

Climate Change and Global Food Security

Research Prompt

"What is the impact of climate change on global food security?"

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Search Results

Understanding Climate Change

Search terms:

- *Causes of climate change*
- *Definition of climate change*
- *Effects of climate change*

Causes of climate change

| Relevant Excerpt | Citation Source |
|---|---|
| ... Natural changes to the climate The leading cause of climate change is human activity and the release of greenhouse gases. However, there are lots of natural causes that also lead to changes in the climate system. Natural cycles can cause the climate to alternate between warming and cooling.... | Causes of climate change - Met Office (metoffice.gov.uk) |
| ... A concise discussion of the primary climate change causes on our planet... | Facts – Climate Change: Vital Signs of ... - What Is Climate Change? (nasa.gov) |
| ... But by harnessing that same ability to innovate and attaching it to a renewed sense of shared responsibility, we can find ways to cool the planet down, fight climate change, and chart a course toward a more just, equitable, and sustainable future. Here's a rough breakdown of the factors that are driving climate change. | What Causes Climate Change? Human and Natural Causes (nrdc.org) |

Effects of climate change

| Relevant Excerpt | Citation Source |
|---|--|
| ... Changes to Earth's climate driven by increased human emissions of heat-trapping greenhouse gases are already having widespread effects on the environment: glaciers and ice sheets are shrinking, river and lake ice is breaking up earlier, plant and animal geographic ranges are shifting, and plants and trees are blooming sooner. Effects that | Effects Facts – Climate Change: Vital Signs of the |

| Relevant Excerpt | Citation Source |
|---|--|
| <p>scientists had long predicted would result from global climate change are now occurring, such as sea ice loss, accelerated sea level rise, and longer, more intense heat waves. "The magnitude and rate of climate change and associated risks depend strongly on near-term mitigation and adaptation actions, and projected adverse impacts and related losses and damages escalate with every increment of global warming."...</p> | <p>Planet (nasa.gov)</p> |

Global Food Security

- [Impact of Climate Change on Crop Production](#)
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Impact of Climate Change on Crop Production

Search terms:

- *Climate change and agricultural productivity*
- *Effects of climate change on crop yields*

Climate change and agricultural productivity

| Relevant Excerpt | Citation Source |
|--|--|
| Climate change affects agricultural productivity both directly, by introducing changes in agro-ecological conditions (e.g. drought, variable precipitation, extreme weather events) and indirectly, by giving rise to new diseases and pests. Food loss and waste account for about 4.4 gigatonnes of greenhouse gas emissions each year; these include on-farm agricultural emissions and the energy used to produce, transport and store food that is ultimately lost or wasted.... | Climate change and post-harvest loss: APHLIS blog post Food Loss ... (fao.org) |
| Abstract This paper evaluates the impact of climate change on agricultural productivity. Cross-sectional variation in climate among Brazilian municipalities is used to estimate an equation in which geographical attributes determine agricultural productivity.... | Climate change and agricultural productivity in Brazil: future perspectives (semanticsscholar.org) |
| ... Changes in Agricultural Productivity Climate change can make conditions better or worse for growing crops in different regions. For example, changes in temperature, rainfall, and frost-free days are leading to longer growing seasons in almost every state. ⁸ A longer growing season can have both positive and negative impacts for raising food.... | Climate Change Impacts on Agriculture and Food Supply US EPA (epa.gov) |
| ... This paper analyzes the economic costs of climate change in Greek agricultural productivity during the last thirty years and discusses the implications for policymakers and for agricultural research. Empirical evidence suggests that climate change is already present and has a significant impact on agricultural productivity. Farmers need to adapt to the expected impacts of climate change in order to maintain their standard of living.... | Climate change and agricultural productivity (semanticsscholar.org) |
| According to the latest estimates, farmers' adaptation of farm production to climate change is inevitable. The climate attributes that are expected to have the most direct impacts on agricultural productivity are the rise in temperature, the change in the frequency and intensity of precipitation and of extreme weather phenomena, and the increase in the level of CO ₂ available for photosynthesis. This paper analyzes the economic costs of climate change in Greek agricultural productivity during the last thirty years and discusses the implications for policymakers and for agricultural research.... | Climate change and agricultural productivity (semanticsscholar.org) |

