



# AMERICAN GEOGRAPHICAL SOCIETY

A Sustainability White Paper

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## Envisioning A Sustainable Planet: A Geographical Framework for Sustainable Development

Based on the AGS 2016 Fall Symposium, Geography 2050:  
Envisioning A Sustainable Planet held at Columbia University

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## Introduction

Independent of one's view of the efficacy of the world-wide Paris Climate Change agreement, critical ecosystems are increasingly under threat, and conserving and restoring ecosystems globally is key to promoting sustainable futures. Sustainability challenges have distinct geographical dynamics, crossing political jurisdictions and natural boundaries alike in their own unique ways. Solutions to such sustainability challenges, likewise have their own effective geographical contexts with their own environmental, political, economic, and engineering realities. Together, industry, science, government, and the social sector must begin to understand our planet's sustainability challenges through a shared geographical lens, if we are to design meaningful solutions for our children everywhere in the world. The perspectives and strategies that a geographically-informed view suggest can be employed to design a sustainable world, if we choose to act. This white paper offers leaders in both the public sector and private enterprise a geographically-informed framework for confronting sustainability challenges facing the planet in the decades to come.

We start from the understanding that the ecosystems that frame the human habitat are globally interconnected, will continue to undergo great stresses and change in future decades as a result of natural processes and human use of the Earth, and will forever affect our collective wellbeing. That impact could be positive if we address existing challenges wisely, or it could be negative if the challenges are ignored. We share an appreciation of what scholars and policy makers in government, private enterprise, and the not-for-profit world bring to understanding biophysical systems and their economic and social impact, and the impact that modification and change to these systems have on the lives and livelihoods of people everywhere. We especially commend to readers an understanding of scale—that an effect in one locality or region or nation can have systemic effects elsewhere, and that the accumulation of local and regional effects is the greatest threat we face to future human and national security, social relationships, and economic opportunities. Sustainable futures call for ensuring that human actions have economically and socially beneficial outcomes within natural processes, and that humans learn the lessons of conservation—how to curate the Earth for the future, not simply exploit it for the present.

In the end, we know this: Unsustainable development brings grave risk. And while risk may be more acute in some geographical contexts than in others, the inter-connectivity of our planet's natural processes mean that these risks will necessarily expand and spread well beyond their initial points of impact to affect even the most distant locales, regions, and states. How do we sustain ourselves and our children in the face of this risk? And how do we engage in robust and constructive public debate about the matter to build the necessary consensus to proceed? Thinking geographically is a necessary first step.

This white paper was compiled and edited by Joseph S. Wood, University of Baltimore, for the Council of the American Geographical Society.

# Sustainability

In 1987, the World Commission on Environment and Development (WCED) defined sustainability as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED 1987). Since then, sustainability has emerged as the guiding principle for longer-term development, even if we have not fully grasped what that means for our everyday lives. Drawing on the AGS/Earth Institute 2016 Conference, Geography2050, we posit four essential and interrelated reasons for why sustainability is essential to social and economic safety and health for our nation and the world:

1. We must recognize how natural systems work. Many resources are renewable while many are not. Use of some resources is sustainable and use of others is not. Use affects some ecosystems in sustainable ways and others in unsustainable ways. Because resources are embedded in both human and natural systems, interventions of any kind have effects not only locally but “downstream” regionally, nationally, and globally. Human sustainability requires understanding natural processes and systems at each of these scales, even as we find evidence of natural system-induced environmental modification around us every day.

The most immediately important natural process is the carbon cycle. It operates at multiple scales, and when more carbon is produced in the atmosphere than captured from the atmosphere, it affects global climate patterns. At the local level it causes dense smog under temperature inversions as in London in 1953, Los Angeles in the 1960s, or Delhi and Beijing in 2016. Carbon emissions reduce worker productivity and cause lung diseases that kill thousands of people a year. Emissions also induce a heat island effect, exacerbating summer temperatures in densely populated areas.

