THE BROOKINGS INSTITUTION

ASIA TRANSNATIONAL THREATS FORUM:
CLIMATE CHANGE IN ASIA

Washington, D.C.

Monday, December 16, 2019

Welcoming Remarks:

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Introduction and Keynote Address:

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U.N. High Representative
Least Developed Countries, Landlocked Developing
Countries, and Small Island Developing States

Climate Threat in the Asia-Pacific:

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P R O C E E D I N G S

GENERAL ALLEN: Ladies and gentlemen, good afternoon and welcome to the Brookings Institution. I'm John Allen. I'm the president of Brookings, and I have the honor of opening today's Asia Transnational Threats Forum. The third of its kind. And the topic today is climate change in Asia.

With climate change and global warming proceeding at an unprecedented rate, it's more important than ever to understand the climate security nexus. Namely, how climate change impacted lives and how it is shaping the security and strategic evidence of Asia-Pacific.

This region, with its extensive coastlines, densely populated cities, and small island states has suffered greater human and economic costs from climate disasters than any other region and is very exposed to climate-related threats. Asia's coastal megacities and their growing populations are vulnerable to massive population displacement.

That coupled with the growing challenges of urbanization, regional security, insecurity, and inadequate responses and mitigation climate change has the potential to significantly increase political instability and create security challenges. Severe droughts and loss of arable land can adversely affect economic activity, peoples' livelihoods, and food security as well. And, in fact, this is already taking place.

Furthermore, heightened competition for water and scarce natural resources is likely to compound violence and armed conflicts in the future. And in our military, in the United States military, we're already talking about the advent of resource wars.

The sense of urgency to respond, to adapt to climate crises is shared by the vast majority of the global community. The European Parliament declared a climate emergency just last month. And last week the EU Commission adopted the European Green Deal. Nagano prefecture in Japan has recently become the first state in East Asia to declare a climate emergency, and promise to take action to address climate change.

These are stories of success. What does climate leadership look like today in Asia more broadly? And how are the United States and its Asia-Pacific allies and partners responding to these climate-related challenges? Today we'll seek to answer some of these questions and to take a closer

look at the region's vulnerabilities to climate-related threats, and the actions that can and should be taken to manage, and to mitigation, and to respond to these challenges.

We have a distinguished lineup of experts from the region to help us to discuss these challenges and these response measures. In particular, we're really deeply honored to have with us today Undersecretary General of the United Nations Mrs. Utoikamanu who will be delivering the keynote address. And, madam, you are most welcome here today at Brookings. And I look forward to hearing her remarks, and the inciteful and thought-provoking discussions that we'll have today in the aftermath.

And, finally, I'd like to extend my gratitude to the Korea Foundation for its support in making this conference possible. Very important work by a very important organization.

Let me now turn the floor over to Jung Pak our senior fellow and the SK Korea Foundation chair in Korea studies to begin today's programming. And thank you for coming today.

MS. PAK: Thank you, John, for that fantastic introduction. But it's also really hard to do public speaking after a general has gone, given he has a more authoritative, masterful delivery. So thank you, John, for joining us today. I know that this is one of your priorities and this is one of Brookings' priorities. And thanks, again, to the Korea Foundation for making this happen and letting me talk not just about North Korea related issues.

So one of the best parts of my job is traveling and meeting people from different parts of the world. Last week I was in Anchorage, Alaska, and it was my first time there, to deliver a talk on North Korea. The people in Anchorage are very nervous because they seem themselves as a likely threat or target for North Korean ballistic missiles. They're the closest to North Korea from the U.S. perspective.

So I packed my warmest and bulkiest winter coat, my winter boots, and a long scarf that I can wrap around my neck five times. Ladies, I know you know what I'm talking about. And I was expecting below freezing temperatures and slogging through deep, plush piles of snow. Instead, it was 40 something degrees and there wasn't much fluffy snow on the ground, just fully plowed, very walkable sidewalks. So walkable that I didn't see very many boots like mine, but people were wearing high heels.

And the sidewalks, if they were covered they had some days' old packed ice, a thin layer of days' old packed ice. Yesterday Anchorage reached a high of 45 degrees, breaking a 30 plus year record. Villages in Alaska have already relocated at least once and will have to move again. That is if

they have the funds and the means to do so.

Residents are worried about fishing and food supplies if the fish migrate for cooler waters. Civic leaders are worried about the erosion of permafrost and damages to infrastructure and how they would pay for it. They're also worried about the melting Arctic and what that might mean for resource competition, especially with China and Russia. One scientist said that it's not climate change, but climate changed.

So I was in Anchorage to talk about North Korea, but it also served for me as a stark reminder of how much the present and future of the U.S. is intricately linked with Asia and the Arctic, and how climate changes are requiring new frameworks on how we think about security and the necessity of immediate action. And new research has shown, as reported by the New York Times has shown that 150 million people living on land will be below high tide by 2050. And that South Vietnam might be completely submerged underwater.

Given the urgency, I am thrilled to have the Ambassador Undersecretary General Utoikamanu as our keynote speaker. Ms. Utoikamanu, a Tonga National, took up her appointment as the high representative for the least developed countries, landlocked developing countries, and small island developing states back in May of 2017. Prior to taking up her position with the United Nations, she was the chief executive officer of the Ministry of Tourism in Tonga.

As a representative for countries most vulnerable to the climate emergency, especially the 38 small island developing states, Ambassador Utoikamanu has been at the forefront of climate leadership, advocating for expanded efforts to understand and respond to growing climate-related security risks. She has been driving efforts to help countries and multilateral organizations develop better frameworks to tackle the crisis and expanding opportunities for collaboration.

And I so welcome Ambassador Utoikamanu to the podium to deliver her keynote.

MS. UTOIKAMANU: Thank you, Mr. John Allen, president of the Brookings Institution, Dr. Jung Pak, senior fellow, excellencies, distinguished colleagues, ladies and gentlemen, I am honored to deliver the keynote address at this important event. I would like to express my sincere thanks to the Brookings Institution for inviting me to make this address.

The issue of climate change and sea-level rise has been a concern to small island

developing states for more than three decades. A call for action was made in 1994 at the first global conference on the sustainable development of the small island states, and climate change and sea-level rise were subsequently incorporated into the Barbados plan of action.

Research and findings of the impact of climate change are now more prolific than in the 1990s. This prediction was clearly reflected in the language used in the PPOA. And I quote, "Global climate change may damage coral reefs, alter the distribution of zones of dwelling, and affect both subsistence and commercial fisheries. It may affect vegetation and sea line intrusion may adversely affect freshwater resources. The increased frequency and intensity of storm events that may result from climate change will also have profound effects on both the economies and the environment of SIS."

I've just returned from the 25th climate change conference parties held in Madrid. At the opening of the conference, UN Secretary General Antonio Guterres observed that the human species has been at war with the planet, now the planet is fighting back. Climate change has escalated into a global climate emergency.

The UN environment program 2019 the Mission Gap report finds that we are on the brink of missing the opportunity to limit global warming to 1.5 degrees Celsius. To limit global warming to 1.5 degrees Celsius we must collectively reduce emissions by 7.6 percent every year between 2020 and 2030. Based on today's commitments by governments, emissions are on track to reach 56 gigaton CO2 equivalent by 2030 which is over twice what they should be.

The world metrological organizations 2019 statement on the state of the global climate found that we are hitting new highs on three global warming indicators. Global atmospheric concentrations of greenhouse gases reached record levels in 2018 with carbon dioxide reaching 147 percent of pre-industrial levels. 2019 is likely to be the second or third warmest year on record. The past five years are now almost certain to be the five warmest years on record, and the past decade, 2010 to 2019, to be the warmest decade on record.

In the fall of 2019, the global mean sea level reached its highest value since our earlier precise measurements. The World Metrological Organization also reported that in September and October we have seen record low sea ice both in the Arctic and Antarctic.

In the first half of 2019 more than 10 million new internal displacements were recorded.

Seven million of these were triggered by hydro-meteorological events such as Cyclone Idai. Idai was one of the strongest known cyclones to make landfall on the east coast of Africa. It had a devastating impact on several countries including Mozambique, as well as Malawi and Zimbabwe, landlocked developing countries, which up to now had been spared from the impact of cyclones and hurricanes.

At the end of August, Hurricane Dorian reeked unprecedented damage in the Bahamas, to the thousands of homes, infrastructure, and water resources. Not to mention, the loss of lives, wounded, and numerous people who are still unaccounted for. Initial damages were estimated at U.S. 3.4 billion, equal to one-fourth of the nation's GDP. It was the second strongest Atlantic storm on record, and the worse ever to strike the Bahamas.

Dorian became the latest in a now-familiar pattern of devastating extreme weather events. Cyclone Pam, a category 5 hurricane struck Vanuatu in 2015. It is considered the worse natural disaster in the history of Vanuatu with damages estimated at $692 million, equivalent to 64 percent of GDP.

I was in Fiji in 2016 when the most intense cyclone in the Southern Hemisphere on record, Cyclone Winston, hit the Fiji Islands. Forty-four fatalities with damages estimated at $1.5 billion U.S., equivalent to 33 percent of GDP was also the costly cyclone in the South Pacific Basin. In February last year also category 5, struck my own native country of Tonga with damages equivalent to 38 percent of GDP.

The impacts of climate change are being felt across the globe. My office is responsible for advocacy in favor of the small island developing states or SIDS, least developed countries or LDCs, and the landlocked developing countries or LLDCs. They are among the most vulnerable countries on the planet. They are at the forefront of the impacts of climate change.

The LLDCs and SIDs in the Asian Pacific region exhibit high vulnerability to climate impacts. The landlocked nations of Central Asia, the mountains Himalayas, the highly exposed coastal LDCs such as Bangladesh, and the Pacific and Indian Ocean SIDs. The national circumstances and specific constraints placed them at the forefront of climate change. Yet, these countries have made the smallest historical contributions to global warming.

The intergovernmental panel on climate change or IPCC special report on 1.5 degrees

has highlighted the urgency to act now and to take major steps in order to avert catastrophic impacts. At 1.5 degrees Celsius over 70 percent of coral reefs will die, but at 2 percent virtually all reefs will be lost.

The impacts of climate change will affect all nations but will pose an existential threat to some SIDs. Indeed, SIDs are confronted with profound structural challenges and disadvantages related to their remoteness, small size, low lying areas, and risk of submersion, and extreme exposure to the evermore severe impacts of climate change.

Responding to these challenges is made more difficult but limited institutional capacity and difficulties in accessing finance and resources, and compounded by a high degree of vulnerability to systemic shocks. The low per capita GNI in LDCs limits their ability to build resilience and respond to disasters.

LLDCs are prone to desertification, while mountainous LLDCs suffer also from glacial lake outbursts, landslides, and flooding. All of these three groups of countries, the LDCs, LLDCs, and SIDs typically are commodity dependent or have narrow economic base which further increases their overall fragility.

High level of indebtedness place constraints on public sector resources available for investments in climate action in the other sustainable development goals. The impact of climate change reduces land availability, imperils food security, and exacerbates water scarcity.

Another possible impact is population being displaced or having to be relocated. My office and the International Migration Office launched a report in September titled, Climate Change and Migration in Vulnerable Countries: A Snapshot of LDCs, LLDCs, and SIDs. The first of 11 recommendations for governments contained in the report is to acknowledge that climate change is a driver of migration, displacement, and planned relocation and that human mobility can, in turn, have impacts on the environment.

It is well-recognized that sustainable development, peace, and security, and the respect of human rights, and the rule of law are closely interlinked. And this has been reflected in the 2030 agenda amid SDGs. Climate change as a threat multiplier has been universally recognized by the international scientific community in the IPCC assessment report, as well as its impact on security.

But with the rapidly accelerating impacts of climate change it is becoming increasingly

apparent that climate change is more than a threat multiplier, but a threat in itself. A threat to people, community and nations, impacting not only on sustainable development but on peace and security. This message was articulated in the strongest terms at the Pacific Island Forum Leaders Meeting in August in Tabbal where I had the honor to represent the UN Secretary General.

Pacific leaders adopted the Forum communique and the Kainaki II declaration for urgent climate change action now. This declaration, as well as the bold declaration adopted at last year's PLF's leaders meeting, places special emphasis on the security risks posed by climate change. Indeed, climate change poses an existential threat to low lying SIDs.

Sea level risk causes loss of land, reducing the amount available for agriculture. Ultimately, land loss will cause the disappearance of low lying countries which raises fundamental issues of sovereignty, state integrity, and national identity. Disruption to food and water resources can also make countries unviable. The very means of sustenance of island populations are under threat from climate change. For example, saltwater encroachment threatens the fragile and limited freshwater supplies.

Global warming also impacts on the critical resources of fisheries, including the tuna which are also important to Pacific SIDs. There's growing evidence that increasing ocean temperatures affects nutrients, productivity, abundance, and migratory routes of tuna schools. And while foreign fleets can adapt, such changes can be far more challenging for domestic fleets that are fishing in their own exclusive economic zones.

In SIDs and coastal nations, extreme weather events damage vital infrastructure. Jetties make up an important part of the maritime transport infrastructure. Their destruction following a major hurricane or cyclone can take three years to rebuild. This posses direct threats to military and defense installations.

Ocean acidification, rising sea levels, desertification, water shortages all threaten food security, increase competition for scarce resources, and eventually trigger the involuntary displacement of people. Furthermore, sea-level rise causes communities in the Pacific to be relocated to higher ground. In the Solemn Islands, communities have had to abandon their homes in outlying islands to move to large islands. In Papal New Guinea they say that this is the first so-called climate refugees situation with

relocation of the people in the Carteret Island. And, also, we've also had relocation in Fiji as well.

