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IMPACT OF CLIMATE CHANGE ON AGRICULTURAL PRODUCTION IN INDIA

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ABSTRACT

The agricultural sector represents 35% of India's Gross National Product (GNP) and as such plays a crucial role in the country's development. Food grain production quadrupled during the post-independence era; this growth is projected to continue. The impact of climate change on agriculture could result in problems with food security and may threaten the livelihood activities upon which much of the population depends. Climate change can affect crop yields (both positively and negatively), as well as the types of crops that can be grown in certain areas, by impacting agricultural inputs such as water for irrigation, amounts of solar radiation that affect plant growth, as well as the prevalence of pests. To study the trend and growth of food grains production, area under cultivation and productivity of food grains in India during pre-globalization (1970-71 to 1990-91) and post-globalization period (1991-92 to 2010-11). To examine the structural difference in the production, area under cultivation and yield of food grains in India during pre-globalization (1970-71 to 1990-91) and post-globalization period (1991-92 to 2010-11). The present study in based entirely on secondary data. pre-globalization (1970-71 to 1990-91) and post-globalization period (1991-92 to 2010-11). The Growth of yield of food grains production in pre-globalization (1970-71 to 1990-91) and post-globalization period (1991-92 to 2010-11). The yield of food grains in India has been increased from 1970-71 to 2010-11 The present study reveals that the globalization had a positive impact on the production and yield of food grains in India but it had a negative impact on area under cultivation of food grains in India.). The area under cultivation in India has been fluctuations from 1970-71 to 2010-11

The annual growth of area under cultivation in India that there is a fluctuation in the growth of area under cultivation in during 1970-71 to 2010-11.the pre-globalization highest annual growth rate 6.67 per cent is seen in the year 1988-89.

KEY WORDS: Agricultural Production, Food Grains, Yield Food Grains

INTRODUCTION

Agriculture represents a core part of the Indian economy and provides food and livelihood activities to much of the Indian population. While the magnitude of impact varies greatly by region, climate change is expected to impact on agricultural productivity and shifting crop patterns. The policy implications are wide-reaching, as changes in agriculture could affect food security, trade policy, livelihood activities and water conservation issues, impacting large portions of the population. The agricultural sector represents 35% of India's Gross National Product (GNP) and as such plays a crucial role in the country's development. Food grain production quadrupled during the post-independence era; this growth is projected to continue. The impact of climate change on agriculture could result in problems with food security and may threaten the livelihood activities upon which much of the population depends. Climate change can affect crop yields (both positively and negatively), as well as the types of crops that can be grown in certain areas, by impacting agricultural inputs such as water for irrigation, amounts of solar radiation that affect plant growth, as well as the prevalence of pests.

IMPACT OF CLIMATIC CHANGES ON AGRICULTURE

- Shift in climatic and agriculture zones
- Impact on Agriculture soil
- Effect on soil organic matter and soil
- fertility
- Effect on biological health of soil
- Soil erosion and sediment transport
- Reduced soil water availability
- Impact on soil processes
- Salinilation and alkalization
- Pest , Diseases and Weeds
- Impact on Plant growth
- Impact on crop production

REVIEW OF RELATED STUDY

N.D.Mathur, T.N.Mathur and O.P.Gupta (1981) have made an attempt to study the growth rate of agricultural production at all India level. For studying the effect of Green Revolution, they have computed compound growth rates of agricultural production for all the crops i.e., food crops and non-food crops for the period vizi, pre-green revolution and green revolution period.

Data for the analysis were obtained from the published records for the period under study. A comparison of growth rates during the pre-green revolution and green revolution period was made which would enable him to judge the effect of green revolution they have estimated the compound growth rate with the help of exponential function log Y = a + bt. Using this form they have found out that the effect of growth was more during the green revolution period.

Growth rates in Agriculture (1975) published by the Directorate of Economic and statistics, Ministry of Food and Agriculture provides a fair indication of the growth of area under crops at all India level for the period 1952-53 to 1965-65 and at the state level for the

period 1949 – 50 to 1965 -65. Growth rates of area under crops are estimated from the comparable series of official index number. Accordingly they found and the growth of area under crops in the state of Karnataka registered a positive growth of 0.81 per cent during 1949 - 50 to 1964 -65 and at the all India level the growth of area increased at the rate of 2.32 per cent during 1952 – 53 to 1964 – 65.

OBJECTIVES

1. To study the trend and growth of food grains production, area under cultivation and productivity of food grains in India during pre-globalization (1970-71 to 1990-91) and post-globalization period (1991-92 to 2010-11).

METHODOLOGY AND TOOLS USED

The present study is based entirely on secondary data. The necessary data hence been collected from Hand book Statistics on the Indian Economy.(RBI) pre-globalization (1970-71 to 1990-91) and post-globalization period (1991-92 to 2010-11).

To estimate the Average Growth Rate (AGR) of production, area under cultivation in India for the two periods pre-globalization (1970-71 to 1990-91) and post-globalization period (1991-92 to 2010-11).

The following formula was used.

$$AGR = \frac{y_t - y_{t-1}}{y_{t-1}} \times 100$$

Where

AGR=

Y_t = current year

Y_{t-1} = Previous year

t = Time Period

To study the difference in the production, area under cultivation and yield of food grains in India the chow test was used.

$$Y = \alpha + \beta + D_{t+U.}$$

Where

Y = Production, Area under cultivation and yield of food grains in India

t = Time trend variable taking values 1,2,3,...42.

