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An analysis of trends, growth and B: C ratio in Bhind district of Madhya Pradesh with special reference to mustard crop

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Abstract

India is a major producer of oilseeds, per capita oil consumption in India is only 10.6kg/annum which is low as compared to 112.5kg/annum in China, 20.8kg/annum in Japan, 21.3kg/annum in Brazil and 48.0kg/annum in USA. The growth rate of 15 percent per annum would be required in edible oil production in the country arrantly edible oil growth rate in India is only 4 percent. India is occupied second position in area and third in production of mustard crop in the world. In India, the area under total oilseeds crops is 26.8 million hector and production is 25.45 million tons (2012-13). The mustard crops covers 72.47 loch hectare area and 68.5 lake tones production in India 2012-13. Major mustard producing states in India are Rajasthan, Uttar Pradesh, Madhya Pradesh, Haryana, Gujarat, West Bangal and Assam. The position of Madhya Pradesh is third in area and fourth in production of mustard in India. In Madhya Pradesh the area under total oilseeds crops is 70.33 lakh hector and the production is 18219 thousand tons. The mustard covers 726.9 thousand tone productions. The major mustard growing district in Madhya Pradesh is Bhind, Morena, Shivpuri, Gwalior, Neemuch and Mandla. In Bhind district the mustard crop covers of area 180.546 thousand hectare area and 175.5 Thousand tones production and it share 24 percent Area and 27 percent production of mustard in Madhya Pradesh (2014-15). As this crops covered major portion in cropping pattern in Bhind district so it necessary to know the present status and level of profitability in study area then farmers can grow continue and including in the cropping pattern.

Keywords: Trends, growth rate, benefit cost ratio, production

Introduction

India is the fourth largest oilseed producing country in the world, next only to USA, China and Brazil, harvesting about 25 million tons of oilseeds against the world population of 250 million tons per annum. India share in world production of oilseeds has been around 10 percent. Oilseeds play the second important role in the Indian agricultural economy, next only to food grain in terms of area and production. They occupy a distinct position after cereals, constituting 14.87 percent of the country's gross cropped area and accounting for nearly 1.4 percent of the gross national product and 7 percent of the value of all agricultural products. India became self reliant in edible oils almost up to 98 percent and oilseeds meal occupied major share in exports from India. The oilseed crops play a vital role in the development of agricultural economy. the seed of mustard covers 40-42 percent oil content mustard seed was primarily used for human consumption because of low erucic acid and thus, becoming desirable edible oil. With the invention of steam power, it was found that the oil could be used as a lubricant that would clean water and steam washed metal surfaces better than any other lubricant. The consumption of rapeseed increased since world war second in western countries. India and china are the two major consumers of mustard seed. In India consumption of mustard seed and oil is generally high in northern mustard oil. The seed and oil both are used as a condiment in the preparation of various pickles and flavoring the curries and vegetables. The oilcake is mostly used as a cattle feed and manure. The leaves of the mustard plants are used vegetable food. Furthermore both the seeds and leaves traditionally have been used for medicinal purpose. Mustard crops are important for the Indian economy, since India imports large quantities of edible oil despite having the largest area of cultivated oil seeds in the world. In recent past the country has grown to become one of the major vegetable oil importers and due to a decline in oil seeds production and a study fall in international prices. China, India and Japan are considered as net importers in the international mustard oil trade. The mustard crops 2 percent erucic acid in the seed oil and less than thirty micromoles of glucosinolat for every gram of oil free cake.

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Materials and Methods

Collection of data

The study is based on both primary and secondary data. The primary data was collected from the selected respondents with the help of pre-tested interview schedule by the personal interview method and secondary data was collected from Madhya Pradesh agriculture statistics, land record office, annual districts statistics and other published and unpublished reports.

