Global Change Research Needs and Opportunities for 2022-2031

Committee to Advise the U.S. Global Change Research Program

Discussion with GUIRR

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The National Academies of SCIENCES ENGINEERING MEDICINE

U.S. Global Change Research Program

- Interagency program (13 agencies and departments) established by Congress (Global Change Research Act of 1990)
- Coordinates federal research and investments in understanding the forces shaping the global environment, both human and natural, and their impacts on society
- Conduct a synthesis of climate impacts and trends across U.S. regions and sectors every four years in the National Climate Assessments (NCAs)
- Coordinates U.S. research activities with other nations and international organizations

Committee to Advise the USGCRP

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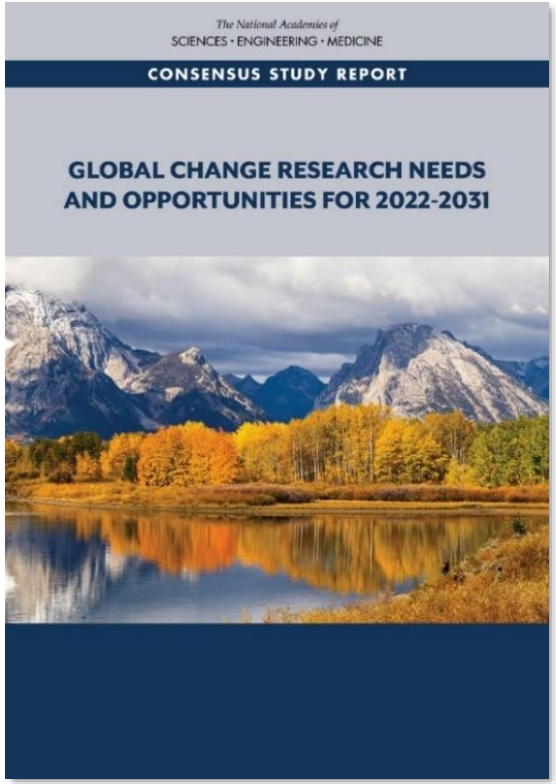
Charge for this Report

- **RISK IDENITIFCATION –** Identify the most critical global change risks likely to face the nation and the world in the **next decade**.
- **RESEARCH PRIORITIES –** Recommend priorities for natural and social science research needed to advance understanding of these risks, and to support decision making at local to national scales.
- **POLICY RELEVENCE –** Discuss opportunities for USGCRP participating agencies and other partners to advance the identified research priorities and applications to decision contexts.



A New Approach is Needed

- There is an urgent demand for effective, science-based policies to limit climate change and to manage its consequences. ***Traditional climate research is not fully meeting decision-maker needs***
- To produce the scientific understanding needed to inform its climate change policies, the nation requires ***a USGCRP commensurate with the scope, scale, and urgency of climate change and other global change challenges***
- GCRA mandates the Program to “provide usable information on which to base policy decisions relating to global change” (PL101-606). ***This information needs to be more than usable, it should be useful and easily used***

Focus First on Urgent Risks to Americans' Well-being

- Most urgent risks to address are those to the security of critical human systems: ***health, food, water, energy, transportation, economy, and national security***
- The sustained security of these systems in a changing climate will be a major consideration over the coming decade
- Risks to these systems are interconnected and interdependent in complex ways
- Understanding risks will require an ***integrated, systems-based risk framing*** to identify research priorities

