



E-ISSN: 2278-4136
P-ISSN: 2349-8234
JPP 2018; 7(3): 2600-2605
Received: 07-03-2018
Accepted: 12-04-2018

Annu
Department of Agricultural
Statistics, Narendra Deva
University of Agriculture &
Technology, Kumarganj,
Faizabad, Uttar Pradesh, India

Nitin Tanwar
Department of Mathematics &
Statistics, CCS Haryana
Agricultural University, Hisar,
Haryana, India

Trend in fertilizer consumption in different agro-climatic zones of Eastern Uttar Pradesh

Annu and Nitin Tanwar

Abstract

The present study based on time series data from 1971-72 to 2004-2005, use of the moving average method for find the trend of fertilizer consumption in eastern Uttar Pradesh (U.P.). The fertilizer consumption has been found increasing and decreasing gradually i.e. fluctuating over period of study.

Keywords: fertilizer, consumption, climatic, Uttar Pradesh

Introduction

Eastern Uttar Pradesh is the most popular and occurs an important place in fertilizer consumption in Uttar Pradesh. The Eastern Uttar Pradesh covers 25 Districts. The Eastern Uttar Pradesh covered different three Agro-climatic zones viz., North Eastern Plain Zone, Eastern Plain Zone and Vindhyan Zone. North Eastern Plain Zone constitute 11 Districts, Eastern Plain Zone constitute 12 Districts. Vindhyan Zone constitutes two Districts. The Eastern Uttar Pradesh has been divided in three different agro-climatic zones, which includes North Eastern Plain Zone, Eastern Plain Zone, and Vindhyan Zone. Uttar Pradesh has total geographical area of 29.44 million hector out of which cropped area covers 24.24 million hector with cropping intensity of 148.6% The average fertilizer consumption of Eastern Uttar Pradesh 1521.85 kg /ha during 1970-71 to 2004-05. The North Eastern Plain Zone of Uttar Pradesh, India covers a geographical area of 33.49 thousand km² consisting of 11 districts. Rice and wheat are important food crops of the zone, covering are of 13.42 and 13.26 lakh /ha. The Eastern Plain Zone covers a geographical area of 45.33 thousand km² consisting of 12 districts. Gross irrigated area of the zone is largest (1808495 ha) among other zones of Eastern Uttar Pradesh. This constitutes 52% of the total area of land utilization as compared to 39% of North Eastern Plain Zone and 13% of Vindhyan Zone. Rice and wheat are important food crops of the zone.

The Vindhyan Zone out of the all three zones is the smallest zone having the geographical area of 11.33 thousand km² consisting of 2 districts. The irrigation potential in the zone is very poor i.e. 13% of the total area of land utilization and 42% of the cropped area, hence irrigation facility is to be developed in the zone to increase the large area under irrigation.

Materials and Methods

The investigation was carried out during 1970 – 71 to 2004-05. The study is based on secondary data. The data time series of 35 years on fertilizer consumption in districts of Easter Uttar Pradesh. The data were collected from the report of Director Agriculture, Statistics and crops Insurance, Government of Uttar Pradesh, Krishi Bhawan Lucknow Uttar Pradesh. The data is classified in two parts 1970-71 to 1989-90 is during green revolution and 1990-91 to 2004-05 is Post Green revolution. Further the entire 25 districts under consideration are classified in three Agro-climatic zones viz. North Eastern Plain Zone Eastern Plain Zone and Vindhyan Zone respectively. North Eastern Plain Zone constitute 11 Districts viz. Basti, Bahraich, Balrampur, Deoria, Gorakhpur, Gonda, Mahrajganj, Kushinagar, Siddharth Nagar, Sant Kabeer Nagar and Shravsti, Eastern Plain Zone constitute 12 Districts viz. Azamgarh Ambedkar Nagar, Barabanki, Ballia, Chandauli, Faizabad, Ghazipur, Mau, Jaunpur, Sant Ravidas Nagar, Sultanpur and Vanarasi. Vindhyan Zone constitutes 2 Districts viz., Mirzapur and Sonbhadra.

