Climate Change and Agriculture: Future Implications

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Our world is faced with the prospect of rising temperatures, ie, global warming. The implications associated with this climate change are many and will require ongoing adjustments to the world's ecosystems. One significant concern will be the availability of adequate food and water.

Climate changes that are predicted to continue through the next century will present new complex patterns in precipitation, agriculture, food security, and migration patterns. They will also have an impact on weeds, insects, and disease as the environmental ecosystems change.

The uncertainty of all these predictions makes it difficult to design an effective paradigm to meet the basic needs of society, ie, food, water, and health. These changes will be regional and will result in positive or negative impacts on crop growth and food production. It will require adjustments and perhaps radical changes in the way we plant, harvest, and consume food supplies to minimize economic stresses. Safety issues with planting and harvesting must also be addressed to improve efficiency, along with the working environment of the farmer, rancher, and their families. However, food production will not be limited to terrestrial products only, and will include those harvested from the oceans and inland waterways.

Precipitation changes will be a key factor and will again be regional and will dictate the necessary adjustments to maintain economic profitability.

The major uncertainty is which geographic regions will benefit from the changes ahead and which areas will lose or be devastated by storms, drought, or floods. It is a daunting task for climatologists to develop more accurate climate models that are more consistent with natural climate variability. Climate models are driven by supercomputers that are capable of capturing and simulating weather systems all over the world and are true to the basic earth-science laws that control the dynamics of our planet. Thus, will the northern reaches of the temperate zone of the northern hemisphere, such as Canada, Russia, and Northern Europe, experience increased temperatures in the future; will the lower latitudes and tropical areas become savannas with limited crop and livestock environments? Speculation abounds but hard evidence and accurate modeling are currently lacking.

If predictions of climate change hold, it will be imperative to search for food crops that will be tolerant to the increased temperatures as well as the alterations in the insect population and soil content. Only 2.5% of our planet's water is fresh, and only a small fraction of that water is available for human, plant, and animal subsistence, so conserving this vital resource is imperative.

All of these factors should be viewed together when considering basic needs such as food and water that must be available to the 9 billion inhabitants who will be living on the planet in the next 30 to 50 years. Obviously, the details of the changes that ensue will require in-depth research on all aspects of how to live and cope with climate change and will apply to both developed and developing countries of the world.

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