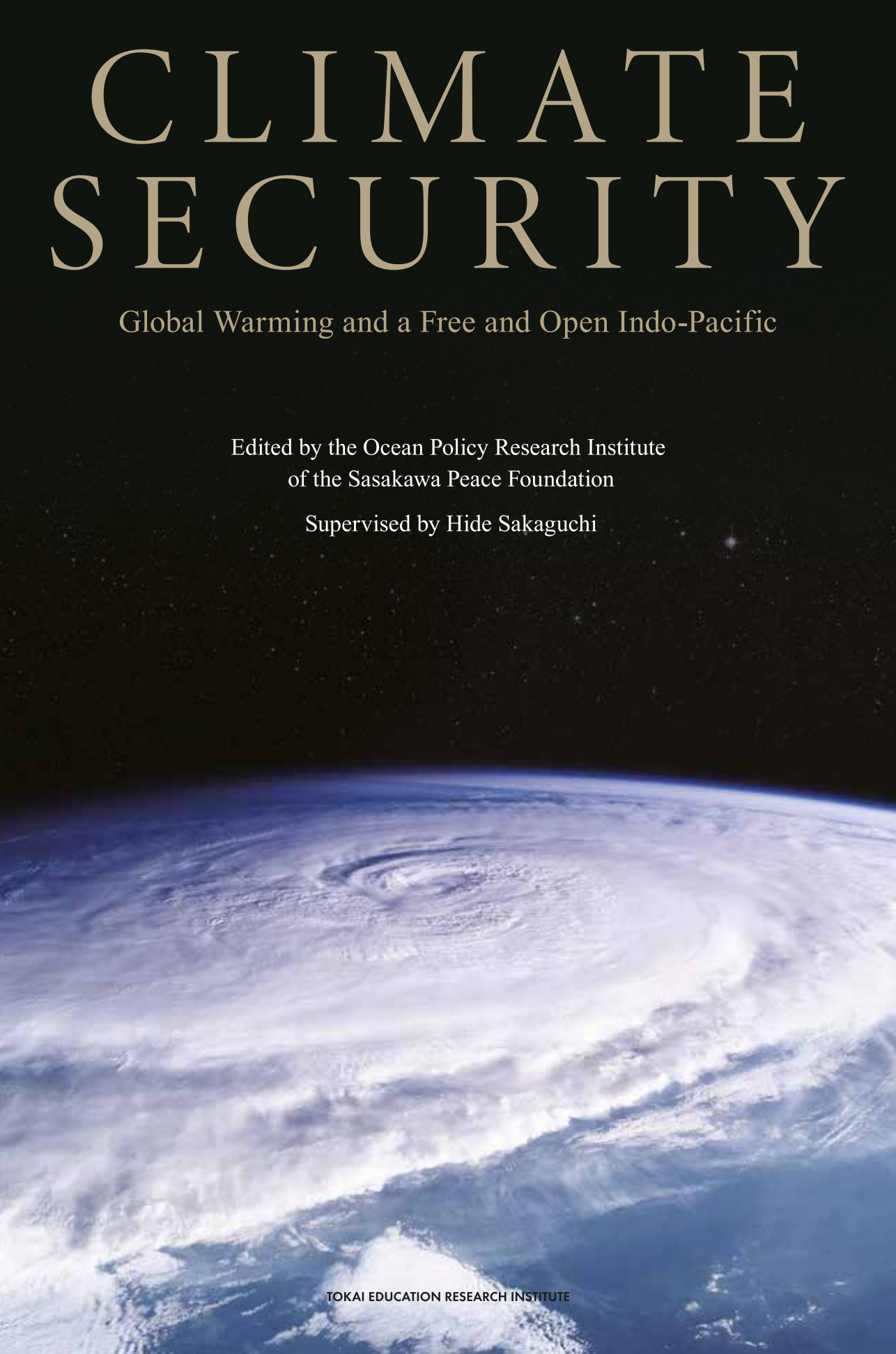
CLIMATE SECURITY

Global Warming and a Free and Open Indo-Pacific

Edited by the Ocean Policy Research Institute
of the Sasakawa Peace Foundation

Supervised by Hide Sakaguchi



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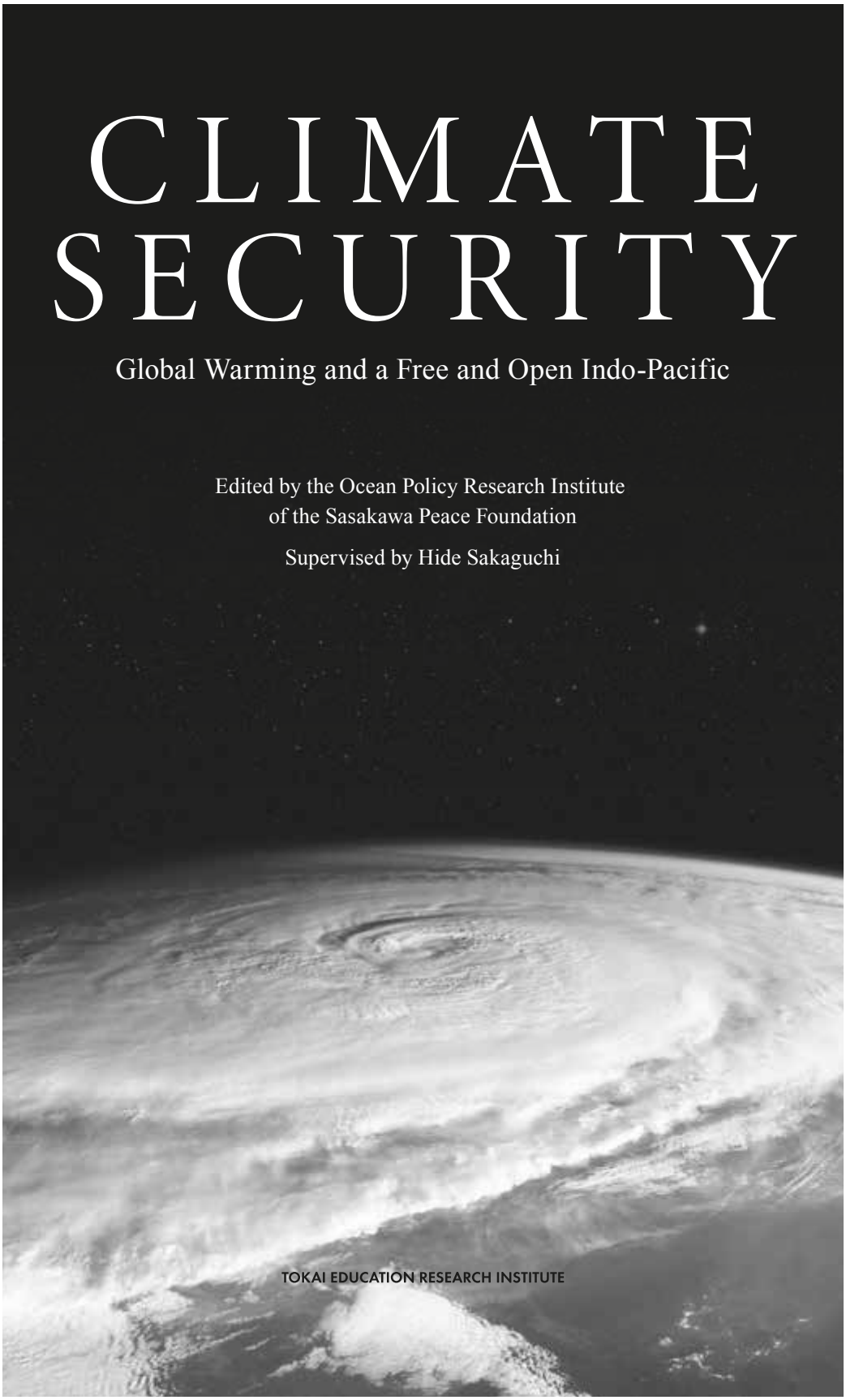

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Preface

Hide Sakaguchi

According to a report released by the Intergovernmental Panel on Climate Change (IPCC) in 2019, the global sea level at the end of the 21st century will be up to 1.1 meters higher than it was at the end of the 20th. This increase will be due to the effects of rising sea temperatures and melting ice masses caused by global warming.

As a result, many people living in coastal areas and low-lying island countries could lose their livelihoods, the natural environments and man-made facilities in coastal areas could cease to function, and coasts' baselines could change as land areas are flooded or eroded. This could cause countries to lose territorial waters and exclusive economic zones (EEZ). From a worldwide viewpoint, global warming due to climate change is undeniably causing droughts from extreme heatwaves and floods from heavy rains—in coastal and inland areas alike—and thereby becoming a major destabilizing factor for people's livelihoods and supplies of drinking water, and for food production, public health, public security, the economy, and society as a whole. The destabilization of society as a whole may lead to refugees, looting, violence, and terrorism, becoming a problem not just for neighboring countries, but for the entire international community as well. Furthermore, as efforts within the international framework on climate change progress faster, automobiles, ships, aircraft, power generation, and other conventional technologies that rely on fossil fuels may become unusable within a few decades. It is also possible that not only social infrastructure, but also the military will require major transformations and strategic changes. In other words, climate change is no longer merely an environmental issue. Rather, it is a threat to society that must be viewed as a security issue.

The climate security concept covered in this book is not that new. In fact, it was already being discussed at the end of the last century, starting in Europe in the late 1990s, and was also raised by the United Nations Security Council in 2007. Furthermore, after taking over in the United States at the beginning of 2021, the Biden administration signed a presidential order in January in which it clearly identified climate change as a security issue. In other words, climate change has become an urgent security issue in the international community—one that transcends the scope of environmental activists.

If we look at Japan however, while the concept of "climate security" is being discussed among some stakeholders, it is not generally recognized yet, with even key parts of the government that lead the nation being far from aware of it. If you tell people you think climate security is a serious problem, they will probably not say they agree unless they happen to be experts on the issue. On the contrary, at best we can expect that they will just ask you what the unfamiliar term means. This may be because even the primary and secondary industries combined only account for about 30% of Japan's industrial population, but whatever the reason, the tendency to view climate change as a threat and security issue is extremely low. In particular, it is not even widely known in Japan that the international community has been warning the country about its industrial sector's lack of awareness and efforts. As you progress through this book, you will probably realize that the fate of the future hangs on whether the industrial sector in particular understands the climate security issue properly, and takes preemptive adaptation measures. However, it is very unfortunate that the climate security issue is still seen as someone else's problem in Japan, let alone not being widely understood.

How critical this situation is can be easily grasped by looking back over the spread of COVID-19, which is believed to have already been progressing gradually in the latter half of 2019. The worldwide pandemic it caused from around April 2020 crippled not only Japan, but the entire world. As of 2021, the number of deaths caused by the virus itself has exceeded 3.8 million worldwide. For a time, medical systems ceased to function all around the world, and social and economic activities stopped. In addition, if the number of related deaths is also included, COVID-19 can be said to have killed more than 10 million people. Approximately 180 million people have been infected as of June 2021. In a global pop-

ulation of approximately 7.7 billion, this truly is a pandemic. If we apply this ratio to Tokyo's Shinjuku Station, which is in Japan's most crowded city and on average sees more than 3.5 million users a day, it means there would be about 80,000 infected people walking around in the station. In other words, it goes without saying that this situation would be a threat: Shinjuku Station would instantly fall into chaos.

Japan's current indifference to climate security is similar to the situation from the latter half of 2019 to the beginning of 2020. I myself was on a business trip in Qingdao, China in the second half of January 2020, and news of the COVID-19 outbreak in Wuhan reached there. From January 23 onward, my hotel and the airport were under martial law and an extremely strict quarantine. However, upon arriving at Narita Airport, all the passengers were let through freely without even a temperature check, even though they had been on a direct flight from China. Then as if there was nothing going on, they all simply went on to their next destinations by connecting flights from Narita, public transport, or car. The experience both showed me what a "someone else's problem" attitude truly was, and made me very afraid about what might happen next.

However, the SARS coronavirus that emerged in late 2002 (and belongs to the same family as COVID-19) only infected around 8,000 people worldwide, killing about 700. If we apply this ratio to the people in Shinjuku Station as before, we get about three people, so the probability of encountering the disease would be virtually zero. The SARS issue caused a huge media frenzy, but throughout, Shinjuku Station remained bustling with people just as usual. Fortunately, there were virtually no infections in Japan, but given the high lethality of the disease, I shudder to think what might have happened if it had spread. I was on a flight from Shanghai at the end of 2002 as well, and I will never forget how there was an eerie sense of high alert on the plane and at the airport in China, but in Japan everything was very relaxed and people saw the situation as someone else's problem. I do not intend to get into the debate here about whether Japan's initial response to COVID-19 was delayed because the SARS coronavirus had not become a serious epidemic there or worldwide. However, I will say that something both cases have in common is the fact that Japan did not take strong action until the situation was serious. If we claim to be a member of the international community, and a developed country as well, we must not forget that we have a duty to take the initiative regarding collecting and analyzing comprehensive information on problems that could become serious international issues (which the climate security issue already is), and to play a leading role in the countermeasures within the framework of international cooperation. Repeatedly failing to act quickly and then relying on other countries once the situation becomes life-or-death will only harm Japan's diplomatic standing.

In addition, when dealing with threats that could lead to life-or-death problems and shake the nation, Japan must first accurately investigate the situation and factors involved. Then, it must take immediate steps to overcome the threats or eliminate them preemptively, and thereby keep its citizens' lives safe and sound. However, although climate change had been discussed as an important issue both in the international community and domestically for many years (as had been asserted by the IPCC, Kyoto Protocol, Paris Agreement, and so on), in all that time, it was never truly seen as a life-or-death problem in Japan. In other words, despite being widely recognized as a hot topic that set the mass media buzzing, it was still seen as someone else's problem, just like SARS had been, and COVID-19 was from late 2019 to early 2020 (as described above). Japan finally started to take an interest in international efforts on the issue when the Sustainable Development Goals (SDGs) spread around the world. (The SDGs are 17 global goals set forth in the "2030 Agenda for Sustainable Development" adopted by the United Nations General Assembly in September 2015.) However, it still lacks any deep understanding of the life-or-death problems that exist behind sustainability.

Looking at the actual situation in Japan however, hot summer days and tropical nights (according to the official definition) have been getting more frequent since 2000, and the Japanese archipelago has been gradually becoming subtropical from the south upward. Consequently, the power expended on air conditioning in summer has been skyrocketing, and heatstroke has been claiming more and more victims every year. Additionally, the scale of disasters caused by torrential rain and the frequency of typhoons are clearly continuing to increase, and the number of large-scale disasters is going up every year.

The conventional concept of disaster includes the idea that we must always be prepared and on our guard (disaster prevention). As the Japanese scientist and essayist Torahiko Terada famously warned, natural disasters always strike again just when we have forgotten how terrible they are. In other words, back in his day, there was enough time between disasters for people to forget about them. The Japan Meteorological Agency also uses the phrase "heavy rain that comes once every few decades" in its special warnings. Similarly, when announcing "probability precipitation," it also uses phrases like, "The probability precipitation with a 100-year recurrence period is 200 mm." This means, "Heavy rain of at least 200 mm could fall once every 100 years on average."

However, 11 prefectures have been issued Special Heavy Rain Warnings (one of the special warnings in use since August 2013) at least twice so far, as of June 2021, with Fukuoka and Nagasaki having been issued four each, with major flood damage suffered afterward. Experts attribute these heavy rains to the increase in atmospheric water vapor caused by a rise in the average temperature, which will increase at a rate of 1.24°C per 100 years, and to rising sea temperatures in the Indian Ocean, the Philippine Sea, and the East China Sea. The sea temperatures around Japan in particular, such as the East China Sea, have risen more than twice the global average. This means the total rainfall will keep increasing and rain-related disasters will become threats that strike every year during the rainy season, with no time whatever to forget them.

Returning to a global perspective, rising sea temperatures do not only cause water damage due to rain. They also cause sea level rise as a result of seawater expansion and melting sea ice near the poles. Sea levels in many parts of the world are already rising steadily, and low-lying and coastal areas are facing various threats that could result in lost livelihoods. Examples include impacts on agriculture from water damage, flooding, erosion, and salinity. Consequently, rising sea levels are having a major impact on coastal life and industries, and may even result in mass migrations in the future.

Rising sea temperatures also greatly affect the habitats of marine organisms by significantly changing their natural environments, including seawater currents and temperature and salinity distributions. As many fisherfolk have been complaining every year for some time, this is causing some species in certain fisheries to become unfishable. In particular, sedentary organisms like algae, corals, and oysters could get wiped out just like that, because unlike fish, they cannot escape the high summer temperatures. Losing algae would also throw the food chain out of balance, changing the ecosystem dramatically and completely altering the landscape within the sea. The term "rocky-shore denudation" refers to when the algae habitat is lost due to rising sea temperatures, and this in turn changes the habitats of fish.

Changes in the distribution of marine organisms that serve as food could increase fishing that violates existing international treaties and agreements, such as ones concerning fishing on the high seas, highly migratory species, and straddling fish stocks, and agreements between states on fish catch sizes in exclusive economic zones. This could lead to new international fishing disputes and increased illegal fishing.

To reiterate: depletion of conditions that form the basis of people's survival due to climate change and natural disasters will often become a factor that leads to deteriorating security and the outbreak of conflict. Furthermore, it is amply conceivable that destabilization of the food supply will lead to even worse armed conflicts between countries. Strengthening the system preemptively in order to respond to such threats with rapid, effective humanitarian assistance, etc. in the event of a large-scale natural disaster is not just about disaster relief: it is also about preventing public security from deteriorating and conflicts from breaking out. Monitoring and regulating fishing that violates international fishing treaties, etc. are also means of so-called "preventative diplomacy"—something that can help avoid conflict between countries in the first place. Thus, the international community is starting to recognize the importance of thinking in terms of "climate security" when addressing sea level rise caused by global warning, humanitarian assistance and disaster relief in the event of large-scale natural disasters, and reconstruction assistance.

On the other hand, climate change also impacts national defense and the structure of international security. It has an especially significant impact on undersea defense operations that use submarines and the like. This is because sonar devices are used for undersea communications and positioning, and their

accuracy mainly relies on making corrections for water temperature and salinity. As mentioned above, water temperature and salinity distributions have changed drastically with rising sea temperatures, and the historical data for each region will cease to be applicable. This trend is most pronounced around the equator. It is also difficult to estimate, because rapid warming is creating a complex structure of water temperature and salinity distributions.

In addition, military bases on islands and in coastal areas will suffer damage due to sea level rise and major disasters, as this is expected to interfere with their duties. In countries with bases in areas vulnerable to natural disasters, the need to develop base facilities and functions that can respond to climate change is being recognized, and addressed as part of "climate security."

If natural disasters become frequent, it may be necessary to change where troops are stationed. However, doing so will also risk disrupting the existing power balance. Climate change also has a rather large impact on defense functions and the security environment, and some see it as the greatest security threat of all.

We may need to look at the bigger picture. If global warming continues, it will affect various industries related to agriculture and fishing, and could change the existing global economic structure. If this changes international relations and the power balance between major countries, it will lead to a geopolitical paradigm shift. The world may be forced to reconstruct its security strategy with climate change in mind. We need the right know-how to stabilize the disrupted security environment.

As the examples above illustrate, climate change is becoming a life-or-death problem that will rock the international community in a variety of ways. A particular problem with global warming is that it is not a one-off event like an earthquake. Neither is it a seasonal phenomenon. Rather, it is like a flow with tremendous inertia that will not just simply stop, and experts predict that it will continue to get worse over the next 40 years. They say that even if we do limit greenhouse gas emissions through various initiatives and somehow reduce their rates of increase, it will still be difficult to shift the trend back toward climate cooling. It truly is a threat.

That is why as an initiative toward climate security, the Sasakawa Peace Foundation's Ocean Policy Research Institute has been studying how to address the threats to human habitats and international relations that will arise from climate change in the oceans. The research started in 2019, and has continued through to 2021. This book summarizes the results, and presents them to the world at large with the aim of proposing an international approach to climate security. Climate security will require cooperative international efforts between a variety of actors, including governments, relevant ministries and agencies, relevant NGOs, and especially, national defense organizations and institutions. A climate security session was included as part of the Leaders' Summit on Climate led by the United States in April 2021. In the session, defense ministers and representatives from participating countries and institutions expressed the need for a military response. The need for countermeasures from the military against global warming was also discussed at the NATO Summit in June 2021. Defense organizations and institutions need to work internationally on interdisciplinary climate security.

I hope that in addition to the above-mentioned stakeholders, everyone else involved in a wide array of industries also takes up this book and reads through it, in order to hasten efforts in the industrial sector to address this issue.

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Part 1

Climate Change and the Security Environment

Since prehistoric times, as humans have struggled to survive and build the foundations of daily life and society, they have constantly had to respond to changes in the global environment—changes that have included global cooling, global warming, and shifting patterns of wet and dry weather. We can look back on this as a bitter struggle between mankind and the climate. We are now facing a new threat of climate variation: global warming. It is having a major impact on the habitats of all living things.

About 71% of the Earth's surface is covered by oceans. It would be more fitting to call this planet the "water globe." The impacts of climate change and global warming on the oceans are major threats to the survival of land-dwelling humans and their social infrastructure. The first part of this volume provides an overview of the impacts of global warming on the oceans, such as rises in sea temperatures and levels, and their threat to the security environment.

The Security Environment Created by Climate Change

Kazumine Akimoto

The Lord told Noah, "The Earth is filled with violence because of them ... I will send rain on the Earth for forty days and forty nights, and I will wipe from the face of the Earth every living creature I have made." ... Noah built a boat.

This is an excerpt from Chapters 6 to 9 in the Old Testament's Book of Genesis.[1]

Tablet 11 of the Epic of Gilgamesh,[2] which may have been composed even before the Old Testament, contains a similar story of escaping a flood by boat. The passage reads as follows:[3]

"Man of Shuruppak, son of Ubartutu, tear down the house and build a boat. Abandon wealth and seek living beings. Spurn possessions and keep alive living beings. Make all living beings go up into the boat." ... Six days and seven nights came the wind and flood, the storm flattening the land. On the seventh day, the flood storm lost the fight. ... The land was seen in 12 places. The ship stayed at Mount Nisil.

There currently seems to be no evidence to prove whether there really was a flood that threatened to destroy all life on Earth in prehistoric times. However, myths provide a testament to how people feared the fury of the weather long ago, and the threats it posed to their lives and societies.

Our planet is said to have been born some 4.6 billion years ago. Over time, oceans spread across it. Then 3.6 billion years ago, life was born from those oceans. Within the unimaginably long history of the evolution of life on Earth, the species *Homo sapiens*—modern humanity's direct ancestors—appeared around 200,000 years ago. Modern humans left their birthplace in Africa 65,000 years ago. Those in Eurasia went north. Others went south, then headed east, crossing lands, mountains, and seas. It is believed that they reached South America about 30,000 years later. Through this process, modern humans chose and settled in lands that would suit their own ways of life. What prompted them to migrate, then settle? There are several factors, including population growth and the availability of new, unexploited lands. However, one major reason was certainly that they were responding to climate variation, the beginning of a long struggle.

The Earth has gone through a number of ice ages. We are currently in the Quaternary Ice Age,[4] which began about 2.6 million years ago and is characterized by cycles of bitterly cold glacial periods followed by milder interglacial ones. Our distant ancestors were born into such environments, evolved into modern humans, left Africa and migrated in search of lands to live off of, settled at last, then created a diversity of lifestyles and social structures. This brought culture and civilization to their societies, but the process was a struggle against natural phenomena. Climate variation[5] poses a major threat to

1 Executive Committee of the Common Bible Translation, *New Interconfessional Translation* (Japan Bible Society, 1996), 9.

2 It is generally thought that the Book of Genesis in the Old Testament was written either between 500 and 600BC or around 1000 BC, and that the Epic of Gilgamesh was written around 3500 BC.

3 Fumio Yajima, *Epic of Gilgamesh* (Chikuma Gakugei Bunko, 1998), 117.

4 The Quaternary is the period from 2.588 million years ago to the present. It is regarded as the era of mankind.

5 In this chapter, we use the term "climate variation" to refer to natural phenomena such as El Niño that change the climate periodically or irregularly, and "climate change" to refer to so-called man-made changes in climate since the Industrial Revolution.

modern humans' survival and their societies, and history furnishes examples of how it has actually led to violence and slaughter. Long before strife over national interests, geopolitical rivalries, or religious and ideological clashes, which we might immediately think of as the causes of war today, the struggle against climate variation was once the greatest challenge we faced. Perhaps that struggle ought to be called "historical security."

In this chapter, we examine how humans have struggled against climate variation since the end of the last glacial period[6] in the Quaternary Ice Age (16,000BC), when they began to settle and build civilizations. It is, so to speak, a history of modern humans' climate security. In the following, modern humans will be referred to simply as "humans."

1. Human history amid climate variation: Migration, settlement, and war (from BC)

Humans developed societies while living through glacial and interglacial periods. Around 16,000BC, when a glacial period was probably ending, global warming prompted early humans in Europe, the Cro-Magnons, to abandon their cave-dwelling way of life and follow the reindeer north. It is thought that the Earth headed into an interglacial period, the climate warmed, and the sea level began to rise around 14,000BC.[7] However, some also believe that the climate was unstable and constantly fluctuating, for example because the warming caused many icebergs from the North Atlantic to flow into the ocean, cooling the climate down again.[8]

The unstable climate threatened the security of food that could be obtained from hunting and gathering, so humans migrated in search of places to hunt and gather as their groups increased in size. In other words, they sought to ensure their food security. Their response to climate variation was to find a viable way to adapt to it—i.e., to survive "with climate variation." This may also be mankind's first-ever example of climate security.

By around 12,000 BC, humans were not only settling in the cradle of civilization, groups of them were doing so in Siberia and the Americas as well. Climate variation is thought to have settled down for a while around that time. While the Neanderthals died out, *Homo sapiens* are said to have been able to thrive because of their ability to cooperate in large groups. Thought to have been physically robust, the Neanderthals generally formed societies based on small family units. *Homo Sapiens* on the other hand lived in large groups. The technology and wisdom needed to adapt to climate variation came about due to cooperation.

Cold weather and droughts are said to have made the climate unstable again around 11,000 BC. This time however, most of the groups that had settled all around the world did not return to a life of migration. This is because it was not easy to migrate in large groups. Some groups began to cultivate wild seeds or corral wild animals on their lands in order to ensure food supplies.

When humans lived a migratory lifestyle, they had more flexibility in deciding how to respond to various situations. Once groups put down roots however, a hunter-gatherer lifestyle made it difficult for them to adapt to climate variation, relying as it did on nature. Around 11,000 BC, a major drought struck the "Fertile Crescent"—the birthplace of Mesopotamian civilization.[9] Having chosen to settle there rather than keep migrating, the Sumerians were hit very hard. As the dry weather continued, the forests that had been their source of food receded, and it became difficult to gather sufficient resources. In the unstable climate, groups could no longer secure enough food through hunting and gathering to feed their whole population.[10] And so in the midst of a severe drought, farming began to be explored as a

6 See the theory that the final glacial period of the Quaternary Ice Age was 12,000 years ago.

7 Brian Fagan, *The Long Summer: How Climate Changed Civilization* translated into Japanese by Erika Togo (Kawade Shobo, 2008), 40.

8 *Ibid*., 94.

9 This drought is believed to have been caused by the warming of North America. The warming increased the volume of water in the North American lakes that flowed into the Atlantic Ocean, interrupting its deep ocean currents. This then caused cooling in Europe and a major drought in southwest Asia.

