Growth performance of Nutri-Cereals in India

ABSTRACT

The Nutrient rich millet crops can be cultivated in adverse soil and climate conditions. As a behest from India United Nations with the aim of creating awareness,to increase production and consumption of millets declared 2023 as the International Year of Millets. Hence the study focussed on estimating the growth performance of Nutri cereals (Millets) in India. The growth performance was estimated using the Compound Annual Growth Rate (CAGR). The secondary data on millets area, production and productivity from 1992 to 2021 were collected from various publications like Indiastat and APEDA. This study revealed that the area and production is declining for the past three periods as a result of the green revolution.There was a significant increase in productivity in the last two periods due to the introduction of high yielding, pest and disease resistant varieties. This study will help in understanding the growth trend of millet during the periods and be able to suggest ways in increasing area, production and productivity of millet cultivation in India.

Key words: millets, area, production, productivity, trend, growth rate

INTRODUCTION

The Poaceae family, cultivated small grained cereals are called Millets: such as Sorghum, Pearl millet, Finger millet (major millet) Foxtail millet Kodo millet, Proso millet and Banyard millet (minor millet). Millets have low glycemic index, millets expert a gradual impact on blood sugar level, making them an optional choice for managing diabetes and their consumption is also associated with weight reduction (Ugare *et al*., 2014).India is the1st largest producer and 10th largest exporter of millets in the world (494 Rs Crore). In India the mojor minor cultivating states are Rajasthan, Karnataka, Maharashtra, Uttar Pradesh, Haryana, Gujarat, Madhya Pradesh, Tamil Nadu, Andhra Pradesh and Uttarakhand . The cultivation area of millet was high in Rajasthan (4.36 M ha), Maharashtra(2.29 M ha), Karnataka (1.64 M ha), Uttar Pradesh (1.08 M ha) Madhya Pradesh (0.55 M ha). The most increased production was recorded in Rajasthan (4.3 Mt), Maharashtra (2.33 Mt), Karnataka (2.3 Mt), Uttar Pradesh (2.22 Mt) Madhya Pradesh (1.16 Mt) (India Stat 2021-2022). Majority of the millets are short duration (90-110days), which able to withstand drought and are mostly cultivated in the arid and semi-arid regions of India. Millets are adaptive to both diverse soil and climatic conditions. In India millets are mostly grown from June to November, and well-drained loamy soil is required for optimum growth and a better yield (Saxena, R*et al*.,2018). The major export destinations of millets from India are UAE (United Arab Emirates) (108 Rs Crore), Saudi Arabia (83.14 Rs Crore) Nepal (5.57 Rs Crore) Bangladesh(3.69 Rs Crore) Japan(3.37 Rs Crore) (APEDA 2021-2022). Over the decades the area, production and productivity of millets are decreasing in India. The primaryfactor being the lack of suitable varieties, agricultural equipment's and lack of government policies (Sendhil, R., *et al*.2023). To counter the declining trend in millet cultivation, the government should initiate an awareness program aimed at educating farmers on the nutritional benefits and climate resilience of millets. Processing and value addition of millets into ready to eat and ready to cook products will provide a wide scope and opportunity to the farmers for increasing the market demand of millet (Ramakrishna *et al*., 2022). This study was conducted to determine the growth rate in area, production and productivity of millets in India and to suggest ways to increase millet production in India.

METHODOLOGY

The trend of area, production and productivity for millets in India was estimated using the compound annual growth rate. The formula employed in this investigation was the same as the one Muthulakshmi *et al*., 2023 described in her paper.

$Y_t = ab^tU_t$ ..... (1)

For this analysis, annual time series data regarding the area, production and productivity covering the years 1992–2021 were gathered from a variety of published sources, including India Stat, Agricultural Statistics Handbook and APEDA. The following describes the variables that are part of formula (1):

Y_t= Area (thousand hectares), Production (thousand tonnes) and Productivity (kg/ha)

a= Intercept

b= Regression coefficient

t = Time period (1992-2021)

U_t= Disturbance term

The recommended model was then converted into logarithmic form, as shown below and utilized to estimate the coefficients of a few chosen study variables.

$\ln Y_t = \ln a + t \ln b + \ln U_t$ ..... (2)

The OLS method was used to calculate the estimates for the regression analysis. Next, using the formula listed below, determine the worked-out estimate (b) value for each variable used to get the compound annual growth rate (CAGR).

