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Changing Agricultural Growth And Crop Instability In Haryana

The Authors

(1) Dr. Asha Lata, Assistant Professor, Department of Geography, G.J.J.Government College, Hisar, Haryana

(2) Dr. Ashwani Kumar, Assistant Professor, Department of Geography, C.H.L. Government College, Chhara, Jhajjar, Haryana

Abstract

The present study examines the instability and sustainability of major crops in Haryana over the past three decades from 1990-91 to 2021-22. The findings recorded a rapid decline in the area under Gram cultivation, while Wheat, Rice, Cotton and Mustard crops experienced significant fluctuations. In India various agricultural reforms like land reforms, the Green Revolution, minimum support prices, and economic liberalization have positively contributed to increased productivity and production across crops. But they have also led to instability in crop cultivation. For instance, while rice and wheat have seen relatively stable production levels, coarse cereals and pulses have experienced high instability in terms of cultivated area and production, particularly in Haryana. To ensure food and nutritional security, it is essential to maintain sustainable crop production; this study evaluates that sustainability through the use of sustainability indices.

Key Words - Growth, Crop Instability, Production, Agriculture

Introduction:

Haryana, with its fertile lands, is a leading state in both agriculture and industry. Around 70% of its population is directly or indirectly involved in agriculture. The state has become self-reliant in producing food grains and holds the position of the second-highest contributor to the central food grain reserves of India. Despite its agricultural success, Haryana has also faced trends of crop instability in the sector over the years. While it has been a leader in agricultural productivity, particularly in wheat and rice, the state faces various challenges that lead to fluctuations in growth and instability. The relationship between growth and instability in agriculture is debated: modern technology is thought by some to reduce crop yield variability, while others argue it may increase it. Studies from the 1980s onward (Mehra 1981; Hazell 1982; Dev 1987; Ray et al. 1988) observed that agricultural production became more unstable post-technology introduction, while Sharma et al. (2006) found food grain production in India to be more stable in the 1990s than in the 1980s. This study assesses instability across Haryana's major crops by examining variability in cultivated area, yield, and production.

The paper is organized into two sections: the first examines trend of growth from 1990-91 to 2020-21 in the area of cultivation and production of major crops in Haryana. The second section of the study measures instability in crop production. Numerous studies (Rao, 1975; Narain, 1976; Mehra, 1981; Hazell, 1982; Rao et al., 1988) have indicated that high-yield variety (HYV) seeds and fertilizer-based technologies have contributed to increased production and productivity. However, this growth has also led to increased yield variability (Vani and Vyasulu, 1996). Factors such as the Green Revolution, Minimum Support Prices (MSP), and selective government policies have favored certain crops, shifting traditional cropping patterns in Haryana and India. The adoption of Green Revolution practices, while reducing instability in some crops, has increased instability in coarse cereals and encouraged mono-cropping in Haryana. Instability decreased in states like Punjab, Haryana, and Assam, while increasing in others such as Orissa and West Bengal (Mahendradev, 1987).

Data Base and Research Methodology:

This study utilizes the Cuddy-Della Valle Index (CDI) to assess fluctuations in crop production. The index is computed using the following formula:

CDI=C.V.×(1–R2)0.5CDI = C.V. \times (1 – R^2)^{0.5}CDI=C.V.×(1–R2)0.5

- where:
- **C.V.** = Coefficient of Variation
- **R^2** = Ratio of explained variation to total variation (ESS/TSS), with **ESS** as the explained variation and **TSS** as total variation.

The C.V. is adjusted with R2R^2R2 to account for trends in production over time, ensuring statistical reliability. This study categorizes CDI values into three levels of instability:

- **Low instability**: 0 to 15
- **Medium instability**: 15 to 30
- **High instability**: above 30

This study relies on secondary data from various issues of the *Statistical Abstract of Haryana* and the *Economic Survey of Haryana and India*.

Agricultural Growth in Haryana:

Agricultural production in Haryana increased for most crops during the 1990s, except for maize, Moong, Gram, Barley, Masur and Oilseeds. Gram initially decrease by -82.9% from 1990–91 to 2000-01 but after a sharp increase of 62.9% in the 2000-01 to 2010-11it decreased by-175%, during 2010-11- to 2020-21.

Notably, crop production increased for most crops during the 1990s, except maize, barley, and masur. During the 2000s, a number of crops such as jowar, maize, gram,

moong, masur, and various oilseeds experienced a decline in growth. Overall, total food grain and cotton production saw significant growth over the period (see Table 1).

Table 1 Growth in Production of Major Crops in Haryana

Crops	% Increase in Production		
	1990-91 to 2000-01	2000-01 to 2010-11	2010-11 to 2020-21
Rice	46.9	22.2	38.48
Wheat	50.1	16.4	1.5
Jowar	-64.6	39.4	-153.1
Bajara	24.7	44.5	16.15
Maize	-30.6	-78.9	-32.14
Barely	10.3	9.2	319.3
Gram	-82.9	62.7	-175
Moong	-69.0	89.9	45.4
Masoor	-54.6	57.5	450
Total Foodgrains	39.08	19.7	10.8
Oilseeds	-11.76	41.6	23.4
Total Cotton	19.74	20.8	3.58
Sugarcane	4.7	35	29.6

Data Source: Statistical Abstract of Haryana (Different Issue) *000' of bales of 170 k.g.

