

EDITORIAL

AGROMETEOROLOGY IN THE CONTEXT OF CLIMATE CHANGE

Climates are classified on the basis of thermal and moisture regimes of the regions of the world. There is scientific evidence that the climates of the different regions are changing continuously during the past centuries due to human interactions with the environment. Because of vast exploitation of natural resources in some of the overpopulated regions, the changes in the environment conditions are inducing climate change. However it was a very slow process in the past (before Second World War). But recent studies on climate change suggest that there is a wider variability in the environmental factors that are used for defining the climate.

Rapid industrialization, over exploitation of petrochemicals, deforestation, mining etc appears to have largely contributed to the changes in the environment that induced climatic variability on continuous basis. It is more so in temperate climates of the northern latitudes as the temperatures during the winter season remain below 5 °C for a period ranging from 3 to 6 months. At the same time, in the tropical regions the thermal regimes permits the growth of vegetation and photosynthetic activity round the year provided water is available. This process is leading to shift in the source and sink towards the tropical regions inducing changes in the general circulation of the atmosphere and consequently the climate.

Climate variability and climate change

Long term averages of the precipitation and temperature are generally adopted for characterizing the climates. The precipitation and the temperature are known to change from time to time within the same season or year and from season to season as well as from year to year within certain limits. People all over the world have evolved their management system to adopt themselves to the changing weather scenarios from season to season and year to year within the extreme values of the moisture and thermal regimes. Therefore we consider that the changes in the weather conditions from year to year or season to season within their climate system as a Noise and they were assuming that the normal conditions will return. It is this belief that helped them to survive threats in the terms of droughts, floods, heat waves, cold waves and other abnormalities. People continue to have faith that as long as the changes in the thermal and moisture regimes are well within the past extreme limits already experienced by them, the changes in weather and climate are reversible. Therefore, it is important for us to examine whether the recently induced changes in the weather and climate are reversible or irreversible. Scientists need to examine whether such induced changes in the weather and climate are reversible or irreversible across different regions of the world and delineate the areas that are likely to be threatened by the actual climate change.

When once we identify the regions that are vulnerable to global warming and climate change, we have to develop technology and management options that can help us to convert climate change as an opportunity rather than as a threat to humanity. At the same time we have to evolve strategies to exploit such extremes of climatic abnormalities for the benefit of the society. Moreover, there is also need to protect the environment without further deterioration. This warrants the necessity for an environmental audit system on a continuous basis. There may be several pockets all over the world literally contributing to the changing environment, global warming and climate change. These are the ones which are creating problem to the rest of the world. Some of the studies conducted in India on changes in the thermal regime suggest that the temperatures are showing increasing trend in metro-cities and urban areas compared to rural areas.

Agrometeorological concerns

Agrometeorology is recognized as a science that uses the knowledge of weather and climate for improving agricultural production based on inter-related studies between the environmental and agricultural production systems. The agrometeorology has three major approaches:

- i. To examine historical weather data and develop short term and long term strategies in agricultural planning and management of agricultural production systems.
- ii. To continuously monitor the weather conditions at micro-level to study the interaction between the environment and agricultural production system to evolve strategies for day to day management at field level.
- iii. To interpret long, medium and short range weather forecasts and its relevance to different agricultural production systems to alert the agricultural agencies and extension workers for continuous interaction with the farming community.

Re-approach towards research to address problems related to climate change

1. Examine historical weather data to quantify whether there exist a Noise or an Irreversible change in climate/weather of their respective regions.
2. Identify changing climate scenarios and production systems that have performed better under changing climate scenarios.
3. There is need for climate-production relationships.
4. Modelling of climate-crop production systems.
5. Expand crop-weather observations net work to cover different micro-agroecological systems within different agroclimatic regions.
6. Agrometeorological studies have to be enlarged to cover all the sectors of agricultural production including agriculture, horticulture, animal husbandry, poultry, fisheries etc.
7. Agrometeorological studies need to be extended to input generation for agro based and food processing industries.
8. Agrometeorological studies have to address problems related to quality of environmental components such as soil/water/air quality.
9. There exist wide gap between resource availability/exploitation/utilization which is leading to deterioration in the quality in the environment and consequent changes in the climate. Such issues have to be addressed by alerting the stake holders.
10. Determined efforts are required to develop decision support system to transform weather forecasts into action plans at various levels covering government agencies, extension workers and farming communities.
11. Studies have to be carried out to quantify the contribution of various sectors like urbanization, agriculture, industrialization etc to the changes in the environment leading to climate shifts.

Future outlook

The awareness on the agrometeorological inputs to the society is gaining but not to the extent that is required in the context of changing climate scenarios. It is desirable to transform present agrometeorological education system to address and combat the challenges of climatic threat in the 21st century. It requires greater commitment on the part of various educational institutions/agencies to generate desired man power in the light of above challenges.

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