 per cent in 2011.

3.3 Status of Gross Fixed Capital Formation in Haryana

Gross fixed capital formation in Haryana increased from 0.85 thousand crores (1970-71) to 104.86 thousand crores (2020-21). CAGR at current prices was 15.53 per cent (1990-2021), indicating robust capital investment. This happened with establishment of industrial hubs, IT companies, residential areas etc in the state.

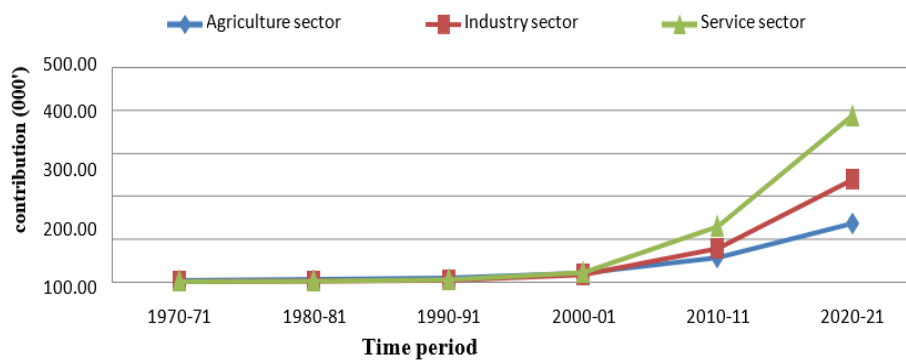


Fig. 1. Economic diversification and development in different sectors

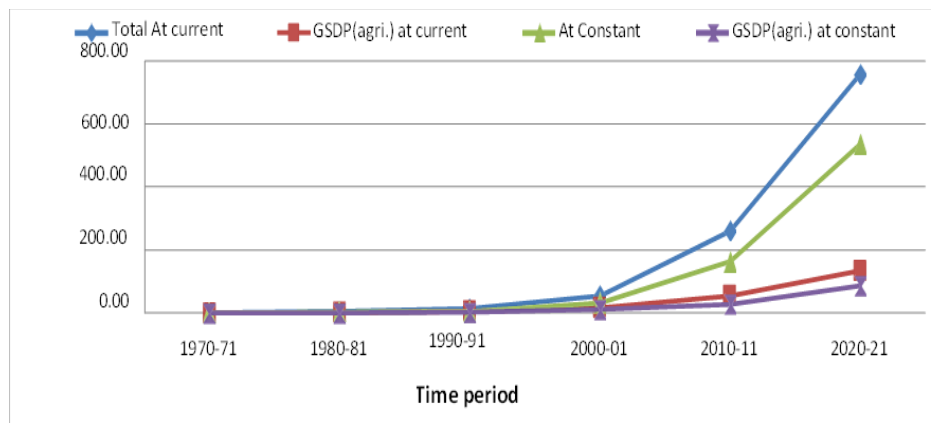


Fig. 2. Status of gross state domestic product in Haryana 1970-2021

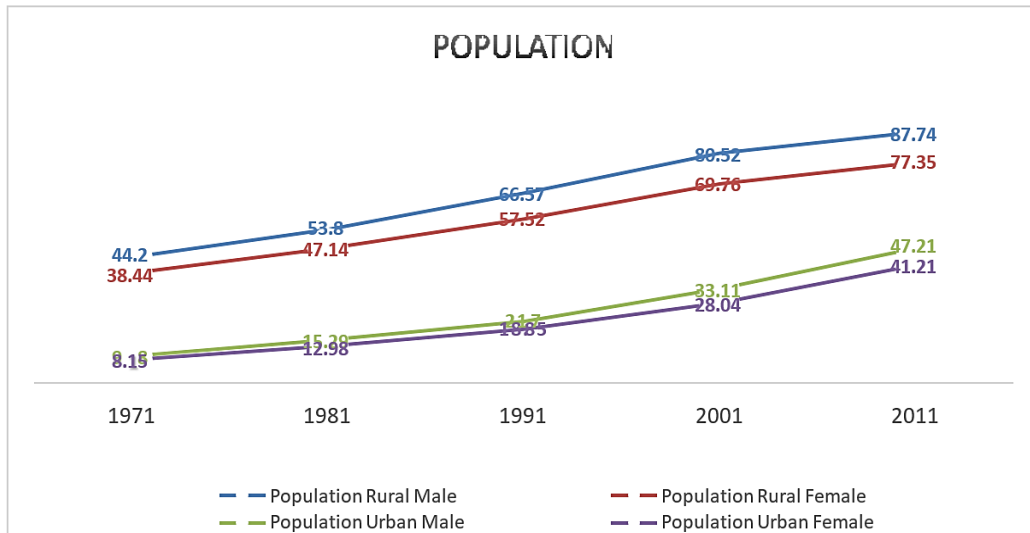


Fig. 3. Status of rural and urban population in Haryana

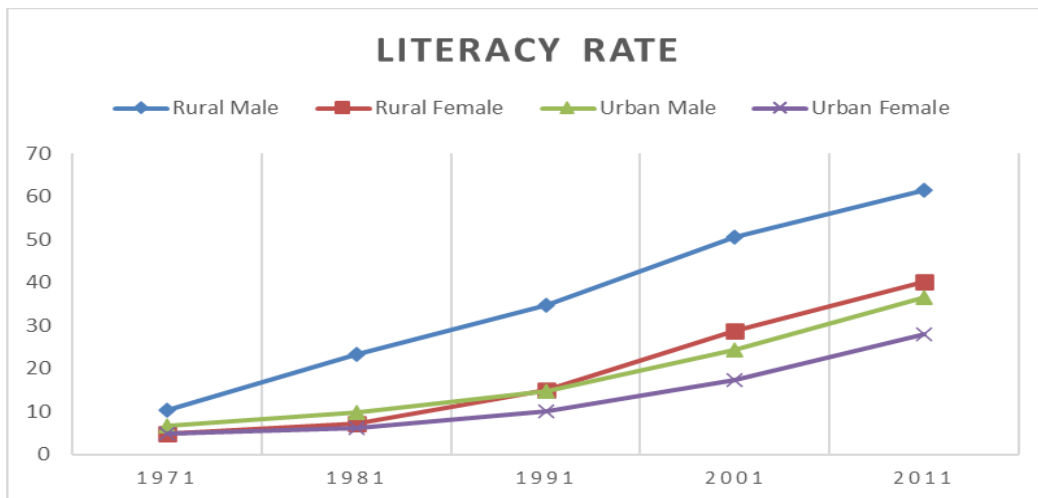


Fig. 4. Status of literacy rate in India and Haryana

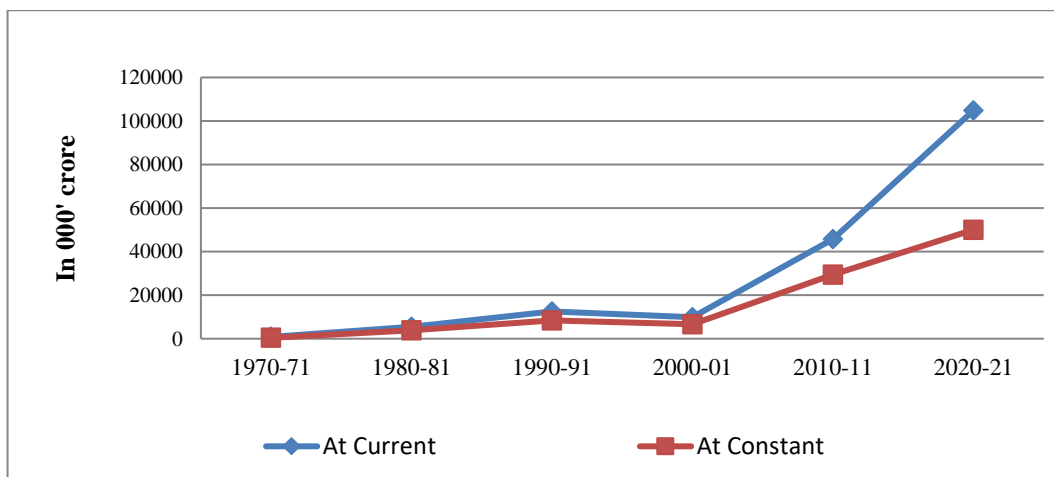


Fig. 5. Status of gross fixed capital formation in Haryana: 1970-2021

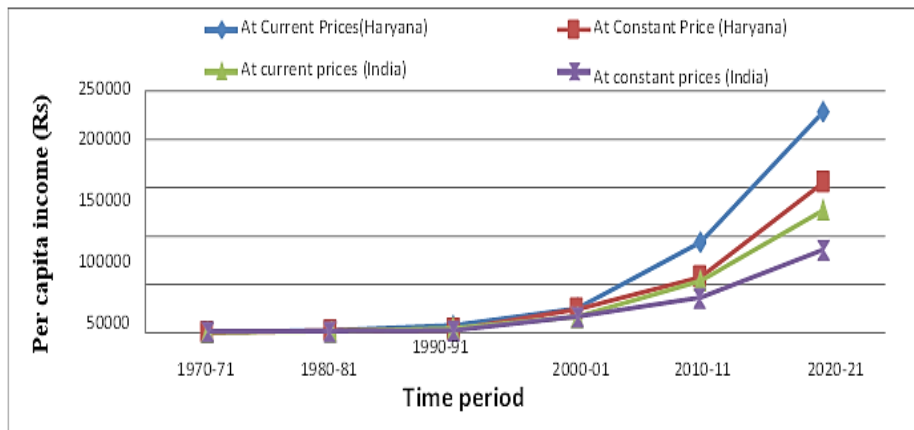


Fig. 6. Per capita income in Haryana and India: 1970-21

