

Article

An insight into status of wheat production in India

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Abstract

The role of wheat in alleviating hunger and malnutrition, thereby establishing zero hunger and food security, is well known. Consumption of wheat in rural India has increased apparently due to the availability of nutritious cereal. The area under wheat cultivation has remained almost constant during the time under consideration (2012-2021). Yield and production have shown constant trend from 2012 to 2014, then there was a drop in both the parameters in 2015. Since 2016, both production and yield has seen a rising trend. Wheat showed 0.33 %, 1.94 % and 1.61 % growth in area, production, and yield, respectively. Among states, Uttar Pradesh recorded highest wheat production while Tripura recorded lowest wheat production. Crop intensification, resources degradation, yield plateau, pest and diseases, growing demand, declining total factor productivity are some of the major constraints faced by wheat producers in India.

Keywords: Wheat, Production, Yield, Growth rate

Introduction

Wheat is the second most important staple crop after rice and provides about 20 per cent of daily protein and food calories to the people. Wheat has been a part of human civilization and is regarded as one of the important food grains in agriculture throughout the world [1]. Wheat is rich in starch, protein, vitamins, minerals, dietary fibres, and phytochemicals [2]. About 13-17 per cent of the wheat grain is bran and 53 per cent of it is fibre content [3]. Every 100 gm of wheat contains 72 gm carbohydrates, 13.2 gm proteins, 10.7 gm fibres, 2.5 gm fat, 0.4 gm sugar along with 11% water and provides about 340 calories of energy [4]. Wheat is rich in all these nutrients and provides nearly 55 per cent of carbohydrates and 20 per cent of calories consumed around the world [5&6]. Wheat is placed first among the cereals in terms of consumption due to its nutritive value and relative ease in its harvest, storage, transport, and processing as compared to other grains [7].

Studies suggest that malnutrition can be successfully addressed if the diet of the people consists of balanced proportions of proteins, carbohydrates, fat, and micronutrients [8]. Thus, it is evident that wheat plays an important role in alleviating hunger and malnutrition in the world. South Asia, where India is located, is the hub of the world's largest dominance of malnutrition consisting of the largest number of stunted children less than 5 years of age [9]. The role of wheat in alleviating hunger and malnutrition, thereby establishing zero hunger and food security, is well known. A study carried by Bhola Nath [10] concluded that wheat production in India will grow in 2026-2027 while growing at an average growth

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rate of 4% every year. Consumption of wheat in rural India has increased apparently due to the availability of nutritious cereal. Owing to its nutritious value, wheat is an important crop in India which is a home of millions of malnourished people. Current study evaluates the status of wheat production in India and its states.

Materials and methods

Data of wheat production in India for past one decade (2012-2021) was collected from Food and Agricultural Organisation. Growth rate for area, production, and yield of wheat for India was estimated. For this purpose, following regression equation was fitted:

$$\ln(\text{area/production/yield}) = a + b \times \text{time}$$

Eventually growth rate was calculated by using the following formula:

$$r = [\text{antilog}(b) - 1] \times 100$$

where,

r = rate of growth

b = regression co-efficient

a = constant term

Coefficient of variation (CV) was also estimated. CV is expressed as a ratio of the standard deviation to the mean multiplied by 100.

Instability (Cuddy-Della Valle Index): Instability in area, production, and productivity was estimated to examine the extent of risk in those variables using the coefficient of variation for no-time trend series and Cuddy-Della Valle instability index for the series following a time trend. The Cuddy-Della Valle Index was computed as,

$$I = CV \times \sqrt{(1 - (R^2)^{-1})}$$

where, I is the instability index (%), CV is the coefficient of variation (%), and is the coefficient of determination from a time trend regression.

Results and discussion

Trend in wheat production, yield, and area: Wheat is cultivated in Rabi season. The crop is sown during 2nd fortnight of October to 1st week of January and harvested during the months of March to May. India currently occupies second position in wheat production next to China. Fig. 1 indicates the rising trend in area, production, and yield of the crop from 2012 to 2021. As indicated in the figure, the area under wheat cultivation has remained almost constant during the time under consideration. Yield and production have shown constant trend from 2012 to 2014, then there was a drop in both the parameters in 2015. Since 2016, both production and yield has seen a rising trend. Increased yield is due to the factors like adoption of high yielding genotypes through well-established coordinated research system coupled with increase in area under irrigation and favourable weather factors during the crop season.