D = 1 ,for time period 1990-91 to 2010-11 (post- globalization)

D = 0, for otherwise in 1970-71 to 1990-91 (pre- globalization)

AGRICULTURAL PRODUCTION – FOODGRAINS

Table: 1 The Growth of Food grains production pre-globalization (1970-71 to 1990-91) and post-globalization period (1991-92 to 2010-11).

Table: 1 The Growth of Food grains production

Year	Pre-Globalization	Year	Post-Globalization
1970-71	108.42(-)	1991-92	168.38(-4.54)
1971-72	105.17(-3.00)	1992-93	179.48(6.59)
1972-73	97.03(-7.74)	1993-94	184.26(2.66)
1973-74	104.67(7.87)	1994-95	191.50(3.93)
1974-75	99.83(-4.62)	1995-96	180.42(-5.79)
1975-76	121.03(21.24)	1996-97	199.43(10.54)
1976-77	111.17(-8.15)	1997-98	193.12(-3.16)
1977-78	126.41(13.71)	1998-99	203.61(5.43)
1978-79	131.90(4.34)	1999-2000	209.80(3.04)
1979-80	109.70(-16.83)	2000-01	196.81(-6.19)
1980-81	129.52(18.07)	2001-02	212.85(8.15)
1981-82	133.30(2.92)	2002-03	174.78(-17.89)
1982-83	129.52(-2.84)	2003-04	213.19(21.98)
1983-84	152.37(17.64)	2004-05	198.36(-6.19)
1984-85	145.54(-4.48)	2005-06	208.59(5.16)
1985-86	150.44(3.37)	2006-07	217.28(4.17)
1986-87	143.42(-4.67)	2007-08	230.78(6.21)
1987-88	140.35(-2.14)	2008-09	234.47(1.60)
1988-89	169.92(21.07)	2009-10	218.11(-6.98)
1989-90	171.04(0.66)	2010-11	244.78(12.23)
1990-91	176.39(3.13)	2011-12	257.44(5.17)

Source: *Data hence been collected from Hand book Statistics on the Indian Economy.(RBI*

The above table 1 shows The Growth of Food grains production pre-globalization (1970-71 to 1990-91) and post-globalization period (1991-92 to 2010-11).the agricultural production in India has been fluctuations from 1970-71 to 2010-11 The annual growth of food grains production in India that there is a fluctuation in the growth of food grains production in during 1970-71 to 2010-11.the pre-globalization highest annual growth rate 21.24 per cent is seen in the year 1975-76. The post-globalization highest annual growth rate 21.98 per cent is seen in the year 2003-04.

Production plan:-

Since the significant value is statistically significant at 1 per cent level and β value is .850 which is positive the globalization had a positive impact on food grains production in India.

ESTIMATED RESULTS

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	131.292	5.140		25.544*	.000
	Time	74.300	7.269	.850	10.222	.000

**Singnificant at 1% leve*

AREA UNDER CULTIVATION – FOODGRAINS

Table 2 explains the Growth of under area cultivation in pre-globalization (1970-71 to 1990-91) and post-globalization period (1991-92 to 2010-11).

Table-2 Area under Cultivation of Food grains

Year	Pre-Globalization	Year	Post-Globalization
1970-71	124.32(-)	1991-92	121.87(-4.67)
1971-72	122.62(-1.37)	1992-93	123.15(1.05)
1972-73	119.28(-2.72)	1993-94	122.76(-0.32)
1973-74	126.54(6.09)	1994-95	123.71(0.77)
1974-75	121.08(-4.31)	1995-96	121.01(-2.18)
1975-76	128.18(5.86)	1996-97	123.58(2.12)
1976-77	124.35(-2.99)	1997-98	123.85(0.22)
1977-78	127.52(2.55)	1998-99	125.16(1.06)
1978-79	129.01(1.17)	1999-2000	123.11(-1.64)
1979-80	125.21(-2.95)	2000-01	121.05(-1.67)
1980-81	126.67(1.17)	2001-02	122.77(1.42)
1981-82	129.14(1.95)	2002-03	113.87(-7.25)
1982-83	125.09(-3.14)	2003-04	123.45(8.41)
1983-84	131.16(4.85)	2004-05	120.08(-2.73)
1984-85	126.67(-3.42)	2005-06	121.60(1.27)
1985-86	128.03(1.07)	2006-07	123.70(1.73)
1986-87	127.20(-0.65)	2007-08	124.06(0.29)
1987-88	119.69(-5.90)	2008-09	122.83(-0.99)
1988-89	127.67(6.67)	2009-10	121.12(-1.39)
1989-90	126.77(-0.70)	2010-11	125.73(3.81)
1990-91	127.84(0.84)	2011-12	126.74(0.80)

Source: *Data hence been collected from Hand book Statistics on the Indian Economy.(RBI)*

The above table 2 shows The Growth of area under cultivation pre-globalization (1970-71 to 1990-91) and post-globalization period (1991-92 to 2010-11). The area under cultivation in India has been fluctuations from 1970-71 to 2010-11 The annual growth of area under cultivation in India that there is a fluctuation in the growth of area under cultivation in during 1970-71 to 2010-11.the pre-globalization highest annual growth rate 6.67 per cent is seen in the year 1988-89. The post-globalization highest annual growth rate 8.41 per cent is seen in the year 2003-04.

Area under Cultivation:-

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	125.907	.624		201.882*	.000
	time	-3.278	.882	-.507	-3.717	.001

**Singnificant at 1% level.*

Since the significant value is statistically significant at 1 per cent and the β value is –0.507 which is negative, the globalization has negative impact on the area under cultivation of food rains production in India.

CONCLUSION

The present study reveals that the globalization had a positive impact on the production and yield of food grains in India but it had a negative impact on area under cultivation of food grains in India.

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