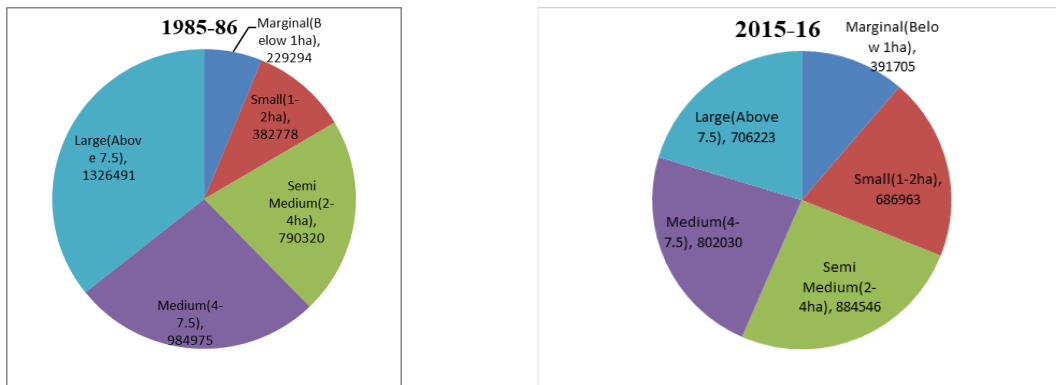


Fig. 7. Status of holdings under different categories of farm in Haryana

3.4 Status of Per Capita Income in Haryana

Per capita income in Haryana augmented greatly from Rs 877 (1970) to Rs 2.29 lakh (2020) in last five decades indicating around 12% average CAGR (at current prices) in various decades. The increase in per capita income was reflected due to increase in farm productivity, increased wages of industrial labour, expansion of industry and service sector resulting manifold increase revenue of the state.

3.5 Status of Holdings under Different Categories of Farms in Haryana

Distribution of operational holdings shifted over the years, with share of marginal holdings (<1.0 ha) of 51.27 per cent in 2015-16. The number of medium (4-7.5 ha) and large holdings (>7.5 ha) reduced drastically over the period due to fragmentation of land holdings and diversion towards non-agriculture purposes and it reached to 14.94 per cent in 2015-16 from 22.20 percent in 1985-86.

3.6 Occupational Distribution of the Workforce in Haryana

The primary sector involves extracting natural resources, the secondary sector focuses on manufacturing goods, and the tertiary sector provides services. As economies grow, they typically shift from primary to tertiary sector dominance. Primary sector dominated (66.65%) for employment of workforce in seventies in the state however this pattern changes up to 2011 and tertiary sector became the largest employer (52.10%). The significant growth in secondary and tertiary sectors over the decades also witnessed. Although the agriculture sector's proportion of all jobs has been decreasing over time, the majority of people are still employed in this low-productivity industry (Choudhary et al., 2022; Kumar et al, 2023; Gautam et al. 2024). However, as shown, the manufacturing sector's percentage of total employment has stayed essentially unchanged, while the services sector's share has been growing quickly [24], (Jaipal et al. 2023; Kalla et al. 2023; Sanitha and Singla, 2016,) [25].

