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Parul M Patel
Ph.D. Scholar, Department of
Agricultural Economics, C. P.
College of Agriculture, S.D.
Agricultural University,
Sardarkrushinagar, Gujarat,
India

Jadeja RM
Assistant Professor, Department
of Agricultural Economics, C. P.
College of Agriculture, S.D.
Agricultural University,
Sardarkrushinagar, Gujarat,
India

Thakar KP
Professor and Head, Department
of Agricultural Economics, C. P.
College of Agriculture, S.D.
Agricultural University,
Sardarkrushinagar, Gujarat,
India

Soumya C
Assistant Professor, Department
of Agricultural Economics, C. P.
College of Agriculture, S.D.
Agricultural University,
Sardarkrushinagar, Gujarat,
India

Corresponding Author:
Parul M Patel
Ph.D. Scholar, Department of
Agricultural Economics, C. P.
College of Agriculture, S.D.
Agricultural University,
Sardarkrushinagar, Gujarat,
India

Growth rates of cost and returns in summer pearl millet cultivation in north Gujarat

Parul M Patel, Jadeja RM, Thakar KP and Soumya C

Abstract

The present study focuses on the general trends and growth rates of cost and returns of summer pearl millet in North Gujarat region for the period from 2010-11 to 2021-22. The study revealed that the nominal cost and returns increased over the study period. During 2010-11, the nominal gross income was ₹37484/ha which was increased by about 2.5 times (₹93013/ha) in 2021-22. The total nominal cost in 2010-11 was ₹32481/ha which was increased almost by double ₹64843/ha in 2021-22. The increase in gross return was more than the increase in nominal total cost. The cost of production during 2010-11 was ₹1151/qlt which was increased to ₹1496/qlt with positive and significant annual growth rate of 3.07 per cent per annum. The farm harvest price of summer pearl millet also increased with high positive growth rate of 5.77 per cent per annum from ₹ 956/qlt to ₹ 2146/qlt over the study period. The growth rate of yield was also found positive and significant of 2.23 per cent per annum. During 2010-11 net return was ₹5066/ha which was increased by 5.5 times (₹28170/ha) during 2021-22 with very high increasing growth rate of 14.83 per cent per annum over the study period. The substantial annual growth in net returns from the cultivation of summer pearl millet, as opposed to growth in total cost over the study period in the North Gujarat region, indicates the promising profitability and economic viability of this crop in the region.

Keywords: Summer pearl millet, growth rate, cost and returns

Introduction

Pearl millet commonly known as Bajra, is one of the important millet crops grown in India. India produces about 10.36 million tonnes of pearl millet from an area of 7.54 million ha, with an average productivity of 13.74 qtl/ha during the year 2019-20. Pearl millet is primarily cultivated in the states of Rajasthan, Gujarat, Uttar Pradesh, Haryana, and Maharashtra. During the year 2019-20, Gujarat accounts for 5.96 per cent (0.44 million ha) of total pearl millet's area with 10.52 per cent (1.09 million tonnes) share in total production in India with an average productivity of 24.25 qtl/ha (<https://www.indiastat.com>). This reveals that average productivity of pearl millet in Gujarat is almost double as compared to India. Among the total pearl millet cultivation of Gujarat, summer pearl millet cultivated in 60.57 per cent area and kharif pearl millet grown in 39.43 per cent of total area with production share of 71.75 per cent and 28.25 per cent, respectively (Directorate of Agriculture Reports, GOG, Gandhinagar). The average yield of pearl millet in Gujarat has increased at the growth rate of 5.29 per cent while it has increased by 4.08 per cent in India over the ten years i.e. from 2005-06 to 2015-16 (Directorate of Economics & Statistics). The major reason for this growth is crop improvement programmes, intensive use of inputs and more area under irrigation (Chaudhari *et al.*, 2016 & Reddy *et al.*, 2013) ^[2, 5]. Within Gujarat, 8 districts accounted for almost 90% of the area and production under summer pearl millet. Among these districts Banaskantha (North Gujarat region) is the leading district with more than 40% of the area and production followed by Anand and Kheda; this trend is mainly due to the increase in irrigation facility in the region which ultimately increase cropping intensity of the region as a result as whole. There is a positive relation between percent area under summer pearl millet and percent area under irrigation (Reddy *et al.*, 2013) ^[5]. The cultivation of summer pearl millet is mostly concentrated in North Gujarat region which occupied for about 72 per cent of the total summer pearl millet area of the state. Therefore, present study focuses on the general trends and growth rates of cost and returns of summer pearl millet in North Gujarat region for the period from 2010-11 to 2021-22.

Methodology

Summer pearl millet cultivation is largely concentrated (72% of total cultivated area) in North Gujarat region of the state (Anonymous, 2019-20). Hence, the north Gujarat region was purposively selected for the present study.

The present study was completely based on secondary data which were collected from the annual AGRESKO Report, Department of Agricultural Economics, C. P. College of Agriculture, S. D. Agricultural University, Sardarkrushinagar, Gujarat. The data were collected for period of twelve year from 2010-11 to 2021-22.

