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Trend analysis of oilseed and pulse crops of gird agro-climatic region of Madhya Pradesh

[1]Ankit Soni and [2]Dr. DP Rai

[1]Research Scholar, Mahatma Gandhi Chitrakoot Gramodaya Vishwavidyalaya, Satna, Madhya Pradesh, India

[2]Dean, Faculty of Agriculture, Mahatma Gandhi Chitrakoot Gramodaya Vishwavidyalaya, Satna, Madhya Pradesh, India

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Corresponding Author: Ankit Soni

Abstract

The present study confined to Gird Agro Climate Region of Madhya Pradesh. The state is divided in 11 Agro-climatic regions. There are seven districts under Gird Agro Climatic Region e i., Gwalior, Guna, Ashoknagar, Morena, Shivpuri, Sheopur and Bhind. In Gird Agro Climate Region of Madhya Pradesh, oilseed and pulses is the main crop-grown covering about 67.5 percent of the net sown area. The oilseed & pulse crops were selected based on higher area and production of Madhya Pradesh. The area of oil seeds crops will be expected to increases about 9.07 M ha. of Madhya Pradesh, while production of oil seeds crops will be expected to increases about 11.63 MT till 2033-34 of Madhya Pradesh. The Productivity of oil seeds crops will be also expected to increases about 1440.54kg/ha till 2033-34 of Madhya Pradesh, the area of pulse crops will be expected to increases about 8.62 M.ha. of Madhya Pradesh, while production of pulse crops will be expected to increases about 9.44 MT till 2033-34 of Madhya Pradesh. The Productivity of pulse crops will be also expected to increases about 1203.56kg/ha till 2033-34 of Madhya Pradesh.

Keywords: Trend, growth, area, production, productivity and growth rate

Introduction

The agriculture sector which alone represents 23 percent of India's Gross National Product (GNP), plays a crucial role in the country's development and shall continue to occupy an important place in the national economy. It sustains the livelihood of nearly 70% of the population. It seems obvious that any significant change in climate on a global scale will impact local agriculture, and therefore affect the world's food supply. The growth in Indian agricultural sector had its moments of glory; nonetheless Green Revolution has been the major success story of free India. The nation that was frequently plagued by famines and chronic food shortage before green revolution today faces surplus. From a food grain production around 55 million tons at the time of independence, we now boost of production of more than 250 million tons of food grain 2011. Unlike developed nation, agriculture still remains the backbone of our country. In India oilseeds crop of the presently occupies an area of more than 28.79 million hectare with 36.10 million tonne production in India with 1254 kg/ha. Productivity in India during 2020-2021. (At a glance 2021). In India, pulse crops are grown in different states. Madhya Pradesh has first rank in area and production, 31 percent and 28 percent respectively, in total pulses. In India pulse crop of the presently occupies an area of more than 28 million hectare with 25.46 million tonne production in India with 885 kg/ha. Productivity in India during 2020-2021. (Annual report 2021-22)

Materials and Methods

The present study confined to Gird Agro Climate Region of Madhya Pradesh. The state is divided in 11 Agro-climatic regions. There are seven districts under Gird Agro Climatic Region e.i., Gwalior, Guna, Ashoknagar, Morena, Shivpuri, Sheopur and Bhind. In Gird Agro Climate Region of Madhya Pradesh, oilseed and pulses is the main crop-grown covering about 67.5 percent of the net sown area. The oilseed & pulse crops were selected based on higher area and production of Madhya Pradesh.

The collected data was tabulated in the view of the cited objectives and was interrelated by using suitable statistical measures. Followings statistical measures were used for present study. Trend analysis and likert scale were calculated for the study. The secondary data was collected through different Government offices such as Department of Agriculture, Directorate of Economics and Statistics and Government of Madhya Pradesh. In other hands, the secondary data was collected from the website of Ministry of Agriculture and Farmers' Welfare Government of India (agriculture. govt. in), Department of Farmer Welfare and Agriculture Development, Madhya Pradesh, Agricultural Statistics at a Glance, and Food & Agriculture Organization (FAO). The secondary data used trend of area, production and productivity was analyzed which was based on data from 2019-20 to 2033-34 year of selected crops i.e. oil seeds and pulse crops of Madhya Pradesh.

