**TRENDS IN AGRICULTURAL PRODUCTION AND PRODUCTIVITY WITH RESPECT TO FOOD AND NUTRITIONAL SECURITY**

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1. **INTRODUCTION**

Developing the agricultural sector is crucial for enhancing nutrition and food security. Its functions include expanding food availability and diversity, promoting economic change, and serving as the main source of income for many of the world's poorest people. Numerous empirical studies conducted over many years and many nations have shown that improving food security and nutrition requires both agricultural development and economic expansion, and that the former can support the latter.

According to the Economic Survey 2020-2021, agriculture's contribution to GDP has increased to approximately 20% for the first time in the last 17 years, making it the only sector showing promise for GDP growth in 2020–21. Agriculture's contribution to the GDP increased from 17.8% in 2019–20 to 19.9% in 2020–21.

Additionally, the output raised the National Food Security Act's (NFSA) allotment of food grains, which grew by 56% in 2020–21 compared to 2019–20. Up till December 2020, the government will have distributed 943.53 lakh tonnes of food grains to the states and union territories. The amount of food produced has increased. As a result, we are now self-sufficient and a net exporter of agricultural and related goods, as opposed to being a food-begging bowl following independence.

One of the most effective strategies for eradicating extreme poverty, increasing shared prosperity, and feeding an estimated 9.7 billion people by 2050 is agricultural development. Compared to other sectors, the agriculture sector's growth is two to four times more successful at increasing the incomes of the poorest people.

However, food security, poverty alleviation, and growth generated by agriculture are all at risk: Crop yields may decrease as a result of climate change, particularly in areas with the greatest food insecurity. About 25% of greenhouse gas emissions are attributable to agriculture, forestry, and changes in land use. One way to combat climate change is through agricultural mitigation.

1. **DEFINITIONS**
2. **Agricultural production**: Agricultural production refers to the use of cultivated plants or animals to produce products for sustaining or enhancing human life. Agricultural output is measured in terms of volume and it is the crop's total yield from a farm, either seasonally or annually.
3. **Agricultural productivity**: Agriculture productivity is a crucial idea that not only explains the situation of the land and its yield but also aids in the formulation of policies. Agricultural land productivity refers to the output per unit of land. It not only describes the strength of the land but also the role of factors in increasing the productivity. Various production factors, such as the use of high-quality seeds, appropriate and high-quality fertilizers, and sources of irrigation, are involved in the production process. As a result, there are many factors which can affect the output per unit of land. It measures the outcome relative to the input. It makes hazy reference to the rate of output.
4. **Food security**: In 1986 the World Bank further added the dimension of activity level and defined food security as “secure access at all times to sufficient food for a healthy and active life”. At the household and individual level, the concept of adequate food is considered in both quantitative terms (i.e., caloric sufficiency) and, even more so, in qualitative terms (i.e., variety, safety and cultural acceptability).
5. **Nutrition security:** The term ‘nutrition security’, emerged in the mid-1990s and focused on food consumption by the household or the individual and on how that food is utilized by the body and thus in principle is more than food security. In terms of nutrition, sufficient utilisation refers to the body's capacity to take in and process food.
6. **Food and Nutrition Security:** “Food and nutrition security exists when all people at all times have physical, social and economic access to food, which is consumed in sufficient quantity and quality to meet their dietary needs and food preferences, and is supported by an environment of adequate sanitation, health services and care, allowing for a healthy and active life.” - **FAO definition (1996, 2009)**
7. **GLOBAL AGRICULTURAL PRODUCTION TREND**

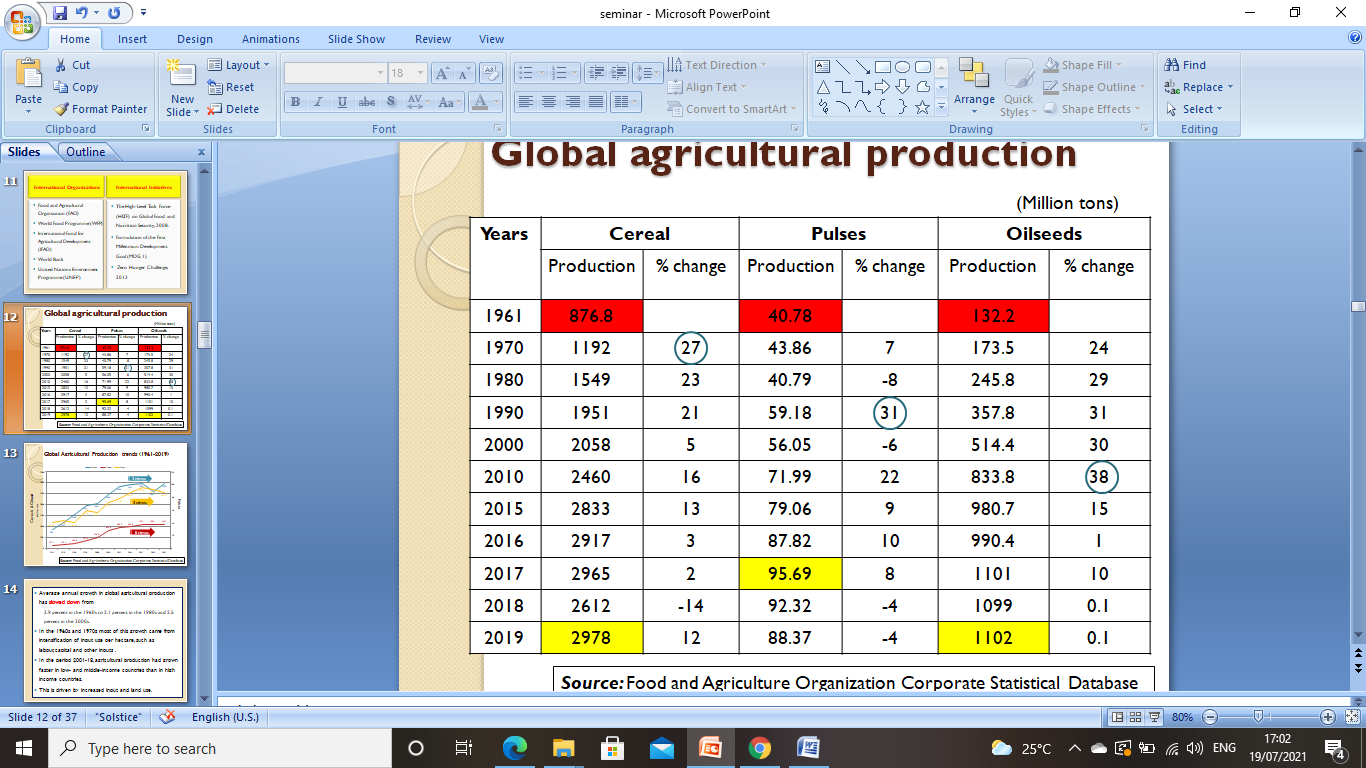
From 2.9 percent in the 1960s to 2.1 percent in the 1980s and 2.5 percent in the 2000s, the average yearly growth in agricultural production has declined. The majority of this rise occurred throughout the 1960s and 1970s as a result of increased input consumption per hectare, including labour, capital, and other inputs. Gains in Total Factor Productivity have allowed output to expand despite a slowing in the growth rate of the utilisation of these input factors over the past two decades (TFP). Increases in TFP are largely to blame for the boom in worldwide agricultural productivity since the 1990s. This entails combining the various production elements more effectively through farming techniques (increasing technical efficiency) and introducing novel production-enhancing technology. The use of labor-saving techniques is responsible for a sizable portion of the TFP growth.

