

# ADAPTING TO THE CHALLENGES OF THE 21<sup>st</sup> CENTURY FOOD AND AGRICULTURE

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## **ABSTRACT**

*Environmental change has become one of the world's most major problems as of late, influencing individuals, the climate, and the economy. Because of the need to increment worldwide food supply under the decreasing accessibility of soil and water assets and the rising dangers from environmental change, farming will confront huge difficulties in the 21st century. There are chances to make food and work frameworks that are stronger to natural, financial, and social dangers due to these challenges. These difficulties require the utilization of current multidisciplinary information, as well as the advancement of an assortment of new mechanical and institutional developments. Environmental change is difficult for agribusiness and agrarian arrangement making, just like the evolving environment. As the impacts of environmental change are supposed to decline, horticulture should figure out how to lessen its ozone harming substance emanations (GHGs). In a discussion given to the MIT Enterprise Forum in 2003, Nobel laureate Richard E. Smalley illustrated the Humanity's Top Ten Problems for the Next 50 Years. Teacher Smalley accepts that the most major problems confronting humankind today are: energy, water, food, the climate, destitution, psychological oppression, and battle, as well as illnesses, instruction, a vote based system, and populace development. An outline of the significant difficulties confronting the worldwide food and horticultural framework in the 21st century, as well as the effects of environmental change, is one of the objectives of this review. It expects to sum up key discoveries about a portion of these issues. Environmental change difficulties (dry spell, cold, saltiness) and their effect on farming will be the focus of future review studies.*

**KEYWORDS:** 21st Century, agricultural , Climate change, food, challenges

## **1. INTRODUCTION**

### **1.1. Roles for Agriculture in the 21st Century**

As a result, agriculture shifts from being a source of environmental degradation to a source of environmental restoration and health. There are numerous reasons why this is important. In today's world, crop agriculture now occupies about 40% of the livable land. Deforestation in tropical regions is almost exclusively the result of agricultural expansion. Farming and ranching take up about 80% to 90% of usable land, depending on how you define "usable." Agricultural and forested landscapes are home to far more wild species than are found in protected areas. Many species will not be able to thrive in these landscapes if they are not properly managed. It's also worth noting that the vast majority of the world's most important watersheds are under agricultural use. People, industry, agriculture, and nature will all be harmed if these systems cannot produce enough clean water.

In the last four decades, numerous "intensification without simplification" agro-ecological practises have been developed that work with natural systems. In addition to helping farming scenes go from being a net wellspring of ozone harming substances to a net sink, these new frameworks can assist with saving biological system processes while working on long haul usefulness.

To keep up with biological systems, we should make a move past the homestead and plot level. Soil, water, and vegetation assets utilized by different land partners should be overseen in a more planned manner if we are to broaden our perspective and consider entire landscapes. Such integrated landscape management initiatives have proliferated around the world because of increasing pressures on our resources.

## **2. FOOD AND AGRICULTURE IN THE PRESENT TIME**

In order to better understand the challenges facing agriculture and food systems in the 21st century, this report was created. Its examination of 15 global trends sheds light on the issues at hand and the actions that must be taken. There are a total of ten challenges that must be overcome in order to maintain everyone's food security and nutrition, as well as the long-term viability of agriculture. Returning to the status quo is not an option. This means that considerable adjustments in agricultural systems, rural economies, and natural resource management will be required if we are to realise the full potential of food and agriculture.

## **TRENDS**

### **A number of global trends are influencing food security, poverty and the overall sustainability of food and agricultural systems.**

In a scenario of moderate economic growth, the world's population is predicted to reach approximately 10 billion people by 2050, resulting in a 50% increase in agricultural demand over 2013. People in low- and middle-income countries will transition to consuming more meat, fruits, and vegetables instead of grains as their living standards grow, necessitating a shift in production and putting additional burden on the planet's natural resources.

