



AGRICULTURAL STAGNATION AND ITS IMPLICATIONS FOR FOOD SECURITY IN NORTH KARNATAKA REGION

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Article DOI: <https://doi.org/10.36713/epra25022>

DOI No: 10.36713/epra25022

ABSTRACT

Agriculture remains the backbone of rural livelihoods in North Karnataka, where a significant proportion of the population depends directly on farming for income, employment, and food. Despite advances made at the national level since the Green Revolution, the region continues to experience slow and uneven agricultural growth. This stagnation poses a serious challenge to achieving sustainable food security, particularly given the increasing pressure of population growth and the rising demand for essential food commodities. Food security, as defined by the FAO, exists when all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food to lead active and healthy lives. In this context, the availability of food driven primarily by agricultural production constitutes the foundational pillar of food security. Understanding how stagnation in agricultural output affects this pillar is therefore crucial for addressing the region's food-security concerns. This study investigates the trends, patterns, and growth rates in the production of major food crops in North Karnataka, with a focus on staples such as rice, wheat, and pulses. These crops were selected because they form the core of the regional diet and directly influence household-level food availability. Using secondary data, the study analyzes long-term changes in crop area, yield, and production, as well as structural shifts in cropping patterns. Evidence from the region indicates that while the area under total oilseeds has increased, this growth has been concentrated mainly in rapeseed and mustard, sunflower, and soybean, rather than representing a broad-based expansion across all oilseed varieties. Furthermore, although the share of cereals in the total cropped area declined from 35.02 percent in 1970–71 to 31.24 percent in 2007–08, the proportion of fruits and vegetables rose significantly from 15.88 percent to 24.27 percent during the same period. These changes point to a diversification of agriculture, but they also reflect stagnation in the production of essential food staples. Historical evidence from the early Green Revolution period shows that wheat production achieved a compound annual growth rate of 5.03 percent between 1967–68 and 1979–80, driven by improvements in both yield and area. However, such rapid growth has not been consistently replicated in the context of North Karnataka's current agricultural landscape. Instead, slow growth in staple crop production combined with persistent constraints such as erratic rainfall, limited irrigation, inadequate technological adoption, and low farm investment has weakened the region's capacity to ensure stable food supplies.

The study concludes that agricultural stagnation in North Karnataka has direct and far-reaching implications for food security. The sluggish growth in essential food grains reduces availability, increases vulnerability to price fluctuations, and undermines the nutritional well-being of the population. To address these issues, the study emphasizes the need for region-specific strategies that enhance crop productivity, promote efficient resource management, strengthen irrigation infrastructure, and encourage the adoption of modern agricultural technologies. Such interventions are crucial not only for revitalizing agricultural growth but also for securing a sustainable and resilient food-security framework for North Karnataka.

1.1 INTRODUCTION

Agricultural development, since the Second World War, has enabled impressive progress in food production. This was mostly due to a combination of economic growth, advances in technology and knowledge, and improved management along supply chains. This increased production has mostly occurred through intensification, specialization, and economies of scale that depend increasingly on inputs including animal feed and non-renewable sources of energy. Nevertheless, extensive grass based livestock systems, pastoral and smallholder crop–livestock



mixed systems that do not rely on external inputs have also contributed significantly to increased supplies of food. Food security as well as ensuring food for all is an important challenge for the world community. Food security refers to the situation “when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life” (FAO, 2010). Many people consider it as a basic human right but approximately one billion people around the world especially in the food deficit and low income developing countries are still living with chronic poverty and undernourishment (IEG, 2011). The concept of providing people with food security extends from the individual and local community level to the global level. At the individual level, the concept of food security implies that under all circumstances each man, woman and child has access to sufficient, good quality food to meet the individual dietary requirements consistent with normal active life. At the national and regional levels, food security implies an assured availability of food through production, stock drawdown, trade or food aid to meet minimum requirements per capita, and also to meet any unexpected shortfall over a limited period.

