



Resilience Strategies for Smart Agriculture and Climate Change

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DESCRIPTION

Climate change is posing serious threats to agriculture and food security, especially for small-scale producers in low- and middle-income countries. Climate change can affect agriculture in various ways, such as increasing temperatures, weather variability, droughts, floods, pests, diseases, and salinity. These impacts can reduce crop yields, livestock productivity, food quality, and income, and increase food prices, poverty, and hunger. Therefore, there is an urgent need for resilience strategies that can help farmers cope with or adapt to climate change and sustain their livelihoods.

Smart agriculture is an approach that uses Information and Communication Technologies (ICTs) to enhance agricultural and rural development. Smart agriculture can provide various benefits such as improving access to information, markets, services, inputs, finance, education, extension, and innovation. Smart agriculture can also enable better management of natural resources, reduce production costs, increase yields, quality, and income, and ultimately improve food security and nutrition.

Smart agriculture technologies

- Mobile phones and applications that provide weather forecasts, market information, advisory services, input subsidies, crop insurance schemes, and digital platforms for market linkages.
- Precision agriculture technologies such as sensors, drones, satellites, Geographic Information Systems (GIS), and remote sensing that provide real-time data on soil moisture, nutrient status, crop health, and pest infestation.
- Irrigation systems that use solar power, drip irrigation, sprinklers, or rainwater harvesting to optimize water use efficiency and reduce water stress.
- Biotechnology and genetic engineering that develop climate-resilient crops and varieties that can tolerate drought, heat, flooding, salinity, or pests.
- Digital platforms and block chain that facilitate traceability, certification, and branding of agricultural products and enhance value addition and access to higher-value markets.

Smart agriculture enhance resilience to climate change

- Smart agriculture can improve the adaptive capacity of farmers by providing them with timely and relevant information and knowledge on climate risks and opportunities and enabling them to make better decisions on what, when, where, and how to produce.
- Smart agriculture can reduce the exposure of farmers to climate shocks by providing them with technologies and practices that can increase their productivity and income and reduce their dependency on climate-sensitive resources such as land, water, and biodiversity.
- Smart agriculture can reduce the sensitivity of farmers to climate impacts by providing them with technologies and practices that can improve their resource use efficiency and reduce their emissions and environmental footprint.

According to a study by Acevedo, smart agriculture interventions such as mobile phone-based information services, input subsidies delivered through vouchers or e-wallets, and digital platforms for market linkages have positive impacts on the adoption of climate-resilient crops and varieties by small-scale producers in low- and middle-income countries. For example, the study found that mobile phone-based information services increased the adoption of drought-tolerant maize by 11.5%, input subsidies delivered through vouchers increased the adoption of improved seeds by 16%, and digital platforms for market linkages increased the adoption of high-value crops by 14%.

Challenges and opportunities for smart agriculture

Smart agriculture faces some challenges such as lack of infrastructure, digital literacy, affordability, regulation, and coordination. Therefore, smart agriculture requires an enabling environment and a supportive framework that involves the participation and collaboration of various stakeholders such as farmers, private sector, public sector, civil society, and donors.

- Leveraging the rapid growth of mobile phone penetration and internet access in developing countries to reach more farmers

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with smart agriculture services and solutions.

- Promoting public-private partnerships to mobilize resources and expertise for developing and scaling up smart agriculture technologies and innovations.
- Strengthening the capacity of farmers and extension agents to use and benefit from smart agriculture technologies and practices through training, awareness-raising, and demonstration.
- Integrating smart agriculture into national and regional policies and strategies for climate change adaptation and mitigation and sustainable development.

Smart agriculture is a potential tool for enhancing resilience to climate change in agriculture. Smart agriculture can provide various benefits such as improving access to information, inputs, technologies, markets, services, and innovation. Smart agriculture can also enable better management of natural resources, reduce production costs, increase yields, quality, and income, and ultimately improve food security and nutrition. However, smart agriculture also faces some challenges such as lack of infrastructure, digital literacy, affordability, regulation, and coordination. Therefore, smart agriculture requires an enabling environment and a supportive framework that involves the participation and collaboration of various stakeholders such as farmers, private sector, public sector, civil society, and donors.