Methodology

Sampling technique Niwas block of Bhind district was purposively chosen as the study area because, it has the larger area under mustard crop cultivation in the district. A multistage simple random sampling technique (SRS) was adopted to select the block, villages and the respondents, market and different farmer involved in mustard crop production and marketing in Bhind district. The details of the sampling techniques at various stages are given as under:

Profitability concept

Net farm income = Gross income – cost C3 (total expenses)

Farm business income = Gross income – cost A1

Family labour income = gross income – cost B2

Benefit cost ratio = $\frac{\text{Gross Income}}{\text{Gross Expenses}}$

Statistical Tools for Secondary Data Analysis

1. **Arithmetic Mean:** The average was worked out by using the arithmetic mean of mustard crop for their area, production and productivity during the study period for Bhind district

Mean (\bar{x}) = $\frac{\sum x}{n}$

Where,

\bar{x} = Average of different factors

$\sum x$ = summation of different factors

N = number of observation

2. **Absolute change:** A change in area, production and productivity, were work out by the formula given below.

Absolute change = $Y_n - Y_0$

Where,

Y_n = Average of the last three years 2012-13 to 2014-15 variant area/production/productivity

Y_0 = Average of the beginning (Base) three years 2003-04 to 2006-07 of concerned variable.

3. **Relative Change:** Relative change method was used for estimation the percentage change.

4.

Relative change = $\frac{Y_n - Y_0}{Y_0} \times 100$

Where,

Y_n and Y_0 refer to same as expressed in absolute change.

5. **Coefficient of Variation:** Coefficient of variation was used to compare the variability in the selected variable for the period under study.

Coefficient of variation (C.V. %) = $\frac{\text{Standard Deviation}}{\text{Mean}} \times 100$

6. **Estimate of Trend and Growth Rate:** To reveal the behavior of selected variables in the district over time, regression analysis was carried out. The following form of linear production function was fitted by least square technique to estimate the trend and growth rate of the selected variable for the study period.

Linear Equation $Y = a + bx$

Where,

Y = Dependant variable i.e. Area, Production and Productivity

A = constant/ Intercept

B = regression Coefficient (Rate of Change)

X = Independent variable (Years)

Simple Growth Rate (SGR) = $\frac{b}{\bar{Y}} \times 100$

Compound Growth Rate (CGR) = (Antilog of $b - 1$) $\times 100$

Results and Discussion

Trend and growth of area, production and productivity of mustard

The area, production and productivity of mustard was found to be increased by 20.01, 42.54 and 14.54 per cent in the current year (130.00 thousand ha, 190.82 thousand tone and 1290 kg/ha), respectively.

Table 1: Growth and variability in area, production & productivity of mustard

Year	Area (000'ha)	Production (000' t)	Productivity (kg/ha)
2003-04	123.91	146.21	1180
2004-05	134.36	125.36	933
2005-06	150.47	187.18	1244
2006-07	151.55	130.89	863
2007-08	146.75	136.77	932
2008-09	176.71	226.72	1283zz
2009-10	177.56	242.43	1269
2010-11	180.65	235.75	1305
2011-12	172.90	199.20	1152
2012-13	180.00	287.60	1598
2013-14	180.55	175.50	957
2014-15	130.00	190.82	1290
Absolute Change	27.27	65.06	162.67
Relative Change (%)	20.01	42.54	14.54
SD	21.71	50.85	212.48
CV (%)	13.67	26.71	18.2
B	3.14	8.04	22.57
CGR (%)	2.02	4.56	1.91

The area, production and productivity of mustard in Bhind district grew with the compound annual growth rates of 2.02, 4.56 and 1.91 per cent, respectively with the magnitude of 3.14 thousand ha (area), 8.04 thousand tone (production) and 22.57 kg/ha (productivity) during the period 2003-04 to 2014-15. Instability in area, production and productivity of mustard has been computed using coefficients of variation. Maximum variability has been observed in the case of production (26.71%), followed by productivity (18.20 %) and area (13.67%) of mustard during the period 2003-04 to 2014-15 (Table.1 and Fig. 1, 2 & 3).

