



Adaptation Strategies of Agriculture to Climatic Changes

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DESCRIPTION

Agriculture is a fundamental human activity at risk from climate change in coming decades. At the same time it will continue to be, a major agent of environmental and climate change at local, regional and planetary scales.

Adapting to climate change helps reduce the risks of climate variability and change, increase the resilience of the system to potential disruptions, and even modify the system to better utilize future conditions. Climate adaptation includes all planned and unplanned adaptations in the natural and human systems that occur in response to climate change and its subsequent impact. Adaptation policies are generally designed to address the major risks posed by climate variability and change, but they can also stimulate innovative solutions and opportunities.

It is important to recognize that farmers are constantly adapting to changing conditions. These include market price volatility, rising input costs, new neighbors, labor shortages, pest epidemics, and bad weather. Coordination of these farms is important to maintain the level of production, profit and responsibility. At the same time, producers may need to make additional adjustments to accommodate extreme weather events, increasing climate change, and the increased likelihood of long-term changes in climate trends.

As climate variability and change increases, producers need to deal with changing, uncertain and increasingly novel situations. Within the agricultural sector, adaptation occurs at various levels, from industry-wide changes (trade policies, government programs, insurance options, technology, etc.) to site-specific responses (production system inputs, cultivation, crops, etc.). In addition, agricultural adaptation strategies can be broadly categorized into agricultural production practices, agricultural financial management, agricultural infrastructure, new technology development, government programs and insurance. The first three categories relate to producer-level decision-making, the last two relate to the broader socio-economic system, usually the responsibility of public institutions and agribusiness.

Agriculture operates within countless cultural, institutional and economic structures that define different climates, environmental conditions and management practices used. There are correspondingly large adaptation options available to improve the resilience of agricultural systems to the uncertain future impacts of climate

change. The argument to focus on adapting agriculture to climate change is based on several considerations.

- Past greenhouse gas emissions have forced the Earth to warm further by about 0.1 °C every decade for several decades, making unavoidable levels of impact and necessary adaptations or coping strategies.
- The major greenhouse gas emissions continue to grow rapidly. The lack of current progress in developing global emission reduction agreements beyond the Kyoto Protocol raises concerns about future emission levels.
- The upper limit of the IPCC scenario range for climate change has increased over time, meaning that potentially high global temperatures are likely to have a non-linear and increasingly negative impact on existing agricultural activities.
- Observed atmospheric CO₂ concentrations, global temperature, and sea level changes have reached the upper bounds of the values suggested by the IPCC scenario, and other specific effects of climate change are higher than previously thought.

It's happening faster than previously considered (such as collapse of the Greenland Ice Sheet).

- The potential impact of climate change on agriculture, especially in the tropics, has proven to be more significant than previously envisioned.
- Climate change can provide agricultural investment opportunities that reward those involved in early action.

Importantly, the collective adaptation responses needed in the coming decades to limit the risks of climate change and maximize opportunities is a planned investment for the continued development of the relevant agricultural sector. It is to bring additional costs to society beyond. Much of this additional investment must be made in developing countries. Recent UNFCCC estimates conservatively these additional costs to be approximately US \$ 100 billion annually worldwide in 2030. This is expressed as the flow of additional investment and funding needed to minimize the risk of damage to the sectors associated with rural development in developing countries. These projected adjustment costs are small compared to current and projected global agricultural GDP, but represent a significant

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increase (10-20%) compared to projected domestic investment in these sectors, which must be noted. Moreover, they are much larger than the total amount of foreign direct investment, funding for development assistance, and debt financing for agricultural and rural development in developing countries (up to 5-10 times depending on the region).

Following are the adaptation strategies for a selection of agricultural sectors

- In general, people who seek to improve the management of

finite resources such as water, technical modifications based on reductionist analysis, engineering design principles, or computer-aided models.

- Altered system design and management (usually need changes in attitudes and/or behavior, referred to as attitudinal fixes).
- Decision-making tools (including the use of climate forecasting and information sources)
- Institutional changes.