10 *The Long Summer: How Climate Changed Civilization* 135.

way to augment their food supplies. Humans made their first attempts to cultivate the land, devising technology for doing so as they went along. We can describe it as a paradigm shift in climate security "with climate variation."

There are many theories about the origins of agriculture, but what we do know is that wheat was being cultivated in the Fertile Crescent in the area of modern day Syria around 9000 BC, when the Earth is believed to have entered a period of climatic warming. Traces of rice cultivation from around 8000BC have also been confirmed in the Yangtze River Basin in China. Over time, the practice of ensuring food stability through agriculture began to take root in the Middle East and Asia. Potatoes were first cultivated in Papua New Guinea around 7000BC.[11] Livestock farming also began around that time. Seeking to secure enough food by shifting from being hunter-gatherers to crop and livestock farmers encouraged people to settle, and over time groups became larger and began to form societies.

Then around 3800BC, abnormalities started to arise in the Fertile Crescent during the wet season. The Mesopotamian climate appears to have been significantly affected by changes in the North Atlantic Cycle and the Indian Monsoon Current. Changes in the latter caused the precipitation pattern to vary, and in the ancient cities of Mesopotamia the rainy season started to begin and end early. The impact on agriculture in the Tigris-Euphrates Basin was devastating. The thriving city-state of Ur suddenly vanished around this time.[12] The period was a major event in the history of cities perishing due to climate variation. In ancient societies that relied on agriculture for food, responding to climate variation became the biggest security issue.

As an aside, many believe that the Epic of Gilgamesh mentioned at the beginning was composed around 3500BC. If so, we may assume that its account of a flood describes an event that had happened in a previous age. If the Epic of Gilgamesh was set in Mesopotamia around 3800 BCE, when the rainy season is said to have become abnormal, then it is tempting to imagine that there might really have been a flood. As with the Iliad and the Trojan War, it is also intriguing to think that this epic might actually be true.

To return to the changing rainfall patterns that struck the ancient city-states of Mesopotamia, after its agriculture was devastated the region saw frequent conflicts between city-states over water rights, territory, and trade. There is little information about conflicts and the collapse of cities in BC-era human societies. Consequently, there are several theories about what caused them. They should probably be attributed to a combination of several of the hypothesized factors all acting together, but climate variation was undeniably the biggest factor of all.

As human societies settled and became less able to respond flexibly to climate variation, the threats it posed sowed the seeds of pillage and armed conflict over food and land. When droughts, floods, or cold weather compromised food security in areas humans had settled, rather than move to unsettled ones, the groups there sometimes chose to fight with peoples in other areas and steal their food and land. The struggle against the climate often turned into wars between groups. The disappearance of ancient Mesopotamia's city-states is also thought to be mainly due to such wars.

Climate variation also caused internal conflicts. The once-flourishing Old Kingdom of Egypt, builder of the Great Pyramid of Giza, is said to have fallen into decline because the rise of local officials reduced the dynasty's political influence. Water levels in the Nile River had a decisive effect on agriculture during the Old Kingdom. Droughts and floods affected agricultural production levels that depended on the bounty the Nile provided. Continual poor harvests led to more frequent internal conflicts, and this is very likely what gave local officials—who were closer to the farmers than the dynasty was—a chance to rise in power. The dynasty's control diminished amid repeated internal conflicts. This is thought to have brought the hitherto-stable political system to the brink of collapse. Eventually, the ruler of Thebes in Upper Egypt started a project to build irrigation channels that successfully revived agriculture. Egypt was reunified in 2046 BC, and the Middle Kingdom began.

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11 Remains of an agricultural irrigation facility, "Kuk Early Agricultural Site," have been discovered by an academic study in Australia.

12 *The Long Summer: How Climate Changed Civilization* 210.

In the ancient Mediterranean world, an incident occurred where climate variation contributed to the collapse of the global economy zone. For around 300 years starting from 1500 BC or so, ancient nations and peoples around the Mediterranean Sea (Mycenaeans, Hittites, Assyrians, Babylonians, Cypriots, and Egyptians) actively traded a wide variety of goods, and an ancient global economic zone flourished. This has been confirmed as a historical fact: for example, ruins dating back to this era have been found to contain items that were only produced in other areas of the Mediterranean world. This global economic zone collapsed suddenly, starting in 1177BC.[13] The Hittites disappeared altogether, despite having flourished through their ironware and military strength.

In 1177BC, many of the ancient cities that comprised the global economic zone showed signs of large-scale collapse, and archeological finds have proven that after that trade stopped. The large-scale collapse of ancient cities around the Mediterranean is mainly attributed to a domino effect of internal conflicts and pillage all across the region.[14] One theory is that climate variation triggered this. This was because winds from the Sahara Desert turned northeast and caused a major drought in the Mediterranean region. A letter from a Hittite king asking for assistance in the form of ships bearing grain has been found among burned clay tablets excavated from the remains of a Hittite kiln. Ancient cities were collapsing all over the Mediterranean sphere during the drought. The main culprits are thought to have been the so-called Sea Peoples, who allegedly marauded around the Mediterranean, ravaging and plundering as they went. It is a mystery why the Sea Peoples were constantly on the move, but the Mediterranean trade routes may have broken down because they were destroying the cities involved.

The global economic system was a very complex structure and at risk of being destroyed if subjected to some kind of shock. In such a world, a single factor could upset the gears and cause it to fail. Once that happened, it could be difficult to fix. What befell the Mediterranean world in 1177BC should be analyzed as a warning from ancient times for today's international community, which is also supported by a global economy.

In the current international community, we also find many examples of societies that are destabilized by migration from outside, not climate variation. Refugees and immigrants from the Middle East and Africa crowded into Europe in 2015, creating an extraordinary situation. That April, five ships carrying some 2,000 refugees sank in the Mediterranean, killing nearly 1,200 people. This gave rise to the phrase "European refugee crisis." The causes were political unrest in North Africa and the Syrian civil war. Bulgaria built a wall along its border with Turkey to keep the refugees out.

In Central America, massive immigration has become an international issue. In October 2018, Hondurans fleeing poverty and crime formed caravans and made for the United States. More and more people joined the northbound caravans, and by the time they arrived in Mexico they were about 7,000 strong. The US government responded by deploying 5,200 border patrol guards.

The phenomena of refugees and immigrants heading for Europe and the United States are not due to climate variation. However, we should assume that rising sea levels could cause migration in the future. Tuvalu has a population of about 11,000, the Republic of Kiribati about 122,000, and the Republic of Maldives about 500,000, and all of these countries are facing the threat of erosion from rising sea levels. The scientific predictions and a high level of international interest mean that an orderly response will probably be made regarding the population movements from island countries threatened by sea level rise in the Indian Ocean and South Pacific. However, if small villages on the coasts of Southeast Asia, South Asia, and Africa also face erosion, the large populations affected will lead to migration on an incomprehensible scale. Some estimates predict that 40% of the world's coastal population will be affected by sea level rise.[15]

There is a theory that a prehistoric sea level rise had a hand in forming the Black Sea. The theory is that around 5600BC (about 2,000 years before the Epic of Gilgamesh), the North Atlantic Cycle

13 Eric H. Cline, *1177 B.C.: The Year Civilization Collapsed* translated into Japanese by Kazumi Yasuhara (Chikuma Shobo, 2018).

14 *Ibid*. There is also an earthquake theory, but currently no evidence of an earthquake on such a large scale.

15 European Geosciences Union, *The transient sensitivity of sea level rise*, 2 February 2021 (http://OS - The transient sensitivity of sea level rise (Copernicus.org)) (accessed on 2 February 2021).

warmed what is now Europe and the Middle East. The resulting rapid rise in the level of the Mediterranean Sea caused seawater to flow inland, and this formed the present-day Marmara and Black Seas. The flood damage caused by the influx of water from the Mediterranean may be the greatest disaster in human history. This massive flood has also been theorized to be behind the story of Noah's Ark.

Sea level rise is not thought to be the only reason humans migrate due to climate variation. Some studies suggest that if today's global warming continues, the map of the planet's agricultural regions will be redrawn. Regions like Russia, Canada, and North Europe will become major agricultural producers. The ensuing population growth will be accompanied by social unrest due to food shortages, giving rise to migration on a massive scale.[16]

Climate variation's impacts are not straightforward. However, we must acknowledge that if we fail to be alert and respond to it, it could cause social systems to collapse, and even lead to wars. Most population groups today are concentrated in cities. There is no doubt that they are vulnerable to the effects of climate variation. In addition, we must realize that the lives of all humans—more than 7.7 billion people—rely on climate-dependent crops and seafood.

2. The natural environment and the formation of modern human society: Global cooling, global warming, and security

The global climate has been repeatedly cooling and warming in the A era as well. Medieval Europe around the year 1000 is thought to have been in a period of warming. This probably led to warmer seas around northern Europe, and cod fishing flourished there. Economic activity was booming from the opening of trade routes from Iceland and Norway to North America to sell things like polar bear pelts. The period is called the Dark Ages, but actually, feudal Europe enjoyed continuously abundant harvests. Most conflicts were inheritance disputes between monarchs and lords, and security seemed to be stable.

However, 200 years later, in the 1300s, the world suddenly shifted to a cooling that would last for 600 years.[17] The change plunged Europe into an era of food shortages. In 1315, even the summer was cold. The result was a disastrous wheat harvest. Europe's population had been growing significantly until then, thanks to bountiful agriculture, fishing, and stable security. In England, the population had increased from 1.4 million at the end of 1100 to 5 million by 1300. France's population had increased as well, from 6.2 million at the end of 1100 to 17.6 million in 1300.[18] The cold summers continued, and the food supply became too small to feed the whole population. The cold summers also hurt the fishing industry. The cod fishing that had been bolstering the economies in northern Europe also declined. The reason is thought to be that the cod changed their habitats in response to the rapid cooling of the northern seas. As the Hanseatic League was rising, the cod fishing industry shrank. In 1348, Europe's economy was dealt another massive blow in the form of the Black Death pandemic.

Global cooling was still causing poor harvests in Europe when the French Revolution erupted in 1789. In the midst of the emancipation and religious reforms of the Enlightenment the power balance between the king and aristocracy and the populace demanding their "daily bread" collapsed, taking the Ancien Régime with it. In 1840, a famine struck Ireland and killed 1.8 million people. There are various theories about why global cooling began in the 1300s, including changes in monsoons and ocean circulations. However, no one knows the cause for sure. More than that, what we should focus on here is the Industrial Revolution that unfolded in Britain between the 1760s and 1830s. Shipping and railway technology developed as the Industrial Revolution progressed, and the resulting bulk transportation boosted economic activity. Many entrepreneurs and workers traveled between Europe, North America, and Oceania. Urban activity flourished, and deforestation spread as well. The Earth entered a somewhat overdue period of global warming. The start of the Industrial Revolution coincided with the beginning

16 Abrahm Lustgarten, The Great climate migration (*The New York Times Magazine*, 23 July 2020) (https://www.nytimes.com/interactive/2020/07/23/magazine/climate-migration.html) (accessed on 28 January 2021).

17 Brian Fagan, *The Little Ice Age: How Climate Made History* translated by Erika Togo and Rumiko Momoi (Kawade Bunko, 2009), 101.

18 *Ibid.,* 79.

of the end of global cooling.

The global temperature started to rise gradually around 1850. Mankind has been blessed with a good climate ever since, and seems to have lost all memory of how climate variation has had a major impact on its survival and social structure throughout history. In the mere 250 years since the Industrial Revolution, have we really fallen into the misconception that climate variation has nothing to do with our security? The 20th century is called a century of war. Mankind went through two global wars. Even now in the 21st century, there are still internal conflicts and wars on terrorism all over the world. Many of these conflicts have been over national sovereignty, territory, ideology, or religion. Geopolitical confrontation is ever-present between major powers. However, in all its history, nothing has affected mankind's security environment as much as climate variation. Humans have a history of struggling against climate variation as the biggest threat to their security—one that goes far back into the BC era. They have seen climate variation as a threat to their survival and social structures, and have taken security measures against it accordingly. We seem to have forgotten now, but throughout history, global cooling and warming have had a huge impact on people's security environments. With global warming affecting our ecosystems and survival mechanisms, we should remember this again today—and also remember the need to address the issues from a security perspective.

We know based on scientific evidence that the Industrial Revolution and global warming are related. The era when climate variation affected human survival and social activity has ended, and we are now in an age when human activity has significantly altered the Earth's climate mechanisms. Today's global warming is thought to be influenced by human activity. It has various effects on humans' habitats, including causing drier conditions, abnormal weather, and more frequent and diverse natural disasters. Some areas are seeing abnormal weather due to climatic cooling caused by cold air flowing out from the polar regions. Rising sea temperatures are already causing larger typhoons and increasing storm surge damage. Rising sea levels are eroding island and continental coasts and causing problems like population movement away from ocean regions. And larger natural disasters are causing tremendous damage.

Looking back in history again, we see how dry weather caused droughts that dealt severe blows to the Mesopotamian civilization around 11,000 BC and the ancient Mediterranean societies that flourished until 1177BC, driving them to collapse. Changing rainfall patterns in the Tigris-Euphrates Basin around 3500BC caused so much damage that it destroyed city-states. Global cooling around 1300 caused a great famine in Europe. The mythical Epic of Gilgamesh speaks of a great flood that struck mankind, and one like it is purported to have formed the Black and Marmara Seas around 5600BC.

Without a doubt, the damage humans suffered in the past had a tremendous impact on them. However, if global warming caused a similar large natural disaster today, the damage would be incomparably greater than anything that has happened before. Around the time humans left Africa, their total population is believed to have been about 500,000. It is thought to have been about 5 million around 11,000BC, when the major drought hit the Mesopotamian city-states. When the Mediterranean societies collapsed around 1177BC, the world population is thought to have been less than 100 million. The Earth's total population currently stands at 7.7 billion.[19] It is predicted to reach 8.5 billion by 2030 and 9.7 billion by 2050.[20] Today, changes in oceanic conditions due to global warming threaten to alter marine ecosystems and habitat distribution. This will increase international fishing disputes and illegal fishing. When global cooling in 1300 brought an end to cod fishing, the world population was around 400 to 500 million. Many countries and people around the world now depend on fish as a source of protein. As the population continues to grow, people everywhere could end up depending on fishing for food. Changes in the marine ecosystem and habitat distribution could intensify disputes between nations over fishing. If global warming continues, new events like novel infectious diseases could arise and threaten security in ways that have never been seen before. In 2016, an outbreak of anthrax in Si-

19 United Nations Department of Economic and Social Affairs, "World Population Prospects 2019: Highlights (Ten Key Findings)," United Nations (unic.or.jp) (accessed on 10 February 2021).

20 *Ibid.*

beria claimed one victim. The disease is thought to have been released from the bodies of mammals trapped in permafrost that had thawed due to global warming. Siberia is one of the regions experiencing the worst warming on the planet. The Siberian town of Verkhoyansk holds the world record for the lowest temperature, −67.8°C. On June 20, 2020, however, it experienced an alarming 38°C. If global warming continues, the permafrost will continue to melt, releasing bacteria and viruses currently trapped in it to live among us.

Global warming is also affecting the military. Rising sea levels and increasingly large natural disasters are having a noticeable impact on military equipment, and on the functioning of bases on islands in the South Pacific and Indian Ocean. Military troop operations could also be affected. During the Russo-Japanese War, the Baltic Fleet left its base in Latvia, sailed south across the Atlantic, round the Cape of Good Hope to the Indian Ocean, then through the Straits of Malacca to the East China Sea. Exhausted from the voyage, it was then wiped out in an attack by the Japanese Combined Fleet that had been lying in wait. Now, global warming is opening up the Arctic sea routes. If the Baltic Fleet set out on its journey today, it would reach Vladivostok in two-thirds of the time by going via the Arctic. Such a scenario might have changed the outcome of the war completely. Being able to traverse the Arctic seas would enable naval vessels divided between the east and west US coasts to operate more flexibly. Global warming is producing a wide range of security problems.

Mankind needs to tackle the crises arising from it as security issues that are both old and new.

Current Impacts of Global Warming on the Marine Environment

Hiromune Yokoki

According to a report by the United Nations Intergovernmental Panel on Climate Change (IPCC), climate change and global warming are predicted to cause the average global temperature to increase by up to 3.7°C (2.6 to 4.8°C) compared to the 1986–2005 average by the end of this century (the 2018–2100 average). Climate change and global warming are said to have various impacts on the coastal and marine environment. This chapter provides an overview of these impacts. It also introduces research on predicted damage caused by flooding in coastal areas due to sea level rise, and an economic evaluation of the measures to counter it.

Future climate forecasting is being performed using numerous climate models developed by research institutes in Japan and around the world. In this forecasting, greenhouse gas emissions scenarios (Representative Concentration Pathways (RCPs)) are used as prerequisites (boundary conditions). Four RCPs are mainly used, ranging from RCP 8.5 (which assumes the current situation continues) to RCP 2.6 (which assumes that strong mitigation measures are implemented). The degree of warming is highest under RCP 8.5 and lowest under RCP 2.6. For example, the aforementioned 3.7°C is the predicted average based on RCP 8.5. Furthermore, although many climate models show results that are systematically similar, their predicted values are different, and therefore, their future climate forecasts often show a range of values (the aforementioned 2.6 to 4.8°C). In this chapter, variations between models are omitted to avoid complications in notation, and only average values are shown. However, there is always a range of predicted values, so please refer to the IPCC reports, etc., for details.

1. Impacts of sea level rise on coastal areas

(1) *Causes of sea level rise*

The global mean sea level has been rising at a rate of 1.7 mm/year for the last century overall (1901–2010), but this has increased to 3.2 mm/year recently (1993–2010). According to future projections, compared to the average for 1986–2005, the average for 2081–2100 will be 0.63 m higher under RCP 8.5 or 0.40 m higher under RCP 2.6. Even a simple division yields 6.6 mm/year (RCP 8.5) or 4.2 mm/year (RCP 2.6), so sea level rise is predicted to accelerate regardless of which greenhouse gas emissions scenario is used.

The main causes of sea level rise are considered to be thermal expansion (resulting from rising sea temperatures) and melting glaciers. Although the contribution to sea level rise from the melting of the Greenland and Antarctic ice sheets had been considered to be relatively small, recent studies have clarified the melting process of these ice sheets, and melting prediction models have further developed, making it clear that these ice sheets are contributing to rising sea levels more than ever before. In the IPCC's latest report, the melting of the Greenland and Antarctic ice sheets and mountain glaciers is considered to be the main cause of sea level rise, and under RCP 8.5, it is predicted to rise by an additional 20 cm by 2100. However, the mechanics of melting and decay of the Antarctic ice sheet are still

being researched, and more precise predictions are expected to be published in the future.

Thermal expansion of the oceans is expected to continue, albeit slowly, for hundreds to thousands of years even after the temperature has stabilized, as rising sea temperatures spread to the deep sea. Combining this with the melting of glaciers and ice sheets, sea levels are expected to rise, and to continue (accelerating) even after the end of this century. In the oceans, uneven distribution (disproportion) of seawater due to the Earth's rotation on its own axis and heat transfer by ocean currents, distribution of atmospheric pressure (cyclones and anticyclones), the presence of fresh water masses, etc., cause the sea level to differ between regions (sea areas), and it varies by about 30% of the average depending on the sea area. These fluctuations in sea level between sea areas are expected to remain constant even as sea levels rise.

(2) *Impacts on coastal areas*

Coastal areas are land areas bordering oceans. They are distinctive regions that naturally have both marine and land-like properties. They are also bases for human activity where many people have lived and many industries have been located since ancient times. Therefore, coastal areas are affected by environmental changes caused by human activities, as well as by changes in marine and land environments.

Coastal lowlands and their communities will be exposed to larger and more frequent rises in sea level and storm surges as climate change progresses. Some of the impacts expected in coastal lowlands include flooded land, coastal erosion, and saltwater intrusion into groundwater and rivers. In addition, there will be a relative rise in sea level where land subsidence occurs as a result of excessive groundwater pumping from development of lowlands. Impacts like these are occurring even now in urban areas located in vast deltas downstream from major rivers, and are expected to impede urban development in the future.

Astronomical tidal movement (i.e., the daily fluctuation in sea level) is caused by the interaction between the celestial motions of the Moon, Earth, and Sun. However, there are studies that show the tidal amplitude changes for other reasons as well, such as changes in internal tidal waves caused by ocean stratification and changes in energy transport within oceans. Some studies that have analyzed tidal data also suggest that the tidal fluctuation changes by 1 to 4% over a period of 100 years. In some coastal areas, this fluctuation is about the same as the projected sea level rise. Since tidal changes in coastal areas are often similar to resonance phenomena caused by the topographic shape of the bay, it is also possible that the tidal amplitude will change significantly with, for example, slight fluctuations in the sea level. This is an important issue that is also related to the efficiency of tidal power generation, and future research results are eagerly awaited.

Waves are another factor that affects the sea level in coastal areas. This is due to wave setup, a phenomenon in which the sea area's water depth decreases as waves get closer to land and eventually break, resulting in an increased mean water level on land. The rise in water level increases with high waves. Observations of high waves in the oceans show that wave heights in the North and South Atlantic Ocean have increased by 1.0 cm/year and 0.8 cm/year respectively over the past 30 years. Major factors causing this are thought to be increasing sea surface wind speed and decreasing sea ice cover, the latter due to rising sea temperatures. Future projections for waves under RCP 8.5 suggest that the Antarctic Ocean, the Tropical Eastern Pacific, and the Baltic Sea will rise, and the North Atlantic Ocean and the Mediterranean Sea will lower.

2. Impacts of rising sea temperatures and ocean acidification on the marine ecosystem

The marine ecosystem is extremely important for many reasons, including that it consists of multiple food chains, and the organisms at the tops of these are directly linked to humans' food. The main impacts of climate change and global warming on the marine environment are rising sea temperatures

and increased ocean acidification.

Oceans get heat from the atmosphere through their surface and store it, raising the water temperature. Oceanic warming is indicated by the amount of heat stored in the ocean, along with the water temperature. Studies of these show that the rate of oceanic warming has approximately doubled. Dissolved oxygen levels decrease due to rising sea temperatures, which generally have adverse impacts on ecosystems. In addition, because the scale of the oceans is huge and rising sea temperature is only transmitted very slowly, stratification has been observed to occur, with areas with increased temperatures existing only in the surface layers of the oceans. Stratification inhibits vertical circulation of nutrient salts and other materials in the oceans. Desalination of the surface layer has also been observed, particularly in sea areas at high latitudes.

The ocean also absorbs carbon dioxide from the atmosphere and stores (dissolves) it. It is thought to absorb 20 to 30% of the carbon dioxide generated by humans, and the amount absorbed is increasing in response to the increase in the atmospheric concentration. This is accelerating ocean acidification. This poses a threat to coral reefs and other organisms that produce calcium carbonate.

Primary production in the oceans is predicted to decrease by 5 to 10% due to climate change. This is attributed to factors such as ocean warming and stratification and the resulting decrease in nitrogen circulation, and is also predicted to reduce the food supply towards the deep sea. Tropical species are already said to be migrating to higher latitudes due to the rise in sea temperature, and this migration is expected to accelerate in the future. The distribution of fish catch sizes across sea areas and the combination of species caught in each sea area are already changing as a result. Ocean warming and changes in primary production during this century will change the composition of the marine ecosystem. This is expected to reduce the global amount of marine life and also reduce the maximum fish catch sizes (stocks), albeit with fluctuations by region. Reductions like these in the total amount of marine animals and the potential fish catch sizes will raise the risk of impacts on human communities whose incomes, livelihoods, and food security depend on them.

In coastal areas, rising sea temperatures, decreasing levels of dissolved oxygen, and eutrophication are deteriorating the water quality environment and causing repeated algal blooms. This kind of deterioration of the coastal environment is expected to have adverse impacts on food supply, tourism, the economy, health, and more. The environmental impact in coastal areas is not only due to climate change: there are also significant impacts from human activities. These include changes in land use, coastal development, and the resulting coastal pollution. This is an important consideration for future environmental management in coastal areas.

3. Economic assessment of the impacts of sea level rise on coastal areas

(1) *The need for economic assessment of the impacts of climate change on coastal areas*

With climate change becoming manifest, an urgent issue is to quantitatively evaluate the impacts of sea level rise on coastal areas, and the results of adaptation measures. To date, the authors have conducted a series of evaluations on a global scale regarding the impacts and adaptations to address them, including flooding, taking into consideration rising sea levels and tides, the effects of damage reduction through protective barriers, and estimates of the cost of these. One example of these is an evaluation that used eight General Circulation Models (GCMs) and Shared Socioeconomic Pathways (SSPs) from the Coupled Model Intercomparison Project Phase 5 (CMIP5) to assess the uncertainties in the impacts of flooding (flooded area, affected population, and damage costs) on coastal areas globally, taking into consideration sea level rise and tides at full tide. Another example is an evaluation that used MIROC-ESM, a climate model in which the impact is estimated to be quite high, to indicate the costs of flood damage due to sea level rise, etc. The latter evaluation also found that the damage costs could be reduced by 60 to 70% if 1-m-high dikes were constructed as an adaptation measure.

This section presents results obtained by using multiple GCMs to estimate the impacts of glob-

al-scale flooding and the adaptation costs, and compare the damage costs to the adaptation costs. To calculate the adaptation costs, several adaptation scenarios are set up regarding the location and height of dikes installed as a protective measure, and their effectiveness is examined.

(2) *Method of assessing the impacts of flooding*

(a) Flooded areas

The flooding calculations were done by converting elevation data and sea level data into grid data. Flooded areas were defined to be areas where the sea level is higher than the elevation of the (adjacent) land. The comparison of land elevation and sea level in the flooding calculations was done sequentially, moving inland from the coastline location. ETOPO1 was used for elevation and seafloor topography data. This elevation data is global grid data with 1-minute intervals, with elevation values for land areas and water depth values for sea areas (each in units of 1 m). Esri's coastline data was invoked to distinguish between land and sea areas. In the flooding calculations, the sea level rise data resulting from the GCM output was turned into uniform 2.5-minute intervals, so for ETOPO1 as well, the 1-minute-interval grid was averaged to turn it into 2.5-minute intervals.

Table 1 List of GCMs used

GCM	Country	RCP 8.5	RCP 2.6
ACCESS1-3	Australia	Yes	No
CanESM2	Canada	Yes	Yes
CMCC-CM	Italy	Yes	No
GFDL-ESM2M	USA	Yes	Yes
MIROC-ESM	Japan	Yes	Yes
MIROC-ESM-CHEM	Japan	Yes	Yes
MPI-ESM-MR	Germany	Yes	Yes
NorESM1-M	Norway	Yes	Yes

Tsuchida et al. (2019)

The data on sea level rise was obtained using eight GCMs (Table 1). The only RCPs used were RCP 8.5, which has the highest radiative forcing, and RCP 2.6, which has the lowest.

Also, sea level change due to astronomical tides was taken into account as a likely daily occurrence. High tide was assumed, and obtained by summing together the amplitudes of each of the four main tidal constituents from tidal data from TPXO7.2—namely, M2 (the principal lunar semi-diurnal tide), K1 (the principal solar semi-diurnal tide), S2 (the luni-solar diurnal tide), and O1 (the principal lunar diurnal tide). In studies that have done similar calculations, the maximum global flooded area at the end of this century will be 420,000 km² when the tides are taken into account. This is about 200,000 km² greater than when the tides are excluded, suggesting that they have a large impact.

