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# Agricultural Science Facing Climate Change Along With the Challenges of Food Production

Dr Ashok Yadav

SOA, Sanskriti University, Mathura, Uttar Pradesh, India

Email Id- dean.soa@sanskriti.edu.in

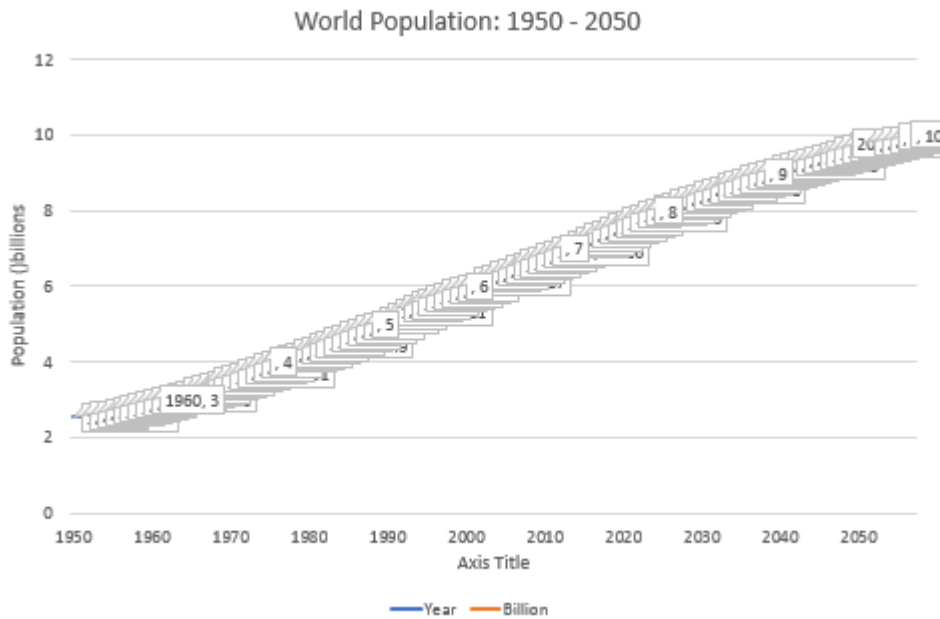
**ABSTRACT:** *In recent decades the major concerns that the world's environment, people and economy have been affected by climate change have been considered. As a consequence of rising global food supply while managing with limited land and water resources and growing climate-change concerns, agricultural activity will confront substantial challenges in the 21st century. However, such problems provide greater ecologically, economically, and socially risk-resistant possibilities to design and maintain food and subsistence systems. In order to deal with these difficulties, it is certainly necessary to apply current interdisciplinary knowledge and various technical and institutional advancements. The shifting climate is challenging agriculture and agricultural policy-making. Agriculture must address both greenhouse gas (GHG) emission reduction and climate change adaptation. The aim of this article is to examine some of the main results concerning several of these concerns, with a focus on climate change and to offer an overview of the major challenges faced by the world's food and farming environment in the 21st century and its impacts. Specific problems and their influence on agriculture will be the subject of future study.*

