

# Assessment Of The Impact Of Climatic Changes On Traditional And Organic Agricultural Practices

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*ABSTRACT: Agricultural production is an important factor, and climatic changes play a vital role in organic and traditional practices. The climatic change that affects agriculture then the important change on research has motivated during the last period. Organic Agriculture has been changed on climate flexibility farming system that encourages the proper administration of local knowledge, soil, biodiversity, and water. They adapt to the change of climate as a good option. The negative offset impacts of climatic condition change positively contribute to organic agriculture, to substantiate this statistic by inadequate data. Climatic change is one of the biggest threats for both traditional and organic agriculture. The production crop needs to adapt themselves to the environment; the farmer needs to take some work to avoid the disaster from climatic change. When compared with traditional agriculture, organic agriculture got a higher potential to mitigate the change of climate. This paper reveals the comparison of the effect due to the climatic change on both traditional and organic agriculture are presented and discussed.*

*Keywords: climatic change, traditional agriculture, organic agriculture.*

## 1. INTRODUCTION:

Climatic change is the primary thing for agricultural practices. The release of 'greenhouse gas (GHGs) into the atmosphere causes climate change. The parameter is related to climate change, such as sea level, temperature, soil moisture, and precipitation. The important sector to consider climatic changes in 'Agriculture.' Agriculture subsidizes to both climatic change and then it is affected by the change of climate (Aydinalp and Cresser 2008).

The climatic change is also affected human beings, ecosystems, and livelihoods, and they present a better development contest for the global community in general. The proliferation of greenhouse gases causes the greenhouse effect. Effect and causes of the relation of change in climate and agriculture may see many forms and levels, evaluating relation and the effect of change in climate on agriculture and the effect of both organic and traditional agriculture are not accurately recognized. (Khanal 2009).

Climate may vary from the year, and they are strongly influenced by communication among the ocean and atmosphere, and land surfaces (Bouraoui, Vachaud, and Chen 1998).

To predict the climatic change before avoiding the hazard in agriculture, it only predicts some specific places. Climatic prediction is useful for agriculture to support the strong simplification of its value. The environment's last state for the growing season, mainly water, needs to be stored in the soil for fertility. The conditioned crop will respond to climate change during the growing season. The traditional field methodology is planned to measure

the production, resources, or profit in the variable of treatment using efficiency in response (Hansen 2002).

The potential of long-term crop yields to barrier yields in the face of climatic adversity is a vital factor in agriculture's ability to sustain future society. Understand the important potential of agriculture and improve the climate on extensive long-term trials for various crops in a particular area (Gomiero, Paoletti, and Pimentel 2008).

The effects of climatic changes in agriculture are mainly estimated by crop simulation, production function, Ricardian, PMP, GEM, IAM. Agriculture is affected by climatic change in a different dimension. There are many reasons for evaluating the effect of climatic variations in agriculture that involve many factors such as Climate change, Biological aspects, socioeconomic factors, strategies with the effect of climate change, the impact of national and international level and feedback of the climatic changes (Salvo 2013).

They also perform some other functions like Renewable natural resources management, landscape protection, and construction in agriculture. We need to overcome the difficulties in evaluating the effect of agriculture practices and agriculture production on the ecosystem, affecting both the goods and services of the production. Both benefits and costs of the different management types are necessary to evaluate and maintain a sustainable agroecosystem. The system's overall effects are useful to understand by broad-scale and determine the ecosystem by using the temporal and spatial scale (Dale and Polasky 2007).

Due to the climatic changes, the crop production is severally affected by the variation in climate then the human being needs to compromise their food security both locally and globally. We need to plan for climate variation by using a series of agro-ecological performances to reduce crop disasters. These disasters are linked to the farm biodiversity, which is a function of the conventional farming system. To avoid the disaster, farming needs to adapt the crop for the climatic changes by using some strategy to increase resilience and provide benefits (Altieri and Nicholls 2017).

Generally, adaptation is an important response to crops in the climatic change sector. Without adaptation, it makes a problematic situation for agriculture production and economics and communities; but adaptation reduces the vulnerability and realizes the numerous opportunities. Agricultural adaption may vary that related to the climatic change where the adjustment is made, based on the farm types and locations and the political and institutional, and the economic circumstances where the climate is experienced, and decisions are made by management. (Smit and Skinner 2002).

This result expects climatic change on tradition and organic agriculture, prediction of climatic change in agriculture, effects of climatic changes on the environment. The adaptation and mitigation of the crop during the climatic change, precaution made to avoid the disaster, may affect locally or globally. Thus, these climatic changes in different agriculture systems are explained and analyzed in this research work.