(b) Data on the affected population and damage costs

The affected population is defined to be the population present in the grid squares identified as flood areas, and is calculated as "the population affected by flooding." The population distribution data in the Shared Socioeconomic Pathways (SSP1-3) developed by the National Institute for Environmental Studies of Japan was used to calculate the affected population. Since this data was in intervals of 0.5° and 10 years, the elevation data was rearranged into 2.5-minute intervals. When doing so, the population in each grid square in the original data was assumed to be evenly distributed. Also, a regression formula was used to estimate the flood damage costs. The formula was derived from the relationship

between the damaged (affected) populations, GDP per capita, and damage costs due to floods, storm surges and high waves, landslides, etc., that occurred in 171 countries around the world from 1980 to 2013 that are classified as "hydrological disasters" in EM-DAT. For details on this, please refer to Yotsukuri et al. (2017).

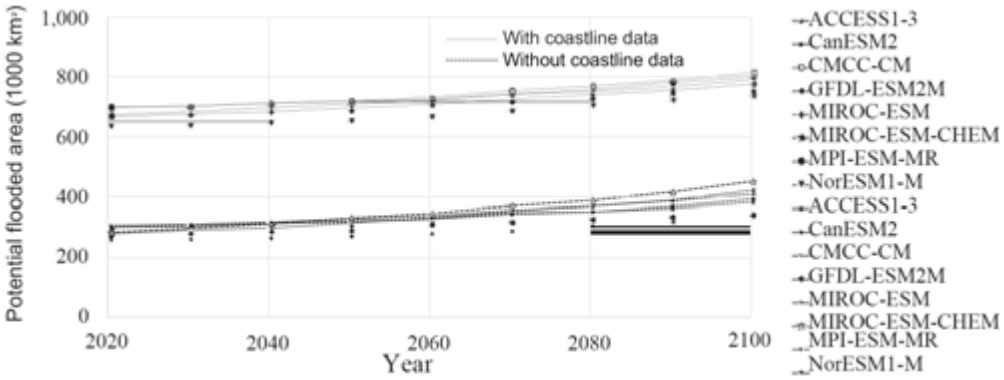

Figure 1 Changes in flooded area over time under RCP 8.5 (Tsuchida et al., 2019)

Table 2 Legend of the symbols used in the graphs

GCM	SSP1	SSP3	GCM	SSP1	SSP3
ACCESS1-3	▲	△	MIROC-ESM	✚	✙
CanESM2	■	□	MIROC-ESM-CHEM	★	☆
CMCC-CM	◎	◎	MPI-ESM-MR	●	○
GFDL-ESM2M	◆	◇	NorESM1-M	▼	▽

Tsuchida et al. (2019)

(3) *Results of flood impact assessments*

(a) Flooded area

Figure 1 shows the changes in flooded area over time with each GCM under RCP 8.5. The results shown include both ones where elevation data alone was used to distinguish land and sea areas ("Without coastline data") and ones where coastline data was also invoked to do so ("With coastline data") (Table 2).

When coastline location data was not used, the highest value shown in 2020 was approximately 330,000 km² with CMCC-CM, and the lowest was approximately 270,000 km² with NorESM1-M. The highest value in 2100 was approximately 460,000 km² with MIROC-ESM-CHEM, and the lowest was approximately 350,000 km² with NorESM1-M. When coastline location data was used, the highest value shown in 2020 was approximately 710,000 km² with ACCESS1-3, and the lowest was approximately 640,000 km² with NorESM1-M. Then in 2100, the highest was about 820,000 km² with CMCC-CM, and the lowest was about 750,000 km² with NorESM1-M. When coastline location data was used, the average flooded area in 2100 was approximately double the one obtained without using it. This indicates that using coastline data increased the flooded area because some of the grid squares considered to be land area had been regarded as sea area when the judgment was based on elevation alone.

On the other hand, as the year approached 2100, the variation in sea level calculated by the GCMs

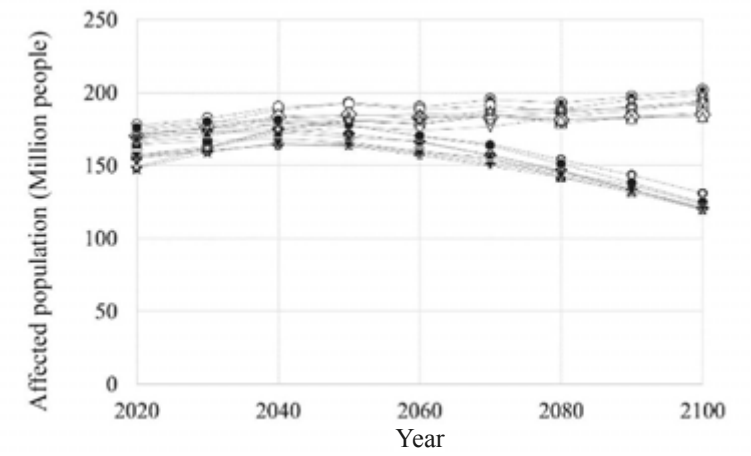

Figure 2 Changes in affected population over time under RCP 8.5 (Tsuchida et al., 2019)

caused the variation in flooded area to increase, but the trend was almost identical whether or not coastline data was used. In the following, flood results obtained by using coastline data are used to calculate the damage costs and affected population.

(b) Affected population

Figure 2 shows the changes in affected population over time under RCP 8.5. A legend of the symbols used in this figure is shown in Table 2. In 2020, the highest value shown was approximately 178 million people with MPI-ESM-MR_SSP3, and the lowest was approximately 159 million people with MIROC-ESM-CHEM_SSP1. Then in 2100, the highest was approximately 202 million people with CMCC-CM_SSP3, and the minimum was approximately 120 million with NorESM1-M_SSP1.

All the SSPs showed nearly identical values from 2020 to 2050, but from then on, the values gradually branched apart depending on their SSPs, and by around 2100, the maximum difference between the SSPs was a factor of about 1.7. Because the global population increases more in SSP3 than in SSP1, the affected population for SSP3 was larger overall. The details are not shown here, but the results show that the population changes in each SSP contributed to the affected population even more than the differences between the RCPs did.

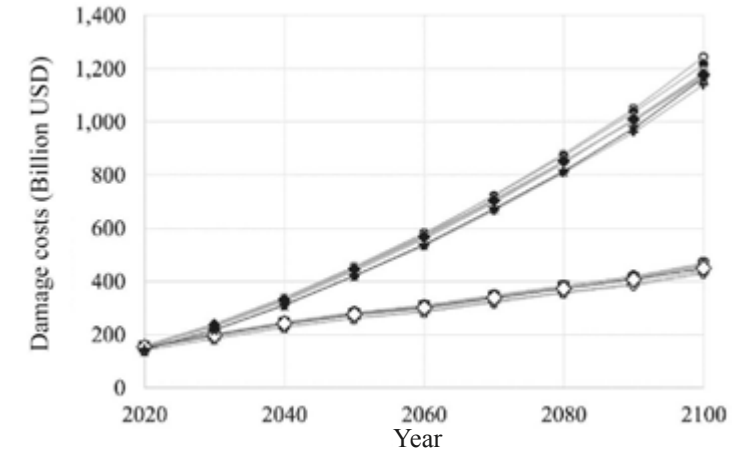

Figure 3 Changes in damage costs over time under RCP 8.5 (Tsuchida et al., 2019)

(c) Damage costs

Figure 3 shows the changes in flood damage costs over time under RCP 8.5. As with Figure 2, a legend is shown in Table 2. The figure shows that under RCP 8.5, there was no significant difference in 2020 regardless of which GCM or SSP was used, with damage costs ranging from approximately 101 to 110 billion USD. Then as the year approached 2100, a significant difference between the SSPs appeared. The highest value in 2100 was 1,244 billion USD with CMCC-CM_SSP1, and the lowest was 430 billion USD with MIROC-ESM_SSP3.

For SSP1, the damage costs increased despite the fact that the affected population decreased. The increase in damage costs despite a decrease in affected population is thought to be because SSP1 is the scenario with the largest GDP increase in each country. A similar trend to the affected population was also observed with damage costs. However, the maximum difference between the SSPs in 2100 was a factor of 1.7 in the case of affected population but a factor of 2.7 in the case of damage costs. Based on this, the differences between the SSPs contributed more to the damage costs than they did to the affected population. This indicates that estimates of the damage costs and affected population pertaining to an SSP are affected more by the SSP itself than by variations in the estimates obtained from the RCP and GCM.

(4) *Estimate of adaptation costs based on protective measures*

The adaptation costs were estimated for the case of constructing dikes to counter the impacts of flooding shown in Section 1. Ideally, actual dike construction data from each country should be used when estimating the adaptation costs, but it is difficult to collect it all. Therefore, based on actual dike construction data from various other countries, a regression formula for estimating dike costs was calculated using three indicators: construction costs, GDP per capita at the time of construction, and dike crest height. The adaptation costs and damage costs were then compared based on the calculated multiple regression formula. For details on the dike construction data, please refer to Kumano et al. (2017).

(a) Formula for estimating dike costs

From the dike cost database, the only dike data we could obtain that included crest height was for cases in Japan and the United States. The regression formula was created using a total of 205 items of data, of which 185 were from cases in Japan and 20 were from the US Army, etc., in the United States. Regression formulas were posited that were based on a combination of the dike crest height (H), GDP per capita (pGDP), and parameters formed from powers of these. Then, the combination with the highest coefficient of determination based on the multiple regression analysis was chosen to be the formula for estimating dike costs. Here, H^3 was used to create the formula for estimating dike costs, because its combinations with pGDP and $pGDP^{1/2}$ were the ones with the highest coefficients of determination. For details on the regression formula, please refer to Tsuchida et al. (2019).

(b) Adaptation scenarios

The following assumptions were made when estimating the adaptation costs: The sea level in 2010 was used as the reference, the dike crest height was set in relation to sea level rise after that, and the adaptation costs (construction costs) were estimated accordingly. For the damage costs, the figure obtained by subtracting the damage costs in 2010 from those in 2100 was used. This was then compared with the adaptation costs. The adaptation scenarios regarding the dike crest heights and construction sites were set as shown in Table 3.

In Scenario 1, the dike crest height was set separately for each grid square in order to keep the flooded area to zero. In Scenarios 2 and 3, dikes with a crest height of 0.5 m and 0.25 m respectively were constructed in all coastline grid squares identified as flood areas. In contrast, in Scenarios 4 and 5,

dikes with a crest height of 0.5 m and 0.25 m respectively were constructed in all coastline grid squares identified as flood areas where affected population was present.

(c) Changes in flood damage due to differences in dike crest heights

Before we compare the adaptation costs and damage costs, Figure 4 shows an example of changes in the affected population due to differences between the adaptation scenarios in Table 3. The figure shows the changes in affected population over time when the dike crest height is raised by 0.25 m.

Table 3 Adaptation scenarios

	Dike construction site (Coastline)		
	Flood area	Populated flood area	Dike crest height (m)
Scenario 1	Yes		No flooding
Scenario 2	Yes		0.5
Scenario 3	Yes		0.25
Scenario 4		Yes	0.5

Tsuchida et al. (2019)

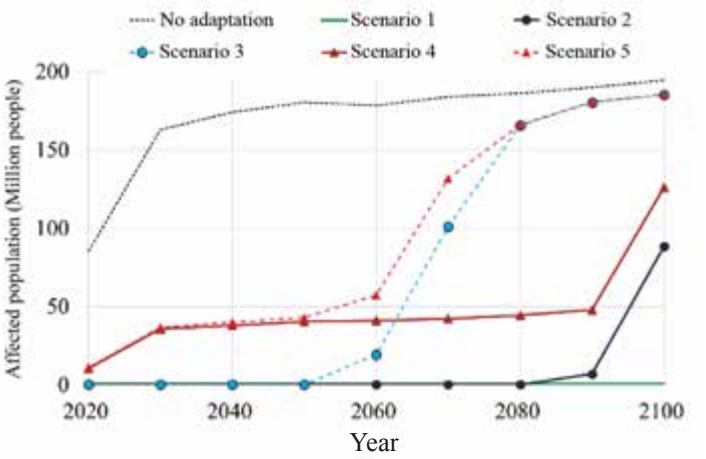

Figure 4 Changes in affected population over time with a dike crest height of 0.25 m (Tsuchida et al., 2019)

First, in Scenario 1, the flooded area was always zero, so the affected population was also zero. In Scenario 3 (with a dike crest height of 0.25 m), the affected population was kept to zero until 2050. In Scenario 5 (also with a dike crest height of 0.25 m), there were few dike construction sites, so flooding arose from grid squares where dikes were not built. Consequently, there was already some affected population in 2020, but its size remained constant until 2050. However, beyond 2050, a significant affected population increase was observed in both scenarios due to further sea level rise, and the situation approached the case with no adaptation measures. Under Scenario 5, the affected population had reached approximately 185 million people by 2100.

On the other hand, looking at Scenarios 2 and 4 (with dike crest heights of 0.5 m), we see that the affected population was kept low until 2080 in Scenario 2. Like Scenario 2, Scenario 4 already had some affected population in 2020, but its size remained constant until 2080. After that, the affected population increased in both scenarios: by approximately 88 million people in Scenario 2 and approximately 126 million people in Scenario 4.

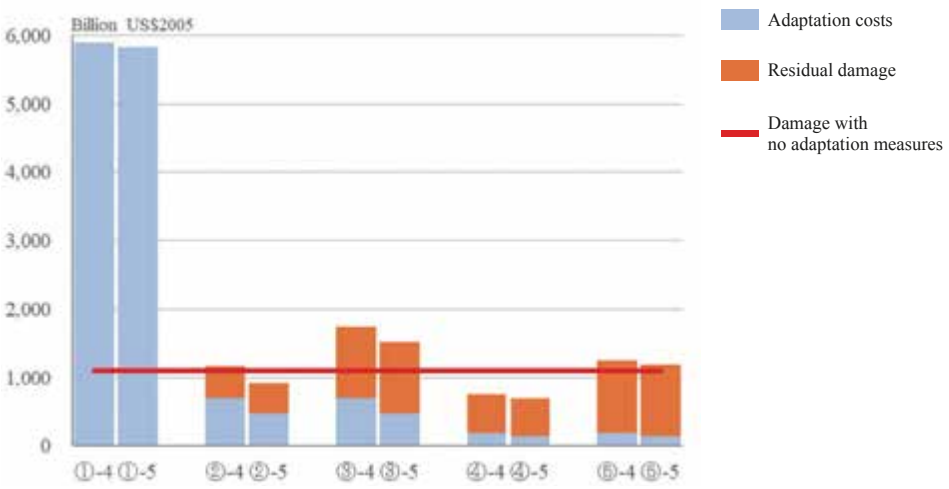

Figure 5 Adaptation costs, residual damage (for two formulae of estimating dike costs), and damage without adaptations for SSP1 (Tsuchida et al., 2019)

These results revealed that a dike crest height of 0.25 m as in Scenarios 3 and 5 could keep the affected population low until 2050, and a dike crest height of 0.5 m as in Scenarios 2 and 4 could do so until 2080. Also, the affected population was kept the lowest in Scenario 2. However, in all scenarios, there was a significant increase afterward, and the situations approached the case with no adaptation measures.

(d) Comparison of adaptation costs and damage costs

Figure 5 shows the adaptation costs, residual damage, and damage with no adaptation measures with SSP1 in 2100. The horizontal axis shows the adaptation scenarios, and the two bars for each show the results for the two regression formulas described above. Regarding Scenario 1, the dike construction costs stand out as much higher. They are about six times greater than the case with no adaptation measures. Scenario 1 aimed for zero flood damage, and we see that the residual damage was kept low. However, the adaptation costs are overly high (Figure 5).

With the exception of Scenario 1, the adaptation costs tended to go up more because of the number of dike construction sites than they did because of the differences between dike crest heights (Scenarios 2 and 3, and 4 and 5). On the other hand, differences in residual damage levels were observed due to having different dike crest heights, with scenarios with lower dike crest heights having higher costs (Scenarios 3 and 5). Compared to the case with no adaptation measures, only Scenario 4 yielded a lower sum of the adaptation costs and residual damage. The reason for this may be that limiting the number of dike sites and setting a higher crest height of 0.5 m kept both the adaptation costs and residual damage low. This trend remained the same even when the regression formula was different. With SSP3, there was no combination where the sum of the adaptation costs and residual damage costs was less than the damage costs with no adaptations.

As mentioned above, there are uncertainties about the future with SSPs, etc., but based on fundamental data (elevation, tide level), RCPs, GCMs, and information on construction costs, etc., we have presented an example method and the results of an economic assessment of flood damage due to future sea level rise. We also estimated adaptation costs, using constructing dikes as an example. This kind of economic assessment will be essential to examining how to maintain human habitats in coastal areas moving forward. Also, as in the example above, adapting by constructing dikes could cost more than the damage if no adaptations were made, and that would be uneconomical. Of course, it is essential—and not only for economic reasons—to consider comprehensive measures that include multiple adapta-

tion scenarios, for example, evacuation, adaptation, and protection using green infrastructure.

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Part 2

The Concept of Climate Security

Some opinions in the international community now view climate change from a security perspective, and urge responding by way of a concept called "climate security." The Leaders Summit on Climate held in April 2021 on the initiative of President Biden included a session titled "Climate Security," in which Japan's Minister of Defense Nobuo Kishi also gave a lecture.

What does climate security actually mean, who are the main players, and how should it be addressed? In the second part of the book, we will explain the concept of climate security, present the importance of addressing it, and advocate the use of national defense capabilities as a part of comprehensive security.

The Concept of Climate Security and Its Importance

Yasuko Kameyama

1. Introduction

"National security" refers to when a country regularly maintains systems that will enable it to protect itself from certain threats when it is exposed to them. Traditionally, when the term "security" has been used in the context of international politics, it has usually meant taking military measures to counter an external attack by a hostile country. Even now, the term's military meanings are likely to spring to mind whenever it is used. However, since the 1980s, global environmental issues such as climate change, depletion of the ozone layer, and acid rain have been gaining increasing attention as important international issues. There is a wider recognition that they pose direct and indirect threats to countries, and a trend toward analyzing them as part of their national security framework has gained pace rapidly. Although this trend has given rise to new concepts such as "environmental security," "environment and security," and "ecological security," opinions are widely split regarding the appropriateness and significance of debating environmental issues in terms of security,[1] and there is still no consensus.

Before we start looking at climate change, this chapter will explain how environmental issues started to be discussed from a security perspective in the first place. Then after that, it will outline how this debate, which had died down temporarily, has re-ignited in recent years, especially in relation to climate change. It will then describe future developments, going over various definitions.

2. Background to the "environment and security" debate

Originally, the main environmental issues were pollution (for example, air and water pollution) and the destruction of nature (for example, deforestation). All of these were confined to individual countries. The damage was visible, and the issues were largely solved by measures such as imposing regulations on the activities of a few companies in the regions concerned. However, as the issues have grown in scale, they have begun to cross national borders. How they cross them is different for each issue. With international rivers that flow through multiple countries, such as the Rhine and Danube in Europe and the Mekong in Southeast Asia, pollutants flowing from upstream have prevented countries downstream from using the water. This transborder issue has been arising since the 19th century, and an international framework had been constructed by the middle of the 20th. Furthermore, the 1980s saw an increase in issues that could not be solved without the cooperation of all countries responsible for pollution—issues like acid rain and protecting the ozone layer. This became an international issue from the viewpoint that the pollutants spread regardless of borders, and that no country was capable of adequate measures alone.

1 Kawashima and Akino 2001; Detraz and Betsill 2009; Deudney 1990; Floyd and Matthew 2013; Kameyama 2010.

This coincides with the era when the Cold War between the United States and what was then the Soviet Union was starting to move toward its end. Since World War II, the biggest international issues had been the Cold War and military issues. Then in the 1980s, various international issues other than military ones started to get attention, notable examples being human rights, the environment, and economic issues such as trade friction. In the run-up to the United Nations Conference on Environment and Development (the Earth Summit) held in Rio de Janeiro, Brazil, in 1992, heads of state and other political leaders began to call global environmental issues the new security issues.[2] For example, the Soviet Union's Mikhail Gorbachev proposed that a Global Environment Facility be established by taking the vast sums poured into the Cold War and redirecting them into addressing global environmental issues. Countries that had opposed each other during the Cold War for the sake of national security would have to build cooperative relationships in order to protect the global environment. The idea of working with other countries to protect the homeland's national interests also fit the trend toward free trade and globalization, and it spread rapidly among experts and researchers in the field of global environmental conservation and security.

The 1990s saw the environment and security become flourishing areas of study, amid a general mood that it was a boom time. These studies were all first attempts to somehow link environmental issues and security, but as we will see later in this section, each had a different focus and approach, and each ended up sending a different message. In addition, there were criticisms of each focus. While most of them fully agreed that global environmental issues were important, they did not find any additional value in using the word "security" to talk about them. For politicians, the word was no doubt useful for highlighting the global environment as a serious, urgent issue. However, attempts to derive any more of a message from it than that hit a wall.

Against this background, the debate on the environment and security fizzled out temporarily at the end of the 20th century. In 2007, the British government proposed that climate change be put on the United Nations Security Council's agenda,[3] and urged that it be recognized as a part of national security. Some countries agreed, but others argued that there was no need for the Security Council to discuss climate change because there were separate international organizations that specialized in dealing with environmental issues—ones like the United Nations Framework Convention on Climate Change and the United Nations Environment Programme (UNEP).

The second wave of linking environmental issues and security began around 2015. At the time, people were mainly talking about the relationship between security and climate change specifically rather than the environment in general. The background to this included, first of all, the United Nations General Assembly's adoption of the Sustainable Development Goals (SDGs) in 2015, which gave countries a shared notion that the environment, the economy, society, and systems were all intertwined, and goals for them should be achieved at the same time. The SDGs set 17 goals and emphasized the relationships (nexus) between them. Goal 13 was a measure against climate change, but achieving it would require thoroughly examining its relationships with other goals, like poverty and peace.

The Paris Agreement was also adopted at the end of the same year, marking the first time an international agreement on climate change had seen the light of day since the Kyoto Protocol 18 years before. The decision to adopt it had doubtless also been influenced by the fact that by this time, abnormal weather was clearly becoming more frequent all around the world, and people were getting first-hand experience of what the world would be like after atmospheric warming—something that had only been theorized about by scientists up to then. It meant that droughts, heatwaves, hurricanes, forest fires, and other disasters had come to be accepted as national security issues, not just environmental ones.

2 Gore 1992.

3 United Nations Security Council 2007.

3. Classifying discussions as environmental security or climate security

Up to then, terms like "environmental security," "environment and security," "climate security," "climate change and security," "ecosystem security," and "biological security" had been used to describe a series of concepts that had in fact varied slightly depending on the speaker.[4] These differences had often led to confusion and talking at cross-purposes in debates about the concepts, and numerous people had either agreed with them or criticized them without actually understanding them properly. In light of that, we will now explain five approaches.

Discussions on security are generally categorized based on three points. The first is what to consider "threats." As noted at the beginning, national security's conventional image of a "threat" was usually a military attack from a hostile country. The point of discussion is whether to consider environmental destruction a new "threat" as well, given the urgency of global environmental issues. The second point is "what" to protect against the threats. The traditional and fundamental purpose of national security was to defend to death the nation and its interests. In order to protect themselves, nations were even willing to sacrifice their people's lives. However, as demonstrated later by human security and other notions, the idea spread that more weight should be given to the lives of individuals and to maintaining a minimum standard of living. The third point is "how" to protect. With traditional security, the primary means was to maintain a military capability, but as the two points above demonstrate, as the definitions of "threat" and "what" to protect change, the means of protection will change as well. In the following, we will continue to clarify the differences between these three points from the perspective of each.

(1) *The idea that global environmental issues should be considered new "threats"*

This idea seeks to have global environmental issues regarded as new threats to the nation that should be taken account of in addition to military ones. For example, Ullman defines threats to national security as an action or sequence of events that threatens drastically and over a relatively brief period of time to degrade the quality of life for the inhabitants of state. These "threats" include indirect ones, such as environmental destruction, natural disasters, conflict over scarce resources, an inability to meet people's basic needs, and population growth that will lead to overdemand.[5] Also, Mathews says argues that states are now interdependent, and that transborder environmental issues such as acid rain raise doubts about the conventional concept of national security, which emphasizes borders. She also says that security should be redefined to include global environmental issues, population issues, and depletion of natural resources. Furthermore, she explains that these issues are different from conventional security in the sense that solving them will require cooperating with other countries, rather than fighting them.[6]

As shown in these papers, ways of thinking classified into this type emphasize the need to not limit the definition of "threats" to simply attacks against the nation by other countries, but to expand it to encompass global environmental issues, population growth, depletion of resources, and a broad range of other global issues that have been identified from the 1970s onward. The "nation" is at the core of what must be protected against threats, but there is no reason to limit it to just the nation, and it may also include individuals or the entire ecosystem. In addition, the ideas call for cooperation between nations as a means toward security.

This type of concept uses the expressions "environmental security" and "climate security" rather than "environment and security," in order to redefine the conventional concept of security by adopting a broader definition of threat itself. In particular, when specifically adapted to climate change, this concept considers it to be a threat to the survival of the nation and its people. It is a similar concept to the term "climate crisis" used in recent years. Almost the only way to achieve climate security is to suppress

4 Floyd 2010; McDonald 2013; von Lucke et al. 2014.

5 Ullman 1983.

6 Mathews 1989.

climate change by reducing greenhouse gas emissions.

Part of the reason politicians and the mass media use the term "climate security" may also be that simply saying that will have a bigger impact on the audience than explaining at length how serious an issue climate change is.[7] On the other hand, the term "climate change mitigation" has conventionally been used to express the need to reduce greenhouse gas emissions, and some critics say that using the term "security" does not suggest any additional implications.

(2) *Viewing global environmental issues as a part of human security*

This concept focuses on the fact that global environmental issues are harming the lives of individuals, especially in developing countries. The idea is familiar to people involved in assisting the development of such countries. Example issues are that crops cannot be harvested because of drought, people have to walk long distances to get drinking water, and houses are blown away by typhoons.[8] This type emphasizes "what" to protect, and places the emphasis not on protecting the nation, but the lives, minimum standard of living, and happiness of individuals. According to a recent report, from 2019 to 2020, there were 11,000 cases of abnormal weather worldwide, and these took the lives of 475,000 people and had an economic impact estimated at $2.56 trillion. Mozambique, Zimbabwe, Bahamas, Puerto Rico, Myanmar, and Haiti are said to have suffered the worst damage.[9]

Whether the "threat" is torrential rain caused by climate change or a tsunami caused by an earthquake unrelated to climate change, the best way to protect the lives of individuals is to always be thoroughly prepared. Therefore, when climate change is discussed from this perspective, aside from reducing emissions, the focus is entirely on being prepared, through so-called adaptation measures, at the individual or community level. In connection with the SDGs, when climate change is treated as one of the types of security alongside energy security and food security, it is categorized as this type.

The strength of this type of discussion lies in what it has in common with human security. It is also an opportunity to encourage international cooperation. Not just developing countries, but also developed ones have suffered severe damage from torrential rains in recent years. Security theory from the viewpoint of protecting human lives is readily accepted by the general public, and words like the English "security" have come to be commonly used in everyday life, including by people in developed countries when they mean protecting themselves against natural disasters.

On the other hand, people who place importance on the traditional concept of security sometimes have misgivings about including discussions on the safety and security of individuals in the scope of security concepts. Also, for people involved in the measures against climate change, the series of actions mentioned above are described as adaptation measures, and it is not appropriate to bring up the word "security." In particular, the Japanese word "anzen hosho" is the word used to mean "security" in this field, but it has a stronger nuance of the traditional idea of national security than the English word "security" does, and is rarely used in Japan in relation to flood damage.