Extreme weather events associated with increasing global temperature, such as storms and droughts, destroy houses, offices, roads, critical public utilities, and farmland.

The best antidote is to decrease emissions and increase carbon dioxide capture through plants and clean oceans. In the meantime, however, we clear more and more global tree acreage annually and global temperature continues to rise, leading to ice melt, increased coastal flooding, and more frequent extreme weather events. It is not incidental that deforestation in Brazil is implicated in Arctic ice melting which in turn exacerbates coastal flooding in Florida. That is how natural systems work, and why we must understand them to chart a sustainable path.

2. We must recognize that global security and sustainable development are intertwined. Conflict over essential resources—water, food, energy, shelter—affects everyone, with repercussions across boundaries that can extend conflict and force migration regionally, nationally, and globally, making any of us vulnerable. National homeland security depends on reducing conflicts,

many of which have an environmental dimension. Had we monitored the negative environmental impact of oil drilling in Nigeria over recent decades, might we have been able to intervene and preclude the rise of Boko Haram as a business, political and military actor?

Among the greatest risks we face anywhere on earth result from impacts on natural systems elsewhere. According to the World Economic Forum (WEF 2017) the greatest immediate risks we face are water availability crises—think too much water in Bangladesh and too little in California—and extreme weather events—think desertification in Africa and hurricanes in the United States. When these outcomes are purposefully caused, as in the draining of the lower Tigris and Euphrates “Garden of Eden” swamps by Saddam Hussein, they can cause or perpetuate crises for large numbers of people who may turn to or on others to save themselves. No resolution of the Israel-Palestine issue will result without dealing with water security for both parties. No solution in southern Sudan is possible without the development of a sustainable approach to meeting food needs and exploiting oil resources. In the meantime, the United States is forced to determine how to deal with refugees fleeing resource issues almost everywhere in the world—a homeland security matter.

The most effective antidote to conflict over resources is broad-based sustainable futures for all. Any other solution that fails to address sustainability ensures continued conflict, which is why the US military regards climate change and global warming as critical national security issues for which it must plan.

3. We must recognize that economic security depends on global security, and that sustainability offers incredible opportunities for constructive business development. Venture capitalism and the market are already moving at increasing speed toward supporting renewable resources and sustainable economics. We cannot know how humans will react to the next resource crisis, but if we work to build a sustainable economy through sustainable practices, we accomplish more for our fellow humans than by pursuing unsustainable development. Opportunities for transformation of land and water systems for most effective uses—to ensure sustained clean air and water and to provide food—can improve the quality of life for all of us.

Energy is singularly important here. Whether we work to sustain present levels of production of carbon-based, non-renewable energy sources or not, we know that the world’s economy is increasingly reliant on renewable sources of energy. Private capital investment in energy infrastructure no longer needs tax credit incentives to ensure control and security over energy sources. Private investment has a huge impact on development of alternative energy power plants, and distributed energy generation is one of the waves of the future. Subsidies were helpful to get things going, but they are no longer required. Large consumers are making commitments to be 100 percent renewable—note the recent Google announcement (Holzle 2016)—which is helping to expand the alternative energy sector. Major consumers, such as China, have also become leaders in renewable/alternative energy sources.

The Chinese understand the importance of building sustainable infrastructure.

With ice melt, the Arctic is now open to seasonal shipping, extractive industries, military installations and increased human settlement, and we are challenged to think about the region's conservation—not to preclude its use but to ensure a sustainable future. Drilling threatens sustainability, but routing trade and developing ecotourism offer potentially sustainable economic opportunities, if implemented sensitively. At a different scale, we are learning that suppression of wildfire, which may only get worse than it is in California, has a cost greater than that of letting forests evolve naturally. The problem presents an economic opportunity, even as it raises fundamental questions: How do we restore the original ecology of fire lands and rebuild sustainable communities out of range of fires, in order to reduce the continued risk of life and property loss? Alternatively, outdoor recreation, nature tourism, and leisure travel, already major economic drivers in the global economy, offer minimally consumptive, sustainable economic opportunities, especially for otherwise economically marginal and protected areas of the globe, including national parks or protected marine areas.

