Agriculture Field Management and Climate Impact on Crops

Mr. Deepak Kumar¹, Mr. Nitin Kumar², Dr. Tripti Khatana³
Assistant Professor¹, ², Associate Professor³
Department of Agriculture¹, ², Department of Applied Science³
Roorkee College, Roorkee, India

Abstract:
Agriculture play the key role in the development of human life growth and farming is main concern for the government of India from last five years. During this government many major changes and development are planned by them for the growth of farmers and agriculture field. Due to chemical impurities in water in lake and rivers fishes are died and many new diseases are developed in the surrounding atmosphere. Farming is basic requirement to create quality food surpluses that enabled people to live in cities. Agriculture is directly dependent on climate, since temperature, sunlight and water are the main drivers of crop growth. While some aspects of climate change such as longer growing season and warmer temperatures may bring benefits in crop growth and yield, there will also be a range of adverse impacts due to reduced. These impacts may put agricultural activities at significant risk. Impact of climate change on agriculture will be one of the major deciding factors influencing the future food security of mankind on the earth. Agriculture is not only sensitive to climate change but also one of the major drivers for climate change. Understanding the weather changes over a period of time and adjusting the management practices towards achieving better harvest are challenges to the growth of agricultural sector as a whole. The climate sensitivity of agriculture is uncertain, as there is regional variation in rainfall, temperature, crops and cropping systems, soils and management practices. The inter-annual variations in temperature and precipitation were much higher than the predicted changes in temperature and precipitation. The crop losses may increase if the predicted climate change increases the climate variability. Agriculture began thousands of years ago. Agriculture based on large-scale monoculture in the twentieth century came to dominate agricultural output, though about 2 billion people still depended on subsistence agriculture into the twenty-first Century. Modern agronomy, plant breeding, agrochemicals such as pesticides and fertilizers, and technological developments have sharply increased yields, while causing widespread ecological and environmental damage. Selective breeding and modern practices in animal husbandry have similarly increased the output of meat, but have raised concerns about animal welfare and environmental damage. Environmental issues include contributions to global warming, depletion of aquifers, deforestation, antibiotic resistance, and growth hormones in industrial meat production.

Keywords: Agriculture field Management Training, Climate of India, Different Types of Climatic Regions, Factors affecting Climate of India, Different Types of Climatic Regions, Factors Affecting India's Climate, Price Control Digital Agriculture Economy, Enabling Farmer Community, Industrial Waste Water, Industrialization, Temperature.

I. INTRODUCTION
India is an agriculture based country, approximate 50% of population is depend on agriculture. This structures the main source of livelihood and earning of people. The commitment of agribusiness in the national income in India is all the more, subsequently, it is said that agriculture in India is a backbone for Indian Economy. The contribution of agriculture in the initial two decades towards the total national output is between 48% and 60%. Agricultural exports constitute a fifth of the total exports of the country. In perspective of the overwhelming position of the Agricultural Sector, gathering and support of Agricultural Statistics expect incredible significance. According to the fourth Advance Estimates of Production of food grains for 2018-19, aggregate food grain production is assessed to be 364.77 million tons (MT). Export of spices from India are relied upon to reach US$ 3 billion by 2018-19, on the back of imaginative promoting strategies, inventive bundling, quality in quality and an in number appropriation system. The Indian flavors business is pegged at Rs 50,000 crore (US$ 6.42 billion) every year, of which the marked portion represents 15 %. India has the 10th-largest arable land resources in the world. With 20 agri-climatic regions, all 15 major climates in the world exist in India. The country also possesses 46 of the 60 soil types in the world. India is the largest producer of spices, pulses, milk, tea, cashew and jute; and the second largest producer of wheat, rice, fruits and vegetables, sugarcane, cotton and oilseeds. Further, India is second in global production of fruits and vegetables and is the largest producer of mango and banana. During 2018-19 crop years, food grain production is estimated at record 284.95 million tones. In 2019-20, Government of India is targeting food grain production of 291.10 million tones. Production of horticulture crops in India is estimated at record 310.7 million metric tones (MMT) in 2018-19 as per final estimates. India has the largest livestock population of around 535.78 million which translates to around 31 per cent of world population.

