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Climate Smart Agriculture

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In order to restructure and realign agricultural systems to promote food security under the new realities of climate change, climate smart agriculture is a solution. Widespread variations in weather and climate patterns are threatening farming productivity and making people more vulnerable to their livelihoods from agriculture. Climate change affects the food markets, putting the food supply at risk across the populace. Threats can be mitigated by enhancing farmers' adaptive capabilities and boosting resilience and efficiency of use of resources in agricultural production systems.

Why is climate-smart agriculture needed?

The world's population is expected to grow by a third between now and 2050. In underdeveloped countries, most of those additional 2 billion will live. Simultaneously, more people in towns will live. FAO forecasts that agricultural production will have to rise by 60% by the year 2050 in order to meet the projected demands of food and feed, if present income and consumption growth patterns continue. Therefore, agriculture has to change to feed the world's expanding population and provide the base for economic growth and poverty reduction. Under the normal commercial situation, climate change will make this work harder because it affects agriculture, demands spiralling adjustment, and related expenses. Adaptation to climate change and reduced emission intensities per production will be essential to fulfil food security and agricultural development goals. The natural resource base has to be transformed without any depletion. As a result of increased frequency and unpredictability of weather patterns, climate change already has an influence on agricultural and food security. This can lead to reduced output in susceptible regions and poorer earnings. These changes can also impact food prices globally. These changes are particularly impacted by developing nations and small farmers and pastoralists. Many of these small-scale producers already have a deteriorated basis for natural resources. They frequently lack information about possible choices to modify their production systems and have restricted access to the usage of technology and financial services and their assets, and risk-taking

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capabilities. Enhancing the level of food security while helping to mitigate climate change and preserve the natural resource foundation and vital services of ecosystems requires a transition to more productive agriculture production systems, a more effective use of input, lower variability and greater output stability and a greater resilience to risks, shocks and climate variability over the long run. Increased agricultural productivity and resilience needs a fundamental shift in the way that land, water, soil nutrient and genetic resources are managed to improve the efficiency of these resources. This transition needs substantial changes in governance and law, policies, and funding systems at the national and municipal level. This will also lead to improved access to markets for manufacturers. Those improvements will make a major contribution to mitigating climate change by lowering greenhouse gas emissions per unit of land and/or agricultural produce and enhancing the carbon sink. Three targets are identified to meet this objective: (1) sustainable increases in agricultural productivity in order to support equitable income, food and development increases; (2) adaption and build-up of climate change resilience between farms and countries; and (3) opportunities to lower GHG emissions from agriculture relative to past trends.

Essential elements of the CSA approach

Agricultural growth is already being impeded by climate change. Climate change affects agricultural production in various parts of the globe, which has more negative consequences than positive and extremely vulnerable to additional negative impacts, according to the Intergovernmental Panel on Climate Change (IPCC). The IPCC. Without changing our approach to agricultural growth and development planning and investment we risk misallocating human and financial resources, producing agricultural systems incapable of promoting food security and worsening climate change. Climate-smart agriculture (CSA) can avoid this 'lose–lose' outcome by integrating climate change into the planning and implementation of sustainable agricultural strategies. CSA identifies synergies and trade-offs among food security, adaptation and mitigation as a basis for informing and reorienting policy in response to climate change.

Some of the fields in which we support the implementation of climate-smart solutions are:

Crop management

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When an impact and risk assessment has been carried out, it is possible to design climate-intelligent solutions that are suited to a certain region, agricultural community or even individual farm. For instance, pruning is necessary in cocoa, but it must address the local climatic risks: When excessive precipitation occurs, the pruning should be done more regularly to guarantee that stronger trees recover more quickly, while the farmer must avoid cutting too much in the long dry season to make primary branches and stubble overly exposed to sunshine. Harvesting and fermentation also need differing techniques in various climatic circumstances (in the case of cocoa). In the event of heavy rains or excessive moisture, simple solar dryers can be created from wood frames and plastic sheets to dry beans.

Soil management

Contour planting, as seen here with tea bushes on a Rwandan farm, helps reduce soil erosion.

High precipitation, particularly in sloping areas, may wash away fertile top soil. Planting the soil cover helps maintain soil in high rainfall – and in drought-prone locations it's particularly useful since it helps to maintain soil moisture. In places susceptible to floods, farmers can develop drainage to prevent the washing of nutrients rich in top-soil; trenches can also assist to regulate excess water and maintain soil as required. Plants are also an efficient technique to reduce soil erosion, for example on slopes or on natural terraces. It can also be helpful to mulch organic materials in the soil from agricultural leftovers.

All methods which enhance soil quality and structure boost production – a key objective in all climate smart agriculture. Healthy soils are also significant carbon sinks that store and keep carbon dioxide from the atmosphere and so assist to combat climate change.

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Pest and disease management

Global warming can lead to pests and illnesses, which can dramatically lower harvests and even kill whole farms. Increased temperature, for example, has allowed roya fungi to grow and destroy coffee fields throughout Central America. Under a changing climate, tried-and-tested methods of combating pesticides and diseases frequently fail; desperate farmers might be tempted to increase chemical numbers, but over-use will only raise expenses, harm beneficial insects and increase the danger of people and the environment being contaminated. Training in climate-smart agriculture gives farmers the skills to use exactly the correct amount and time of year to fight these newly spreading pests. It might also be helpful to invest in pesticide resistant seedlings. With regard to weeds, in all-weather situations encourage farmers to employ as much as possible manual weeding and target harmful weeds while leaving soft weeds which may really refill the soil, and avoid eroding the top soils that are rich in nutrients.

Shade trees

Shades are useful for a given farm or town regardless of the climatic risk: the proper number of trees of the correct species with the suitable quantity of canopy may assist prevent excessive sun, severe winds and heavy showers on a farm. However, excessive shadow can contribute to the farm's more humid environment, and with cocoa, extra moisture, for example, produces better circumstances for some fungal infections.

Water conservation

70% of the world's freshwater supplies are used in agriculture. Water shortages are becoming a serious danger as the global warming continues—already a problem in many areas. Rainwater harvesting is one technique for farms to brace themselves for water scarcity. Communities can dig bamboo ponds to save the water more effectively. There are various techniques to collect rainwater on particular farms, starting with the simple installation of barrels outside to building more complicated systems that canal moisture over a number of canisters and pipes from the rooftops. Traditional irrigation practises can contribute to tackling farm water stress. It can be labour-intensive and possibly wastingable, as extremely dry ground cannot absorb a significant quantity of water at once, but irrigation using low-tech slow-drip can result in bamboo poles and bottles filled with water adjacent to plants.

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There might potentially be too much water from climate change. The combination of lengthy dry periods that make the soil difficult, followed by heavy rain, is the basis for floods. Excess water may be channelled and crops protected against dampness-fueled diseases by building drain systems and trenches.

Conclusion

Climate change changes agricultural output and food systems, therefore changing the strategy of agricultural systems to promote global food safety and poverty reduction. To achieve the level and rate of change required, an integral, evidence-based and transformational approach must be taken to address food and climate safety at all levels from the global to local and from research to policies and investments, as well as through the private, public and civil society sectors.

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