The Tenth Five-Year Plan had targeted gross domestic product (GDP) growth in agriculture and allied sectors at 4 per cent per annum, aiming to reverse a sharp deceleration in the second half of the 1990s - from 3.2 per cent per annum in the period 1980-81 to 1995- 96 to 1.9 per cent per annum during 1996-97 to 2001-02¹ This has not been achieved. Drought conditions caused agricultural GDP to fall by 7 per cent in the first year of the Tenth Plan (2002-03) and, despite a smart rebound by 9.6 per cent in the second year (2003-04), growth in the first two years of the Plan averaged only 0.9 per cent per annum. With the monsoon weak in 2004, agricultural growth in 2004-05 will be modest at best, being placed at 1.1 per cent according to advance GDP estimates. On this basis, GDP growth in agriculture and allied sectors during the first three years of the Tenth Plan averages only 1 per cent per annum. The Tenth Plan target of 4 per cent growth is, therefore, far from being realized. In fact, per capita agricultural GDP shows no significant upward trend after 1996-97, only fluctuations.

1.2 DEFINITION OF FOOD SECURITY

Food security exists when all people, at all times, have physical and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life.

The phrase “All people, at all times” is integral to the definition of food security, and is key to achieving national food security objectives.

All people Different people are food secure to varying degrees and will be affected by adverse events differently. We must assess variations in food security status between different groups of people. Most commonly, humanitarian and development agencies differentiate between groups according to their main livelihood (source of food or income), in addition to other factors such as geographical location and wealth.

All times This recognizes that people’s food security situation may change. Even if your food intake is adequate today, you are still considered to be food insecure if you have inadequate access to food on a periodic basis, risking a deterioration of your nutritional status. Adverse weather conditions (drought, floods), political instability (social unrest), or economic factors (unemployment, rising food prices) may impact on your food security status.

1.3 DIMENSIONS OF FOOD SECURITY

1. **Food availability:** The availability of sufficient quantities of food of appropriate quality, supplied through domestic production or imports (including food aid).
2. **Food access:** Access by individuals to adequate resources (entitlements) for acquiring appropriate foods for a nutritious diet. Entitlements are defined as the set of all commodity bundles over which a person can establish command given the legal, political, economic and social arrangements of the community in which they live (including traditional rights such as access to common resources).
3. **Utilization:** Utilization of food through adequate diet, clean water, sanitation and health care to reach a state of nutritional well-being where all physiological needs are met. This brings out the importance of non-food inputs in food security.
4. **Stability:** To be food secure, a population, household or individual must have access to adequate food at all times. They should not risk losing access to food as a consequence of sudden shocks (e.g. an economic or



climatic crisis) or cyclical events (e.g. seasonal food insecurity). The concept of stability can therefore refer to both the availability and access dimensions of food security.

1.4 GROWTH OF AGRICULTURE AND CONCERNS OF FOOD SECURITY

“India cannot prosper without the prosperity of Agriculture”. In this chapter basically we try to examine the growth of agriculture during the period between 1981-82 and 2009-10, before and after liberal economic reforms, and also try study the prospective and challenges involved in today’s political and physical environment with regard to the food security.

Rice (65per cent) and wheat (35 per cent) comprise majority of the Indian diet pattern⁵ the main problem in the agriculture sector is not so much lack of production and productivity but assured and sustained increase in farmers’ income. The present marketing system is not farmer friendly, Government support and intervention to provide remunerative prices is dwindling and over all government investment in capital information in agriculture has not. The unfortunate and sad part of it is that, most of the Indian agriculture still remains the "Gambling in the Monsoon" (only 40 per cent of cultivated land is irrigated). After facing severe food insufficiencies soon after the independence due to problems like lower production, famines and occurrence of wars, which continued till mid 1960’s. India could able to wake up from this menace and come up with innovative measures like Green revolution, which brightened the situation in terms of self sufficiency in food grain production to some extent. In any developing country it is natural that agricultural sector contributes major share in its GDP during the initial stages. But as the process of economic development starts making impact, gradually the dependence on agriculture both for livelihood as well as share in GDP would come down. But unfortunately the sad story in India is that though the share of Agriculture has come down in GDP, the amount of people who are dependent on agriculture has not come down significantly. Growth in Industry and Manufacturing sector has not been able to release the additional work force from agriculture. This kind of development cannot be termed as an inclusive mode of development. Before analyzing the prospects and challenges involved in Indian agriculture as far as food security is concerned, it’s imperative for us to examine the expansion, relevance and evolution of Indian agriculture over the years.