Effects of climate change on crop yields

| Relevant Excerpt | Citation Source |
|---|---|
| This, potentially, reduces agriculture's resilience to climate change and thus food security. Furthermore, the expected increase in frequency of adverse and extreme weather events due to climate change are likely to affect crop yields differently, depending on when in the growing season they occur. We show that soil carbon provides farmers with a natural insurance against climate change through a gain in yield stability and more resilient production.... | Soil carbon insures arable crop production against increasing adverse weather due to climate change (semanticscholar.org) |
| The estimates of the production function parameters and their elasticities are utilized to analyse the impacts of the projected climate change on agriculture. The results show that the climate change will have modest effects on the mean crop yields, but will significantly reduce the variance and covariance for most of the crops considered.... | An analysis of the impact of climate change on crop yields and yield variability (semanticscholar.org) |
| ... In addition, because wildfire smoke can travel long distances from the source fire, its effects can be far reaching, especially for people with certain medical conditions or who spend long periods of time outside. Decreased crop yields. Rising temperatures and carbon dioxide concentrations may increase some crop yields, but the yields of major commodity crops (such as corn, rice, and oats) are expected to be lower than they would in a future without climate change.... | Climate Change Impacts on Agriculture and Food Supply US EPA (epa.gov) |
| Over broad spatial domains we observe only slight moderation of short-run impacts by farmers' long-run adjustments. In the absence of additional margins of adaptation beyond those pursued historically, projections constructed using an ensemble of 21 climate model simulations suggest that the climate change could reduce global crop yields by 3-12% by mid-century and 11-25% by century's end, under a vigorous warming scenario. | Global vulnerability of crop yields to climate change - ScienceDirect (sciencedirect.com) |
| ... Maize crop yields are projected to decline 24%, while wheat could potentially see growth of about 17%. Using advanced climate and agricultural models, scientists found that the change in yields is due to projected increases in temperature, shifts in rainfall patterns, and elevated surface carbon dioxide concentrations from human-caused greenhouse gas emissions. These changes would make it more difficult to grow maize in the tropics, but could expand wheat's growing range.... | Global Climate Change Impact on Crops Expected Within 10 Years ... (nasa.gov) |

Impact of Climate Change on Livestock

Search terms:

- *Climate change and animal agriculture*
- *Effects of climate change on livestock production*

Climate change and animal agriculture

| Relevant Excerpt | Citation Source |
|--|--|
| ... These changes can slow animals' growth and reduce reproductive rates, which can increase costs for animal producers and consumers. Because of these impacts, changes in temperature associated with climate change may have an effect on the productivity of animal agriculture. Animals need to eat, too-so effects of climate change on the crops animals rely on, such as changes to availability and price, can also have a big impact on animal producers' bottom lines.... | Animal Agriculture in a Changing Climate USDA Climate Hubs (usda.gov) |
| When it comes to the climate crisis, animal agriculture is a leading culprit. It's simple, really: Water and land are used to grow crops to feed animals.... | The Climate Crisis and Animal Agriculture, Explained PETA (peta.org) |
| ... We show that, even in the absence of any other emission reductions, persistent drops in atmospheric methane and nitrous oxide levels, and slower carbon dioxide accumulation, following a phaseout of livestock production would, through the end of the century, have the same cumulative effect on the warming potential of the atmosphere as a 25 gigaton per year reduction in anthropogenic CO2 emissions, providing half of the net emission reductions necessary to limit warming to 2°C. The magnitude and rapidity of these potential effects should place the reduction or elimination of animal agriculture at the forefront of strategies for averting disastrous climate change. | Rapid global phaseout of animal agriculture has the potential to stabilize greenhouse gas levels for 30 years and offset 68 percent of CO2 emissions this century (semanticsscholar.org) |

Effects of climate change on livestock production

| Relevant Excerpt | Citation Source |
|--|---|
| Climate change has profound effect on livestock. The anticipated rise in temperature due to climate change is likely to aggravate the heat stress in livestock, adversely affecting their productive and reproductive performance.... | EFFECTS OF CLIMATE CHANGE ON LIVESTOCK PRODUCTION AND MITIGATION STRATEGIES - A |