**KEYWORD:** *Abiotic pressure, Agriculture, Biotechnology, Cold, Drought, Food security, Salinity.*

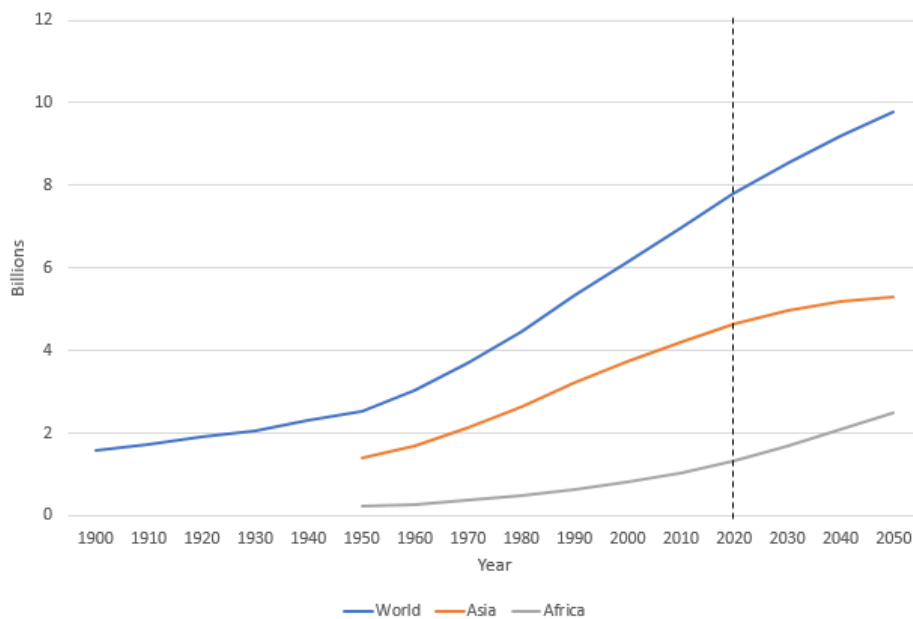
## 1. INTRODUCTION

The world population in 1900 was 1.6 billion; in 2000 it reached 1.6 billion people and last year it exceeded the milestone of \$1 billion. In this century, the consequences of the world's largest population boom are visible around the world (Fig. 1a). The global population continues to increase, albeit at a slower rate, and developing countries are expected to account for almost half of the world's population growth. (Fig. 1b, for more details). This century will see low or no population growth in developing countries, but the majority of the increase will be through immigration from the less developed nations. It will help the poorest countries in the globe. The growth. The population of the developing world in 1950 was 1.7 trillion or around a quarter; in 2020, more than a quarter of the world's population will have grown to be in the least developing countries [1].

These nations have poor incomes, considerable economic instability and low indices for the human development. Urbanism is currently one of the planet's strongest transformative forces. More than a billion people are expected to live in cities all over the world. By 2050, people were expected to grow to 2 billion. Many people, especially young people, are now moving from rural to urban regions, which is a concern both for urban and rural people. We still speak of rural and territorial development directly or indirectly when we talk about urbanisation. How can we ensure access to healthful food for urban residents? What can we do to provide sufficient food for the city's people? What kind of infrastructure is needed and what kind of food in urban areas can be produced? What strategies do the communities employ to ensure that their environment's environmental services are safeguarded [2]?