4. We must recognize that sustainability is not just about the environment; it is about people and their lives—about human security—from the most vulnerable among us to the most privileged. It is about human security, public health, and public safety on the one hand and equity in pursuit of happiness on the other. It is about personal realization; it

is the moral thing to do to ensure that all of our fellow citizens have the opportunity to escape poverty or avoid falling into it.

Too many people already face insecurity in terms of food, water, shelter, and energy. Sustainable practices offer a means to help them achieve sufficient levels even as we ensure long-term sustainable sufficiency to the larger society. At the local scale, green-policy efforts—such as making cities more human and compatible using green infrastructure—pays sustainable dividends. New York City has purchased rural land as a protected watershed for its potable water supply, while in Chicago tree planting reduces temperatures and diminishes the incidence of heat stroke and reduces runoff filtration needs. Likewise, foreign assistance with performance measures provides an opportunity to enhance public health and reduce poverty while sustainably increasing food production. There is great potential in restoring degraded lands that could be planted with food while absorbing carbon dioxide particularly in shrinking cities that have endured de-industrialization. The Dutch are “making room for water” to avoid dependence on unsustainable structural defenses against coastal flooding.

Crime prevention is also a sustainability issue, and we can enhance human security and public safety by reducing criminal activity. Crime, especially in conflict zones are key areas of concern for enhancing public safety by undertaking sustainable approaches aimed at reducing the poverty and inequality that often lead to criminal activity.

## Developing Sustainably

We also posit five essential and interrelated principles for how to accomplish sustainability for future beneficial social and economic outcomes:

1. Sustainable futures start with recognizing how systems work at multiple scales and how repercussions can extend across the whole range of ecosystems. For instance, we know that edges or boundary zones—ecotones in environmental speak—are most sensitive to change: coastal zones in terms of sea-level rise, semi-arid areas in terms of desertification, periglacial zones in terms of increasing temperature, or biome transition zones with respect to deforestation. These are where everyday hazards are most prevalent. What we do through intervention to ensure positive effects on natural systems anywhere should have a beneficial effect everywhere, since all impacts have downstream effects.

Much of what occurs through natural processes is invisible, but an albatross carcass full of plastics (washed into storm drains and thence into the oceans looking very much like plankton) or plastic yellow baby ducks (lost from a ship out of China and collecting on the west coast of the United States) offer compelling documentation of these natural processes, even as they present a huge problem for ocean health. Recall too that parts of the Malaysian airliner lost south of Australia have washed ashore on east coasts of Indian ocean islands. These images demonstrate how widespread ocean currents are, how far things can travel across oceans, and how no place is immune from interventions in natural systems, both positive and negative.

Hence improved human sanitation and sewer overflow reduction at the local level have real positive effects. Primary treatment of human waste has been enough to change the quality of the Thames River and reductions in nitrogen-based fertilizer have increased both agricultural efficiency in the Chesapeake Bay watershed and water quality in the bay itself.

Some interventions in natural processes can have counter intuitive outcomes. We certainly know that indigenous people who control land in Brazil have a comparatively good record of forest preservation. Fire suppression will cost more in the long run than reducing the forest fuel load; reducing forest loss in one ecosystem and reducing forest cover in another are both strategies for conserving naturally occurring ecosystems.

2. Sustainability must recognize scales of action—that our realms of action must be local, regional, national, and global.

People who live on the ocean know how change affects their immediate lives. That drives them to sustain fishing for generations, not eliminate it. But they cannot alone respond to the prospect of fish species relocation or coastal flooding induced elsewhere. Actions by state actors that reduce forest cover not only dispossess indigenous peoples—forcing migration to cities or other countries. They also affect measurable carbon loads in the

atmosphere. At the neighborhood scale, such things as maintaining tree cover to reduce heat gain from paved surfaces in residential neighborhoods saves real energy costs for air conditioning.