## **2. RELATED WORK:**

(Wani et al. 2013) discussed the adaptation and mitigation strategy of climatic changes and variability on organic farming, a sustainable option, and concrete and potential are additional on this strategy. The significant contributors to adaptation and mitigation are nutrients and carbon sequestration of the careful management of climatic changes and variability on zones and a wide range of local condition zones. The effect of climatic changes is gradual reverse potential on organic farming for construction resilience and sustainability by the key issues. The research was placed on yields and the environment for organic farming. Organic farming can be improved by increasing the development of more possibilities on the local market and local processing and the importance of exporting organic farming.

The important roles of climate and agriculture changes in an agricultural watershed in Iowa are presented on (Villarini and Strong 2014). The discharge of water from rivers plays a vital role for both living beings and agriculture. The improved processes of physical understanding can main to social benefits and enormous economic benefits; flood warning to be improved and mitigation, and improve water management during a shortage. The relentlessly overwhelmed by catastrophic flooding on low on the summer and spring floods of 1993, 2008, 2013 and deficiency of 2012 existence the latest prevalent disturbing the states. These are natural disasters, but they affect a huge price both economically and in the death rate. In Iowa, they use rainwater to harvest corn and soybean, explain the discharge record of rainfall, impairs the land use may change by high discharge and low discharge due to heavy rainfall and low rainfall.

A new novel method is introduced that presents the smart approach suitable for food production in traditional agriculture; food production aspects the major problem such as climatic changes, population increases, and degradation of natural resources, including soil degradation and loss in biodiversity. The green revolution has multiplied the production of agriculture on numerous wrinkles, but climatic changes include the high environmental cost. Traditional agriculture has more attention in worldwide sustainable food production in climatic changes and considers the difference between climate change and agriculture. The agriculture that contributes the GHG emission. The reduction of Greenhouse emissions will prevent climatic changes and reduce cardio heart disease, diabetes and also reduce livestock production in heavy consumption cities worldwide. The traditional practices on smart agriculture are coupled with the modern sustainable of farming has a noble choice for change in climatic condition adaptation and mitigation for increasing food production; this is explained on paper (Singh and Singh 2017).

(Arora 2019) Changes in climatic conditions are one of the most concern and alternating the ecosystem in the world. Temperature is increased on earth mainly due to greenhouse gas emissions in the atmosphere, and it may be increased due to deforestation. Then the GHG emission got increased, affecting the soil, water and air are getting polluted. This greenhouse gas has Nitrogen, carbon dioxide, and methane; during farming, these gases pollute food and crop production, producing diseases.

(Friel et al. 2009)The increase in temperature gets dearth, irregular precipitation, floods, and other extreme disasters worldwide. By reaching the 9.7 billion population in 2050 would enlarge the food demand, then the pressure on agricultural areas is affected by climatic changes. Agriculture and climate change have complicated links and unexpected changes in climate conditions that threatened food security globally. Then it causes difficulties in coping up with the needs of the growing population.

(Iglesias et al. 2012) developed the climatic change that affects European farmers' arable agriculture, the farmer adaptation including the high determination of information about climate, social-economic data, and the effects of valuation models. The farmer has no restriction for water usage for yielding; they may consider the hopeful from the view of the production point and the view of environmental point. The farmer understands the adaptation of the agriculture capacity for change in climatic conditions and limits adaptation strategies. The changes in hydrological rule used for the demand and water supply for yielding and irrigation result from the climatic condition changes.

#### *Scope and Objective:*

This presents the research objective of climatic change in traditional and organic agriculture.

- Micro Irrigation Techniques for Traditional and Organic Agriculture
- Quality of Soil used for agriculture.
- Imbalance in Use of Fertilizer and Pesticides

By researching climatic changes in both traditional and organic agriculture, farmers will be aware of the climatic change and the threat of climate change that affects crop production. All half of food production is related to greenhouse emissions produced during farming. This emission includes methane from livestock, Nitrogen, and carbon dioxide from agriculture that generate land-use changes and deforestation. Analyze and provide the precaution and prediction to farmers in future to avoid the disaster generated by climatic change.