| Relevant Excerpt | Citation Source |
|---|---|
| | REVIEW (semanticscholar.org) |
| <p>... Most of the livestock owners in the country perceive there is a climate change impacts on Livestock production and productivity. The major effects of climate change on livestock production include feed shortage, shortage of water, livestock genetic resources loss, reduced productivity, and decreased mature weight and/or longer time to reach mature weight in their order of importance. Higher temperatures resulting from climate change may increase the rate of development of certain pathogens or parasites that have one or more life cycle stages outside their animal host....</p> | Impacts of climate change on Livestock production and productivity and different adaptation strategies in Ethiopia (semanticscholar.org) |
| <p>... Livestock sector has also been affected by changing climate due to which there is increased loss of livestock assets and several other indirect losses. Some of the effects of climate change in livestock include thermal and cold stress, increased diseases incidences and decrease in the feed, fodder and water availability. This results in decreased animal production and productivity....</p> | Impact of Climate Change on Livestock Production (semanticscholar.org) |
| <p>... The study employed a social survey research design, where primary data was collected using questionnaires and participant observation, while secondary data was sourced from journals, books, articles, and agricultural records at the subcounty and county headquarters and from the meteorological department. The study found out that climate change is affecting aspects of smallholder livestock production mostly livestock health, livestock yield, forage availability, and water availability. From the study, it was concluded that, due to the effects of climate change, mainly prolonged droughts and reduced rainfall amounts in the study area, smallholder livestock production farmers in the study area is experiencing increased disease occurrence, reduced livestock yield, reduced forage productivity and reduced water availability....</p> | Aspects of Smallholder Livestock Production Affected by the Effects of Climate Change in Njoro Sub-County (semanticscholar.org) |
| <p>... Its contribution is especially important in marginal lands where livestock represents a unique source of energy, protein and micronutrients (Chapter B2-1.1). Climate change has substantial impacts on ecosystems and the natural resources upon which the livestock sector depends. At the same time, livestock food chains are major contributors to greenhouse gas emissions (FAO, 2006)....</p> | B2 - 1 Livestock production and climate change Climate Smart ... (fao.org) |

Impact of Climate Change on Fishing and Aquaculture

Search terms:

- *Climate change and seafood production*
- *Effects of climate change on fish stocks*

Climate change and seafood production

| Relevant Excerpt | Citation Source |
|---|---|
| Whilst growth in seafood production from capture fisheries is limited, global mariculture production is expanding. However, climate change poses risks to the potential seafood production from mariculture. Here, we apply a global mariculture production model that accounts for changing ocean conditions, suitable marine area for farming, fishmeal and fish oil production, farmed species dietary demand, farmed fish price and global seafood demand to project mariculture production under two climate and socio-economic scenarios.... | Projecting global mariculture production and adaptation pathways under climate change (semanticscholar.org) |
| ... The other is ocean aquaculture-fish and shellfish that are farmed. Climate change is affecting wild fisheries by changing their productivity and shifting where fish live out in the ocean. Among other factors, these characteristics determine how much we can sustainably harvest.... | Seafood Production Suffers Under Climate Change, but Sustainable ... (pewtrusts.org) |
| ... Both scenarios showed even greater increases in production when vegetarian alternatives were substituted in half of the aquafeed. "Climate change affects everything, including aspects of seafood farming we've not previously considered," Cheung said. "We need to act, and quickly, to mitigate climate change, rather than relying on one solution to solve all our seafood production problems.... | Study finds aquaculture production vulnerable to climate change ... (seafoodsource.com) |
| ... This will affect what they catch, harvest and produce and who they sell it to. If seafood businesses fail to adapt to the expected impacts of climate change, this could cause challenges across the seafood supply chain. There is scope to reduce emissions throughout seafood supply chains, in fishing and farmed seafood production, trading and processing.... | Climate change and the seafood industry (seafish.org) |
| ... However the seafood industry will need to make further changes to adapt to and mitigate the impacts of climate change. Why climate change is relevant to seafood We've created a short film which outlines how climate change will impact the seafood industry. You can watch the film by clicking the play icon on the image below.... | Climate change and the seafood industry (seafish.org) |