The techniques employed are described as follow

Trend of fertilizer consumption in Eastern Uttar Pradesh period along with three year moving average of three agro-climatic zones

Correspondence

Annu
Department of Agricultural
Statistics, Narendra Deva
University of Agriculture &
Technology, Kumarganj,
Faizabad, Uttar Pradesh, India

The moving average of period k of a time series given is a new series of arithmetic means, each of k success observations of the time series; we start with the first k observation. At the next stage, we leave of the first and include the $(k + 1)^{\text{st}}$ observation. This Process is repeated until we arrive at the last k observation. Each of these means is centered against the time, which is the mid- point of the time interval included in the moving average. Thus when k , the period of the moving average, is odd, the moving average values corresponding to tabulated time values for which the time series is given, when the period is even, the moving average falls midway between two tabulated values. In this case, we calculated a subsequent two-item moving values average to make the resulting moving average values correspond to the tabulated time periods.

Not only show tabulated but also shows the graphically methods of fertilizer Consumption of Fertilizer of three different agro climatic zones have been studied.

Fertilizer consumption for whole eastern Uttar Pradesh have been shown along with the trend of fertilizer consumption using by moving average method of time series analysis for all district respectively. This has also been done for the three

agro -climatic zone viz. North Eastern Plain Zone, Eastern Plain Zone and Vindhyan Zone.

Results

Status of fertilizer consumption in Eastern Uttar Pradesh

To get the present picture of status of fertilizer consumption in Eastern Uttar Pradesh per hectare consumption data from 1970-71 to 2004-05 has been presented in the Table 1. Per hectare consumption data in Eastern Uttar Pradesh are smoothing by using 3-yearly moving average. Figures presented in the table reflect that per hector consumption of fertilizer in eastern Uttar Pradesh is increasing and decreasing gradually i.e. fluctuating over period of study.

A decline in fertilizer consumption is observed during the year 1973- 74. 3-yearly moving average is declining during the year 1972-73. It could be assumed that variations in fertilizer consumption depend largely on amount of rainfall during monsoon period available land, type of crop cultivated, area under irrigation etc. As the irrigation status of eastern Uttar Pradesh is not very good and rainfall distribution is also not uniform, these create obstacles in crop production and ultimately fertilizer consumption status decreases.

Table 1: Fertilizer consumption in Eastern Uttar Pradesh

Year	Fertilizer consumption Kg/ha	3-Yearly Moving Average
1970-71	350.23	-
1971-72	320.56	324
1972-73	301.21	302.67
1973-74	286.26	321.97
1974-75	378.44	404.81
1975-76	549.74	499.53
1976-77	570.43	643.82
1977-78	811.31	731.01
1978-79	811.31	779.98
1979-80	717.32	774.70
1980-81	795.48	786.75
1981-82	847.47	862.40
1982-83	944.25	960.54
1983-84	1089.91	1016.28
1984-85	1014.7	1129.61
1985-86	1284.23	1136.59
1986-87	1110.85	1147.37
1987-88	1047.04	1135.61
1988-89	1248.95	1150.95
1989-90	1156.87	1310.91
1990-91	1526.93	1427.84
1991-92	1599.72	1535.57
1992-93	1480.08	1566.03
1993-94	1618.3	1593.08
1994-95	1680.87	1673.85
1995-96	1722.4	1756.83
1996-97	1867.24	2192.76
1997-98	2988.65	2621.99
1998-99	3010.1	3087.82
1999-00	3264.71	3109.83
2000-01	3054.68	3241.76
2001-02	3405.91	3298.58
2002-03	3435.17	3433.06
2003-04	3458.10	3469.47
2004-05	3515.15	-
Average	1521.845	-

