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GLOBAL WARMING AND ITS EFFECT ON AGRICULTURE

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Abstract:

Agriculture is the backbone of Indian economy which in turn relies on the monsoon season. The Intergovernmental Panel on Climate Change (IPCC) projected that the global mean surface temperature will likely rise and may result into uneven climatic changes such as irregular rainfall patterns, increased surface temperature and elevated CO2 content in the atmosphere. Research studies indicate that weathering parameters influence strongly (67%) compared to other factors like soil and nutrient management (33%) during the cropping season. Researchers have confirmed that crop yield falls by 3-5% for every 1°F increase in the temperature. Present study shows that the crop production is dependent on temperature and shows a funnel shape for all the seasons. At lower temperature both the properties are almost linearly correlated, whereas at higher temperatures, it increases but with large scattering. The findings may be helpful to study the effect of climate change on the crop production.

Key words:

Global Warming, IPCC, Climate change, Greenhouse effect, Agriculture.

Introduction:

Organic agricultural a synonymous for biological agriculture, seems to be the feasible solution to the most debated topic “Climate change”. The climate of our world is undergoing a dramatic change. Global warming is increasing rapidly and there is widespread consensus that the current trend is caused by increased emissions of various greenhouse gases such as carbon dioxide, hydrofluorocarbons, per fluorocarbons, sulphur hexafluoride, methane and nitrous oxide. Greenhouse gases allow short-wave solar radiation to pass into the earth’s atmosphere. They absorb some of the long wave thermal radiation that is otherwise emitted back out to space, which results warming effect on our atmosphere. The emission of greenhouse gases into the atmosphere comes with industrialization, through deforestation, shifting cultivation and the expansion of intensive agriculture.

The present day agriculture is no more sustainable in most parts of the country, cannot forbid relying on chemical fertilizers and pesticides for the sake of susceptibility as defined by the west. The powerful message that distills from all thoughts and dialogues is the move towards Fukuoka’s natural farming and VinobaBhave’sSarvodaya method of ‘Rishi Kheti’. The logic to these naturalists is aimed at reduced dependency on non-renewable resources, purchased inputs

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and population control to achieve higher efficiency of inputs and economic maximization of yield along with environmental safety.

Biological agriculture can be defined as a system that attempt to provide a balanced environment, in which the maintenance of soil fertility and the control of pests and diseases are achieved by the enhancement of natural processes and cycles, with moderate inputs of energy resources, while maintaining an optimum productivity. The chemical agricultural (conventional agriculture) techniques have resulted in great increase in productivity; however, it has greater negative impacts that include soil erosion or degradation, effects of pesticides, detention of soil health and environment, environmental pollution etc.

The soils of India under different Eco zones have lost a significant amount of C and, therefore, offer a great potential for rehabilitating these areas. Our result clearly showed that improvements in farming systems and use of organic material/compost could add C to soils. Results also clearly demonstrated that organic management of land definitely increase carbon stock and concurrently enhance plant productivity and prevent erosion and desertification especially under arid and semi-arid eco systems.

Plant residues provide a renewable resource for incorporation into soil organic matter. Production of plant residues in ecosystems at steady-state will be balanced by the return of dead plant material to the soil. In agricultural systems, it was estimated only about 20% of production will an average be accumulated into the soil organic fraction. Furthermore, in some farming systems, all above ground production may be harvested, leaving only the root biomass. The actual quantities of residue returned to the soil will depend on the crop, the growing conditions and the agricultural practices. For example, for a soybean-wheat system in our sub-humid areas, the annual contribution of C from above ground biomass was about 22% for soybean and 32% for wheat. This resulted in 18% of the annual gross carbon input being incorporated into the soil organic carbon. The positive influence on microbial biomass, microbial and enzyme activities, carbon sequestration, water holding capacity, carbon stock and build up under organic farming than conventional agriculture would definitely boost to migrate climate change under different Eco zones of India. The following tables show some of the advantages of organic agriculture over chemical agriculture.

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Methodology:

For the present research paper the primary and secondary sources have been used. Materials from various libraries have been collected. Internet sources have also been explored and at the same time various concerning laboratories have also been visited. The article regarding to it have been read thoroughly. The reports of the national and international conferences have also been taken under consideration. After having collected the various material and explored the internet sources, all the available material have been analyzed. The descriptive and analytical research method has been used for this research paper.