3. Open, sharable data from multiple sources and at multiple scales provides essential knowledge to carry out sustainable development. Federal, state, and local governments collect tremendous amounts of population, social, economic, and environmental data. Some data come from simple counting and other from sophisticated methods such as satellite remote sensing. Some are highly localized and others global in reach. Data are presented in numerous ways from simple tables and maps to sophisticated geographic information systems. Some data are highly classified, other data should be, and usually are, open and sharable. The National Geospatial Intelligence Agency, for instance, uses geospatial technology to enhance humanitarian relief and conversation, polar navigation, real-time fire imagery, post-earthquake damage assessment, extreme weather monitoring, or expansion of illegal mining. Such data resources present opportunities to promote sustainability to preclude future impacts.

Nonprofits also gather important open and shared data: Global Forest Watch collects data on an interactive map of forest loss and makes the data available for researchers and policy makers. Global Forest Watch also uses machine learning to project where forest loss will occur. Community groups can use such information to push for changes with a range of positive impacts for the communities they represent.

4. Sustainability is most likely to be

embraced if efforts are made to communicate about levels of confidence in taking on risk, as any good business person does now, and we should assume that taking no action bears the most risk.

It is important neither to exaggerate nor underestimate effects of interventions in natural systems. To ensure sustainability, we need to monitor retrenchment of conservation, train a new generation of sustainability leaders, redouble efforts to communicate clearly, and share the level of certainty around evolving issues.

Tracking change can be good for business. The British XL Catlin Insurance Co. exemplifies the business opportunity of assessing risk. It monitors systems impacts at a range of scales, noting from its own research that oceans are changing at a rate far in excess of any time in the last 65 million years. Catlin is pushing science forward to promote understanding of temperature change in oceans on storm intensity, sea-level rise, food security, sea-ice loss, ocean acidification, and every combination of these.

5. Sustainability must recognize that action to ensure success must be participatory. We are reminded of the old Earth Day slogan—*think globally and act locally*. People feel left out when treated as if they do not matter, but we also need to improve people's understanding of issues and risks, listen to them, and encourage informed debate. States, municipalities and non-profits have been taking ever stronger leadership roles on environmental protection, but without shared understanding of the imperative for sustainable development, we will have disjointed policy and uneven implementation.

## Conclusion

As we face the future, we have choices. We can try to engineer one-offs in response to changes in the environment or we can develop a comprehensive sustainable future, one that uses natural systems to sustain humanity. Metaphorically, we can move to safe ground and curate that ground for sustainable development, or we can try to defend unsafe ground from the forces of natural systems. Natural systems, threats to national security, opportunities for building new markets, and aspirations for reducing global, national, and local inequalities all benefit from sustainability. We should think of sustainable development as akin to the search for a sailing route from Iberia to India, the search for a Northwest Passage, or the effort to put a man on the Moon. There is no downside to sustainability, if we choose it.

### Citations

Holzle, Urs. "We're set to reach 100% renewable energy—and it's just the beginning." Google. Google, 06 Dec. 2016. Web. 16 May 2017.

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WEF, World Economic Forum. "The Global Risks Report 2017." The World Economic Forum, 11 Jan. 2017. Web. 16 May 2017.

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## AMERICAN GEOGRAPHICAL SOCIETY

The American Geographical Society (AGS) is a 21st century learning society dedicated to the advancement of geographic thinking, knowledge, and understanding across business, government, academe, social sectors, and most importantly with teachers and students. Established in 1851, AGS is the oldest professional geographical organization in the United States. It is recognized worldwide as a pioneer in geographical research and education for over 166 years. The mission of AGS is to advance and promote geography in business, government, science, and education. Our goal is to enhance the nation's geographic literacy so as to engender sound public policy, national security, and human well-being worldwide. AGS seeks to engage the American public, from its youngest to its oldest citizens, with new and amazing ways to understand and characterize our changing world. The Society maintains its headquarters in New York City.

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