Agriculture output increased more quickly in low- and middle-income countries between 2001 and 2014 than in high-income nations. However, in low-income nations, higher input and land utilisation rather than increases in productivity have been the main drivers of agricultural expansion. Even in the low-income group, TFP growth outpaced the use of variable inputs per hectare as a driver of agricultural expansion despite these substantial national disparities. Most future increases in global agricultural output are anticipated to come from expanding the use of already-existing or brand-new techniques and technology.

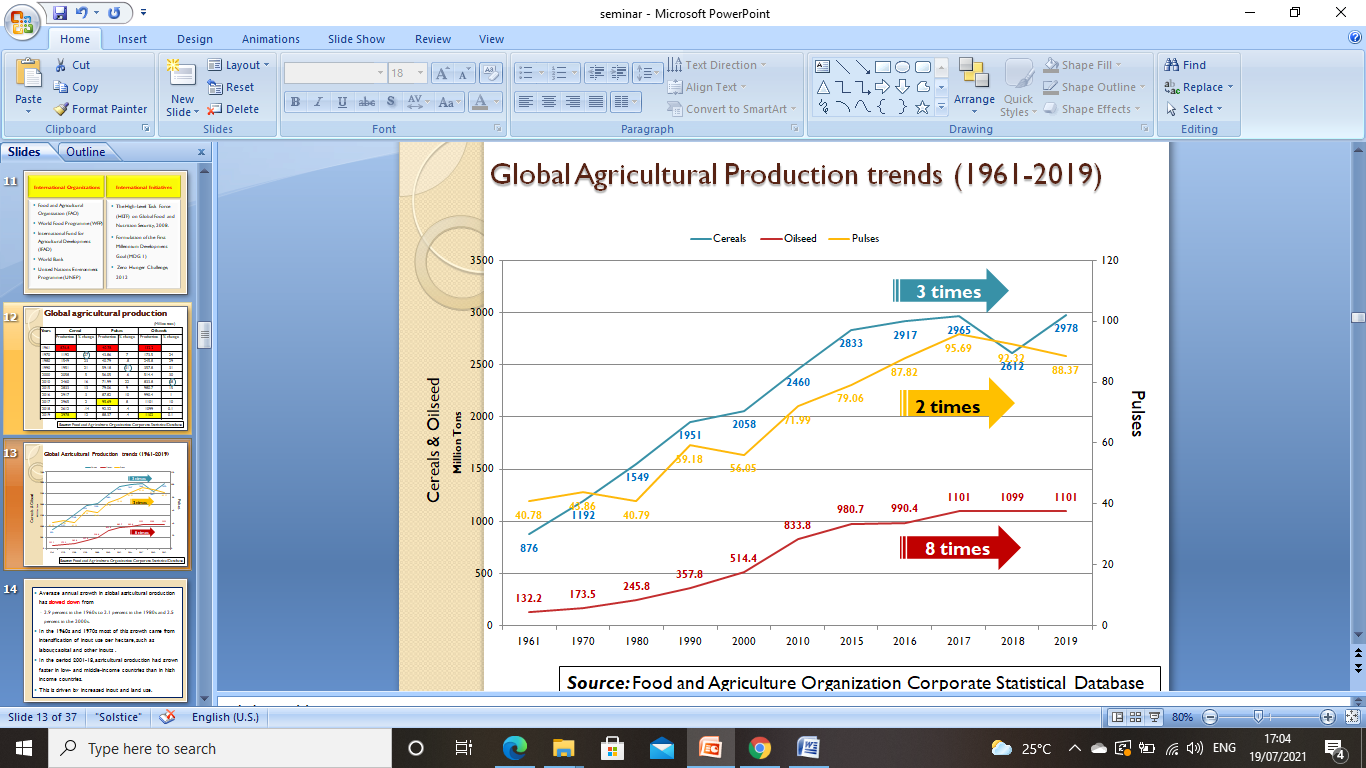
It reveals from Table 1, that in the last fifty years cereals, pulses and oilseeds production has increased by about more than three times, two times and eight times respectively. Here, it is worth noting that there exist wide variations in the production of food-grains.

The production of cereals in 1961 was 876.8 million tons in which turned to 1192 million tons 1970 accounting a drastic change of 27%. During 1980 to 2017, its production was recorded to increase from 1549 to 2917 million tons. But it was declined to 2612 million tons in the year of 2018 whereas it reached highest production of cereals in 2019 i.e. 2978 million tons.

**Table 1: Global Agricultural Production**

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***Source:*** Food and Agriculture Organization Corporate Statistical Database



***Source:*** Food and Agriculture Organization Corporate Statistical Database

**Fig.1: Trends of Global Agricultural Production**

The production of pulses was registered at 40.78 million tons in 1961 which was increased to 87.82 million tons during 1970-2016. This crop witnessed very deep fluctuations in 1990 with 31% of change. Thus, production of pulses was recorded to be highest in the year of 2017 i.e. 95.69 million tons which declined to 92.32 in 2018 and 88.37 in 2019.