Effects of Global Warming:

Each year, scientists learn more about the consequences of global warming, and many agree that environmental, economic, and health consequences are likely to occur if current trends continue. Here's just a smattering of what we can look forward to

- Melting glaciers, early snowmelt, and severe droughts will cause more dramatic water shortages and increase the risk of wildfires in the American West.
- During last two decades there has been tremendous growth of the industries in the world.
- These industries release toxic gases, chemicals and effluents in huge quantities in the environment creating air, water, soil pollution.
- Rising sea levels will lead to coastal flooding on the Eastern Seaboard, especially in Florida, and in other areas such as the Gulf of Mexico.
- Forests, farms, and cities will face troublesome new pests, heat waves, heavy downpours, and increased flooding. All those factors will damage or destroy agriculture and fisheries.
- Disruption of habitats such as coral reefs and Alpine meadows could drive many plant and animal species to extinction.
- Allergies, asthma, and infectious disease outbreaks will become more common due to increased growth of pollen-producing ragweed, higher levels of air pollution, and the spread of conditions favorable to pathogens and mosquitoes.

Causes of Global Warming:

Global warming occurs when carbon dioxide (CO2) and other air pollutants and greenhouse gases collect in the atmosphere and absorb sunlight and solar radiation that have

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bounced off the earth's surface. Normally, this radiation would escape into space but these pollutants, which can last for years to centuries in the atmosphere, trap the heat and cause the planet to get hotter. That's what's known as the greenhouse effect.

In the United States, the burning of fossil fuels to make electricity is the largest source of heat-trapping pollution, producing about two billion tons of CO2 every year. Coal-burning power plants are by far the biggest polluters. The country's second-largest source of carbon pollution is the transportation sector, which generates about 1.7 billion tons of CO2 emissions a year.

Curbing dangerous climate change requires very deep cuts in emissions, as well as the use of alternatives to fossil fuels worldwide. The good news is that we've started a turnaround: CO2 emissions in the United States actually decreased from 2005 to 2018, thanks in part to new, energy-efficient technology and the use of cleaner fuels. And scientists continue to develop new ways to modernize power plants, generate cleaner electricity, and burn less gasoline while we drive. The challenge is to be sure these solutions are put to use and widely adopted.

Effect of Global Warming on Agriculture:

1. Change in production area and Yield Reduction :

Global warming climate change can affect agriculture in a variety of ways. It reduced crop quantity and quality due to the reduced growth period following high level of temperature rise, reduce sugar content, bad coloration and reduced storage stability in fruits; increase of weeds, blight and harmful insect in agriculture crops; reduced land fertility due to the accelerated decomposition of organic substances. In addition because of global warming and climate change the main area of production area also change as a crop requires different climate and environmental condition to grow, which will be altered because of temperature rise. Thus the main areas of production change the boundary and suitable areas for cultivation move towards different area. Further beyond a certain range of temperature, warming tends to reduce yields because crops speed through their development, producing less grain in the process.

2. Higher Temperature :

Consumption of fossil fuels (e.g. oil and coal) is one of the reasons responsible for global warming. It is anticipate that, the average temperature of the earth will rise by up to 6.4% by the end of the 21st century (2001~ 2100) and sea leval will rise by 59cm. In fact the average temperature of the earth has risen 0.74% over the past 100 years (1906~2005). Thus the global warming not only causes a change in average temperature and precipitation but also increases the

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frequency of floods, droughts, heat waves, and the intensity of typhoons and hurricanes following the change in temperature and precipitation patterns. Increase in temperature lead to climate change, which will show impact in various other forms throughout the world, including the rise of sea level, decrease in glaciers, northward movement of plant habitats, change in animal habitats, rise of ocean temperature, shortened winter and early arrival of spring. Further higher temperature also interferes with the ability of plants to get and use moisture. Evaporation from the soil accelerates when temperatures rise and plants increase transpiration that is, lose more moisture from their leaves (Evapotranspiration).

3. Increase Rainfall :

Due to the expected increase in atmospheric moisture, as CO_2 continuingly rising because of green house effects that generally responsible for more rainfall. Increasing rainfall brings devastating droughts and floods for resident living in low lying area. The likely to increase in rainfall have impact on water availability as there will be race between higher evapotranspiration and higher precipitation. Typically, that race is won by higher evapotranspiration. On the contrary climate change carbon emissions can also help agriculture by enhancing photosynthesis in many important, so - called $C_{3,}$ crops (such as Rice, wheat, and soybeans).

The Gandhian Approach towards Sustainable Development:

Mahatma Gandhi, an ardent champion of sustainable development, advocated harmonious existence of mankind with nature and ecology based on equity and justice. He said long ago in 1924, “Earth provides enough to satisfy every man’s need, but not any man’s greed”.56 With this world view, Mahatma Gandhi was engaged in criticizing the colonial modernity which went beyond the carrying capacity of the planet earth and exploited people and resources across the planet. Therefore, our freedom struggle under his leadership was in a way the first ever struggle in history for sustainable development. Gandhiji’s ideal life was an enlightened unselfish ethical life of plain living and high thinking. He wrote in 1938:

“Man’s happiness really lies in contentment. He who is discontented, however much he possesses, becomes a slave to his desires….. The incessant search for material comforts and their multiplication is an evil. I make bold to say that the Europeans will have to remodel their outlook, if they are not to perish under the weight of the comforts to which they are becoming slaves…”.