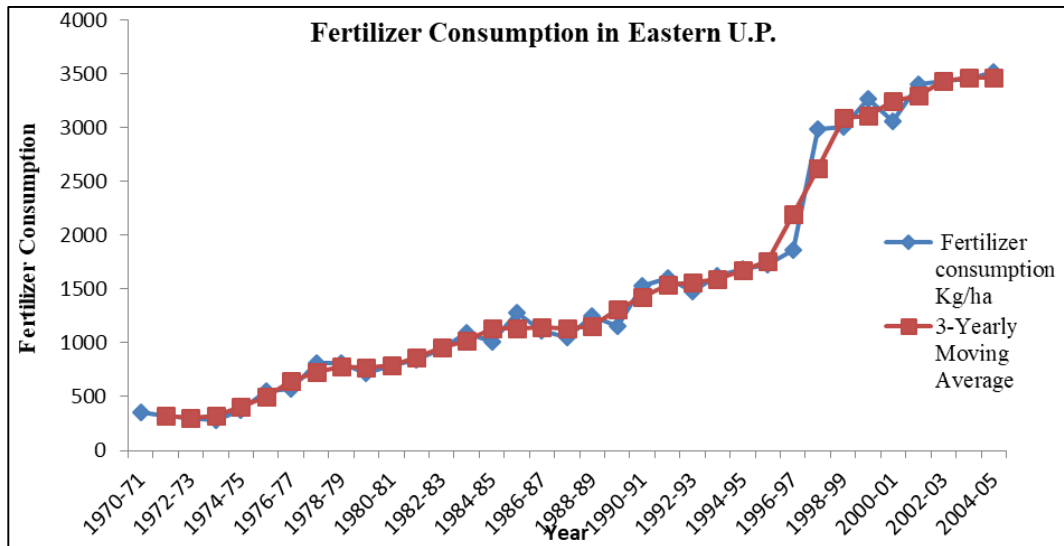


Fig 1: Fertilizer consumption in Eastern Uttar Pradesh

The fertilizer consumption in north eastern plain zone
Trend of fertilizer consumption in North eastern Plain Zone has been presented in Table 2 consumption was found highest

during 2002-03 where as it is lowest during 1973-74. The actual trend in fertilizer consumption by using 3-yearly moving average has been presented in Fig 2.

Table 2: Fertilizer consumption in North Eastern Plain Zone

Year	North Eastern Plain Zone	3-Yearly Moving Average
1970-71	147.6	-
1971-72	132.47	134.18
1972-73	122.47	124.70
1973-74	119.16	135.55
1974-75	165.04	171.95
1975-76	231.67	216.15
1976-77	251.76	264.70
1977-78	310.68	291.04
1978-79	310.68	301.26
1979-80	282.44	299.51
1980-81	305.43	304.59
1981-82	325.9	332.85
1982-83	367.23	383.52
1983-84	457.45	409.30
1984-85	403.22	459.76
1985-86	518.62	456.26
1986-87	446.96	475.17
1987-88	459.93	470.06
1988-89	503.31	443.02
1989-90	365.83	473.16
1990-91	550.34	506.79
1991-92	604.21	561.02
1992-93	528.51	579.07
1993-94	604.49	566.69
1994-95	567.07	602.42
1995-96	635.72	629.60
1996-97	686.01	817.96
1997-98	1132.15	1000.27
1998-99	1182.67	1198.33
1999-00	1280.19	1245.18
2000-01	1272.69	1312.27
2001-02	1383.94	1399.29
2002-03	1541.24	1456.31
2003-04	1443.75	1478.49
2004-05	1450.493	-
Average	602.6092	-