### 3. METHODOLOGY:

This section describes the effect of climatic change in Traditional and Organic agriculture, the sustainability of the organic and traditional agriculture practices in any region. Comparing both profits in the dry region, organic agriculture provides more than traditional agriculture farming (Farooq et al. 2010). Nutrients are balanced in organic farming, negatively found on crop rotation, indicating the imbalanced nutrients supply. Organic farming soil is high in organic matter content and lowers nutrients losses per unit area of land. Organic farming using the strategy of adopting to stabilize agriculture; external inputs are less dependent. Key issues affecting the productivity of agriculture include decreasing the sizes of the landholding agriculture, monsoon dependence continued, irrigation by inadequate access, soil nutrients imbalanced the use that results in the loss of fertility of the soil (Tuomisto et al. 2012). The traditional agriculture and organic agriculture for sustainability using the technoGIN model, which calculates the agriculture farming input and output, allows the effects of economic and environmental indicators. The crop rotation and production techniques in a land unit particular, where the agronomic input of production techniques such as animals, seed, fertilizer, and labor to achieve the production level target.

In traditional Agriculture has disasters such as increasing population and climatic changes, and degradation of natural resources. The agroecosystem on the ecological integrity by the intensive use of natural resources, fossil fuels, machinery, and agrochemicals. Agriculture is sustaining the livelihood of several numbers of maximum people, contributing to change in the climate. Traditional agriculture is got increased worldwide attention on food production in the context of sustainable climatic changes. The changing climatic condition is increasing the concentration of chlorofluorocarbon (CFC), Carbon dioxide (CO<sub>2</sub>), methane, and other "greenhouse" gases (Adams 1989). Global warming shares about a 12% increase in total anthropogenic GHG emissions. This emission consists of Carbon dioxide (CO<sub>2</sub>), Nitrous Oxide (N<sub>2</sub>O), and methane(CH<sub>4</sub>) are the major things that are emitted from GHGs emitted by agricultural farming. In climatic change, the agroecosystem is heavily sensitive and susceptible (McLaughlin and Mineau 1995). It affects both human health care and food production. The adaptation will dull some of the worst predictions; then, the warming causes considerable damage to agriculture (Mendelsohn 2008). This emission will affect the living being deadly disease are caused, water and soil are also affecting.

Traditional and Organic agriculture is suitable to use the three approaches such as:

- It is enhancing agriculture's productivity that sustainably supports the increased food security, profits, and development.
- Improve the capacity of adaptive and resilience at various levels to shock to national from the farm
- Decreasing Greenhouse gas discharges and improve sequestration of carbon

The contribution to 18% of the GDP nearly half of the workplace in the country. The country's growth for contribution has increased the manufacturing and service, and agriculture was decreased from 50% of GDP in 2015 - 2016 to 16% in 2019 – 2020. The crops cultivated on traditional and organic agriculture and the production of crops and seeds are cultivated several years. Foodgrains of total production are increased from 250 million

tonnes in the year of 2009-10 to 550 million tonnes in the year 2019 – 20, and the estimated production of food grain to 800 million in the year of 2030 – 31 has increased.

Table 1: Sources of Irrigation for agriculture

Source of Irrigation	(Percentage %) share of holdings	Number of holdings
Tube wells	44.2%	31,722
Wells	19.7%	14,101
Canals	25.7%	18,414
Tanks	5.8%	4,180
Other Sources	8.4%	6,046

Source: Agriculture Census 2011, PRS.

Nowadays, 50% of the agricultural food grains are cultivated by irrigation method; the rest of the agriculture area relies on rainfall. The irrigation sources include groundwater, canals, and tanks in table 1. The irrigation process consumes 85% of water in our country, and 64% of groundwater is used for landholding irrigation, such as wells for the irrigation process. Usually, Nitrogen and phosphorus are polluted by the water mechanism and food for algae that grow the famish the water habitats of oxygen. Organic agriculture is planting cover crops and constructing soil organic matter. This organic farming holds water shortage, and 20% of water is bent down to the aquifer under organic farming than under traditional agriculture. Organic farming used less watershed than conventional farming.

The number of crops is cultivated per unit of load in several years is evaluated for calculation. This adaptive method on traditional and organic agriculture is an alternative method for food production in climatic change and mitigating climatic conditions. Agriculture is useful for natural resource management, human health safety, social-ecological integrity, and energy conservation.

#### 4. RESULT AND DISCUSSION:

This section has discussed the percentage of food production growth on organic farming in Fig.1.and Traditional Agriculture Farming in Fig.2. The production growth is get compared. Both Organic and Traditional agriculture has cultivated some of the crops such as Potato, Chilly, Tomato, seeds, Brinjal, Bittergaurd in Fig.3.