And such examples pose challenging issues for the governments and stakeholders on land (inaudible) and ownership. If not carefully managed these can cause social tensions and even conflict.

International displacement or migration due to climate change impacts can cause new pressures or exacerbate existing ones, including between nations. To manage such challenges we need to enhance our global governance arrangements through adaptive institutions, legal and policy measures, and call upon the leadership of all nations to act urgently.

An issue that is receiving growing attention is the impact of sea-level rise on the exclusive economic zones of small islands states. The licensing of foreign fishing vessels, especially where there's limited domestic capacity to exploit fisheries bring in significant amounts of much-needed revenue.

The international legal regime that rants maritime boundaries, the UN Convention on the Law of the Sea or UNCLS does not explicitly address the question of the effect of sea-level rise and how to treat the possible resulting loss in maritime zones from land loss upon which the boundaries initially determined. Several SIDs have affirmed the permanency of their unclosed maritime boundaries, including SIDs in regional agreements and national legislation.

Meanwhile, legal discussions are ongoing in the sixth committee of the UN General Assembly on whether the freezing of boundaries or maintaining of existing entitlements are permitted by UNCLS and, if not, how could this be further articulated from a legal standpoint, either by way of a protocol to UNCLS, an amendment to existing articles, or a UN General Assembly resolution.

In the face of accelerating impacts of climate change with little progress in mitigation of greenhouse gasses by major emitters, it is essential that the rights of SIDs should be rapidly safeguarded and clarified, and any legal uncertainties are dispelled. Failure to do so could create international tensions, given the economic implications both of fisheries and exploitation of sea resources.

A broader question arises on what should be done under the UN architecture to address the climate security interlinkages. The topic of climate change and security has been on the United Nations' agenda for some time. Unquestionably, there is a strong interlinkage between UN efforts on development, peace, and security, and climate change. Efforts to advance on one pillar are linked to

progress made on the other. Adverse climate change impacts can set us back on both.

I recall when I held the position of permanent representative of Tonga to the United Nations in 2008. The Pacific countries were already discussing the need to bring the topic to the Security Council. I clearly recall the response we received at one of our very first meetings with a number of member states.

Why do you want to take this to the Security Council? Do you want the peacekeepers to stop the water from going onto the islands? But we reaffirmed that this issue was important to us, it was a life or death issue. We were not successful in our attempt to place this issue to the attention of the Security Council but were able to negotiate and submit a draft resolution entitled Climate Change and its Possible Security Implications which was adopted by the General Assembly in 2009.

In the same year, at it's 40th Pacific Island Leaders' meeting leaders recognized that climate change is a great challenge of our time, and adopted the Pacific call for climate action. There has been a resurgence of attention to this question over recent months, including the role played by the Security Council and other organs of the United Nations.

In January of this year the Dominican Republic, and its council presidency for the month organized an open debate in the Security Council on addressing the impacts of climate-related disasters on international peace and security. The meeting attracted considerable interest. Over 80 member states debated the issue for more than eight hours.

The majority viewed climate change insecurity as an important issue that needed to be addressed. Several key points were made at the meeting. Firstly, climate change is a concrete and existential threat to humanity, and some developing nations are particularly vulnerable. Mitigating the impacts of climate-related disasters benefits global stability and conflict prevention.

Secondly, the entire United Nations system needs to be engaged in climate change, starting with increasing its analytical capabilities to better understand climate fragility risks and formulate evidence-based response strategies. Thirdly, the United Nations Security Council's specific role is to work on the security impacts of climate change and is complementary to the mandate and actions of the UNFCCC and other UN bodies. The climate security nexus should feature regularly in the council, and that there should be regular briefings on climate risks and progress made.

And, fourth, the small island developing states call for an appointment of a UN Secretary General special envoy on climate change and security. However, back in 2008, a few delegations questioned whether Security Council engagement was appropriate, citing knowledge gaps and doubts concerning the link between climate change and security. Some argued the Council should focus more on political issues directly relevant to conflicts given its specific mandate, as opposed to that of the General Assembly and the UNFCCC.

Since that meeting, some progress has been made. The United Nations has developed and integrated risk assessment framework to analyze climate-related security risks. It has also set up an informal inter-agency group of the UN System entities to share information on ongoing work and promote collaboration.

At the level of member states, a group of friends on climate and security which was set up in 2018 and co-chaired by Germany and the Republic of Nauru has seen its membership grow to more than 40 countries from all of the UN's five regional groups. Germany will occupy a non-permanent Security Council seat in 2020 and has already announced that climate change and security will be a priority agenda item. A topic which it had promoted the last time it held the position in July 2011.

Thus, there's hope that progress can be made in addressing the climate change, peace, and security nexus. Especially, as it is related to exacerbating existing conflicts, or even tensions arising from increased competition over scare critical natural resources. Failure to do so will mean a less effective UN response to existing crisis where climate change is a threat multiplier and possible failure to prevent new conflicts from arising due to climate-related stresses.

But what of the loss of land and displacement displacing SIDs if climate change remains unchecked these issues will pose existential threats, the submerging of entire islands, and challenges to sovereignty, state integrity, and national identity. In 2013 parties to the climate change convention established the Warsaw International Mechanism for Loss and Damage to address loss and damage associated with the impacts of climate change, including extreme weather events and slow onset events in developing countries that are particularly vulnerable to the adverse effects of climate change.

AOSIS, the Alliance of Small Island States was a strong proponent of the mechanism which they had hoped would provide support on risk management, manage financial risks associated with

climate-related extreme weather events, and create an international insurance poll to be funded by developed countries to compensate vulnerable developing countries from uninsured loss and damage.

There's been no agreement of progress in international climate talks on financial compensation. Work, to date, under the mechanism, has focused on the first two issues. So we are left with the conclusion that there has been no satisfactory solution to the impacts of climate change facing vulnerable nations. Financial and technical support for adaptation has fallen far short of the mark.

This will be essential to ensure that vulnerable countries build resilience to the next impacts of climate change that are already taking place and will only become more intense and frequent. The response to address loss and damage from climate disasters has been in the form of humanitarian aid which is little more than a band-aid solution.

Countries attending the recent climate change meeting in Madrid did not agree on concrete actions related to slow-onset events such as sea-level rise, but instead, set up an expert group to look at possible options. The climate-related security risks are adding a new dimension to already complex national development challenges.

I would like to end by emphasizing that there would be no need to address the climate change security interlinkages if we had been able to put a brake on our greenhouse gas emissions back in the early 1990s when the international scientific community had first agreed that human beings were disrupting climate conditions through greenhouse emissions. The message is as clear now as it was then.

And I think we have run out of time. We've run out of time a long time ago to respond to this. There is a great urgency to arrest greenhouse gas admission and invest heavily in adaptation in the most vulnerable nations. The consequences are already severe and the unthinkable is on our doorstep. We have run out of time. In fact, we ran out of time many years ago. Thank you.

MS. PAK: Thank you, Ambassador Utoikamanu. When we were looking at who might deliver the keynote today for this conference we couldn't think of anybody better than Ambassador Utoikamanu, given her long experience and her leadership on these issues.

We have just a few minutes for questions and the Ambassador was gracious enough to agree to a couple of questions. I have lots, but I want to make sure to give people a chance. So woman

in the back and gentlemen upfront. Let's take two questions.

QUESTIONER: Thank you. I'm Jeanie Win with Voice of Vietnamese Americans. You made a statement clearly that by 2050 South Vietnam would be submerged under the water if we do nothing now. And not only that, all of the small islands would be affected. And right now you say that we need to mitigate the carbon dioxide emissions since 1990. What would you suggest to do now for the people in the U.S., in Vietnam, in China, and in India? There was talking about carbon tax. Do you think that's a good suggestion?

MS. PAK: Thank you. Gentlemen upfront.

QUESTIONER: Hi. Christopher Crane, Crane Foundations. I've been to Bangladesh 15 times since 2008 and what I've learned from them is basically one question. Why don't we make climate change and solutions to climate change and education curriculum, you know, all the way up from third grade? We absolutely don't.

And it is interesting that three months ago when there was a goals education summit at Brookings the education director of UNICEF said this year he's only looking for transformational work. So would it not be possible for you to go over to UNICEF and basically -- you know, we have all these summits where people talk to each other, but it doesn't end up as a product which then becomes an education curriculum that teaches the students.

MS. PAK: So your question specifically is about why don't we have it as part of education curriculum overall? In the U.S.?

QUESTIONER: Wouldn't that be a more effective way of achieving things than spending all the money on talks --

MS. PAK: Okay. Got it. Got it.

QUESTIONER: -- and having no money that goes to education.

MS. PAK: Right. Thank you. So two questions. One is, what should we do now? You talked about the urgency. What do we need to do now by India, U.S., China and there was somebody else? And South Vietnam, about Vietnam.

And, secondly, what are your thoughts about having an education curriculum to talk about and to be able -- so that we can speak the same language, I guess, right, on climate change and

the relationship to security.

MS. UTOIKAMANU: Thank you for those questions. I think what is important to appreciate is that the climate change and impacts is a global issue and therefore, the appropriate response to it will have to be undertaken at a global level. And the intergovernmental process that has been taking place in Madrid at COP and others it will, you know, include political commitments by all countries concerned, the developing countries, as well as the developed countries to limit to 1.5 degrees Celsius. I think that is quite an important political commitment. And then others follow through with the operationalization of that and its impact on policies and other decisions in government.

With regards to the curriculum, I know that in the part of the region that I come from in the Pacific climate change is part of the curriculum so that children at a young age know what the issues are and how they can contribute to mitigating the negative impacts of climate change.

MS. PAK: But the problem is that there's a tension between the least developed states and the most developed states, right? And that the countries that you represent at the UN they're the most vulnerable and also the least developed which is a mutually reinforcing debilitating, right, convergence of issues?

MS. UTOIKAMANU: Well, for the most vulnerable groups of countries that I work across, the least developed landlocked and small island 91 states they're at the forefront of the impact of climate change. And they contribute the least towards the issue. But, also, because of their country situation, they don't have the means to really deal with the impacts. So I guess part of the tension is the responsibility for providing the finance to deal with the impacts of climate change, whether it's mitigation or adaptation.

MS. PAK: How much did you feel the U.S. absence in Madrid? High-level?

MS. UTOIKAMANU: Well, the UN is not part of the intergovernmental process, so we were not in the room in the negotiations. But I was there to support particularly the least developed countries in the small island developing states. So my part was focusing on how we can progress on the loss and damage. And then also, how we can provide support to these countries in growing and submitting the NBC report which is due next year.

MS. PAK: I'll take one more question. Gentlemen with the glasses in the fourth row.

QUESTIONER: Hi. I'm Fernando Batista formally World Bank environment department, and I have a question about the Marshall Islands. And the reason -- I'd like to find out why you didn't put in your security paradigm why the problem with Runit Island is not mentioned. Because that is -- you know, that's the cap where the concrete cap is covering the radioactive material that the United States buried in the ground in the 60s, 70s and -- I don't know if you could give us a little light on that.

MS. PAK: Why the ambassador didn't mention the Marshall Islands?

QUESTIONER: (Inaudible).

MS. PAK: Well, that would be a security issue, wouldn't it?

MS. UTOIKAMANU: From the Pacific and having worked in the government for almost 30 years we have been involved in considering the Marshall Islands situation, and I've also had bilateral talks with the president of the Marshall Islands on how the United Nations can support them with this particular issue. So the relevant agencies in the UN are helping the Marshall Islands in looking at analysis and evaluation of the situation.

MS. PAK: Thank you. Thanks, all of you, for your questions, and please join me in thanking Ambassador Utoikamanu for her wonderful keynote address.

We have Annika Betancourt who's a visiting fellow here who will be moderating our first panel. Thank you.

(Recess)

MS. BETANCOURT: Good afternoon, everyone. Good afternoon. My name is Annika Betancourt, I'm a Visiting Fellow with the Center for East Asia Policy. It's my pleasure to be with you today. I'm joined by four very distinguished panelists.

Immediately to my left is Dr. Mely Caballero-Anthony, she's a Professor, International Relations at the Nanyang Technological University in Singapore, and an expert on non-traditional security threats. Thank you for being with us.

Next to her is Dr. Suh-Yong Chung, who is a Professor and Director of the Center for Global Climate and Marine Governance at Korea University in Soul. He also advises the government of the Republic of Korea, and came to Brookings directly from COP25 in Madrid, so we're glad to have him.

Also joined by Dr. Leonardo Martinez-Diaz, who is currently the Global Director of the

Sustainable Finance Center at the World Resource Institute, and a former Deputy Assistant Secretary of the Treasury for Energy and Environment. Thank you for being with us.

Finally, last but not least certainly, is Sherri Goodman, who is a Senior Fellow at the Wilson Center's Environmental Change and Security Program and Polar Institute. Also she was a former First Deputy Under Secretary of Defense for Environmental Security, and we're very delighted to have her with us today.

So just to start us off, one of the reasons why we wanted to hold this forum was to talk about, as Jung said, climate change. And so the Asia Pacific is regularly identified as one of the regions that is already hardest hit by the effects of climate change. And obviously these effects carry very important regional and global implications.

So I wanted to just give a couple of short data points before we start with our panelists to just give you a snapshot of the situation in the region.