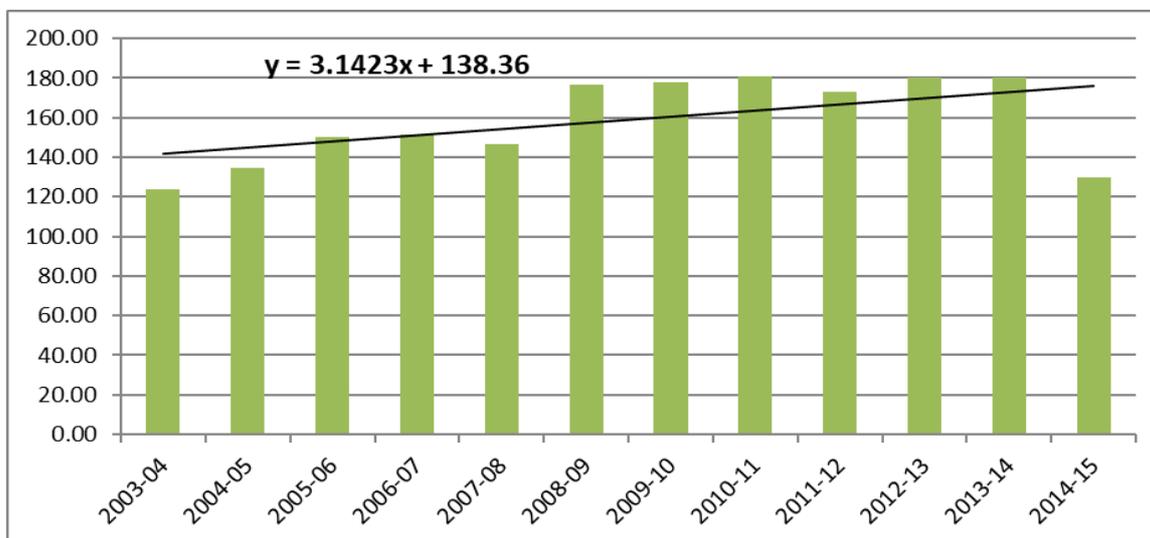


Fig 1: Trend of area of mustard in Bhind district of Madhya Pradesh

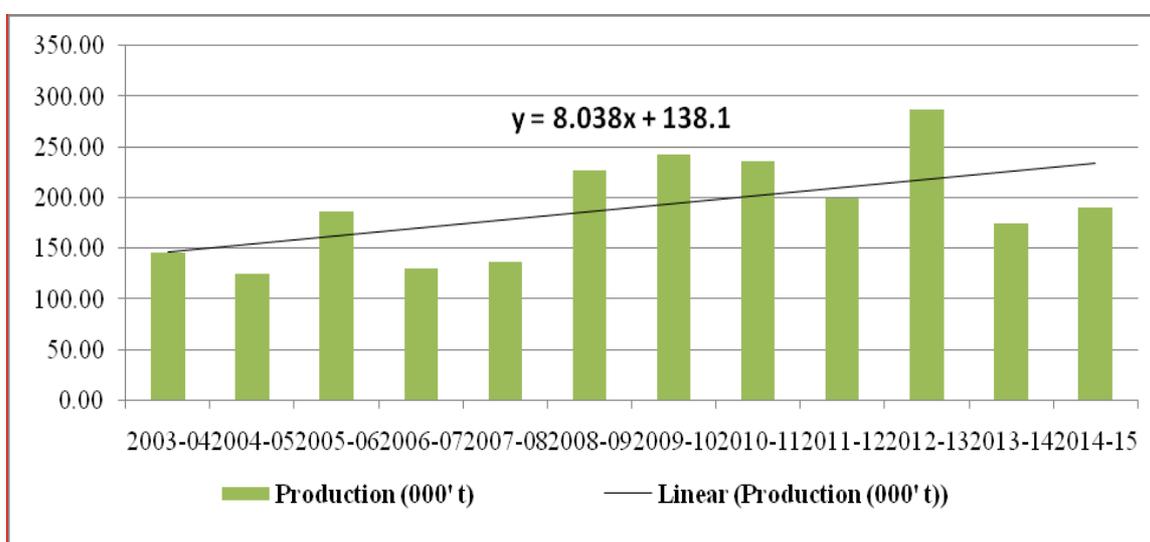


Fig 2: Trend of production of mustard in Bhind district of Madhya Pradesh

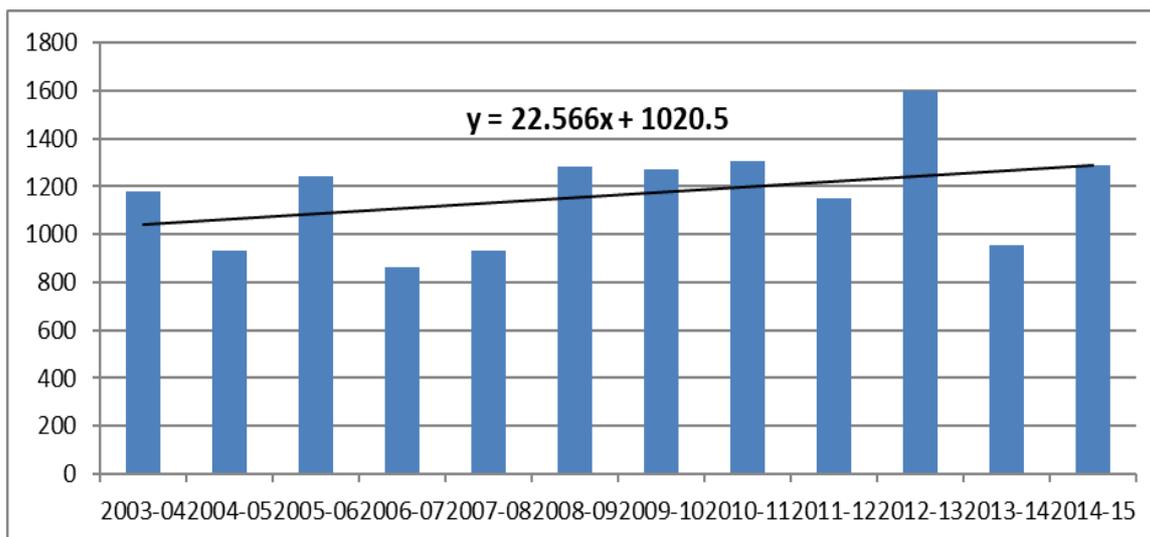


Fig 3: Trend of productivity of mustard in Bhind district of Madhya Pradesh

Profitability of mustard

The profitability of mustard crop has been presented in Table 2. Total operational cost, yield, price, and cost of cultivation/ha, cost of production/q, Net income and B: C ratio have been computed for mustard crop in the study area.

On the basis of analysis of data it can be concluded that the net income of mustard in case of small, medium and large and overall categories of the farmers was recorded as Rs. 34433.83/-, 40110.94/-, 30095/- and 34880.07/- per hectare, The B:C ratios obtained under mustard cultivation were 3.41,

3.66, 2.92 and 3.32 among above mentioned categories, respectively.

The yield of mustard obtained under small, medium, large and overall categories was 14.76, 16.80, 13.73 and 15.10 q/ha and cost of production to obtain a quintal of mustard was recorded as Rs. 967.36/-, 896.08/-, 1141.35/- and 