1.5 REVIEW OF LITERATURE

B.N. Lalithchandra (2017) The population projections for 2050 revealed that world population will increase by 2 billion and most of these people live in developing countries. The key message of “State of Food Insecurity in the World” calculated that hunger remains an everyday challenge for almost 795 million people worldwide, including 780 million in developing countries, puts a heavy pressure on the existing crop lands to produce more per unit of inputs for ensuring not only food security but also keeping the quality of natural resources used in the production of food on a sustainable basis. Since reducing undernourishment and provision of food security is considered as the indicators of economic developments, efforts are to be made to increase agricultural production by 60.0 per cent in the coming decade. The efforts directed towards these goals must be green, clean and resilient and this transformation needs a mechanism by which natural resource base become a sustainable one. Hence, it is inevitable to transform agriculture to provide the basis for economic growth, poverty reduction and food security. These goals are to be achieved by encountering the present climate change which is producing disastrous effects to crops, crop production, food security and health of the living beings and quality of natural resources. In this context we feel that Climate-Smart Agriculture, which should be sustainable one, only can save the people as well as the natural resources. This paper aims at this direction and makes an attempt to explain how agriculture can be made a smart, green and clean one and how to transform its vital components so that per capita availability of nutritious food will be available for all people, particularly to women and the disadvantaged social groups around the globe.

Pravin Kumar (2014) Indian as well as global agriculture will face several challenges over the coming decades because it must produce more food to feed affluent and growing populations. Improving agricultural productivity while conserving and enhancing natural resources is also another problem in Indian agriculture. The solution of aforesaid problem in changing scenario is sustainability in agriculture production. In India, rural economy suffers from poverty, unemployment, malnutrition, limited diversification of farming and degradation of natural resources such water, land and forest. Livelihood diversification is essential for poverty reduction, food security, rural livelihood security and improved income for rural farming community. This study paper mainly focused on sustainable agriculture, its roles in rural livelihood security, and major issues in sustainable agriculture, finally it discussed the government policies and institutions for securing the rural livelihood. The purpose of this paper is to explore how sustainable agriculture policies can better serve the goal of poverty reduction as well as rural livelihood security. The



efforts to stimulate and support to the sustainable agricultural growth are essential for the rural livelihood security and rural development in India.

Ajay Kumar and Pritee Sharma (2013) This research paper analyzes the impact of climate change on agricultural productivity in quantity terms, value of production in monetary terms and food security in India. The study undertook state wise analysis based on secondary data for the duration of 1980 to 2009. Climate variation affects food grain and non-food grain productivity and both these factors along with other socioeconomic and government policy variables affect food security. Food security and poverty are interlinked with each other as cause and effect and vice versa, particularly, for a largely agrarian economy of India. Regression results for models proposed in this study show that for most of the food grain crops, non-food grain crops in quantity produced per unit of land and in terms of value of production climate variation cause negative impact. The adverse impact of climate change on the value of agricultural production and food grains indicates food security threat to small and marginal farming households. The state wise food security index was also generated in this study; and econometric model estimation reveals that the food security index itself also gets adversely affected due to climatic fluctuations.

