



P-ISSN: 2349-8528

E-ISSN: 2321-4902

www.chemijournal.com

IJCS 2017; 5(2): 543-547

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Received: 23-01-2017

Accepted: 26-02-2017

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Climate change and its impact on the Agriculture

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Abstract

Climate change refers to the changes beyond average atmospheric conditions, which are caused by both natural and human activities. The foremost important aspect of this variation is that the earth's average climate is gradually raising thanks to the increasing concentration of greenhouse gases (GHGs) emission in the atmosphere. The research on heating challenges plenty of uncertainties. In the trail of this research, the simplest predictions that were made about climate rise were on the premise of greenhouse emission emissions, which is probabilistic in nature. These uncertainties are because of the dearth of adequate knowledge domain or insufficient accuracy in predictions, which can be expected to enhance over time. With regard to agriculture, we shall first highlight the three important aspects so as to exhibit the connection between global climate change and agriculture. Firstly, climate change features a direct effect on the biological aspects of plant growth. Secondly, the impact of climate change on agriculture is taken into account due to the interaction between direct biological effects on the one hand, and biosphere and geosphere effects like soil conditions, seed-water-fertiliser-pesticide technologies, plant entomology etc. on the opposite hand. Thirdly, we've got to contemplate the impact of global climate change on society and economy additionally, managing the challenges posed by warming on existing social and economic conditions, particularly in rural areas. Global climate change is predicted to own different sort of effects in between agro-ecological regions, farming systems and different social classes and groups. More importantly climate is that the most vital variable of climate change. Where, one among the most important effects of increase in climate results the speed of the crop growth period especially during the grain-filling stage causing lower yields.

Keywords: Climate, Agriculture, Climate, Environment, Health, Floods, Ecological, Productivity

Introduction

Occurrence of global climate change results flood, drought and more extreme atmospheric condition, which may directly affect the crop yield. Some evidences of climate change witnessed recently in India were, unexpected floods in Uttarakhand in 2013 and Jammu Kashmir in 2014, which caused havoc, took many lives and millions rupees of economic losses. The flood incidences were never new in Assam, but these incidences are occurring more frequently in present situation and these are major natural disasters of this era which has resulted in heavy life loss, economic loss and crop loss. Global climate change effects the weather of life for the people round the world and these effects are seen on access to water, food production, health and environment. Many a lot of people round the world might suffer from hunger, water shortage and coastal flooding because the world warms resulting in worse situations in climate change scenario. Global climate change can have both direct and indirect negative impacts, on the final wellbeing of those that depend highly on the natural resources especially agriculture and forest for his or her daily livelihoods. With regards to agriculture the overall consensus suggests that change in climate and precipitation will end in land and water regimes change, which can subsequently disturb the agricultural productivity.

Climate change-the global effect

Climate change is one among the foremost burning global problems with the recent times. Melting of polar ice-caps, whole in the ozonosphere, extinction of assorted species from the face of the planet, rise in global climate, breeding of assorted deadly diseases associated with climate change etc. are reported extensively worldwide. Studies suggest that if this trend continues for the following 60 to 70 years, our planet earth will not be a liveable place. High level delegations from different nations have in the present times realized these facts and have began to show their concerns by holding frequent talks and discussions to test the changing climate so on take necessary preventive measures. The Copenhagen Summit held in 2009 also witnessed such initiatives wish to create global awareness and to act jointly so as to suppress the emission of harmful gases and produce stability in the fast deteriorating climate. But, after all the end result has not been very encouraging.

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Sadly, the negative impacts of climate change are evident all around us. The winters are shorter and summers are longer nowadays, the common annual rainfall over the previous couple of years has drastically reduced and therefore the average global climate has risen, resulting in a high imbalance within the lives of flora and fauna. Moreover, global climate change has drastically affected our economy, which depends highly on agriculture. Climate and agriculture are inextricably linked because the later in most of the developing and under-developed countries still depends fundamentally on the weather. The changing weather patterns have already started showing negative impacts on agriculture in many parts of the globe including India. Notably, India has experienced a catastrophe during this regard in the recent years. Due to late arrival of monsoon and scanty rainfall, crops are destroyed each year leading to many farmers committing suicide, out of loss and frustration, especially in the states of state, Chhattisgarh, Gujarat Maharashtra, Karnataka, Kerala and Madras. As reported by Forbes and also the Center for Human Rights and Global Justice (CHRGJ) at NY University in 2011, over the amount of past 15 years, the scourge of suicides have claimed lives of an estimated 250,000 farmers and therefore the death count remains climbing in India.