**Fig. 1a: Populace Progression (World Populace: 1950–2050)**

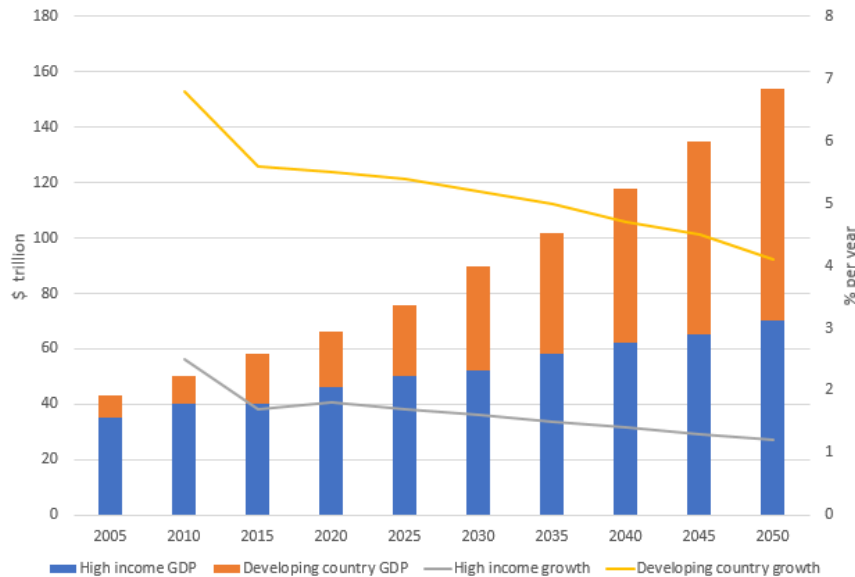


**Fig. 1b: Populace Progression (World Populace Scattering: 1950 - 2050)**

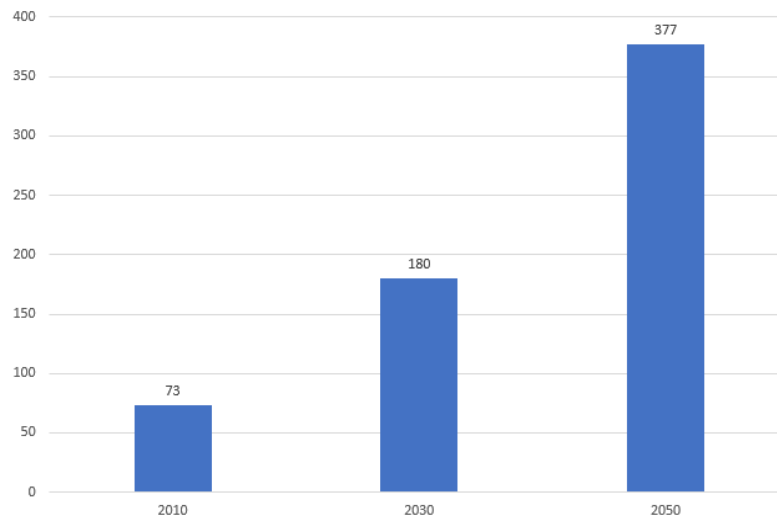
Many of the major issues are linked jointly to urbanisation and food safety. Diät tastes as well as wealth and insecurity have evolved as a result of urbanisation. Structural transformation is also occurring in rural areas. However, as seen in Fig. 2, income growth is unequal across and within nations. Fig. 3 shows how the world economy is going to develop fast, with Purchasing Power Parity (PPP) exchange rates growing at 4.6% year, to one percent. Global growth will

be achieved every day, based on PPP exchange rates, which have considerably less to do with food availability and far more to do with famine in rural regions in industrialised countries. Rich people seldom go hungry, while impoverished people always remain same [3].

On the other side, food shortages are more and more viewed as an opportunity for unrest, drought, and mass exodus. August famine has risen from about 800 million in 1996 to more than 1 billion currently according to the latest Food and Agriculture Organization (FAO) estimate. Most hunger in the world is concentrated in a few locations. These regions feature substantial rural communities, chronic poverty and extensive expanses of poor agricultural output due to the progressive worsening of resources, bad economic conditions and severe climate hazards. 74 per cent (810 million) of the world's 1.1 billion seriously disadvantaged rural regions depend on small-scale farming. Despite the fact that the world's food supply is ample, hungry people exist [4].



**Fig. 2: Illustrating the High Income GDP and Growth; Developing Income GDP and Growth**



**Fig. 3: World GDP Growth (\$ Trillion) From 2010-2050**

While the number of hungry people has fallen, the overall number of hungry people is still growing (Fig. 4). In 2009, for the first time in history, the number of people categorised as undernourished exceeded 1 billion. Food production, per capita consumption and life expectancy in Sub-Saharan Africa have declined over many years. In addition, the most rapid population increase, lowest land fecundity and least capacity to welcome immigrants in towns and cities are poor African states, such as Malawi, Niger and Ethiopia. Although since 1990 global hunger has shrunk slightly, it is still regarded as grave. Significant regional and nation variances are hidden behind the global average [5].

The greatest improvement was noticed, especially the number of young people, but this quick increase could not be continued. Sub-Saharan Africa has evolved throughout the century and has reached South Asia. A 70 percent increase in global food production is anticipated to meet the increasing world demand for food by 2050. (Table 1). Most of the expansion would need extra land, which in recent years has been a source of worry [6].

**Table 1: Estimated Demand and Offer for Food in the World in Million Tones**

Produce	Manufacture (2005)	Assessed Demand (2025)	Essential Supplementary Produce	Upsurge in Manufacture
Muesli	2219.4	3140.4	921	41.5
Oil Seed	595.01	750.97	155.96	26.2
Perennial	242.81	321.99	79.18	32.6
Annual	352.2	437.98	85.78	24.4
Meat	264.7	376.49	111.79	42.2
Hen	80	113.7	33.7	42.1
Mutton	103.4	146.8	43.4	42
Bovine	63.5	90.4	26.9	42.4
Coffee	7.72	9.4	1.68	21.8

Fibre	28.5	36.37	7.87	27.6
Timber	3401.9	4148.4	746.5	21.9

## 2. LITERATURE REVIEW

R. Roson *et al.* presented in the article that if the item is effective, healthy, and safe, it must be produced with the maximum processing capacity renewed for a number of years. During the past several decades the development of food production systems has become more integrated in agriculture, fishery, forestry and other commercial practises. The global demand for all agricultural products is projected to increase by 1.1% per year between 2005/07 and 2050. Because supply is consistent with global demand (not for specific nations or sectors), global production should be 60% higher in 2050 than in 2005/07. Although growth rates for major commodity categories may be small in percentages compared to prior years, they are significantly different in quantities [7].