Effects of climate change on fish stocks

| Relevant Excerpt | Citation Source |
|--|--|
| Worldwide climate change will influence the spatial distribution and status of exploited fish stocks, often in uncertain ways with cascading effects on the social-ecological systems depending on them. Likewise, changes in sociopolitical conditions influencing consumer demand, fuel, and fish prices may jeopardize the viability of fisheries.... | Unraveling the combined effects of sociopolitical and climate change scenarios for an artisanal small-scale fishery in the Western Mediterranean (semanticscholar.org) |
| ... As climate change can affect stocks in unexpected ways, even MSC certified fisheries can experience problems. Here are two examples of fish stocks affected by climate change: North East Atlantic mackerel There has been a rapid change in Atlantic mackerel distribution since 2007. Stocks have moved northward as sea temperatures rise.... | Climate change and fishing Marine Stewardship Council (msc.org) |
| ... So increased production of seafood could lead not only to lower environmental impacts, but also to healthier diets. How is climate change affecting the supply of seafood? We look at two sectors of seafood supply in our paper.... | Seafood Production Suffers Under Climate Change, but Sustainable ... (pewtrusts.org) |
| Its effects are changing the distribution of fish stocks and their food. Fishing for Solutions - the Climate Catastrophe Fishing for Solutions - the Climate Catastrophe Balancing economic and environmental priorities is now even more important to keep our oceans healthy and full of fish for the future - we can only do this by fishing sustainably If climate change affects fish, can I still eat it?... | Climate change and fishing Marine Stewardship Council (msc.org) |
| ... We are seeing this most significantly in tropical regions, but also in the Arctic, where many exploited species are slow to mature, or Ireland, Canada and the USA, with high fishing mortality rates. These climate effects, even when we looked at conservation-focused scenarios, are making it too difficult for fish stocks to bounce back. " Dr. Cheung says that due to climate change, the world is unlikely to return to historical levels of fish stocks.... | Global fish stocks can't rebuild if nothing done to halt climate change ... (sciencedaily.com) |

Impact of Climate Change on Food Distribution and Access

Search terms:

- *Climate change and food access*
- *Effects of climate change on food distribution*

Climate change and food access

| Relevant Excerpt | Citation Source |
|--|--|
| ... Severe drought across the Horn of Africa has forced thousands of families to leave their homes in the countryside and seek help near urban centers. 2. Climate change limits access to food If climate change reduces the amount of food produced, then it makes sense that it also reduces the amount of food people can access. This simple instance of supply-and-demand, however, has big impacts.... | How climate change increases hunger (and why we're all at risk) (concernusa.org) |
| Climate change can affect food availability, access, utilization, and the stability of each of these over time. Constrictions at any point can lead to food insecurity through the activities of the food system, including food production, transportation, and storage.... | Climate Change, Global Food Security, and the U.S. Food System ... (usda.gov) |
| ... A half-billion people already live in places turning into desert, and soil is being lost between 10 and 100 times faster than it is forming, according to the report . Climate change will make those threats even worse , as floods, drought, storms and other types of extreme weather threaten to disrupt, and over time shrink, the global food supply. Already, more than 10 percent of the world's population remains undernourished, and some authors of the report warned in interviews that food shortages could lead to an increase in cross-border migration.... | Climate Change Threatens the World's Food Supply, United Nations ... (nytimes.com) |
| ... Blistering heat and severe drought across France have wreaked havoc on agricultural production and prompted farmers to call on the government for help. Climate change is the common thread, either triggering or worsening these horrifying conditions and leading to devastating impacts on food availability, livelihoods, and human health. As the world experiences increasingly severe climate impacts on agricultural production, many of our food systems are being pushed to the breaking point.... | Climate Change and the Future of Food unfoundation.org (unfoundation.org) |
| Global conflicts, climate change and supply disruptions from COVID-19 have exacerbated the problem. This article takes a closer look at the impact of climate change on today's food crisis. Extreme weather is a driver of world hunger.... | How climate change affects the food crisis - U.S. Embassy ... (usembassy.gov) |