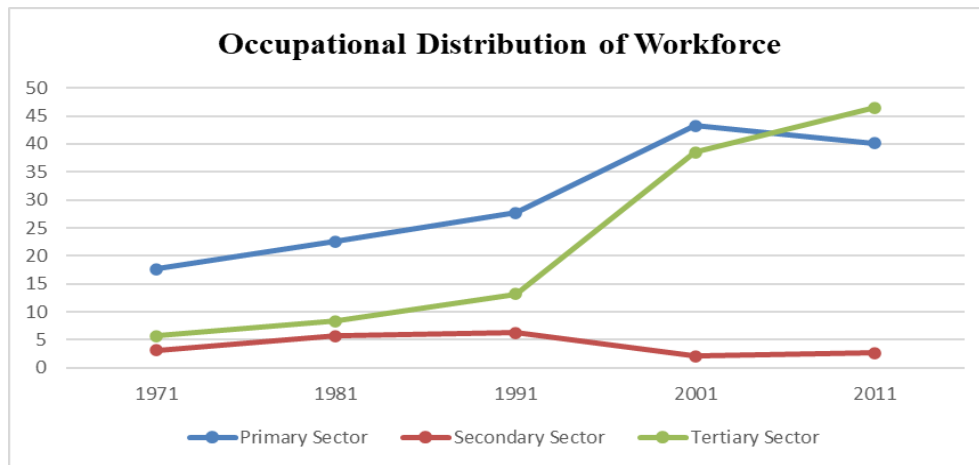


Fig. 8. Occupational distribution of workforce in Haryana: 1970-2011

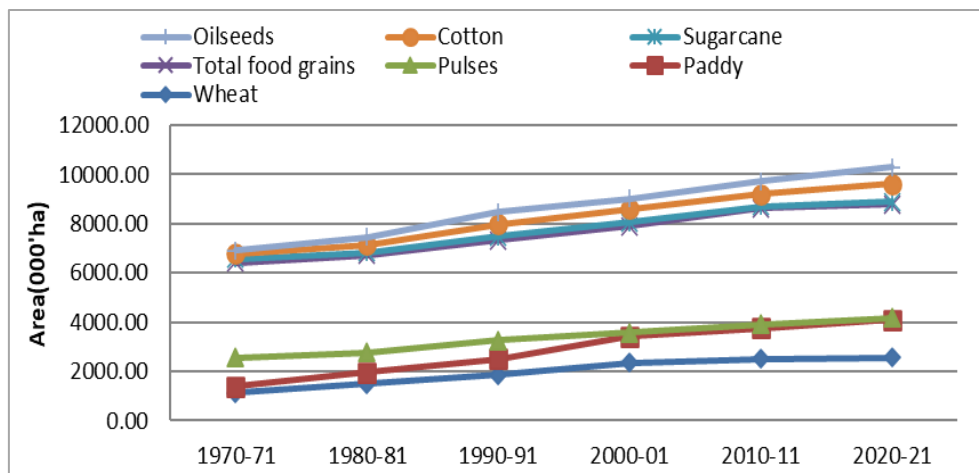


Fig. 9. Area coverage under different categories of farm in Haryana

3.7 Status of Area Coverage under Major Crops in Haryana

The cultivation of fine cereals like wheat and paddy has significantly increased over the years, while the cultivation of pulses and coarse cereals, except pearl millet, has declined. Land previously used for less profitable crops such as pulses, barley, maize, and jowar has shifted to more lucrative crops like wheat, paddy, cotton, sugarcane, and mustard. This shift is attributed to the expansion of irrigation facilities, improved market infrastructure, and active government participation in procurement. The compound annual growth rate (CAGR) for major crops shows positive growth for wheat (1.71%), paddy (3.46%), and total food grains (0.01%) during the period from 1970 to 2021.

4. CONCLUSIONS

The study concluded that GSDP of state showed a substantial increase over years. The number of literate people in Haryana increased significantly from 26.99 lakh to 165.98 lakh in fifty years indicating six times. Per capita income revealed a significant upsurge from Rs 877 to Rs 2.29 lakh. The share of marginal and small farmers increased from 56.92 to 71.33 percent in last thirty years due to fragmentation of land holding and diverted of land towards non-agricultural purposes. The employment of work force in agriculture dropped by 44.96 percent over the period. The forest area as well as net sown area reduced while total cropped area improved due to expanded irrigation infrastructure. Area under wheat and paddy showed manifold increase as result of area diversion from less remunerative crops.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declares that no generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of this manuscript.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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