Murtala Abdullahi Kwara (2013) in this paper the impact of agricultural commercialization on food security in Nigeria is examined using OLS regression method. The results show that commercialization enhances food security in the country. Other variables that significantly contribute to food security are domestic food production and food import. Per capita income showed a very weak relationship with food security. Policies to improve food security in the country should be geared towards increasing domestic food production and improving the distribution of income. Commercialization of agriculture is also important for ensuring food security and land reforms and provision of credits to smallholder farmers are needed to encourage commercialization.

Lavlu Mozumdar (2012) the study reveals the contribution of increased agricultural productivity in food security in the developing countries. An intensive literature review is conducted in writing the article. It has depicted the different productivity measures in agriculture and their relative uses. It explains several non-conventional production factors influencing agricultural productivity growth along with conventional production factors. It also explains how increased agricultural productivity is linked with food security, rural livelihood as well as rural poverty reduction. Finally it demonstrates why increased agricultural productivity is necessary for developing countries including Sub-Saharan Africa and it also provides a few policy options to increase agricultural productivity in developing countries.

Elumalai Kannan (2009) The present study discusses the trends in crop sector growth at national and sub-national levels in India. Data on important variables such as area, production, input use, and value of output were compiled for the periods 1967-1968 to 2007-2008 from published sources. The analysis reveals that the cropping pattern in India has changed significantly over time, with a marked shift from the cultivation of foodgrains to commercial crops. Among foodgrains, the area planted to coarse cereals that is generally cultivated in dry regions declined by 13.3 percent between triennium ending (TE) 1970-1971 and TE 2007-2008. Similarly, the performance of pulses in terms of area and output was not impressive during the study period and the technological breakthrough witnessed in other crops was not conspicuous in pulses. Nevertheless, increase in crop yield has been a major factor in accelerating crop production in the country since the late 1960s. Modern varieties, irrigation, and fertilizers were the important contributors of higher growth in crop production. However, technology and institutional support for a few crops such as rice and wheat have changed crop area and output composition significantly in some regions. The results of the crop output growth model indicate that enhanced capital formation, better irrigation facilities, normal rainfall, and improved fertilizer consumption will help increase crop output in the country.

Fernando P. Carvalho (2006) Decades ago, agrochemicals were introduced aiming at enhancing crop yields and at protecting crops from pests. Due to adaptation and resistance developed by pests to chemicals, every year higher amounts and new chemical compounds are used to protect crops, causing undesired side effects and raising the costs of food production. Eventually, new techniques, including genetically modified organisms (GMOs) resistant to pests, could halt the massive spread of agrochemicals in agriculture fields. Biological chemical-free agriculture is gaining also more and more support but it is still not able to respond to the need for producing massive amounts of food. The use of agrochemicals, including pesticides, remains a common practice especially in tropical regions and South countries. Cheap compounds, such as DDT, HCH and lindane, that are environmentally persistent, are today banned from agriculture use in developed countries, but remain popular in developing countries. As a consequence, persistent residues of these chemicals contaminate food and disperse in the environment. Coordinated efforts are needed to



increase the production of food but with a view to enhanced food quality and safety as well as to controlling residues of persistent pesticides in the environment.

1.6 OBJECTIVES OF STUDY

- ❖ To examine the trends in agricultural availability of food articles and implications on food security in North Karnataka .
- ❖ To study the impact of slow agricultural growth over domestic food production and Food Security in North Karnataka .

1.7 METHODOLOGY

In order to establish these objectives, secondary data, we can compare the agricultural growth rates of food security production during the prescribed period, in this process, as Rice and wheat are our primary ingredients in diet, we try and restrict ourselves mostly with the crops of Rice, wheat, and pulses. We also try to study the direct and indirect factors that influenced their production over the said period. Along with these observations, we will also take into account the agricultural availability of different food articles and minimum and maximum adequacy levels. Here we mostly confine ourselves to the study of aggregate or national indicators with the examine of major states performance. We also study the population and growth rates of food security over the years, particularly in comparison with food security slow agricultural growth.

