

Preserving biodiversity, and energy & climate change, in USA

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Many thanks to Kangwon Law School, and particularly to Professor SungJa Cho for inviting me today. I remember fondly her visit with excellent students from your University to my Pace University Law School, so it is good to reciprocate.

There no longer is any doubt that climate change is proceeding at unprecedentedly rapid rates and that the global warming that results is the greatest threat to life on earth and to its environment in history. The results are already evident in sea level rise, increased draughts, floods, the intensity and frequency of storms, effects on agriculture and in particular food supplies, and many other essential aspects of life.

A less discussed but equally devastating consequence of climate change is its effect on biodiversity. The rapid change of climate is contributing to the destruction of forests that are home to many of the species essential to life and the environment, the increase in acidity of the oceans and elimination of coral reefs threatening the fisheries on which much of the world depends for food, the melting of glaciers essential to the supply of drinking water, the elimination of species essential to supplies of medicines, and many other biodiversity effects.

Current rates and magnitude of species extinction far exceed normal background rates. Human activities have already resulted in the loss of biodiversity and thus may have affected goods and services crucial for human well-being. The rate and magnitude of climate change induced by increased greenhouse gases emissions has and will continue to affect biodiversity either directly or in combination with other drivers of change

There is ample evidence that climate change affects biodiversity. According to

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the Millennium Ecosystem Assessment, climate change is likely to become one of the most significant drivers of biodiversity loss by the end of the century. Climate change is already forcing biodiversity to adapt either through shifting habitat, changing life cycles, or the development of new physical traits.

Conserving natural terrestrial, freshwater and marine ecosystems and restoring degraded ecosystems (including their genetic and species diversity) is essential for the overall goals of both the Convention on Biological Diversity and the United Nations Framework Convention on Climate Change because ecosystems play a key role in the global carbon cycle and in adapting to climate change, while also providing a wide range of ecosystem services that are essential for human well-being and the achievement of the Millennium Development Goals.

Biodiversity can support efforts to reduce the negative effects of climate change. Conserved or restored habitats can remove carbon dioxide from the atmosphere, thus helping to address climate change by storing carbon (for example, reducing emissions from deforestation and forest degradation). Moreover, conserving in-tact ecosystems, such as mangroves, can help reduce the disastrous impacts of climate change such as flooding and storm surges.

Ecosystem-based adaptation, which integrates the use of biodiversity and ecosystem services into an overall adaptation strategy, can be cost-effective and generate social, economic and cultural co-benefits and contribute to the conservation of biodiversity.

Conservation and management strategies that maintain and restore biodiversity can be expected to reduce some of the negative impacts from climate change; however, there are rates and magnitude of climate change for which natural adaptation will become increasingly difficult. Options to increase the adaptive capacity of species and ecosystems in the face of accelerating climate change include:

Reducing non-climatic stresses, such as pollution, over-exploitation, habitat loss and fragmentation and invasive alien species.

Wider adoption of conservation and sustainable use practices including through the strengthening of protected area networks.

Facilitating adaptive management through strengthening monitoring and evaluation systems.

Ecosystem-based adaptation uses biodiversity and ecosystem services in an overall adaptation strategy. It includes the sustainable management, conservation and restoration of ecosystems to provide services that help people adapt to the adverse effects of climate change. Examples of ecosystem-based adaptation activities include:

- Coastal defense through the maintenance and/or restoration of mangroves and other coastal wetlands to reduce coastal flooding and coastal erosion.
- Sustainable management of upland wetlands and floodplains for maintenance of water flow and quality.
- Conservation and restoration of forests to stabilize land slopes and regulate water flows.
- Establishment of diverse agroforestry systems to cope with increased risk from changed climatic conditions.
- Conservation of agrobiodiversity to provide specific gene pools for crop and livestock adaptation to climate change.

For many species, the climate where they live or spend part of the year influences key stages of their annual life cycle, such as migration, blooming, and mating. As the climate has warmed in recent decades, the timing of these events has changed in some parts of the world. Some examples in the U.S. are:

- Warmer springs have led to earlier nesting for 28 migratory bird species on the East Coast of the United States.
- Northeastern birds that winter in the southern United States are returning north in the spring 13 days earlier than they did in the early 20th century.
- In a California study, 16 out of 23 butterfly species shifted their migration timing and arrived earlier.

Changes like these can lead to mismatches in the timing of migration, breeding, and food availability. Growth and survival are reduced when migrants arrive at a location before or after food sources are present.

As temperatures increase, the habitat ranges of many North American species are moving northward in latitude and upward in elevation. While this means a range expansion for some species, for others it means a range reduction or a movement into less hospitable habitat or increased competition. Some species have nowhere to go because they are already at the northern or upper limit of their habitat.