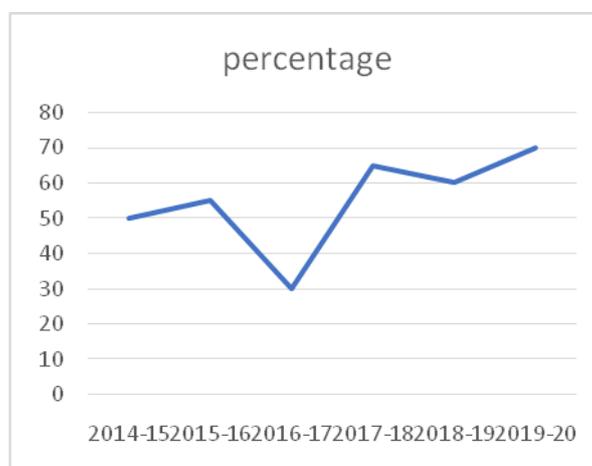


Fig.1: Production growth on Organic Agriculture.

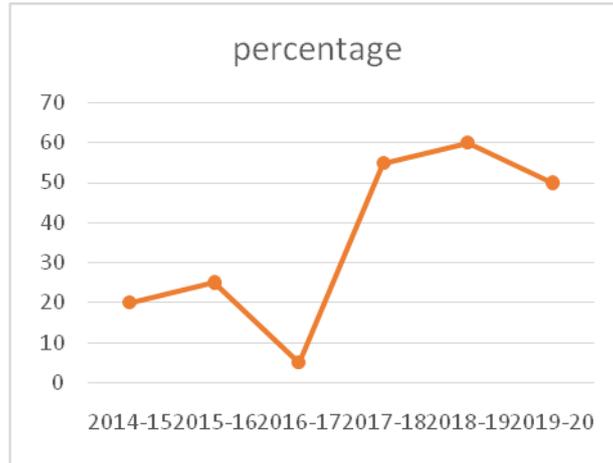


Fig.2: Production growth on Traditional Agriculture.

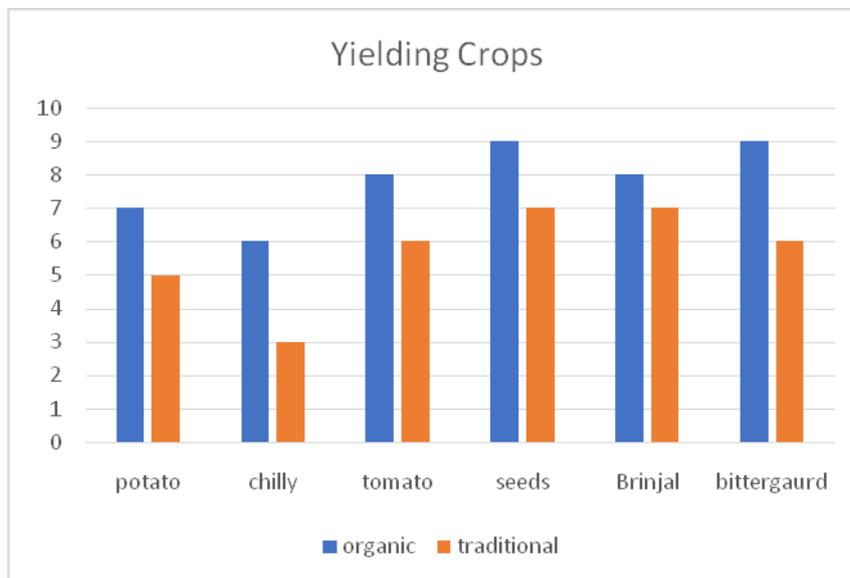


Fig.3. Production on both traditional and Organic Agriculture.

Land, water, seeds, and fertilizer are used to access the agriculture sector, and the production of agriculture is dependent on several factors. Fig 1 demonstrates the production growth of the organic agriculture sector over the years. Fig 2 demonstrates the production growth of the traditional agriculture sector. The agriculture sector that subsidizes the gross domestic product (GDP) that got decreased from 55% in 1952 to 16% in 2019, the service sector got improved from 30% to 55%. The high production level in India has yielded less than the other producing country, yielding of food grain in India increased more than the five times since 1985 – 2019.

