Output:

Research Report on Climate Change

Introduction
This report explores the topic of Climate Change by addressing key research questions generated through advanced reasoning. The findings are based on web searches conducted to gather relevant and recent information.

What are the projected economic impacts of climate change on developing nations in the next 25 years, differentiating between high and low emission scenarios?
Source 1: PDF
Summary of studies on the impact of climate change on crop yield with reference to a no-climate-change scenario.....31 THE SOCIOECONOMIC IMPACT OF CLIMATE CHANGE IN DEVELOPING COUNTRIES IN THE NEXT DECADES: A REVIEW 1 List of abbreviations CGEM-IAM computable general equilibrium modeling–integrated assessment modeling CI confidence interval CVD cardiovascular disease GDP gross domestic product GENESIS Global ENvironment and Ecological Simulation of Interactive Systems HadCM Hadley Centre Coupled Model climate simulation HAPPI half a degree additional warming, prognosis, and projected impacts IPCC Intergovernmental Panel on Climate Change NDC nationally determined contribution OECD Organisation for Economic Co-operation and Development PV photovoltaic RCP Representative Concentration Pathway SSP Shared Socioeconomic Pathway UI uncertainty interval UN SDG United Nations Sustainable Development Goal Wm–2 watts per square meter THE SOCIOECONOMIC IMPACT OF CLIMATE CHANGE IN DEVELOPING COUNTRIES IN THE NEXT DECADES: A REVIEW 2 Executive summary Climate change is a growing threat to the world. In D.R. Reidmiller, C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. May cock, and B.C. Stewart (Eds.), Impacts, risks, and adaptation in the United States: Fourth National Climate Assessment (Vol. 2, pp.

Source 2: Quantifying economic impacts of climate change under nine future ...
Supported by advances in the development of theoretical-numerical economic modelling, there is a growing body of literature on the global economic impacts associated with climate change, based on integrated assessment models (IAMs; IPCC, 2014).Quantifying and narrowing the uncertainties in the multiple physical and socio-economic processes associated with climate change is the biggest

Source 3: The socioeconomic impact of climate change in developing countries over ...
Various studies indicate climate change's extensive impacts on the economy ((((human health [8,9], water resources , food systems ((((economic growth (((((labor productivity , energy markets , and poverty . The review prioritized studies with a strong quantitative orientation to measure the future impact of climate change on socioeconomic indicators. Overall, country-specific studies are underrepresented in the literature, indicating a need for more evidence to establish the heterogeneity of climate change's impact on socioeconomic

indicators across different countries. Out of 139 reviewed studies, 47 assessed climate change's impact on agricultural productivity, primarily focusing on food security measures.

Source 4: The economic commitment of climate change | Nature
Manage preferences for further information and to change your choices. Skip to main content * News * Books & Culture * Current issue * Browse issues * Send a news tip _Energy Econ._**46**, 576–592 (2014). Press, 2015). _The Green Swan_ (BIS Books, 2020). Res. Lett._**16**, 094037 (2021). Res. Lett._**17**, 084038 (2022). Res. Lett._**48**, e2021GL094086 (2021). Economic impacts of tipping points in the climate system. _Nat. Sustain._**4**, 101–108 (2021). _Q. J. Econ._**137**, 2037–2105 (2022). Res. Lett._**16**, 114010 (2021). European Institute on Economics and the Environment, Working Paper 22-1 (2022). _Q. Res. Lett._**11**, 084003 (2016). & Yamagata, Y. Xue, T., Zhu, T., Zheng, Y. & Zhang, Q. Res. Lett._**16**, 104050 (2021). ISSN 1476-4687 (online) ISSN 0028-0836 (print) * Press releases * Press office

Source 5: 38 trillion dollars in damages each year: World economy already ...
Topics Open submenu About Open submenu Close submenu About Software Project Management Open submenu Close submenu Software Project Management Projects Open submenu Publications Open submenu Close submenu Projects Close submenu Publications Publications Open submenu Projects Open submenu Close submenu Publications Close submenu Projects Projects Open submenu Close submenu Event-based modeling of economic impacts of climate change Close submenu Projects Publications Open submenu Projects Open submenu Close submenu Publications Close submenu Projects Public Economics and Climate Finance Open submenu Close submenu Public Economics and Climate Finance Board of Directors Open submenu Close submenu Board of Directors Publications Open submenu Projects Open submenu Close submenu Publications Close submenu Projects Close submenu Climate & Weather Potsdam 2005 Open submenu Close submenu 2005