For example, boreal forests are invading tundra, reducing habitat for the many unique species that depend on the tundra ecosystem, such as caribou, arctic fox, and snowy owl. Other observed changes in the United States include expanding oak-hickory forests, contracting maple-beech forests, and disappearing spruce-fir forests. As rivers and streams warm, warmwater fish are expanding into areas previously inhabited by coldwater species. ¹ Coldwater fish, including many highly valued trout species, are losing their habitats. As waters warm, the area of feasible, cooler habitats to which species can migrate is reduced. ¹ Range shifts disturb the current state of the ecosystem and can limit opportunities for fishing and hunting.

The Arctic food web is complex. The loss of sea ice can ultimately affect the entire food web, from algae and plankton to fish to mammals.

The impact of climate change on a particular species can ripple through a food web and affect a wide range of other organisms. An example is the complex nature of the food web for polar bears. Declines in the duration and extent of sea ice in the Arctic leads to declines in the abundance of ice algae, which thrive in nutrient-rich pockets in the ice. These algae are eaten by zooplankton, which are in turn eaten by Arctic cod, an important food source for many marine mammals, including seals. Seals are eaten by polar bears. Hence, declines in ice algae can contribute to declines in polar bear populations

In some cases, ecosystem change occurs rapidly and irreversibly because a threshold, or “tipping point,” is passed.

One area of concern for thresholds is the Prairie Pothole Region in the north-central part of the United States. This ecosystem is a vast area of small,

shallow lakes, known as “prairie potholes” or “playa lakes.” These wetlands provide essential breeding habitat for most North American waterfowl species. The pothole region has experienced temporary droughts in the past. However, a permanently warmer, drier future may lead to a threshold change—a dramatic drop in the prairie potholes that host waterfowl populations.

Similarly, when coral reefs become stressed, they expel microorganisms that live within their tissues and are essential to their health. This is known as coral bleaching. As ocean temperatures warm and the acidity of the ocean increases, bleaching and coral die-offs are likely to become more frequent. Chronically stressed coral reefs are less likely to recover.

Climate change and shifts in ecological conditions also could support the spread of pathogens, parasites, and diseases, with potentially serious effects on human health, agriculture, and fisheries. For example, the oyster parasite, *Perkinsus marinus*, is capable of causing large oyster die-offs. This parasite has extended its range northward from Chesapeake Bay to Maine, a 310-mile expansion tied to above-average winter temperatures.

Climate change, along with habitat destruction and pollution, is one of the important stressors that can contribute to species extinction. The IPCC estimates that 20-30% of the plant and animal species evaluated so far in climate change studies are at risk of extinction if temperatures reach levels projected to occur by the end of this century. Projected rates of species extinctions are 10 times greater than recently observed global average rates and 10,000 times greater than rates observed in the distant past (as recorded in fossils). Examples of species that are particularly climate sensitive and could be at risk of significant losses include animals that are adapted to mountain environments, such as the pika, animals that are dependent on sea ice habitats, such as ringed seals, and cold-water fish, such as salmon in the Pacific Northwest.¹⁾

Much of the United States this year has been plagued by unprecedented droughts that have destroyed crops, record floods that have destroyed whole communities, and unprecedented forest fires that have destroyed thousands of

¹⁾ Taken from *Climate Change and Biodiversity, the new great threat to biodiversity*, Commission on Biodiversity, <http://www.cbd.int/climate/> (2012).

homes, lives and livelihoods. Yet the federal government in the United States has been very deficient in addressing these climate change risks.

Unfortunately, we now have a Congress in the US dominated by Representatives that deny the science of climate change and its origins in human-caused emissions of greenhouse gasses; they have refused to ratify the Kyoto Protocol and to pass proposed legislation to address the mitigation and adaptation measures needed to control climate change. This U.S. phenomenon is largely the result of a system of legalized corruption through billions of dollars in campaign contributions to Members of Congress and candidates, authorized by a business-oriented Supreme Court that has equated such contributions with constitutionally protected free speech. Elections for President and Members of Congress now cost millions of dollars, mostly for television advertising, and few Members are willing to bite the hand that feeds them by passing and enforcing environmental legislation that big business contributors claim will hurt our economy that, like most others around the world, is suffering greatly from recession and unemployment.

While this U.S. dilemma dwarfs the corruption in other countries, the competition between development and environmental goals is evident in virtually every country. The outcry by big business that climate change legislation will be economically harmful is demonstrably false. Countries as diverse as China, Germany, and most notably Korea, are finding that energy efficiency and renewable energy present tremendous economic opportunities, and in fact renewable energy is the fastest growing energy media. Energy efficiency has clearly demonstrated in many large businesses as well as progressive states, that saving wasted energy is an enormously profitable venture.