CHANGE IN PRODUCTION OF MAJOR CROPS OF HARYANA:

Table 2 depict a substantial increase in food grain production in Haryana since 1990-91 to 2020-21, with total production of food-grains rising from 9559 000' tonnes in 1990-91 to 18591000' tonnes in 2020-21, a 48.58% increase. Wheat and paddy have driven this growth, with rice production rising from 1834 000' tonnes in 1990-91 to 5633000'tonnes in 2020-21 and wheat from 6436 000' tonnes to 11406 000' tonnes over the same period. The combined share of wheat and rice in total food grain production rose from 86.51% in 1990-91 to 91.65 % in 2010-11, establishing Haryana as a major contributor to India's grain supply. While food grain production has grown continuously, pulse production, after a peak of 541.7000' tonnes in 1990-91, began to decline (see Table 2).

Table 2 The Agricultural Production of Major Crops in Haryana (in 000Tonne)

Years	Wheat	Rice	Total Pulses	Total Foodgrains	Sugarcane	Cotton	Oilseess
1990-91	6436	1834	541.7	9559	780	1155	638
1995-96	7291	1847	450.1	10171	809	1284	783
2000-01	9669	2695	99.8	13295	817	1383	563
2005-06	8853	3195	111.8	13005	831	1502	822
2010-11	11578	3465	153.1	16566	604	1747	964
2015-16	11351	4144	34.5	16334	699	995	851
2020-21	11406	5633	67.0	18591	858	1812	1257

Data Source: Statistical Abstract of Haryana (Different Issue) *000' of bales of 170 k.g.

Since 1990-91, Haryana has seen a significant growth in food-grain production. Maximum growth percent share of total food-grain recorded during 1990-95 to 2000-01, 23.49 percent. Wheat and paddy have been key drivers of this surge. Rice and Wheat crops show maximum 31.46 percent and 24.5 percent growth

during 1995-96 to 2000-01respectively. Similarly, cotton and oil seeds growth also mark positive growth during the study period.

Table 3 Haryana: Change in Production Growth of Major Crops (In%)

Years	Wheat	Rice	Total Pulses	Total Foodgrains	Sugarcane	Cotton	Oilseeds
1990-91 to 1995-96	11.72	0.7	20.19	6.01	3.58	10.04	18.51
1995-96 to 2000-01	24.59	31.46	-351	23.49	0.97	7.15	-39.07
2000-01 to 2005-06	-9.21	15.65	101.69	-2.22	1.68	7.92	31.5
2005-06 to 2010-11	-23.53	7.79	26.97	21.49	-37.58	14.02	14.73
2010-11 to 2015-16	-2.1	16.38	343.76	-1.42	13.59	-75.57	13.86
2015-16 to 2020-21	0.48	26.43	48.5	12.14	18.53	45.08	32.29

Data Source: Statistical Abstract of Haryana (Different Issue) *000' of bales of 170 k.g.

Cotton production also showed substantial growth, climbing from 1155,000 bales in 1990-91 to 1812,000 bales in 2020-21,36.25 percent increase. Maximum growth in cotton production registered during 2015-16 to 2020-21, when production reached 1812,000 bales, representing a 45 percent increase over 99500 bales.

Other crops, including sugarcane, oil-seeds, and cotton, have shown consistent production increases. Sugarcane output rose from 731000' tonnes in 1990-91 to 858 000' tonnes in 2020-21 after decreased 604 000' tonnes during 2010-11.Oil-seeds production steadily increased from 638000' tonnes in 1990-91 to 1257 000'tonnes in 2020-21 during the period. However, pulses have not followed this trend, with only limited gains during 2010-11 to 2020-21 from 99 000' tonnes to 153.1 000' tonnes in production.

Table: 4 Production Instability in Major Crops of Haryana

YEARS	LOW INSTABILITY CROPS	MEDIUM INSTABILITY CROPS	HIGH INSTABILITY CROPS
2000-01 TO 2020-21	WHEAT 6.71 RICE 11.66 SUGARCANE 12.58 RAPESEEDS AND MUSTARD 11.67	COTTON 19.35 BAJARA MAZE BARLEY MAIZE	GRAM 35.97 MOONG 42.91 JOWAR 31.50

Production Instability in Major Crops of Haryana

The study reveals that production instability for rice, wheat, sugarcane, rapeseed and mustard in Haryana remained low in from 2000-01 to 2020-21, while, cotton,bajara, maize and barley exhibited moderate instability. During the study period, crops like gram, jawar and moong, remained in high instability category. Government policies, such as Minimum Support Price (MSP), crop insurance, and subsidies, provide stable support for staple crops like rice and wheat, contributing to consistent production levels. Additionally, advanced agricultural technologies, high-yielding seed varieties, and mechanized farming methods, widely adopted for these crops, further enhance their production stability.

Conclusion and Suggestions:

In Haryana, agricultural production has shown varying growth rates and spatial patterns. Crops like rice and wheat have consistently performed well across all three periods (1990-91 to 1999-2000, and 2000-01 to 2010-11 and 2020-21). In contrast, crops such as gram, massar, moong and maize, recorded negative growth, with total pulses showing a general decline. Gram had the steepest decline in both production and area, while moong had negative growth in the 2020-21, only improving in 2010-11. Cotton production grew steadily and Oil-seeds showed slight growth since 2015-16.

Instability in wheat, rice, and sugarcane production has been low and continues to decline, reflecting a trend toward crop diversification in rice, wheat, and cotton. States like Haryana, Punjab, Kerala, Bihar, and Rajasthan have shown a significant downward trend in crop instability (S. Mahendradev, 1987). While wheat, rice, and sugarcane have low instability, gram, moong, and massar have consistently high instability during the periods. Addressing the changing growth trends and instability in Haryana agriculture requires a multi-pronged approach, combining both short-term and long-term strategies. The policy framework should focus on enhancing resilience, promoting sustainable agricultural practices, ensuring food security, and improving the income of farmers.

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