Agriculture Field Management Training
For the progress and survival of any Nation, its Agriculture sector must be strong well functioning and well caring by the Individual, Local government and Central Government of that country. Agriculture sector plays a huge role, when it comes to satisfying the food demand of our country as well as maintaining the economy! Still, this field is widely overlooked by new generation. But last five years governments focused on
agriculture and invest more and more time and money for the development of this field. They tend to look at agriculture sector as advanced field in India for economic growth of the country. In Agricultural Management we plan and coordinate the operation of farms, nurseries, greenhouses, and other agricultural production sites, where we plan for proper take care of soil, crops and irrigation planning of the field. In each village of the country we have to work for management of agriculture field. Most of the field is wasted by the industries and state government, we planned for that area must be used for short term generation vegetables, fruits and medicated plants purpose. It also provides the employment of young generation and local economy of the state increases rapidly. Agriculture field in India has shown a steady average nationwide annual increase in the kilograms produced per hectare for some agricultural items, over the last 60 years. These gains have come mainly from India’s green revolution, improving road and power generation infrastructure, knowledge of gains and reforms. Despite these recent accomplishments, agriculture has the potential for major productivity and total output gains, because crop yields in India are still just 40% to 60% of the best sustainable crop yields achievable in the farms of developed and other developing countries. Additionally, post harvest losses due to poor infrastructure and unorganized retail, caused India to experience some of the highest food losses in the world. Agriculture management Training is an important factor to develop the capacity building of farmers as to enhance the execution in their fields and also for the curing the crops from damage from insects and other sources. Consequently, State Government and skilled person in this field works jointly for that and it needs appraisal is imperative to the training process. It serves to recognize present issues and future difficulties to be met through training and improvement. It is obliged to figure out the needs of individual trainee in his field on which proficient skills ought to be assembled to get the best results in his field.

Climate of India
Impact of climate change on agriculture will be one of the major deciding factors influencing the future food security of mankind on the earth. Agriculture is not only sensitive to climate change but also one of the major drivers for climate change. Understanding the weather changes over a period of time and adjusting the management practices towards achieving better harvest are challenges to the growth of agricultural sector as a whole. The climate sensitivity of agriculture is uncertain, as there is regional variation in rainfall, temperature, crops and cropping systems, soils and management practices. The inter-annual variations in temperature and precipitation were much higher than the predicted changes in temperature and precipitation. The crop losses may increase if the predicted climate change increases the climate variability. Climate change has already caused significant damage to our present crop profile and threatens to bring even more serious consequences in the future (WHO, 1992). Wheat yields are predicted to fall by 5-10% with every increase of 1°C and overall crop yields could decrease up to 30% in South Asia by the mid-21st century [8]. India could experience a 40% decline in agricultural productivity by the 2080s [9]. Rise in temperatures will affect wheat growing regions, placing hundreds of millions of people at the brink of chronic hunger [9]. India experiences a variety of climates ranging from tropical in the south to temperate and alpine in the Himalayan north. The elevated areas receive sustained snowfall during winters. The Himalayas and the Thar Desert strongly influence the climate of the country. The Himalayas work as a barrier to the frigid katabatic winds, which blow down from Central Asia. The Tropic of Cancer passes through the middle of the country, and this makes its climate more tropical. India is a big tropical country and is famous for its diverse climatic features.

Different Types of Climatic Regions
The climates of India are mainly divided into four different groups. The classification of these groups is based on the Koppen climate classification system.

1. Tropical Wet (Humid): The tropical wet (humid) climate group in India is divided into two subparts - tropical monsoon climate or the tropical wet climate, and tropical wet and dry climate or savannah climate. The Western Ghats, the Malabar Coast, southern Assam, Lakshadweep and Andaman and the Nicobar Islands have the tropical monsoon climate. It experiences moderate to high temperature with seasonal but heavy rainfall. The months from May to November experience the most rainfall and the rain received during this period is sufficient for vegetation throughout the year. Tropical wet and dry climate or the savannah climate is most common in the country. It prevails mainly in the inland peninsular region of the country except for some portion of the Western Ghats. The summers are scorching and the rainy season extends from June to September.

