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IMPACT OF CLIMATE CHANGE ON INDIAN AGRICULTURE

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ABSTRACT

Climate change has a serious impact on Indian agriculture. Throughout the 21st century, India is projected to experience warming above global level. India will also begin to experience more seasonal variation in temperature with more warming in the winters than summers. Longevity of heat waves across India has extended in recent years with warmer night temperatures and hotter days, and this trend is expected to continue. The average temperature change is predicted to be2.33°C-4.78°C with a doubling in CO2 concentrations. These heat waves will lead to increased variability in summer monsoon precipitation, which will result in drastic effects on the agriculture sector in India. Climate models predict a gradual rise in carbon dioxide concentration and temperature across the globe.

KEYWORDS: Climate change; Rainfall; Agriculture productivity

INTRODUCTION

Agriculture production is directly dependent on climate change and weather. Possible changes in temperature, precipitation and CO2 concentration are expected to significantly impact crop growth. The overall impact of climate change on worldwide food production is considered to be low to moderate with successful adaptation and adequate irrigation. Agriculture will also be impacted due to climate changes imposed on water resources. India has experienced 23 large scale droughts starting from 1891 to 2009 and the frequency of droughts is increasing.

Climate change is posing a great threat to agriculture and food security. Water is the most critical agricultural input in India, as 55% of the total cultivated areas do not have irrigation facilities. Currently we are able to secure food supplies under these varying conditions. All climate models predict that there will be more extreme weather conditions, with

Prof. Kishor M. Taksande, **"IMPACT OF CLIMATE CHANGE ON INDIAN AGRICULTURE**", Review Of Research | Volume-4 | Issue-4 | Jan-2015 | Online & Print more droughts, heavy rainfall and storms in agricultural production regions. In addition, changes in cropping and land-use patterns, over-exploitation of groundwater and changes in irrigation and drainage have modified the hydrologic cycle in many climate regions and river basins of India. Availability of water is the most important factor in agricultural production.

Water quality and quantity are serious constraints for agriculture in most parts of India. Agriculture must adapt to changing climatic conditions by tapping water resources and developing improved water management approaches. Simultaneously, there is also need to develop and implement technologies and policies which will help in reducing and mitigating greenhouse gas emissions. Therefore, assessment of the availability of water resources is future national requirement and expected impact of climate change and its variability is critical for relevant national and regional long-term development strategies for sustainable Development. India is home to 16% of the world population, but only 4% of the world water resources. Agriculture is directly dependent on temperature , sunlight and water are the main drivers of crop growth.

These impacts may put agricultural activities at significant risk. climate change has already caused significant damage to our present crop profile and threatens to bring even more serious consequences in the future. 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. India could experience a 40% decline in agricultural productivity by the 2080s.

Impact of Climate Change on Crop Productivity

Rainfall in India has a direct relationship with the monsoons which originate from the Indian and Arabian Seas. A warmer climate will accelerate the hydrologic cycle, altering rainfall, magnitude and timing of run-off. Warm air holds more moisture and it will result in an increase in evaporation of surface moisture. Climate change has a direct impact on crop evapotranspiration (ET). In arid regions of Rajasthan state an increase of 14.8 per cent in total ET demand has been projected with increase in temperature The study further indicates that even a marginal increase in ET demand due to global warming would have a larger impact on the fragile water resources of arid zone ecosystem of Rajasthan .Therefore, change in climate will affect the soil moisture, groundwater recharge, and frequency of flood or drought, and finally groundwater level in different areas .Effect of climate change will affect water cycle .In addition, rise in sea level will increase the risk of permanent or seasonal saline intrusion into ground water and rivers which will have an impact on quality of water and its potential use of domestic, agricultural and industrial uses. Climate change will have number of effects on agriculture. Higher temperatures and changing precipitation patterns will severely affect the production patterns of different crops. Agricultural productivity will also be affected due to increased carbon dioxide in the atmosphere

In such a scenario, agriculture will need better management of natural resources like land, water and genetic resources to make it more resilient. India has made a National Action Plan on Climate Change which was unveiled in 2008. There are eight national missions that would form the core of the national plan. These include national missions for solar energy, enhanced energy efficiency, sustainable habitat, conserving water, sustaining the Himalayan ecosystem, a "Green India", sustainable agriculture and strategic knowledge platform for climate change. However, there are some innovative responses by water utilities to address these climate change risks and it has resulted in pushing the frontiers in a number of areas. It includes desalination, re-use and storm water harvesting and aquifer recharge.

It would be worthwhile to give high priority to "more crops per drop" approach, rainwater harvesting, aquifer recharge, revival of water bodies and conservation technologies. In the last decade, the Central Government has tried to address the issue through several initiatives such as subsidies for micro-irrigation (which optimizes water usage for agriculture), national watershed development project for rain fed areas and artificial recharge to ground water through dug wells in hard rock areas and rural water supply enhancement programmed through the catchment area approach. In 2007, Union Ministry of Water Resources of the country initiated a Farmer Participatory Action Research Programmed in over 2000 villages all over the country to assess the impact of water saving technologies on agriculture production. It has been found that yield and income can be increased by 50 to 100 per cent in most of the crops by using water saving technologies. Additional yield of 1 ton per hectare can be realized through supplemental irrigation. Our agriculture is more prone to monsoon rains as we are growing high water requiring crops like rice and sugarcane. We should increase area under low water requiring but high value crops like pulses and oilseeds to counter the erratic monsoons.

CONCLUSION

Global climate change is not a new phenomenon. The effect of climate change poses many threats; one of the important consequences is bringing about changes in the quality and quantity water resources and crop productivity. It can be concluded that the Indian region is highly sensitive to climate change. Agriculture sector is the most prone sector as it will have a direct bearing on the living of 1.2 billion people. India has set a target of halving greenhouse gas emissions by 2050 .There is an urgent need for coordinated efforts to strengthen the research to assess the impact of climate change on agriculture, forests, animal husbandry, aquatic life and other living beings.

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