<b>COMPARISON BETWEEN ORGANIC AND TRADITIONAL AGRICULTURE</b>	
<b>Organic Agriculture</b>	<b>Traditional Agriculture</b>
This depends on naturals like biodiversity and compositing material to provide healthy plants.	This depends on chemical involvement that against pests and weeds to provide healthy plant.
Less water level is used for irrigation.	More watersheds are used for irrigation.
Organic farming increases soil health.	Soil nitrogen is high in conventional farming that tends to soil erosion.
Micro-irrigation or drip irrigation techniques are used.	Micro-irrigation or drip irrigation techniques are used.
No fertilizer is used for organic farming.	A large number of synthetic fertilizers are used to grow plants or crops.
Organic agriculture had a small carbon footprint, improves soil health, and preserve, refills the natural ecosystem for clean water and air without pesticides.	Traditional Agriculture causes greenhouse gas (GHG) emission, soil erosion, polluted water, and portends human health.
Agriculture practices used in Organic farming are crop rotation, green manures and compost material, pest control biological, and mechanical cultivation.	Agriculture practices used in Traditional farming are Crop rotation, agroforestry, intercropping, animal crop farming, and traditional organic composting material.
Spreading manure is the equipment used for organic farming.	Traditional agriculture equipment is like weeder, Axe, sieve, plow, spade, et cetera..,

Table 2: Comparison between Organic Agriculture farming and Traditional Agriculture farming.

Weeding, processing, organizing, and exporting are examples of pre-harvest and post-harvest activities. Table 2 shows the comparison of organic and traditional agriculture farming, the environmental impacts effect on both traditional and organic agriculture such as biodiversity loss, enhanced soil erosion, and degradation, eutrophication that include algal blooms and dead zones of the ocean, usage of pesticides on agriculture that affects the human being and wildlife health.

The environmental impact of traditional farming is lower than Organic agriculture farming; a comparison overview provides a global and cross-cutting. There are 742 agriculture methods over 90 similar foods production in both agriculture farming. Compared to traditional farming, food and crops from organic farming are mainly rich in nutrients without pesticides. In Agriculture, the micro-irrigation method is used by applying drop by drop water that nearer to the root area zone of the crop to spacing the crop drippers are fixed. Many types are irrigation processes are used for agriculture farming. They are used in agriculture for orchards, row crops, and vineyards.

The quality of soil is very important in agriculture for productivity. The soil has high nutrients such as Phosphorous, potassium, and nutrients. Primary, secondary, and micro-nutrients rich soil are used in agriculture farming to yield more crops. Suppose the nutrients are imbalanced in a nutrient, leading to a decline in the water table and soil quality and overall soil health depletion. In that case, the imbalance of use of fertilizer in soil tends to lose fertility. The most used fertilizer in agriculture is urea, and Nitrogen, potassium, phosphatic are nutrients used in fertilizer. The NPK fertilizer is used in a recommended ratio such as 4:2:1. The level of fertilizer used in soil depends on the type of soil, level of yield, and availability of water.

Organic agriculture has the major advantage of eliminating the use of pesticides. They produce food in originality contain with fewer remains of pesticides. However, traditional agriculture is easily affected by environmental impacts. The usage of pesticides is highly on traditional agriculture to control pests, weeds, and diseases, which is particularly used to control the pests. Under the traditional agriculture weed problem, my increase because plowing is not used. The strength of traditional agriculture is to build organic carbon soil, and that reduces soil erosion. Due to climatic change, crop production is needed to prepare. There are fewer greenhouse gas emissions in traditional agriculture, which release a low amount of Nitrogen into the environment. Compared to conventional agriculture in terms of greenhouse gas emissions (GHG), it requires more land area than any other agriculture farming. When the greenhouse gas emission is compared with the food production per kg, there is a clear difference between Organic and Traditional Agriculture.

## 5. CONCLUSION:

In recent times, Organic agriculture and Traditional agriculture were formed to harvest the different food products. This paper determines the environmental impacts that affect Organic and traditional agriculture, and then it affects food and crop production. Due to the population increases, the need to cultivate more food production, more water resources are used for agriculture, it leads to lack of watershed for human and wildlife. The environmental impacts are mainly on traditional agriculture because that increases the greenhouse gas emission, soil erosion. They use the excessive use of fertilizer that causes depletion of micronutrients and salinity in the soil. It caused the originality and taste of the food product to damage and decreased it, leading to the deadly disease. To grow the crop, traditional agriculture is the modern way of planting crops that includes pesticides, fertilizers, and chemicals. To avoid this, organic agriculture is also affected by environmental effects. It damages the nutrients from organic farms. Organic farming is environment-friendly and provides more benefits that reduce carbon dioxide and minimize climate change. Organic farming (gardening) reduces water pollution, and low water and equipment and low manual work are done and used for farming where the organic and traditional agriculture farming need to take many forms depending on the different variation on agro-ecological and socio-economic conditions are across the Universe.

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