Effects of climate change on food distribution

| Relevant Excerpt | Citation Source |
|---|--|
| ... See Transportation for a more detailed discussion. Climate variability and change will also affect food distribution systems indirectly, such as through changes in agricultural trade flows. For example, if corn production shifts northward in response to increasing temperatures, different transportation routes and modalities may be required to transport the corn to market from new origins.... | Food Distribution U.S. Climate Resilience Toolkit (climate.gov) |
| Projected rising temperatures, changing weather patterns, and increases in the frequency of extreme events may affect the food distribution system at the local, national, and global scales. Land, water, and air transportation are all vulnerable to climate change.... | Food Distribution U.S. Climate Resilience Toolkit (climate.gov) |
| ... Urbanization and globalization are causing rapid changes to food systems. Climate change may affect food systems in several ways ranging from direct effects on crop production (e.g. changes in rainfall leading to drought or flooding, or warmer or cooler temperatures leading to changes in the length of growing season), to changes in markets, food prices and supply chain infrastructure. The relative importance of climate change for food security differs between regions.... | Climate change and food security (nih.gov) |
| ... Food service makes up the largest share of these jobs at 13 million. ²⁸ Cattle, corn, dairy products, and soybeans are the top income-producing commodities. ²⁹ The United States is also a key exporter of soybeans, other plant products, tree nuts, animal feeds, beef, and veal. ³⁰ Environmental Justice and Equity Many hired crop farmworkers are foreign-born people from Mexico and Central America. ³¹ Most hired crop farmworkers are not migrant workers; instead, they work at a single location within 75 miles of their homes. ³² Many hired farmworkers can be more at risk of climate health threats due to social factors, such as language barriers and health care access. Climate change could affect food security for some households in the country. Most U.S. households are currently food secure.... | Climate Change Impacts on Agriculture and Food Supply US EPA (epa.gov) |
| ... This is true even in places like the Philippines and Vietnam, which have relatively high incomes, but where farmers often live at the edge of poverty and food price increases have an outsized impact on poor urban consumers. How might climate change affect farming and food security in the future? Up to a certain point, rising temperatures and CO2 can be beneficial for crops.... | Climate Explorer: Food Security and Climate Change (worldbank.org) |

Mitigation and Adaptation Strategies for Ensuring Food Security

- [Sustainable Agriculture Practices](#)
- [Crop Diversification and Resilience](#)
- [Improving Water Management in Agriculture](#)
- [Enhancing Food Storage and Preservation](#)

Sustainable Agriculture Practices

Search terms:

- *Agroecology and climate change*
- *Organic farming and climate resilience*

Agroecology and climate change

| Relevant Excerpt | Citation Source |
|--|--|
| A new academic review of over 10,000 studies finds substantial evidence that agroecological practices - like farm diversification, agroforestry and organic agriculture - can make a significant contribution in helping low- and middle-income countries (LMICs) meet their climate adaptation and mitigation targets through their food systems. The study found that agroecology can play a major role in climate change adaptation and mitigation. However, we still don't have enough data and evidence on what works, where and why.... | Agroecology: A key piece to climate adaptation & mitigation? (cgiar.org) |
| ... One where farmers adapt and build resilience to the increasing challenges from climate change and where nutritious food is available for all. Agroecology provides one solution towards this transformation. Agroecology has been around since the 1920s when scientists used the term to refer to the application of ecological principles to agriculture, where diversity, recycling and effective use of resources in farming systems is central.... | How agroecology can respond to a changing climate and benefit ... (ifad.org) |
| ... Evidence from the global North suggests that reliance on organic nutrient sources and organic farming will likely avoid increased nitrous oxide emissions compared to use of synthetic nitrogen fertilizer. Adaptive capacity Evidence suggests that agroecology provides more climate change adaptation and mitigation than conventional agriculture by emphasizing locally relevant solutions , participatory processes and co-creation of knowledge. Specifically, co-creation and sharing of knowledge supported farmers' capacity to adapt to local conditions.... | Agroecology: A key piece to climate adaptation & mitigation? (cgiar.org) |
| ... Recovery of forest cover and the structure and health of the soil allows more water to be available and stored. Importantly, agroecology has the potential to contribute to farmers' income generation and stability by reducing losses to climate shocks and reducing inputs costs. What is more, agroecological backyard gardens in which horticulture is integrated with vegetables and fruits production ensure the availability of nutritious food.... | How agroecology can respond to a changing climate and benefit ... (ifad.org) |
| ... It has evolved over the years to become a holistic approach to agriculture, integrating science with economic, social and ecological systems. Agroecology has become high on | How agroecology |

| Relevant Excerpt | Citation Source |
|--|--|
| the global agenda for the Sustainable Development Goals. The approach has a potential strong contribution to farming system resilience against climate change impacts, to the conservation of biodiversity, and to reversing land degradation trends.... | can respond to a changing climate and benefit ... (ifad.org) |

