Research Paper - Economics

An Assessment Of Malthusian Theory of Population In Indian Scenario

- Dr. M. Maria John Kennedy
Amul Anandar College, Karumathur, Madurai

- Mr. V. Veluchamy
M.S.S. Wakf Board College, Madurai

Introduction

Agriculture is the heart of Indian economy. Indian agriculture had a glorious period much before colonisation of Indian economy by the British. At that time there was a proper balance between agriculture and industry and both flourished hand in hand. This situation continued till the middle of the 18th century. The interference from the alien British government and its deliberate policy of throttling the village handicraft and cottage industries destroyed the fiber of balance and the economy of the country was badly shattered. British pursued a typical colonial policy in India and did nothing to develop agriculture. Though things have changed considerably, thanks to Green Revolution, the emerging trends in the growth of population and the stagnant agricultural production in the backdrop of high food inflation provides a formidable challenge to policy makers and economists. A pertinent question that arise in the Indian context is the applicability of Malthus and his mass starvation theories

In 1798, Thomas Malthus- a clergyman and professor of modern history and political economy predicted that (unchecked) population would grow more rapidly than food production because, the quantity of land was fixed. The problem, he believed, was that the fixed amount of land would lead to diminishing marginal product of labour so output would rise less than in proportion to the increase in farm workers. Malthus grimly concluded that, mass starvation would result. Though Malthus was proved as a false prophet in western counties, his predictions are partly true to several African and few Asian countries. Percapita food production has fallen in Africa over the past two decades. Worse in several recent years; mass starvation and food based riots have plagued some African countries. In this context an attempt has been made in this paper to analyse the relationship between population growth and food supply in India since 1980's

Objectives of the study

1. To analyse the trends in the growth of population and food supply in India since 1980.

2. The applicability of Malthus prediction in the Indian context with regard to population and food supply.

Methodology

The following methodology is followed in the study.

Study period

The study covers a period of thirty (30) years. Decade wise analysis has been followed in the study from 1980-to 1990, 1990 to 2000 and 2000 to 2009.

Sources of Data

The study is based on secondary data. The required data has been collected from RBI Hand Book of Statistics on Indian Economy, Economic Survey and various journals

Tools used

To analyse the trends and growth rate of population and food supply, the statistical techniques of simple liner regression and compound growth rate have been applied in this study.

Trend Analysis

The objective of the present study is to analyse the growth of population and food supply in India. For this purpose, two popular forms of trend analysis, namely the liner trend model and the semi-log model have been used.

To fit the straight line, a model of the following type has been used.

T = a + bt + ut

T = Population in crores and Food supply in million tones

t = time period variables takeing values,1,2,3…

'a' is the intercept term and 'b' is the

regression co-efficient showing the annual growth or decline in the population and food supply in India. The compound growth rates have also been worked out for population and food supply growth for the three sub-decades and as also for the whole period. To get the constant annual compound growth rate another semi-log model of the following type is used in this study.

The semi-log model is Log Y=a+bt

Compound growth rate = [antilog (b-1)100

The above regression models are estimated using the principle of least square. The compound growth rates of the population and food supply are estimated for the three sub-decades 1980-81 to 1989-90,1990-91 to 1999-00, and 2000-01 to 2008-09 and also for the entire period of 1980-81 to 2008-09.

Analysis and Discussion

The following table shows the growth of agricultural food grain production and growth of population in India since 1980. The table (1:1) shows that food grain production has increased from 129.59 million tones in the year 1980-81 to 228.37 million tones in the year 2008-2009. The corresponding population in this period are 67.9 and 118.0 crores respectively.

Table-1.1

Growth Of Population And Food Grains In India

Year	Population In Crores	Total Food Grains (Million tones)
1980-1981	67.9	129.59
1981-1982	69.2	133.30
1982-1983	70.8	129.52
1983-1984	72.3	152.37
1984-1985	73.9	145.54
1985-1986	75.5	150.44
1986-1987	77.1	143.42
1987-1988	78.8	140.35
1988-1989	80.5	169.92
1989-1990	82.2	171.04
1990-1991	83.9	176.39
1991-1992	85.6	168.38
1992-1993	87.2	179.48
1993-1994	89.2	184.26
1994-1995	91.8	191.50
1995-1996	92.8	180.42
1996-1997	94.6	199.43
1997-1998	96.4	192.27
1998-1999	98.3	203.61
1999-2000	100.1	209.80
2000-2001	101.9	196.81
2001-2002	103.7	212.85
2002-2003	105.5	174.78
2003-2004	107.5	213.19
2004-2005	109.0	198.36
2005-2006	110.7	208.59
2006-2007	112.2	217.28
2007-2008	114.5	230.67
2008-2009	118.0	228.37