Table 1 Share of Area under Major Crops in India

Source: Directorate of Economics and Statistics, Government of Karnataka

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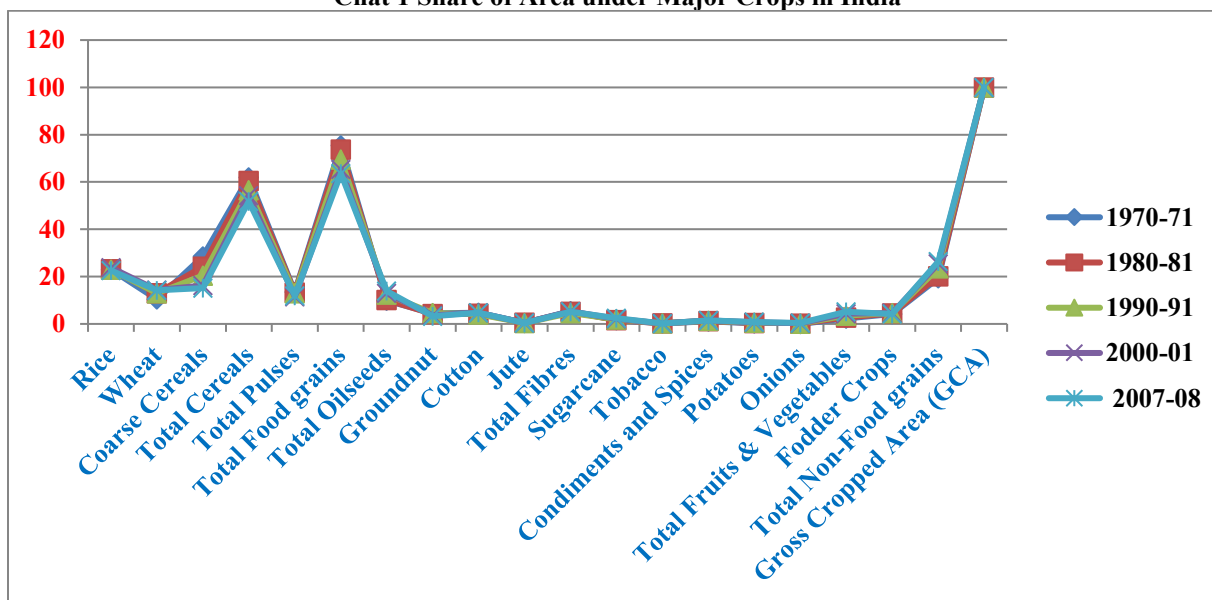


Table 1 Increase in area under total oilseeds is not reflective of general rise in area across all oilseed crops, but seemed to be limited only to rapeseed and mustard, sunflower and soybean. Favorable market conditions for refined oil and protein-rich soya food might have been responsible for inducing farmers to allocate larger areas for these crops. The area under groundnut came down from 4.42 per cent in 1970-71 to 3.20 per cent in 2007-08. However, the area under commercial crop like cotton almost remained constant at 4.5 per cent and that of sugarcane registered marginal increase from 1.62 per cent in 1970-71 to 2.47 per cent in 2007-08. Wheat has gained importance with area allocation of only 10.42 per cent in 1970-71, and it steadily increased to 14.18 per cent in 2007-08. Area under rice remained more or less constant during the period under study. Interestingly, area lost by food grains was used for the cultivation of oilseeds, fruits, vegetables and non-food crops to the extent of 4.0 per cent, 2.86 per cent and 7.02 per cent, respectively, between 1970-71 and 2007-08. Although the shift from coarse cereals to high value crops is likely to increase farm output and income to farmers, in dry land regions it will expose cultivators to serious weather-borne risks because high value crops have a high water requirement.