Compound Annual Growth Rate

The compound growth rate of cost and returns of summer pearl millet was estimated by given formula:

Compound Growth Rate (CGR): $Y = AB^t$

Where, Y = Cost/returns of summer pearl millet

A = Constant/ Intercept

B = 1 + r

t = Time variable in year (1,2,3,...n)

The value of B was calculated by using index numbers in log form following formula given below:

$$\text{Log } B = \frac{\sum t \log Y - \sum t \log Y / N}{\sum t^2 - (\sum t)^2 / N}$$

The compound annual growth rate (r) was obtained as below:

$r = (\text{Antilog } B - 1) \times 100$

Significance of growth rate was judged by student t-test.

Results and Discussions

General trend and growth rates of cost and returns of summer pearl millet

The CAGR of cost and returns of summer pearl millet in north Gujarat region for the period from 2010-11 to 2021-22 is presented in table1.

Table 1: Growth rates of cost and returns of summer pearl millet in North Gujarat region from period 2010-11 to 2021-22

Year	Yield (qtl/ha)	FHP (₹/qtl)	Gross return (₹/ha)	Total cost/ Cost C ₂ (₹/ha)	Net Return/ Return over Cost C ₂ (₹/ha)	Cost of production (₹/qtl)
2010-11	28.16	956.00	37484.00	32418.00	5066.00	1151.00
2011-12	27.25	1077.00	41702.00	35031.00	6671.00	905.00
2012-13	27.31	1341.00	48844.00	34248.00	14596.00	940.00
2013-14	29.36	1174.00	48545.00	46086.00	2459.00	1011.00
2014-15	30.46	1134.00	52412.00	47620.00	4792.00	1034.00
2015-16	31.74	1576.72	70310.00	45474.00	24836.00	1020.00
2016-17	32.94	1239.16	63109.00	46969.00	16140.00	922.00
2017-18	33.81	1254.03	65664.00	50186.00	15478.00	958.00
2018-19	35.20	1944.51	88387.00	55592.00	32795.00	1224.00
2019-20	33.75	1738.52	80293.00	57426.00	22867.00	1243.00
2020-21	33.01	1460.00	66963.00	59084.00	7879.00	1288.00
2021-22	33.80	2146.07	93013.00	64843.00	28170.00	1496.00
CAGR (%)	2.29**	5.77**	7.73**	6.15**	14.83*	3.07*
p value	0.000072	0.001105	0.000019	0.000001	0.037306	0.013358
t value	6.47	4.52	7.55	10.66	2.40	3.00

(Note * = 5% level of significance, ** = 1% level of significance and NS = non- significant)

The general trends in farm harvest price and cost of production can be shown from fig 1. The results revealed that the nominal cost and returns increased over the study period. During 2010-11, the nominal gross income was ₹37484/ha which was increased by about 2.5 times (₹93013/ha) in 2021-22. The total cost (Cost C₂) in 2010-11 was ₹32481/ha which

was increased almost by two times ₹64843/ha during the year 2021-22. It can be concluded that, the increase in gross return was more than the increase in nominal total cost. The cost of production during 2010-11 was ₹1151/qtl which was increased to ₹1496/qtl with positive and significant CAGR of 3.07 per cent per annum.

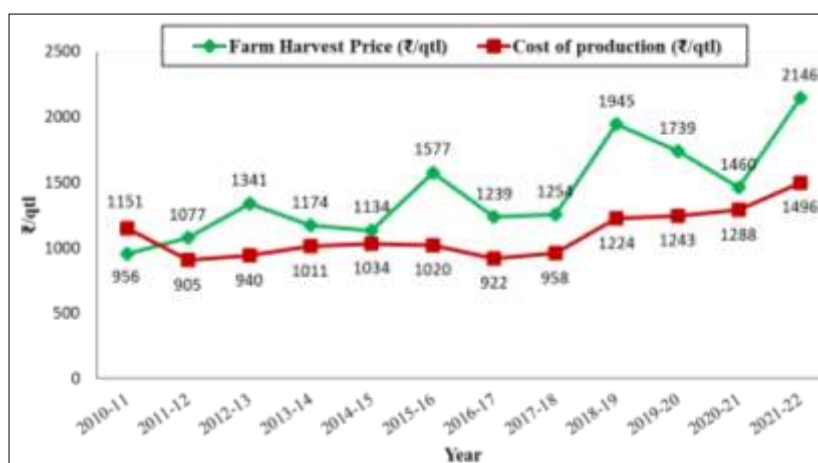


Fig 1: Trends in FHP and Cost of production of summer pearl millet in north Gujarat region from 2010-11 to 2021-22

The farm harvest price of summer pearl millet also increased with high positive growth rate of 5.77 per cent per annum from ₹956/qlt to ₹2146/qlt over the study period. The growth rate of yield was also found positive and significant 2.23 per cent per annum. During 2010-11 net return was ₹5066/ha which was increased by 5.5 times (₹28170/ha) during 2021-22 with very high positive significant growth rate of 14.83 per cent per annum over the study period. The substantial annual growth in net returns from the cultivation of summer pearl millet, as opposed to growth in total cost over the study period in the north Gujarat region, indicates higher profitability of summer pearl millet in the north Gujarat region over the study period.

Conclusion

The compound annual growth rate of yield and farm harvest price of summer pearl millet in north Gujarat region shows positive and significant growth of 2.29 per cent and 5.77 per cent per annum, respectively over the year 2010-11 to 2021-22. The growth in net return (14.83%) was very high and significant as compared to growth in nominal total cost (6.15%) as well as cost of production per quintal (3.07%) over the study period indicates the promising profitability and economic viability of summer pearl millet crop in the north Gujarat region.

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