1001.60/-, respectively. The cost of cultivation per hectare of mustard was documented as Rs. 14282.75/-, 15054.06/-, 15670.80/- and 15002.54/- respectively among different the categories mentioned above.

Table 2: Economics/Profitability of Mustard Crops (Rs/ha)

Cost items	Small	Medium	Large	Over all
Operational costs				
Seed	745.5	631.4	766.7	714.53
Fertilizer & manure	2854.96	3698.80	3758.81	3437.53
Insecticides & pesticides	502.40	508.75	502.70	504.62
Human labour				
Family	1242.54	825.75	789.65	952.65
Hired	812.65	1082.00	1175.43	1023.36
Machine labour	2690.47	2765.36	3013.87	2823.23
Bullock labour	0.00	0.00	0.00	0.00
Irrigation	1762.22	1722.72	1794.65	1759.86
Harvesting & threshing	3256.00	3380.81	3412.56	3349.79
Interest on working capital	416.00	438.47	456.43	436.97
1. Total Operational Costs	14282.75	15054.06	15670.80	15002.54
Yield (Quintals)	14.76	16.80	13.73	15.10
Price	3286.00	3271.00	3320.00	3292.33
2. Value of main-product	48516.82	54952.80	45583.60	49684.41
3. Value of by-product	199.75	212.20	182.65	198.20
Net Income	34433.83	40110.94	30095.45	34880.07
Cost of production/q	967.36	896.08	1141.35	1001.60
Cost of production/ha	14282.75	15054.06	15670.80	15002.54
B.C. Ratio	3.41	3.66	2.92	3.32