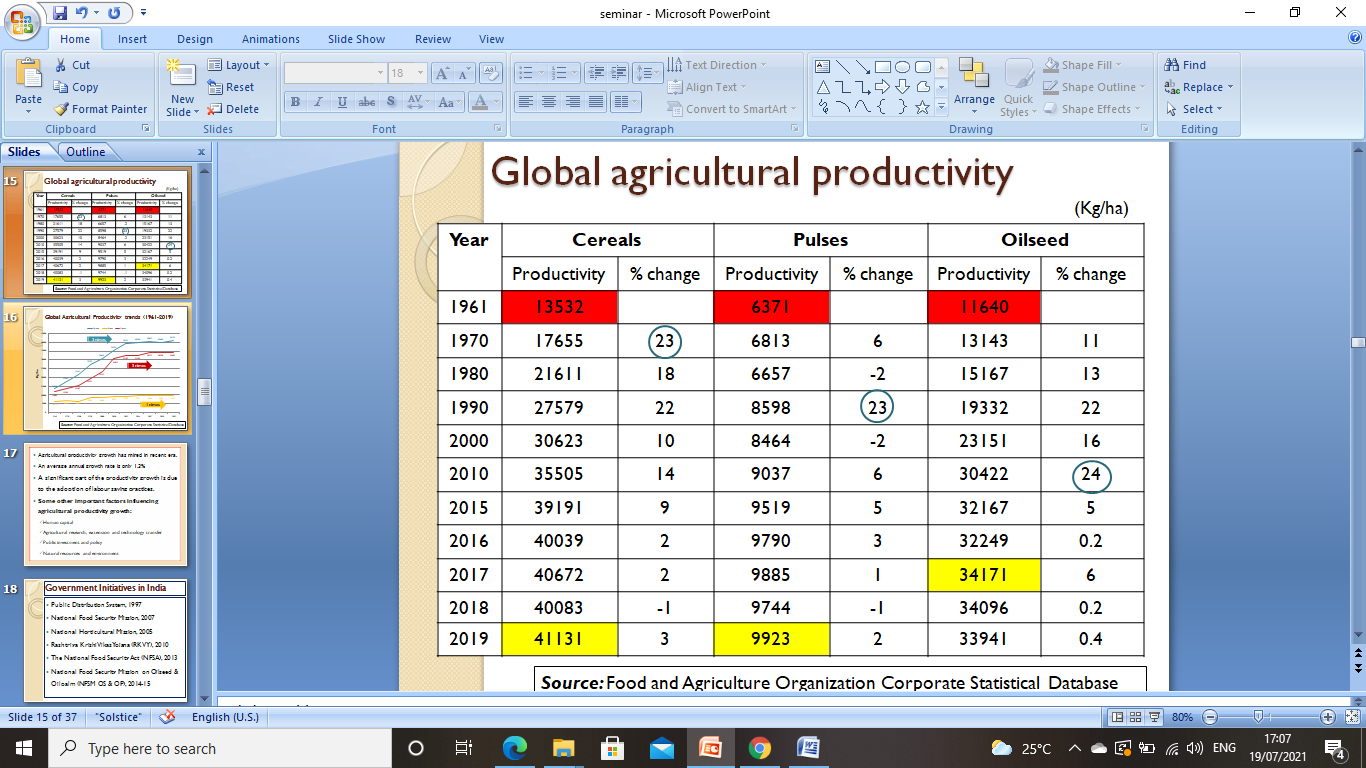
The production of oilseed was 132.2 million tons in 1961 which was increased to 1102 million tons in 2019 showing its highest production. No deceleration was recorded in oilseed production since 1961 to 2019.

This data indicates that agricultural production (major crops) has increased considerably over the years but in terms of percentage, increase in production varies from year to year. The same period witnessed a remarkable process of industrialization and globalization of food and agriculture. Food supply chains have lengthened dramatically as the physical distance from farm to plate has increased; the consumption of processed, packaged and prepared foods has increased in all but the most isolated rural communities. According to FAO, however, widespread hunger and malnutrition continue to be major problems in many regions of the world. By 2030, and certainly not by 2050, hunger will not be completely eradicated at the current rate of development.

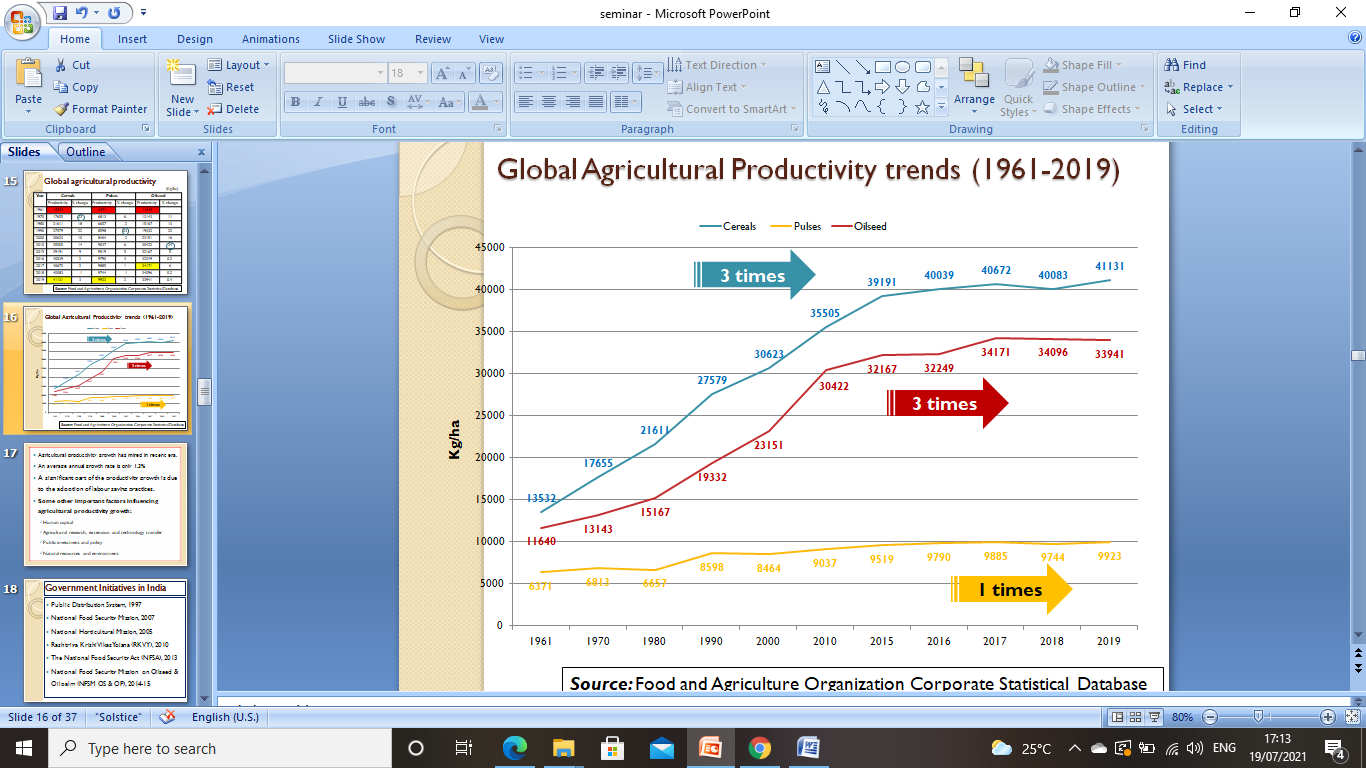
1. **GLOBAL AGRICULTURAL PRODUCTIVITY TREND**

Growth in agricultural productivity has slowed recently. While the recent rate of population increase in the world is about 1.2 percent, the average yearly growth rate of productivity of the major agricultural crops is still quite low at about 1.3 percent. Land is a scarce resource; expansion of the cultivated area is not possible in many developing countries (ECG, 2011). To fulfill the future need for food for the expanding population, increasing agricultural production may therefore be the only viable option. Due to the scarcity of arable land and related inputs, intensive agricultural growth instead of extensive agricultural growth may be the new strategy to boost future productivity growth in agriculture across the majority of the world. Therefore, along with diversification, production intensification and improving input or resource usage efficiency are important critical initiatives.

**Table 2: Global Agricultural Productivity**

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***Source:*** Food and Agriculture Organization Corporate Statistical Database

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***Source:*** Food and Agriculture Organization Corporate Statistical Database

**Fig.2: Trends of Global Agricultural Productivity**

The table 2 indicates that the per hectare productivity of cereals in 1961 was 13532 kg per hectare which in 1980 increased to 21611 kg and further 35505 kg per hectare in 2010. The per-hectare productivity of cereals was increased significantly to 41131 kg per hectare in 2019 recording its highest productivity till now. The productivity of cereals was increased by three times from 1961 to 2019.