### **Economic growth and population dynamics are driving the structural change of economies.**

In some regions, the decline in agricultural production and employment is occurring at a faster pace than in others, and this presents different challenges. Investment in agricultural technology and research is increasing productivity, but crop yields have slowed to levels that are unacceptably low. Reducing agricultural output losses and waste would eliminate the need for additional production boosts. Depletion of natural resources, loss of species, and the spread of infections and diseases that cross borders, some of which are growing resistant to antimicrobials, all impede increased productivity.

### **Climate change affects disproportionately food-insecure regions, jeopardizing crop and livestock production, fish stocks and fisheries.**

Increased competition for natural resources, higher greenhouse gas emissions, and more deforestation are all on the rise all likely consequences of increasing agricultural demands.

### **Hunger and extreme poverty have been reduced globally since the 1990s.**

More than 700 million people, the most of whom reside in rural areas, are still poor. Despite gains in combating hunger and increasing nutrition and health, about 800 million people are chronically hungry, with another 2 billion suffering from micronutrient deficiencies. Without further efforts to encourage poor development, a "business-as-usual" scenario would leave 653 million people undernourished by 2030. It is impossible to eradicate poverty even in places where it has been reduced because of the persistent inequality that exists.

### **Critical parts of food systems are becoming more capital-intensive, vertically integrated and concentrated in fewer hands.**

Inputs all of this is taking place, including the provision of services and the distribution of food. The first to lose out are small-scale farmers and landless families, who are increasingly looking for work outside of agriculture. In many parts of the world, increased migration, notably of male members of rural households, is contributing to a 'feminization' of farming.

**Conflicts, crises and natural disasters are increasing in number and intensity.**

Affected people are pushed back into poverty as a result of these factors, which in turn fuels the migration of people in need of humanitarian aid. Protracted crises are often characterised by violent conflict. Between 2.5 and 3 times as many people are undernourished in low-income countries with a long-term crisis as in other low-income countries.

**CHALLENGES**

**These trends pose a series of challenges to food and agriculture.**

There is no sustainable food and agricultural production in Intensive, high-input farming techniques that have resulted in significant deforestation, water scarcity, and soil depletion. To protect and improve the natural resource base while also improving production, innovative systems are required. Agroforestry, Climate-Smart Agriculture, and Conservation Agriculture (CSA) are all holistic techniques that must be implemented, as well as the application of indigenous and traditional wisdom. With technical improvements and major reductions in the use of fossil fuels across the economy and in agriculture, climate change and the worsening of natural disasters, which touch all ecosystems and every aspect of human life, might be addressed. Pests and diseases have the ability to travel across national borders, and international cooperation is needed to stop them.

**Eradicating extreme poverty, and ensuring that vulnerable people who escape poverty do not fall back into it, requires action to reduce inequalities.**

Equality must be addressed in both countries as well as among citizens of the same country. This includes addressing disparities in the distribution of wealth and opportunity. Rural areas would benefit from Pro-poor growth methods ensure that the poorest people benefit from market integration and agricultural investment, addressing the core causes of migration and enhancing their income and investment prospects in rural areas.

**But pro-poor growth must go beyond agriculture, by involving both rural and urban areas and supporting job creation and income diversification.**

Ending hunger and tackling the triple burden of malnutrition by promoting healthier diets can be accomplished through social protection and pro-poor economic growth. To eradicate hunger, malnutrition, and extreme poverty, it is critical to build resilience to long-term crises, disasters, and wars, as well as to prevent conflicts by supporting inclusive and equitable global development.

**A rethinking of food systems and governance is essential for meeting current and future challenges.**

Food frameworks that are all the more in an upward direction composed and coordinated give normalized food to metropolitan regions and formal work open doors. They should, notwithstanding, be joined by mindful speculations and worry for smallholder vocations, the ecological impression of long food supply chains, and the consequences for biodiversity. Making food frameworks more proficient, comprehensive, and versatile is an important first step in addressing these issues.