Trend Analysis

Linear Model: The linear trend model that is suggested by finger (2007) and Boken *et al.* (2000) was used in this study for analysis. The trends in area, production and productivity of oilseed and pulse crops have been worked out by fitting the following functions:

$Y_t = a + bx$

Where,

Y= Expected value,

t=Time index

a= Intercept

x =Area/ production/ yield

b= Regression coefficient for x

Trend of Area, Production and Yield

The trend of area, production and productivity was analyzed which was based on data from 2019-20 to 2033-34 year of selected crops i.e. oil seeds and pulse crops of Madhya Pradesh.

Trend of Oilseed Crop in Madhya Pradesh

The trends of area, production and productivity of oil seed crops for next 15 year (2019-20 to 2033-34) of Madhya Pradesh are showing the table 1. The area trend of oil seed crops will be expected to increase from 7.55 (2019-20) to 9.07 Mha (2033-34) of Madhya Pradesh, while production of oil seed crops will be expected to increase from 8.81 (2019-20) to 11.81 Mha (2033-34) of Madhya Pradesh. The Productivity trend of oil seed crops will be expected to increase from 1193.52kg/ha (2019-20) to 1440.54 kg/ha (2033-34) of Madhya Pradesh,

The value of regression of area was found to be 0.11 which is positive and significant that means area of oil seed crops will be significantly increases in future. The value of regression of production was found to be 0.22 which is positive and significant that means production of oil seed crops increases significantly. The value of regression of productivity was found to be 17.64 which are positive and significant that means productivity will be significantly increases for next 15 years.

Table 1: Trend of area, production and yield of oilseed crops in Madhya Pradesh

Year	Area (Mha)	Production (MT)	Yield (kg/ha)
2019-20	7.55	8.81	1193.52
2020-21	7.66	9.03	1211.16
2021-22	7.77	9.24	1228.80
2022-23	7.88	9.46	1246.45
2023-24	7.98	9.67	1264.09
2024-25	8.09	9.89	1281.74
2025-26	8.20	10.11	1299.38
2026-27	8.31	10.32	1317.03
2027-28	8.42	10.54	1334.67
2028-29	8.53	10.75	1352.32
2029-30	8.64	10.97	1369.96
2030-31	8.74	11.18	1387.60
2031-32	8.85	11.40	1405.25
2032-33	8.96	11.61	1422.89
2033-34	9.07	11.83	1440.54
Intercept (a)	5.27	4.28	822.98
'b'	0.11	0.22	17.64
R^2	0.728	0.614	0.398