2. Tropical Dry: The tropical dry climate group is divided into three subdivisions (a) tropical semi-arid (steppe) climate, (b) sub-tropical arid (desert) climate and (c) sub-tropical semi-arid (steppe) climate. Karnataka, central Maharashtra, some parts of Tamil Nadu and Andhra Pradesh experience the tropical semi-arid (steppe) climate. Rainfall is very unreliable in this type of climate, and the hot and dry summers are experienced from March to May. With scanty and erratic rainfall and extreme summers, western Rajasthan witnesses the sub-tropical arid (desert) climate. The areas of the tropical desert that runs from the regions of Punjab and Haryana to Kathiawar witness the sub-tropical semi-arid (steppe) climate. The maximum temperature in summers goes up to 40°C, and the rains are unreliable and generally take place during summer monsoon season in this climate.

3. Sub-tropical Humid Climate: This climate is witnessed by most of the North and Northeast India. Summers are scorching, while in winters, the temperature can plunge to as low as 0°C. Rainfall mainly occurs in summers, but snowfall or occasional rain in winters is also witnessed in some areas. The hottest months are May, and June and frost also occur for few months in winters.

4. Mountain Climate: The temperature falls by 0.6°C for every 100 m rise in altitude in the Himalayas and results in several different climates from tropical to tundra. The trans-Himalayan belt, which is the northern side of the western Himalayas, is cold, arid and windswept. There is less rain on the leeward side of the mountains whereas the well-exposed slopes receive heavy rainfall. Heaviest snowfall occurs between Decembers to February.

IJESC, February 2020

24668

http://ijesc.org/
Factors Affecting India's Climate

There are certain factors which affect the climate of India:

1. **Latitude:** The Tropic of Cancer passes through the middle of India and extends from Mizoram in the east and Rann of Kutch in the west; and considerably affects the climate of the country effectively. To the south of the Tropic of Cancer lies the southern part of the country which belongs to the tropical area and its north lays the northern half of India which belongs to the sub-tropical zone. Therefore, India experiences both sub-tropical and tropical climates.

2. **Altitude:** In the north, India is bounded by mountains with an average height of 6,000 metres and in the south, has a vast coastline with a maximum elevation of about 30 metres. The Himalayas act as a barrier against the cold winds from Central Asia. Therefore, due to the altitude of these mountains, the Indian subcontinent experiences milder winters than Central Asia.

3. **Monsoon Winds:** The ‘monsoon winds’ is the most dominating factor influencing the climate of India. It is often called the monsoon climate. A reversal in the monsoon winds can bring a change in the season of the country, for instance, the extreme summer season suddenly changing to the rainy or monsoon season. The entire country receives rainfall due to the south-west summer monsoons from the Bay of Bengal and the Arabian Sea.

4. **Western Disturbances and Tropical Cyclones:** Large parts of peninsular India get influenced by the tropical cyclones which originate in the Arabian Sea and the Bay of Bengal. Most of the cyclones originate in the Bay of Bengal and influence the climatic conditions at the time of the south-west monsoon
season. The western disturbances originate over the Mediterranean Sea and influence the weather conditions in the Western Himalayan region.

Climate Related Calamities and main other factors which affect the agriculture
Climate-related calamities are a significant cause of loss to agriculture. Some of the natural disasters that have been experienced in the country are as follows:

Landslides and Floods:
Floods are the most common natural disaster in India and are caused due to the inadequate capacity of the river banks to carry high flows which are brought down from the upper catchment because of the heavy rains. Almost the entire country is flood-prone, and the precipitation events like torrential rains and flash floods have become common in central India in the last few decades. But, the regions located in the Indo-Gangetic plains and northeast India is more prone to floods. Erratic, excess or untimely monsoon rains can harm the agriculture of the country.