**On the path to sustainable development, all countries are interdependent.**

Effective national and international governance is one of the most difficult challenges to overcome, as it requires clear development objectives as well as a commitment to achieving those goals. An approach to sustainable development that rises above the split among "created" and "creating" nations is addressed in the 2030 Agenda for Sustainable Development. To accomplish practical turn of events, all nations should cooperate to make significant changes in the manner they produce and consume.

**3. Adapting agriculture to climate change**

About 33% of ozone depleting substance discharges are credited to horticulture. CO<sub>2</sub> is delivered into the air because of exercises, for example, furrowing area and moving ('slice and consume') development for rural extension. Decay of natural matter in overflowed rice paddies contributes essentially to the 40% of human-caused methane discharges. Domesticated animals represents about a fourth of all methane emanations on the planet. Likewise, the breakdown of compost and fertilizer and pee from domesticated animals represents 80% of human-made nitrous oxide emanations. Accordingly, horticultural GHG outflows

can be enormously decreased, and ranchers' jobs, particularly in agricultural nations, can be fundamentally improved (FAO, 2003).

It is fundamental perusing for ranchers, land supervisors, policymakers, scientists and understudies who are engaged with setting up the world for environmental change's difficulties and open doors.

Activities taken in light of the danger or truth of environmental change, as well as changes in the choice climate (like changes in friendly and institutional designs or modified specialized choices) that could influence these activities' true capacity or ability to be acknowledged are alluded to as "transformation" (IPCC, 2007).

Because of environmental change, centering more is basic attention on agriculture's ability to adapt, according to Howden et al. (2007).

1. It is already impossible to avoid some impact and necessary adaptation responses due to the 0.1°C per decade warming that has already been committed to the planet by previous greenhouse gas emissions.

2. A continuing rise in major greenhouse gas emissions is causing changes in barometrical CO<sub>2</sub>, worldwide temperature, and ocean level that are now surpassing the situations considered by the Intergovernmental Panel on Climate Change (IPCC) (IPCC). Environmental change impacts are additionally happening quicker than recently anticipated. Assuming that these examples persevere, we'll should be more proactive and adjust all the more rapidly.

3. At present, there is an absence of progress in the improvement of worldwide emanation decrease arrangements past the Kyoto Protocol, which raises worries about future outflows and environmental change and its related effects.

4. There has been an expansion in the high finish of the environmental change situation range lately, and these possibly higher worldwide temperatures might adversely affect existing horticultural exercises.

5. Agrarian speculation may likewise profit from environmental change, which remunerates the people who make the most of these open doors right off the bat.

Due to the wide scope of environment and other natural factors, as well as social, institutional, and monetary elements and their associations, rural practices differ colossally. This truly intends that there is a wide scope of potential transformations to browse (Howden et al., 2007). Horticulture needn't bother with to be rehashed to adjust to environmental change. Therefore, agrarian practices should be adjusted to meet the consistently changing and

habitually really testing natural circumstances. FAO works with its part nations to fabricate limit at the public, neighborhood, and local area levels, bring issues to light of, and plan for, the likely impacts of environmental change to guarantee the fitting data is shared and placed into practise. The government's goal is to integrate climate change issues into agricultural policies and programmes by ensuring the inclusion of appropriate adaptation practises. Community-based climate change adaptation planning is one of FAO's primary missions, and it is based on site-specific assessments of the potential impacts of climate change and the best ways to mitigate those impacts.

#### **4. CONCLUSION**

Agriculture's contribution to India's economic growth and development as a whole doesn't require much explanation. In order to meet new challenges and seize new opportunities, this role will need to be re-oriented in light of the shifting environment and requirements. Rather than "pushing for incremental change," we will need to shift our thinking and approach to agriculture from "transformational change." The sustainability of food and nutrition security, climate change adaptation and mitigation, and the sustainable use of critical resources such as water, energy, and land are all intertwined in agriculture in the twenty-first century. Furthermore, agriculture has regained its former prominence as a source of gainful employment as manufacturing has been unable to absorb the additional labour needed to keep up with population growth.

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