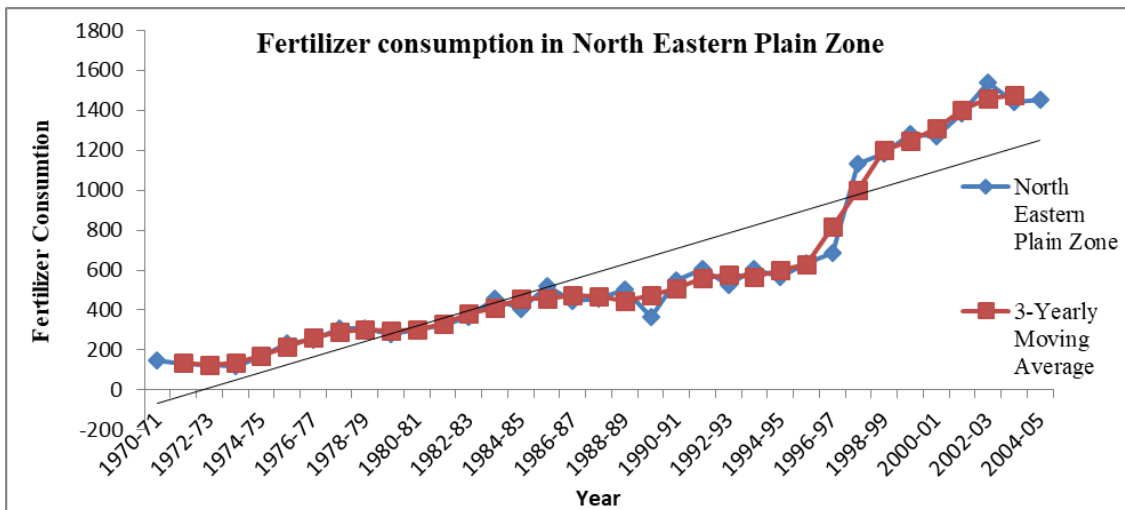


Fig 2: Fertilizer consumption in North Eastern Plain Zone

Fertilizer consumption in Eastern Plain Zone of Eastern Uttar Pradesh

The Eastern Plain Zone is second zone of the Eastern Uttar Pradesh. The Table 3 shows fertilizer consumption has been

highest 1930.52kg/ha during 2004-05, and lowest 160kg/ha during 1973-74. The actual trend is using the method of 3-yearly moving average for Eastern Plain Zone of Eastern Uttar Pradesh.

Table 3: Fertilizer consumption in Eastern Plain Zone, of Eastern Uttar Pradesh

Years	Fertilizer consumption in Eastern Plain Zone	3-Yearly Moving Average
1970-71	195.32	-
1971-72	178.28	180.63
1972-73	168.29	168.94
1973-74	160.27	175.93
1974-75	199.25	217.78
1975-76	293.83	262.50
1976-77	294.44	352.13
1977-78	468.12	410.22
1978-79	468.12	450.46
1979-80	415.15	448.73
1980-81	462.94	456.47
1981-82	491.32	499.46
1982-83	544.14	544.14
1983-84	596.96	570.47
1984-85	570.33	629.06
1985-86	719.91	639.92
1986-87	629.54	634.03
1987-88	552.65	629.47
1988-89	706.22	671.82
1989-90	756.59	787.46
1990-91	899.59	857.60
1991-92	916.63	895.42
1992-93	870.04	906.68
1993-94	933.38	942.96
1994-95	1025.48	982.09
1995-96	987.42	1032.63
1996-97	1085.01	1275.92
1997-98	1755.34	1517.94
1998-99	1713.48	1775.08
1999-00	1856.43	1749.85
2000-01	1679.65	1809.04
2001-02	1891.06	1787.15
2002-03	1790.76	1856.17
2003-04	1886.70	1869.32
2004-05	1930.52	-
Average.	859.80	

