**The Urgency of Climate Smart Agriculture**

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Agriculture is the backbone of human civilization, providing food and livelihood to millions around the world. However, the changing climate is making it increasingly challenging for farmers to meet the growing demand for food. Climate change has brought about a range of problems, including more frequent and severe weather events, declining soil fertility, and water scarcity.

These issues have a significant impact on crop yields and the livelihoods of farmers, particularly in developing countries like Pakistan. In Pakistan, agriculture accounts for approximately 21 per cent of the country’s GDP and employs around 45 per cent of the population. However, the sector is facing significant challenges due to the impacts of climate change, including increased temperatures, reduced rainfall, and more frequent and severe weather events, such as droughts, floods, and heat waves. These changes are affecting crop yields, reducing the availability of food, and impacting the livelihoods of farmers and their families. To tackle these challenges, a new approach to agriculture is needed, one that is not only sustainable but also resilient to the impacts of climate change.

This is where Climate Smart Agriculture (CSA) comes in. CSA seeks to promote sustainable agriculture by balancing three main goals: increasing food security, improving farmers’ livelihoods, and reducing greenhouse gas emissions. One of the key aspects of CSA is the use of technology to improve the efficiency of farming practices. Precision agriculture, for example, allows farmers to use data and technology to optimise their crop management practices, such as applying the right amount of fertilizer at the right time. This reduces waste and increases yields; benefiting both the environment and the farmers’ bottom line. Another important aspect of CSA is the use of sustainable land management practices, such as agroforestry, which integrates trees into crop and livestock systems. This improves soil health, reduces erosion, and provides a range of other benefits, including increased biodiversity and improved water management. These practices can help farmers in Pakistan adapt to the impacts of climate change and reduce the risk of crop failure. In addition to these technical measures, CSA involves a change in the way we think about and manage agriculture. This includes a shift towards participatory approaches, where farmers are involved in decision-making and have a greater say in the management of their land.

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This leads to greater ownership and motivation to adopt sustainable practices and helps build a more resilient agriculture sector. The implementation of CSA is a collective effort, requiring the involvement of all stakeholders, including governments, the private sector, and research institutions. Governments can play a key role by providing technical and financial support to farmers and creating policies that incentivise the adoption of CSA. In Pakistan, the government can support CSA by investing in research and development, improving access to finance for farmers, and creating a supportive policy environment for sustainable agriculture practices. The private sector, including agribusinesses and ag-tech companies, can support the implementation of CSA by providing access to financing, new technologies, and markets for sustainable agricultural products. Research institutions can contribute by conducting research on sustainable agriculture practices, developing new technologies, and sharing knowledge with farmers and other stakeholders.

Climate change is affecting agriculture in wa number of ways, including more frequent and severe weather events, declining soil fertility, and water scarcity. These issues are having a significant impact on crop yields and the livelihoods of farmers, particularly in developing countries like Pakistan. As a result, it is more important than ever to adopt a new approach to agriculture, one that is sustainable and resilient to the impacts of climate change. Climate resilient crops are crops that have the ability to withstand and adapt to the impacts of climate change, such as extreme weather conditions, changes in temperature and precipitation patterns, and increasing pest and disease pressure. These crops have specific traits that make them more resistant to the effects of a changing climate, such as drought tolerance, heat tolerance, flood tolerance, and improved pest and disease resistance. Some examples of climate resilient crops include: Drought tolerant crops: Crops such as sorghum, millet, and cassava have a deep root system that allows them to access water in times of drought. They are also able to conserve water, making them well-suited to dry areas. Heat-tolerant crops: Crops such as rice, maize, and wheat have been developed to withstand high temperatures, making them suitable for areas that are experiencing rising temperatures due to climate change.

Flood-tolerant crops: Crops such as rice and mung bean have been developed to be able to grow in flooded conditions, making them suitable for areas that are experiencing increasing levels of flooding due to climate change. Pest and disease-resistant crops: Crops that have been genetically modified to be resistant to pests and diseases, such as Bt cotton and Bt brinjal, are also considered to be climate resilient. This is because pests and diseases are becoming more prevalent due to climate change, making it increasingly important for crops to have this resistance. Adopting climate-resilient crops can help farmers reduce the risks associated with climate change, improving food security and their livelihoods. Additionally, the use of climate-resilient crops can help reduce the need for chemical inputs, such as pesticides, thereby benefiting the environment. In Pakistan, the adoption of climate-resilient crops is still in its early stages. However, there is growing interest and recognition of the importance of these crops in the face of increasing climate variability and extreme weather events. The government of Pakistan, in collaboration with international organisations and research institutions, has started to promote the development and dissemination of climate-resilient crops. For example, the government has established research programs to develop heat and drought-tolerant varieties of wheat, rice, and maize. In addition, the government is promoting the use of conservation agriculture practices, such as reduced tillage and intercropping, which can increase the resilience of crops to the effects of climate change. However, some challenges need to be overcome in order for climate-resilient crops to be widely adopted in Pakistan. For example, there is a lack of awareness among farmers about the benefits of these crops and how to grow them. In addition, there are limited market opportunities for farmers who want to grow these crops, and there is a lack of investment in research and development of these crops. Despite these challenges, it is clear that the adoption of climate-resilient crops is becoming increasingly important in Pakistan as the effects of climate change become more severe. With continued efforts to promote the development and dissemination of these crops, they have the potential to play an important role in improving the resilience of Pakistan’s agriculture sector to the impacts of climate change. In conclusion, Climate Smart Agriculture is a critical and urgent need of the time. It provides a way forward for farmers to produce enough food to meet the growing demand, while also protecting the environment and building resilience to the impacts of climate change. Implementing CSA requires all stakeholders’ involvement and a collective effort to promote sustainable agriculture. By working together, we can ensure a more secure and sustainable future for farmers, and for the planet.

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