CAGR (r) = [Antilog (logb)-1] X 100 ..... (3)

Where,

r = Compound growth rate in per cent

The t statistic was used to determine the standard error of growth rate and assess its significance.

t=bi/Se (bi) ..... (4)

Where,

bi= Regression coefficient

Se= Standard error of the regression coefficient

RESULT AND DISCUSSION

Growth performance of Millets in India

A compound annual growth rate was analysed to examine the growth rate of area, production and productivity of millets in India. The study period was divided into three periods viz., Period I (1992-2001), Period II (2002-2011) and Period III(2012-2022) (Fig. 1). The growth rate of area, production and productivity was identified that the cultivation area of millets showed a negative compound annual growth rate of -4.30 per cent and the production as well as the productivity also showed a negative compound annual growth rate of -5.11 and -0.85 per cent during the Period I (1992-2001). The period I indicates a negative trend due to green revolution which focused on high yielding varieties of crops and it providing high preference to paddy and maize cultivation which intern help the farmers in getting high profit. The same result was lined in Arun Pandiyan *et al*.,(2019) and Pandey and Bolia (2023). During the second period (2001 to 2012), the area under millet cultivation was continued to decrease with a compound annual growth rate of -4.92 per cent and with the production declining at a compound annual growth rate of -1.80 per cent while the productivity was indicating a positive annual growth rate of 3.26 per cent. The increasing trend in productivity was due to the introduction of pest and disease resistant varieties of millets (Kumar *et al*., 2022). During the third period (2012 to 2021), the compound annual growth rate of area and production were declined but surprisingly the millet productivity per unit area witnessed a positive compound annual growth rate of 4.41per cent.The increase in productivity was observed due to the introduction of new government policies in which prior importance was given for millet cultivation.“National program on Nutri-cereals” was launched in the year 2018 by the government of India, which aims at enhancing the quality and productivity of millets in India (Chaudharyet al.,2023). Although the millet production indicated an overall negative trend. The overall cultivation area for millet is being consistently declining over the three periods, which indicates a shift away in millet cultivation. Even though the millet productivity per unit showed a promising sign of improvement which indicates the possibility of adopting more efficient millet varieties and agricultural practices.

Table 1. Growth performance of Millets in India during 1992- 2021

Particulars	CAGR		
	Period I (1992- 2001)	PeriodII (2002-2011)	PeriodIII (2012-2021)
Area	**-4.30**	**-4.92**	**-6.26**
Production	**-5.11**	**-1.80**	**-2.13**
Productivity	**-0.84**	**3.26**	**4.40**

Source: Author’s calculation based on the data from India Stat (1991-2021)

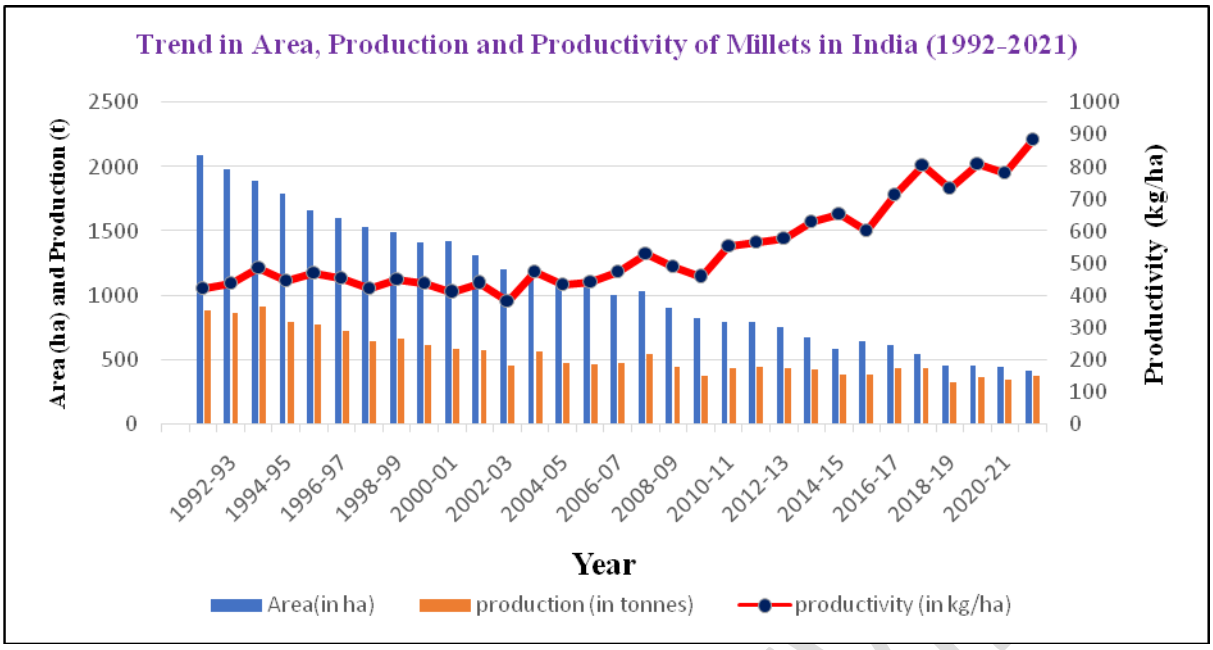

Fig. 1. Trend in Area, Production and Productivity of Millets in India (1992-2022)

Conclusion

The demand on millets and its value added products in India is continues increasing over the past few years due to the awareness on high nutritional potential of millets. But the area and production is found to be decreasing trend, However the productivity growth rate is increasing due to the technological advancement in cultivation. There is a vast scope for bringing more area under millet cultivation India. The Central and State government agencies concentrate on conduct of more awareness programme related to Millet cultivation, Value addition, Marketing and Export of Millets among the farming Community.

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