For pulses, it was 6371 kg per hectare in 1961 increasing to 8464 kg per hectare in 2000. The per hectare productivity of pulses was recorded to be highest with 9923 kg in 2019. It was recorded that the productivity of pulses was increased by three times from 1961 to 2019.

In case of oilseed it rose to 34171 kg per hectare in 2017 against 11640 kg per hectare in 1961. The increase in productivity of oilseed was still very low i.e. it increased by one time only since 1961 to 2019.

**An overview of Indian Agriculture**

The second advance estimates of production of principal crops for year 2020-21 have been released.  The second advance estimates of production of major crops reveal a record production of 303.34 million tonnes of food grains, which clearly outlines the tireless hard work of farmers, research by agricultural scientists, and farmer-friendly policies of the Central Government. All-round agricultural reforms will also benefit the country in the long run.

In 2nd Advance Estimates of production of principal crops released by Union Ministry of Agriculture and Farmers’ Welfare, the assessment of production of different crops is based on the data received from States and validated with information available from other sources. As per 2nd Advance Estimates, the estimated production of major crops during 2020-21 is as under:

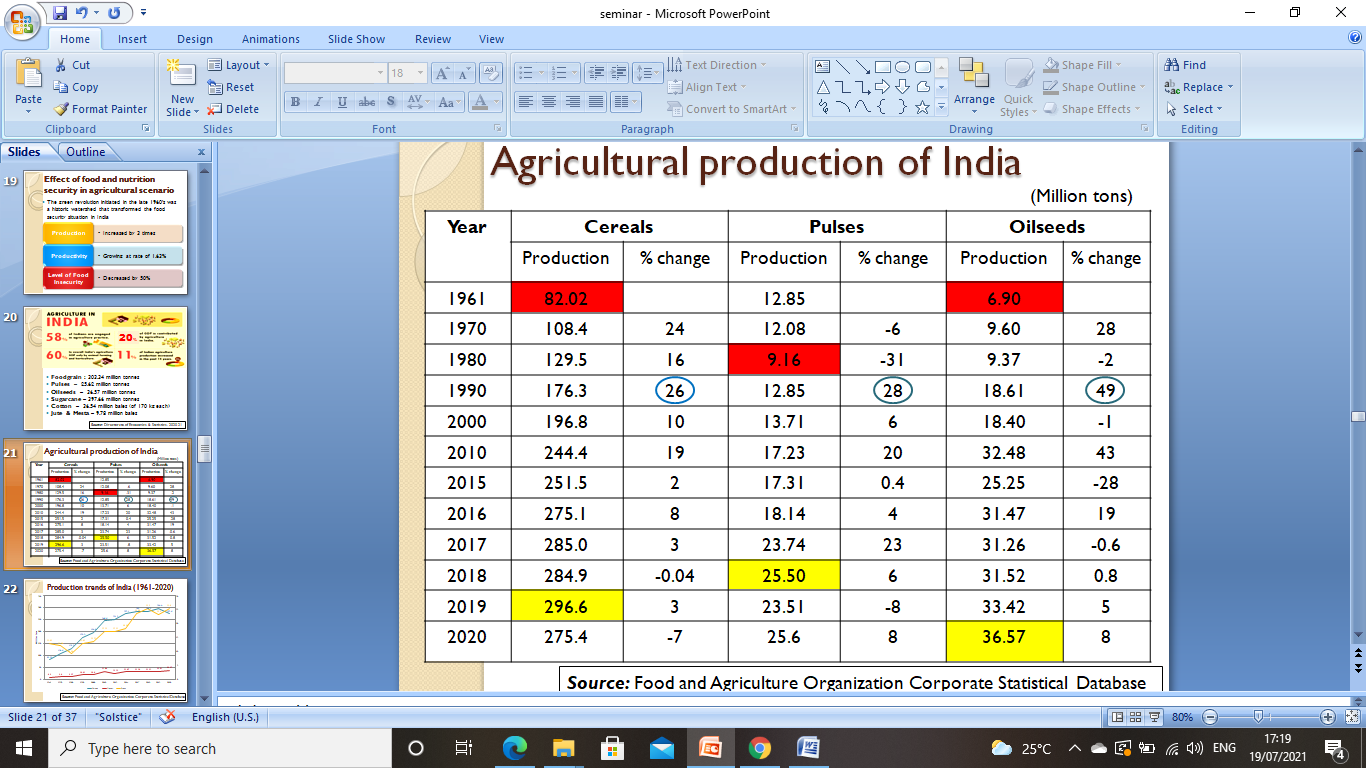
**Table 3: Production of major crops during 2020-21(2nd Advance Estimates)**

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| --- | --- | --- |
| **Sl. No.** | **Crops** | **Production (million tonnes) 2020-2021** |
| **1.** | **Foodgrains** | **303.34** |
|  | Rice | 120.32 |
|  | Wheat | 109.24 |
|  | Nutri/ Coarse cereals | 49.36 |
|  | Maize | 30.16 |
| **2.** | **Pulses** | **24.42** |
|  | Tur | 3.88 |
|  | Gram | 11.62 |
| **3.** | **Oilseeds** | **37.31** |
|  | Groundnut | 37.31 |
|  | Soybean | 13.71 |
|  | Rapseed and Mustard | 10.43 |
| **4.** | **Sugarcane** | **397.66** |
| **5.** | **Cotton** | **36.54 million bales** |
| **6.** | **Jute & Mesta** | **9.78 million bales** |