(3) *An approach from the perspective that global environmental issues are causing conflicts*

This approach confines the concept of security to the scope of the conventional military sense, and focuses on the causal relationship between security and environmental issues. Homer-Dixon, an authority on this approach, says conflicts that have an extremely high probability of involving the use of force harm security by definition. He postulates that four events caused by environmental degradation—decreased crop yields, economic stagnation, uneven population distribution, and the collapse of existing systems and social relationships—will lead to conflict in the international community. Based on this, he then analyzes the processes that lead from environmental destruction to conflict in the form of concrete

7 Methmann and Rothe 2012.

8 Mobjörk et al. 2016; Vogler 2013.

9 Eckstein et al. 2021.

case studies.[10]

Many of these kinds of studies take the view that there is a cause-and-effect relationship in the sense that environmental destruction causes conflicts. However, a report by the World Commission on Environment and Development (WCED) titled "Our Common Future" focuses on how, conversely, conflict leads to environmental destruction. In this connection, it has been pointed out that nuclear weapons, weapons of mass destruction, and chemical weapons like defoliants destroy not only human life over wide areas, but the local environment as well.[11] Similarly, Gleick cites cases where one country has attacked another by cutting off its water supply.[12]

In this way, when the approach focuses on the cause-and-effect relationships between environmental destruction and conflicts, the perspectives regarding "threat" and "what to protect" are similar to the conventional concept of security, and physical conflicts between countries or ethnic groups are assumed. The characteristic feature is the focus on how environmental destruction and climate change act as causes of conflicts. Therefore, this type often uses "and" between the two elements, such as in "environment and security" and "climate and security." Also, in discussions of this type, the most reliable security measure is not to address climate change, but to solve social instability.

Up to now, research classified into this type has received quite a lot of criticism. If climate change does indeed cause conflict, then conflicts should likewise be happening in Japan, where typhoons cause damage, and in the United States, where there are forest fires every year. Why do not all natural disasters necessarily lead to conflicts, even though damage is caused by natural disasters all around the world? Some critics argue that in societies where conflicts arise, the social infrastructure was unstable from the start, and environmental destruction or climate change is just one among multiple causes.[13] While these criticisms are valid, it is also true that regions that were already socially unstable will become all the more so due to climate change,[14] and as we will see later, this approach has become the most flourishing line of discussion in recent years.

(4) *Damage to military facilities caused by climate change*

In recent years, there have been increased cases where abnormal weather like hurricanes and tornadoes have caused catastrophic damage to countries' military facilities. Consequently, the idea that climate change harms countries' defense capabilities has become a prominent topic of debate, particularly by the US Department of Defense.[15] In this case, the "threat" is climate change, and "what must be protected" is military capability. The way to do so is to take adaptation measures in military facilities. The measures required include keeping military aircraft indoors when a hurricane is expected, and not siting defense facilities in lowlands or near rivers.[16] Although discussions of climate change and security from this perspective in countries other than the United States are not heard of openly, the types of threats in (1) to (3) above often place an extra burden on the respective country's military organizations, so in many countries, defense-related ministries and agencies are discussing and publishing reports on climate change in one way or another.

(5) *Studies on the relationship between ecosystems and security*

These studies address how as environmental destruction progresses and changes ecosystems, this causes problems by creating new threats that did not exist until now or that did exist before but never used to affect humans. For example, the development of forests and changes in the climate can cause

10 Homer-Dixon 1991, 1999.
11 WCED 1987.
12 Gleick 1993.
13 Baechler 1998; Boas 2015; Hartmann 2010.
14 Purvis and Busby 2004; Busby 2019.
15 National Intelligence Council 2016; Schwartz and Randall 2003.
16 CNA Corporation 2007; Department of Defense 2019.

pathogens that had never affected humans before to become a threat to the very existence of the human race—a notable example being Ebola hemorrhagic fever.[17] In the United States, these contagious diseases are collectively referred to as "Emerging and Re-emerging Infectious Diseases" (ERIDs), and the National Science and Technology Council has discussed the dangers they pose to US citizens. The recent coronavirus disease (COVID-19) is also apparently being discussed as part of this category.

An issue related to this is the use of biological weapons and defoliants. Hostile countries can indirectly damage each other's militaries by spreading potent viruses or destroying the environment. Intentionally changing the ecosystem this way can in turn harm humankind. Whether these things are done deliberately or not, they have led to using names like "ecological security," "biological security," etc., for considerations aimed at preventing new organisms from threatening to the very existence of the human race. It is believed that climate change can cause these problems indirectly by, for example, forcing people to travel farther into untrodden places to seek new sources of water and warming the climate so it is easier for viruses and vector species to reproduce. The "threats" are climate change, viruses, etc., "what must be protected" is human life, and the "means of protection" are efforts to keep ecosystems healthy.

4. Recent and future developments

After the adoption of the Paris Agreement in 2015, negotiations related to the United Nations Framework Convention on Climate Change gave considerable attention to the urgent issue of the increase in refugees due to climate change. Large numbers of refugees had begun to enter Europe from Africa and the Middle East, and European countries were struggling to accept them. Climate change is cited as one of the causes of the refugees.[18] In the Pacific region, people had begun migrating from small island states that were becoming uninhabitable due to rising sea levels, their primary destinations being Australia and New Zealand. There are other reasons people migrate besides sea level rise, with a notable main one being living on an island where there is not enough work. However, factors such as seawater getting into groundwater are gradually making some places harder to live in. As the number of immigrants increases, so do concerns about deteriorating public security. This in turn prompts countries to reconsider how to accept immigrants.[19]

The increase in abnormal weather in Guatemala, Honduras, and other countries in Central America has contributed to the increase in refugees in the United States. While (then) President Trump is known to have adopted a policy of refusing them entry to the United States when they tried to get in via Mexico, the fact that climate change is what had originally caused the increase in refugees was not raised. From a national security viewpoint, there have been many cautionary opinions about excessive acceptance of refugees. However, if climate change is causing the increase in refugees, then developed countries can be said to have a liability to accept them on the grounds that a significant cause of climate change is the large amounts of greenhouse gases they have released into the atmosphere. From a humanitarian standpoint, they will be expected to accept refugees more actively in the future as one of the responses to climate change.

After taking office in 2021, President Biden reiterated the stance[20] of the former Democratic administration under Obama. Climate change as a security issue is seen as including the effects of abnormal weather both in and outside the United States. The recognition of "climate change and security" under the Biden administration is taken as a vague concept covering all of the five categories described above, with the understanding that climate change is the cause of a variety of damage, risks, and threats both in and outside the United States. In particular, from a diplomatic perspective, John Kerry, who had negotiated on the Paris Agreement as Secretary of State during the Obama administration, was appointed as the Special Presidential Envoy for Climate and a member of the National Security Council (NSC). Given that Special

17 Brown 1989; Desai 1995; Pirages, 1995.

18 Nagarajan et al. 2018; Kelley et al. 2015.

19 Merone 2018; Ministry of Defence of New Zealand 2018.

20 White House 2015.

Envoy Kerry is originally from the field of diplomacy, from a diplomatic standpoint, America can be expected to get more strongly involved than ever in discussions on climate change and security.

The United Nations Security Council has also shared the recognition that climate change is a cause of the increase in refugees and conflicts. Climate change has been on its agenda in some form every year since 2017. One main expression of this concern is that conflicts in Africa (such as those in Sudan (Darfur) and the area around Lake Chad) are worsening due to climate change.[21] Future policy changes in the United States may further stimulate the debate.

As mentioned above, the foundations for discussing climate change in the context of security have been laid all around the world, with American and European officials and experts playing the central role. Unfortunately, in many cases in Japan, climate change is still interpreted as the environmental issue of "global warming", and "measures against global warming" are associated with conserving energy. Discussion is limited to saving energy and so on, like turning off the lights in unoccupied rooms. In recent years, damage to people and property caused by floods, etc., due to typhoons and torrential rains has increased, and the mass media and so on have finally begun to explain that climate change is the cause. Although the issue is starting to be recognized as an imminent crisis, the concept of security has yet to be discussed.[22]

As an island nation surrounded by sea, climate change is going to become a threat for Japan in the near future. Rising sea levels are expected to significantly impact urban areas such as Tokyo and Osaka. They will also affect coastal ecosystems and fishery resources. There will be even more floods. Instead of preparing for water damage and typhoons in an ad hoc manner, it will be necessary to discuss the security of Japan on the basis of medium- to long-term predictions.

In addition, matters like the above-mentioned United Nations Security Council discussions will also need to be made more widely known to the public. Up to now, Japan has been cautious about accepting immigrants. However, if climate change is causing the increase in refugees, Japan will also be held responsible in proportion to its greenhouse gas emissions. It should begin to discuss how to assist refugees.

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21 Adelphi 2015.

22 Kameyama and Ono 2020.

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Efforts to Address Climate Security in the Indo-Pacific Region: Making Use of Essential Defense Functions

Kazumine Akimoto

1. Concept framework for security

(1) *The universal concept of security*

What is security? The word is discussed in various places, but seems to have many different meanings. It is apparently unclear when the Japanese term for security, "anzen hosho," first came into use. It was probably an interpretation of the English word "security." So, what is "security"? In Japanese-English dictionaries, "security" is translated as words meaning peace of mind, safety, defense measures, and security systems, and as "anzen hosho." The plural form "securities" can also mean marketable securities (i.e., financial instruments). The origin of "security" is the Latin word "securitas," which is said to come from "sēcūra," a combination of "se," meaning "without," and "cura," meaning "concern." In other words, it means stability or peace of mind resulting from having no concerns.

"Securitas" is sometimes cited to describe the rule during the Pax Romana. "Pax Romana" means "peace by Rome" (or "Roman peace"). After Octavian defeated Antony and Cleopatra in the Battle of Actium in 31 BCE and became emperor in 27 BCE, the Roman Empire spent around 200 years expanding its hegemonic order over its neighbors. This brought peace and prosperity to the regions under its influence. These two centuries or so are called the "Pax Romana." There were still wars, but Rome's overwhelming might drove most hostile forces away.

Pax is the Roman goddess of peace and order. She would also appear later in relation to the peace and prosperity brought by the British Empire and the United States: the Pax Britannica and Pax Americana. However, none of this peace was brought by the goddess. The Pax Romana came about because the Roman Empire's policy was to prioritize prosperity over war, and it had the military might to make that possible.

Before the Pax Romana, Rome at the end of the Republic had constantly struggled with political disorder and internal conflict. During this period of conflict, the key to ensuring security was the military led by the ruler, whose role was to protect the political system and people's lives and property from hostile forces. That state of affairs continued into age of the Pax Romana. For Rome, securitas meant protecting the political system and people's lives from hostile forces—in other words, security. Societies with immature political systems often regard it as advantageous to have a dictatorial political system that can make decisions about security easily, rather than having a democracy where it will take time to form a consensus. That was true of Rome when it transitioned from republic to empire, and it is also seen in some countries in the modern world. It is the same now as it was in the past.

The relationship between the people and the rulers with regard to safety carried on into the feudal world of the Middle Ages. The same situation can be seen in Japan's Warring States period of rivalry between local warlords, and in the shogunate rule of the early Edo period. The advent of Westphalian sovereignty in 1648 introduced a concept of a modern sovereign state according to which national defense—i.e., protecting the nation's territory and sovereignty and its people's lives and property—was

the duty of the military. The theory of social contracts put forward by philosophers like Jean-Jacques Rousseau also placed importance on ensuring security.

Let us go back to the days of the Pax Romana. Once the Pax Romana was in place, it freed people from the threat of hostile forces and brought them peace in a hegemonic order. However, this peace was simply a state in which war was suppressed or limited, and a safe society was not guaranteed in every regard. Even in now-peaceful Rome, there were things that threatened people's lives and property. One example is natural disasters. Notably, when Mt. Vesuvius erupted in 79 AD, it wiped out the flourishing ancient city of Pompeii. As discussed in Part 1, Chapter 1, natural phenomena had been the first threats humankind had faced. Now, one had struck peaceful Rome.

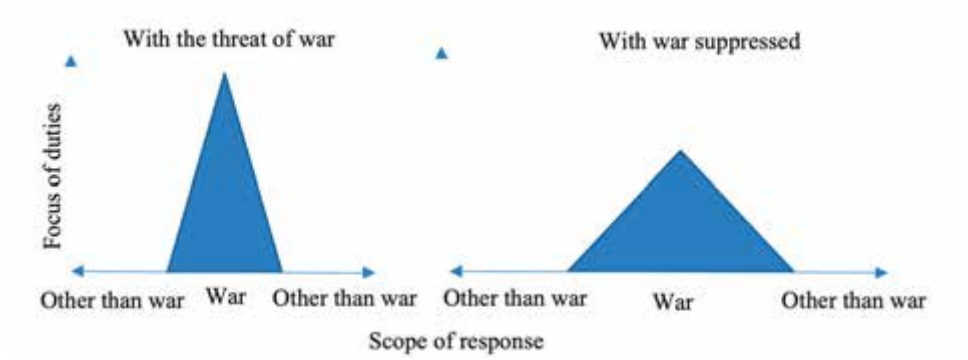

Figure 1 Duties and scope of response of national defense organizations in relation to ensuring security

In a society where war was suppressed or limited—a peaceful world bearing the name of Pax—people were reminded that national defense alone would not guarantee their safety. The importance placed on individuals' lives, principles, and rights increases in direct proportion to the level of peace. In other words, people will demand that a broader range of things be protected. Paradoxically, even under a dictatorial system with its easy decision-making, as the threat of hostile forces fades, increasing importance will be openly placed on protecting individuals' ideas and principles. However, contradictions like this are not the theme of this section, so we will not examine them further. To put it simply, in a peaceful society, the scope of security will be more diverse, encompassing people's lives, property, and rights, the social systems, and so on. In other words, the range of security tends to broaden as shown in Figure 1. In this situation, being responsible for safety, the military will inevitably be required to serve multifaceted roles.

In human societies, there are situations where people think, "There is danger, but we feel secure for the time being." The first that comes to mind is, "Our territorial sovereignty is under threat from hostile forces, but we're amply prepared to deter or defeat them." We can also imagine situations involving threats other than from hostile forces. For example, imagine ones like these: "There is a thief, but the police are keeping a close eye on him," or, "There are sharks, but I'm in a boat," or "I'm in a safari park, watching fierce beasts roam free from inside my car." These are situations where people feel there is no need to worry for now, because there are safety measures in place. People also need to be able to feel, "Even if things do get dangerous, rescue is guaranteed." In other words, "My life and property are guaranteed to be protected even if the thief slips past the police," or, "I'll be rescued from the sharks even if the boat starts to sink." These are similar to deterring and defeating armed attacks from hostile forces.

Creating systems that guarantee safety and peace of mind even when there is danger, and preserving the stability of society—these are essential requirements for security. It does not matter what the danger is. Of course, dangers other than invasion by hostile forces also include natural disasters. The organizations responsible for national defense will inevitably need to serve multifaceted roles in situ-

ations where the threats from other humans have faded. Of course, the original duty of the national defense organizations will still be to prevent invasion from outside and maintain internal security. However, the personnel and equipment they possess for these purposes can also be used in areas such as humanitarian assistance and disaster relief (HA/DR). Of course, another option is to have dedicated organizations for dealing with dangers other than invasion by hostile forces. However, it would be inappropriate in terms of cost-effectiveness to maintain permanent organizations in order to respond to disasters that are difficult to predict. These may be able to deter invasions from hostile forces, but it is impossible for them to prevent natural disasters.

It is conjectured that once people are sure they will be kept safe from threats from other humans, they become more aware of the threat of natural disasters. The threats of civil war and terrorism still exist in today's world, but for the present, large-scale wars between nations are being avoided. In an era like that, national security policies are becoming diverse, and national defense organizations are being called on to play multifaceted roles.

(2) *Security and national defense: Distinctions based on the concept of comprehensive security*

Here, we must clarify the relationships between security, defense, and national defense. The distinctions between security, defense, and national defense are certainly ambiguous. Consequently, this ambiguity gives rise to people using terms related to security to mean different things, as discussed at the beginning. Official documents also often seem to view national defense as the same thing as security. Defense used to mean national defense, and be viewed as part of the vague concept of security. However, when peace was secured in Europe after World War I through the Allied powers against Germany, the concept of multinational defense was formed. This was regarded as separate from conventional national defense, and sometimes referred to as security. It was similar to today's concept of collective security under international law, which involves maintaining peace, including for one's enemies. In this context, the definition of security has been divided into two aspects: security that is primarily based on national defense, and security as a defense posture between multiple countries.

Things became even more complicated after the Cold War between the United States and Soviet Union ended. The tensions caused by the bipolar confrontation between East and West had been eliminated, and armed conflicts between countries had also decreased. The various approaches of an international community that had moved beyond territorial sovereignty to address diversifying threats (notable examples being global terrorism and civil-war massacres), were becoming increasingly institutionalized. Against this background, the concept of security split into two notions: one that included national defense, and one that did not.

Many people distinguish between security and national defense in Japan according to the concept of comprehensive security. However, that is also ambiguous. Post-war Japan not only prepared for security against military threats: it also formed a comprehensive security initiative aimed at international cooperation, through comprehensive measures that encompassed politics, economics, and culture. Based on the results of study groups on comprehensive security, the Masayoshi Ohira cabinet formalized a security initiative that combined military and non-military aspects. This went on to become a shared security concept that gained international recognition. Following that, the Zenko Suzuki cabinet established a ministerial meeting on comprehensive security in 1980. However, the definition of security became labyrinthine when Prime Minister Suzuki himself said that the US-Japan alliance would not involve any military aspects. A joint statement was issued by Prime Minister Suzuki and US President Ronald Reagan in May 1981.[1] When reporters asked Prime Minister Suzuki about the wording "US-Japan alliance" used in the statement, he replied that nothing would change in terms of the military aspects. The newspapers then reported that he had said the US-Japan alliance would not involve any military aspects. This had some effects on the political situation—for example, the Minister for Foreign

1 Ministry of Foreign Affairs, "Joint Statement by Prime Minister Suzuki and US President Ronald Reagan," (https://www.mofa.go.jp/mofaj/gaiko/bluebook/1982/s57-shiryou-403.htm).

Affairs resigned because he feared that relations between Japan and the United States would deteriorate.[2] The meaning of "alliance" here was a relationship between the two countries aimed at tangible cooperation in all the ways laid out by the US-Japan Security Treaty. In that sense, it was probably inappropriate to categorize it as military or non-military. Comprehensive security should be viewed as a broad security concept that also includes national defense.

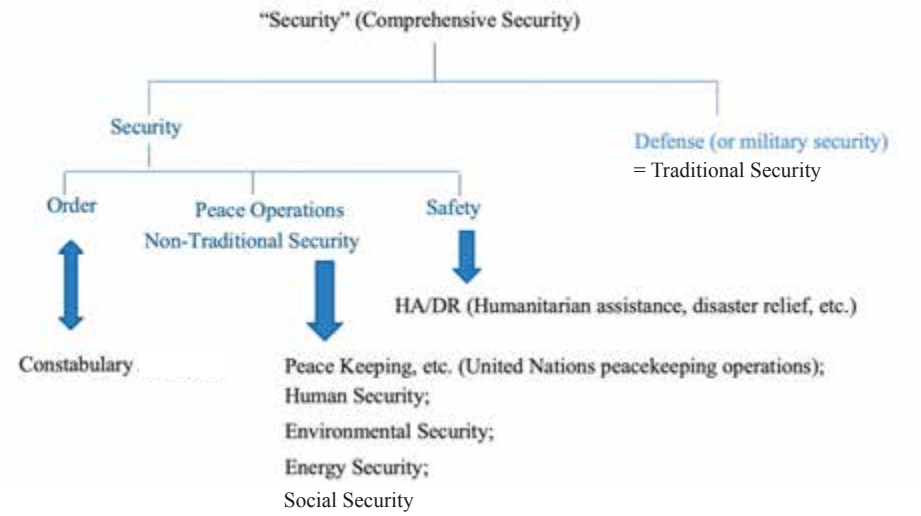

Figure 2 Concept framework for security

Figure 2 summarizes the meaning of security based on the concept of comprehensive security. There are two kinds of security: comprehensive security—i.e., security in the broad sense—and security in the sense of activities other than national defense. Security in the broad sense (i.e., security = comprehensive security) consists of both national defense and other security activities as well. National defense is military security, and is about being prepared against so-called traditional threats. Non-military security includes public safety and security through constabulary activities (i.e., policing), peace activities led by the United Nations, and safety measures against non-traditional threats such as pirates, terrorists, and anti-government extremists.

We will use this concept framework to discuss climate security in the next section.

2. Global warming and national defense

(1) *The impact of global warming on security environments*

Global warming is now having a variety of impacts on human habitats. This is already manifesting itself in many ways in the Indo-Pacific region. Notably, rising sea levels and sea temperatures are causing coastal erosion and larger typhoons respectively, and these are leading to increasingly large-scale natural disasters. The rising sea levels are threatening the lives and industries of people living on island and continental coasts, and the erosion could one day deprive people of their homes and force them to migrate to other areas. The larger natural disasters are causing serious damage to people's lives and the infrastructure that supports them. Global warming also threatens to affect marine ecosystems and the

2 House of Representatives, "Question Concerning Cabinet Inconsistency Regarding the US-Japan Summit Meeting Held in May 1981," (https://www.shugiin.go.jp/internet/itdb_shitsumon.nsf/html/shitsumon/a166231.htm).

populations and habitats of marine life that are food resources. That could in turn lead to more international fishing disputes and increased illegal fishing.

Of course, the Earth does have periodic climate variation, and is thought to cycle between cold periods and warm ones (when the air is not as cold). As mentioned in Part 1, Chapter 1, we are thought to currently be in an interglacial period during the Quaternary Ice Age, which began about 2.6 million years ago. Periodic climate variation will continue, so a cold period may ensue sooner or later. If that is so, then the cold period caused by periodic climate variation may contain and even eliminate the global warming currently being caused by the increase in greenhouse gases due to humans. However, global warming is still progressing in the short term compared to periodic climate variation, whose cycles occur over millions or tens of millions of years. Given that the effects of global warming could be progressing even faster in ten or twenty years' time, it definitely must be addressed. We will make the same distinction in this chapter as we did in Part 1, Chapter 1, using "climate change" to refer to global warming thought to be caused mainly by human activity since the Industrial Revolution, and "climate variation" to refer to the natural cycle of warming and cooling. However, we will regard the current global warming as resulting from interactions between the two. We will say "climate variation" when both are involved, and "climate change" when humans are the only cause.

Progressive global warming will destabilize habitats and livelihoods. This will in turn cause widespread deterioration of public safety, alter existing international relations, and thereby destabilize security environments. Meanwhile, the rising sea levels and large-scale disasters due to global warming have had a considerable impact on the functioning of national defense forces' military bases in the Indo-Pacific region. It is also amply conceivable that rising sea temperatures will affect the performance of underwater weapons, and through them, defense capabilities and power balances.

When considering the threats posed to habitats by global warming and the resulting deterioration in security and destabilization of international relations, countries with common interests in the Indo-Pacific region should regard them as security issues, and form an international posture of addressing climate security with shared principles and values. The scope of climate security in the Indo-Pacific region will be broad and diverse. HA/DR and reconstruction assistance in response to rising sea levels and large-scale disasters epitomize human security, and will help maintain public safety and prevent internal conflicts. At the same time, global warming will also impact national defense functions and international security structures. Military bases on islands and in coastal areas are likely to be affected by the rising sea levels and large-scale disasters, obstructing their duties. It might become essential to redeploy the military units or update the bases' facilities so they can respond to global warming, but more than that, there is also a risk that existing power balances could shift. Climate security must definitely be regarded as also including maintaining national defense functions and stabilizing security environments, but even broader perspectives will probably be necessary. If global warming continues, it will also change things like agricultural zones and fishing grounds, and through them, food security and the global economic structure. If this changes international relations and the power balances between the major countries, it will also have a considerable impact on geopolitics. The world may be forced to reconstruct its security strategies with global warming in mind. Climate security will need to be addressed wisely if potentially shifting security environments are to be stabilized.

So, thinking in terms of Figure 2 in the previous section, climate security should cover a broad scope that includes human security, order, humanitarian assistance and disaster relief (HA/DR), and national defense. This is often referred to as environmental security, but in this chapter, the concept of environmental security is regarded as limited to measures to prevent environmental deterioration, and is distinct from climate security. From 1996 to 2000, researchers at Japan's National Institute for Defense Studies proposed the concept of Ocean-Peace Keeping (OPK) as an international initiative by multinational naval forces to address piracy, monitor the marine environment, and conduct rescue operations in the event of natural disasters. Ensuring climate security in sea areas is also a measure that coincides with OPK.

The Paris Agreement of 2015 sets goals of making greenhouse gas emissions essentially zero by the second half of the century, and of limiting the rise in temperature to at most 2°C above the pre-in-

dustrial level, and ideally to just 1.5°C above it. Currently, some data indicates that the global temperature has risen by about 1°C since the Industrial Revolution. If this is the case, then the natural phenomena believed to be caused by global warming will still continue to occur even if the Paris Agreement proves to be effective. We need to anticipate that global warming will become the norm, and address climate security as part of a new concept: "with climate change." Given that climate security's scope is wide and diverse, it will require involvement, cooperation, and international efforts by a variety of actors, including governments, relevant ministries, agencies, and NGOs, and especially, national defense organizations.

Several countries and institutions have recognized the importance of climate security and are already surveying efforts by national defense organizations and taking action to address it. Some examples are given below.

(2) *Efforts to address climate security in the United States*

The United States is an ally of Japan under the Japan-US Security Treaty. It released a White House report titled "The National Security Implications of a Changing Climate" in May 2015, during the Obama administration.[3]

The report begins by quoting the National Security Strategy formulated in February that year (White House, National Security Strategy, February 2015): "Climate change is an urgent and growing threat to our national security, contributing to increased natural disasters, refugee flows, and conflicts over basic resources like food and water. The effects of climate variation are now being felt from the Arctic to the Midwest. Increased sea levels and storm surges threaten coastal regions, infrastructure and property. In turn, the global economy suffers, compounding the growing costs of preparing and restoring infrastructure."[4] The US government is accordingly establishing security measures in response to climate variation. In that connection, the security measures it identifies as needing to be pursued include the rising sea levels and storms in the United States' coastal areas, glacial melting in the Arctic Ocean, and the effects of global warming on military base functions. For example, when Hurricane Sandy struck North America in 2012, the US Marine Corps deployed landing craft. This illustrates the need to be able to readily deploy the military to help with disaster relief and rescue in response to rising sea levels and storms. The United States has also identified that it needs to take measures to ensure its food security and national security in response to the accelerating melting of glaciers in the Arctic Ocean, and to maintain military base functions and immediate response readiness even while living with the effects of climate variation. To summarize, it is emphasizing the need for military involvement in security and for interagency cooperation.

After the Trump administration took over from the Obama administration in January 2017, interest in climate variation as a whole changed in the United States. Nevertheless, the nation has a long history of working to address the climate crisis from a security perspective dating back to the 1990s, and has produced more than 100 documents on the matter.[5] Let us look at some of examples of these.

In August 1991, President George H. W. Bush raised climate variation as a security issue in the National Security Strategy. In 2003, the US Department of Defense analyzed past incidents of abnormal weather and published a report titled "An Abrupt Climate Change Scenario and Its Implications for United States National Security."[6] The report concluded that abnormal climate change can destabilize geopolitical environments and even cause wars, thereby posing threats to national security that are dif-

3 Finding from Select Federal Report *THE NATIONAL SECURITY IMPLICATION TO A CHANGING CLIMATE*, THE WHITE HOUSE, May 2015.