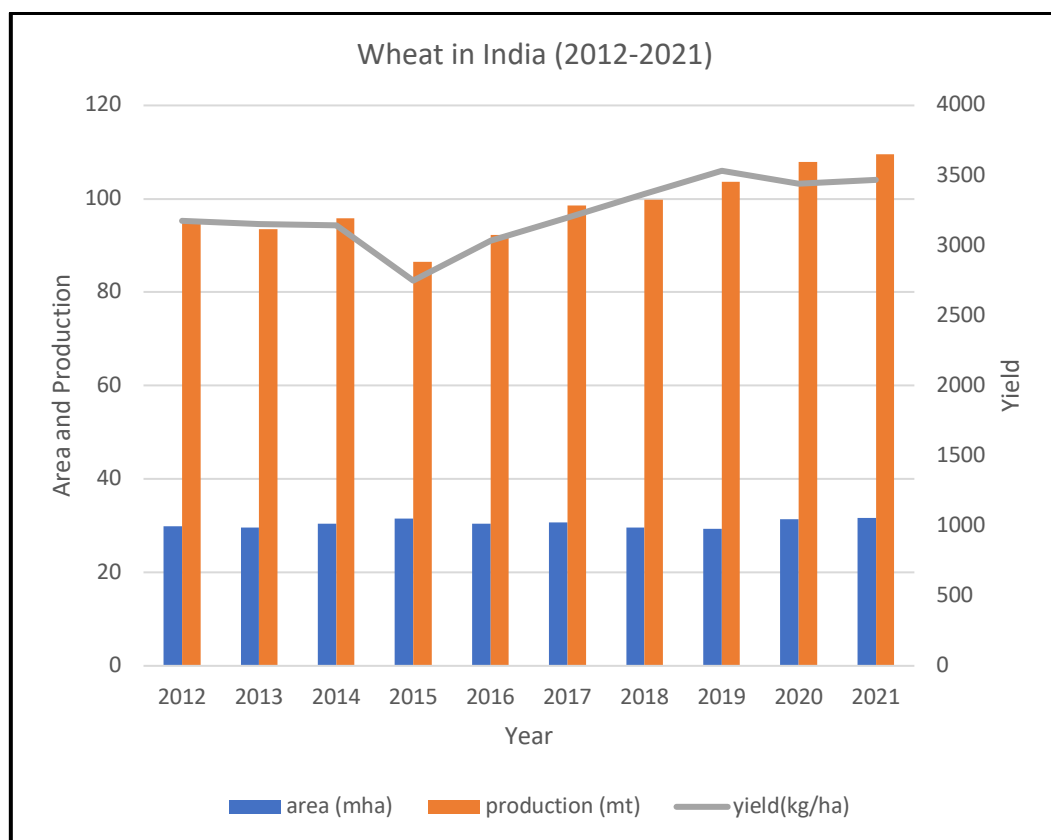


Fig 1: Trend in area, production, and yield of wheat (2012-2021)

Growth in wheat production, yield, and area:

Table 1 indicates the growth and instability in wheat area, production, and yield. All the three parameters witnessed increasing growth in the time under consideration. Wheat showed 0.33 %, 1.94 % and 1.61 % growth in area, production, and yield, respectively. Average yield during the period was recorded to be 3226.87 kg/ha, while production and area were 98.25 mt and 30.46 mha, respectively. A perusal of Table 1 reveals that maximum instability exists in yield (5.26 %), followed by production (4.17 %) and area (2.41 %). Researchers must develop new promising varieties which has stable yield.

Table 1: Growth and instability in wheat area, production, and yield (2012-2021)

Particulars	Area	Production	Yield
Growth rate	0.33 %	1.94 %	1.61 %
Mean	30.46 mha	98.25 mt	3226.87 kg/ha
Standard Deviation	0.78	6.81	222.93
Coefficient of Variation	2.59 %	6.93 %	6.91 %
Instability Index	2.41 %	4.17 %	5.26 %

State wise wheat production (2021):

Uttar Pradesh recorded highest wheat production while Tripura recorded lowest wheat production. This may be because the agroclimatic situation of Uttar Pradesh is favorable for wheat production while that of Tripura is not favorable.