So for instance, Southeast Asia is one of the fastest growing economic regions in the world. Growing population organizations suggest that electricity demand is expected to triple between 2015 and 2040. Just a couple of countries in the region. 70 percent of Vietnam's population lives along its 2,000 meter coastline. And Indonesia has a population of 264 million and one of the world's longest coastlines of 34,000 miles. The Philippines, 22,000 mile long coastline and 100 million people. And just for reference, you know, Vietnam, Indonesia, Philippines, are somewhere about $2,000 to $3,000 GDP per capita. And as a frame of reference the ROK's GDP per capita is around 30,000 U.S. dollars, and Australia is 53,000.

And the number of category 4 and 5 hurricanes have increased by 75 percent or more since 1970 in this region, as well as the increase in the destructiveness. So it's just a couple of data points.

I'd like to turn it over to each of my colleagues here to give some initial comments, and then we'll come back and ask some questions and get some questions from the audience.

Let's start with Sherri.

MS. GOODMAN: Okay. Good afternoon everyone. It's great to be here with you. I'm going to let you tee up the slides here. So I'm Sherri Goodman, and it's great to be here at Brookings

with you all. Let me thank the great Brookings team, General Allen, Yung, Annika, the whole team here. Ambassador, very nice to have you here. Korea Foundation, thank you, obviously, for your support.

I was really interested -- first let me say I always start with the BLUF, the bottom line up front, right? I spent a lot of time in the Department of Defense with our military, and I'm so pleased that you used the phrase that I coined now 13 years ago, almost threat multiplier, with the first group of military leaders. I would put General Allen, who was on active duty at the time we formed the Military Advisory Board in 2007, but among the cohort of like-minded leaders, first U.S. but now international, who understand the seriousness of the climate threat and characterize it as a threat multiplier.

Indeed, you know, when we issued our first report in 2007, right after that, Ambassador, came the first UN Security Council discussion about climate change as a security issue. And that has led to many of the actions that you have documented since then.

Of course that is of course not enough, so, you know, my second BLUF is that Asia is on the front line of climate threats globally. And that's why I think this conference is really important.

And then third, you know, what can we do about it, and that's improve predictive capabilities and climate proofing solutions.

Now let's see, what do I need to do here. My slides are not as good as yours, Ambassador, so. But you really told a lot of the story. But I want to start, you know the major issues facing the region, we've already talked about those. I want to put this in some historical context. You showed a slide, Madam Ambassador, from back in 19, I think '94, the first UN Security Council debate.

Well in 1995 I held the first Asia Pacific Environment Security Forum with then PAYCOM Commander Admiral Primer. Some of you might remember him going way back then. He was our Pacific Area Commander. And so our military, the United State Military, has a long history of engagement in the region on environmental issue. We didn't frame it as climate change then, we weren't quite that smart. But we were working on a range of issues having to do with water, energy, natural resources protection, cleaning up contaminated sites across the region, and generally elevating discussion and opportunities better to integrate institutions. The military with its foreign ministries, with its environmental ministries, with its finance ministries across a range of countries and domains.

And so now fast forward, these are the major issues, you know, facing the region today,

and it's all framing. This Administration framed by sort of, you know, great power competition, but underlying and driving a lot of that is the food and water insecurity, and of course the disaster risk. So, you know, now what we see is the sea level rise being a major source of threat in the region, flooding, rising sea surface temperatures, ocean acidification.

And then changing climate circulation patterns, I think is really important. We're beginning to understand more about that, but I think there's still a lot we don't know about the El Nino and La Nina cycles, how they effect that. But our ability better to understand that will enable us in the future to have better predictive capabilities in the region.

Okay. We sometimes refer to as Disaster Alley. So in the region disaster risks are rising and that makes people more vulnerable because they're increasingly exposed to these hazards. And this is sort of a way of framing that hazards exposure and vulnerability and the impacts. And we see those rising, you know, globally, but especially in the Asia Pacific region. So we now have four out of five people affected by natural disasters live in Asia. And you can see that the percent of the world's total, many of them are in the Asia Pacific region. And your slides, Madam Ambassador, showed that in a very vivid and important way.

One thing that we should not underestimate is the impact on global food and fish stocks of climate threats. Ocean acidification, rising temperatures, migration of fish stocks, and now, you know, newer findings that the availability of key omega three fatty acids could be declining with the changes in ocean temperature. And this is, as you see, this chart shows you various RCP scenarios and the effect on global fish stocks. Not to mention, forget the migration northward of many of the global fish stocks towards the Poles.

Last week I testified in the Senate on the Artic, and of course we have a fishing moratorium today in the Central Artic Ocean. But many wonder whether China's interest in the Artic is in part motivated by the future prize of a vibrant fisher in that region. So we see this is going to have global impacts in many ways and that just exacerbates the challenges for our Coast Guard friends, I saw some in here at lunch, who have the mandate, along with others around the world, to address illegal and unregulated fishing.

Okay. Well this is just a snapshot, a bit of an eye chart of the climate hotspots across the

region. Some of you have probably seen this slide before, but it shows you that there's no lack of challenges across the region.

So at the Wilson Center, one of the places where I now am, along with the Center for Climate Security, over the last couple of years we've been running an effort to improve our predictive capabilities for disruptive weather and water and climate security events by integrating sort of our understanding of the natural system changes, the ecosystem changes, along with transnational threats and security threats, and to get a more integrated framework.

And we've done four case studies now, I'll talk just briefly about two. We did one on South Asia and Pakistan, looking at the climate threats there. And you can see how in this part of the region you have a lot of climate insecurities, got a lot of draught, combined with flooding, Himalayas, the water tower of Asia. As that changes that's going to make many more people water insecure across the region. And you see some now new elevation data. I'm going to show you a little bit more in a moment about how Mumbai just as an example, a megacity, could be very much under water in coming years.

Now we recently took a deeper dive into the Cove States here, somebody asked about the Cove States here in the Asia Pacific region, the Marshall Islands, along with the Federated States of Micronesia, to look at a combined set of threats in this region, both the increasing presence of China in the region, but also, and the Cove States, our arrangements for the Cove States come up for negotiations within the coming years, and what are their major challenges. Many of them food and water insecurity driven by climate change, and how can we better shape our engagements. We did this with Indo Pay Com, J9, as well as NOAH and other U.S. Federal agencies and looking at this integrated set of risks. So here you see the A2, AD outer island chain and a combined set of risks we're trying to better combine and at the same time disaggregate these complex, compounding risks in the region.

And we just need to underscore, I think, that migration, that climate migration, and Ambassador, you said it very well. This region is going to be at the front line of a new generation of climate migration and we don't currently today have the legal mechanisms to address the sovereignty of nations of people who will be displaced and to manage that. And that is one deeply personal to me. My parents were Holocaust refugees and they were fortunate enough to come here and to be able to live their lives. And many of the legal mechanisms we have in place here today are those that we put in place

after World War II to deal with the refugee crisis as we understood it at the time. And we need to really think about how we update that. And I was very interested in the solutions that you put forth there, Madam Ambassador.

I'm going to move right on to this next set because I know my time is running out, but I think this new elevation data that's come out is important for people who are working in this space to know about. And I have to thank Climate Central and my colleagues over there. This shows you this new data, the increased number of people that are going to be at risk from annual floods in a number of countries across the Asia Pacific region. And the numbers are quite significant, the increased exposure to many cities, many key populated cities in the region.

And just as an example, land below the projected flood level in 2050 in Bangkok, Thailand, with this new data we see many, many cities, much more at risk. And if you want to take a deeper dive into it you can go and look at all of these data sources, that's where it comes from.

And with that I'm going to get off the stage and look forward to engaging with you in the Q&A session.

MS. BETANCOURT: We'll go with Leonardo.

MR. MARTINEZ-DIAZ: I'll do it from here if that's all right. Thank you for taking on this issue. It is absolutely crucial, and the connections between climate change and security are now becoming more and more clear.

I think after Sherri's excellent presentation you will begin to feel a bit overwhelmed. And that's always the impression one feels after just even a casual survey of the compounding damages and the risk.

And so one of the crucial things we need to do both as policy students, policy makers, and as the general public, is to figure out how do we come up with a positive, concrete agenda for action. That of course, that includes cutting emissions because there is no adapting to a five degree world, and probably not even to a three degree world.

But as we cut emissions, we also have to come up with ways to begin to absorb, reduce, and bounce back from the damage. And that means thinking more deeply about a policy agenda for building resilience.

And that's what my co-author, Alice Hill, and I do in a recent book *Building a Resilient Tomorrow*. We lay out 10 lessons that we have learned so far on how to build resilience. The focus is on the United States, but I think those lessons are easily exportable to other parts of the world. Let me give you just a flavor of a couple of those lessons that build on very much the agenda that Sherri just set out.

The first is about building more resiliently around the world. This is especially important in Asia which has, of course, some of the largest cities and urban environments in the world. And I think this lesson is about how do we build more smartly and how do we build for the future, not just the past. It's pretty clear now that the future will not resemble the past in terms of climate, in terms of other parameters that we currently use to design site and build infrastructure. And so now we have to begin to think about what are these structures going to be withstanding? Where do we place them so they will be at lower risk? And how do we make sure that this applies not just to, you know, key military and political facilities, but that they also include the vast majority of commercial and residential structures that are the heart of the economy in most places.

So what this means is we need, first of all, a land use policy, building codes and zoning regulations that set up a clear boundary but where not to go, right. Where are the safe zones, where are the unsafe areas. We need to broadcast to the public, to developers, to the real estate community, to villages and cities, about the importance of planning in a way that is future informed.

And that means governments have to come up with flood maps, they have to come up with risk maps, and to develop a hazard matrix that allows all of these different decision makers across the economy to make good decisions about where to build. And we need to have building codes that are enforced. Not only that they are good, but also enforced.

The story of Houston, I think, is informative. The City of Houston in Texas, of course, had a policy of pretty lax building codes. It allowed folks to build pretty much wherever they wanted. And over time you had a vast city that was very dynamic economically, but then when Hurricane Harvey arrived in 2017, it dumped 50 inches of rain in just a few hours, causing massive flooding and enormous damage.

Very shortly after that the city got together and passed some of the most stringent building codes in the United States. And whether they will be enforced and how they'll be enforced

remains to be seen. But it's clear that cities, even those that before were not embracing strong building codes, are beginning to do so.

And in Asia, of course, the systems in every country, every city, are different because of the politics and the governance and the history. But the overall message here is clear, we have to build for the future.

The second lesson that I want to leave you with is about data. We need to get the data, but we need to make it useable. Today we collect more climate and weather data than we ever have in the history of humanity, right. Just NOAH alone collects terabits of data, enough to fill over 7,000 90 minute Netflix videos a day, right. And that's just one agency. And so the problem isn't so much collecting more, we will continue to do that. The problem is how you boil that down and turn it into decision ready data that folks can use in businesses, in cities, in communities. And that means not just getting the right data to the right folks, it means doing so in an interface that doesn't require a Ph.D. to understand. Right?

And that's true in Vietnam as it is in the United States. We still have not have cracked that yet. During the Obama Administration I recall lots of efforts to try to increase access to data, lots of clearing houses and places, platforms on line to get the data, but in the end it can be quite overwhelming, especially if you're working in a small city or in a small business with limited resources. So we need to be able to do that. There's some excellent technological capacity now that can help us do that, but we need the political will to build these interfaces and to ensure that the cost of the data is accessible.

Of course a private sector will create very fancy proprietary tools for big business to understand what's happening to its supply chains and so on, but we need to make sure there's a platform of accessible free or a very low cost data that people can use.

Third lesson, really quickly, is about finance. We need to make markets work for resilience. And that means we need to make sure that prices begin to capture climate risk. And currently they're not really doing so. In real estate we're beginning to see a signal, a price signal, in places like Florida, like New York, we've detected now a price differential between 6 and 7 percent of discount that properties in risky areas appear to be incurring in the market. But stocks and bonds, insurance premiums, all of these things do not yet fully reflect the magnitude of the risk. And that is true in the

United States as it is true in many parts of the world that have even well-functioning markets. So we need to figure out in those places where the markets are already quite sophisticated and deep, how do we ensure that climate risk is increasingly reflected. And that is of course quite important because it then drives prices and begin to drive decisions to buy and sell insurance and bonds and stocks and real estate, and that of course leads over time to reward those players that are building resilience and to signal to others that this is dangerous, right, and you probably shouldn't be buying that property or shouldn't be investing in that company.

Finally, and Sherri already alluded to this, is the real pickle of relocation. How do you resettle people, not just individuals, individual households, from one place to another, but how do you move communities, entire communities, to other places? There are places that are worth protecting, where you can build more sea walls, more Mangroves, more infrastructure to protect the assets. But then there are places that simply will not be economically feasible to protect. And the question is, how do we do that? And how do we do it gradually, with plenty of time, with preparation, so that the relocation, which is inherently going to be traumatic, is not the kind of human tragedy that we saw in New Orleans during Katrina, in the Philippines during Typhoon Haiyan, right.

And that means there are some experiments already in the United States. We've seen this done in Louisiana and a small scale in Alaska so far. Moving whole villages is enormously expensive. We're talking hundreds of thousands of dollars per person. And so until we are able to reduce those costs and figure out more efficient ways to do this, it's going to be quite difficult.

We do have in the United States a buyout program that allows the government to individually sort of buy people's homes and allow them to relocate. But that is very slow and in many places folks don't want to leave. They are naturally attached by history, by culture, to a place, and they will not take the buyout. So we need to think of more community oriented ways to convince folks that moving as a group is a logical thing.

Politically this will mean that we need politicians, all the way to the local level, who are willing engage communities in a dialogue about this issue, and the earlier the better.

MS. BETANCOURT: Thank you. Dr. Chung.