4 *White House, National Security Strategy, February 2015*. Original text: "Climate change is an urgent and growing threat to our national security, contributing to increased natural disasters, refugee flows, and conflicts over basic resources like food and water. The present day effects of climate change are being felt from the Arctic to the Midwest. Increased sea levels and storm surges threaten coastal regions, infrastructure, and property. In turn, the global economy suffers, compounding the growing costs of preparing and restoring infrastructure."

5 Peter H. Gleick, *A History of U.S. Defense, Intelligence and Security Assessments of Climate Change*, March 6, 2019.

6 U.S. Department of Defense, *An Abrupt Climate Change Scenario and Its Implications for United States National Security*, 2003.

ferent from any others that we recognize today.

In 2007, the Council of Foreign Relations published a report titled "Climate Change and National Security: An Agenda for Action" that described the serious threat that climate variation posed to the security of the United States and other countries. Also in 2007, a group of retired generals and admirals at the Center for Naval Analysis wrote a report titled "National Security and the Threat of Climate Change." The report suggests that climate variation poses a complex threat to vulnerable regions, that this in turn affects the national security of the United States, and that its government should play a national and international role in preventing global turmoil. The study showed that more than 30 US military bases were already in danger from rising sea levels, and that their defense functions were also being impaired.

The 2010 Quadrennial Defense Review warned about the threat that climate variation posed to security. The subsequent 2014 Quadrennial Defense Review indicated the government's continued vigilance regarding the complex threat posed by climate variation.

In 2014, the Department of Defense also produced the January 2014 US Department of Defense Climate Change Adaptation Roadmap. The roadmap states that climate variation will threaten national security in the future, and is a complex threat that also leads to infectious diseases, terrorism, and other issues. It then presents a three-stage response plan: (1) Assess the impact of climate variation on national defense duties; (2) Formulate responses within the Department of Defense; then (3) Formulate coordinated interagency responses.

A year later in 2015, the Department of Defense testified to Congress that climate variation was not a future threat to security but a real and present one, and that it was working on operational and strategic responses. The same year, the Department of Defense reaffirmed its recognition that climate variation was a threat to national security.

Donald Trump became US President in 2017. The discussions and policy-making on climate variation are said to have waned under his administration, which lasted until January 2021. It is certainly true for example that matters related to climate variation were removed to formulate President Trump's 2017 National Security Strategy. However, with the effects of global warming becoming increasingly apparent, people in the field of security continued to say that climate security efforts were needed. We will present them in chronological order.

On March 14, 2017, the Secretary of Defense, James Mattis, stated that climate variation was hindering the duties of US forces dispatched to various parts of the world. This led to a series of moves related to the need for climate security efforts. On November 11, 2017, when the Senate asked the Secretary of the Navy, Richard Spencer, whether climate variation was affecting the navy's duties and equipment, he replied that it might lose bases due to rising sea levels and abnormal weather. On March 13, 2018, the Commander of the United States Africa Command, Thomas D. Waldhauser, said that climate variation threatened to make food supplies scarce, with adverse impacts on public safety in Africa. On November 5 the same year, the Chairman of the Joint Chiefs of Staff, Joseph Dunford, said in a speech at Duke University that climate variation was a factor behind international conflicts, and the military should also take measures. On February 12, 2019, the Commander of the United States Indo-Pacific Command, Admiral Philip S. Davidson, testified to the Senate Committee on Armed Services that climate variation posed a threat to security in the Indo-Pacific region. Two months later on April 19, the Chief of Naval Operations, John Richardson, stated that the accelerating melting of glaciers in the Arctic Ocean would affect the nation's defense strategy.

The US Department of Defense's focus regarding climate security is on the following: early prevention of threats to peace and security caused by global warming; humanitarian assistance and disaster relief; and maintaining defense functions. Examples of specific interventions include rescue assistance for victims of Typhoon Haiyan, which struck Leyte in the Philippines in 2013, multinational training for assistance in the event of similar disasters, and addressing the impact of global warming on military functions.

The White House's stance has been different from the US Department of Defense's. The Department of State testified about the impact of climate variation on national security at a hearing of the

House Permanent Select Committee on Intelligence in June, but its comments were deleted by the White House and the parties involved in the analysis resigned. In addition, on August 7, 2019, it came to light that without any public announcement, the Task Force on Climate Change established by the Navy in 2009 had been shut down in March and its website closed.[7]

When President Joe Biden was inaugurated in 2021, his administration made global warming one of its most important issues. On the day of his inauguration, the new President announced that the United States would return to the Paris Agreement. Then on January 27, he signed an executive order instructing all government agencies to make addressing climate variation a central policy issue. President Biden called global warming "the existential threat to human existence as we know it," and said he would hold a summit meeting on April 22 with countries that were major greenhouse gas emitters.

In response to the new administration's policy, the United States Indo-Pacific Command held the 2021 Pacific Environmental Security Forum (PESF) (online) from February 22 to 25, 2021.[8] Ever since the first one held in 2010, military representatives have been using these forums to exchange views with civilians on environmental protection, management, and security in the Indo-Pacific region. Some of the participants were from countries that did not have military organizations, and the matters discussed also included responses to natural disasters. The agenda for the 2021 forum included topics such as climate security and use of sustainable resources, and international cooperation toward these.

The Leaders Summit on Climate President Biden had announced was held online on April 22 and 23 with participation from 40 countries as planned. The summit and other efforts by the United States and other major countries to address climate security, including the international community's interests and motives toward it, will be discussed in detail in Part 4, Chapter 2.

(3) *Efforts to address climate security in European countries*

Now, we will take a look at the European countries that are increasing their interest and involvement in the Indo-Pacific region. Many of the North Atlantic Treaty Organization (NATO)'s members have been actively engaging with the issue of global warming. In October 2015, ahead of the 21st United Nations Climate Change Conference held in Paris that November and December, the NATO Parliamentary Assembly adopted a resolution in which it declare climate variation to be a serious security crisis.[9] Following that, the French members of the NATO Parliamentary Assembly advocated the need for preventive diplomatic responses, calling on member states to be alarmed about the serious armed conflicts that could arise from resource shortages and economic crises caused by climate variation, and act to address them now.[10] Many NATO countries recognize that climate variation is not merely a global environment issue, but one with geopolitical implications.

Meanwhile, in the "Council Conclusions of Climate Diplomacy" it formulated in January 2020, the Council of the European Union summed up by describing climate variation as a serious issue that must be solved on a global scale, and one that will threaten peace and security if it is not addressed promptly. However, while the European Union may have announced a stance of addressing climate variation as a part of comprehensive security, it has yet to take any unified, coordinated action.

France has territory in the Indo-Pacific and the second largest exclusive economic zone in the world, and its military organizations are actively working on climate security. The French Ministry of Defense has already identified climate variation as central to various threats faced today, in the 2013 "Defense and National Security White Paper" and in "The Strategic Review of Defence and National Security," published in October 2017. In the Indo-Pacific region, the French military is engaging in

7 Philip Athey, "Navy quietly shut down climate change task force", E&E News. Wednesday, August 7, 2019, (https://www.eenews.net/stories/1060877355).

8 U.S. Indo-Pacific Command "2021 Pacific Environmental Security Forum", (http://U.S. Indo-Pacific Command Hosted the 2021 Pacific Environmental Security Forum Virtually).

9 NATO, "Climate Change Is Significant Security Threat and Its Bite Is Already Being Felt", (https://www.ecowatch.com/nato-climate-change-is-significant-security-threat-and-its-bite- is-alr-1882107200.html).

10 *Ibid.*

various strategies to provide humanitarian assistance and prevent conflicts from arising due to climate variation. Specific examples include joining the United States, Australia, and other countries in conducting multinational rescue training for the event of a large-scale natural disaster, and sending patrol aircraft to South Pacific island countries' exclusive economic zones to patrol for illegal fishing.

France's approach to climate security is based on joint response with Europe and international organizations. In line with that policy, in 2015, the French military held an international conference titled "Defence and climate: what are the stakes?" Then in 2017, it organized joint studies on the Mediterranean and South Pacific titled The impacts of climate change in terms of security and defence in the Euro-Maghreb area" and "The impact of climate change in the South Pacific by 2030."

(4) *Climate security efforts by the international community*

While the United Nations Framework Convention on Climate Change (UNFCCC) has identified climate variation to be the most important issue, the United Nations itself has yet to discuss the relationship between this issue and security. Although there have been discussions about climate security at the annual Conference of the Parties (COP) before, they were not officially planned. The Department of Political and Peacebuilding Affairs (DPPA) was the first to discuss climate security, including it on their own strategic agenda for 2020 to 2022. In 2018, the DPPA established the Climate Security Mechanism (CSM) in collaboration with the United Nations Development Programme (UNDEP) and the United Nations Environment Programme (UNEP), in order for the United Nations to effectively address the security crises associated with climate variation. The Climate Security Mechanism presented a toolbox for promoting responses to the crises.

Meanwhile, the United Nations Security Council discussed climate security and energy in 2007, and issued a presidential statement in 2011 on the threats climate variation posed to global security. In this statement, the then United Nations Secretary-General Ban Ki-moon emphasized the necessity of international security measures in the face of frequent abnormal weather, which posed a risk to people's lives and the facilities and political systems in all countries.[11] The United Nations Security Council continues to hold unofficial meetings on climate security.

Also, while it is not a United Nations framework, the Arctic Council is also working to address the issues. For example, it is conducting multinational rescue training by coast guards for the event of a maritime accident in the Arctic Sea, where maritime traffic is expected to increase due to glacial melting.

In the South Pacific, Australia has been cooperating with France and other countries to provide assistance to island nations that have extensive exclusive economic zones but lack the ability to control them effectively. Examples include dispatching military aircraft to monitor fishing activities. Japan is showing a stance of active contribution, with a particular focus on HA/DR in the event of major disasters. For example, it dispatched Self-Defense Force vessels and transport aircraft to provide aid to the Philippines when it was struck by Typhoon Haiyan in 2013.

(5) *The significance of systematic security as seen in "climate security"*

As we have seen above, in response to catastrophic damage to human life and facilities, etc. caused by global warming, several countries and international organizations are showing a stance of going beyond the boundaries of national sovereign territory in an effort to address climate security. The following are the five main foci of climate security efforts targeting sea areas:

(1) Rescue activities in large-scale disasters

(2) Monitoring fishery resources

(3) Responding to the changes in security environments caused by glacial melting in the Arctic

11 UN NEWS, "Warning of climate change's threat to global security, Ban urges concerted action", (http:// Warning of climate change's threat to global security, Ban urges concerted action | | UN News).

Ocean

(4) Dealing with the impacts on national defense functions

(5) Measures to prevent population movements due to rising sea levels

Rescue activities for victims of large-scale typhoons, tidal waves, etc. in coastal areas will not only rescue lives, but also prevent security from deteriorating. Monitoring fishing activities will help prevent international conflicts. The glacial melting in the Arctic Ocean and the impacts of global warming on national defense functions are changing existing security environments and strategic balances. Consequently, they must definitely be addressed as problems that are directly connected with national defense. Measures against rising sea levels will also help prevent international security environments from from shifting due to large-scale population movements.

Needless to say, the purpose of climate security is to address security situations that arise in connection with global warming. However, there is a secondary effect that must be noted. With the international community's interest in addressing global warming increasing, countries that actively work on climate security will raise their profiles in the arenas related to global challenges and conflicts. In other words, they will gain a significant influence over consensus building in international politics.

It is not surprising that sovereign states' world view is based on the power politics of seeking to leverage their diplomatic, economic, military, and other kinds of power to the maximum in international relations. Paradoxically however, they have decided that rather than wearing down their national power by trying to secure their relative superiority in all respects, it would in reality be better to balance their forces and stabilize international politics. To that end, they have come to seek a balance of power with their rivals. However, in today's world, where a wide range of values are respected, the elements of national power in power politics are also becoming more diverse. Hence, in addition to diplomatic, economic, military, and similar kinds of power, so-called "power of influence" is also being increasingly recognized as a form of power by which nations can play a leading role in international politics. Examples of how they can develop their power of influence include contributing to sustainable development and providing humanitarian assistance to countries hit by major disasters. In a globalized economy that calls for coordination rather than confrontation, efforts such as climate security can be powerful factors toward determining nations' power of influence. Countries like the island nations in the South Pacific will tend to prefer nations that provide disaster relief and fishery surveillance rather than ones that exert a strong naval presence. The countries in the South China Sea welcome the deployment of the US Navy as a force that can contain China's heavy-handed maritime expansion. At the same time, they also want assistance with building their capability to protect their resource environments and enforce their laws. In 2018, China established the China International Development Cooperation Agency, an organization aimed at dealing with natural disasters and humanitarian crises in other countries. This is called "disaster diplomacy." The power of influence nations develop through climate security will also become a strong weapon for handling international relations to their advantage. In this connection, it will be important that power of influence be wielded by countries that have shared values. Japan should therefore actively engage in climate security with countries that share its values.

Part 3

Climate Security Issues

So far, we have seen that climate change, which accelerates global warming, causes instabilities regarding human survival, social infrastructure, and even international relations, and needs to be addressed from the viewpoint of security.

Part 3 of this book analyzes how phenomena attributed to global warming can harm human society and indirectly cause conflict, with notable examples being the increasing scale of typhoons and other natural disasters, the increasing frequency of abnormal weather, and the erosion of islands and coastlines caused by rising sea levels. Moreover, it focuses on specific issues such as immigration resulting from rising sea levels, and proposes a way for international cooperative efforts to address climate security in coastal areas.

Risks and Realities of Violent Conflict Caused by Climate Change

Takashi Sekiyama

1. Introduction

Until recently, Japan had been considered unfamiliar with the concept of climate security or environmental security.[1] For example, the index terms of the Defense of Japan white papers from 1970 to 2020 do not include the words "climate security" or "environmental security." Similarly, one will not find them in the table of contents of any Annual Report on the Environment in Japan white papers for at least five years from 2015 onward.

In the international community, on the other hand, not only environmentalists but also security experts around the world are paying close attention to the threats posed by climate and environmental change. For example, since 2007 the United Nations Security Council has been discussing how security could be affected by climate change, increasing scarcity of resources and water, ecosystem change, etc.[2] The European Union (EU) also recognizes in its documents on the Common Foreign and Security Policy that climate change is an indirect cause of many conflicts around the world.[3] Against this background, academic research that draws attention to the relationships between climate change and conflict has also increased dramatically in the past decade.[4]

As discussed in Part 2's Chapter 1, the concept of climate security is used with an extremely wide variety of meanings. Some people use the concept to view climate change itself as a threat, while others view conflict caused by climate change as a threat. Also, there are differing news of what subjects to protect from threats, with the various foci including individual human beings, countries, societies, and the entire ecosystem, including mankind. Among discussions on climate security, ones that focus on human beings as subjects of protection coincide with the "theory of human security," and there have been many such discussions in Japan as well. On the other hand, there has not been enough discussion in Japan on how to protect the nation and society from the threat of conflict caused by climate change in particular.

This chapter is mainly interested in the risk of conflict and violence arising between groups or countries as an indirect result of climate change. First of all, climate change generally refers to a long-term shift in global average temperatures and climate patterns. Therefore, there are climate security

1 Sekiyama, T. (2020). "Environmental Security and Japan." *Security Studies*, 2 (1): 65-80.

2 United Nations. (2021). "Climate Change 'Biggest Threat Modern Humans Have Ever Faced,' World-Renowned Naturalist Tells Security Council, Calls for Greater Global Cooperation." Retrieved March 31, 2021, from https://press.un.org/en/2021/sc14445.doc.htm

3 European Union. (2017). *Joint Communication to The European Parliament and The Council: A Strategic Approach to Resilience in the EU's External Action*. Retrieved January 28, 2020, from https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX:-52017JC0021.

4 E.g., Koubi, Vally. (2019). "Climate Change and Conflict." *Annual Review of Political Science*, 22: 343-360; Mach, Katharine J., Kraan, Caroline M., Adger, W. Neil, et al. (2019). "Climate as a risk factor for armed conflict." *Nature*, 571: 193-197; von Uexkull, Nina, and Buhaug, Halvard. (2021). "Security implications of climate change: A decade of scientific progress." *Journal of Peace Research*, 58 (1): 3-17.

studies that have analyzed the relationship between climate change and trends in the outbreak of conflicts over the centuries. However, climate change is expected to increase the frequency and severity of natural disasters, such as floods and storms, or of extreme weather that brings extreme temperatures and precipitation. For people living in the modern era, the risk that natural disasters and extreme weather will trigger conflict in the near future is a matter of life and death. This is why this chapter focuses mainly on the relationships between conflict and natural disasters and extreme weather.

There are still in fact many unknowns regarding the relationships between climate change and conflict. For example, some analyses claim that climate change causes fierce conflict, while a fair number of studies suggest a weak correlation between them. Therefore, assuming that climate change causes conflict, what might the mechanism be like? Are there any specific conditions that affect whether climate change leads to conflict? What actual examples are there of conflicts indirectly caused by climate change? What kinds of risks could climate change pose to regions around the world in the next few decades? In the following, this chapter summarizes the findings of existing research on climate security, and attempts to answer these questions.

2. Direct pathways by which climate change leads to conflict

Climate change is said to be a "threat multiplier."[5] In other words, besides being a direct threat to people and society by causing extreme temperatures and precipitation, it can also indirectly amplify threats to peace and prosperity in human society through various other pathways. There is concern that climate change as a direct threat can increase the risk of conflict by, for example, affecting people mentally and physically and causing shortages of water and other resources. On the other hand, an indirect pathway that has been identified is the fact that climate change can affect food production, economic and social life, etc., and the resulting increased food prices and large-scale movements of people can increase the risk of conflict. This section as well as the next looks in detail at correlations like these between climate change and conflict.

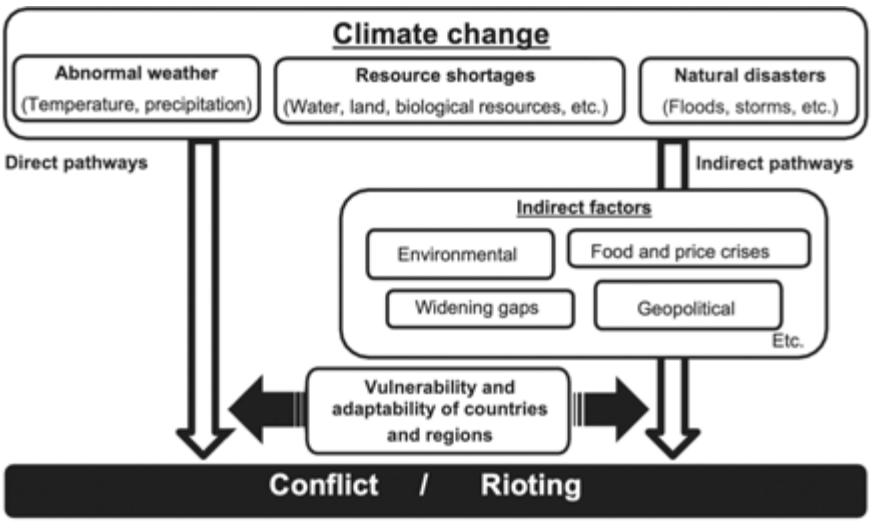

Figure 1 Relationships between climate change and conflict/rioting
Source: Developed by the author

5 CNA. (2007). *National Security and the Threat of Climate Change*. Arlington: The CAN Corporation; US Department of Defense. (2014). *Quadrennial Defense Review 2014*. Washington, DC: Department of Defense.

(1) *Temperature change*

Changes in temperature, precipitation, and other aspects of the weather can cause discomfort and have other psychological or physiological effects on people. This can trigger violence.[6] For example, when the temperature rises, rioting in cities[7] and political instability[8] (e.g., coups d' état) become more likely. Temperature change also affects the incidence of various kinds of violence against people, including murder, assault, rape, burglary, and brawling at sports events.[9] Some studies predict that murder will increase by 6% worldwide for every 1°C that the average global temperature rises.[10]

Correlations between temperature and conflicts around the world have also been suggested. For example, Marshall B. Burke et al. of Stanford University stated that there was a strong correlation between temperature rise and the outbreak of civil war in sub-Saharan Africa from 1981 to 2002, and predicted about a 50% increase in the incidence of civil war by 2030 if greenhouse gas emissions continue as they are.[11]

On the other hand, some previous studies refute any direct correlation between temperature and conflict. For example, Halvard Buhaug of the Peace Research Institute Oslo pointed out that Burke et al.'s study affirming a correlation between temperature rise and civil war was biased in terms of the periods and countries it sampled, and did not take social and geopolitical factors into consideration. He also reported that his own analysis did not find any correlation between temperature and civil war in Africa.[12] In response to Buhaug's criticism, Burke et al. revised their regression models and reanalyzed their data. As a result, they reported that while a correlation between temperature rise and conflict did exist, it could no longer be seen after 2002.[13] The correlation between temperature rise and conflict is presumed to have weakened since 2000 due to factors such as the progress of international cooperation (including UN peacekeeping activities) and improvements in countries' economic development and domestic governance.

(2) *Precipitation change*

As with the analyses of temperature change, analyses of the relationships between conflict and precipitation change (such as having extremely heavy rain or very little rain) have produced a mixture of affirmatory and negatory reports. Some analytical findings regarding precipitation suggest that relatively large civil wars are more likely to break out in developing countries in years when there is heavy rain. In particular, a correlation between precipitation and conflict and rioting has been suggested in developing countries in regions like Africa. For example, inter-group conflict in East African countries like Ethiopia, Kenya, and Uganda is said to frequently arise during extremely severe rains and droughts.[14]

While analyses like these confirm a relationship between precipitation change and conflict, many others refute it. For example, some research on Asia[15] and Africa[16] refutes any correlation between

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6 Anderson, C.A., and Bushman B.J. (2002). "Human aggression." *Annual Review of Psychology*, 53: 27-51.

7 Yeeles, A. (2015). "Weathering unrest: The ecology of urban social disturbances in Africa and Asia." *Journal of Peace Research*, 52, 2: 158-70.

8 Dell, M., Jones, B.F., and Olken, B.A. (2012). "Temperature shocks and economic growth: Evidence from the last half Century." *American Economic Journal: Macroeconomics,* 4(3): 66-95.

9 Ranson, M. (2014). "Crime, weather, and climate Change." *Journal of Environmental Economics and Management*, 67 (3): 274-302.

10 Mares, D., and Moffetti, K.W. (2016). "Climate change and interpersonal violence: A 'global' estimate and regional inequities." *Climate Change*, 135 (2): 297-310.

11 Burke, M.B., Miguel, E., Satyanath, S., Dykema, J.A., and Lobell, D.B. (2009). "Warming increases the risk of civil war in Africa." *Proceedings of the National Academy of Sciences of the United States of America*, 106 (49): 20670-74.

12 Buhaug, H. (2010). "Climate not to blame for African civil wars." *Proceedings of the National Academy of Sciences of the United States of America*, 107 (38): 16477-82.

13 Burke, M.B., Miguel, E., Satyanath, S., Dykema, J.A., and Lobell, D.B. (2010). "Climate robustly linked to African civil war." *Proceedings of The National Academy of Sciences of The United States of America*, 107 (51): E185.

14 Raleigh, C., and Kniveton, D. (2012). "Come rain or shine: An analysis of conflict and climate variability in East Africa." *Journal of Peace Research*, 49(1), 51-64.

15 Wischnath, G., and Buhaug, H. (2014). "On climate variability and civil war in Asia." *Climate Change*, 122(4): 709-21.

16 Theisen, O.M. (2012). "Climate clashes? Weather variability, land pressure, and organized violence in Kenya, 1989-2004." *Journal of Peace Research*, 49: 81-96.

drought and the outbreak of civil war. Another study on East Africa has also stated that extremely heavy rain may even reduce the risk of violence.[17]

(3) *Natural disasters*

Climate change increases the frequency and severity of natural disasters such as storms, floods, and landslides. Although natural disasters' direct, overwhelming influence only lasts for a short period of time (when viewed on the timescale of climate change), they can damage infrastructure, crops, and livestock. Existing empirical studies state that floods may prolong civil wars.[18] Floods destroy public infrastructure and reduce government annual revenues. This reduces the government's ability to maintain public safety, and tends to prolong civil wars as a result.[19] Moreover, one study on the Philippines states that unsettled rain can cause citizens to become increasingly dissatisfied, and that this can lead to problems like oppression, civil war, and terrorism between them and the state.[20]

(4) *Shortages (scarcity) of water and other resources*

The effects of resource scarcity have long attracted attention as a mechanism by which climate change causes conflicts. In other words, it has been argued that if climate change causes a shortage of resources like fresh water, arable land, forests, and fish, competition and conflict over them will intensify.[21] Studies have stated that in developing countries in particular, when water shortages arise due to decreased rainfall or increased temperatures, this can cause farmers and nomads to fight over limited water resources and urban populations to riot. Countries that share water in rivers, lakes, etc., are said to come into conflict over water resources particularly easily when one country is upstream of the other.[22]

However, the argument that resource scarcity leads to conflict has received a fair amount of criticism, both on theoretical and empirical grounds. Economists, for example, see scarcity as a problem that can be overcome. They will say that if an efficient market is functioning properly, then there will be investment, technological innovation, and trade to preserve or replace scarce resources.[23] However, markets will not function properly without stable governance and systems. In this regard, some political scholars have said that such factors as inadequate governance, rampant corruption, and inefficient systems are important in linking resource shortages with conflict.[24]

It is also not empirically clear whether resource shortages cause conflict. As a counterexample to this, one report has said that villages competed for water in the early days of the Darfur conflict in Sudan, with those with plentiful water and vegetation being destroyed or plundered.[25] As discussed below, disputes over water have even been pointed to as important factors behind the Israeli-Palestinian conflict in the Middle East. On the other hand, some analyses suggest that the probability of military conflict is lower between countries facing water shortages.[26] It has also been suggested that in the case of international rivers, etc., if there are treaties and other systems regarding the management and allocation

17 O'Loughlin, J., Witmer, F.D.W., Linke, A.M., Laing, A., Gettelman, A., and Dudhia, J. (2012). "Climate variability and conflict risk in East Africa, 1990-2009." *Proceedings of the National Academy of Sciences of the United States of America*, 109: 18344-49.

18 Ghimire, R., and Ferreira, S. (2016). "Floods and armed conflict." *Environment and Development Economics*, 21: 23-52.

19 *Ibid*.

20 Eastin, J. (2018). "Hell and high water: Precipitation shocks and conflict violence in the Philippines." *Political Geography*, 63: 116-34.

21 Homer-Dixon, T.F. (2001). *Environment, Scarcity, and Violence*. Princeton: Princeton University Press.

22 Brochmann, M., and Gleditsch, N. P. (2012). "Shared rivers and conflict — a reconsideration." *Political Geography*, 31: 519-27.

23 Lomborg, B. (2001). *The Skeptical Environmentalist: Measuring the Real State of the World*. Cambridge: Cambridge University Press.

24 Barnett, J., and Adger, W.N. (2007). "Climate change, human security and violent conflict." *Political Geography*, 26: 639-55.

25 De Juan, A. (2015). "Long-term environmental change and geographical patterns of violence in Darfur, 2003-2005." *Political Geography*, 45: 22-33.

26 Devlin, C., and Hendrix, C.S. (2014). "Trends and triggers redux: Climate change, rainfall, and interstate conflict." *Politica Geography*, 43: 27-39.

of shared water resources, then water shortages will increase incentives for cooperation between the countries concerned.[27]

3. Indirect pathways that link climate change with conflict

Besides leading to conflict by direct pathways as discussed in the previous section, climate change can also do so indirectly by causing economic and social turmoil such as large-scale movements of people and increased food prices. This section reviews the findings of existing research on these kinds of indirect pathways linking climate change with conflict.