How effective are current global climate mitigation policies in reducing greenhouse gas emissions, and what are the key barriers to greater effectiveness?
Source 1: A review of successful climate change mitigation policies in major ...
Global replication of successful sector-level policies and their performance will definitely reduce greenhouse gas emissions by 2030 compared to levels achieved under current policies. Even so, the resulting level of sector progress still does not keep the world on track to measure up to the challenge of meeting the temperature limits of the

Source 2: Government policies work to reduce greenhouse gas emissions
Climate protection efforts have not been in vain. Policies have already led to a discernible reduction in greenhouse gas emissions." To conduct this literature review study, the researchers pulled together more than 1,500 papers, and analysed the results from more than 300 of these studies on the effects of greenhouse gas regulation.

Source 3: Effectiveness of 1,500 global climate policies ranked for first time

The study, led by Climate Econometricians at the University of Oxford, the Potsdam Institute for Climate Impact Research (PIK), and the Mercator Research Institute on Global Commons and Climate Change (MCC), analysed 1,500 observed policies documented in a novel, high quality, OECD climate policy database for effectiveness.

Source 4: Climate policies that achieved major emission reductions: Global ...
Meeting the Paris Agreement's climate objectives necessitates decisive policy action ().Although the agreement seeks to limit global average temperature increase to "well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C," its success critically hinges on the implementation of effective climate policies at the national level.

Source 5: Climate Policies with Real-World Results
These are real policies in countries with very different income levels and political contexts. They provide invaluable insights on how countries actually design and implement climate policies, and on the hard compromises that doing so can require, such as the rapid expansion of solar power in India, the use of waste to generate affordable energy in Mexico, and the greening of Colombia's

What are the primary social and political factors influencing public perception and acceptance of climate change science and proposed solutions?
Source 1: Perceptions of climate change - ScienceDirect
Originating in social psychology, the values framework of Schwartz (1994) has been utilized in several studies showing that the endorsement of "self-transcendent" values—encompassing an emphasis on protecting and caring for other people—is associated with acceptance of the reality of climate change and level of concern about this issue

Source 2: Public Perception of Climate Change: The Importance of ... - PubMed
Also, cultural worldviews and climate-relevant knowledge appeared important for people's willingness to change behaviors and to accept climate change policies. In addition, different types of knowledge were found to have different impacts on people's concern about climate change, their willingness to change behaviors, and their acceptance of

Source 3: Predictors of public climate change awareness and risk perception ...
Climate change is a threat to human societies and natural ecosystems, yet public opinion research finds that public awareness and concern vary greatly. Here, using an unprecedented survey of 119

Source 4: PDF
vide little insight into the determinants and components of public risk perception. For example, a critical finding of recent research on risk perception is that public perceptions are influenced not only by scientific and technical descriptions of dan-ger, but also by a variety of psychological and social factors, including personal

Source 5: Characterizing public perceptions of social and cultural impacts in ...

Values (Environmental) Values (Cultural) Water quality: the quality of water resources, affecting humans or nature: Local practices: long-established food gathering, hunting, and access to nature: Climate change: greenhouse-gas emissions and amounts or timing of climate change effects: Identity: how people view themselves and the roles that make them feel part of the larger community

To what extent does climate change exacerbate existing inequalities in access to resources and essential services, and what are the potential mitigation strategies?
Source 1: Climate change inequalities: A systematic review of disparities in ...
Inequitable access to climate change mitigation and adaptation strategies can exacerbate existing social vulnerabilities and enhance disparities in the impacts of climate change. Despite advances in the development of sustainable adaptation and mitigation strategies, the extent to which access to practical initiatives is equitable across the

Source 2: Linking Climate and Inequality
But unmanaged climate change threatens to set back that progress by damaging poverty eradication efforts worldwide, and disproportionately affecting the poorest regions and people. Climate risks disproportionately affect the poorest countries and people, who are more exposed and more vulnerable to their impacts. Such actions need to be complemented by measures to offset the costs on the poor and vulnerable across and within countries. By hitting the poorest hardest, climate change risks both increasing existing economic inequalities and causing people to fall into poverty.