While the Congress has been hostile to addressing climate change threats, our President has devoted substantial resources to promote clean energy and he has authorized our Environmental Protection Agency to set new and much stricter standards for vehicle efficiency and for reducing greenhouse gas emissions from industries and power plants. Many of our state and local governments have taken action directly to limit greenhouse gas emissions and promote energy efficiency and renewable energy.

Korea has contributed to the world the extraordinary leadership of the Secretary

General of the United Nations, Bann Ki Moon, who has been the dominant spokesman for promoting Millennium Development Goals to elevate millions of people in developing countries out of poverty, Energy for All to promote universal access to clean and affordable energy, and has given strong support to the very difficult negotiations for mitigation and adaptation to climate change through the International Panel on Climate Change.

Korea itself has taken exemplary steps to mitigate its greenhouse gas emissions. On August 15, 2008, the 60th anniversary of the founding of the Republic of Korea, President Lee Myung-bak announced a new national policy vision of “Low Carbon, Green Growth” that has been a model for many other countries.

The initiative is intended to pursue three primary objectives: (1) promotion of “eco-friendly new growth engines” for the national economy, (2) enhancement of South Korea’s quality of life and (3) contribution to international efforts to fight climate change. To achieve this ambitious vision, the Presidential Commission on Green Growth (PCGG) was created and a Framework Law on Green Growth was passed by the National Assembly.

In short order, the PCGG adopted a long-term National Strategy for Green Growth (2009 - 2050) and a Five-Year Plan for Green Growth (“Five-Year Plan”). This first Five-Year Plan, covering the period 2009 - 2013, comprises a manifest of political commitments and a blueprint for government action; it contains budgetary earmarks and tasks delegated to relevant ROK ministries, and targets spending of 2 percent of the nation’s GDP on green growth. Given the global economic downturn that impacted South Korea during the genesis of this ambitious policy initiative, its rollout has been touted domestically as a “Green New Deal.” As such, investment was initially weighted toward infrastructure projects to help combat the sagging economy, with spending shifting toward export-focused green-tech R&D over time.

Within the Five-Year Plan, the PCGG announced 10 policy categories intended to achieve the stated objectives of the government’s Low Carbon, Green Growth initiative:

1. Effective mitigation of greenhouse gas (“GHG”) emissions

2. Reduction of fossil fuel use and enhancement of energy independence
3. Strengthening the nation's capacity to adapt to climate change
4. Development of green technologies
5. The “greening” of existing industry and promotion of green industries
6. Advancement of the industrial sector
7. Engineering a structural basis for the new green economy
8. Greening the land and water and building a green transportation infrastructure
9. Bringing the green revolution to the daily lives of the nation's citizens, and
10. Becoming a role model for the international community as a green-growth leader.

Shortly after this announcement, the National Assembly adopted its Third National Basic Plan for New and Renewable Energy (NRE) R&D and Deployment (“Third Basic Plan”), identifying NRE development and deployment targets designed to increase the share of new and renewable energy to its primary energy supply to 4.3 percent by 2015, 6.1 percent by 2020 and 11 percent by 2030.

Now, both rich and poor nations are turning to Seoul for lessons in green-powered development, and the new economic approach that was born out of financial mayhem. The OECD — the economic policy institute of wealthy and aspiring nations — describes green growth as a new paradigm for how to run an economy in a way that limits environmental degradation and ensures prosperity.

At the same time, the newly established Seoul-based Global Green Growth Institute — headed by former South Korean Prime Minister Han Seung-soo and climate change expert Lord Nicholas Stern — is working on the ground in poor countries. The goal there is getting states to “leapfrog” over the dirty technologies like coal that were ushered in by the first industrial revolution. 2)

This is a truly remarkable accomplishment. It has not been by any means

2) Taken from REEP Report, http://www.reegle.info/policy-and-regulatory-overviews/KR#energy_framework and *South Korea's “low carbon, green growth” initiative spurs renewable energy*, Hunton & Williams, LEXICON, <http://www.lexology.com/library/detail.aspx?g=423ec506-b23e-4cac-bad0-24bc67afc8b2> (2010).

problem-free due to shortcomings in South Korea's public participation provisions and a court system that makes citizen challenges to legal deviations very difficult. It has experienced its own share of corruption. But these deficiencies will no doubt be corrected in time, very likely led by the students to whom I have the privilege of addressing today.

The Korean example demonstrates the feasibility of demonstrating that environmentally sound development can be profitable, doing well by doing good. The leadership demonstrated here deserves the congratulations of the world. I hope some of our own balky legislators take note.

Keep up the good work.