(1) *Climate migrants*

When problems due to climate change such as rising sea levels, changes in weather conditions, and shortages of water and food become more serious, many people may be forced to leave their homelands. The influx of a large number of "environmental immigrants" that have arisen in these ways will place a burden on societies that accept them, and this can lead to disputes with the existing inhabitants.[28] For example, immigrants and the existing inhabitants will compete for land, work, resources, medical care, education, and other social services. Furthermore, conflict can result if the influx of environmental immigrants disturbs the ethnic balance of the host region, increasing political tensions between ethnic groups.[29] In addition, when environmental immigrants gather at their own country's borders, troops may be deployed to close them, as in the actual situations described below.

Bangladesh,[30] Kenya,[31] and elsewhere already provide examples of the mechanisms where extreme weather gives rise to immigrants, and how the influx causes conflict in the host communities. In the early days of the Darfur conflict, people moved from villages with poor water resources and vegetation to ones where they were plentiful, leading to competition there over resources.[32] There are similar reports that in India, an increase in internally displaced people due to unsettled rain can easily cause rioting.[33] In an incident in 2021, some 9,000 Honduran immigrants gathered at the border of neighboring Guatemala, fleeing from the hardships caused by COVID-19 and hurricanes. In response, the Guatemalan government deployed nearly 2,000 police and soldiers along the border, who then reportedly used tear gas and truncheons to prevent the immigrants from entering the country.

However, whether environmental immigrants arising from climate change and extreme weather lead to conflict seems to depend significantly on other socio-economic factors, and no conclusions have been reached. One of the major reasons for the lack of definitive evidence linking climate change with migration and conflict is that the complex relationships between these factors have not been modeled properly. For example, most of the existing studies conduct analyses without distinguishing between extreme weather and natural disasters such as floods and droughts, assuming instead that they are equally capable of leading to conflict. However, migrations caused by disasters like floods that have a relatively short-term impact may be less likely to cause conflict than those caused by droughts, etc., due to extreme weather and climate change, which are comparatively long-term. This is because short-term

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27 E.g., Dinar, S., Katz, D., De Stefano, L., and Blankespoor, B. (2015). "Climate change, conflict, and cooperation: Global analysis of the effectiveness of international river treaties in addressing water variability." *Political Geography*, 45: 55-66.

28 Brzoska, M., and Fröhlich, C. (2015). "Climate change, migration and violent conflict: Vulnerabilities, pathways and adaptation strategies." *Migration and Development*, 5: 190-210.

29 Gaikwad, N., and Nellis, G. (2017). "The majority-minority divide in attitudes toward nternal migration: Evidence from Mumbai." *American Journal of Political Science*, 61: 456-72.

30 Petrova, K. (2021). "Natural hazards, internal migration and protests in Bangladesh." *Journal of Peace Research*, 58(1): 33-49.

31 Koubi, V., Nguyen, Q., Spilker, G., and Böhmelt, T. (2021). "Environmental migrants and social-movement participation." *Journal of Peace Research*, 58(1): 18-32.

32 De Juan, A. (2015). "Long-term environmental change and geographical patterns of violence in Darfur, 2003-2005." *Political Geography*, 45: 22-33.

33 Bhavnani, R.R., and Lacina, B. (2015). "The effects of weather-induced migration on Sons of the Soil riots in India." *World Politics*, 67: 760-94.

evacuees often return to their homelands when the situation settles down, and are less likely to compete with existing inhabitants for employment, education, etc. Also, in the event of a natural disaster, the international community and other parties may provide humanitarian assistance, alleviating the shortages of water, food, and other resources.

(2) *Reduced harvests and food and price crises*

Extreme weather and natural disasters can seriously affect harvests and livestock, leading to lower incomes for farmers and higher food prices. If they can no longer eat or get by, some people might do anything to make ends meet, even if it means resorting to violence. Economically speaking, the loss of income and economic opportunities will reduce the opportunity cost of taking part in revolts and riots, and increase the relative expected profit at the same time.[34] Therefore, decreased farmers' incomes and increased food prices due to extreme weather and natural disasters can influence the occurrence, duration, and intensity of conflict. In particular, for urban residents who cannot easily obtain alternative food, increased food prices can easily become an incentive to participate in rallies, protests, and riots.

For example, one report says that if extreme temperatures occur during the best seasons for farming rice in Indonesia[35] or growing corn in sub-Saharan Africa,[36] yields of these crops decrease and civil war becomes more likely. Similarly, another study that analyzed data on 46 African countries from 1997 to 2011 has found that extreme weather occurring during the growth seasons of major crops in the regions was more likely to lead to conflict than when it occurred in any other season.[37] An analysis of the Syrian Civil War has found that droughts during the growth season of major crops can easily trigger rioting.[38] It has also been reported that increased food prices due to extreme weather and natural disasters show a correlation with urban rioting in African countries,[39] and with social instability worldwide.[40]

(3) *Widening gaps*

Decreased crop yields, higher prices, and infrastructural damage caused by extreme weather and natural disasters can lead to recession and widen the gaps in the agricultural sector and in the economy as a whole. This can indirectly cause conflict. The concept of relative deprivation, the gap between expected and real life, is the key that links widening gaps with conflict. Widening gaps increase relative deprivation for many people and drive them to demand redistribution of wealth, even if it means participating in riots and conflict. In short, if extreme weather or natural disasters cause a severe economic recession and widening gaps, then rioting and conflict can ensue.[41]

There are actual examples of terrorism being committed against a background of environmental deterioration and widening gaps associated with climate change. For example, in the oil-producing Niger Delta region in southern Nigeria, an international terrorist organization called the "Movement for the Emancipation of the Niger Delta" (MEND) is calling for (among other things) fair distribution of oil income to the region, and is attacking petroleum-related facilities and kidnapping foreign nationals

34 Chassang, S., and Padró i Miquel, G. (2009). "Economic shocks and civil war." *Quarterly Journal of Political Science*, 4: 211-28.

35 Caruso, R., Petrarca, I., and Ricciuti, R. (2016). "Climate change, rice crops, and violence: Evidence from Indonesia." *Journal of Peace Research*, 53: 66-83.

36 Jun, T. (2017). "Temperature, maize yield, and civil conflicts in sub-Saharan Africa." *Climate Change*, 142: 183-97.

37 Harari, M., and La Ferrara, E. (2018). "Conflict, climate and cells: A disaggregated analysis." *Review of Economics and Statistics*, 100(4): 594-608.

38 Linke, A. M., and Ruether, B. (2021). "Weather, wheat, and war: Security implications of climate variability for conflict in Syria." *Journal of Peace Research*, 58(1): 114-131.

39 Raleigh, C., Choi, H.J., and Kniveton, D. (2015). "The devil is in the details: An investigation of the relationships between conflict, food price and climate across Africa." *Global Environmental Change*, 32: 187-99.

40 Bellemare, M.F. (2015). "Rising food prices, food price volatility, and social unrest." *American Journal of Agricultural Economics*, 97(1): 1-21.

41 Cederman, L.E., Gleditsch, K.S., and Buhaug, H. (2013). *Inequality, Grievances, and Civil War*. Cambridge: Cambridge University Press.

to pursue its demands.[42]

Similarly, the region around Lake Chad—which lies adjacent to the Sahara and straddles four countries (Nigeria, Chad, Niger, and Cameroon)—is a well-known, classic example of a place where conflict has been indirectly caused by water and food shortages, and the widening gaps that accompany them. Between 1963 and 2001, Lake Chad lost more than 90% of its area due to large-scale irrigation, overgrazing, and desertification as the population around it grew. Consequently, the region constantly suffered from serious shortages of water and food, and inhabitants who relied on the lake for farming, fishing, and grazing lost their livelihoods. The shortages of water and food associated with the drying up of Lake Chad have been identified as exacerbating the existing inequalities, poverty, and political instability in northern Nigeria in particular, leading to the rise of Boko Haram, an Islamic terrorist group formed in 2002. For many young people who cannot get a job, joining a terrorist organization is a way to improve their livelihoods.[43]

(4) *Geopolitical changes*

Another important pathway by which climate change can indirectly lead to conflict is geopolitical changes. These can be brought about by climate change itself, or by measures to counter it. For example, as sea ice in the Arctic Circle melts, geopolitical tensions between countries like Russia, China, the United States, and Canada may increase due to competition over the region's marine resources and sea routes. Furthermore, there is no denying the possibility that if these major countries deepen their confrontations over rights and interests in the Arctic Circle, the tensions could spark armed intervention or proxy wars in other parts of the world.

In particular, reduced dependence on fossil fuels and the spread of renewable energy is likely to have a significant impact on the world's geopolitical power relationships.[44] Because reserves of oil, natural gas, and coal are unevenly distributed geographically, the countries that produce them and the routes used to transport them have enjoyed a high profile over the past two centuries. On the other hand, renewable energy could potentially exist almost anywhere in the world, albeit in different forms and amounts. Therefore, as the shift from fossil fuels to renewable energy gains momentum, the conventional geopolitical power relationships scenario will change, and international relations will be restructured.

If major suppliers of fossil fuels fail to reorganize their economies in readiness for energy transition, they will suffer a decline in economic and diplomatic power. Countries that are at particular danger are ones that derive a high percentage of their GDP from fossil fuel exports, have a low per capita GDP, and lack any extra financial capacity. Examples of this group include Libya, Angola, the Republic of Congo, Timor-Leste, and South Sudan. One of the major geopolitical risks posed by energy transition is that it could destabilize these oil-producing countries.

However, the geopolitical importance of oil-producing countries in the Middle East is unlikely to dwindle immediately. Demand for oil will remain for some time, with uses including fuel for aircrafts and ships and making plastics, etc., in the chemical industry. Consequently, global oil production is expected to still be about 24 million barrels per day even in 2050. (It is 90 million barrels per day at present.) New oil fields will become less likely to be developed to meet this limited demand, and if existing oil fields stop producing—with the costlier areas doing so first—then the oil supply will become concentrated among a small number of low-cost producers. As a result, the share of the global supply accounted for by the Organization of the Petroleum Exporting Countries (OPEC)—which mainly consists of Middle East countries—is expected to increase from about 37% in recent years to 52% in

42 Ubhenin, O.E. (2012) "Climate Change and Violent Conflicts in Nigeria: Human Needs and Relative Deprivation Theories." in: Scheffran J., Brzoska M., Brauch H., Link P., Schilling J. (eds.), *Climate Change, Human Security and Violent Conflict.* Berlin: Springer.

43 Rudincová, K. (2017). "Desiccation of Lake Chad as a cause of security instability in the Sahel region." *GeoScape*, 11(2): 112-120.

44 Van de Graaf, Thijs et al. 2019. "A New World: The Geopolitics of the Energy Transformation." Abu Dhabi. International Renewable Energy Agency.

2050.[45]

On the other hand, if renewable energy becomes more prevalent and related technologies such as solar panels, wind turbines, electric vehicles, and energy storage become widely used, demand for the various minerals and metals needed to manufacture them will increase. Logically, regions with large reserves of those minerals ought to be able to benefit from energy transition. Central and South America have an abundance of underground resources such as copper, silver, lithium, nickel, manganese, and zinc. Africa is blessed with platinum, manganese, and chromium. In the Asia-Pacific region, China has a wealth of metal and rare resources. Moreover, if mining technology progresses enough for undersea mineral resources to be used economically, disputes over those will also increase.

In addition, countries capable of gaining an advantage through new renewable energy technologies may be able to increase their influence in the international community. China is a major threat in this regard. Currently, it boasts one of the world's largest business scales in terms of manufacturing, exporting, and installing solar panels, wind turbines, batteries, and electric vehicles. In view of China's vast, growing market, it is undeniable that Chinese companies might catch up with and overtake American, European, and Japanese ones in many sectors in the future, among them automobiles, machinery, and energy.

4. Vulnerability and adaptability of countries and regions

Climate change is said to be a threat multiplier because it can amplify threats to peace and stability that societies already face. However, the extent to which it increases the risk of conflict, whether directly or indirectly, can vary depending on the various social conditions that the country or region faces. This section shows how governance and the level of economic development are factors that affect countries' and regions' vulnerability and adaptability to these climate change threats.

(1) *Level of economic development*

Climate change is more likely to trigger conflict among people who are vulnerable to the impacts of extreme weather and natural disasters, or in societies where confrontation already exists. In particular, countries are more susceptible to climate change if they have a high poverty rate and/or are highly dependent on agriculture and other industries that are easily affected by natural conditions. As a result, they will also have a higher risk of conflict caused by climate change.[46] It has also been stated that developing countries whose cities lack the capacity to absorb any additional population because of undeveloped infrastructure and social services are more likely to experience conflict when climate change causes an influx of people from rural to urban areas.[47]

Of course, developing countries are not the only ones facing risks from climate change. On the contrary: it should be noted that reducing the use of fossil fuels—a measure to address the urgent issue of countering climate change—will require economically and socially developed rich countries to spend more on transition.[48] If developed countries fail to reorganize their economies in accommodating the energy structure transition, they could also sow seeds of rioting and conflict in the form of economic stagnation, widening gaps, geopolitical changes, and so on.

45 IEA. (2021). *Net Zero by 2050*. Paris: IEA.

46 Ide, T., Schilling, J., Link, J.S.A., Scheffran, J., Ngaruiya, G., and Weinzierl, T. (2014). "On exposure, vulnerability and violence: Spatial distribution of risk factors for climate change and violent conflict across Kenya and Uganda." *Political Geography*, 43: 68-81.

47 Reuveny, R. (2007). "Climate change-induced migration and violent conflict." *Political Geography*, 26: 656-73.

48 Ricke, K., Drouet, L., Caldeira, K., and Tavoni, M. (2018). "Country-level social cost of carbon." *Nature Climate Change*, 8(10), 895-900.

(2) *Governance*

Even if a country or region has latent geographic and economic vulnerabilities, if it also has a political system and administrative capability that can adequately deal with extreme weather and natural disasters, then these vulnerabilities will not necessarily become threats to peace and stability. For example, in a country or region with high administrative capability and little corruption, extreme weather and natural disasters act as incentives for political leaders to gain political support by providing citizens with the economic assistance, infrastructural development, and social services they need.[49] This means that extreme weather and natural disasters are unlikely to develop into rioting and conflict in these countries and regions.

Conversely, in countries and regions where the political system is ineffective or where essential administrative services for citizens' lives are not adequately provided, there is a high risk that climate change will lead to conflict. For example, it has been suggested that in non-democratic countries, economic crises associated with extreme weather and natural disasters are likely to lead to civil war.[50] In addition, extreme weather and natural disasters can cause damage to public infrastructure and reduce tax revenues in the aftermath of recession, consequently reducing the government's ability to maintain public safety and suppress rioting and civil war. It has been said that extreme weather and natural disasters can prolong civil wars as a result.[51]

5. Future climate security risks

Whether it be a civil war within a country or a war between countries, armed conflicts are significantly influenced by the international relations and domestic situations faced by the countries concerned. As we have seen, climate change will likely have a major impact on both domestic affairs and international relations for many countries.[52] This section, therefore, predicts the future climate security risks that each region of the world might face, doing so in light of the factors that link climate change with conflict as described in the previous sections.

49 Bueno de Mesquita, B., and Smith, A. (2017). "Political succession: A model of coups, revolution, purges, and everyday politics." *Journal of Conflict Resolution*, 61: 707-43.

50 Koubi, V., Bernauer, T., Kalbhenn, A., and Spilker, G. (2012). "Climate variability, economic growth, and conflict." *Journal of Peace Research*, 49: 113-27.

51 Ghimire, R., and Ferreira, S. (2016). "Floods and armed conflict." *Environment and Development Economics*, 21: 23-52.

52 Guy, K. et al. 2020. "A Security Threat Assessment of Global Climate Change: How Likely Warming Scenarios Indicate a Catastrophic Security Future." Washington, DC: The Center for Climate and Security, an institute of the Council on Strategic Risks.

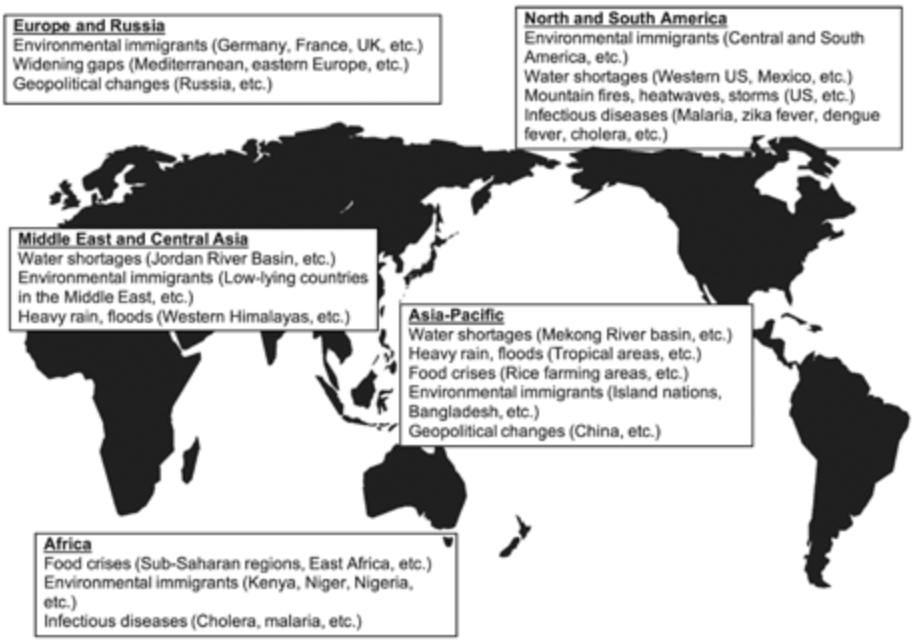

Figure 2 Major climate security risks in the various regions of the world
Source: Created by the author

(1) *Asia-Pacific*

The Asia-Pacific region (which includes East Asia, Southeast Asia, South Asia, and Oceania) is heavily affected by climate change, with examples including water shortages, floods, storms, reduced food production, and rising sea levels.[53] Particularly in Asia, demand for water and food has been growing due to increasing populations, urbanization, and industrialization, and vulnerability to water and food shortages associated with climate change is increasing.[54]

First of all, water shortages could become a source of conflict in this region. In particular, glaciers in the Hindu Kush Himalayan region are an important source of fresh water for people in mainland China and the Indian subcontinent, but they are rapidly being lost to global warming over the past few decades. Even moderate estimates are projecting that if glaciers keep melting, a third of those in this region will disappear during this century.[55] If that happens, the water flow in the Yellow River, Yangtze River, Mekong River, Indus River, and Ganges River will decrease. This will have a serious impact on an extensive region stretching from China to India. In particular, if the water flow in international rivers such as the Mekong River, Indus River, and Ganges River decreases, it could lead to conflict between countries upstream and downstream of each other along them. In fact, the construction of dams and adjustment of the water flow by China in the upper Mekong is already causing friction with the countries in downstream regions.[56]

Secondly, increased incidence of heavy rains and floods could cause social instability in the Asia-Pacific tropical region. As temperatures rise due to global warming, there will be increased evaporation from the sea surface, leading to more water vapor in the air. It is believed that this effect will

53 Hijioka, Y., Lin, E. Pereira, J.J. Corlett, R.T. Cui, X. Insarov, G.E. Lasco, R.D. Lindgren, E. and Surjan, A. (2014). "Asia." *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge: Cambridge University Press, 1327-1370.

54 *Ibid.*

55 National Research Council. (2012). *Himalayan Glaciers: Climate Change, Water Resources, and Water Security*. Washington, DC: The National Academies Press.

56 Qin, L. (2017). "Source of Mekong, Yellow and Yangtze rivers drying up." *China Dialogue*.

make India and East Asia more prone to heavy rain in the tropical monsoon region.[57] Also, if climate change intensifies, it will affect the paths and intensities of typhoons, causing floods in areas that rarely suffered any typhoon damage before.[58] As described above, these effects are projected to increase not only the number of areas in the Asia-Pacific region facing constant water shortages, but also the number exposed to serious damage from heavy rain and storms due to global warming.

Thirdly, changes in the average temperature and rainfall patterns associated with climate change can threaten the stability of the region through pathways such as reduced food production and higher food prices. In Asia, 81% of the population still depends on agriculture for their livelihood.[59] In particular, for countries whose staple food or major crop is rice, instability in rice farming caused by having warmer weather, heavy rain, and very little rain can be a major factor that leads to social turmoil. Despite once boasting the world's largest export volume of rice, Thailand has been suffering a significant drop in rice production since 2019 due to droughts. In the Asia-Pacific region, many countries are reliant on fisheries and marine tourism resources for food and income, but global warming and ocean acidification will have a critical impact on coral reefs and fishery resources. It has been reported that in East Asian sea areas, global warming has already decreased fishing productivity by 15% to 35%.[60] If rising sea temperatures cause fish to change to their habitats to cooler waters, that could also affect confrontations in existing regions of conflict such as the South and East China Seas, or create new confrontations over territorial waters and exclusive economic zones in other regions.

Fourthly, the emergence of environmental immigrants is also highly likely to threaten regional stability in the Asia-Pacific region. This is a region with several countries where a large number of people or a large proportion of the population are facing having to leave their homes due to rising sea levels and other impacts of climate change. For example, in low-lying countries whose land is all only a few meters above sea level (such as island nations in the Pacific and Indian Oceans), most of the population is at risk from rising sea levels. In particular, in the Maldives, Marshall Islands, and Kiribati, this is predicted to affect more than 40% of the population.[61] In terms of totals, climate change is threatening 107 million people in China, 53 million in Bangladesh, 44 million in India, 38 million in Vietnam, and 26 million in Indonesia.[62] In particular, in Bangladesh, up to 20 million people might move to other parts of the country or to other countries by 2050 due to rising sea levels and floods, and these environmental immigrants could become a source of conflict within Bangladesh itself or in India and other neighboring countries.[63]

Finally, attention should be paid to the impacts of climate change on the governance and geopolitical balance in countries in the Asia-Pacific region. The trends in China are of particular concern in this regard. In recent years, China has been trying to forcibly change the status quo in surrounding regions and expand its influence on the Eurasian continent as a whole, under the banner of the Belt and Road Initiative. There are concerns that as the impacts of extreme weather, water shortages, and decreased

57 Hijioka, Y., Lin, E. Pereira, J.J. Corlett, R.T. Cui, X. Insarov, G.E. Lasco, R.D. Lindgren, E. and Surjan, A. (2014). "Asia." *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge: Cambridge University Press, 1327-1370.

58 Altman J., Ukhvatkina O. N., Omelko A. M., Macek M., Plener T., Pejcha V., Cerny T., Petrik P., Srutek M., Song J. S., Zhmerenetsky A. A., Vozmishcheva A. S., Krestov P. V., Petrenko T. Y., Treydte K., Dolezal J.. (2018). "Poleward migration of the destructive effects of tropical cyclones during the 20th century." *Proceedings of The National Academy of Sciences of The United States of America*, 115: 11543-48; Hijioka, Y., Lin E., Pereira J. J., Corlett R.T., Cui X., Insarov G.E., Lasco R.D., Lindgren E., and Surjan A.. (2014). "Asia." *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge: Cambridge University Press, 1327-1370.

59 Hijioka, Y., Lin, E. Pereira, J.J. Corlett, R.T. Cui, X. Insarov, G.E. Lasco, R.D. Lindgren, E. and Surjan, A. (2014). "Asia." *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge: Cambridge University Press, 1327-1370.

60 Free, C., Thorson, J.T., Pinsky M.L., Oken K.L., Wiedenmann, J., and Jensen, O.P. (2019). "Impacts of historical warming on marine fisheries production." *Science*, 363(6430).

61 Smith, T.G., Krishnan, N., and Busby, J.W. (2016). *Population-Based Metrics of Subnational Climate Exposure*. Austin: Robert Strauss Center for International Security and Law.

62 *Ibid.*

63 Rigaud, KK., de Sherbinin, A., Jones, B., Bergmann, J., Clement, V., Ober, K., Schewe, J., Adamo, S., McCusker, B., Heuser, S., and Midgley, A. (2018). *Groundswell: Preparing for Internal Climate Migration*. Washington, DC: World Bank.

production from agriculture and fishing become more serious, China might bolster its moves in this regard even further. Moreover, it is predicted that if the value of land, water, and rare resources in places like Yunnan Province and the Xinjiang Uygur Autonomous Region increases even more due to climate change, then oppression of ethnic minorities in these regions by Han Chinese will intensify.

(2) *Africa*

Africa is probably the region facing the world's most serious climate security risks. The Intergovernmental Panel on Climate Change predicts that Africa will suffer greater temperature rises than the global average, and face threats from serious water and food shortages, floods, droughts, environmental immigrants, and infectious diseases.[64] Furthermore, Africa is characterized by a history of underdevelopment and conflict, and many countries there have had governance issues and ethnic conflicts from the beginning. For these reasons, it is feared that together with the pressure of a rapidly increasing population, the direct and indirect effects of climate change could act as an archetypal threat multiplier, amplifying the existing risks and tensions in Africa.

Firstly, it is thought that climate change, and particularly global warming, will lead to serious food shortages and price rises there.[65] In semi-arid areas of the continent, global warming will likely cause decreased soil moisture content, and this may lead to a loss of cultivatable land and a decrease in food production. Given that about 20% of all African people already suffer from malnutrition, the impact of decreased food production will be severe. It is predicted that the effects will be particularly significant in sub-Saharan and East Africa.[66]

Secondly, if land continues to become arid, environmental immigrants could increase, and this could lead to conflict. For example, conflict over land between nomads and farmers has been deepening in Nigeria in recent years.[67] If climate change progresses, large numbers of nomads might invade farmers' land in search of new economic opportunities and places to raise livestock. If that happens, conflict over limited land and water may grow more and more intense.

In particular, if the effects of climate change cause large numbers of people to flock to densely populated cities where the social infrastructure was weak to begin with, then the likelihood of severe rioting and conflict will increase. In fact, migration from rural to urban areas has increased in Kenya and Niger due to recent droughts.[68] Many cities in Africa cannot cope with their rapidly growing populations, and people are becoming more and more dissatisfied that their food, water, employment, and hygiene needs cannot be met. This situation could threaten the safety of the cities by encouraging extremist groups seeking to usurp the government's authority, or by intensifying tensions between ethnic groups. This is particularly true of places where conflicts have broken out regularly in the past. The rise of the above-mentioned Islamic terrorist group Boko Haram is one example of this.

From the perspective of human security, the danger that climate change will increase the risk of the infectious diseases that plague African countries also cannot be ignored. If the climate becomes warmer, precipitation increases, and floods become more frequent, then combined with malnutrition and other sanitation problems, these effects may cause known or unknown infectious diseases to spread. For example, cholera is currently spreading due to high temperatures and increased heavy rain, particularly in countries with poor sanitation infrastructure. It is feared that global warming will make the situation

64 Niang, I., Ruppel O.C., Abdrabo M.A., Essel A., Lennard C., Padgham J., and Urquhart P.. (2014). "Africa." *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge: Cambridge University Press. 1199-1265.

65 *Ibid.*

66 Food and Agricultural Organization (FAO). (2019). *The State of Food Security and Nutrition in the World 2019: Safeguarding against economic slowdowns and downturns*. Rome: FAO.

67 International Crisis Group. (2018). *Stopping Nigeria's Spiraling Farmer-Herder Violence*. Brussels, Belgium. International Crisis Group.