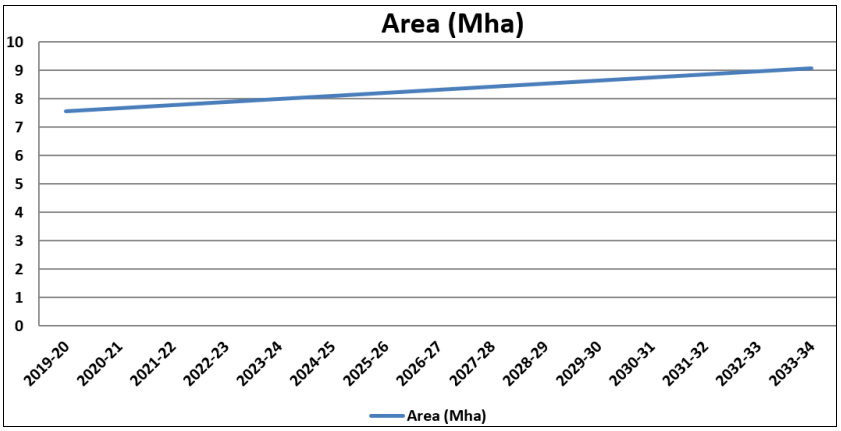

Fig 1: Area of oil seed crop in Madhya Pradesh

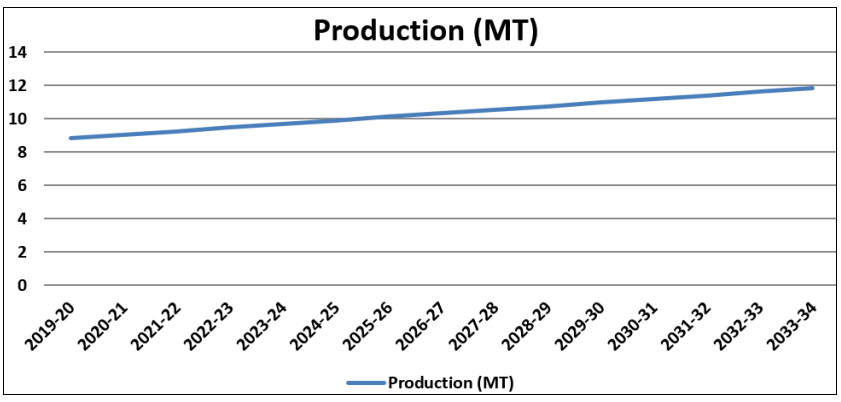

Fig 2: Production of oil seed crop in Madhya Pradesh

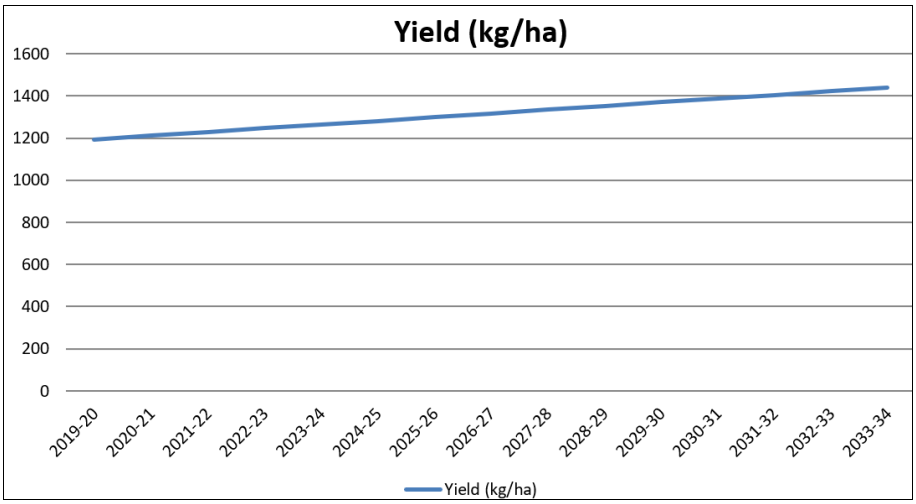

Fig 3: Yield of oilseed crop in Madhya Pradesh

Trend of Pulse crops in Madhya Pradesh

The trends of area, production and productivity of pulse crops for next 15 year (2019-20 to 2033-34) of Madhya Pradesh are showing the table 2. The area trend of pulse crops will be expected to increase from 6.58 (2019-20) to 8.62 Mha (2033-34) of Madhya Pradesh, while production of pulse crops will be expected to increase from 6.40 (2019-20) to 9.44 Mha (2033-34) of Madhya Pradesh. The Productivity trend of pulse crops will be expected to increase from 976.18 kg/ha (2019-20) to 1203.56 kg/ha (2033-34) of Madhya Pradesh,

The value of regression of area was found to be 0.15 which is positive and significant that means area of pulse crops will be significantly increase in future. The value of regression of production was found to be 0.22 which is positive and significant that means production of pulse crops increases significantly. The value of regression of productivity was found to be 16.24 which are positive and significant that means productivity will be significantly increases for next 15 years.