Droughts:
Drought is a situation which arises due to the scarcity of water. In India, agriculture depends on the rains or the monsoon season as a source of water. But, the shortage or failure of water supply results in the below-average crop yields. Climatic factors such as high wind, high temperature and low humidity also add to the severity of drought in India. Andhra Pradesh, Rajasthan, Gujarat, Odisha, some parts of Maharashtra and Karnataka are some of the drought-prone areas in the country. India has witnessed many famines such as Bengal famine of 1770, 1876-77, 1899 and 1943, which took lives of millions of people.

Tropical Cyclones:
These are the most devastating natural disasters which result in a massive loss of life and property. In India, the lives of the coastal habitats are profoundly affected by the cyclones. The areas near the Bay of Bengal and the Indian Ocean are the most cyclone-prone regions of the country. Coastal areas of Odisha, West Bengal, Tamil Nadu and Andhra Pradesh are more exposed to cyclones. During the time of cyclone, heavy rains, winds with high speed and storm surge are also experienced which also affect the lives of the people as it becomes difficult for them to get relief and supplies during this phenomenon. A super cyclone, Cyclone 05B that struck Odissa on October 29, 1999, is considered to be the deadliest cyclone in the country in the past few decades. It was deemed to be equivalent to Category 5 hurricane. More different factors which affect the agriculture field

Price Control:
The fluctuating prices for key crops such as tomato, potato and onion (TOP) has resulted in the government announcing 500 crores for initiating Operation Green. It aims to stabilize the demand-supply situation for these crops and promote initiatives to control disparity. The situation requires fundamental changes beginning from crop variety selection (table variety v/s processing varieties), procurement mechanism, post-harvest handling and storage, processing of produce, market development, logistics services and distribution. However, it remains to be seen how it will impact an average farmer. Take the example of tomato, India produces around 19 million tones of tomato every year. Leading producing states like Andhra Pradesh and Madhya Pradesh which contribute to around 30% of the total production of India should innovate on implementation of these solutions. Another important aspect which needs to be considered is the development of large scale infrastructure to support the mass storage and movement of perishable items. Currently the cold chain network is highly disaggregated and operates on thin margins. Technology innovation for implementing low cost and durable multimodal solutions is one of the key challenges here.

Digital Agriculture Economy:
The agricultural sector has witnessed the infusion of digital intervention. Most stakeholders understand that the next growth curve for agriculture can be achieved through digital innovation in the sector. It can transform the entire input supply chain, crop management cycle, storage and market access. The trend has begun to pick up as more and more agri innovation start up ventures are popping up in the sector looking at modernizing agriculture by bringing in applications in precision agriculture/traceability/climate smart agriculture, creation of digital platforms and natural resource management. The AgTech summit at Andhra Pradesh showcased the latest technology innovation in agriculture. As more startups join the list, the PE/venture capital fund has also started to flow in them. 2018 saw an inflow of over $1 billion in startups in India.

Enabling Farmer Community:
The year has seen continued effort in strengthening farming community through greater focus on the Farmer Producer Company (FPO) formation. Currently there are over 900 FPOs (both registered and under process) supported by Small Farmer Agribusiness Consortium (SFAC) which have mobilized approximately 9 lakh farmers across India. Apart from basic formation, these entities are also being handheld on developing an ambient environment to undertake business operations unlike a corporate entity. However, the challenge lies in how effectively the FPO adopts to the corporate style of working.

Industrial Waste Water:
Agriculture consumes 60% of available water resources. Water is the basic need of good development of agriculture. Maximum crops and pulses are affected by the waste effluent of industries and houses, because in various places there is no proper water filtration system planned by the industries to reduce the impact of chemicals on the agriculture field. For Example paper mill and sugar mill generates the lime and sulphur in a big amount it’s affected the underground layers. If we treated the water, then we find that number of impurities affected the water softness. Industries used freshwater to carry away waste from the industrial plant and into rivers, lakes and oceans. Asbestos, Lead, Mercury, Nitrates, Phosphates, Sulphur, Oils, Petro chemicals are main pollutants which are found near the industrial areas agriculture fields. This affects the human life and also is the causes of different types of disease and impurities find the crops.