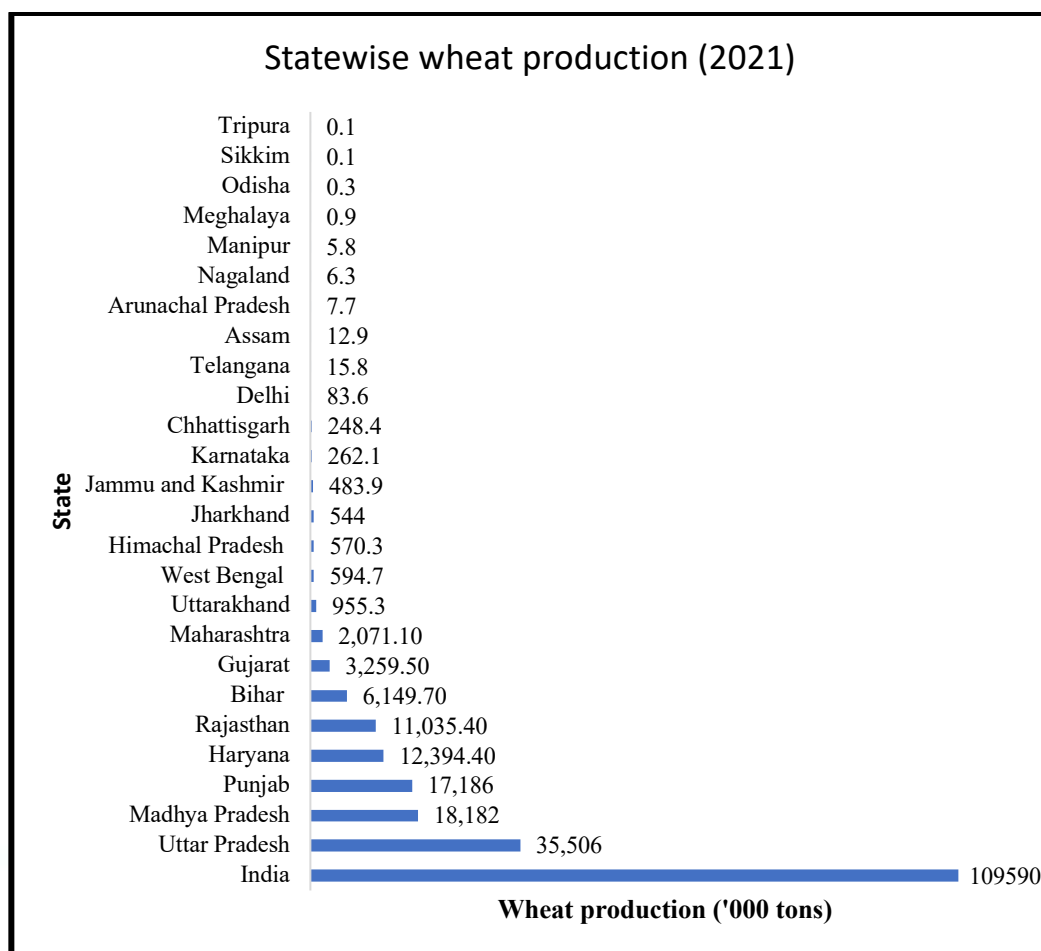


Fig 2: State wise wheat production

Table-2 shows the percentage of wheat production by different Indian states in 2021. The figures suggest that about eighty per cent of wheat production comes from north and central India. Fig 3 depicts the pictorial representation of percentage share of wheat production in various states.

Table 2: Percentage share of all Indian states in wheat production.

S. No.	State	Percentage share in production
1	Uttar Pradesh	32.3989
2	Madhya Pradesh	16.5909
3	Punjab	15.6821
4	Haryana	11.3098
5	Rajasthan	10.0697
6	Bihar	5.6116
7	Gujarat	2.9743
8	Maharashtra	1.8899
9	Uttarakhand	0.8717
10	West Bengal	0.5427
11	Himachal Pradesh	0.5204
12	Jharkhand	0.4964
13	Jammu and Kashmir	0.4416
14	Karnataka	0.2392

15	Chhattisgarh	0.2267
16	Delhi	0.0763
17	Telangana	0.0144
18	Assam	0.0118
19	Arunachal Pradesh	0.0070
20	Nagaland	0.0057
21	Manipur	0.0053
22	Meghalaya	0.0008
23	Odisha	0.0003
24	Sikkim	0.0001
25	Tripura	0.0001