Source: Hand Book of Statistics on Indian Economy,RBI, Various issues

Table-1.2
Growth of Population and Food Supply in the Decade (1980-81 to 1989-1990)

Period	Items	Model	a	b	Std-Error	T-stat	Sig-t	R^2	CGR
(1980-81 to 1989-90)	Population	Lin	66.0266	1.598788	0.016324	97.959	0.000	0.99	--
		Log-Lin	4.1955	0.021384	7.1628	298.54	0.000	0.99	2.161
	Food Supply	Lin	124.496	4.009636	1.008326	3.977	0.0041	0.66	--
		Log-Lin	4.83450	0.026969	0.006687	4.033	0.0038	0.67	2.733

Source: Computed by the researchers.

The above Table (1:2) shows that in the decade (1980-81 to 1981-90) the population had grown at an absolute rate of 1.59 crores per annum where as, food supply had grown at an absolute rate of 4.00 million tones per year. The semi log model shows that the values of slope co efficient of population and food supply in the years 1980-81 to 1989-90 are 1.0213 and 0.0269 which shows that the population and food supply had grown at the rate of 2.13 and 2.69 per cent. The regression estimates are statistically significant at 5 per cent and 1 per cent level. In the decade from 1980-81 to 1989-90 the population and food supply had increased at a compound growth rate of 2.16 and 2.73 per cent respectively. Thus, in the decade 1980-81 to 1989-90 the growth of food supply is just over the growth of population.

Table-1.3 Growth of Population and Food Supply in the Decade (1990-91 to 1999-2000)

Period	Items	Model	a	b	Std-Error	T-stat	Sig-t	R^2	CGR
(1990-91 to 1999-2000)	Population	Lin	82.0600	1.805455	0.030811	58.598	0.0000	0.99	--
		Log-Lin	4.41188	0.019672	0.000406	48.444	0.0000	0.99	1.987
	Food Supply	Lin	167.0313	3.913212	0.648308	6.036	0.0003	0.81	--
		Log-Lin	5.123459	0.020684	0.003456	5.985	0.0003	0.82	2.090

Source: Computed by the authors

From the above Table (1:3) it is vivid clear that in the decade (1990-91 to1999-2000) the population had grown at an absolute rate of 1.80 crores per annum where as food supply had grown at an absolute rate of 3.91 million tones per year. The semi log model shows that the values of slope co efficient of population and food supply in the

decade (1990-91 to 1999-2000) are 0.0196 and 0.0206 which shows that the population and food supply had grown at the rate of 1.96 and 2.06 per cent. The regression estimates are statistically significant at 5 per cent and 1 per cent level. In the decade from 1990-91 to 1999-2000 the population and food supply had increased at a compound growth rate of 1.98 and 2.09 per cent respectively. In this period also, the growth of food supply has just surpassed the growth of population.

Table-1.4

Growth of Population and Food Supply in the Decade (2000-01 to 2008-09)

Period	Items	Model	a	b	Std-Error	T-stat	Sig-t	R²	CGR
2000-01 to 2008-09)	Population	Lin	99.7722	1.89000	0.078824	23.977	0.0000	0.98	--
		Log-Lin	4.60600	0.017274	0.000615	28.072	0.0000	0.99	1.742
	Food Supply	Lin	183.4650	5.489667	1.895188	2.897	0.0231	0.55	--
		Log-Lin	5.218746	0.025701	0.009335	2.753	0.0284	0.52	2.603

Source: Computed by the authors

In the decade (2000-01 to 2008-2009) the population had grown at an absolute rate of 1.89 crores per annum where as food supply had grown at an absolute rate of 5.48 million tones per year. The semi log model shows that the values of slope co efficient of population and food supply in the decade (2000-01 to 2008-2009) are 0.0172 and 0.0257 which shows that the population and food supply had grown at the rate of 1.72 and 2.57 per cent. The regression estimates are statistically

significant at 5 per cent and 1 per cent level. In the decade from 1980-81 to 1989-90 the population and food supply had increased at a compound growth rate of 1.74 and 2.60 per cent respectively.