Organic farming and climate resilience

| Relevant Excerpt | Citation Source |
|---|---|
| ... With climate change already affecting agriculture, there is an urgent need to increase its resilience. Organic farming is seen by many as both an environmental friendly farming system and as a practice with higher intrinsic resilience against climate change. This thesis aims to investigate in what ways these claims might be true and also how organic farming might be used as a way of sequestering carbon from the atmosphere.... | Organic farming's role in adaptation to and mitigation of climate change : an overview of ecological resilience and a model case study (semanticscholar.org) |
| Livelihood resilience of vegetable farmers: efficacy of organic farming in dealing with climate change in Java, Indonesia Some researchers believe that organic farming can improving farmer's resilience in dealing with climate change. Livelihood resilience is attributed to buffer capacity, self-organization, and learning capacity.... | Fachrista et al.: Livelihood resilience of vegetable farmers: efficacy of organic farming in dealing with climate change in Java, Indonesia (semanticscholar.org) |
| ... Important determinants that influence the farmer's level of resilience are cooperation networks, adaptation strategies and accessibility to extension services, and climate information and training. The study recommends that policymakers need to develop organic farming and supporting institutions to increase farmer's resilience in dealing with climate change. | Fachrista et al.: Livelihood resilience of vegetable farmers: efficacy of organic farming in dealing with climate change in Java, Indonesia (semanticscholar.org) |
| ... A decades-long organic farming trial found that organic yields can be up to 40% higher than nonorganic farms in drought years. By foregoing most fossil fuel-based inputs, organic farmers are also more resilient and adaptable not only to stressors related to climate change but also other disruptive global stressors. As farmers grapple with everything from extreme weather events to heat stress and wildfires, and agriculture becomes even less predictable in the face of a changing climate, it is essential for governments to help farmers transition to practices that increase resilience and dramatically decrease reliance on fossil-fuel based chemicals.... | Organic Agriculture Helps Solve Climate Change (nrdc.org) |

... As stewards of healthy soil, organic farmers and ranchers can be a major force for climate mitigation (U.S. Department of Agriculture Secretary Vilsack confirmed

| Relevant Excerpt | Citation Source |
|--|--|
| <p>as much during the recent announcement of the new USDA framework for resilient food and farming systems). Organic farming promotes resiliency by boosting soil's ability to retain water and the natural nutrients found in healthy soils. By increasing organic matter in soil continuously over time, organic agriculture improves water percolation by 15-20%, replenishing groundwater and helping crops perform well in extreme weather like drought and flooding....</p> | <p>Organic Agriculture Helps Solve Climate Change (nrdc.org)</p> |

Crop Diversification and Resilience

Search terms:

- *Climate-smart agriculture practices*
- *Diversification of crops for climate resilience*

Climate-smart agriculture practices

| Relevant Excerpt | Citation Source |
|--|--|
| <p>... Unpredictable weather patterns, shorter growing seasons, droughts, extreme temperatures, and increased exposure to pests and crop diseases pose daunting problems to smallholder farmers around the world-especially in the tropics, where people tend to be more reliant on natural resources. Climate-smart agriculture techniques can help farmers adapt to and prepare for impacts in order to preserve- and even improve-their livelihoods. With a population expected to balloon to 9.8 billion by 2050, climate-smart agriculture is crucial to global food security, as well: Smallholder farmers currently provide more than 80 percent of the food consumed in large parts of the developing world, particularly South Asia and sub-Saharan Africa....</p> | <p>What Is Climate-Smart Agriculture? Rainforest Alliance (rainforest-alliance.org)</p> |
| <p>... Our commitment to climate-smart agriculture The Rainforest Alliance has long been at the forefront of developing and implementing climate-smart agriculture solutions. Climate-smart methods are a key part of our 2020 Sustainable Agriculture Standard. In collaboration with the World Cocoa Foundation and our research partners CIAT and IITA, we created science-based training materials for specific cocoa-growing regions and made them available to the public online in 2018; we're continuing to create more such guides for other landscapes and crops....</p> | <p>What Is Climate-Smart Agriculture? Rainforest Alliance (rainforest-alliance.org)</p> |
| <p>... SMEs can better address opportunities in local markets and can better adapt climatesmart technologies to local markets. There are various approaches to make agriculture "climate smart". These can be complementary, and it is therefore an important challenge to link their best practices....</p> | <p>Making agriculture in Africa climate-smart From continental policies to local practices (semanticscholar.org)</p> |
| <p>... Reduced emissions (mitigating greenhouse gas emissions) It is worth noting that Climate-Smart Agriculture does not define any new farming practices. In fact, Climate-Smart Agriculture includes many practices that farmers already use: Conservation tillage Cover cropping Nutrient management Agroforestry other practices to reduce GHG emissions Steering these practices toward production, adaptation, and mitigation goals is what makes them "Climate-Smart". Here in the Northeast, the concept of Climate-Smart Agriculture is already taking root....</p> | <p>The role of Climate-Smart Agriculture in climate adaptation and ... (usda.gov)</p> |