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Mahatma Gandhi was so peeved of the western culture and civilization that he wrote 'if India followed the western model of development she would require more than one planet to achieve the progress they had attained'.

The Nicolas Stern Committee Report on Global Warming and Global Economy also underlined the Gandhian philosophy when it observed that at the current rate of consumption of resources and energy of the planet, mankind would require more than one planet for survival. The Stern Committee Report, therefore, stressed on reduction of greenhouse gas emissions by remodelinglife style and by transiting from a carbon economy to a non-carbon economy. We need to remodel our outlook and achieve the goal of sustainable development. By adopting a combination of factors which include the adoption of clean technologies, equitable distribution of resources and addressing the issues of equity and justice, we can make our developmental process more harmonious with nature.

Conclusion:

The climate change, as realized through trends of temperature rise and increased CO_2 concentration, is a major concern. The number of studies for assessing its impact on agriculture has increased. Crop growth models have been modified and tested for various important crops of this region under different climate change scenarios. But most of the results happen to be region specific and with certain assumptions. Enhancing carbon stock in different areas could have direct environmental, economic and soil benefits for local people. It could increase benefits for farmers as well as mitigate global warming, at least in the coming decades until alternative energy sources are developed.

Though climate change poses a variety of challenges, the present paper would specifically focus on the issues viz. agriculture and food security, water stress and water insecurity, rising sea levels, biodiversity and human health, which have immense relevance from the perspective of developing countries in general and India in particular.Accuracy in assessing the magnitude of the climate change on higher spatial and temporal resolution scale is the prime requirement for accurate estimates of the impact. Indian agriculture is likely to suffer losses due to heat, erratic weather and decreased irrigation availability. Adaption strategies can help minimize negative impacts.

References:

1. Collected Works of Mahatma Gandhi, vol.29.

2. Eric Neumayer, Greening Trade and Investment: Environmental Protection Without Protectionism, Earthscan

Publications Ltd., 2001.

3. Bruce E. Johansen, Global Warming in the 21st century: Plants and Animals in Peril (www.greenwood.com).

4. Jeffrey D. Sachs, 'Common Wealth: Economics for a Crowded Planet', Allen Lane, 2008.

5. Herbert Girardet (ed.), Surviving the Century, Earthscan, London, 2007.

6. N.K.Singh, 'The Politics of Change: A Ringside View', New Delhi: Penguine Viking, 2007.

7. The Day After Tomorrow: Impact of Climate Change on the World's Water, Dr. PradiptoGhosh (Terragreen, 2008)

8. ChandrashekharDasgupta, 'Shifts on Climate Change', The Telegraph, Calcutta, 2 September, 2008.

9. Coping with Climate Change: GautamDutt and FabiinaGaioli (Economic & Political Weekly, 20 Oct., 2007).

10. Effect of Global Warming on Crop Productivity, Y.S. Shivay and AnshuRahal (Kurukshetra, July 2008)

11. Franklin Cudjoe and Bright Simons, 'UN climate change plans and world's poor', The Pioneer, 9 September 2008.

12. N.K. Singh, Preferential Trade Agreements: Stumbling Blocks or Building Blocks, The Indian Express, April 24, 2005.

13. M.S. Swaminathan, For an Action Plan for Bihar, The Hindu, 5 September, 2008

14. P.P.Sangal, India's Climate Change Action Plan, The Economic Times, New Delhi, 29 July, 2008.

15. G. Ananthapadmanabhan, What should be India's stand at Bali climate meet?, The Economic Times, 20 November 2007.

16. An Assessment of the Intergovernmental Panel on Climate Change: Climate Change 2007: Synthesis Report.

17. Carbon Market: Emerging Sectors and Trends, ASSOCHAM, 2008.

18. Climate Change 2007: Synthesis Report, IPCC, Geneva, 2007.

19. Climate Change 2007: Impacts, Adaptation and Vulnerability (Working Group II Contribution to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change).

20. Energy Subsidies: Their Magnitude, How they Affect Energy Investment and Greenhouse Gas Emissions, and Prospects for Reform, Final Report, UNFCCC Secretariat,10

21. Aggrawal P.K. 2003, 'Impact of climate change on Indian agriculture'

22. Chandramani 2010, ' Effect of Global Warming', Oxford book company Jaipur, New Delhi.