Table-1:5

Growth of Population and Food Supply in the Whole Period from (1980-81 to 2008-09)

Period	Items	Model	a	b	Std-Error	T-stat	Sig-t	R²	CGR
Whole Period (1980-81 to 2008-09)	Population	Lin	64.991379	1.761724	0.012237	143.968	0.0000	0.99	--
		Log-Lin	4.209720	0.019500	0.000185	105.433	0.0000	0.99	1.96
	Food Supply	Lin	129.389187	3.441296	0.245639	14.010	0.0000	0.87	--
		Log-Lin	4.891455	0.019479	0.001426	13.656	0.0000	0.87	1.96

Source: Computed by the authors

In the whole period (1980-81 to 2008-2009) the population had grown at an absolute rate of 1.76 crores per annum, where as food supply had grown at an absolute rate of 3.44 million tones per year. The semi log model shows that the values of slope co efficient of population and food supply in the whole period (1980-81 to 2008-2009) are 0.0195 and 0.0195 which shows that the population and food supply had grown at the rate of 1.95 and 1.95 per cent. The regression estimates are statistically significant at 5 per cent and 1 per cent level. In the whole period from 1980-81 to 1989-90 the population and food supply had increased at a compound growth rate of 1.96 and 1.96 per cent respectively.

Thus, the study clearly shows that for the whole period the compound growth rate of

agriculture and population are almost equal. It indicates an emerging danger which is unless rectified may bring various undesirable consequences in the economy.

There fore now it is pertinent to analyse the reasons for stagnant production in agriculture which is likely to be a stumbling block for the growth in the years to come. Therefore it is necessary to analyse the reasons for the sorry state of agricultural growth.

Reasons for the slow growth of agricultural production:

Increasing productivity

Firstly, it is imperative to increase the agricultural productivity of major crops. Though India is successful in increasing the yield of major crops like rice from 668 Kgs per hectare in 1950-51 to 2203 Kgs in 2007-2008 and 665 Kgs per hectare for wheat in 1950-51 to 2785 Kgs per hectare in the year 2007-08, lagging far behind with comparison to major countries. For example Egypt is able to produce 7.9 metrictones of rice per hectare where as India is able to produce only 2.9 metrictones per hectare

So far as wheat is concerned China is able to produce 4.25 metrictones per hectare. India is able to produce only 2.71 metrictones per hectare, so far as maize is concerned USA is able to produce 9.15 metrictones per hectare but India is able to produce only 1.18 metrictonnes per hectare

Pressure of Population on Land

Secondly though population is giving pressure on land and the availability of land under cultivation depicts a dismal picture. The total area under food grain is almost stagnant from 1967-68 onwards. It was 121.42 million hectares in the year 1966-67, now it is only 123.48 million hectare. Though   the area under cultivation has increased to 131.16 million hectare in 1983-84, the government has failed to arrest the decline in area under cultivation. The area under rice has increased from 30.81 million hectare in 1950-51 to 43.62 million hectare in 2006-07. The corresponding figure for wheat is 9.75 and 28.04 respectively. But it is sorry to note that the coarse cereal has declined from 37.67 million hectare in 1950-51 to 28.71 million hectare in 2007-08. More over due to economic liberalisation and over crowding of population pressure there is a mad urge to convert agricultural land to non agricultural purposes. This trend unless checked will produce high food inflation and starvation a predicted by Malthus.

Investment in Agriculture

Thirdly, the investment in agriculture is an issue which needs serious attention. Gross capital

formation in agriculture was 9.9 per cent of total Gross capital formation in 1990-91 and these fell drastically to only 3.5 per cent in 1999-2000 in terms of 1993-94 prices. This brings out clearly the total neglect of agriculture during the period of 1990s. In terms of 1999-2000 prices, the share of GCFA (Gross Capital Formation in Agriculture) in total GCF (Gross Capital Formation) was 10.2 per cent in 2006-09. This poor investment in agriculture is one of the main causes of low growth in agriculture in recent years.

Conclusion

Thus, the study has clearly shown that the growth of agricultural production in recent years is not impressive. Though the Malthusian predictions with regard to population and food supply are not according to the prediction of Malthus, the undesirable truth is that his predictions can be taken as a broad warning which is unless care of may produce serious imbalance in the economy.

Therefore research and development for improving supply of food grains and ensuring the sustainability of an efficient system of agriculture .adequate investment in agricultural infrastructure and research and development are needed. Recent data shows that there has been a deceleration in public investment in agriculture. It is therefore suggested that greater investment in research and development is crucial to develop technologies that would enhance productivity of dry land agriculture and thereby have a greater impact on reducing poverty and enhancing food supply.

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