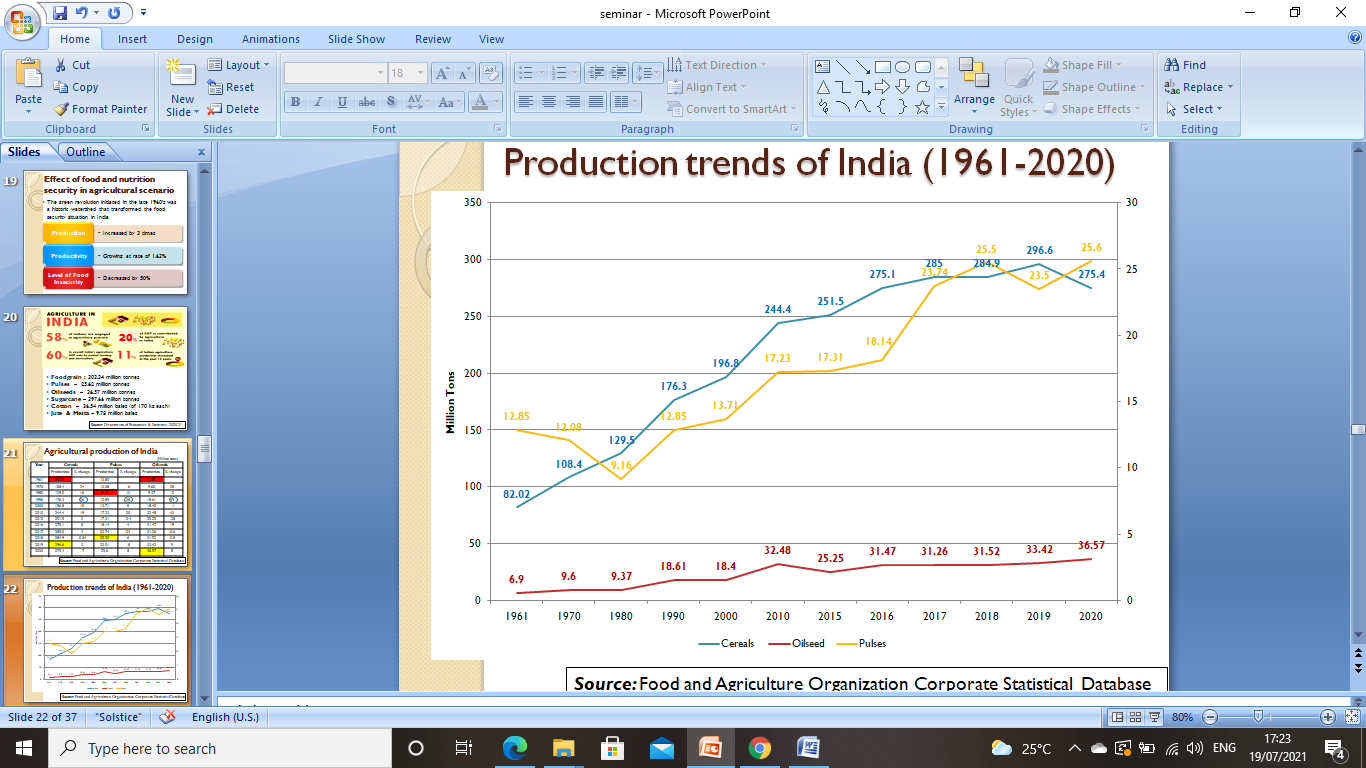
**Trends of agricultural production in India**

In India, total agricultural production has been increasing with the combined effect of growth in total cultivated areas and increases in the average yield per hectare of the various crops. Table 3 reveals the trend in total agricultural production in India.

**Table 4: Agricultural Production in India**

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***Source:*** Food and Agriculture Organization Corporate Statistical Database

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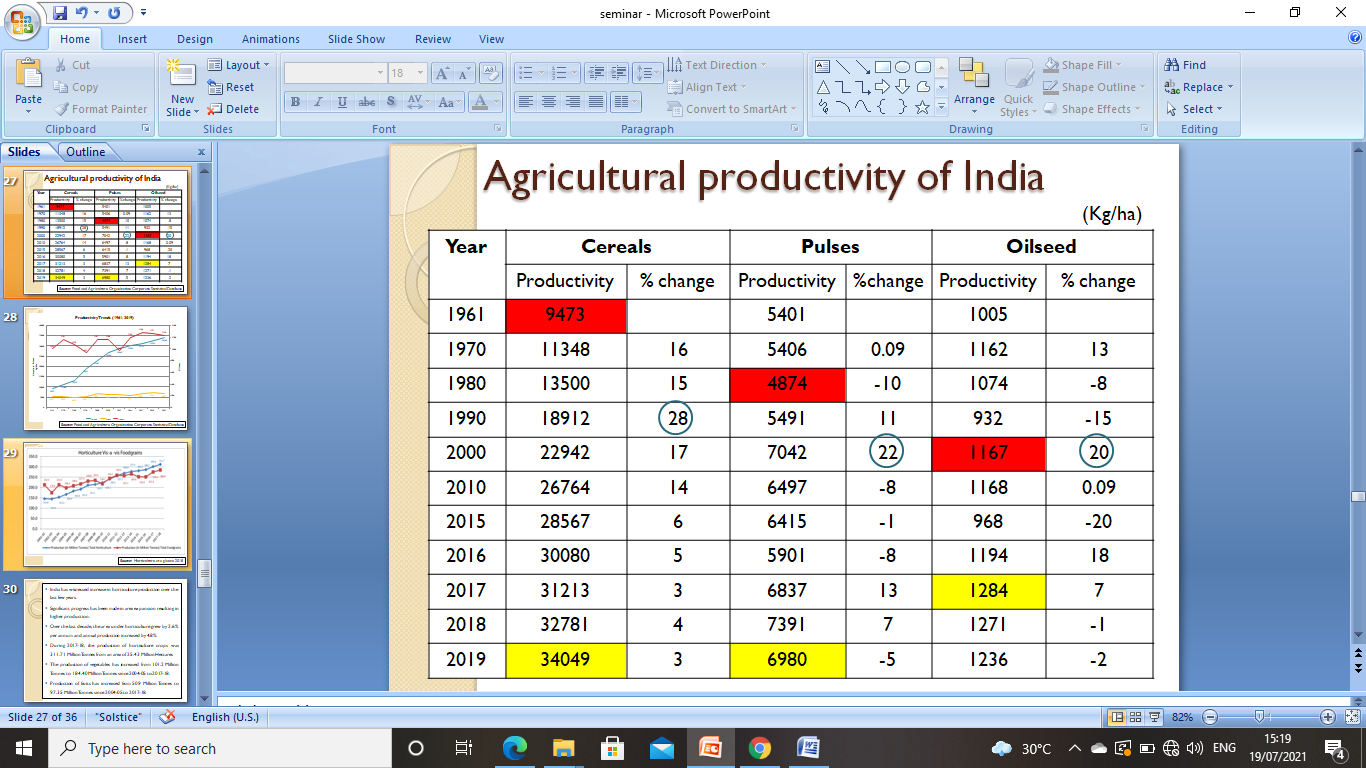
***Source:*** Food and Agriculture Organization Corporate Statistical Database