Table 2 Share of Various Crops in Value of Output (at 1999-2000 Prices) per cent

Crops	1970-71	1980-81	1990-91	2000-01	2007-08
Cereals	35.02	36.25	36.95	34.40	31.24
Rice	18.65	18.61	19.59	18.10	16.54
Wheat	7.25	9.87	10.92	11.62	10.17
Coarse Cereals	9.17	7.74	6.44	4.68	4.53
Pulses	8.42	6.55	6.25	4.78	4.38
Gram	3.54	2.57	2.06	1.75	1.67
Arhar/Tur	1.55	1.37	1.38	1.06	0.96
Oilseeds	7.47	6.59	8.84	7.94	8.33
Groundnut	3.94	3.28	3.69	2.36	2.16
Sunflower	00	0.04	0.26	0.25	0.38
Coconut	1.33	1.11	1.28	1.42	1.32
Sugars	4.86	4.28	4.53	6.02	5.82
Fibres	3.60	4.04	3.83	3.41	5.25
Cotton	3.09	3.47	3.40	2.99	4.86
Tea	0.80	0.86	0.79	0.81	0.79
Coffee	0.30	0.36	0.35	0.47	0.40
Tobacco	0.78	0.78	0.68	0.56	0.42
Condiments & spices	2.70	3.20	3.49	4.16	4.52
Potatoes	0.73	1.10	1.27	1.57	1.45
Fruits & vegetables	15.88	18.83	17.87	23.25	24.27
Value of Output from Agriculture	100.00	100.00	100.00	100.00	100.00