MR. CHUNG: Thank you. Thank you for the invitation to Brookings. I was flying from

Madrid. Actually I couldn't see the final moment of the climate meeting because of my travel schedule to here, even though we were expecting to seal the final deal in Madrid. But actually things have been postponed to Glasgow next year. And that doesn't necessarily mean that there is a hope lessening, but I think we had just taking some moments, actually to find that's a better solution. So moving is better than no action. So that's the motto that we found in Madrid.

By the way, this is my second coming to Washington, DC in a conference on climate change with the support of Korean Foundation. And then today's theme is Asia Transnational Threat Forum and Climate Security in Asia. So let me ask you one question before I go into, you know, some of the details. What is the definition of the security in the encyclopedia? If you take a look at it, one of the definition is feeling safe. That's what security means.

So what we need to do in Asia Pacific in terms of the climate security, is that we have to let people feel safe. So then the question is, how can we do it, right? And then threats means that we don't build the safe, even by listening to that. And then if I want to make you feel safe, then I need to address the immediate threats, right, measures so that we can avoid that immediate threats. But though that's not enough. You know, we need to ultimately find the fundamental solutions that will prevent the threats from not happening to us.

In this sense, let me just compare some of the situations between in the United States and in Asia Pacific by looking at the same impact to the society. I'm sure that everybody in this room still remember 2005 when Hurricane Katrina hit the United States. Do you know how many people lost their lives at that time? About 10,200 people. It was a great loss.

Similar size of typhoon, you know, is like hurricane in Asia, hit Philippines. Do you know how many people lost their life? 12,000 people. With the same impact to the society. But in the United States you lost a lot, but 12 times more people lost their lives in Philippines. That's my starting point, why Asia Pacific is important.

By the way, if we take a look at your study by the scientists about why Asia Pacific is important in terms of the greenhouse gas emissions, more than 50 percent of the greenhouse gas emissions will come from Asia. That's a lot. And under the UNFCCC, UN rule, climate rule, do you know what? Up until Paris Agreement was resulted, (inaudible) that only developed the countries take the

legally binded responsibility with the greenhouse gas emissions.

In Asian context, there are only almost one country belonging to that category, that's Japan. Other than Japan, including Korea, actually we didn't have to do anything. Who is the number one emitter in the world now? China, right? And then I'm sure that India will soon or later replace that part of the list. And then Korea is number seven. And then we have other countries. But Asia doesn't have any institutional basis actually, to address climate change. Even if the impact is greater than in the United States. The question is, I said, what is the, you know, fundamental, you know, solution that we have to find out, long-term solution. Right?

Where does that threat come from? That's human activities, right. And then fundamentally we have to reduce greenhouse gas emissions. By the United States only? No, no, no. What I'm talking about, Asia is becoming the engine of the growth of the world, right? China, Korea, Japan, these business is booming and we know next destination is India, and do you want to include the Middle East as well? So it's engine of growth, not taking any legally binding obligation to reduce greenhouse gas emissions.

And here, if you ask, in Korea, to me, which are not legally obliged obligation to this greenhouse gas, of course not. If I think about national interest, right? And you have to design the institutions and develop a scheme in Asia as to where players can comfortably follow the rule they abide by reducing greenhouse gas emissions. How to do it, what are needed, right? That's what we need to think about.

Number one, going back to Philippines case, many Asian countries, Asia is very diverse, but the many Asian countries lack capability, right? So we need to help them. We are talking about some of the small countries and possibly reason they don't have a capacity to cope with these threats and to turn it into a matter of opportunity by growing your economy, introducing low carbon technologies. But they don't have the capacity.

You go to even Africa, you know, they want to grow the economy, but they don't have the capacity. So we need to help the capacity building process. Not in Northeast Asia though, right, where you go to Japan, we don't have to work on it. We are talking about some part of Asia, right?

Number two, as I said, governance matters. Are we talking about only Pacific region or

Northeast Asia, Southeast Asia, including Bangladesh? We don't have a forum here, right? Of course climate is a global problem, that's true. But do you know what the Paris Agreement means, which guides the society now towards risk climate change? It gives the whole driver to the hands of individual states by focusing on the implementation, not regulation. Meaning that, you know, asking countries to develop their five-year low carbon development plan. We call this a national determined contribution and we see submitted to you in essence every five years. We are not going to enforce you to do so, we just review it, encourage you to, you know, constantly implement your growth plan. It's good for everybody.

So because it's a matter of the implementation by individual countries, there is increasing more opportunities for countries to work together with neighboring countries, right? You go to Northeast Asia, Jung said, and we are not going to talk about North Korea today, I have a lot to say in climate context. I have in my mind how two Koreas can be unified only thinking about the climate change. I have good solutions. I'm just waiting for another president candidate to take my idea. Because do you know why? Climate change is a matter of opportunity.

Next, last week in Madrid, North Korean delegation even came and they said they will directly reduce greenhouse gas emissions. And they will do so more if international society helps them to do so. So it's about the development, okay? But we don't have a governance system at the regional level in place. Of course thinking about the immediate threat, you need to set up sort of the regional disaster risk management system and some other things and see their rise, right? That's necessary, but that's not all, you need to have, you know, regional economy development forum, right? Which focuses on low carbon technologies.

Do you know what is the size of this at the global level in terms of market size? Some people say 2 percent of the global GDP. As I said, Asia is engine growth of the world. So there is a vast amount of the market potential. I am sure that you heard about the Saudi (inaudible) going to IPU these days. Do you know? Because they want to transfer their energy system from fossil fuel to renewables. To do so they need to have a bit more financial resources. That's why they decided to open some part of their big company to the world. Everybody's ready, right?

And then also there is another issue that the Asia society needs to think about. That is there any governing systems of supporting the financial institute in Asia? That's another issue. We have

AIIV promoted by China. Do you know though what is the largest climate change financial organization in the world at this time? That's Green Climate Fund, which is located in the Republic of Korea. Have you ever heard about the Global Green Growth Institute? This new intergovernmental organizations having more than 30 countries as members. What is the purpose of this organization? It helps developing countries to identify their path of growth in a low carbon way, right? It is based in the Republic of Korea. Why? Because Asia society is so important. Of course, if Korea was lucky enough to get some of them, but if not because of Korea, but in general, Asia society has a lot of potentials.

Here my point, Asia society, Asia Pacific has a lot of, you know, problems in terms of being exposed to the threats. But depending on how we work together, we can transform this society in a very safe place where everybody feel safe. And then there are a lot of good opportunities, especially that the states can work together in Asia.

So I stop here. Thank you.

MS. BETANCOURT: Thank you. Last but not least, Dr. Caballero-Anthony.

MS. CABALLERO-ANTHONY: Thank you. The problem when you're the last speaker is most of your panelists have already said, I actually have a lot of notes.

But anyway, before that, really thanks to Brookings for organizing such a timely meeting. And also for giving me the opportunity to join this panel and to tell you more about the Asian story that has already been talked about very often.

Dr. Chung talked about how Asia can actually work together. The impact of climate change, as many of you already know, is not just cost cutting, but it also has this really transnational impact. What happens in one state effects the other. So when you talked about having institution, governance institutions, and particularly for countries that are really, really facing directly exposed to many of the impact of climate change. What you need therefore is perhaps apart from understanding what the risk is, is then to say so what do you do?

We have witnessed the frustration of the international level when countries try to negotiate emission targets. But at the same time, while the negotiation is happening at the global level, there's a realization that, you know, you also have to help countries deal with the day to day security challenges. So in other words, the adaptation response and the adaptation capability.

So what I'd like to do in the very short time allotted to me is to just highlight three key issues, important critical issues in Asia, particularly in Southeast Asia. Because as you mentioned, four of five countries in Southeast Asia are really in terms of most climate vulnerable, you're talking about Indonesia, talking about Vietnam, you're talking about the Philippines, Miramar. These are all highly exposed.

So when you talk about the impact on displacement, and this is where I refer to my notes, really as just for 2018 alone, the number of people that have been displaced, new displacement in the region, is really close to over 6 to 8 million people.

Five countries of this country's, the new displacement also is not just from natural disasters, but also natural disasters coupled with conflict, existing conflict. So you have in the Philippines, close to 3.9 million people, in Indonesia 857, in Miramar, if you don't include the ring population that is also suffering, highly exposed to natural disasters. You also have, just conservatively, 340,000 people. So what do you do with this new displacement and how do you deal with the frequency of national disasters? How can the region help in dealing with search and rescue operations, providing assistance to those that have been effected by national disasters? So this is shaping the discourse in Southeast Asia. You could talk about regional cooperation within Southeast Asia.

One of the biggest agenda is really to deal with disasters, is humanitarian assistance and disaster relief. So apart from ensuring that you are able to get countries to help, providing logistics for example, getting volunteers out there, but you need to have people that can easily be deployed so that you are able to then have what you call an assessment group. This is very difficult in 2008 when Cyclone Arthur came to effective. It was very difficult to bring assistance in. And as a result of that, there's a long story behind it, and I'm sure you know. But as a result of that the region decided to have a legally binding agreement, the advent if Asian Disaster Management Measures for Emergency Response, which allows countries, of course, to then provide immediate assistance.

And as a result of that, you have now a mechanism in the region called the ACHA Center, the Action Center for Humanitarian Assistance, that can then coordinate assistance to the region.

So when Typhoon Haiyan happened, despite all the imperfections of this regional mechanism, we were able to send people to come in and to provide assistance to local governments, you

are able to send in and coordinate some of the assistance coming from foreign governments, and as this ACHA Center gets more improved in terms of being able to forecast natural disasters, help provide alerts, assistance, and at the same time build the capacity of individual countries to have what they call the National Disaster Management Mechanism that meets every year. They share experiences, then while you cannot prevent disasters from happening, at least you are able to help people respond to the disasters and at least prepare so you won't have an instance where when you run out of medicine, when you don't have enough food, you don't have enough tents, then, you know, what do you do? The region should be able to provide assistance to a neighbor that has suffered from natural disasters.

There are of course controversies. How do you deal with countries that don't welcome assistance, immediate assistance, because being able to open your doors to immediate assistance would also expose your own witnesses. So what happens in the Humanitarian Assistant and Disaster Relief exercise is to be able to build confidence and trust, among neighbors, that we don't have enough capability and we need help. And it also means telling us from them what needs to be improved.

The second is really having to do with the impact of too much water or too little water in terms of food security. Asia is known to be a food basket to many parts of the world. But it also continues to suffer from, as a result of natural disasters, already very real challenges to food resources. In terms of yields, for example, there is a reduction, not just in food stocks in terms of cereals, but also in terms of fish stocks. So what do you do? What's happening in the region is trying to be able to develop, you're talking about building resilience, to develop what you call climate smart technologies. How do you help countries develop this technology, given the fact that production would be constrained as a result of climate change?

Now it's important to note that climate change, as a result of climate change, you're also seeing a region that for the longest time you see millions of young children actually suffering from under nourishment. In East Asian Pacific alone, the number of under nourished children below the age of five in the year 2000 was already 23.8 million. And that is expected to rise to another 15 million by the year 2050.

If most of your undernourished and hungry people are actually in East Asia and including, you know, the wider Asia, and also in Southeast Asia, can climate smart technologies help? How do you

help your farmers be able to address the prospects of lower yields in terms of rice, which is a main staple in the region? Are you able therefore to use technologies for cities, make cities become your producers of food rather than rely solely on the rural areas? So can cities actually be given the technology to even grow rice? The discussion in the region, for example, is a small city state like Singapore where you have all this public housing. At one point there were some ideas that you can actually have your, we call it public housing. On top of it you can actually build rice fields. That's something to think in the future. Or you make use of vertical gardens to grow your own vegetables. So can a country that imports 90 percent of its food become at least 20 to 25 percent independent of food when it comes to, for example, producing their own vegetables, or even producing things like eggs, or the other ambition is some kind of smart aquaculture. So things like that. It's an opportunity that's out there, it's an opportunity that can be rehashed, at the same time addressing the real challenges of food security.

The third is the challenge to health. Southeast Asia has a long history, most recent history, of infectious diseases. We suffered from SARS in 2003. We also suffered from the Bird Flu, H5 and 1. And there was also the problem with the MERS Virus. And as a result of climate change many people already know that it will actually increase the incidents of vector borne diseases. One of the concerns at the moment is what do you do with the transmission of new breeds of mosquito diseases such as Dengue, Chikugunya, and the Zika Virus. And how do you minimize or control the possibility of more cases of malaria, or even water borne diseases like cholera.

The increase of rural to urban migration, the lack of proper urban architecture to support it also increases the risk of water supply contamination. So all of these scenarios are being played out. So what do you have? Within the region, as a result of SARS, in fact the wider region you now have a task force that looks at the incidents of pathogenic infectious diseases. What you do is to increase surveillance mechanism. So as a result of SARS, we now have a system where health authorities think about providing a regional, you know, just like a global disease surveillance mechanism, thinking about the possibility of having a regional disease surveillance mechanism. And at the same time looking at the possibility of having, for example, a bank for vaccines.

Now all these measures were necessary then, but it's now even realized to be even more important as people prepare for the impact of climate change.

What that tells you therefore is while the region is very much vulnerable to the impact of climate change, there are movements that are taking place, institutions that are being developed, to respond to climate change. Taking off from what was mentioned earlier, it's being able to understand that while your scientists have all the data, you've able to translate that from knowledge to actual policy and to actual mechanisms, at the same time raising awareness and getting neighbors to actually work together to respond to many of the shared challenges of climate change.