| Relevant Excerpt | Citation Source |
|---|---|
| <p>... At the same time, the report also showed that greenhouse gas emissions from farming made climate change worse. Climate-Smart Agriculture was seen as a way for farmers to address these twin problems while maintaining yields. Today, Climate-Smart Agriculture is guided by three main goals: Increased productivity (sustainably intensifying agriculture)...</p> | <p>The role of Climate-Smart Agriculture in climate adaptation and ... (usda.gov)</p> |

Diversification of crops for climate resilience

| Relevant Excerpt | Citation Source |
|--|---|
| <p>Many studies have shown that crop diversification can improve climate resilience of agricultural systems, reduce pesticide application and promote biodiversity. Increasingly, consumers are more aware of these issues and favor products produced locally from organic agriculture....</p> | <p>Innovation and diversification through niche crops : potential and suitability for Switzerland (semanticscholar.org)</p> |
| <p>One rational and cost-effective method may be the implementation of increased agricultural crop diversification. Crop diversification can improve resilience in a variety of ways: by engendering a greater ability to suppress pest outbreaks and dampen pathogen transmission, which may worsen under future climate scenarios, as well as by buffering crop production from the effects of greater climate variability and extreme events. Such benefits point toward the obvious value of adopting crop diversification to improve resilience, yet adoption has been slow....</p> | <p>Resilience in Agriculture through Crop Diversification: Adaptive Management for Environmental Change (semanticscholar.org)</p> |
| <p>... Economic incentives encouraging production of a select few crops, the push for biotechnology strategies, and the belief that monocultures are more productive than diversified systems have been hindrances in promoting this strategy. However, crop diversification can be implemented in a variety of forms and at a variety of scales, allowing farmers to choose a strategy that both increases resilience and provides economic benefits.</p> | <p>Resilience in Agriculture through Crop Diversification: Adaptive Management for Environmental Change (semanticscholar.org)</p> |
| <p>... Ljung Box test and the ARCH-LM reveals that the residuals in the models fitted are free from conditional heteroscedasticity as well as serial autocorrelation. The study joins the call for the promotion of these crops in the country for their resilience to climate, while continuous effort is made to make the other crops more climate-resilient.</p> | <p>Testing the climate resilience of sorghum and millet with time series data (semanticscholar.org)</p> |
| <p>... Farmers also highlighted the central role of pastures and grazing to achieve autonomy and improve cost control. Diversification within the farm via crop rotations, herd composition, and farm products was also considered to improve farm resilience. In this study, we are the first to explore organic farmers' perception of farm resilience....</p> | <p>Resilience applied to farming: organic farmers' perspectives (semanticscholar.org)</p> |

Improving Water Management in Agriculture

Search terms:

- *Climate change and water scarcity in agriculture*
- *Water-efficient irrigation techniques*