**Fig.3: Trends of Agricultural Production in India**

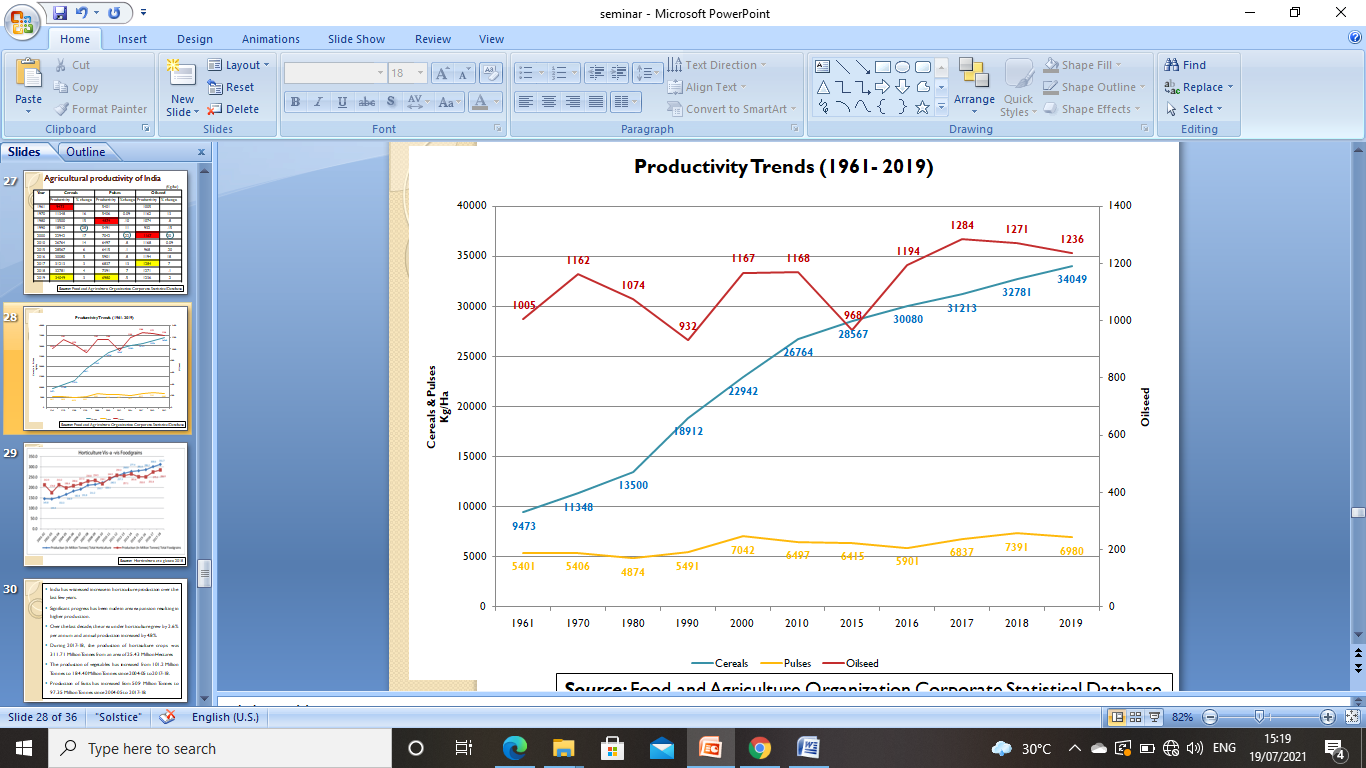
Agricultural production has grown.This production also boosted allocation of food grains under the National Food Security Act (NFSA) that increased by 56 per cent in 2020-21, compared to 2019-20. The government allocated 943.53 lakh tons of food grains to states / Union territories till December 2020.

**Agricultural Productivity Trends in India:**

**Table 5: Agricultural Productivity in India**

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***Source:*** Food and Agriculture Organization Corporate Statistical Database



***Source:*** Food and Agriculture Organization Corporate Statistical Database

**Fig.4: Trends of Agricultural Productivity in India**

Productivity growth is only increasing by about 2% annually. Small land holdings, covert unemployment, low marginal productivity, insufficient modernization of agriculture, inadequate skill development, higher production costs, price risks, inadequate irrigation facilities, sluggish land reform, ineffective institutional credit delivery, ineffective marketing of agricultural products, and other factors are some of the causes of low productivity.

Since India lacks landholdings suitable for agriculture, there is a need for considerable and widespread changes in agricultural methods. Some improvements which can raise productivity include:

* Development of more effective irrigation systems
* Introduction and upgrading of large scale irrigation
* Improve promotion and transport of farm produce
* Remove problems in marketing of farm produce including addressing the issues around APMC act.
* Improving storage facility, tenant security, supply of better quality seeds
* Promote multiple cropping
* Promotion of agricultural mechanization which enables the average farmer to operate without the assistance of hired labour.

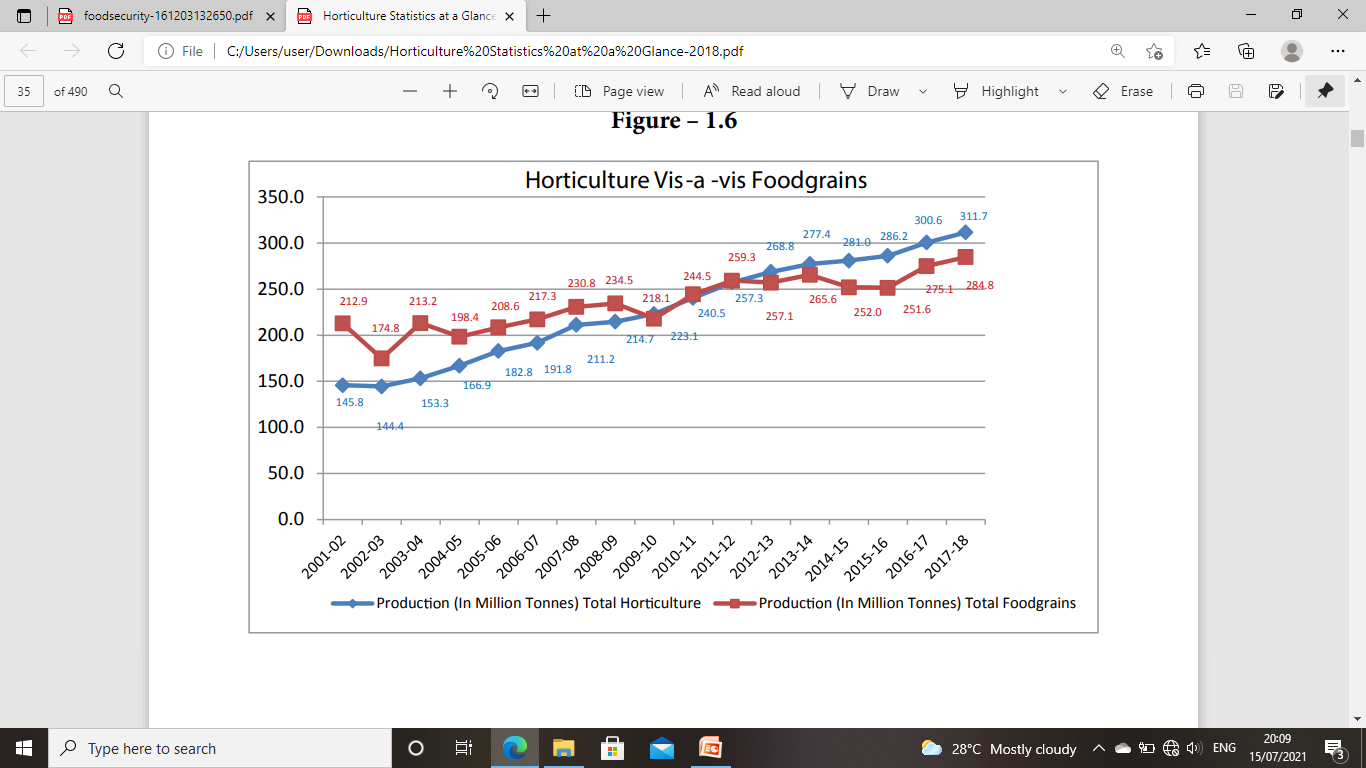
1. **STATUS OF FOOD AND NUTRITIONAL SECURITY:**

The status of food security of a country needs to be assessed at three levels.