Table 2: Trend of area, production and yield of pulse crops in Madhya Pradesh

Year	Area (Mha)	Production (MT)	Yield (kg/ha)
2019-20	6.58	6.40	976.18
2020-21	6.73	6.62	992.43
2021-22	6.87	6.83	1008.67
2022-23	7.02	7.05	1024.91
2023-24	7.16	7.27	1041.15
2024-25	7.31	7.49	1057.39
2025-26	7.45	7.70	1073.63
2026-27	7.60	7.92	1089.87
2027-28	7.74	8.14	1106.12
2028-29	7.89	8.36	1122.36
2029-30	8.03	8.57	1138.60
2030-31	8.18	8.79	1154.84
2031-32	8.33	9.01	1171.08
2032-33	8.47	9.22	1187.32
2033-34	8.62	9.44	1203.56
Intercept (a)	3.52	1.83	635.12
'b'	0.15	0.22	16.24
R^2	0.728	0.711	0.571

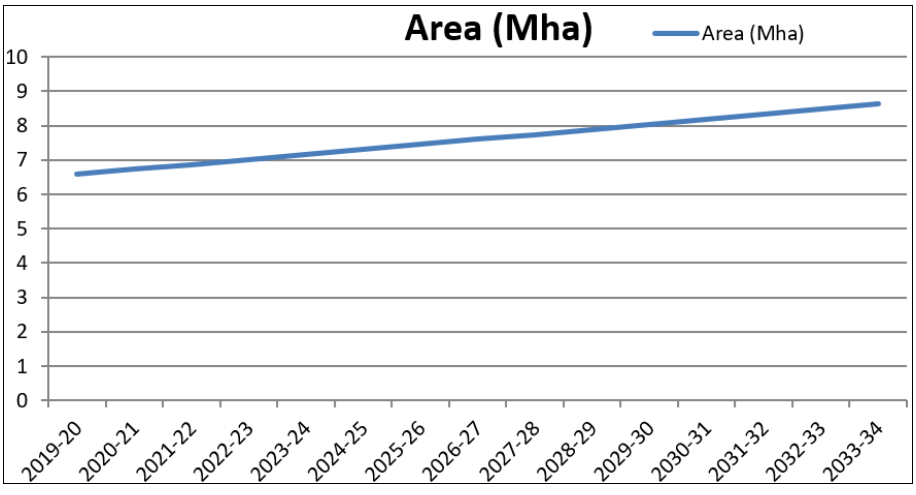

Fig 4: Area of pulse crop in Madhya Pradesh

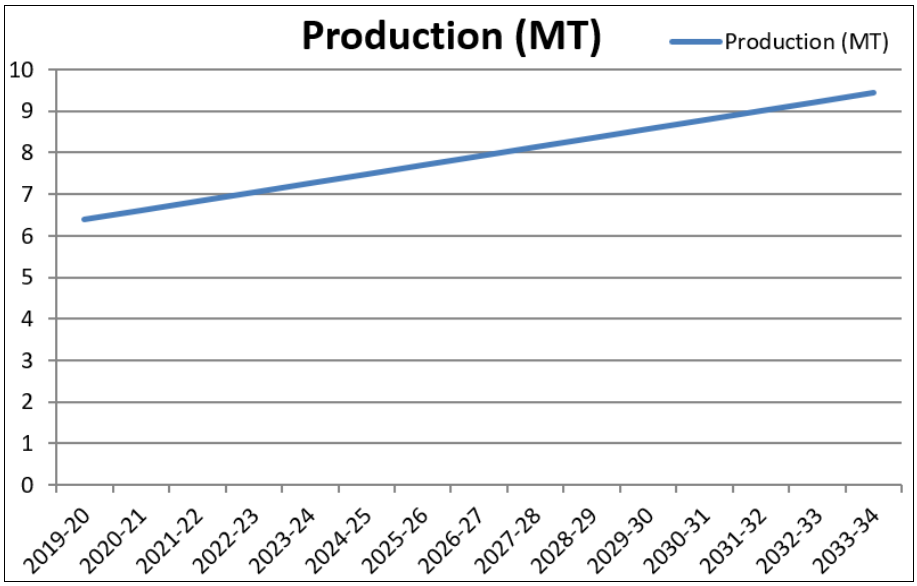

Fig 5: Production of pulse crop in Madhya Pradesh

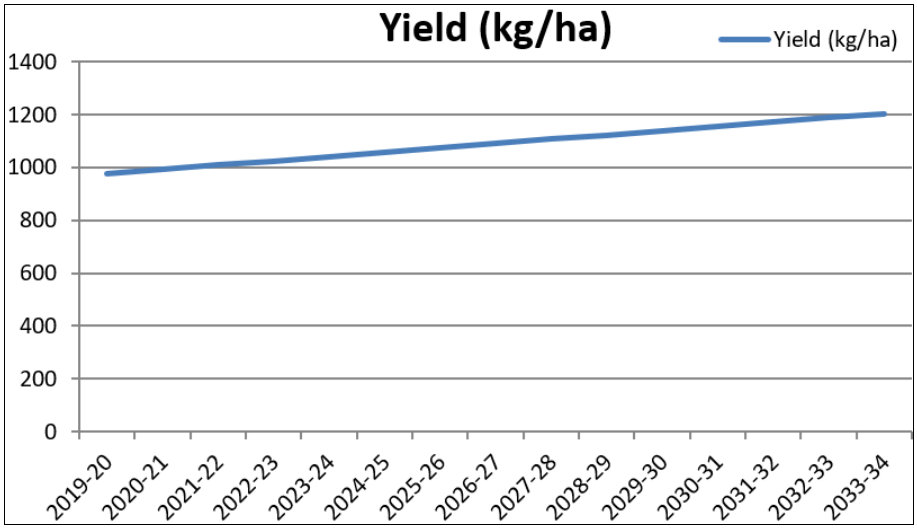

Fig 6: Yield of Pulse crop in Madhya Pradesh

Summary and Conclusion

The area trend of oil seed crops will be expected to increase from 7.55 (2019-20) to 8.42 Mha (2027-28) of Madhya Pradesh, while production of oil seed crops will be expected to increase from 8.81 (2019-20) to 10.54 MT (2027-28) of Madhya Pradesh. The Productivity trend of oil seed crops will be expected to increase from 1193.52kg/ha (2019-20) to 1334.67 kg/ha (2027-28) of Madhya Pradesh, The area trend of pulse crops will be expected to increase from 6.58 (2019-20) to 7.74 Mha (2027-28) of Madhya Pradesh, while production of pulse crops will be expected to increase from 6.40 (2019-20) to 8.14 MT (2027-28) of Madhya Pradesh. The Productivity trend of pulse crops will be expected to increase from 976.18 kg/ha (2019-20) to 1106.12 kg/ha (2027-28) of Madhya Pradesh, The area of oil seeds crops will be expected to increases about 9.07 M ha. of Madhya Pradesh, while production of oil seeds crops will be expected to increases about 11.63 MT till 2033-34 of Madhya Pradesh. The Productivity of oil seeds crops will be also expected to increases about 1440.54 kg/ha till 2033-34 of Madhya Pradesh,The area of pulse crops will be expected to increases about 8.62 M.ha. of Madhya Pradesh, while production of pulse crops will be expected to increases about 9.44 MT till 2033-34 of Madhya Pradesh. The Productivity of pulse crops will be also expected to increases about 1203.56kg/ha till 2033-34 of Madhya Pradesh.

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