For sure there'll be difficulties. I talked about the problem of having to relocate and having to deal with displaced population. The region has its own share of guilt in not being able to respond, for example, to forced migration in the case of what happened in Miramar. But now you actually look at a specter of one neighbor, Bangladesh, that is now thinking of relocating many of its refugees in another island that is also prone to natural disasters. And there's been a lot of talk when you talk about the linkage with climate and security, about the impact of this close to a million refugees at the same time there could also be possibly climate induced refugees, and it's basically a double whammy problem for them.

So the region is unprepared, but at the same time trying to do something to address many of the shared challenges. Thank you.

MS. BETANCOURT: Thank you. So I think what we'll do is we'll take a couple of questions from the audience. I also have a couple of questions, but perhaps we have the same questions. So I'll take a couple, and then we'll kind of go down the line and see who would like to answer them.

So I saw a hand in the back.

MR. TRETKIN: Thank you. My name is Michael Tretkin, I have a question for Professor Chung. You have mentioned the Global Green Growth Institute and the Global Climate Fund. So I'm wondering what lessons did the Republic of Korea learn from hosting those two institutions, and what do you think those two institutions bring to the table? Or after your COP 25 experience, where do you think those two institutions could bring some new solutions?

MS. BETANCOURT: Okay. There's also a woman here, third row.

MS. FLORINI: Hi, my name is Karen Floini, I'm the Vice President of Programs at

Climate Central. Thanks, Sherri, for highlighting our new study. I just wanted to make the offer to folks who might be interested in that that the corrected elevation data are now publically available for free for non-commercial use. And if anyone is interested in following up on that, please let me know. This matters immensely because sea level rise is not just a matter of the height of the water, but also of the height of the land, and as our new study indicates, the most widely used dataset available to date has an average error of six feet. We've gotten that down to four inches. So again, if anyone's interested in following up on those data I'm happy to discuss it afterwards.

MS. BETANCOURT: Great. There's also a woman here in the fourth row.

FEMALE SPEAKER: I have a question about the ice melting in the polar region and its influence on international relations in Asia. Not just China, but also our allies, such as South Korea and Japan are also interested in the Artic region, especially in the Northern Sea route above Russia and the natural resources over there because of the ice melting in the high north. So it seems that Russia is also welcoming their fans and investments for Russian LMG gas bid construction projects such as the MR project.

So could you talk about your thoughts about what changes will be brought to the international relations because of the climate change in the high north region.

MS. BETANCOURT: Okay. Thank you. So I'm going to add one question, and then we'll go down the line.

So looking at, and some of you touched on this, the intersection between demography, inequality, and migration, there, you know, across the Asia Pacific you have, you know, very highly developed countries and you have developing countries at various stages of development. And so with, you know, the unequal impacts of climate change across the region and despite ocean, very mobile and innovative populations, how do, well first of all, where the migrants go? Where's the first, second, third, kind of destination if they predict they're going to be displaced or they have been displaced. And what is the responsibility of the developed countries in the region. And Dr. Chung, if our ROK government, for instance, has looked at kind of what the government might do in the face of migrants coming from the region. That would be very interesting.

So there's that question, and then also lessons learned from the Global Green Growth

Institute and what those institutions in the ROK bring to the table.

The woman from Climate Central talking about the height of land versus more of an announcement than a question, but we appreciate that.

And then the role of Asia nations in ice melt in the polar regions.

So why don't we start with Sherri. Feel free to pick any and all.

MS. GOODMAN: I'll take the Artic question. My testimony before the Senate Commerce Security Subcommittee last week where I talk about this extensively.

So Russia is essentially militarizing and attempting to monetize the Northern Sea route. Now with, you know, the sea ice is melting, the polar regions are melting, changing twice as fast as the rest of the planet. You know, we're seeing increasingly navigable waters, it's, you know, the repetitive of change is well beyond anything that has been documented. The permafrost is now collapsing at a point where it may even become a source of emissions as opposed to a sink in the future.

So Russia, with the longest Artic coastline, first needs to monetize the opportunity to create a toll road across the Northern Sea route and in the future have a shipping route that stretches from Shanghai to Hamburg and is available to, you know, for Asia and other shippers who want to both seek the vast energy and other natural resources in the region, but also eventually use it for destination shipping.

At the same time Russia has remilitarized many parts of the Artic. They're rebuilding its bases, it's put a lot of nuclear, you know, it's got nuclear ice breakers, it's developing the first nuclear armed vessel that will take operation in 2023. And so there are a lot of activities occurring there that are deeply concerning from a security standpoint.

At the same time they've been open to a great deal of Chinese and other foreign directed investment to help build out, you know, and other energy opportunities across the region. They need both financing and in some cases they need technology. And so China has seen this as an opportunity, declared itself a near Artic stakeholder, is seeking to build a sort of polar silk road that takes advantage of the Northern Sea route and potentially in the future a central Artic route if that should open up in decades hence. Japan and South Korea certainly have, and Singapore and others have already been very much involved in Artic research. Svalbard, which has a unique international legal status which allows a sort of

central demilitarized island that's part of Norway, which allows for international research. Many of these countries have researchers stationed up there, are seeking to understand how the Artic is changing so that they could be part of this whole new geostrategic competition that has essentially opened up because of climate change.

I would just say on your last question on changing demographics of the region and how to take advantage of the talent and the diverse talent that exists across the region. One of the things I know that Indo-Pakum, and I'm sure General Vowell will talk more about this when he comes up here later, is that there's now, you know, a law, there's a U.S. law and Women, Peace, and Security, but there's an international mandate on it. And I think there are opportunities in terms of combining engagements on Women, Peace, and Security and on climate security to put those populations most directly affected, which is often women and children, at the front lines of the solution set on climate change across many of the small islands and developing states.

It's an often untold story because it doesn't fit the current narrative of great power competition. But it's a very important opportunity, and I see, you know, from where I sit engaging most directly with our U.S. military that wants to engage not just on the military side, but broader sort of whole of government. And I think there are many ways in which that can be heralded and cultivated and nurtured right now.

MR. MARTINEZ-DIAZ: To your question on how do we deal with the prospect of millions of people being displaced from coastal areas in Asia and other parts of the world, right. I think you're going to need several things. The first is to for governments to have an understanding of where the receiver communities are going to be, the second line of defense, if you will. It's of course someone speculative, but you need to be able to model where folks are going to go.

So we know for example that during Hurricane Katrina, a million people were displaced from New Orleans and surrounding area, a quarter of a million wound up in Houston, where they were largely resettled. The other three quarters of a million went to very many states. So we could yield to think through where are those receiver communities going to be and to begin to prepare them for that eventuality, right. And that means building infrastructure, in many cases flexible search capacity, if you will, in education and healthcare so that they are ready to absorb some of those folks once they come in.

In the case of New Orleans, the City of Houston was able to absorb those folks largely without too much trouble because it's a big economy and it was largely undisturbed by the Hurricane. But what if it hadn't been Houston, it was a smaller place, what if it had been a city that had also been hit in some way, right. So we need to strengthen the receiver communities starting now.

The second is to inject some programs that allow for immediate cash to those who need to make the move, right. So even in the United States we know that people have a lot of trouble finding even $500 of surplus cash if they need it in an emergency. And with renters we know from surveys that most renters would have trouble coming up with $2,000 to relocate or to move quickly. This is just in the United States, right. In other places that's even more challenging. So other programs we can put in place to provide the quick infusion of cash, small grants. In the case of Katrina again, the government allowed folks to access their retirement or their pension fund money without a penalty so they could just get that extra couple thousand dollars they needed to move. So there are things we can do to provide that quick assistance.

The third is, how do you provide help so that those who are displaced can find new livelihood and relocate permanently without terrible hardship, right. So these are things like coming up with seamless financial services so that you can carry your financial services, your bank account, your credit card, whatever it is, to a different state or even a different part of the country, without having to start from scratch. How do you come up with some licensing requirements for certain professions that allow people to export, to move their skillset from one place to another? Again without having to start from scratch.

Essentially, how do you facilitate mobility and reduce the transaction costs of folks who need to start a new life somewhere else.

Okay. So this is more low income communities as was the case after Haiyan, the Philippine government started to move folks who are fisher folk primarily, up to the mountains, right. And quickly realized that they didn't know how to make a livelihood for themselves because they had no skillsets for their new location. So we need to figure out how to train those people and provide the resources necessary to help them make a new living wherever they are going to be located.

Bangladesh, by the way, is starting to think of some creative ways with the German

government, to do that.

And finally, on GGGI and Green Climate Fund, I have a little bit of experience there because I used to represent the U.S. on the Board of the Green Climate Fund, and had to go to Korea three times a year for several years to represent the U.S. And I think what I would say is it's great that Korea took the opportunity to house and host these important institutions in its own country, it's important.

I was in Songdo, the new sort of city that came up from nothing into a major, you know, hub, where I'd say it's important to continue to internationalize that city. So you can continue to attract people from all over the world who can stay there, right. It's been difficult for many years because it's been largely a city that has continued to evolve from zero. And now that it's built up, it still needs to be a place where folks can move seamlessly, again, in terms of financial services, in terms of language, so that it truly becomes an international hub rather than just a Korean city that happens to house these international organizations.

MR. CHUNG: Again, I can continue to have some of the explanation about the GGGI and GCF. Personally, I knew the GGGI before it was born. So I was a council member of the GGGI sitting in the accompanying party. Also member of the Committee to host the GCF for Korea.

Looking at these two organizations, there are many things that we can learn, especially from the developing countries' point of view. First of all, it tells the countries that climate change is not a matter of the cost, but matter of opportunities.

Taking one country example of Ethiopia that I'm more immediately engaged with. Ethiopia's NDC, and if you don't know the term and this is a national climate change plan, needs to summit the UNXCCC, that it was this organization which actually helped the government of Ethiopia to prepare for this national climate change plan called Climate Change Green Economy, which is very, very ambitious, to reduce Greenhouse Gas Emissions by 64 percent relative to the VAU level in 2003, and then they engaged in the various policy measures that with the support of this global organization. And then so it ends up with that the Ethiopian National Plan NDC has to be one of the very best agencies that, you know, NDFCC level, which helped these countries to get more funding than other African countries from the GCF.

And then if we go to Ethiopia, Ethiopia on line, for instance, has some around three

Dreamliners. It's more than the Korean Air or Asian Airlines in terms of this flying aircrafts, which is very energy efficiency in fuels. Everything is in context of the climate change. They have some ability actually to draw the attention from the society that they interact with, you know, the major players at the global level, with this organization.

And then, by the way, if we go at the (inaudible), their Prime Minster, who received the Nobel Peace Prize, right. One of the main reasons why he received the Nobel Peace Prize this year is because he planted trees more than anyone else before. So that helped the Minister to receive the Nobel Peace Prize.

What I'm talking about, because of the political world. And then being associated with the a very fine expertise based services by this organization actually some poor country has a vision to become middle income country by 2025.

So GGGI has been very much helpful in terms of the helping working together with developing countries. They also help the (inaudible) after some years, two years ago to develop their national plan on how to implement green growths.

And then GCF is also very, very unique not only because it is a climate change focus in terms of methodology, as you may know, that the private sector is more critical in providing funding to the climate world. And then GCF has this very unique program called Private Sector Facility. In other words, if a major country, a major company would like to go to developing country but you're not sure about the political risk and some other risks so that you can make an investment decision, you knock at the door of the GCF, they will match their funding at your due risk this plan so that the private sector can comfortably penetrate into developing countries, thereby you can help developing countries to grow their economy, creating jobs, and then the technical transfer happens, and then GCF only has this function.

So there are some good lessons that we can learn. With two organizations they now have more than 300 staffs, both GGGI, GCF have 300 staffs. They were created in 2012 as a very fast growing organization. There are many good opportunities we can utilize by engaging yourself from these two organizations. So I stop here.

MS. CABALLERO-ANTHONY: We forgot mobility. It is easy to have all these plans, and I think they are very important to prepare for the real possibility that as in the context of Asia, I'm talking

about Southeast Asia, that you'll really have thousands of people going to be displaced as a result of natural disasters.

The problem, however, is that most of the countries are not really prepared to deal with displaced population. You talk about the case in Typhoon Haiyan for example, but in conflict settings like in the case of Southern Philippines, it's very difficult. And this is where sometimes while you have all these plans in place to provide and ensure that you have the right relocation, you're able to provide for cash transfers, you have the search capacity to ensure that you have medical personnel and all the other relevant agencies to deal with the needs of the displaced population, there is also, at least discourses in the region is that you really have to get the local communities prepared to accept this displaced population. Because most of the time it cannot just be governments to deal with this. So we have this discussion about state plus mechanisms, because most of the time it's your local societies, your NGOs that help make this displaced population more welcome.

But when it comes to cross-border displacement, that is a problem. And this is why I think one of the best things that has happened in at least the international level, is this global compact of migration, which actually now talks about what to deal with climate induced displaced population.

And countries are, you know, are they actually prepared to deal with this? You're talking about for example the displaced population from Bangladesh going into the neighboring India. I mean migration is an issue, and it continues to be. There are a lot of things attached to it. And much as you can argue that this displaced population have their own skills, that they can actually contribute to the economy. One has to, you know, as part of this is where regional mechanisms are important, because you have to get the region prepared to think about the possibility of accepting and helping this displaced population.

And you can imagine in a region where, you know, it's basically characterized by very difficult bilateral tensions. India and Bangladesh and India and Pakistan, and we're talking about, by the way, as a result of melting, you know, glaciers and all that, in the Hindu coast region for example, I mean you're talking about the possibility of this region really becoming water stressed. Now as this actually has indications on Southeast Asia, particularly when it comes to the Mekong. And, you know, we have China as a major player. And, you know, what about the impact, the possibility of even thinking about sharing

water resources as a result of, you know, reduced water supply. And that is a major issue that is being, you know, sometimes is swept underneath the carpet at the multilateral discussion, but is an issue that I think the countries ought to be prepared and how to deal with a big neighbor like China and getting them to play the role if they want to be seen to be a responsible player in the region and all this talk about providing public goods. And that one thing they really have to remember.