NASA *et al.* presented in the article that the problem is whether the reduced area of planting and the restricted growth in the planted area will be sufficient to meet anticipated demand, with the exception of a few countries and crops. On the other hand, climate change is presenting a serious concern, which might ruin the capacities of the world's agricultural products. Generally, the long-term viability of the food processing system is under discussion. The idea of more, i.e. exporting objects as a proportion of the entire area over vast distances was questioned [8].

Many people consider, according to EPA-12 *et al.*, that "sustainable production intensification" is required. Can the expected output levels be achieved? We emphasise to support production estimates by believing in both demand and yield increases. Grain returns will improve by around 1 percent annually over the next several years, according to the International Food Policy Research Institute. The global supply of food is expected to expand at a pace of about percent annually, which is consistent with the present percentage rate each year. Food costs have increased worldwide. Earlier initiatives to relieve hunger have taken place globally [9].

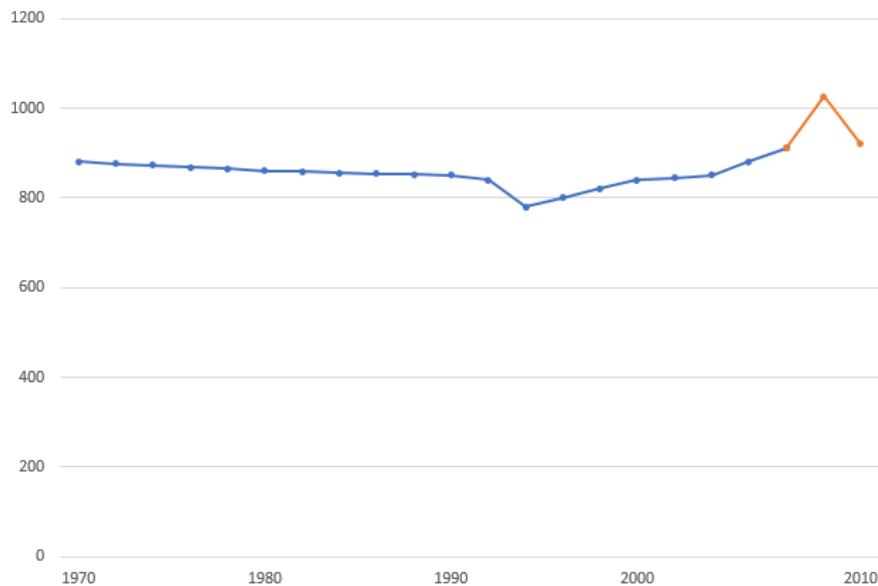
## 3. DISCUSSION

### 3.1 World Urbanization Prospects

Farmers and consuming nations talk of a more significant and longer-term problem between manifestations: continued food insecurity. Huge rises in prices of wheat and maize, as well as, and particularly worse, the situation, are tackling a more severe and long-term problem between farmers and consuming nations: the continued food insecurity. Food costs will, on average, increase moderately with mild changes in temperature by 2050, although previously some predictions anticipate a small reduction in real costs. Second, the expenses are anticipated to soar when temperatures continue to rise after 2050. The drought and significant increases in imported agricultural commodities in many wealthy areas (Europe) decrease local food costs in underdeveloped nations by 8.9% in 2011.

Food expenses are expected to be 3% lower in 2012 in the event of a typical crop year than in 2011. In spite of standardisation, food cost is 25% higher in industrialised countries than it was at the start of the 2005 market. Food costs rose significantly, limiting profit for many people who spend more than half their income on food, especially the urban poor. It is characterised

as a long-term characteristic in its widest meaning, irrespective of source. As a result, shorter-term oscillations, such as El Nio, are excluded from climate change.



**Fig. 4: Graphical Representation for Undernourished People in Million From 1970-2010**

### 3.2 Hunger and Poverty in the World Facts and Figures

The phrase "Climate Change" was developed in 1994 to distinguish human and global climate change activity generated by natural processes on earth. In, particularly as far as environmental policies are concerned. Greenhouse gas emissions will grow as well as climate change will have an influence. A term used in scientific journals indicates rises in surface temperatures. The climate change includes the increase in greenhouse gas emissions and global warming. The energy received from the sun and lost in space governs the Earth's temperature and atmosphere in the most fundamental way.