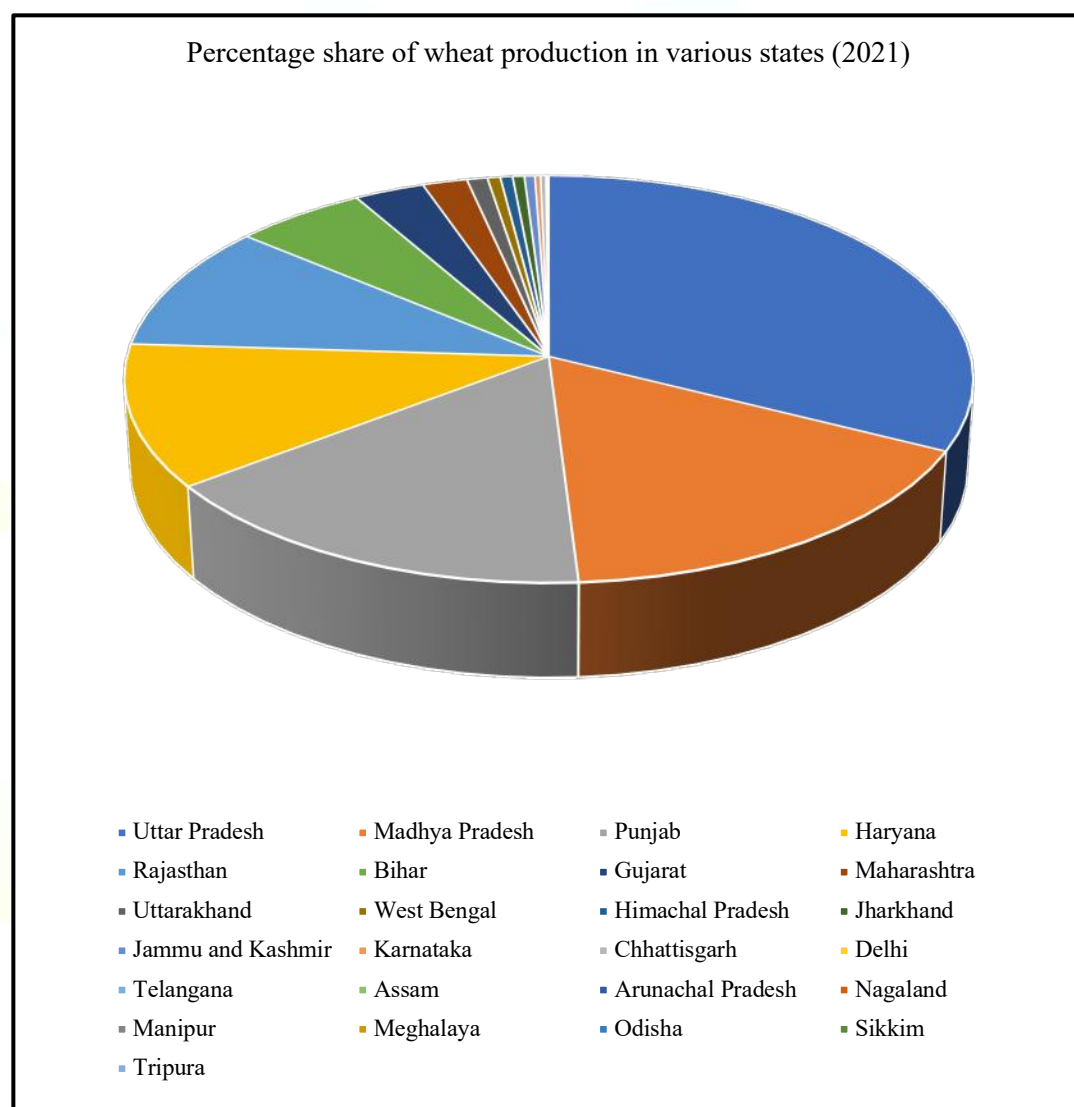


Fig 3: Share of wheat production by states (2021)

Constraints in wheat production in India:

Crop intensification, resources degradation, yield plateau, pest and diseases, growing demand, declining total factor productivity are some of the major constraints faced by wheat producers in India (Fig 4).

