



## Research Article

# GROWTH RATE ANALYSIS OF LEGUMES IN HARYANA STATE

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**Abstract:** The analysis of growth is usually used in economic studies to find out the trend of a variable over a period and used for making policy decisions. The growth in the area, production and productivity of Pulses in Haryana state was estimated using the compound growth function. The necessary secondary data were collected for a period of 15 years from 2000-2001 to 2014-15. Growth rates showed a significant growth in area, production, and productivity of Mungbean and Urdbean while chickpea and pigeon pea showed negative growth in both area and production. CAGR calculated from 1971-2015 showed a deceleration trend (-7.38%) whereas a negligible growth in area under pulses in the state has recorded (0.02 % pa) for the study period from 2000-2001 to 2014-15.

**Keywords:** Growth rates, Major pulses, Area, Production and Productivity

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## Introduction

Pulses are the important sources of proteins, vitamins and minerals and are popularly known as "Poor man's meat" and "rich man's vegetable", contribute significantly to the nutritional security of the country [1]. Currently, we are in the mid-way of self-sustaining in pulses production as we are world leader in production, consumption and import as well. Madhya Pradesh, Maharashtra, Uttar Pradesh, Andhra Pradesh, Karnataka, and Rajasthan are the major states growing pulses in India. These six states contribute 80% of total pulse production and area [2]. It has been estimated that India's population would reach 1.68 billion by 2030. Accordingly, the projected pulse requirement for the year 2030 is 32 million tons with an anticipated required growth rate of 4.2% (IIPR Vision 2030). India must produce not only enough pulses but also remain competitive to protect the indigenous pulse production. A large part of protein requirement could be met by pulses in vegetarian dominated state like Haryana. The daily protein requirement of an average person is 56 g, and 100 g of pulses contain around 25 g of protein [3]. Even though India is the largest producer in the world the per capita availability of pulses in 2014 was around 38 grams per day. The results from household consumption surveys indicate decline in the consumption of pulses leading to increase in malnutrition and decline in protein intake [4]. India is still a home to about 24% of undernourished people in the world [5]. About 15.2% of people in India are undernourished. This signifies the importance of pulses in food and nutrition security for Indian population. The percent contribution of area and production of pulses by Haryana state is very less. It is desirable to study the growth in area, production, and productivity of major pulses in Haryana state. It is now widely accepted that progress of an economy is adequately described by the growth rates of the economy over a period at national, State or district level. It is imperative to study the nature and extent of instability in pulse production. The present study aims at examining the growth in area, production, and productivity of major pulses in the state.

## Material and methods

The study on growth in area, production and productivity of pulses was

purposely taken up in Haryana state of India.

The secondary data on area under different pulses, production and productivity of crops were used to analyze the trends. The analysis was covered for the period from 2000-2001 to 2014-15 Time series data pertaining to area, production, productivity of pulses was collected from Directorate of Economics & Statistics, Krishi Bhawan, New Delhi. To quantify the growth of area, production and productivity of crops, compound growth rates were estimated by fitting to the time-series data in exponential function of the following form:

$$Y = ab^t \quad \text{---(1)}$$

Where,

Y = Index number of area / production / productivity as the dependent variable

t = Time variable (year) as independent variable

a = Intercept

b = Regression coefficient

Equation (1) can be expressed in logarithmic form as follows:

$$\log y = \log a + t \log b$$

$$\log y = A + B t$$

Where,

$$A = \log a$$

$$B = \log b$$

Percent annual compound growth rate "r" can be computed as:

$$r = (\text{Antilog of } b - 1) \times 100. \quad [6].$$

For testing the significance of regression coefficient, "t" - test can be carried out using the following formula:

$$t = \frac{\hat{b}}{SE(\hat{b})}, \text{ with } n-2 \text{ degrees of freedom}$$

Where,

b = estimated value of b

SE (b) = standard error of b

## Results and discussion

Haryana is one of the most economically developed regions in South Asia and its agricultural and manufacturing industry has experienced sustained growth since 1970s. Despite current industrial development, Haryana is chiefly an agricultural state. About 70% of peoples are engaged in farming. Share of area under food grains in Haryana and Share of various crops in the production of food grains in Haryana in the year 2014-15 given in [Table-1]. The cropping pattern in the state has changed significantly over the time as the share of area under food grains in gross cropped area has improved marginally from 4311.4 thousand hectares in 2005-06 to 4481.7 thousand hectares in 2014-15. Decrease in area under coarse cereals and pulses were mainly responsible for that. The area under pulses has decreased from 17.78 and 4.53 percent of GCA under food grains to 1.87 percent. The decrease in production and shrinkage in area of pulse crops in Haryana in the last few decades, because of green revolution, is a cause of great concern [Fig-1]. Also, the reduction in the production of pulses is undesirable from nutritional point of view since a large population of Haryana is vegetarian.

Table-1 Share of area under food grains in Haryana and Share of various crops in the production of food grains in Haryana in the year 2014-15

	Share of area under food grains (Area in 000 hectares)	Share of various crops in the production of food grains (Production in 000 tonnes)
Rice	1277.9 (28.51)	4007 (26.04)
Wheat	2628.1 (58.64)	10707 (69.58)
Coarse Cereals	491.9 (10.98)	619 (4.02)
Total Cereals	4397.9 (98.13)	15333 (99.64)
Total Pulses	83.8 (1.87)	54.5 (0.36)