1. First is the availability of food at national level on sustainable basis, which depends on level and growth of food production, or adequate capacity to import food (if availability elsewhere is assured).
2. Second is the physical and economic access of all households to food. Physical access requires efficient marketing, transport, and storage system to carry the food within an easy reach or at a reasonable distance from human settlements (villages). Economic access of every household to food depends on its purchasing power and prices of food at which it is available.
3. And third is the utilization of available food by individuals, which depends on intra-family allocation of food, and maintenance of reasonable level of health of all individuals to consume and absorb required level of food. Social factors like education, primary healthcare, gender bias, and role of women in household decisions affect food security at the individual level.

### CONCERNS VIS-A-VIS FOOD SECURITY IN INDIA

1. India, currently has the **largest number of undernourished people in the world** i.e. around 195 million.
2. Nearly 47 million or 4 out of 10 children in India do not meet their full human potential because of **chronic under-nutrition or stunting**.
3. Agricultural productivity in India is extremely low.
4. According to World Bank figures, cereal yield in India is estimated to be 2,992 kg per hectare as against 7,318.4 kg per hectare in North America.
5. The composition of the food basket is increasingly shifting away from cereals to high value agricultural commodities like fish, eggs, milk and meat. As incomes continue to rise, this trend will continue and the indirect demand for food from feed will grow rapidly in India.
6. According to FAO estimates in ‘The State of Food Security and Nutrition in the World, 2018” report, about 14.8% of the population is undernourished in India.
   * Also, 51.4% of women in reproductive age between 15 to 49 years are anaemic.
   * Further according to the report 38.4% of children aged under five in India are stunted (too short for their age), while 21% suffer from wasting, meaning their weight is too low for their height.
7. India ranked 76th in 113 countries assessed by The Global Food Security Index (GFSI) in the year 2018, based on four parameters—affordability, availability and quality and safety.
8. As per the [Global Hunger Index, 2018](https://www.drishtiias.com/daily-updates/daily-news-analysis/global-hunger-index-2018), India was ranked 103rd out of 119 qualifying countries.
9. **HORTICULTURAL CROP PRODUCTION:**

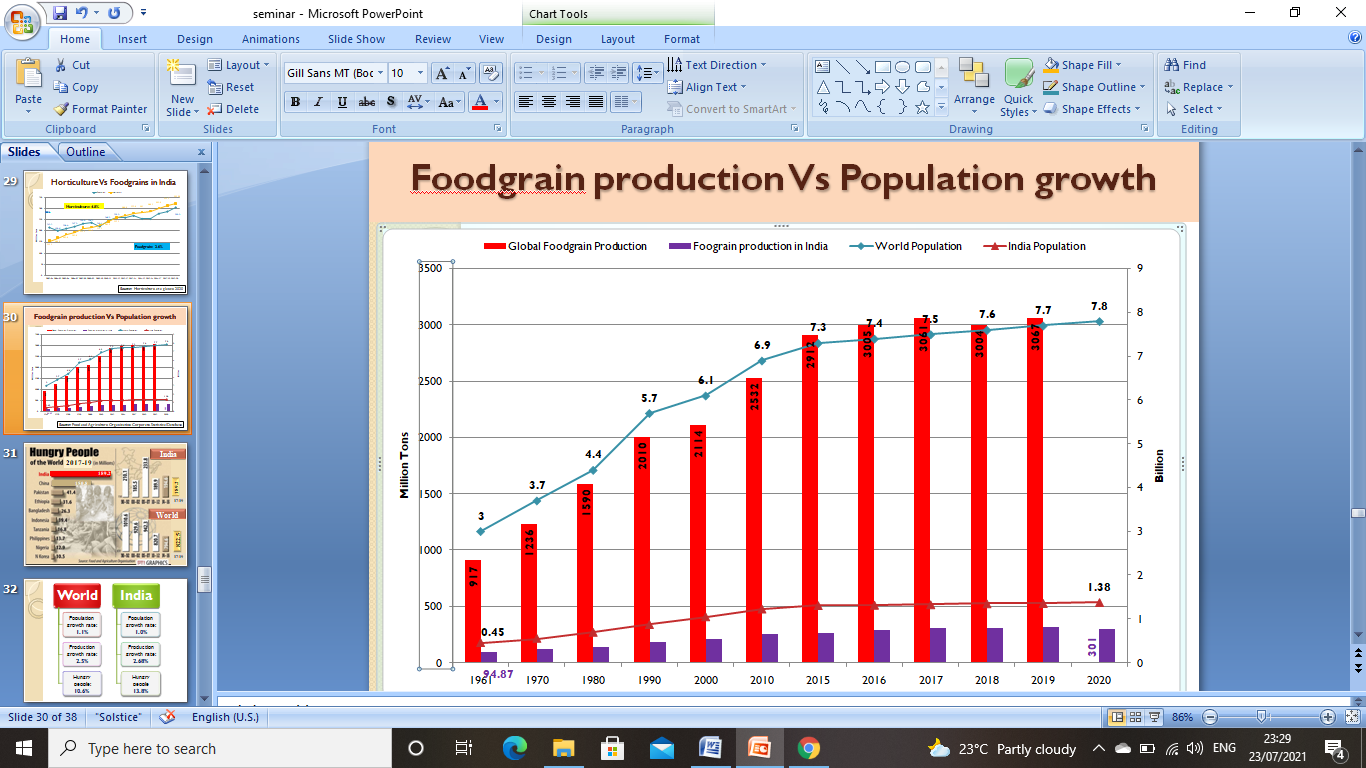


***Source:*** Horticulture at a glance 2018

**Fig.5: Trends of Horticultural and Foodgrains Production**

India witnessed the shift in area from food grain towards horticulture crops over last five years (from 2012-13 to 2017-18). The production of Horticulture crops has outpaced the production of food grain since 2012-13. India has witnessed increase in horticulture production over the last few years. Significant progress has been made in area expansion resulting in higher production. Over the last decade, the area under horticulture grew by 2.6% per annum and annual production increased by 4.8%. During 2017-18, the production of horticulture crops was 311.71 Million Tonnes from an area of 25.43 Million Hectares. The production of vegetables has increased from 101.2 Million Tonnes to 184.40 Million Tonnes since 2004-05 to 2017-18. Production of fruits has increased from 50.9 Million Tonnes to 97.35 Million Tonnes since 2004-05 to 2017-18.

