



The Economic Impact of Climate Change on Crop Losses and Market Prices: An Analysis

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Abstract:-

Climate change has a profound and multifaceted economic impact on agriculture, affecting crop yields, market prices, and overall economic stability. The analysis examines the mechanisms that influence crop yield, the spread of pests and diseases, water supply, and market dynamics. The economic impacts of climate change on agriculture are far beyond the farm level and affect market prices. The combined effects of declining crops, increasing pressure from pests, diseases, shortage of water and market volatility have resulted in significant economic losses in the agricultural sector. These farmers are highly vulnerable to climate change and extreme weather events that can destroy whole harvests and livelihoods. Agricultural practices such as conservation of tillage, agricultural forestry and the use of organic fertilizers can help to retain carbon in the soil and reduce the emissions of agriculture. Policy makers, researchers and farmers must work together to solve these problems and build a sustainable and resilient agriculture sector.

Keywords: Crop yields, Economic losses, Sustainable practices

Introduction

Climate change is a global pressing problem with widespread impacts in various sectors, especially agriculture. Climate change is putting pressure on the agricultural system, causing economic losses due to crop damage and market price fluctuations.

The analysis examines the multifaceted impact of climate change on agriculture, the mechanisms that influence crop yields, the spread of pests and diseases, water supply, and market dynamics. Understanding these effects is crucial to preparing strategies for reducing economic losses and ensuring food security.

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Temperature and Weather Extremes

One of the most direct causes of climate change is climate change and extreme weather events. Rising temperatures can stress crops and reduce their growth and productivity. For example, heat waves lead to plant heat stress, thereby suppressing growth and reducing yields. Wheat, corn and rice are particularly vulnerable to high temperatures at critical growth stages.

In addition to heat waves, extreme weather events such as flooding, drought, storms, and climate change are becoming more frequent and serious as climate change continues, and the Intergovernmental Panel on Climate Change (IPCC) predicts that global crop yields will decline by 25 per cent by 2050 as the trend continues. These events can cause significant crop damage. Floods can wash seeds, damage plant roots and reduce soil fertility, while droughts can lead to water shortages and a decrease in crop yields. Storms can physically damage crops and infrastructure, causing immediate losses and a long-term reduction in productivity.

Pests and Diseases

Climate change also affects the incidence and distribution of agricultural pests and diseases. Warmer temperatures and changes in rainfall patterns create favorable conditions for many parasitic and pathogenic organisms, allowing them to expand their

range and increase their number. For example, due to climate change, fall army worms, native to the Americas, have spread to Africa, Asia and Australia. The parasite feeds on a variety of crops, causing serious damage and economic losses. It is estimated that the armyworm alone in Africa accounts for \$13 billion annually in losses. Warmer and wetter conditions can promote the growth of fungi and bacteria in crops. For example, the spread of fungus diseases affecting wheat crops is linked to changes in climate conditions. The increased prevalence of pests and diseases not only reduces crop yields, but also increases the costs of pest management and disease control, further burdening farmers' resources.

Water Availability

Water is a key resource for agriculture and is increasingly affected by climate change. Changes in rainfall patterns and high temperatures lead to changes in water cycles. In many regions, this reduces the supply of water for irrigation. As water scarce, crops are exposed to water stress, resulting in lower yields. The World Bank warns that water scarcity in some regions could reduce agricultural productivity by 20 per cent by 2050, and that water scarcity also directly affects crop yields and may lead to increased competition for water resources between agriculture and other sectors, such as industries and domestic use. This increases the cost of

irrigation water and further increases the production costs of farmers. Furthermore, decreased water availability limits the ability to implement practices such as additional irrigation, which are essential to maintaining crop yields during drought periods.

Market Prices

The economic impacts of climate change on agriculture are far beyond the farm level and affect market prices. The loss of crops due to extreme weather, pests, diseases and water scarcity may lead to a shortage of supplies. This shortage increases market prices and creates volatility that affects producers and consumers. Farmers face uncertain incomes due to fluctuating crops and prices, and consumers face higher food prices, leading to food insecurity, especially in low-income communities. A study published in *Nature Climate Change* found that volatility in the production of main crops caused by climate, such as wheat, rice and corn, could lead to price increases of 19 to 29 per cent by 2050. Increased food prices can lead to higher inflation, reduced purchasing power and increased economic inequality. For farmers, price volatility makes it difficult to plan and invest in their business, thereby reducing overall agricultural productivity and resilience.

Economic Losses

The combined effects of declining yields, increasing pressure from pests and

diseases, shortage of water and market volatility have resulted in significant economic losses in the agricultural sector. These losses can spread across the economy and affect related industries such as food processing, transport and retail. The Food and Agriculture Organization (FAO) estimates that agricultural losses related to climate change could cost the world's economy US\$1.5 trillion by 2050. Economic losses are particularly severe for small-scale farmers, who often lack the resources to invest in adaptation measures. These farmers are highly vulnerable to climate change and extreme events that can destroy whole harvests and livelihoods. In addition to immediate financial losses, climate change can also lead to a long-term reduction in agricultural productivity and land degradation, further affecting economic stability and development.

Adaptation and Mitigation Strategies

In order to reduce the economic impact of climate change on agriculture, adaptation and mitigation strategies must be adopted. Adaptation includes adapting agricultural practices to change climatic conditions. These include the adoption of drought-resistant crop varieties, the improvement of water management through efficient irrigation systems, and the implementation of integrated pest management, which reduces the impact of pests and diseases. Investing in climate-

resistant infrastructure such as flood protection and storage facilities can also help to protect crops and reduce losses. The mitigation strategy aims to reduce greenhouse gas emissions affecting climate change. Sustainable agricultural practices such as conservation of tillage, agricultural forestry and the use of organic fertilizers can help to retain carbon in the soil and reduce the emissions of agriculture. In addition, the reduction of food waste and improved supply chain efficiency can reduce the entire carbon footprint of the agricultural sector.

Conclusion

Climate change has a profound and multifaceted economic impact on agriculture, affecting crop yields, market prices, and overall economic stability. The threat of rising temperatures, extreme weather events, pests, diseases and water shortages requires concerted efforts to develop and implement effective adaptation and mitigation strategies. Investors can mitigate economic losses and ensure food security when climate change occurs by investing in climate-friendly agricultural practices and infrastructure, improving water management, and reducing greenhouse gas emissions. Policy makers, researchers and farmers must work together to solve these problems and build a sustainable and resilient agricultural sector.

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