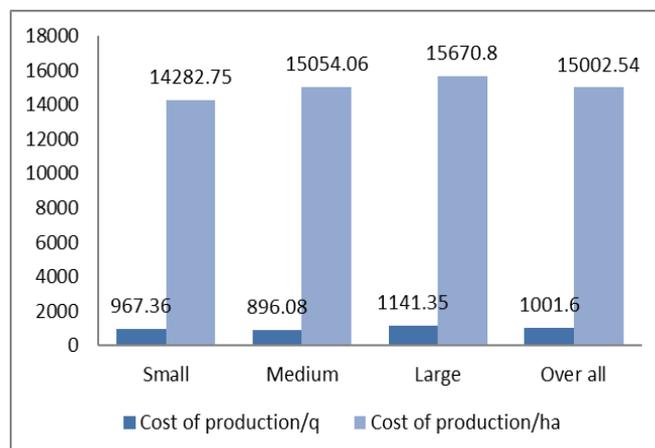


Fig 6: Cost of production of sample farmers

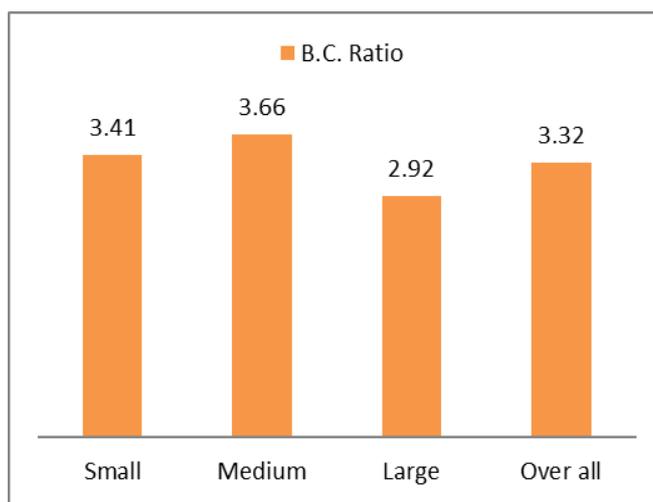


Fig 7: C ratio of sample farmers

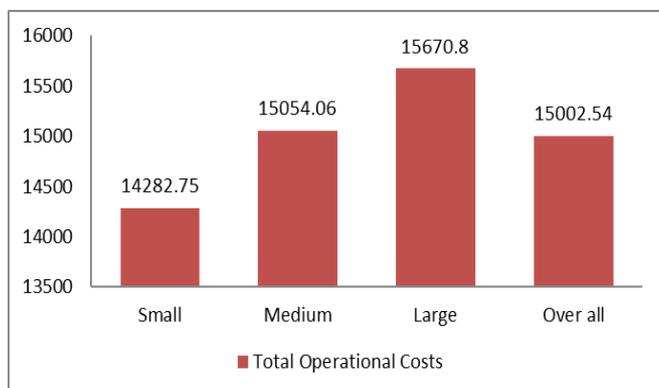


Fig 4: Total operational costs of sample farmers in Rs/ ha.

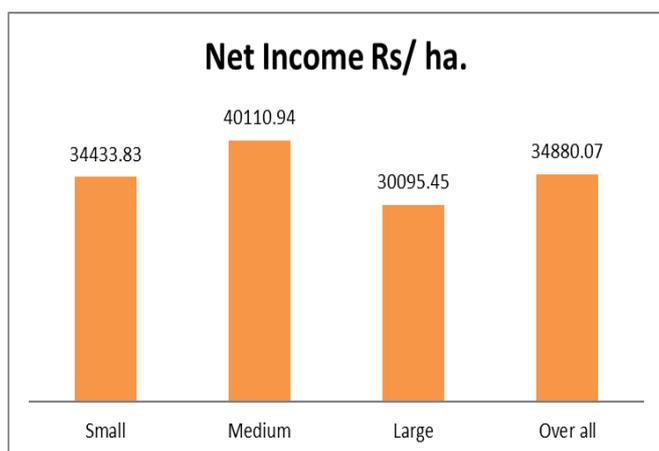


Fig 5: Net income in sample farmers in Rs/ ha

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