Climate change and water scarcity in agriculture

| Relevant Excerpt | Citation Source |
|--|--|
| <p>... As the global population increases, and resource-intensive economic development continues, many countries' water resources and infrastructure are failing to meet accelerating demand. Climate change is making water scarcity worse. The impacts of a changing climate are making water more unpredictable....</p> | <p>Water Scarcity UN-Water (unwater.org)</p> |
| <p>... "Most studies focus on blue water resources alone, giving little consideration to the green water. " The researchers find that under climate change, global agricultural water scarcity will worsen in up to 84% of croplands, with a loss of water supplies driving scarcity in about 60% of those croplands. Sowing solutions Changes in available green water, due to shifting precipitation patterns and evaporation caused by higher temperatures, are now predicted to impact about 16% of global croplands....</p> | <p>80% of global croplands will experience water scarcity ... (preventionweb.net)</p> |
| <p>... Here are just four areas where we can work to save this precious resource: 1. Agriculture Agriculture is both a major cause and casualty of water scarcity. Farming accounts for almost 70 percent of all water withdrawals, and up to 95 percent in some developing countries....</p> | <p>Water Scarcity – One of the greatest challenges of our time FAO ... (fao.org)</p> |
| <p>... From unpredictable rainfall patterns to shrinking ice sheets, rising sea levels, floods and droughts - most impacts of climate change come down to water water (UN Water). Climate change is exacerbating both water scarcity and water-related hazards (such as floods and droughts), as rising temperatures disrupt precipitation patterns and the entire water cycle (UNICEF). Get more facts on climate and water below....</p> | <p>Water – at the center of the climate crisis United Nations (un.org)</p> |
| <p>... But rising temperatures also accelerate evapotranspiration from plants and soils, and there must also be enough water for crops to thrive. For areas of the world that are already water-constrained, climate change will increasingly cause adverse impacts on agricultural production through diminishing water supplies, increases in extreme events like floods and severe storms, heat stress, and increased prevalence of pests and diseases. Above a certain point of warming -- and particularly above an increase of 2 degrees Celsius in average global temperatures - it becomes increasingly more difficult to adapt and increasingly more expensive....</p> | <p>Climate Explorer: Food Security and Climate Change (worldbank.org)</p> |

Water-efficient irrigation techniques

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| ... On individual farms, there are several ways to collect rainfall, from simply placing barrels outside to creating more sophisticated systems that channel rain from roofs into barrels through a series of gutters and pipes. Traditional irrigation methods can also help address water stress on farms. Using watering cans is labor-intensive and potentially wasteful, since very dry earth can't absorb large amounts of water at once- but placing bamboo sticks or bottles filled with water next to plants can create low-tech, slow-drip irrigation.... | What Is Climate-Smart Agriculture? Rainforest Alliance (rainforest-alliance.org) |
| ... BMPs #4 and #5 work in tandem to make outdoor water use as efficient as possible. Whether installing a new irrigation system or retrofitting an old one, there are many options to improve water efficiency. Most importantly, the person(s) responsible for the irrigation system should have proper training in system installation, maintenance, and management.... | Best Management Practice #5: Water-Efficient Irrigation ... (energy.gov) |
| ... Learn more about soaker hoses with this online resource from the Saving Water Partnership (PDF). Drip System Drip irrigation is the most water-efficient way to irrigate many different plantings. It is an ideal way to water in clay soils because the water is applied slowly, allowing the soil to absorb the water and avoid runoff.... | Watering Systems Regional Water Providers Consortium (regionalh2o.org) |

Enhancing Food Storage and Preservation

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Reducing post-harvest losses due to climate change

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| At the same time, climate change is creating conditions that could make postharvest loss an even greater challenge. The task Efforts to reduce postharvest loss are critical in the face of climate change. (Image: Piyaset / Shutterstock) One of the greatest tasks we face in the 21st century is to feed the growing human population sustainably, and to do so in the face of climate change.... | Climate change and postharvest loss (aphlis.net) |
| ... Similarly, the promotion of micro-processing amongst the non-farm actors in the value chain is creating employment and market opportunities that are further extended to smallholder farmers. Any meaningful solution seeking to address post-harvest loss should consider linking food security and climate change to inform investment opportunities and viable strategies that can optimally reduce post-harvest losses. What climate-smart techniques is TechnoServe promoting to help farmers reduce their food loss? Through the YieldWise program - a partnership between TechnoServe, the Rockefeller Foundation, and Syngenta Foundation - we are providing training on best practices that help farmers improve their production, decrease post-harvest losses, and increase their incomes.... | How is Climate Change Affecting Post-Harvest Loss? (technoserve.org) |
| At the same time, climate change is creating conditions that could make postharvest loss an even greater challenge. The task Efforts to reduce postharvest loss are critical in the face of climate change.... | Climate change and postharvest loss (aphlis.net) |
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| ... How does post-harvest loss impact the environment? What is the link between post-harvest loss and climate change? Post-harvest loss has a direct impact on the environment and vice versa. Widespread agricultural production can lead to deforestation, soil depletion and degradation, poor underground water quality from pesticide residue, and other serious environmental concerns.... | How is Climate Change Affecting Post-Harvest Loss? (technoserve.org) |