Source 3: Climate Change Is Already Exacerbating Current Social Inequities
Recently, the 10 essential public health services were updated, and they encapsulate perfectly how we need to respond to the climate crisis. 5 In their article, Zacher et al. demonstrate the use of longitudinal data to determine the root causes of health disparities and inequities as they relate to long-term physical health symptoms caused by

Source 4: EPA Report Shows Disproportionate Impacts of Climate Change on Socially ...
EPA Report Shows Disproportionate Impacts of Climate Change on Socially Vulnerable Populations in the United States Climate Change and Social Vulnerability in the United States: A Focus on Six Impact Sectors is one of the most advanced environmental justice studies to date that looks at how projected climate change impacts may be distributed across the American public. EPA's new, peer-reviewed report shows the degree to which four socially vulnerable populations— defined based on income, educational attainment, race and ethnicity, and age—may be more exposed to the highest impacts of climate change. Today's analysis will help further efforts being taken by the Biden Administration across the Federal government to advance environmental justice and to address the disproportionate impacts that climate change is having on vulnerable communities.

Source 5: Social Dimensions of Climate Change - World Bank Group
The Bank adopts a whole-of-society approach, working with national and local governments, civil society, grassroots communities, and other partners to strengthen social resilience at the

ground level, where the effects of climate change are typically felt the most, and to promote meaningful engagement of all stakeholders in climate change decision-making and action. Channeling resources and decision-making power to support locally led climate action: Supporting devolved climate finance and community and local development approaches that empower communities to drive a climate agenda in support of their development goals; promoting greater transparency and accountability on climate finance; aligning and linking locally led climate action to national climate change priorities and strategies; supporting work to strengthen M&E of resilience and adaptation; and supporting financial inclusion for better and resilient jobs are all critical components.

How are different ecosystems (e.g., coral reefs, forests, arctic tundra) responding to climate change, and what are the potential cascading effects on biodiversity and ecosystem services?
Source 1: Climate change effects on biodiversity, ecosystems, ecosystem services ...
Climate change affects individual species and the way they interact with other organisms and their habitats, which alters the structure and function of ecosystems and the goods and services that natural systems provide to society (Díaz et al., 2019). Periodic assessments of current and future climate change impacts on ecosystems are important for developing and updating natural resource management plans and evaluating adaptation actions (West et al., 2009). We provide a more in-depth, technical analysis of topics of interest to scientists and practitioners, and review climate change impacts at multiple scales, including: 1) the individual organisms, populations, and species of biodiversity which comprise ecosystems; 2) the properties and processes that characterize ecosystems; and 3) the goods and services that ecosystems provide which support human economies and well-being (Fig. 1).

Source 2: Ecosystems, Ecosystem Services, and Biodiversity
The ability to predict ecological responses to changing climate conditions remains a key gap for most ecosystems because of complex interactions among species, the potential for adaptation (through both evolutionary responses and human activity), and the intersection of climate change with other drivers of change.36,285,286 For example, warmer temperatures can lead not only to increased forest regeneration and tree growth but also to increased mortality of older trees through wildfires, insects, and disease, with the resulting net impacts highly uncertain.287 Warmer winters are generally expected to benefit forest pests,288 but complex interactions among pests, their hosts, and other disturbances can make the combined effects more muted than otherwise expected.289,290,291 Recent research suggests that multiple disturbances can have counteracting effects, although patterns are not always clear, and sometimes intensified combined effects (synergies) also occur.292,293

Source 3: 12 Different Types of Ecosystems and Why They Are Important - Outforia
Climate change has the potential to impact ecosystems all over the world. Ecosystem health is intrinsically tied to the planet's health but is greatly threatened by climate change. As each ecosystem is a delicate balance of abiotic and biotic components, the disruption of abiotic components would greatly change the ecosystem.

Source 4: Climate Change Impacts on Ecosystems | US EPA - U.S. Environmental ...