68 Hassan, O.M., and Tularam, G.A. (2018). "The Effects of Climate Change on Rural-Urban Migration in Sub-Saharan Africa (SSA)." *The Cases of Democratic Republic of Congo, Kenya and Niger*. London: Intech Open.

even worse in the future.[69] In East Africa, the habitats of organisms like mosquitoes that transmit pathogens are predicted to expand due to global warming, increasing the incidence of malaria and other infectious diseases.[70]

(3) *Middle East and Central Asia*

The climate security threat of greatest concern in the Middle East and Central Asia is growing water shortages. Many countries in the Middle East and Central Asia have poor water resources in the first place. In addition, predictions suggest that in most of this region, global warming will decrease precipitation and raise the average temperature by at least 3 degrees.[71] Furthermore, some of the lands rely for their water resources on international rivers that run across borders. Examples include Turkey, Syria, Iran, and Iraq along the Tigris-Euphrates River, and Jordan, the Golan Heights, Israel, and Palestine along the River Jordan. These lands are located at the center of conflict hot spots in the region, and there is a danger that decreased water resources will give rise to new tensions. In addition, the food crises that accompany water shortages could become factors that increase the tensions in this region. In Syria and Egypt, for example, food shortages and price rises due to drought have been contributing to social instability in recent years.[72]

In fact, disputes over water resources have been important factors in conflicts in the Middle East before. Conflict between Syria and Israel over the water of the River Jordan is widely known to have been a factor behind the Six-Day War in 1967. Israel's long military occupations of the Golan Heights and Gaza are also said to be partly due to the underground water resources in those lands. If climate change accelerates water shortages, then the conflict between Israel and Palestine over water resources can be expected to intensify, and tensions between neighboring Jordan and Egypt could increase as well.[73]

Environmental immigrants are also one of the major climate security risks that the Middle East and Central Asia face. In the future, worsening droughts may turn farmers and urban populations into refugees—the former because they can no longer farm, and the latter because they can no longer get food. These increases in refugees could become a factor toward political instability. Jordan is still accepting hundreds of thousands of Syrian refugees, and tensions over water, food, and environmental resources are mounting under the pressure of an inflating population.[74] In terms of the emergence of environmental immigrants, there are concerns that low-lying countries such as Egypt, Kuwait, Qatar, Bahrain, and the United Arab Emirates will be affected by rising sea levels. Low-lying cities such as Alexandria in Egypt are already starting to get flooded, and if the problem is left unsolved, millions of people may be forced to evacuate.[75]

In Central Asia, while increasing temperatures may benefit agricultural production, flooding caused by the accelerated melting of glaciers is likely to be a serious threat.[76] The historic flooding that Pakistan experienced in 2010 claimed about 2,000 victims and affected the lives of about 20 million

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69 Luque Fernández, M.A., Bauernfein, A., Jiménez, J.D., Gil, C.L., El Omeiria, N., and Guibert, D.H. (2009). "Influence of temperature and rainfall on the evolution of cholera epidemics in Lusaka, Zambia, 2003-2006: Analysis of a time series." *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 103(2): 137-43.

70 Ermet, V., Fink, A., Morse, A., and Paeth H. (2012). "The Impact of Regional Climate Change on Malaria Risk due to Greenhouse Forcing and Land-Use Changes in Tropical Africa." *Environmental Health Perspectives*, 120(1): 77-84.

71 Waha, K., Krummenauer, L., Adams, S., Aich, V., Baarsch, F., Coumou, D., Fader, M., Hoff, H., Jobbins, G., Marcus, R., Mengel, M., Otto, I.M., Perrette, M., Rocha, M., Robinson, A., and Schleussner, C. (2017). "Climate change impacts in the Middle East and Northern Africa (MENA) region and their implications for vulnerable population groups." *Regional Environmental Change*, 17: 1623-38.

72 Werrell, C., Femia, F., and Sternberg, T. (2015). "Did We See It Coming?: State Fragility, Climate Vulnerability, and the Uprisings in Syria and Egypt." *SAIS Review of International Affairs*, 35(1): 29-46.

73 Feitelson, E., Tamimi, A., and Rosenthal, G. (2012). "Climate change and security in the Israeli-Palestinian context." *Journal of Peace Research*, 49(1): 241-257.

74 Alshoubaki, W., and Harris, M. (2018). "The impact of Syrian refugees on Jordan: A framework for analysis." *Journal of International Studies*, 11(2): 154-179.

75 World Bank. (2013). *Adaptation to Climate Change in the Middle East and North Africa Region*. Washington, DC: World Bank.

76 Hijioka, Y., Lin, E. Pereira, J.J. Corlett, R.T. Cui, X. Insarov, G.E. Lasco, R.D. Lindgren, E. and Surjan, A. (2014). "Asia." *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge: Cambridge University Press, 1327-1370.

people. If climate change progresses, flooding like this could become more frequent in the western Himalayas.[77]

Moreover, the Persian Gulf faces the threat of unprecedented cyclones due to rising temperatures over the Indian Ocean. For example, storm surges of more than 4 meters could strike coastal cities like Dubai, potentially destroying coastal infrastructure not designed to withstand them.[78] Important places related to security in the region could also face similar threats. Examples include coastal military bases along the Straits of Hormuz.

(4) *North and South America*

North and South America are also exposed to climate security risks. For example, mountain fires, extreme heatwaves, and storms in North America and water and food shortages and infectious diseases in South America could threaten the peace and security of society in their respective regions. In addition, with violence and crime syndicates making quite a few countries in Central America and the Caribbean unstable in the first place, climate change could act as a complex threat multiplier.

In the United States, mountain fires, extreme heatwaves, and storms are becoming more frequent. They caused $400 billion worth of damage over the five years from 2014 to 2018.[79] There are concerns that the damage will become even more serious in the future as climate change progresses. Central America is also one of the world's most vulnerable regions in terms of the risks of extreme weather, and estimates suggest that by 2030, climate change will cost its countries the equivalent of 14.2% of their GDP every year.[80]

Water shortages are a major climate security risk that both North and South America face. North America is already facing water shortages due to the combination of global warming, dry weather, and decreased precipitation. In particular, in arid areas of the western United States, Canada, and Mexico, there are concerns that worsening water shortages and droughts will have an impact on growing crops.[81] Furthermore, areas along the border between the United States and Mexico are facing particularly severe dry weather, and this could lead to further destabilization in the future.

In South America, melting of the Andean glaciers that straddle Venezuela, Colombia, Ecuador, Bolivia, and Peru is a source of major concern. In particular, more than half of the glaciers in Bolivia and Peru have already been lost in the past half century, and it is suggested that the Andean glaciers will disappear completely in the next few decades.[82] This melting of glaciers will increase water levels in downstream regions in the initial stages, causing floods in the spring. However, the water flow will decrease as the glaciers shrink, and water shortages will ensue. In particular, in Peru and northeastern Brazil, the melting of the glaciers could worsen droughts.[83]

Environmental immigrants are also likely to increase tensions between countries in the region. It is expected that as climate change worsens droughts, extreme heatwaves, and water and food shortages, vast numbers of immigrants from Latin America will try to cross Mexico's southern borders, and even those of the United States. If rising sea temperatures and ocean acidification continue, coastal inhabitants whose livelihoods depend on fishery resources will also be forced to move in search of new economic opportunities. There is a risk that such an increase in environmental immigrants could further

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77 Sathar, Z.A., Khalil, M., Hussain, S., Sadiq, M., and Khan, K. (2018). *Climate Change, Resilience, and Population Dynamics in Pakistan: A Case Study of the 2010 Floods in Mianwali District*. New York: Population Council.

78 Lin, N., and Emanuel, K. (2016). "Grey swan tropical cyclones." *Nature Climate Change*, 6: 106-111.

79 US Global Change Research Program (USGCRP). (2018). *Climate Science Special Report: Fourth National Climate Assessment, Volume II*. Washington, DC: US Global Change Research Program.

80 ECLAC, COSEFIN, SIECA, SICA, UKAID, and DANIDA. (2015). *Climate Change in Central America: Potential Impacts and Public Policy Options*. Mexico City: ECLAC.

81 Seager, R., Ting M., Held I., Kushnir Y., Lu J., Vecchi G., Huang H., Harnik N., Leetmaa A., Lau M., Li C., Velez J., and Naik N.. (2007). "Model projections of an imminent transition to a more arid climate in southwestern North America." *Science*, 316(5828): 1181-1184; Seager, R., Tzanova A., and Nakamura J.. (2009). "Drought in the southeastern United States: Causes, variability over the last millennium, and the potential for future hydroclimate change." *Journal of Climate*, 22(19): 5021-45.

82 Kornmann, C. (2009). "Retreat of Andean Glaciers Foretells Global Water Woes." *Yale Environment 360*.

83 *Ibid.*

heighten tensions in border regions and make the host communities in North and South America more unstable. In fact, the police and military are already being deployed to stop undocumented immigrants at borders in this region.

The spread of infectious diseases is also a major threat to North and South America. Temperature increases and inundation due to floods increase the risk of waterborne diseases and infectious diseases spread by vectors. Diseases like malaria, zika fever, dengue fever, and yellow fever could spread over wider areas if their vectors' habitats expand due to global warming.[84] There are also concerns that if floods follow heavy rain and storms more frequently, then cholera and other waterborne diseases could spread to other countries. This is already happening in countries like Peru, Ecuador, Colombia, Venezuela, Haiti, and the Dominican Republic.

(5) *Europe and Russia*

Europe and Russia are also not free from climate security risks. This region has many comparatively developed countries that are highly capable of responding to climate change. However, countries in Europe may also face threats of rioting and conflict through the pressure of environmental immigrants, widening gaps, geopolitical changes, and other issues caused by climate change.

An increase in immigrants due to climate change could be the biggest climate security risk for comparatively rich European countries like Germany, the United Kingdom, and France. In southern Europe and around the Mediterranean, increasing temperatures could lead to prolonged droughts, affecting food production, etc.[85] This could increase immigration to other parts of Europe. In addition, the European continent could suffer an average sea level rise of 0.5 m by 2050, forcing people in low-lying areas like the Netherlands to move elsewhere.[86] Moreover, the migration pressure on Europe from the adjacent Middle East and North Africa and from sub-Saharan Africa is also expected to increase. These increases in immigrants from both inside and outside Europe could further amplify the divides that are already emerging between or within European countries.

There are also concerns that in Europe, economic disparities widened by climate change will lead to violence and rioting. Increasing temperatures and changes in rainfall patterns may help increase agricultural productivity in northern Europe, but in southern Europe, they are expected to have serious impacts on food production.[87] Forested areas in southern and eastern Europe could see more frequent mountain fires and droughts. This could damage the forestry sector. These economic impacts due to climate change will pose an intensive threat to the sectors and people that are particularly vulnerable to them. Widening economic disparities caused by them could even be enough incentive for people with nothing to hope for to resort to rioting or conflict to demand the redistribution of wealth. In particular, around the Mediterranean coast and in eastern Europe, economic growth is stagnating due to aging populations, and the unemployment rate among young people continues to rise. As climate change progresses, economic disparities may spread across all of Europe, creating hotbeds of rioting and conflict.

These increases in immigrants and widening disparities caused by climate change could act as significant threat multipliers in some of the European countries where political divides and tensions are already escalating. In some countries, sentiments like patriotism, ethnic nationalism, and anti-immigration are already polarizing society and causing political instability. Governments sometimes also respond to this political and social instability in anti-democratic ways. For example, political leaders in

84 Rodriguez-Morales, A., Echezuria, L., and Risquez, A. (2010). "Impact of Climate Change on Health and Disease in Latin America." *Climate Change and Variability*. DOI:10.5772/9822.

85 Kovats, R.S., Valentini R., Bouwer L.M., Georgopoulou E., Jacob D., Martin E., Rounsevell M., and Soussana J.F., (2014). "Europe." *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge: Cambridge University Press, 1267-1326.

86 *Ibid.*

87 Bindi, M., and Olesen, J.E. (2011). "The responses of agriculture in Europe to climate change." *Regional Environmental Change*, 11(1): 151-58.

Hungary, Poland, and Turkey are cracking down on objections and otherwise limiting democratic freedom.[88] Increasing immigration and widening disparities may further aggravate this political turmoil in Europe.

Geopolitical changes are also a serious climate security risk that Europe could face. The trends in Russia are of particular concern in this regard. Russia is an exporter of fossil fuels such as petroleum and natural gas. However, it may lose its important export demand as the world continues to shift to renewable energy. It is also the world's largest exporter of wheat at present, but is predicted to suffer an average economic loss of over $3 billion per year by 2050 due to decreased production caused by global warming and droughts.[89] Russia is still threatening the stability of Europe, for example, by intervening in the Crimean crisis in the Russo-Ukrainian War in 2014, making approaches in the Balkans, and interfering in European elections. All of this is happening against a backdrop of oil price stagnation, economic sanctions, droughts, and other economic travails. Some security experts fear that as climate change disrupts Russia's economy and its position as a major geopolitical power becomes more insecure, this kind of aggression toward its neighbors will become more manifest.[90]

(6) *The Arctic Circle*

The Arctic Circle looks set to become a focus of global security. In this case, the reason will be new availability of resources and economic opportunities due to climate change, rather than scarcity of them.

Global warming in the Arctic is progressing twice as fast as in other regions of the world. The predictions are that the Arctic will start seeing iceless summers within the next ten years, and that sea ice in the region will completely disappear during summer by the middle of this century.[91] This will open up new sea routes and resource mining opportunities there. Countries might also use the boosted commercial activity in the Arctic as an excuse to permanently station naval forces and coastguards there on the pretext of search and rescue or crushing ice.

In this way, the United States, China, Russia and other countries adjacent to the Arctic could end up competing for newly available resources and sea routes as sea ice there melts. This could increase tensions between them.

6. Conclusion

This chapter has looked at the relationships between climate change and conflict. Existing studies based on cases from the past have yet to fully understand how and under what conditions climate change can lead to conflict. Climate change, natural disasters, and extreme weather are thought to have had direct or indirect impacts on many conflicts and riots up to now, as seen in Sections 2 and 3. However, as seen in Section 4, each conflict arises as a result of various case-by-case determinants acting in complex ways through different mechanisms, so climate change cannot be the single factor. The difficulty of separating the effects of climate change from those of the many other explanatory variables when analyzing cases can lead to inaccurate causal inferences. This analytical difficulty is likely to be one reason that there are both affirmatory and negatory theories regarding the correlation between climate change and conflict.

If the climate change humans will face in the next few decades is like none we have ever experi-

88 Brandt, C., Linzer, I., O'Toole, S., Puddington, A., Repucci, S., Roylance, T., Schenkkan, N., Shahbaz, A., Slipowitz, A., and Watson, C. (2019). *Freedom in the World 2019: Democracy in Retreat*. Washington, DC: Freedom House.

89 Safonov, G., and Safonova, Y. (2013). *Economic Analysis on the Impact of Climate Change on Agriculture in Russia: National and Regional Aspects*. Nairobi: Oxfam.

90 National Intelligence Council. (2017).

91 US Global Change Research Program (USGCRP). (2017). *Climate Science Special Report: Fourth National Climate Assessment, Volume I*. Washington, DC: US Global Change Research Program.

enced in all our history, then it may be impossible to accurately estimate from past history and experience the risks of conflict and rioting that could ensue. It would not be unusual for people in many developed countries (including Japan) to regard conflict and rioting caused by climate change as other people's problems—and things they will probably never experience themselves.

However, one thing we can say is that, as discussed in Section 5, every region of the world is very likely to face some kinds of climate security risks—or rather, complex risks—in the future. Of course, the extent and fields in which the effects of climate change are felt will vary greatly depending on the country and region, as will the vulnerability to and capability of responding to them. However, given that climate change could threaten the peace and stability of society as a threat multiplier and its effects could be irreversible once they gain momentum, all the nations of the world should immediately start working to avoid the riots and conflicts it could cause. And of course, Japan should be no exception.

Climate Security in Coastal Areas and the Issue of Migration

Miko Maekawa

1. Introduction

This chapter will examine how climate security relates to issues currently emerging in coastal areas as a result of global warming, with a particular focus on people forced to migrate as a result of climate change. Humans have lived through history by repeatedly migrating in the past. Through that process, modern humans chose and settled in lands that would suit their own ways of life. Why do people migrate? Various factors have begun to influence people's decisions in recent years. Among these are intensifying disasters, droughts, changes in agricultural patterns, and rising sea levels due to climate change.[1] This is an important issue that also involves human dignity. In this chapter, the issue of migration will be considered from the viewpoint of climate security.

2. Relation between climate change/variation and migration issues

The Special Report on the Ocean and Cryosphere in a Changing Climate (SROCC) published by the Intergovernmental Panel on Climate Change (IPCC) in 2019 examined the melting of ice sheets, disappearance of glaciers, and thermal expansion of the oceans in Greenland and the Antarctic due to climate change. It projected that these will cause the sea level to rise by up to 1.10 m by 2100 compared to what it was in 2000.[2] In atoll countries with average elevations as low as 2 m, it will be difficult to take effective adaptation measures against the projected sea level rise. Consequently, there are concerns that many of these countries' citizens will be forced to move abroad as so-called "climate refugees." What policies and action plans should be implemented by the countries of origin, transit countries, and host countries and communities in order for the migrants to settle and live in their destinations abroad? How can the migrants' human rights and dignity be ensured? What legislative systems and measures should be put in place both domestically and internationally to achieve this? These are major questions the international community has to address.

The motives and circumstances behind why people migrate are probably complex. So, we need to consider therefore, what analytical framework should be used to examine situations where the impact of climate change have forced people to migrate from where they were living, as well as those cases in which they voluntarily choose to move. What analytical framework should be used to examine the situations where the impacts of climate change have forced people to migrate from where they were living, or in cases people voluntarily choose to move? As discussed in Section 1 of Chapter 3, nation-

1 In this chapter, we use the term "climate variation" to refer to natural phenomena such as El Niño that change the climate periodically or irregularly, and "climate change" to refer to so-called man-made changes in climate since the Industrial Revolution.

2 The Ocean Policy Research Institute of the Sasakawa Peace Foundation (2019) *[Participation Report] Intergovernmental Panel on Climate Change (IPCC) Adopts "Special Report on the Ocean and Cryosphere in a Changing Climate and Ice Regions" (SROCC)* https://www spf.org/opri/news/20190926.html (accessed on 26 September 2019).

al security refers to a country's systems to protect itself from particular threats. Since the 1980s, the world has started to recognize that global environmental issues such as climate change, depletion of the ozone layer, and acid rain are direct and indirect threats to nations. Accordingly, the trend toward analyzing them within the framework of security has rapidly gained pace. This trend has given rise to new concepts such as environmental security, environment and security, and ecological security. In the section previously mentioned, the types of environmental and climate security are classified into five broad categories: (1) the idea that global environmental issues should be considered as new threats, (2) the view that global environmental issues are a part of human security, (3) an approach from the perspective that global environmental issues are causing conflicts, (4) damage to military facilities caused by climate change, and (5) studies on the relationship between ecosystems and security. The matters most closely related to the climate-induced migration issues covered in this chapter are the idea that global environmental issues should be considered new "threats," and the view that they are a part of human security. Also, since there is a risk that unexpected migration will lead to friction and conflict within regions, we cannot rule out the possibility that the impact of climate change is an underlying cause of conflict. Hence, this chapter will mainly focus on three of the above perspectives to analyze climate change and migration issues.

3. Impacts of climate change

As mentioned above, the SROCC report released by the IPCC in September 2019 states that marine ecosystems have already begun to see phenomena that are beyond their so-called "tipping points," and that the oceans—and consequently the whole planet—are facing a crisis. It goes on to warn that the future will depend on the actions taken now. Issues like melting ice sheets in the Antarctic and Greenland are causing the sea level to rise about 2.5 times faster than in the 20th century. Some fear this could seriously impact people's lives not only in Pacific atoll countries, but in low-lying coastal cities as well. Examples include New York City in the United States, Shanghai in China, and Tokyo and Osaka in Japan. Even if the nationally determined contributions submitted by countries under the Paris Agreement are combined, it will still be impossible to keep the temperature rise down to 2°C, let alone 1.5°C. More ambitious, rapid, and radical measures are required globally. Over 100 regions and countries have announced a policy of achieving net-zero greenhouse gas emissions by 2050 to 2060. Among these are the European Union, the United Kingdom, New Zealand, China, Japan, and the United States.

As noted in Chapter 2, the global mean sea level rose at a rate of 1.7 mm/year in the 20th century as a whole (1901-2010), but this reportedly increased to 3.2 mm/year from 1993 to 2010. According to future projections, compared to the average for 1986-2005, the average for 2018-2100 will be 0.63 m higher using the RCP 8.5 scenario or 0.40 m using the RCP 2.6 scenario. Calculating the yearly rate, the result is 6.6 mm/year (RCP 8.5) or 4.2 mm/year (RCP 2.6). Therefore, sea level rise is projected to accelerate regardless of which greenhouse gas emissions scenario is followed.

The IPCC's Fifth Assessment Report warns that climate change will probably force increasing numbers of people to relocate. It states that people in low-income developing countries who lack the funds needed for planned migration could be in particularly grave danger from extreme weather events caused by climate change.[3] The International Organization for Migration (IOM) stated in 2009 that by 2050, 200 million people will be forced to relocate due to climate change.[4] By the same year, 300 million people's homes could also be at risk from annual flooding and storm surges. The World Bank projects that by 2050, around 150 million people in sub-Saharan Africa, South Asia, and Latin America

3 IPCC (2013), *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Thomas F. Stocker, Dahe Qin, Gian-Kasper Plattner, Melinda M.B. Tignor, Simon K. Allen, Judith Boschung, Alexander Nauels, Yu Xia, Vincent Bex, and Pauline M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York.

4 International Organization for Migration (IOM) (2009), *Migration, Environment, and Climate Change; Assessing the evidence* (https://publications.iom.int/system/files/pdf/migration_and_environment.pdf) (accessed on 31 December 2021).

will be forced to migrate domestically due to climate change.[5] This is a major threat to the international community. Many of the major cities around the world develop in coastal areas, and the combination of worldwide urbanization and the influx of populations into coastal areas means that the population affected by climate change is very likely to increase. About 40% of the world's population is currently said to live within 100 kilometers of the coastline. Coastal population centers are hubs of trade, traffic, and industry centered on ports. Many infrastructural facilities and assets are also concentrated in those areas. Globally, people tend to gravitate toward urban areas in search of better jobs and lives. However, some of them end up illegally occupying informal housing that does not conform to building regulations and live in overcrowded and unsanitary conditions. This kind of data on urban residents often does not appear in official statistics. That could pose certain risks for public health and disaster preparedness. These areas are extremely vulnerable when disasters strike.

A considerable number of people worldwide are expected to be forced to migrate from their current homes, and coastal areas—particularly low-lying areas by the sea—will be seriously affected. Among these, the Small Island Developing States (SIDS) are being especially affected by sea level rise, cyclones, and rainfall patterns, and there are concerns that they will become even more vulnerable. Atoll countries are concentrated in the Pacific region, with examples including the Marshall Islands, the Republic of Kiribati, Tuvalu, and Tokelau (a New Zealand territory). The total population of these four areas is approximately 190,000 people. In Papua New Guinea and the Solomon Islands "a total of" around 6,300 people were forced to relocate when rising sea levels caused floods there in 2008.[6] Eight atolls are already said to have disappeared from the Solomon Islands.

The World Bank warns that as people flee from hardship, some cities could become regional hotspots i.e., areas with high concentrations of people and facilities. It states that people forced to migrate domestically due to declining agriculture, depleted water resources, and rising sea levels are likely to crowd into areas like the highlands between Bangalore and Chennai in South India, the plateau around Mexico City, and the Kenyan capital Nairobi. This means the urban functions in these areas need to be enhanced.[7]

4. The history of human migration, and migration issues

Humankind was born in Africa, and has continually set forth on grand migrations to find food, escape from enemies, and explore unknown lands. Modern humans apparently left East Africa about 200,000 years ago and migrated to various parts of the continent. They then left Africa about 60,000 years ago, reached Asia and the Americas via the Eurasian Continent, and finally arrived at the southern tip of South America about 10,000 years ago. The last frontier on Earth that humans reached was Oceania. According to migration mapping based on genetic markers, they reached Australia in 50,000 BC, New Zealand in 1000 BC, and the Marquesas Islands and Tahiti (near the center of the Pacific Ocean) around 300 AD.

Migration has undoubtedly helped shape human history in important ways. Our distant ancestors walked (on two feet) about 34,000 km from Africa to the southern tip of South America, then used navigation technology to proceed from there. As civilization developed and human migration diversified, the Phoenicians flourished in the Mediterranean, and the Vikings reached present-day Canada around AD 1000. Muslim merchants have been sailing dhows around the Arabian Peninsula and along the East African coast since ancient times, and there are records of explorers and sailors from the Islamic world and China sailing into open seas before the Age of Discovery. Then, between the 15th and 17th centuries, Portuguese and Spanish explorers "discovered" the world outside Europe. After that, the foundations were laid for mercantilism, colonialism, and European expansion. These prompted hu-

5 Kanta Kumari Rigaud et al. (2018), *Groundswell: Preparing for Internal Climate Migration*. Washington, DC: The World Bank.
6 IPCC op. cit. p.1613-p.1654.
7 Kanta Kumari Rigaud et al. op. cit., p.xxi-p.xxii.

man migration between continents, and led to the spread of Christianity.[8] We must not forget the Atlantic slave trade and the forced migration of indentured servants and refugees in Asia. Some migration was also voluntary: many Europeans moved to America from the 1870s until the start of World War I, and others settled in Australia and elsewhere afterwards. In other cases, people have been chased from their lands due to political conflicts: examples are the Partition of India and resulting diaspora, and Palestinians in Israel escaping to Gaza and the West Bank.

Advances in transportation technology mean that in the 21st century, ordinary citizens can fly around the globe by airplane in 24 hours. However, this does not mean the same thing as securing physical means of transportation and legally crossing borders. The rights to move safely and to move and migrate across national and international borders are not adequately guaranteed worldwide. These issues are causing major political controversy. According to the IOM, "migrant" is an umbrella term that is not defined under international law, and means a person who moves away from his or her place of usual residence, whether within a country or across an international border, temporarily or permanently, and for a variety of reasons. The term also includes people in categories that are clearly defined by law (such as migrant workers), people whose particular types of migration are legally defined (such as illegal entrants), and people whose status and means of transportation are not clearly defined by international law (such as international students). There are currently more than 258 million international migrants, accounting for about 3.4% of the world's population. However, a review of the recent situation reveals another global reality: the right, stated in the 1948 Universal Declaration of Human Rights, to leave any country—including one's own—is increasingly being recognized but the right to enter another country is not. [9]

On top of that, the scale of international immigration has doubled in the past 20 years. Although the motives for migration are diverse, individuals often choose to move for reasons like work or school opportunities, or marriage. Adding to the push and pull factors that encourage migration, the paradigm shift observed in recent studies shows that it is being understood as part of complex, cross-border flows of people, things, money, etc. In addition, migrating either voluntarily or involuntarily, migrants also come from a vast array of backgrounds. Examples include victims of human trafficking, exploited migrants, separated or unaccompanied migrant minors, refugees, asylum seekers, stateless people, forced evacuees, migrants who have been left behind, migrants who were caught up in crises, and minority groups. They also include women and the elderly, disabled, and young people. Climate change is expected to accelerate domestic and international migration. A major cause of domestic migration is weather-related disasters, such as droughts, floods, storms, rising sea levels, and heatwaves.

Similarly, there are concerns about increased relocation due to global climate change. Meanwhile, various scientific theories and statements have confirmed that there is a causal relationship between climate change and sea level rise, and that land could actually become submerged. While it remains difficult to definitively conclude that climate events cause relocations,[10, 11] event attribution research, which evaluates quantitatively the human impact on individual extreme weather events, has been progressing rapidly in recent years.