Source: Directorate of Economics and Statistics, Government of Karnataka

Chat 2 Share of Various Crops in Value of Output (at 1999-2000 Prices) per cent

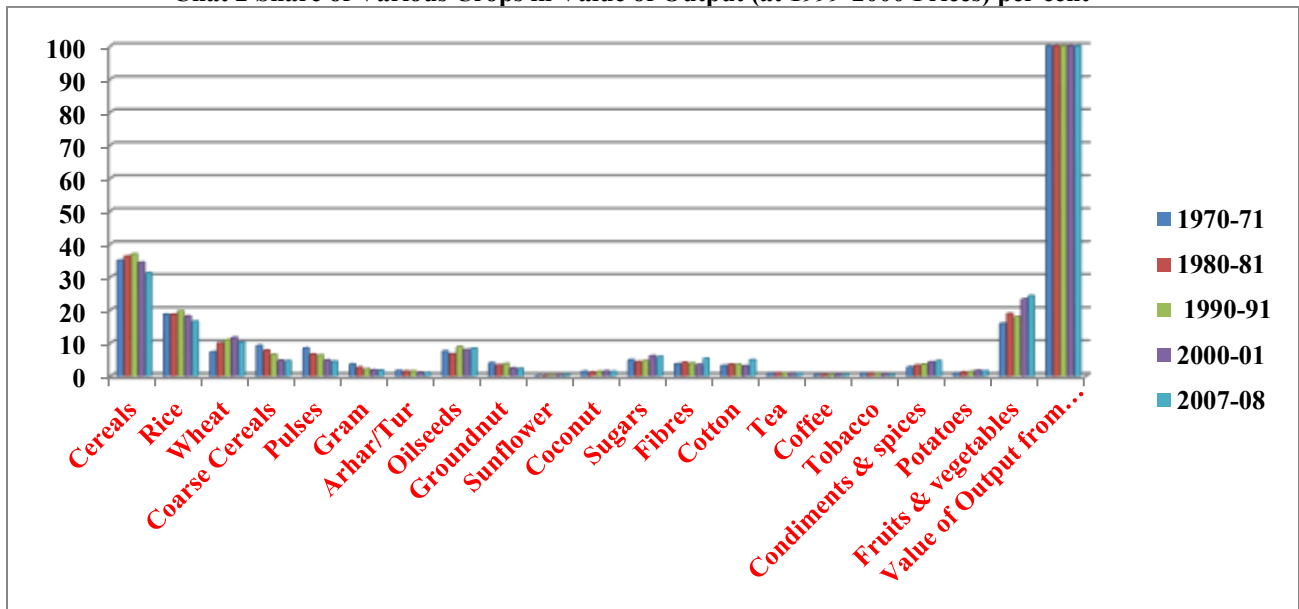


Table 2 While the contribution of cereals declined marginally from 35.02 per cent in 1970-71 to 31.24 per cent in 2007-08, the share of fruits and vegetables increased considerably from 15.88 per cent to 24.27 per cent during the same period. The changing share was largely determined by commodity price, which rose proportionately higher for fruits and vegetables rather than cereals during the recent decade. Similarly, the value of wheat output reported a steady increase until 2000 and declined thereafter. Pulses also registered a decline in value of output from 8.42 per cent in 1970-71 to 6.25 per cent in 1990-91 and then to 4.38 per cent in 2007-08. Despite increase in producer price of pulses.



Table 3 Compound Annual Growth Rates of Area, Production and Yield of Major Crops in Karnataka

Source: Directorate of Economics and Statistics, Government of Karnataka

Crops	1967-68 to 1979-80			1980-81 to 1989-90			1990-91 to 1999-00			2000-01 to 2007-08			1967-68 to 2007-08		
	Area	Prod	Yield	Area	Prod	Yield	Area	Prod	Yield	Area	Prod	Yield	Area	Prod	Yield
Rice	0.74	1.84	1.09	0.41	3.62	3.19	0.68	2.02	1.34	-0.11	1.9	2.01	0.45	2.47	2.01
Wheat	2.87	5.03	2.10	0.46	3.57	3.10	1.72	3.57	1.82	1.25	1.38	0.13	1.14	3.63	2.45
Coarse cereals	-0.98	1.11	2.11	-1.34	0.04	1.39	-1.83	-0.48	1.37	-0.47	3.52	4.01	-1.35	0.56	1.93
Pulses	0.71	-0.26	-0.97	-0.1	1.49	1.59	-0.6	0.67	1.28	1.93	3.31	1.35	-0.01	0.71	0.72
Total Cereals	0.39	2.16	1.77	-0.26	2.26	2.52	0.12	1.72	1.59	0.14	2.20	2.05	-0.06	2.06	2.12
Food grains	0.43	2.19	1.75	-0.23	2.73	2.97	-0.08	2.26	2.34	0.48	2.01	1.53	-0.07	2.27	2.33
Groundnut	0.00	1.64	1.64	1.65	3.76	2.08	-2.31	-1.25	1.08	-0.4	3.0	3.41	-0.26	0.86	1.12
Rapeseed and Mustard	1.05	0.64	-0.40	1.94	7.29	5.24	0.62	0.73	0.11	6.15	8.22	1.95	2.13	4.55	2.37
Oilseeds	0.76	1.88	1.11	2.44	5.46	2.95	0.15	2.27	2.12	3.43	7.44	3.88	1.53	3.51	1.95
Fibre crops	-0.34	3.44	3.79	-1.50	1.52	3.07	2.44	2.03	-0.40	1.08	9.68	8.51	0.35	2.45	2.09
Cotton	0.38	-0.41	-0.79	3.50	5.19	6.01	2.34	2.69	0.34	0.42	3.21	2.79	2.06	3.06	1.18
Sugarcane	1.41	1.99	0.57	1.26	2.71	1.43	1.67	3.05	1.36	1.91	2.39	0.47	1.63	2.68	1.03
Potatoes	4.08	8.07	3.83	2.93	5.17	2.18	3.84	5.44	1.54	3.46	1.65	-1.74	2.99	4.93	1.88
Coconuts	0.38	-0.41	-0.79	3.50	5.19	6.01	2.34	2.69	0.34	0.42	3.21	2.79	2.06	3.06	1.18

Table 3, wheat production registered compound annual growth of 5.03 per cent during the early green revolution period (1967-68 to 1979-80). Both yield and area contributed to higher growth in production. In the case of rice, growth in yield contributed to production growth of 1.84 per cent per annum. For food grains as a whole, the growth in area and yield were 1.75 per cent and 0.43 per cent, respectively and resulted in production growth of 2.19 per cent. However, it is interesting to observe a relatively higher growth in yield of all major crops during 1980-81 to 1989-90, i.e., the mature green revolution period. It indicates that crops other than rice and wheat shared the technological benefits. With decline in area, impressive growth in production of most crops was mainly contributed by growth in yield. Rice registered production and yield growth rate of 3.62 per cent and 3.19 per cent, respectively. Wheat yield also showed splendid growth of 3.57 per cent.