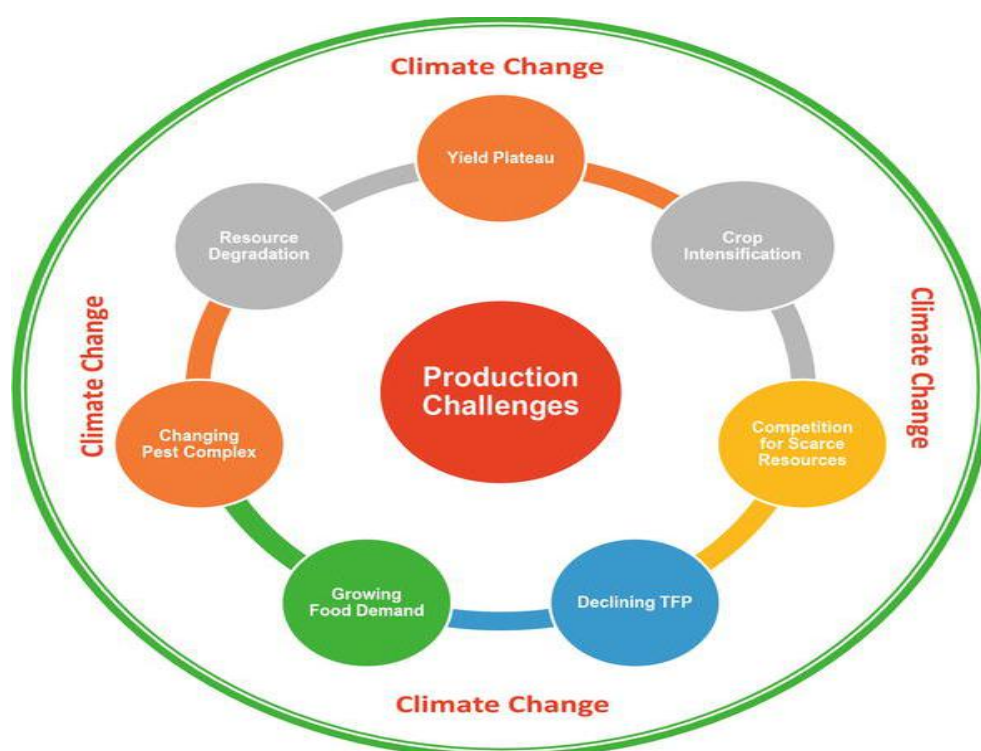


Figure: 3 shows region wise constraints in wheat production

Table 3: Major production challenges in India

Zone	Major production constraints
Northern hills zone	Lack of accessibility of seed of newly released variety, <i>Phalaris minor</i> , small land holdings, high cost of inputs, non-availability of farm machinery, yellow rust, birds, lack of knowledge among the farmers about recent technologies, imbalanced use of fertilizer, lack of irrigation facilities
Northwestern plains zone	High cost of inputs, low price of wheat, erratic power supply, <i>Phalaris minor</i> , low organic matter in the soil, poor quality of seeds, non-availability of labour, untimely rain, <i>Chenopodium album</i> , non-availability of electricity
Northeastern plains zone	Small land holdings, inadequacy of seeds of newly released variety, lack of information among the farmers about recently developed new technologies, late sowing, temperature fluctuations during growth, high-priced inputs, poor quality of seeds, non-availability of labour, low organic matter in the soil, non-availability of farm machinery
Central zone	Non-availability of labour, imbalanced use of fertilizer, high temperature at maturity, limited accessibility to seed of newly released variety, temperature fluctuation during crop growth, high cost of inputs, lack of irrigation facilities, small land holding, decline in water table, untimely rain
Peninsular zone	Low price of wheat, irregular power supply, high cost of inputs, non-availability of labour, non-availability of electricity, higher rate of custom hiring, untimely rain, lack of facilities of canal irrigation, poor accessibility to seeds of newly released variety, temperature fluctuation during crop growth

Conclusions

Wheat is the second most important staple crop after rice and provides about 20 per cent of daily protein and food calories to the people. Wheat is placed first among the cereals in terms of consumption due to its nutritive value and relative ease in its harvest, storage, transport, and processing as compared to other grains. The area under wheat cultivation has remained almost constant during the time under consideration (2012-2021). Yield and production have shown constant trend from 2012 to 2014, then there was a drop in both the parameters in 2015. Since 2016, both production and yield has seen a rising trend. Wheat showed 0.33 %, 1.94 % and 1.61 % growth in area, production, and yield, respectively. Among states, Uttar Pradesh recorded highest wheat production while Tripura recorded lowest wheat production. Researchers must strive to develop new high yielding stress resistant wheat varieties. Also, government must provide impetus in the non-wheat growing regions of the country.

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