1. **FOODGRAIN PRODUCTION VS POPULATION GROWTH:**

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*Source:* Food and Agriculture Organization Corporate Statistical Database

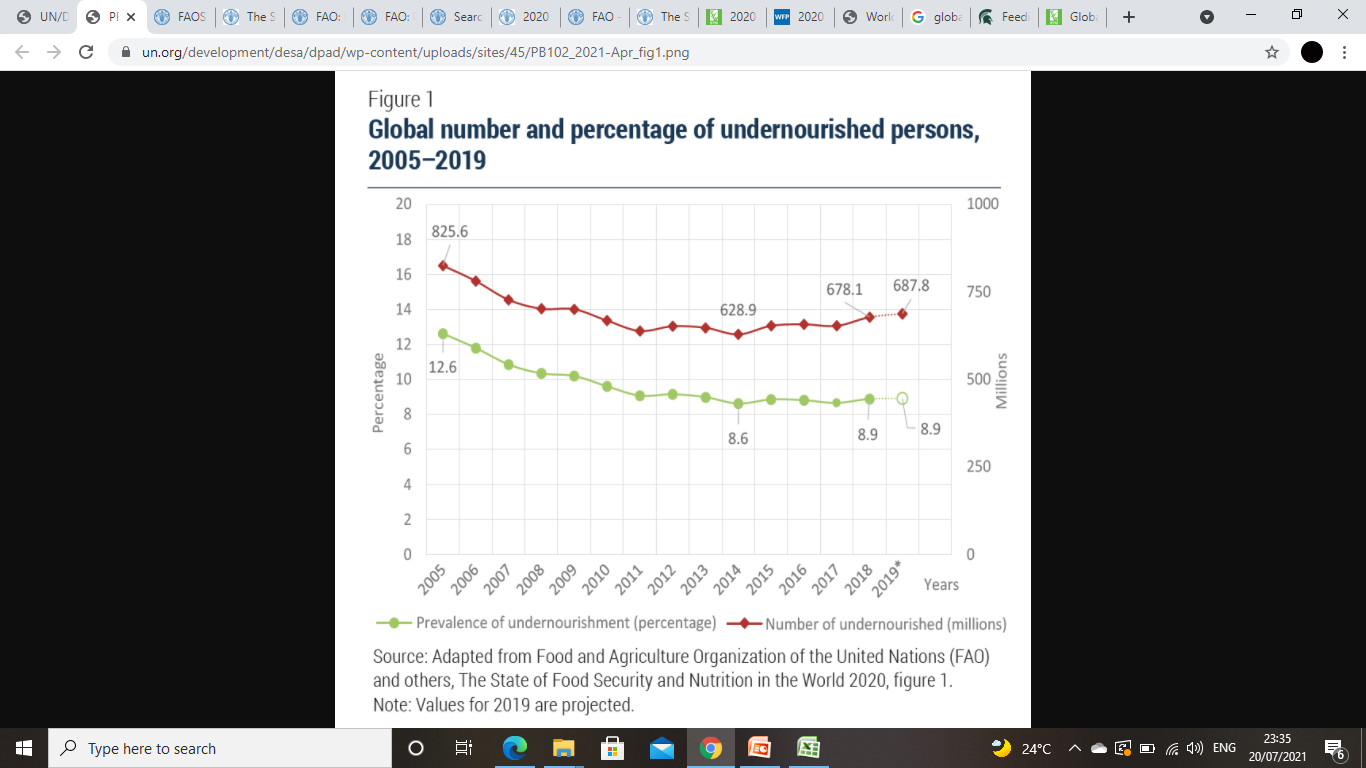
**Fig. 6:** Foodgrain production and population growth

The world population during 1961 was 3 billion which was increased to 7.8 billion in 2020 while the foodgrain production was 917 million tons which was further increased to 3067 million tons in 2019.

The total population was 0.45 billion in 1961 and increased to 1.38 billion in 2020 while the foodgrain production was 94.87 million tons and 301 million tons in 1961 and 2019 respectively.

From the above trend of foodgrain production and population growth we can see that the total world population growth rate is 1.1% while production growth rate is 2.5%. So, 10.6% of total population is still in hungry state. The population growth rate of India is 1% while the production growth rate is 2.68%. Even though the foodgrain production growth rate is higher than the population growth rate, 13.8% of total population accounts for hungry people in India till 2020.

From the figure, it is shown that the total number of undernourished persons in 2005 was found to be 825.6 millions but it has been declined to 687.8 million in 2019. So, the percentage of undernourished people in the world was 12.6% in 2005 while it is 8.9% in 2019.



**Fig.7:** Global number of percentage of undernourished persons

1. **ENSURING FOOD AND NUTRITION SECURITY**
2. Given its enormous population, high rates of poverty, and widespread malnutrition, India faces a difficulty in ensuring food and nutrition security.
3. Depleting water supplies and the consequences of climate change are threatening food supply.
4. It is difficult for the 1/3–4/4 of the population that lives below **the poverty line to access food** economically.
5. Despite recent years of remarkable economic expansion, there has been little progress in improving food distribution and absorption.
6. About half of pregnant women and children are anaemic, and around 44% of children under the age of 5 are underweight.

### CHALLENGES TO FOOD SECURITY

1. **Climate Change: Farming is more challenging by rising temperatures and unpredictable rainfall. Climate change affects not only crops but also animals, forests, fisheries, and aquaculture, and it has serious social and economic repercussions such as decreased earnings, destroyed livelihoods, disruption of trade, and negative health effects.**
2. **Lack of access to remote areas: The tribal communities' severe economic backwardness is a result of their subsistence farming practises and residence in remote, challenging terrain.**
3. **An rise in rural-to-urban migration, a sizable share of unorganised workers, and inadequate housing and food security have all contributed to the unplanned growth of slums.**
4. **Gender disparity, poverty, overpopulation, and lack of access to education.**
5. **Inadequate distribution of food**through public distribution mechanisms (PDS i.e. Public Distribution System).
6. **Biofuels: As the market for biofuels has expanded, less land is now being used to cultivate food crops.**
7. **Conflict: Enemies may cut off food supply to gain an advantage by using them as a weapon. The battle may also result in the destruction of crops.**
8. **Unmonitored nutrition programmes: Although the country has several plans for programmes that include improving nutrition as their key component, these are not properly carried out.**
9. **Lack of intersectoral cooperation between several ministries as well as incoherent food and nutrition policies.**
10. **Corruption: Selling low-quality grains in ration shops, diverting grain supplies to the open market for a larger profit margin, and irregular store openings all contribute to the problem of food insecurity.**
11. **CONCLUSION**

Maintaining food security for the nation's citizens as well as self-sufficiency in the production of foodgrains places a premium on productivity and growth in the foodgrain sector. Food grain output increases by 3.3 percent in the 1960s; between 1970–1971 and 1980–1981, it declined to 2.3 percent. The period from 1980–1981 to 1990–1991 was seen as the highest growth in food grain production, which increased by 3.8 percent annually. Due to population expansion, food loss and wastage, and exports, rice, wheat, and other grain production have expanded significantly, but their productivity has not kept up.

The level of productivity in the agricultural sector should be one of the primary priorities of food and nutritional security. Food is more readily available and easier to get as a result of increased agricultural output, especially in the food production sector. A sizable portion of households, particularly those in rural areas, may see their FS improve if domestic agriculture develops. The satisfaction of household food security and nutrition needs, the provision of employment possibilities, the increase in rural income levels (as a result of increased output and pricing), and the alleviation of rural poverty are some of the advantages associated with agricultural development. Urbanization and its negative consequences can be indirectly reduced by raising rural incomes in the agriculture sector.

In order to be able to feed the anticipated expanding worldwide population, food and nutritional security is a fundamental challenge in global agriculture. The continuing improvement in agricultural productivity and output can help to meet basic needs, fight hunger, reduce reliance on imported goods, improve the trade balance, promote sustainable growth, and boost food and nutritional security. Most future increases in global agricultural output are anticipated to come from expanding the use of already-existing or brand-new techniques and technology.

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