1.8 CONCLUSION

Food security is a major concern in global agriculture that needs a significant increase in order to be able to feed the expected growing world population. One way to feed an ever increasing world population is to increase the local and regional food supply of each and every country through improving agricultural productivity and that may confirm the first element of food security namely the availability of food in achieving sustainable food security. Moreover, increasing productivity among small and marginal farmers can be an important instrument to guarantee food security in low income developing countries in the long-run. Food availability is a necessary condition for food security. India is more or less self sufficient in cereals but deficit in pulses and oil seeds. Due to changes in consumption patterns, demand for fruits, vegetables, dairy, meat, poultry, and fishery products has been increasing. There is a need to increase crop diversification and improve allied activities. The evident that though in the short run agriculture sector does not seem to be harmed by increase in Carbon emission but in long run it will lead to decline in food security status by reducing affordability of poor to purchase food items. Agricultural commercialization promoted food security in the country. Inflation seriously reduced food security as it eats off the purchasing power of people thereby reducing their food consumption. Measures to increase domestic food production and commercialization are very crucial in ensuring food security in the country in addition to equitable distribution of income. In case of mechanization i.e. increase in number of tractors has a positive and statistically significant impact on arhar, gram, bajra and barley food grain productivity. Increase in forest area has negatively affects the productivity of mostly food grain crops like rice, arhar, gram, wheat, bajra, ragi and barley; it means that increases in forest area may lead decline in cultivated land resulting that productivity may decline. This could be due to the fact that the arable land availability in areas with widespread forests is lesser and therefore any expansion in bringing land under cultivation is not possible. Increase in farm harvest price of crops is a major factor to increase the productivity of major staple food grain crops like rice, gram, wheat, maize, bajra and sorghum crops; and it could increase the farmer's decision to select an appropriate crop for cultivation.

1.9 REFERENCES

1. *Ajay Kumar and Pritee Sharma 2013 Impact of Climate Variation on Agricultural Productivity and Food Security in Rural India, Received August 6, 2013 Accepted as Economics Discussion Paper August 15, 2013 Published August 21, 2013 © Author(s) 2013. Licensed under the Creative Commons License - Attribution 3.0.*
2. *Murtala Abdullahi Kwara 2013 Agricultural Commercialization And Food Security In Nigeria, International Journal of Advanced Research in Management and Social Sciences ISSN: 2278-6236, Vol. 2 | No. 7 | July 2013.*
3. *Lavlu Mozumdar 2012 Agricultural Productivity and Food Security In The Developing World, Bangladesh J. Agric. Econs. XXXV, 1&2(2012) 53-69.*
4. *Fernando P. Carvalho 2006 Agriculture, pesticides, food security and food safety, environmental science & policy 9 (2006) ISBN 685-692.*
5. *Pravin Kumar 2014 Sustainable Agriculture And Rural Livelihood Security In India, Journal of Science Agriculture, ISSN 2277 – 3290.*
6. *B.N. Lalithchandra 2017 Climate Smart Agriculture and Food Security: An Analysis, ISSN 2250-057X, Impact Factor: 6.384, Volume 07 Issue 03, March 2017,*
7. *Elumalai Kannan 2009 Trends in India's Agricultural Growth and Its Determinants, Institute for Social and Economic Change (ISEC), India, Asian Journal of Agriculture and Development, Vol. 8, No. 2.*
8. *FAO 2008 This course is funded by the European Union and developed by the Food and Agriculture Organization of the United*