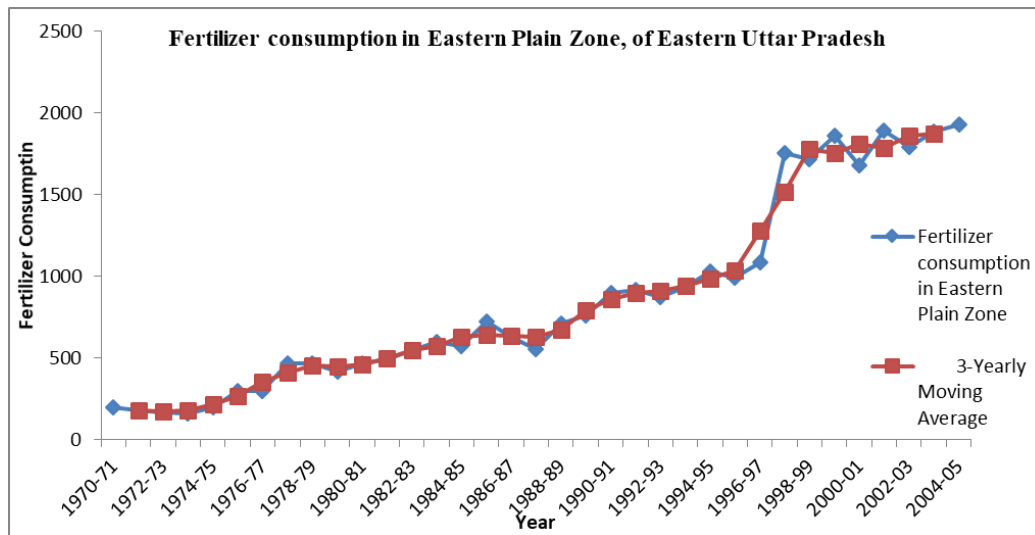


Fig 3: Fertilizer consumption in Eastern Plain Zone, of Eastern Uttar Pradesh

Status of fertilizer consumption in Vindhyan Zone of Eastern Uttar Pradesh

The fertilizer consumption in Vindhyan Zone has been

presented in table 4 the highest consumption was found 134.12 kg/ha during 2004-05 and lowest consumption 7.31 in 1970-71.

Table 4: Fertilizer consumption in Vindhyan zone, of eastern Uttar Pradesh

Years	Fertilizer consumption in Vindhyan Zone of Eastern Uttar Pradesh	3-Yearly Moving Average
1970-71	7.31	-
1971-72	9.81	9.19
1972-73	10.45	9.03
1973-74	6.83	10.47
1974-75	14.15	15.07
1975-76	24.24	20.87
1976-77	24.23	26.99
1977-78	32.51	29.75
1978-79	32.51	28.25
1979-80	19.73	26.45
1980-81	27.11	25.69
1981-82	30.25	30.07
1982-83	32.87	32.87
1983-84	35.5	36.50
1984-85	41.15	40.78
1985-86	45.70	40.4
1986-87	34.35	38.17
1987-88	34.46	36.07
1988-89	39.42	36.11
1989-90	34.45	50.29
1990-91	77.00	63.44
1991-92	78.88	79.13
1992-93	81.53	80.28
1993-94	80.43	83.42
1994-95	88.32	89.33
1995-96	99.26	94.60
1996-97	96.22	98.88
1997-98	101.16	103.77
1998-99	113.95	114.4
1999-00	128.09	114.79
2000-01	102.34	120.44
2001-02	130.91	112.14
2002-03	103.17	120.57
2003-04	127.65	121.64
2004-05	134.12	-
Average	59.43	

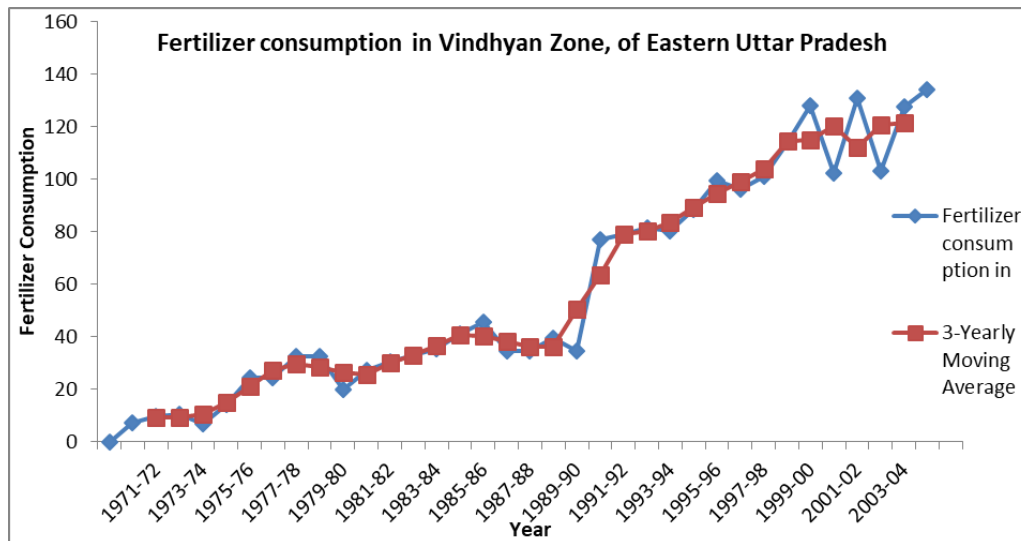


Fig 4: Fertilizer consumption in Vindhyan Zone, of Eastern Uttar Pradesh

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