MS. BETANCOURT: Thank you. Well we're fortunate to have such a wide range of expertise on the stage.

We're out of time, but thank you, and please join me in thanking our panelists.

MS. GROSS: So, I'd like to say thank you to our first panel, thank you to the Keynote, our sponsors, and certainly all of you for coming out here on a truly yucky day. So, we appreciate your presence today.

So in the second panel we'll focus a bit more on how to respond to the climate challenge. Although as we heard in the previous panel talking about, you know, the problem that is here and how to respond to it are pretty much inextricably linked.

In the previous panel we heard how Asia is particularly vulnerable to global change, parts of Asia, this is really an existential challenge, but Asia is looking to be the engine of economic growth going forward, but that could also make Asia the engine of going-forward climate change contributions, which is not a position that that region has been in in the past. So a lot of different interesting things for this panel to discuss, and I'm looking forward to hearing from us.

So our first speaker is Dr. Rod Schoonover. He is the Founder and Principal of Ecological Futures Group. He's also a former high-level official in the U.S. Intelligence Committee, and a former Professor at Cal Poly, San Luis, Obispo; a wonderful town.

Our next speaker is Brigadier General Joel Vowell, he's Deputy J5 at the U.S. Indo-Pacific Command in the U.S. Army, and he is also a Former Federal Executive -- Federal Executive Fellow here at Brookings. And we're really grateful to have him back today.

And on the far side of the stage, our final speaker will be Dr. Hiroshi Ohta. He's a Professor at the School of International Liberal Studies at Waseda University.

So Rod, I'll give the stage to you for your opening comments.

MR. SCHOONOVER: Thank you, and thank you for coming out on a -- as was mentioned -- a yucky day. I don't know if it's still raining and sleeting, but it was when I walked in. And thanks to Brookings for hosting this event.

So normally I'm on the first panel, which is bringing the bad news, and especially being a Former U.S. Intelligence Officer, that's a comfortable place to be. And so I think the first panel did a really excellent job on describing the national security overtones of climate change.

I would mention, just for people who're walking in, security really spans human security, national security and global security, and sometimes those are intermingled. I also think it's important that we take note of some things that aren't always seen as climate change effects, and really call them out as such, for example, the things that aren't normally captured in a meteorological framework.

So, for example, rise in animal and plant extinctions, redistribution of plant and animal life on Earth, especially in the marine systems that are important to the Asia Pacific, desynchronization of the ecological processes that may have economic effects. Certainly the risk of an over-expression of rapidly-evolving or rapidly-reproducing species such as algae, algal blooms are a giant problem developing, especially where temperatures are already high.

And of course in -- we just heard in last panel about the Tibetan Plateau, there's a whole range of mountain phenomena, such as slope instability, and glacial lake outbursts that should rightly be seen as climate effects.

And I'm even going to pull back the aperture just a little bit more, because if we're pivoting towards looking at solution spaces, we need to talk more than just climate change. So, for example, from in the -- I'm a scientist by training so I tend to think of things in a scientific framework -- but if you pulled the camera back climate change is one of multiple anthropogenic stressors to the planet.

So, in addition to changing the chemical composition of the atmosphere that leads to the greenhouse gas effect, and the ocean acidification, we're also loading it with aerosols that have an adverse effect on human health, and we're disrupting geochemical cycles such as nitrogen and phosphorus. Nitrogen, for example, leading to nitrogen overloading in the oceans, that leads to eutrophication, it leads to hypoxia, land system changes such as deforestation, especially in the Pacific context, mangrove clearing is very impactful

And then there's a whole set of ocean stresses, as I mentioned before, acidification, there's stratification, there's pollution, there's debris, and also freshwater stress from over-pumping of groundwater, and also infrastructure development, like dams.

I bring these up because if you're looking at what to do in the 20, 30 years where you can bend the trajectory like greenhouse gas emission reduction policies, you have to really look at vulnerability, and you have to look at adaptation, and working on those other more direct, less lag-time anthropogenic stressors gives you a way to reduce the vulnerability.

And there's also a whole set of other social and political stresses that are affecting, not just Asia, but the world, income disparity, governance challenges, misinformation and disinformation.

And I think it's important to see these holistically because, again, if you're going to tackle vulnerability, and increase the ability for humans to successfully adapt to what are increasingly certain trends in temperature and precipitation changes, then I think you have to look outside of the traditional, certainly the greenhouse gas emission reduction policy, which is crucially important, but there are other parts important too.

MS. GROSS: That was terrific. You know, I think I'll ask you a follow-on question now before we move on down the line. I really appreciate your focus on multiple natural systems, and how these systems can really compound the problem of climate change. Of the kinds of effects that you've described, which of those do you find most important in the Indo-Pacific -- the Indo-Pacific Region and particularly coastal and island areas?

MR. SCHOONOVER: That's a hard question, because Asia is so big. Certainly if you are looking at Indonesia biosphere instability is a serious issue, but just more broadly, I really worry about ocean stress, and really it's not just one, it's the multiplicity of stresses, right.

It's not just the acidification from the absorption of carbon dioxide, and it's not just the stratification, and the freshication -- if that's a word -- from melting ice. It's also the direct pollution, the pharmaceuticals that mimic endocrine action in organisms, microplastics.

Again this is not a word that you normally hear in a national-security conversation. Why is that? I don't know, but we just never really talk about something that has such a critical effect on the fisheries on which so many people in Asia depend.

So, it seems to me that these -- the suite of stressors on the ocean, and which we have very little levers. Again, I'll bring the bad news, there's so little we can do to offset temperature changes in the ocean since it has taken on so much of the thermal spillover from global warming.

And so I think that's one of the things that worries me we don't -- you know, we can address illegal fishing, we can address pollution, we can address some of these -- you know, some of these other more direct anthropogenic stresses, but I do worry about acidification, I do worry about stratification, and change in circulation patterns.

MS. GROSS: Thank you. Although it's a difficult message to hear that, that our challenges with the ocean don't just stop at, you know, sea level rise and direct climate effects.

So, General Vowell, I'd like to pass it off to you.

BRIG. GEN. VOWELL: Oh, well, thanks to Brookings in general, as a recidivist repeat offender, who was here from '16 to '17, I learned from a lot of national treasures here, so it's always a pleasure to come back and participate.

I'm a 28-year Army Officer, now at the Indo-Pacific Command Deputy J5 for Strategic Planning and Policy. And you might be kind of curious, why would an Active Duty Officer be up here talking about climate change impacts? Well, I will tell you, using an old Soviet maxim, you may not be interested in climate change but climate change is interested in you.

So, let me talk strategically about the region if I may, because it's going to tie together with, I think our panel is really focused on what -- kind of what's happening now, but what we can do or think about for the future. And I think at Indo-Pacific Command we deal with some of these all the time.

So, in the National Security Strategy and National Defense Strategy we talk about five stated threats to vital national security, Russia, DPRK, China, violent extremist organizations, and Iran. In our command four of those five exist every day, three of those five are nuclear, and not in a good way, two of those five are existential threats to the United States of America and our allies, just in the nuclear arsenal alone.

So, I think about that a lot. But also stated in those documents are the disasters. We live in a region where 80 percent of the world's volcanoes and earthquakes happen. Yesterday in the Philippines 6.8 magnitude earthquake hit the Philippines. This happens every day in the region.

Typhoons, other disasters that have been talked about in consequence management from eloquent speakers before me, it happens all the time.

So, we're kind of, I would say, practiced in consequence management, disaster response and humanitarian assistance in the region, we get better every day, but that's some of the stuff that we see. So, I mentioned PRC, a competitor -- geostrategic competitor to the global world order, make no mistake, make no mistake about that, but they're also affected by climate change.

You saw the statistics that most of the people in their country live on the eastern seaboard of their own country, and are also going to be affected in the near term by rising sea levels.

But here's what I see when I go forward and talk to different Military counterparts, whether it's in the Maldives, or in other island nations, and that first island chain in the Pacific, you know, from Japan, down through the Philippines, and down to Indonesia, the Straits of Malacca, that first island chain they'll tell you what I just told you, their threats are a competition with China and their pernicious influence that they're trying to achieve.

When you get down to the second island chain, to that COFA state, the CNMI, and to the Vanuatus, and to Tuvalu, and Fiji, and Tonga, and et cetera, et cetera, those islands nations as described that have their highest point, 7 to 10 feet above water, they think it's fascinating that we have this competition right now with China. What really fascinates them if they won't exist in 10, 20, 30 years. And they tell us, in all seriousness like, we have a challenge.

And then you go to a Chief of Defense Conference, which I was at in August of this year in Bangkok, and the Chief of Defense for Papua New Guinea says, this is an issue for his country, not that his country's directly being affected so much, but they are receiving, in receipt of China climate change migrants, and they're having to deal with that effect. And so you've got this spectrum now of the, I guess, the acknowledgement of the impacts that are happening in the region.

So, what do we do in Indo-Pacific Command and the DoD writ large? I mentioned that there's been a lot of activity for years, because the region has been just prone to that for eons and epochs. But with the advent of more climate change impacts, the more we do with disaster management, the more we do with HADR exercises for interoperability, cooperation, knowledge sharing and capacity building, the better off we are.

You may be surprised in the audience that we exercise with the People's Republic of China's Army, Navy and Air Force a couple times a year. It's not combat operations we practice, it's humanitarian assistance, disaster response, and disaster management. That is a common challenge to all. It's also a good way to continue collaborative discussion and dialogue, make sure human safety and security is met the best we can.

My Department deals a lot with consequence-management, the less proactive, mitigation policies, that's up for other instruments of power. I'm but one in the Military, there's diplomatic information, economic, legal et cetera. Those policies have to be put in place on what's specifically to do. But I will tell you it's affecting my partners, my allies when we go talk about security in the region.

Here's a last little vignette for you, I'll pass off the mic. So, as the audience is aware about two, three weeks ago, a tiny little island nation of Tuvalu turned away 400 million dollars from the PRC. Do you know what the PRC was going to do with that money, build them abatements and offshore jetties to make sure the rising sea levels could be -- could keep that at bay from the islands themselves.

So think about this. I just talked about an existential threat to these island nations that have a very small height; that one good tidal wave might take them off the map, and they turned away an offer of aid. I will tell you, there's going to be more stories like that going in the future because with the PRC there's always some sort of string attached.

So there's a country that understands the values of what the PRC is bringing which are not necessarily good, and they come with those strings, but they still have that problem. We've got to be able to address that in the future, we find common values in allies and partners in ways that our competitors can't, for a liberal open international order in a free and open Indo-Pacific but that also requires us to be responsive to their needs in new ways, that from a security standpoint 28-1/2-year veteran who's focused on killing bad guys, and other stuff, to keep us safe and secure we have to think about those in different ways.

And with that, I will yield.

MS. GROSS: I'm not going to let me give let you give them mic back just yet. You know, I hear you saying -- I hear a couple of different stories coming out with respect to with respect to probably our biggest geostrategic challenge which is China.

On the one hand you're talking about some things that they're trying to do geopolitically to help the small island states, but on the other hand there are these bits of cooperation in terms of dealing with disaster response. Could climate change slightly open the door to greater cooperation between us, and our greatest geostrategic partner? Or is this likely to become another area where we have challenges, and are more at odds. Am I being too positive? Or is there -- there's a slight, sunny spot in here?

BRIG. GEN. VOWELL: Again, I'm a general officer, not a specific officer, so I'm generally knowledgeable on subjects, and not very specific, so otherwise if, you know, there's a specific officer, let me answer the question, I think it's both.

I think we talked about the Arctic earlier and at lunch. One of the biggest challenges to China's attempt to go into the Arctic is they have to compete with Russia who claims it as their own. And that's an interesting geopolitical discussion, where China, you don't think of as a member of the Arctic Council because they're not, they want to be.

And why is that? Resource exploitation, resource exploitation, resource exploitation; that's it kids. So, that creates its own challenge, that is an effect of climate change, the receding ice and the open passageways that are going -- we all think are coming, and are being seen now, is going to create that space. That is going to be an interesting place to actually work with other partners, allies, and competitors when those things happen.

But you also mentioned impacts to humanity, and I think that is an opportunity for everyone in the region to come together. Again, our strategy, our policy, is great power competition, not great power hatred. Okay, this is not about denying China everything on a strategic, national level scale. That's not it. I'm not here to tell you that.

Our government wants a China that rises in a safe, rules-based order that we allowed them to grow in for the last 40-plus years. That's what we want. So there's opportunity in space, I'm optimistic as well, not naïve, I'm optimistic that those wedges and seams could be filled with cooperation. And we do that, like I said, there's disaster management exchanges.

And as I mentioned to the group at lunch today, Operation Cobra Gold exercise every year, it happens in February in Thailand. There's 28 nations this year, India and PRC were observer

nations this year that they're going to participate this February, they're participating in the humanitarian disaster -- Humanitarian Assistance Disaster Response Exercise.

Why? Because we want to remain interoperable even with people we compete with; if that that makes sense.

MS. GROSS: Thanks for that, and I'm always looking for whatever little cracks of light come through on an issue like this. Dr. Ohta, the stage is yours, and your slides are there -- press the button --

MR. OHTA: You can see the slides but not the -- oh, yeah, here it comes. My name Hiroshi Ohta, I come from Japan. And also I want to be a part -- a good allied partner with the United States. And also coming from the Asia countries, Japan is also a very vulnerable country.