Soil Impurity
The thin layer of soil that covers the surface of the earth play the main role to the well-being and survival of individuals, without
proper environmental conditions there would be absence of crops, food, plants, animals, forests and even human beings; about 40% of the surface of the earth and more than one billion people are affected by land degradation and plastic wastes; degraded lands are homes to the most poverty stricken sections of the rural people. In India, in rural areas, most of the individuals are living in the conditions of poverty; climatic factors, demographic factors, personal causes, economic causes and social causes are the main factors that lead to the conditions of poverty. Rural poverty-alleviation programs are located in ecologically frail and marginal environments. In these areas, the poor are often fastened into patterns of natural resource degradation by their lack of access to productive resources, institutional services, acknowledgment and technology. Without these resources, they are compelled to overload already eroding lands in order to survive. The increased pressure on the land, through deforestation, overgrazing and over cultivation causes a decline in soil fertility and production, and thus aggravates poverty. This circular, cause-and-effect relationship between rural poverty and environmental degradation is apparent, unless degradation is addressed directly, the sustainability of rural development schemes will be destabilized and endeavors to lessen rural poverty will be endangered [2].

Natural capital is often esteemed and understood most excellent at the local level, and local knowledge is essential for useful solutions. Communities and societies need to be active supporters of the conversion to sustainable development, alleging their rights and also fulfilling their responsibilities in terms of sustainable management of natural resources. Rural development schemes provide a strong opportunity to cumulative small inventiveness in several locations to improve natural capital on a comprehensive scale. These self-governing institutions and their capacities will be answers to greater effectiveness of regulatory and market instruments in ecosystem rejuvenation and perfection of natural capital [6].

Discussion

The decrease of Agriculture field is common problem in the world. In India, there have been many reasons that lead to the depletion of Agriculture field and degradation, these are effects of natural calamities and disasters, population explosion, deforestation, increase in transportation, evocation of fumes and poisonous gases from the industries throwing of waste water effluent into the rivers and lakes cause liquid pollution which effect the soil of the agriculture field and also effect the crops and fruits. The impact of urbanization and migration of rural individuals into the urban areas in search for better livelihood has led to an increase in all kinds of pollution and deforestation, in urban cities especially in the national capital of Delhi, agriculture fields are sell out to construct residential and industrial areas for the urban dwellers and this has been the major source of agriculture field degradation day by day in India.. Delhi (NCR) has been considered as the most polluted city in the world. Other dire consequences have been that as a result of Agriculture degradation in coming years the problems generated here to provide the food each person of India is not possible. We have to consider this in priority the agriculture is the backbone of any country and India is blessed by the nature which have all types of weathers are here. Just think in other countries maximum time the weather is cold up to 0°C OR -10°C. For future generation, we have to save our agriculture field and developed the quality grains in our fields for growth of India.

Summary

For the Agriculture Field have been concerning the climate and energy considerations, natural cycles and their connected social processes, the urban-rural nexus, urban infrastructure and the transport systems, and the green development in future and its economic impacts. The spread of greenery has been considered to be a crucial factor in order to curb weakening of Agriculture Field degradation, there have been number of activities that are as a result of greening of rural development, improved resource conservation, improved resource efficiency, reduction in the negativities of environmental impacts, strengthening of the climatic resilience of communities and contribution to climate change mitigation. India is a developing nation, with the increase in industrialization and development of technology, innovation and other advancement, it is essential that measures and procedures should be implemented in order to cure all kinds of pollution in climate, soil and water, plant more trees, in other words, encourage greenery and follow particular waste management procedures; in order to preserve and safeguard Agriculture Field. It is mandatory to follow all appropriate measures and steps by each person of the country, as it is up to the human beings to curb man-made disasters such as industrial explosions to safeguard their lives.

II. REFERENCES


[5]. Impact of climate change on Indian agriculture: A review. Climate Change 7


[12]. ‘Prohibiting the use of agricultural land for industries is ultimately self-defeating’


[14]. "Drought fears loom in India as monsoon stalls." al Jazeera, 5 August 2012.