Climate Change Impacts on Ecosystems | US EPA Climate Change Impacts on Ecosystems People are taking many actions to help ecosystems adapt to climate change impacts or minimize the effects. Climate change affects ecosystems at multiple levels, from the populations that make up ecosystems to the services they provide to communities, economies, and people. EPA's Seasonality and Climate Change report walks through four main themes threatening ecosystems in the United States. Climate change is affecting some of the critical services that ecosystems provide to society.13 For example, ecosystems provide a bounty of food to people. We can limit climate change's impacts on ecosystems in several ways, including the following:

Source 5: Climate Change, Coral Reef Ecosystems, and Management Options for ...
We highlight coral reef ecosystems because it was beyond the scope of this review to comprehensively cover all types of marine ecosystems and because severe impacts on coral reefs such as mass bleaching events have been evident for decades and have been a topic of considerable research (e.g., Hoegh-Guldberg and others 2007a; Baker and others 2008).

What are the most promising technological innovations for carbon capture and storage, and what are the associated environmental and economic trade-offs?
Source 1: What are the Most Promising Carbon Capture Technologies in 2025?
The Most Promising Carbon Capture Technologies in 2025: DAC, Amine Scrubbing, and Membrane Systems Amine scrubbing remains the most widely deployed carbon capture technology in industrial settings, with continued innovations driving efficiency improvements. Membrane technology has emerged as one of the most promising developments in carbon capture, offering significant advantages in terms of operational simplicity and energy efficiency. The economic landscape for carbon capture continues to evolve, driven by technological improvements and supportive policy frameworks. While each carbon capture technology offers distinct advantages, the most promising solutions in 2025 demonstrate significant improvements in cost-effectiveness and operational efficiency. Direct air capture shows potential for negative emissions at scale, amine scrubbing continues to dominate industrial applications, and membrane systems offer an increasingly attractive alternative for specific use cases.

Source 2: 4 Cutting-Edge CCS Technologies Reshaping the Future of Carbon Capture
As highlighted in the Global CCS Institute's CCS Technologies 2024 report, these innovations are reshaping industries like petroleum and energy, playing a pivotal role in the global energy transition. Central to the technology are the oxy-combustor and CO 2 convective reformer, which utilize oxy-combustion and heat integration to improve thermal efficiency while eliminating the need for energy-intensive carbon capture systems (Fig. 1). The DMX process, developed by IFPEN and marketed by Axens, is a second-generation carbon capture technology that uses a demixing solvent to reduce energy consumption by nearly 30% compared to traditional mono ethanol amine-based processes (Fig. 4). energy transition, energy education, carbon emissions, carbon capture and storage, Baker Hughes, innovation, sustainability, engineering education Image 14: ENGSOLAR Energy Transition Boston University Alumni Develop Clean Solar Panel Technology January 7, 2025 • The Way Ahead

Source 3: Top 10 Innovations in Carbon Capture Technology You Should Know

Top 10 Innovations in Carbon Capture Technology You Should Know Ocean-Based Carbon Capture: Harnessing the Blue Planet’s Power By working with the rhythms of the sea, ocean-based carbon capture could become a vital piece of our climate solution puzzle. But new carbon capture technologies are offering hope. Technologies like post-combustion capture grab CO2 from flue gases, while oxy-fuel combustion burns fuel in pure oxygen, making it easier to separate out the carbon. As the world shifts toward renewable energy, carbon capture allows existing plants to bridge the gap—cutting emissions while new technologies scale up. This partnership between public policy and private innovation is fueling a race to make carbon capture mainstream, affordable, and effective everywhere. Future of Carbon Capture Technology: A World of New Possibilities

Source 4: Carbon capture, utilization, and storage (CCUS) technologies ...
It is noteworthy that if carbon capture and storage technologies are not taken into consideration, the cost of lowering emissions will increase drastically by 140% (Kearns et al., 2021). Pre-combustion carbon capture (Hua et al., 2023). Post-combustion carbon capture technologies (Chao et al., 2021). Physical or chemical absorption procedures can be used to separate the H2 and CO2 combination in the pre-combustion process by syngas scrubbing with a liquid solvent that is selective to carbon dioxide and hydrogen sulphide as acid compounds (Kheirinik et al., 2021). Post-combustion carbon capture is a technology that uses physical or chemical adsorption/absorption techniques to extract CO2 and other gases from burning fossil fuel resources (Chao et al., 2021).

Source 5: What's needed for carbon capture and storage (CCUS) to take off
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Conclusion
This report has provided a comprehensive overview of Climate Change by addressing key questions. Further research could explore additional dimensions or emerging trends in this area.