This energy is distributed by wind, ocean tides and other mechanisms around the globe, and climatic changes take place throughout the world. The phrase environmental forcing is used to refer to components that can have an influence on the climate (EPA U). These mechanisms include changes in solar radiation, changes in the orbit of the earth, mountains and continental drifting and changes in the quantity of greenhouse gases. Feedback on climate change can either increase or decrease the original strength and take place in several shapes and sizes. Some elements of the climate system, such as the sea and ice cells, are more slowly affected by climate change. Forced structures can be used externally or internally. Internal forcing systems are a natural phenomenon of the climate system [10].

Secondary pressures may be global or artificial (climate change). Whether the first push factor two is still in force or not. This can result in the climate system reacting quickly, but it might take decades or more to respond to forcing processes. Slow components cause internal forcing or instability of the global temperature by the five elements according to specialists of the earth's crust (NASA Earth Observatory, 2011).

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### *3.3 World production and use, major products*

The global economy is obviously essential to understanding the impacts of climate change on climate change reduction and adaptation measures. On the other hand, modelling temperature impacts is, for two reasons, an awful task. Climate change is first and foremost a systemic phenomenon that impacts both natural and human settings. In order to determine global climatic patterns, physical variables like the sea, winds, stratosphere and others interact in the so-called earth system. In terms of social consequences, corporate connections and trade expand to a globalised economy the influence of no economic factors. Climate change is naturally affected as it is a systemic phenomenon by uncertainty and ambiguity.

In a number of respects, each has its own set of processes and outcomes the economic and socio-economic implications of climate change. Each factor must be evaluated independently and properly to gain a realistic assessment of the impacts. The global impact of climate change will be enormous. A study indicates that growth might be significantly hindered if climate change is not handled. (2012, News Office). Determined and quantified the anticipated impacts of climate change on the world economy. The examination includes agricultural production, consumption, human health and labour productivity.

No attention must be given to extreme conditions and disastrous accidents. According to a DARA research, the world's effects, serious weather and drought as well as the rising sea levels will pose a threat for people's lives and livelihoods as the average temperatures grow due to greenhouse gas emissions (Zee news Bureau, 2012). Five million people die every year from air pollution, hunger and climate change illness, and this figure is likely to increase if present levels of consumption are maintained. According to the study which projected the human and economic impacts of climate change on 184 nations, over 90% of these fatalities will occur between 2010 and 2030.

There is concern for sensitive industrialised nations. The problem is predicted to kill 100 million people by the end of the following decade. According to the report, global productivity has decreased by \$1.2 trillion a year, with declines that might continue to rise over 10 per cent by 2100. The study shows that it would cost around 10 per cent of world GDP in the last decade to move into a low carbon economy (Zee news Bureau, 2012). In the next portions, we will discuss briefly the impact on food security and agriculture of climate change.

## **4. CONCLUSION**

The population had more than tripled since it grew steadily throughout the world in 2000, and by 2050 the best estimates reached 9 billion. For example, the large number of humans has had enormous impact on the global ecosystem, since we are transforming huge sections of natural vegetation into farmland and grasslands. High-scale fishing has died down the aquatic diversity to feed thousands of humans. When millions of farmers produce livestock or keep poultry, human and domesticated animals cause habitat changes. In collecting emissions that are currently damaging the environment, the push for articles and requirements and the poisoned peaks used to produce energy have been produced.

The intake of minerals, ores, Fossil Fuels and Biomass is projected to be over 140 billion tonnes by 2050. It is anticipated to triple our nutritional needs by then. Does humanity, because of our

expanding population, stand on the edge of extinction? Can a restricted universe support a maximum number of people and, if so, have we accomplished this? Agriculture is also viewed as a distraction for the climate debate, and for many years the United Nations has been unable to conclude. In the 21st century, world farming will face three key challenges: feeding a growing global population, contributing to a decrease in rural poverty and reacting to emerging natural resource management concerns. Bruce Campbell, CGIAR Climate Change leader, Agriculture and Food Security (CCAFS) research project, explained: Both in terms of increased weather and temperatures. We need global action to ensure food security in the face of climate change.

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