I'd like the show first two slides, how Japan is vulnerable. Yeah, this is from IPCC is the most current, fifth assessment report, and Japan, in the absolute term and relative term, is the most vulnerable. And this is kind of a year from 1998 to 2009, and most vulnerable -- or most hit by the extreme weathers and the most damages in absolute term, meaning that exposures of populations to the extreme weather, over 30 million people, just followed by a Philippines and China.

And most of them are Asian countries, but for a relative term is mostly Pacific Island Nations. This is quite interesting. And again for absolute term in economic loss for the GDPs, Japan is number one, and then followed by China and Korea it is because of the economic size.

But again, relative size, most of them are Pacific Islanders, so this is quite interesting how kind of significant to how vulnerable the Pacific Island countries, and also how vulnerable Japan, in terms of physical population size affected, and also economic damages.

And again, this is the most current, the so-called Global Climate Risk Index, this is a German Watch NGO Group, again Japan is the number one. This is annual basis. So last year we had a major typhoon hit major city in the Osaka, and so lots of damages. So, in terms of the death toll, and then deaths per 100,000 people in absolute loss, in relative loss, Japan is ranking very high, so becoming at number one, and then followed by Philippines and Germany.

This is a quite vulnerable situation in Japan, facing lots of typhoons coming to hit now even, this year Tokyo, hit quite hard with the typhoons. But I'm kind of an interesting question but

puzzling, not so many a major ministries, governmental branches are concerning about climate change as a threat, not even using the climate securities, only the environment ministries use the climate securities and issue particular report on climate securities; but not for the Ministry Foreign Affairs, not the Department of Defense.

Firstly, because they do not want -- use securities because this is a very sensitive (inaudible) in Japan, and security for defense force, self-defense forces, we don't say defense forces, such defense forces now the main mission is the disaster relief at home, maybe that would be happier for the Koreans and Chinese people, providing some secure -- sense of security to the -- the Americans.

But anyway so, maybe Dr. Goodman should go to the Japanese Defense Minister's Lecture, how this climate change and security should be connected. But anyway, so that's not so interesting, but they tried to be very much -- the disaster relief activities, it's very important for the emissions.

So, that the most of the ministries, and then government think the Japanese International Cooperation Agencies can take -- play a major role in terms of addressing global climate change in the sense of providing the mitigation policies and adaptation policies.

So these are the kind of one example. I'm not going in detail, but Japan International Cooperation Agency, JICA, the year 2017 spending 787 billion, USD7.1 billion, and then for mitigation and adaptations. These are some concrete projects, and also 14 countries for the Asian countries, and then 6 countries in the Pacific regions that are providing some kind of mitigation and adaptation as the kind of assistance.

So one of the priorities is promoting low-carbon societies, and indigenous buildings and urban development, and another priority is kind of enhancing the contra-measures, and also supporting climate policy and institutional (inaudible) development. And also addressing the ecosystem preservations, and working with international organization.

This is quite a low profile, but this is maybe Japanese Government is trying to address the problem of climate change. Thank you very much. (Applause)

MS. GROSS: Thank you very much for your presentation. And I'd like to ask you, I think we sometimes forget, Japan is definitely not a small island nation, the largest economy in the region, but

there certainly an island nation nonetheless. Are there lessons that the island nations in the Pacific can learn from Japan's response to climate change?

Yes, I think we don't see the climate change as a major threat, but mainly every year we're facing lots of extreme weathers recently. So we have kind of a preparedness plan, how to prepare, and then providing early warning. So before a typhoon hits, or a hurricane hits, the government, and also local government is sending the warning messages, and even local police, and also a local township member, door-to-door, and they're helping to -- elderly and disabled people to be able to escape.

But still major threats and coming recently, and then we still lose some lives, but still try to be, you know, be (inaudible). And also not only typhoon or extreme weathers, but as you know earthquakes is a major problem. So recently the public broadcasting in Japanese, NHK, had a one-week series of the -- how to prepare when major earthquake hit the Tokyo area, megacities.

So there's a kind of showing us very disastrous scenes, and then for 10 days there's no supply of waters, electricity, how to survive. Those kinds of things coming up nowadays, even for the flooding, and typhoons.

But unfortunately it's not enough, still we're losing lots of -- I just showed this, you know, quite a large economic losses and also human lives lost.

MS. GROSS: It's unfortunate that Japan has quite a bit of experience in disaster response.

MR. OHTA: The disaster (off mic)

MS. GROSS: Yeah, useful but not the kind of experience you necessarily want to have. So I'd like to start the Q&A period overall by posing a question to all of our panelists.

You all come from slightly different positions which could make this an interesting question for you each to answer. I'm curious how the cross-Pacific relationship, the relationship between the United States, and in Canada, Mexico, across to the Pacific, how that can be leveraged to help Pacific nations, and particularly the less developed Pacific nations, deal with their climate issues?

How can we leverage? What can we bring to the table in order to help our friends and allies across the ocean? And I'm open to whatever order you all would like to answer that in.

MR. SCHOONOVER: I'll start. So, I just returned from the conference, American

Geophysical Union, so I'm going to put on my Science hat, instead of my Former Intelligence Officer hat. I actually think that -- and piggy-backing on a couple things that have already been mentioned about early warning -- I think this is a place where a lot of fruit is left to be picked, in terms of not just early warning forecasting the weather longer into the -- or further into the future, but also I -- while I was there I saw efforts into nascent, ecological forecasting, helping to forecast the health of certain critical ecosystems into changing climate conditions.

The second largest the -- the country with the second highest number of attendees, it was China, they're a critical part of filling in scientific knowledge that's quite specific to Asia. I think a lot of researchers bring a flavor of their own country, or in their own region into their own research. Japan was another very large attendee, so was Thailand,

I think this is -- I think the science-to-science linkage especially if it is -- the word goose came into my mind -- if it's goosed by governments, meaning it's lubricated -- is that the right word?

MS. GROSS: Sure.

MR. SCHOONOVER: Okay.

MS. GROSS: Encouraged.

MR. SCHOONOVER: Encouraged, thank you.

MS. GROSS: Nurtured.

MR. SCHOONOVER: Nurtured, I think can bear a lot of fruit. And so again I think there's so much dividend, so many dividends from this ecological forecasting, maybe even dipping into social, sociological forecasting. If we can get a handle on migration patterns well before they're established, that would be a real benefit to the security and policy world.

BRIG. GEN. VOWELL: Yeah just a couple adds that -- well, I was thinking about the question again. Not a subject matter expert by any stretch of the imagination, but there are a couple fora that exist where there are opportunities. One is ASEAN, and the subcommittees related for ASEAN that would probably be best addressed, multiple nations involved, but that's aspirational.

We have challenges in ASEAN in my opinion, with just things like the code of conduct for the South China Seas, where UNCLOS is going, where recommendations are going, but there's also the Pacific Islands Forum, so the PIF is another opportunity. There are several, it's about four dialogues with

Pacific Island Nations throughout the year that have different countries involved, some from East Asia, some from North and Latin America. So I think those are venues to have the dialogue discussion going forward about what to do.

But the last thing I'll leave with is, what was impressive to me in this last assignment, and now this one is, just how involved academia and other institutions, and NGOs, PPOs are involved in the region in ways I didn't know.

So, for example University of Hawaii, has a huge outreach program across the region, as an example, and there are many others. But just from a common operational picture of operations, activities and influence across institutions, they and others, University in Australia, Sydney, is involved, and some others in -- that we call the Lower Pacific they would call Northern Pacific, to have this dialogue and discussion for mitigation and response.

We specifically get involved in building partner capacity with things like Maritime Domain Awareness with Sano buoys, with equipment to help primarily those specific island nations deal with the IUU, you know, illegal unregulated unreported fishing issues. And also just to maintain their economic exclusion zones outside their 200 nautical miles, but that's a venue as well, to make sure we can bring those issues up. Other than that I don't have any better policy prescriptions.

MR. OHTA: I'm not too brilliant with the Japanese Government so, first I have to speak for the people-to-people relationship. I think China -- I mean Japan and Korea should cooperate more, and because in ASEAN Plus Three, and also Pacific Island Forum I think Japan can, and also together with Korea, can early become effective, you know, the facilitators to promote all these international cooperation.

It's very difficult to work with China as JB mentioned, but quite competitive, strategically competitive. But unfortunately today's NASA governorship is in two countries, not so, you know, positive, and very negative. But I think for the future, you know, talking about North Korea's issues, and climate change issues, and particularly energy transition we should have some kind of an international transmission, or network with Korea, and Japan, and Taiwan.

That will be helpful to address mitigation, and also maybe help other places. So I think confidence building is quite an important I guess. First, you should kind of learn about how to build trust

among the neighboring countries. I think this is fundamentally very important to me, and then we can further work on the climate change issues. So this is my kind of take.

MS. GROSS: Thank you I think it's probably a good time to open it up for questions. In fact, see people jumping the gun and raising their hands. So, let's get the mics out there. There's a question right here from this gentleman in the third row, and I'd like to take three of them and then we can pose them across the row. You can choose what to answer or not.

SPEAKER: Thank you. I'm Pierre Toff, Thematic Specialist with Amnesty. My question was initially going to be towards the Ambassador, but perhaps it's better suited here. Something that's obviously, as one of the younger generational people, we've got Greta, and (a) it's idea of, you know, grassroots initiatives. But my question simply is, what do you think the role of social media is?

And also a sub-question but related, is unfortunately the U.K. decided to revote in a rather populist leader, and he represents a few other leaders around the world, such as Bolsonaro, who are heavily influential on how much we can actually produce national strategies to mitigate or adapt to climate change. And I just want to hear what you think we can do to respond to climate change with the idea of populism as a barrier? Thank you.

MS. GROSS: We have a question in the back, and then we'll come back here.

MR. WINTERS: Steve Winters, I'm an Independent Consultant. But since we have a voice from Japan here, I'd like to see if you could clarify something I've heard. But my understanding is that it's either the southernmost, maybe the southeasternmost point of territory -- of the Japanese territory is a little speck in the water which is sort of sinking under the water.

And if it disappears completely then this issue of what is the, you know, economic zone, and so forth, and afterwards? And so this issue also arises for major powers. And actually an international lawyer from Singapore said to me once, and this is probably not the case, but I'd like your idea on it if you have one.

He said, you know, one of the reasons that you don't hear Japan criticizing China for its artificial features that they're building in the South China Sea, that's because the Japan, in a sense, is pouring all this concrete on their little place and it's going to end up to be an artificial feature. But they want to continue to have it count.

MS. GROSS: Someone here on this side, and then the other side.

MS. MIZE: I'm Lucy Mize with the Asia Bureau at USAID. And I'm curious how you think about the competing need. Asia is meant to be an economic engine, economic engines are based on consumerism, consumerism has a significant impact on climate change, as does urbanization which is also a major factor in Asia. So, if you have those forces how can you work around them to address some of the issues that you've already raised about the climate change impact?

MS. GROSS: Thank you so much. We have three great questions; one, about how to deal with climate change in a world that's becoming more populist? One, and let's expand it, not just as Japan's maritime boundary, but as islands that are perhaps sinking, how will we think about maritime boundaries in the future? And then one of how do you combine Asia as an economic engine, and the economic growth and perhaps increase in climate emissions that that involves?

And so you can answer as many or as few as you'd like, but I'll just start it down the row. Let's start at the other end to change things up a little bit. Would you like to begin?

MR. OHTA: Two of them are quite difficult questions to answer. For the territorial issues the small islands, (inaudible) Torishima is one of the islands you mentioned maybe. Our Government is building up the concretizing the island not -- kind of avoiding to become submerged under the sea. I suppose the EEZ is the most concerned.

And then not only on the feasibility, but also fishing ground surrounding this, so economically -- and economically and strategically, very important to maintain this island. So I think the Japanese Government tried to -- you know, striving for maintaining this island.

But not only, not because of these island issues that Japan is not kind of taking a strong stance against Chinese expansion of the south side in China Sea, and maybe a different issue I guess, a different -- but certainly there's much concerned about this. Japan's government is very much concerned about the territorial issues with regards to the climate change.

The question about -- for business, and how to convey awareness, and also try to mitigate climate change, is also a very difficult problem. But just maybe introducing very small concrete example how to kind of deal with, is that economic matter is quite important and, for example, Japanese Government has been criticized by the international communities, still maintaining coal power plants

projects, even try to build new ones, but international financial institution like institutional investors, even Norwegian, you know, institutional investors divesting money from the coal power plants, relative to companies' activities.

So in this way, not directly addressing populism, but in this way maybe kind of economic incentive, disincentive can't change the behaviors, so I think somehow addressing more, you know, immediate short-term interest to thinking about the long-term solution of climate change may be one of the approach to deal with this kind of rise of populism. Yet, we can pursue the mitigation policies.

And the engines of -- Asia as the economic engines, and then how to address organizations, is quite fundamental questions, I think not only Asian countries, but also other -- American Continent and others.

But I think one of the -- kind of a broad answer to your question is sustainable societies is one, you know, sustainable community buildings. And also maybe younger generations is not necessarily for the older generations kind of pursuing the material wealth, so they are more kind of economics, and then also not pursuing the material wealth, but also more qualitative quality of life they are pursuing.

So maybe lifestyle is changing, and then many other urban dwellers in Japan feeling tremendous fear when we have major disasters, so maybe they are thinking about, you know, going to the local areas, and maybe changing the urbanization plans to the more kind of a compact city, type of cities. We can have public transportations, you know, and everything is walking distance.