Agricultural success decides the fate of a country's population in getting required amount of food grains and also employment to a specific extent and climate is the key to its success. So, there's a good must deeply analyze the link between these two entities, i.e. agriculture and climate. As mentioned earlier, global climate change has already had some adverse impacts on agricultural productivity and Assam being a serious agricultural state is additionally under the scanner of this uncontrolled and deteriorating phase. In the state of Assam, agricultural sector may be a major contributor to its economy, livelihood and employment. Almost 75 percent of population is directly or indirectly relied on agriculture. During the previous couple of years, the state has experienced a dismal situation in climate leading on to lower agricultural productivity.

Impact of climate change on agriculture

The agricultural processes, industrial development, burning fossils and fuels, nuclear tests and other actions caused by human and nature are the most causes behind the rise in earth climate, leading to global climate change. Increase in the percentage of CO₂ through various gas emissions in the earth's surface is additionally one amongst the foremost causes of worldwide climate change. The Intergovernmental Panel on Climate change (IPCC) observed that agriculture contributes 13.5 percent of world gas emissions. In line with Greenpeace, if calculated, both direct and indirect emissions from the food system, i.e. agricultural contributions might be as high as 32 percent. Now the planet is in danger because of climate change and increase in earth climate. Global climate has risen by 0.6 °C over the last thirty years. This rise in global climate has result in an enormous impact on a large range of climate related factors. Increases in the levels of greenhouse emission, methane and laughing gas gases are mainly results of human activities since dioxide is being dumped within the atmosphere at an alarming rate. Also though historic period, people are pumping out huge quantities of CO₂, leading to raising greenhouse gas by 30 percent, while the burning of fossil and fuels is partly answerable for this huge increase. Land use changes like deforestation

and desertification, along with use of fossil fuels, are the main anthropogenic sources of carbon dioxide; agriculture itself is the major contributor to increasing methane and inhalation anaesthetic concentrations in earth's atmosphere. Also agriculture has been found to supply significant effects on climate change primarily because it produces and releases greenhouse gasses, mainly greenhouse emission, methane and inhalation anesthetic and it's also liable for altering the earth's land cover, which may change its ability to soak up or reflect heat and lightweight, thus contributing to radioactive forcing. In line with the planet Bank (2008), agriculture contributes about half the worldwide emissions of two of the foremost potent non-carbon dioxide greenhouse gases i.e. inhalation general anaesthetic and methane. Livestock manure, nitrogenous fertilizers and irrigated paddy are said to be answerable for producing most agricultural inhalation anesthetic and methane emissions. These non-carbon GHGs have more powerful greenhouse effects and have greater longevity than greenhouse emission. Again weather is a weather conditions that has a crucial impact on. Increase in climate results in direct erratic rainfall effecting agriculture and food supply. Thus the rainfall especially during monsoon plays a serious role in agriculture production. Since agriculture is sensitive to short-term changes in weather, thus food crops are mostly effected. Also insufficient rain and increasing climate not only causes drought, but intense rain in a very short period reduces water recharge, accelerating escape and floods. Thus, both the situations induce negative effects on the agriculture affecting food supply. The global climate change also causes disruption in normal weather patterns changing intensity and duration of monsoon. One in every of the recent most burning issues in agriculture has been low monsoon rainfall because of warming. This low monsoon rains became a threat to small and medium farmers, who invest their time, capital and labour to realize profits but instead thanks to monsoon failure are left with nothing. Ironically, in India once a year many farmers kill because of this heavy loss. Climate change impacts are however addicted to latitudes, longitudes, altitudes and kinds of crops. There are noticeable impacts in plant production, insect, disease and weed dynamics, soil properties and microbial composition in farming system. As per IPCC 2007, climate changes in tropical areas normally had a negative impact on food production and it had been estimated that food production within South Asia would decline by 50 percent by 2050.