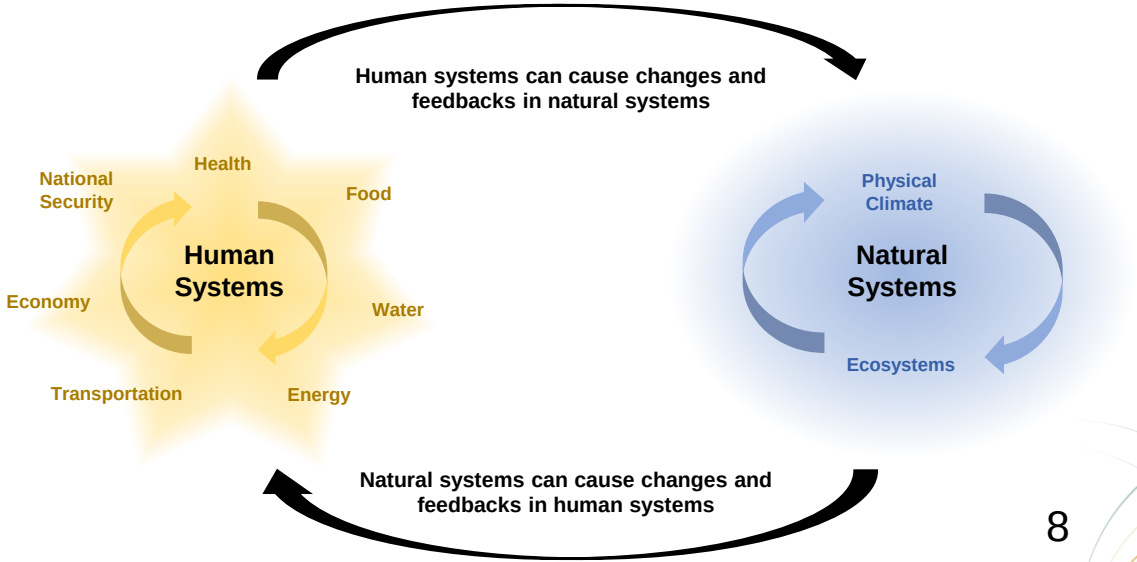
Build on a Foundation of Observations, Modeling, Analysis and Communications

"The committee strongly supports efforts to **observe, model, analyze and communicate** the physics and biogeochemistry of the climate system and the many mandated and other activities of the USGCRP including conducting assessments. The committee assumes these efforts and activities will continue in the coming years."

Recommendations 1 & 2

Apply an *integrated risk-framing approach* to identify research priorities for the next 10 years that provide insights to avoid the worst potential consequences of urgent risks to human and natural systems from current and future climate change.

Accelerate the integration and communication of research on *coupled human and natural systems* to advance understanding of effective options for managing urgent climate change risks at local to international scales.



Recommendation 3

Prioritize research related to managing climate risks:

- *Mitigation* – setting science-based mitigation goals; improving emissions measurement and monitoring; exploring a range of CO_2 removal and sequestration techniques;
- *Adaptation* – conducting new research; enhancing coordination; and expanding communication; and
- *Synergies and tradeoffs*

Recommendation 4

Expand research in *five crosscutting areas*:

1) extremes, thresholds, and tipping points;
2) regional- and local-scale climate projections;
3) scenario-based approaches;
4) advanced data and analysis frameworks; and
5) equity and social justice

Recommendation 5

The USGCRP should explore (a) *organizational* and (b) *operational* changes to enhance the relevance and effectiveness of its work.

“Organizational” Changes

- ***Reallocate existing resources*** within the Federal agencies and departments that make up USGCRP today;
- ***Include relevant Federal agencies and departments*** not formally engaged with USGCRP;
- ***Acquire additional Federal funds*** to support new research initiatives;
- ***Foster public-private partnerships*** to expand the intellectual and financial resources supporting critical global change research.

“Operational” Changes

- ***Prioritize diversity*** in both the Program and USGCRP activities by greatly expanding efforts to be inclusive and representative, and ***prioritize justice*** with research that highlights consequences and opportunities for underserved communities;
- ***Increase the usability and relevance of research by adopting a co-production approach*** to research, recommitting to the sustained assessment process, and establishing a standing user working group or advisory mechanism as a forum for input on user needs;
- ***Advance program integration and accountability*** by increasing transparency of the management structure and criteria for setting priorities, sequencing investments, and guiding development of an integrated program across the individual agencies; and
- ***Develop a strategy for monitoring, evaluation, and learning for the Program’s activities***, including the next strategic plan, with flexibility for setting priorities and activities to adapt to and incorporate learning on an ongoing basis.

Two Final Thoughts

- ***Increased investment in social science research is needed*** to improve understanding of the:
  - consequences of climate change, including for migration, global security, supply chains, governance, human health, etc.
  - behavioral, institutional, and political drivers at different scales
- The committee ***urges USGCRP to be bold in crafting its new strategic plan***. USGCRP has an opportunity to put forward a strategic plan that explains how global change research contributes to the knowledge set needed to address multiple interrelated challenges and ***prepare society to create a more resilient future***

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