Those kinds of maybe new urbanization plan should be one of the ways to change the urgent problem we're facing today. But lots of overnight solutions we can provide for you.

BRIG. GEN. VOWELL: Okay. I'm going to try them all real quickly. To the gentleman up front, an instrument of national policy, I won't get into politics, but I will say this, I'm a little more optimistic, and it comes down to education.

I am a child of the 1970s and '80s public school education in America, very different from my father's generation, and we grew up in the Conservation Movement, Rachel Carson's Silent Spring, et cetera, et cetera. I grew up with that, so it's ingrained in me to personally, and my generation in the Military as well, I've got this in our DNA that we just don't, you know, throw oil down the drain, and we have to try to treat the environment little bit with some respect, much more than we did before, not good

enough.

I've got a 21-year-old and an 18-year-old, they're screenagers, they have to have a screen in front of them, they communicate through social media, they do -- but that is extremely impactful, and it's a -- it's a mobilization for mass movement, if you will.

My fear is that you've got to have the right education platform to do that. I say fear, my concern is. There's a lot of easy ways to disinform society that way, or gravitate to what you think is your preconceived notion for something. And that's all I'll say about that.

But I'm not pessimistic about which leadership of which country now is going to stop all movement. I look at my sons who, you know, do want to leave it better than I found it for them, but they're not waiting. And that's your -- I think that's your generation, you look like you're under 30, so I think they're going to move out on that. I think they're going to surprise us. I'm optimistic that way.

Artificial features, let me -- let me a counter a couple things here. There is a vast difference between the dubious, territorial claims by the PRC and the South China Seas, the Spratlys and the Paracels, Fiery Cross, Mischief Reef; 2016 Court of Arbitration for UNCLOS found in favor of the Philippines. Who listened? Not the PRC. They don't give a damn.

That's not their territory; we gave that to, quite frankly, the Republic of China when we supported Chiang Kai-shek on Nine-Dash, now Ten-Dash Line, that's territory, not the seas.

But as we all know, 200 nautical miles for an exclusive economic zone impacts Malaysia, Brunei, Indonesia, Vietnam, and the PRC, all in the South China Seas, and they're all in competition with that space. What Japan is doing is maintaining sovereignty that's not in -- not in contest, and territorial integrity, which they should do, that's why nobody is really talking about that.

But you go down the street here, at CSIS, or in this building, will show you open source pictures of the militarization of the South China Seas. That is a totally different issue. And while I'm on it, speaking of conservationism and ecological protection, the worst coral disasters and sand plumes in the world are happening with all the construction by China in the South China Seas.

They have (inaudible) coral features and ecological systems en-mass that are not coming back, just to put airfields, and revetments, and missiles in the middle of the ocean. That's a challenge.

I have nothing to say on consumerism and urbanization, other than I realized that those

are true, and so if you have a less materialistic society, sustainable infrastructure; a British author named Matthew Ridley talked about this a while ago in a couple books, but he's more the rational optimism about developing societies.

I don't know enough to know more than that. And I think that that is a factor, and you're absolutely right, and they're in competition with what could be causing climate change.

MR. SCHOONOVER: I'll be quick. A lot of what I had to say was said before. I think the Grassroots Movement, because that's the first part of your question, can only be seen as a positive thing, especially currently. I do have a concern that if tactics became more militant that it would be painted as a -- in a different light.

And the second part your question was about social media, and like a lot of things, maybe like most things, maybe like everything, nothing is purely good or purely bad, and social media, you know, in my mind it's about 50/50 right now.

I'm generally very concerned about information integrity, it goes into the education question that was brought up earlier. How do people know what's true?

So, you know, one of my big heroes in science was Carl Sagan, and he talked about science as a candle in the dark. And I think when the -- when scientific knowledge, scientific integrity is challenged, not just by social media, but that seems to be a new engine that those of us who have been following climate change for, you know, decades, this is a new thing, or at least a new element. And I am worried about that.

In terms of competing needs, I don't have much to say on EEZs any more than what you've already heard. But terms of competing, that's a great question. And of course a USAID Officer would really pick up on that very quickly, because it's a tension that's built in to our modern society, and I actually think that, you know, if you run the 20th Century again knowing what we know now, right, would we optimize a multi-dimensional problem over one variable?

Which means, would you run agriculture so that you maximize your yield without regard to what you're doing to soil? Would you catch as many fish as possible without looking at the long-term integrity? That's kind of what we do. And so I actually don't see urbanization in -- and I'm sure you don't either, in a negative light. I actually think it's a cultural engine, and a political governance engine that we

really need to tap into.

But it's also the site of a lot of vulnerabilities that are emerging because we're not updating our infrastructure. We probably need to rethink infrastructure completely, because if we're building things that are going to allegedly last for 50 to 100 years, that's probably not a strategy when we're not looking at a stability point any time soon.

So, we may need to think of resilience and not as opposed to disposability, but circularity. So it's good for, you know, for about 10 years, and then we do it again, and do it again. That's the way nature adapts by little iterations with stress. So, yeah.

MS. GROSS: Thanks. And I actually, I like the question about populism a lot. So I'm actually going to take the Moderator's prerogative and say a couple of words too. And we're really seeing a lot of that in the world right now, and it's something I've thought about a lot in my own work. Not just populism but anti-globalization, anti multilateralism, we're seeing that happen in a lot of places in the world right now.

And the -- cure isn't the right word -- but the antidote to this I think is a youth population that really cares. If you're a populist, and you're coming out and saying, I want what the people want, and what the people want is climate action, then that's helpful.

The anti-globalization is a bit harder to work with but if you -- again if you have a constituency that really wants action, that really wants resiliency, that really wants a greener energy system, politicians listen to that.

And though so I think we go back to -- I'm a child of the '70s as well -- and the environmental movement was quite different than it was now, but on the other hand we were brought up to care about certain things. And then I see younger people today who look at them completely differently, and care about them to a completely different degree.

They're starting to think about things like circularity, and not having a throw-away culture. And we are approaching things differently, and I think as that generation grows up, votes, that that will help. Politicians respond to the people that they represent. So that's an optimistic view, you've got to be optimistic about something.

So, on that note, I'd like to take some more questions. This gentleman --

MR. SCHOONOVER: (off mic).

MS. GROSS: The last question, he says, no.

MR. SCHOONOVER: Slightly then.

MS. GROSS: Yeah.

SPEAKER: Thank you. Good afternoon. My name is Grayson. So I have a question. So, without measurement we have no management, about management we can't have mitigation. So I'm curious what all of your thoughts are on the emergence of technologies such as 5G, AI, supercomputing, GIS technologies, and how these can influence how we study and understand how the environment is changing, and how we can use these technologies to address these changes.

And if you can, give maybe at least one specific example of what you've seen how these technologies are being used. Thank you.

MS. GROSS: Thanks. Back here in the back row, and then the gentleman in front of him.

MR. PASTREICH: Yes, Emanuel Pastreich from the Asian Institute. I had a question, and the question of say fossil fuels and mitigation. I guess what I was sort of hoping where someone would say, we'll stop using coal and oil by such-and-such a date, and particularly in the case of the Military which is a relatively controlled economic system, it's actually possible in the way you can't do in other sectors to say, we'll go to electric within one year, two years, three years.

And I was curious in terms of what your thoughts were in terms of how, particularly the Military, could serve as the vanguard in terms of absolute mitigation. Thank you.

SPEAKER: Hi. Sorry. My name is William. I'm with the Woodrow Wilson Center. And I had a question for all three of you I suppose. I just spent the last couple of months in Beijing, and all around different parts of China.

And one of the things I've noticed there is that, you know, while there is a really, really big effort to, you know, to be switching to renewable energy to be -- you know, increased recycling, there does remain in China, and in a number of different countries around Asia and the Pacific, a kind of a stigma that, you know, the renewable energy efforts, and environmental conscientiousness is kind of a force pushed by Western powers, pushed by industrialized nations on to countries such as China, India,

Vietnam, and so on that, you know, why is -- why do these countries get to pollute so much, having already done so, having already industrialized.

Whereas, with countries like China and India who are now going through the process of their industrialization, now being forced to do it in a very restricting way. So, is there a way around this? And is there a way to promote industrialization and economic growth in these countries that doesn't compromise renewable development? Thank you.

MS. GROSS: Excellent. Three more good questions: How is new technology influencing our understanding the environment? Can the military be in the vanguard of moving away from fossil fuels? Yeah, and is this push for climate action against fossil fuels an imperialist ploy coming from the West?

MR. SCHOONOVER: I'll just start because I have short answers. I think the tech piece of this is really the only way out, especially with early warning and forecasting. We've already -- we're here talking about this because of remote sensing. We would have this problem that we didn't really have a handle on, and we would just be vulnerable to all of these climate effects, if we didn't have a deep understanding of how the Earth's system works, and that is largely from remote sensing.

And so, you know, although I do worry about 5G and the overlap between some of the hydrological spectra, I think -- I think 5G, and I think especially AI, as an interpretive tool in detecting early warning I think is probably invaluable.

Military should decarbonize as quickly as they can, and they should use mil-to-mil engagement to help other militaries decarbonize as quickly as possible. That's the only correct answer, in my opinion.

And China and other Asian countries, other developing countries, are unfortunately also some of the most vulnerable. You know, we will -- you know, the world view -- climate change is part of the world view at this point, it's no longer at niche topic when I started looking at it. People are more ready to identify things as climate change, and I actually think some of these effects that happen in Asia will be very quickly seen as climate affects.

Now, I don't understand China internal politics well enough to know whether that has any effect on its direction, but I think that's -- it's an interesting question.

BRIG. GEN. VOWELL: I'll take the technology question from a different angle. We, in the Department are optimistic about the character and future of conflict changing, and we see that today with machine learning, inroads to artificial intelligence. And if I could just project there, if we should have a war game today with a bunch of people in a room, and think about action, reaction, counteraction in a scenario, it might take a couple hours to figure out what's the best course of action.

What if I could do 10,000 emulations in less than two seconds? So if I had that technology capability, bunches of algorithms cross-queuing that could tell me where to be predictive, what best course of action country X could take for climate change abatement, et cetera, that might be hopeful, it would also be apolitical, that offer.

Alternative fuels, you might be surprised, and I know a (inaudible) in the armies subside, there are other investments, and the other services, but there's an Assistant Secretary Army for Installations Environment and Energy, and their charge is to do -- I know what the goals are -- I would be lying if I told you percentages -- but their goals are to reduce those kind of carbon footprint emissions.

So, there's a lot of solarization on installations across CONUS specifically. If you go to Fort Knox, Kentucky, if you go out to Fort Bliss, if you go to Fort Campbell, there are solar fields that didn't exist five, ten years ago. That are starting to replace the energy that's coming from other sources, you know, carbon or other based sources.

That that's a step in the right direction, and we've had a nuclear Navy for a while so that's been helpful for decades; and we don't recommend anybody else become nuclear, at least for weapons.

I can't speak to the stigma I would just say that if I understood the question correctly, I don't get my chance to be raised up in industrialized, but you did, and you caused all these problems in India, I would be kind of pissed about that too but, go ahead. (Laughter)

MR. OHTA: For the technological question I think already I heard some answers, but I think I -- there's one, a kind of negative aspect of the using of technological development. Japan is very much a famous of energy-efficient technologies, so because of energy efficiency we use more house appliances, more refrigerators, more Washlet, sort of special, you know, the features that are using more energies in total. So, this is the kind of a negative byproduct of using energy technology, efficient technologies.

And for the last question, how to address the industrializations, particularly emerging economies, of being able to less environmentally harmful development, if possible, I think the two ways, one positive, ways of developed countries show to the developed countries is that going to green, and you can provide more opportunities for the job, and also new development of the technologies, so now the green is better and also more profitable than all the steel and, you know, chemical industries.

And also Chinese society is suffering from air pollutions, so that's because of domestic pressures, the government had to, you know, introduce massively, renewable. But yet they had to maintain economic growth, they're exporting coal power plants to the foreign countries. But if we change the model of the development, so that the positive way of showing that most advanced countries, U.S. and Japan, and European countries show the new lifestyle.

So not using plastics, not using big facilities, and then going to the more public transportation systems, and then bicycling, and others, you know, and EV cars, and also remodeling the urban setting, like I just said the smart cities, and also compact cities, everything in your hand, each in the walking distance, and these kind of things.

And also negatively, we can show, you should not imitate us, because kind of an urban setting in Tokyo is terrible, in terms of future major disasters. So we have the concern about -- you know, we tried to disperse the major business and political centers to other cities, but there are lots of the resistance from the Tokyo Governors, like the Former (inaudible) Government Governor tried to oppose any kind of relocation as part of the functions of the city.

But now so that we become very vulnerable urban system, so China is kind of learning from the mistake of Japan I guess. So maybe some other countries, India also can learn the major concentration of economic political facilities in Tokyo is a most vulnerable environment we're creating. So I think, negatively, we can show, show you that other emerging economies do not imitate Japan. So this is another way, kind of showing that the previous industrialization model is not working for the sustainable societies.

MS. GROSS: I think to wrap up by saying that I really feel like we've had three panelists here with very disparate backgrounds, but I feel like we've turned into more than the sum of our parts. And so I'm very grateful for that.

I'd also like to point out that we've really talked all day today about the fact that Asia may have the most to lose in terms of dealing with climate. There are a lot of states there that are very vulnerable, but there's also a lot of opportunities for cooperation here, and not just on technologies that work but also on kind of the soft infrastructure of climate change, on policies, on education systems, and the kind of things that can really help us move the needle on the climate.

So, I'd like you to join me in thanking our panelists. And we thank you for coming out today. (Applause)

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