Climate Change however could be a natural action but the recent trends are alarming mainly thanks to anthropogenic reasons. Global climate change has already disturbed people, their livelihood, ecosystem and presents a good challenge for the world community generally, and particularly for the poor people living in developing countries. The assembly of food depends on many factors and climate is one among several important factors. The productivity of the soil, availability of water for irrigation, technological developments of the regional agriculture, management skills of the farmers, and capital for support of technology are important. During the temperate latitudes in the late 20th century, except where population pressures were great people generally were well fed. North America, Europe and Northern Asia were ready to maintain calorie and protein levels well above the accepted requirements. Only in the tropical regions of the planet, where soils are frequently infertile, agriculture development retarded, and/or population

pressures had chronic shortages of calorie and protein supply. In present times this further growth in populations will intensify and expand the areas where deficiencies prevailed. So as to supply food for these deficient areas, foreign trade must occur.

Agriculture and climate change in Indian context

Food commodities required by the deficit countries are supplied from the granary surplus countries of the planet. In near future the adverse climatic conditions in the world's 'granary' will affect the diets of individuals from the food deficient regions. It's been often seen that a locality or country with permanent or temporary deficits in calorie and protein supply cannot patronise the world's market place due to lack of foreign credits. Countries don't seem to be liberal to withdraw from the planet „granary“ unless they need other resources to pay money for the trade. With a free market, world trade redistributes commodities from surplus regions to other deficit regions. In India, agriculture is substantially captivated with the south-west monsoon. Thus, an oversized part of the net sown area is rain-fed, thereby making the agriculture sector in India very sensitive to any changes in the patterns of rainfall. The geographics of Indian agriculture suggests that the rainfall distribution pattern is primarily to blame for differences in land uses, cropping patterns, settlement and density of population in several parts of the country. When viewed in the light of the country's limited irrigation potential, the influence of rainfall on crop output will sustain and maybe are going to be more pronounced as production increases at a faster rate. The uncertainties in rainfall will cause the identical old concern and instability will still plague Indian agriculture. The assembly of a selected crop in any region is the resultant of the acreage and therefore the yield per acre. Yield and acreage are often expressed as a function of variety of controlled variables like fertilisers, pesticides, irrigation, prices, etc. and uncontrolled variables comprising the assorted climatic factors like rainfall, climate, run of dry days, humidity, day length etc. Variations in agricultural production can thus be man-made or made naturally. Whether or not the climatic factors follow some repetitive pattern, the assembly fluctuations wouldn't be proportional unless the relative magnitudes of the results of those factors on production remain constant over time. The variables which are currently exogenous is made endogenous to the system through human skill and knowledge at a later period. Theoretically and conceptually, it's possible to practically eliminate the unexpected variation in production because of natural factors (for example, on an experimental plot, water, climate, day length, humidity, wind velocity etc. will be kept at desired levels through artificial techniques). This idealised proposition is however, difficult to conceive if the assembly function of a section or, for that matter, even a plot on the cultivator's field is taken into account. Physical factors appear as constraints on the assembly surface; their basic differences from region to region results in differences in land use and cropping pattern. Studies dole out in many countries to look at the results of varied climatic factors on crop output have singled out rainfall and climate because the most significant influencing factors while the varied other factors which affect the crops are largely rainfall or climate dependent. However, in India, climate doesn't appear to be to blame for fluctuations in crops output.

The effects of rainfall on crops output at any location are very difficult to live precisely. For, it's not only the amount of

rainfall but also its distribution at different stages of the plants growth which influences the entire output. The adequacy and timeliness of the rainfall at sowing affects the sown acres. Similarly, the degree and distribution of rain at the time of sowing, flowering, maturing and harvesting affects crops yield. Again, the crops calendar isn't same throughout the country. Taking account of of these differences, the result poses a heavy problem in statistical estimation, unless the assorted factors are reduced to a manageable limit.

Conclusion

Climate monitoring and forecasting are especially important given the big number of rural people hooked in to subsistence agriculture on pasture. The global climate forecast to vary significantly as a consequence of skyrocketing concentrations of green house gases in the atmosphere, and scenarios for Africa are consistently negative. Long run global climate change effects are witnessed in the agriculture sector of Assam. To cope up with these impacts of global climate change on agriculture, society and livelihoods of the people in the state, there's an urgent need for better policies and their implementation by the government. The long run statistic data shows that global climate change has both direct and indirect negative impacts on the agriculture sector in the state. Since agriculture sector contributes almost 20 percent to the state GSDP, these negative impacts will eventually pull down the share of GSDP in future. On the opposite hand overall agriculture productivity is incredibly much important for the wellbeing of rural household and their livelihoods. Changes in agricultural practices and improved natural resources management techniques are going to be needed to adapt to new conditions. However, adaptation strategies can't be developed and implemented until trends and shifts in climate are identified.

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