Source: Statistical Abstract Haryana

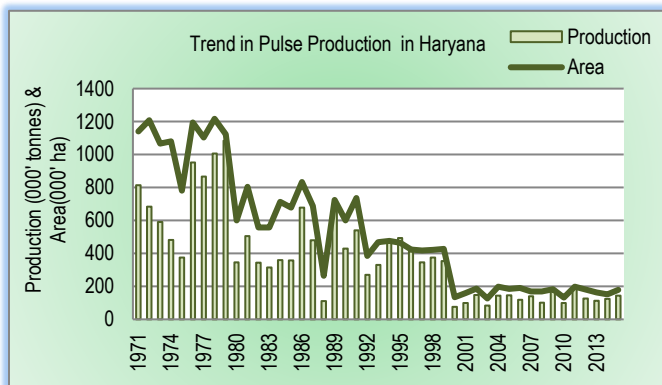


Fig-1 Trend in Pulse Production in Haryana

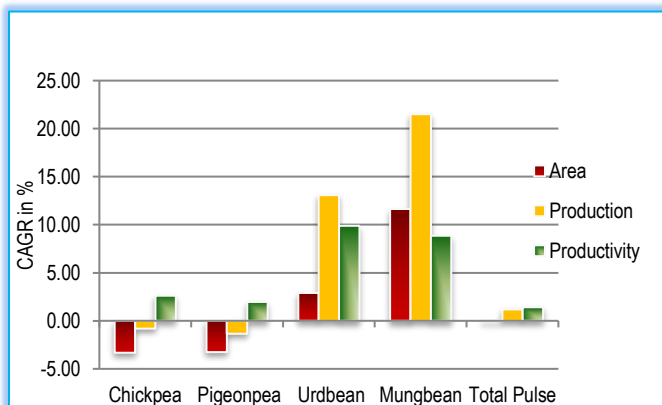


Fig-2 CAGR in Area, Production & Productivity of Pulses in Haryana: 2000-01 to 2014-15

Major pulses grown in Haryana include chickpea or Bengal gram (*Cicer arietinum*), pigeonpea or red gram (*Cajanus cajan*), urdbean or black gram (*Vigna mungo*), mungbean or green gram (*Vigna radiata*) and lentil (*Lens culinaris*). Among these are chickpea and mungbean covers total 86 percent of total area under pulse in Haryana. The average area under total pulses in the state during the study period

was 1.72 lakh ha [Table-2]. The fluctuation in the area under pulses in the state appeared to be low as the coefficient of variation was 12.70 percent. CAGR calculated from 1971-2015 showed a deceleration trend (-7.38%) whereas a negligible growth in area under pulses in the state has recorded (0.02 % pa) for the study period from 2000-2001 to 2014-15. The state is producing 1.3 lakh tonnes of pulses. The growth in the pulse output in the state is around 1.7 percent per annum with a fluctuation of 22.1 percent. The state registered an annual increment of 1.41 percent growth in the productivity of pulses. Chickpea is one of the important pulse crops grown in the state, which is used as dal and making besan which is used for making sweets, snacks and mixed with wheat flour to make chapattis. Chickpea is cultivated in *Rabi* season. The average area under Chickpea in the state is 1 lakh ha which forms about 58.8 percent of the area under total pulses in the state. The area under Chickpea has witnessed a marginal annual decrement of -3.32 percent per annum. The average annual production of Chickpea in the state is around 0.82 lakh tonnes. Chickpea production in the state has observed a mild annual decrement (-0.80 % pa) and its fluctuation is 30.78%. The productivity in the state is hovering 833.87 kg per ha. The area under Pigeonpea in the state has registered a negative growth of -3.26 percent per annum during the study period. The fluctuation in area under Pigeonpea was about 33.57 percent. The production of Pigeonpea recorded a negative growth rate of -1.36 percent per annum. The productivity of Pigeonpea in the state recorded a reasonable growth during the study period (1.96%). The state registered a significant increase in Mungbean area (11.64 % per annum) during the study period. Mungbean yield has been increasing at the rate of 8.85 percent per annum. In Haryana, Mungbean production was increasing at 21.52 percent per annum during the study period. A substantial increment in area, production and productivity noticed in Urdbean cultivation in the state [Fig-2].

## Conclusion

Pulses area, production and productivity have been under influence of seasonal, biotic, and abiotic factors in Haryana due to these reasons the area under pulses affected in Haryana which again influenced the production. Accordingly, the productivity has also under influence because the farmers desired attention on crop management and may be due to lack of required economic and social importance at farmer level by the farming community on this highly nutritive crop.

## Policy implications

The pulse crops growth rates need to be paid attention for their sustainability in area, production, and productivity due to the nutritional and economic importance of the crop in Haryana. The price policy towards the pulse crops need to be renewed season wise for sustainable growth rates in all the fronts.

**Application of research:** It is the time for the policy makers and government to concentrate on pulses production and this study gives us an outlook of current situation of pulse production in the state.

**Research Category:** Agricultural Economics

**Abbreviations:** CAGR –combined annual growth rate, CV- coefficient of variation

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Table-2 Growth in area, production, and productivity of pulses in Haryana (2000-2001 to 2014-15)

	Mean area (000' ha)	CV (%)	CAGR (%)	Mean production (000' tonnes)	CV (%)	CAGR (%)	Mean productivity (kg/ha)	CV (%)	CAGR (%)
Chickpea	100.47	27.79	-3.32	82.13	30.78	-0.80	833.87	21.06	2.61
Pigeonpea	23.81	33.57	-3.26	24.63	35.44	-1.36	1034.07	12.89	1.96*
Urdbean	2.42	48.82	2.90	953.33	72.23	13.09**	374.67	39.81	9.89**
Mungbean	31.80	75.24	11.64**	14.35	101.08	21.52**	404.53	38.26	8.85**
Total Pulse	171.59	12.70	0.02	130.02	22.10	1.17	760.80	14.23	1.41

**Conflict of Interest:** None declared

**Ethical approval:** This article does not contain any studies with human participants or animals performed by any of the authors.

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