In urban areas, factors not necessarily related to climate change are also affecting migration and relocation abroad.[12] These include overpopulation in city centers and changes in land use due to population growth. Growing scientifici evidence indicates that climate change is causing people to relo-

8 Robin Cohen, trans. Yasuko Komaki (2020), *Migration and Its Enemies: Global Capital, Migrant Labour and the Nation-State*. Tokyo Shoseki Co., Ltd.

9 Catherine Wihtol de Wenden, Saeko Ota, trans., Madeleine Benoit-Guyod, cartographer (2019), *Atlas des migrations: Un équilibre mondial à inventer*. Hara Shobo.

10 Etienne Piguet, Antoine Pécoud, and Paul de Guchteneire (2011), "Migration and climate change: An overview," *Refugee Survey Quarterly*, 30(3), p.1-p.23.

11 John R. Campbell (2014), "Climate-change migration in the Pacific," *The Contemporary Pacific*, p.1-p.28.

12 Sandra McCubbina, Barry Smita, and Tristan Pearceb (2015), "Where does climate fit? Vulnerability to climate change in the context of multiple stressors in Funafuti, Tuvalu," *Global Environmental Change*, 30, p.43-p.55.

cate, so it is extremely important to address the issue based on the precautionary approach.[13] Against this background, international frameworks for relocation have still not been adequately developed and neither have the necessary domestic and international support systems for people forced to relocate. In this connection, the existence of legal and institutional gaps regarding support needs is one of the challenges facing island nations. The Refugee Convention was established in 1951 (during the Cold War), but international discussion of the issue of immigration to other countries only began in earnest within the last 30 years.[14]

5. The international community's response to relocation due to climate change

(1) *Loss and damage by climate change*

Article 8, paragraph 1 of the Paris Agreement ratified at COP21 under the United Nations Framework Convention on Climate Change (UNFCCC) states that the parties "... recognize the importance of averting, minimizing and addressing loss and damage associated with the adverse effects of climate variation, including extreme weather events and slow onset events, and the role of sustainable development in reducing the risk of loss and damage." The Paris Agreement is significant in that it builds on previous discussions at the Conference of the Parties and reaffirms that they will comprehensively address these issues in order to mitigate the loss and damage to countries facing the impacts of climate change. The loss and damage due to climate change that the Paris Agreement reaffirms will be addressed are broadly grouped into extreme events and slow onset events (SOEs) that occur over decades, such as sea level rise. Economic losses refer to losses that can be quantified to some extent based on

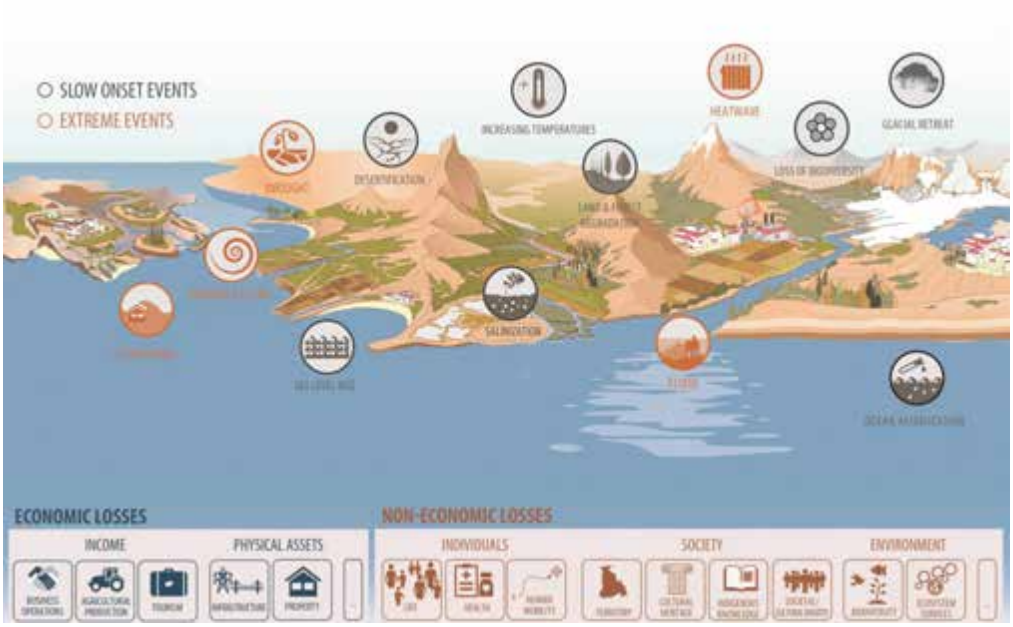

Figure 1 Outline of loss and damage[15]
(Overview on p. 4 of the UNFCCC's Loss and Damage Online Guide)

13 Jon Barnett (2001), "Adapting to climate change in Pacific Island countries: The problem of uncertainty," *World Development*, 29(6), p.977-p.993.

14 Catherine Wihtol de Wenden op. cit., p.164- p.165.

15 UNFCCC (2017), "UNFCCC Loss and Damage Online Guide," p. 5. https://unfccc.int/sites/default/files/resource/online_guide_on_loss_and_damage-dec_2017.pdf (accessed on 21 April 2021).

economic criteria such as income, earnings, or property. Non-economic losses refer to losses whose economic values are hard to calculate—i.e., human life and health, forced mass migration, national territory, cultural assets, indigenous knowledge, social and cultural identities, biodiversity, and ecosystem services, which are outlined in Figure 1.

Of the refugees worldwide who have been driven from their homes by civil war, serious human rights violations, or natural or man-made disasters, about 60% were forced to evacuate domestically. These are called "internally displaced people." Climate refugees who cross borders are also thought to be relatively few in number.

Using the IOM's definitions regarding human migration, displacement (i.e., forced migration) refers in particular to when people are forced to flee, leave their homes, or otherwise migrate due to armed conflicts, circumstances that are generally violent, human rights violations, or natural or man-made disasters, or to escape their effects. On the other hand, planned relocation refers to a planned process in which persons or groups of persons move or are assisted to move away from their homes or place of temporary residence, are settled in a new location, and are provided with the conditions for rebuilding their lives, in the context of disasters or environmental degradation, including when due to the effects of climate change. Lastly, migration due to climate change is classified as the movement of a person or groups of persons who, predominantly for reasons of sudden or progressive change in the environment due to climate change, are obliged to leave their habitual place of residence, or choose to do so, either temporarily or permanently, within a State or across an international border. The IPCC's SROCC report also states that while migration due to climate variation should only be a last resort, if it does become unavoidable, then planned relocation should be considered. This will also help avoid emergency evacuations or displacements that happen too late when a disaster strikes.

The outcomes of climate-induced human migration vary and it is difficult to draw any definitive conclusions, but certain patterns have been observed. First of all, it is commonly observed that the factors that determine human migration are complex, and climate change is only one of them. However, it cannot be denied that if the frequency of extreme events increases in the future, then its relative importance could increase among the factors that influence people's decisions. Although climate change is sometimes discussed in the context of conflict, it is usually described as a "threat multiplier."[16] The thinking is that, as pre-existing poverty gaps, social unrest, and political instability interact in complex ways, climate change exacerbates them, and this leads to a certain scale of human migration. Many argue that the environmental changes brought about by climate change are spurring on social turmoil in already unstable societies. Figure 2 shows the typical patterns seen in the decision-making processes people go through when considering whether to migrate.

16 Climate change and international security, Paper from the High Representative and the European Commission to the European Council, https://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/reports/99387.pdf (accessed on 21 April 2021).

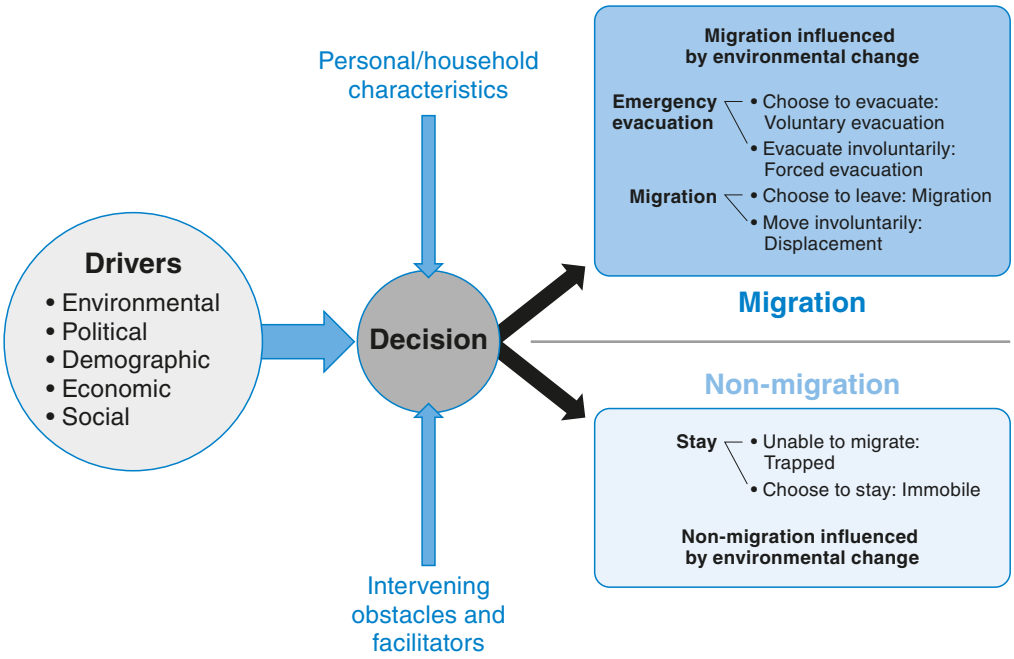

Figure 2 Foresight's framework for human mobility outcomes
(Revised by the author based on Foresight's framework[17])

(2) *Climate change measures and migration issues in the UNFCCC*

Adopted at the 21st Conference of the Parties (COP21) in Paris in 2015, the Paris Agreement became the international framework for measures to combat climate change, following on from the Kyoto Protocol. It was ground-breaking, and set ambitious long-term, globally shared goals of limiting global warming to well below 2°C and preferably to 1.5°C, compared to pre-industrial levels, and aiming for net-zero greenhouse gas emissions from human activities in the latter half of the century. As a result, it was decided that each country would set and implement its own Nationally Determined Contributions.

The two pillars of climate change measures are mitigation and adaptation. Mitigation refers to human intervention to reduce greenhouse gas emission sources and increase carbon sinks. Adaptation refers to adjusting natural and human systems to prevent or reduce the effects of climate change, or take advantage of the opportunities presented by its benefits. The latter refers to all measures taken to adapt to the negative effects of climate change if they prove to be unavoidable in the future despite efforts to reduce greenhouse gas emissions. Adaptation measures may differ between climate variation and change. For climate change, they might include producing crops that are resistant to global warming and dry weather. For variation, they might include dispersing or relocating arable land to reduce the immediate risks.

The following describes how migration issues have been handled in international negotiations under the UNFCCC, based on research notes published by the author in the journal *Pacific Island Studies*.[18] In the negotiations within the UNFCCC, mitigation measures against climate change were the main focus to begin with, but then the importance of adaptation measures gradually became more prominent. Con-

17 Dina Ionesco, Daria Mokhnacheva, and François Gemenne (2017), *The Atlas of Environmental Migration*, International Organization for Migration (IOM), Routledge, New York: p.19.

18 Nagisa Yoshioka and Miko Maekawa, "Comparison and Prospects of Pacific Island Countries' National Policies on Climate-Induced Relocation Issues," *Pacific Island Studies*, vol. 6, December 2018, p.63-86.

sequently, COP12 (held in Nairobi, Kenya in 2006) decided to establish the Nairobi Work Programme on the impacts of and vulnerability and adaptation to climate change. This provides mechanisms for sharing information and knowledge on adaptation measures and supporting their implementation. Under this action plan, more than 360 partner organizations (including the public sector, research institutions, non-governmental organizations, and the private sector) began to share their knowledge and build networks in order to press ahead with adaptation measures. Furthermore, the Bali Road Map agreed on at COP13 (held in Bali, Indonesia in 2007) stipulated that adaptation measures should be a component of future frameworks. The Cancun Agreements adopted at COP16 (held in Cancun, Mexico in 2010) established the Cancun Adaptation Framework, creating a comprehensive international framework for adaptation measures.

Under this framework, countries started the process of formulating National Adaptation Plans (NAPs), in which they compiled the information about their medium- to long-term adaptation needs and plans for implementing adaptation measures. NAPs are strategies by which the Parties ascertain their adaptation needs, then address them in the medium to long term. In this way, adaptation has been discussed as the next major pillar of climate change countermeasures after mitigation. Article 7 of the Paris Agreement contains the following provision on adaptation: "hereby establish the global goal on adaptation of enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change."[19]

As described above, the mainstream discussions so far have focused on mitigation (which was at the core of climate change countermeasures in the UNFCCC and the Kyoto Protocol) and adaptation (whose status as an important measure was established by the Cancun Adaptation Framework). The Paris Agreement (which replaces the Kyoto Protocol) includes a new independent clause on adaptation. It also has clauses on loss and damage, which have been discussed increasingly in recent years. Loss and damage refer to the adverse effects of gradual climate variation and extreme weather events that humans cannot adapt to—i.e., social effects that cannot be addressed even through adaptive measures. It also refers to the costs that accompany them. They also mean both the economic and non-economic impacts described above.

As a result of COP19 (held in Warsaw, Poland in 2013), the UNFCCC decided to establish (under the Cancun Adaptation Framework) the Warsaw International Mechanism for Loss and Damage and the Executive Committee for it. A framework for related loss and damage due to climate change, the mechanism was something developing countries like those in the Alliance of Small Island States (AOSIS) had long been waiting for. It is promoting responses to loss and damage, and facilitating information and knowledge sharing.

The COP16 agreement states that understanding and cooperation at the national, regional, and international levels regarding displacement, migration, and planned relocation due to climate change are particularly important means of advancing adaptation measures under the Cancun Adaptation Framework, and should therefore be pursued. In addition, the 2013 "Technical paper on non-economic losses in the context of the work programme on loss and damage" states that human relocation is one form of loss and damage due to climate change.

At COP21, it was agreed that loss and damage would be included in the Paris Agreement as an independent clause (Article 8) separate from adaptation, and that the Warsaw International Mechanism for Loss and Damage would continue beyond 2020. The issue of liability and compensation for any arising loss and damage was the most difficult discussion, but at the the insistence of the United States and other parties, the COP decisions ultimately stated that Article 8 of the Paris Agreement would not be a basis for (legal) liability for damage or compensation.[20] In addition, the Paris Agreement preamble mentions migrants and calls for countries to consider their human rights when addressing climate

19 Ministry of the Environment (2016), "Paris Agreement (Provisional Translation)," https://www.env.go.jp/earth/ ondanka/cop/attach/Paris_agr20160422.PDF (accessed on 10 May 2021).

20 Akiko Urakami (2018), "Article 8 (Loss and Damage) of the Paris Agreement," https://www.iges.or.jp/ sites/default/files/ inline-files/08.PDF (accessed on 10 May 2021).

change measures. This is at least partly because discussions on adaptation and loss and damage have evolved since the Cancun Adaptation Framework was agreed on at COP16 (held in Cancun, Mexico in 2010). Article 1, paragraph 49 of the COP decisions from COP21 clearly states that a task force should be established for the Warsaw International Mechanism for Loss and Damage, to roll out proposals for integrated approaches to preventing, minimizing, and handling relocation related to the adverse effects of climate change.[21] Based on this, the Executive Committee of the Warsaw International Mechanism for Loss and Damage decided to establish the Taskforce on Displacement. It was launched in June 2017.

Discussion of climate-induced migration has made progress in the United Nations in recent years, as described above. In addition to recognizing the issues of adaptation and loss and damage within the UNFCCC negotiations, the United Nations has begun to concretely discuss international cooperation and support, including toward considering new legal frameworks. The Warsaw International Mechanism for Loss and Damage's five-year rolling work plan, newly formulated in 2017, identifies strengthening and promoting cooperation on human migration due to climate change as one of its strategic workstream tasks. It stipulates that priority should be given to promoting dialogue among stakeholders and sharing knowledge and identifying needs, through the cooperation systems. It also raises as an issue the fact that climate finance assessment—including the work of the UNFCCC's Standing Committee on Finance (SCF)—does not include support for loss and damage. The framework for proving causality regarding loss and damage and seeking monetary compensation as a result of liability is both politically and technically difficult. Climate change is a consequence of collective actions, and thus attributing the causes to specific entities would pose challenges in terms of both temporal and geographical scales. However, in fact, the Global Environment Facility (GEF) and the Green Climate Fund (both established under the UNFCCC) have not yet launched any financial support programs for human migration per se. The keys to addressing climate-induced migration issues will be how existing institutions and organizations can work together to establish new mechanisms for integrated measures based on the task force's recommendations, and how such consensus can be formed.

(3) *International trends beyond the UN Framework Convention on Climate Change: International laws*

There are other relevant international treaties outside the Framework Convention on Climate Change. Examples include international human rights law and the Convention Relating to the Status of Refugees. Here, the relationship between climate-induced migration and refugees is the main issue at hand. The terms "climate refugee" and "environmental refugee" are appearing increasingly often in the media. The term "refugee" is often used to refer to people who are forced to migrate because it will be difficult to stay in their own regions due to environmental deterioration caused by climate change. However, this usage is not strictly correct. This is because the 1951 Convention Relating to the Status of Refugees defines them as people who have fled to another country because they either were or were at risk of "being persecuted for reasons of race, religion, nationality, membership of a particular social group, or political opinion" in their own country. Because of this, so-called "climate refugees" are usually not recognized as refugees under international law. The convention defines refugees as people who have fled their home country for fear of being persecuted there due to their race, religion, or political position, and says they should be granted asylum. Climate evacuees also tend to get less attention in the first place, because their numbers rise gradually since climate change progresses slowly.[22]

International human rights law (based mainly on human rights conventions) and bilateral immigration agreements, etc., can also provide legal grounds for protecting migrants' human rights. The Migra-

21 UNFCCC (2015), *Report of the Conference of the Parties on its twenty-first session, held in Paris from 30 November to 13 December 2015*. Report No. FCCC/CP/2015/10/Add.1. Retrieved from https://unfccc.int/resource/docs/2015/cop21/eng/10a01.pdf (accessed on 10 May 2021).

22 Mikiyasu Nakayama and Miko Maekawa, "Difficulties Posed by the Information Divide Facing Foreign Migrants from Pacific Island Countries," *OPRI Perspectives*, vol. 18, https://www.spf.org/global-data/opri/perspectives/prsp_018_2021_nakayama-maekawa.PDF (accessed on 10 May 2021).

tion with Dignity policy proposed by the previous Kiribati government should be noted in relation to international human rights law. It was developed and implemented by Kiribati's former president Anote Tong himself. The policy's goal is for migrants to develop useful skills, and thereby benefit both their original and accepting countries. Leaders of Pacific island countries do not welcome use of the expression "climate refugees" in the first place, stating that they prefer not to become refugees. The Kiribati government adopted a positive view of migration as part of adaptation to climate change, and supported concrete preparations to make the transition in a dignified manner.

Against this backdrop of international law, in January 2020, the United Nations Human Rights Committee issued a landmark ruling on human migration due to climate change. Kiribati citizen Ioane Teitiota moved to New Zealand with his family because sea level rise due to climate change was causing problems like land grabbing and scarce drinking water. When his residence permit expired in 2010, he applied for refugee status as a climate refugee, but was rejected. As a result, he was sent back to Kiribati in 2015. He subsequently filed a lawsuit in New Zealand that got as far as the Supreme Court, but eventually lost the case. Teitiota then filed a lawsuit with the United Nations Human Rights Committee in 2016, on the grounds that by deporting him to Kiribati, the New Zealand government had violated his right to life as set forth in the International Covenant on Civil and Political Rights. The committee did not rule his deportation illegal, stating that his life was not in imminent danger. However, they also stated that climate change is a serious threat to the right to life, and must be taken into account by immigration authorities and courts when disputing deportations. Some view this judgment as suggesting that individuals may be recognized as refugees if they can prove their rights are being violated by the effects of climate change.[23]

Another notable development came in 2012: the International Law Association (ILA) established the International Law and Sea Level Rise Committee. This examines sea level rise, relocation, and human rights in the context of the international legal system. In a 2018 report, the committee proposed principles for the Declaration of Principles on the Protection of Persons Displaced in the Context of Sea Level Rise,[24] and will continue to review them. The International Law Commission (ILC) is a subordinate body of the United Nations General Assembly established to promote the progressive development and codification of international law. At its 70th session in 2018, it recommended that the issue "sea-level rise in relation to international law" be included in the committee's long-term work plan.[25] The recommendation was adopted by a resolution at the United Nations General Assembly the same year. The following year, an expert study group was established under the ILC to map the legal issues arising from sea level rise from 2019 to 2021 based on three themes: issues related to marine law, issues related to statehood, and protecting people affected by sea level rise. Many UN Member States have repeatedly asserted the importance of ensuring legal stability and safety, certainty, and predictability in matters of sea level rise and international law. Accordingly, they appear to have strong concerns about changing the current situation.

(4) *International trends beyond the UN Framework Convention on Climate Change: Responses by the United Nations Economic and Social Council*

Another non-legally binding but important global agreement is the Sustainable Development Goals (SDGs) formulated in 2015. They were the first-ever development goals to include human relocation. Goal 10 (Reduce inequalities within and among countries) includes as Target 7: "Facilitate orderly, safe, regular and responsible migration and mobility of people, including through the imple-

23 BBC News Japan (2020), "People Urgently Fleeing Climate Crisis Cannot Be Sent Home, UN Rules," https://www.bbc.com/japanese/51186634 (accessed on 10 May 2021).

24 The International Law Association (ILA) (2018), *International Law and Sea Level Rise Sydney Conference Report*. http://www.ila-hq.org/images/ILA/DraftReports/DraftReport_SeaLevelRise.pdf (accessed on 21 April 2021).

25 United Nations General Assembly (2018), *Report of the International Law Commission*. Report No. A/73/10. http://legal.un.org/docs/?symbol=A/73/10 (accessed on 21 April 2021).

mentation of planned and well-managed migration policies."[26] Relocation issues are attracting attention as being shared by developed and developing countries alike, and interest in tackling them seems to be increasing. Aside from Goal 10, Goal 4 (Quality education), Goal 5 (Gender equality), Goal 8 (Decent work and economic growth), and Goal 16 (Peace, justice and strong institutions) also mention migration. Human relocation issues are thus interdisciplinary, and solving them will depend on interdisciplinary cooperation.

At the United Nations World Conference on Disaster Risk Reduction (held in Sendai, Japan in 2015), the Sendai Framework for Disaster Risk Reduction was adopted and new international guidelines for disaster prevention were presented. At the Global Platform for Disaster Risk Reduction (Cancun, Mexico) held in May 2017 with the United Nations International Strategy for Disaster Risk Reduction (UNISDR) as secretariat, it was emphasized that disaster prevention is an important factor to consider when addressing migration and refugee issues.[27] The need to incorporate regional and international knowledge in order to develop disaster prevention strategies was recognized, as was the need to include measures aimed at the following: preventing relocation due to disasters, reducing post-relocation risks, addressing people's needs for protection, and encouraging permanent support measures.

In September 2016, ahead of COP22, the UN General Assembly held the United Nations Summit for Refugees and Migrants, and adopted the New York Declaration for Refugees and Migrants.[28] The declaration proposes comprehensive international community support for people who have been forced to migrate due to conflict, poverty, and natural disasters (including climate change). It also proposes that a system be established for transnational immigration. Under this declaration, the UN started the process for adopting the Global Compact on Refugees and the Global Compact for Safe, Orderly, and Regular Migration. An intergovernmental conference on international migration issues was held in 2018 under the auspices of the UN General Assembly, with the aim of having the latter adopt these two new global compacts. One major achievement of the New York Declaration was that it reaffirmed the protection principles of the 1951 Refugee Convention. Another was that it was a comprehensive document on migration and refugees that was adopted by the UN General Assembly. Given the recent large-scale increases in migrants and refugees in the Middle East, Europe, and elsewhere and the growing international public bias against them stemming from terrorism, the declaration is highly significant in that through it, the international community has once again demonstrated its willingness to cooperate on this issue.

The Nansen Initiative was launched in 2012 to serve as an advisory body for protecting migrants caused by natural disasters (including climate change). It would be led by government agencies of the countries that announced their participation. The initiative was set up by the Swiss and Norwegian governments to discuss and reach an international consensus on measures to meet the needs of people forced to migrate across borders as a result of disasters.[29] The Protection Agenda was agreed on, with the goal of supporting countries' efforts to address relocation issues.[30] It states that the following four issues will be important in the future in relation to migration caused by natural disasters: (a) a comprehensive approach to addressing relocation due to natural disasters, focusing on transnational migrants; (b) the need for country-led responses to the risks; (c) consolidating past knowledge and integrating relevant institutions and sectors to improve the efficiency of future responses; and (d) identifying priorities for action by national and regional institutions and civil society as well as by the international community. In addition, the Platform on Disaster Displacement (PDD) was established in May 2016.[31]

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26 Ministry of Foreign Affairs in Japan, provisional translation (2015), "Transforming Our World: The 2030 Agenda for Sustainable Development," https://www.mofa.go.jp/mofaj/gaiko/oda/sdgs/pdf/000101402.pdf (accessed on 21 April 2021).

27 Global Platform for Disaster Risk Reduction (2017), *The Cancun High-Level Communiqué*. https://www.preventionweb.net/files/53439_thecancunhighlevelcommuniquof24may2.pdf (accessed on 21 April 2021).

28 *Ibid*.

29 The Nansen Initiative website, About Us. https://www.nanseninitiative.org/ (accessed on 21 April 2021).

30 The Nansen Initiative (2015), *Agenda for the Protection of Cross-border Displaced Persons in the Context of Disaster and Climate Change Volume I*. https://nanseninitiative.org/wp-content/uploads/2015/02/PROTECTION-AGENDA-VOLUME-1.pdf (accessed on 21 April 2021).

31 The Platform on Disaster Displacement website. https://disasterdisplacement.org/ (accessed on 21 April 2021).

The platform views the following as strategic priorities: collecting data and knowledge; and mainstreaming relocation issues in relevant policy and action areas.

6. Cases of migration around the world

We will now consider what kinds of relocation are actually happening around the world. According to Internal Displacement Monitoring Center (IDMC) data, 185 million people from 173 countries were forced to migrate from 2008 to 2014 (or 26.4 million people each year). Of these, 82% were in disaster-prone Asia, with the highest numbers in China, India, the Philippines, Pakistan, and Bangladesh.[32] Germanwatch's annual *Global Climate Risk Index* report[33] also states that there were 11,000 extreme events worldwide from 2000 to 2019, costing 475,000 lives and USD 2.56 trillion. The countries and territories that suffered the worst damage during this period were Puerto Rico, Myanmar, Haiti, the Philippines, Mozambique, the Bahamas, and Bangladesh. In 2019, the ranking was Mozambique, Zimbabwe, the Bahamas, Japan, and Malawi. In this section, three cases will be looked at: Typhoon Haiyan's effects in the Philippines; Hurricane Katrina's effects on the United States; and the relocation program in the Pacific island nation of Papua New Guinea's Carteret Islands.

(1) *Super Typhoon Haiyan's damages in the Philippines*

In November 2013, the year's 30th named super typhoon (international name: Haiyan) struck the Philippines. Said to be of a size that only comes once every hundred years, it caused major damage. Typhoon Haiyan struck land around the islands of Leyte and Samar in the central Philippines around 4:00 pm on November 8, 2013. It was the most violent typhoon in history to have made landfall, doing so with a central pressure of 895 hPa and a maximum wind speed of 87.5 m/s. The death toll from Haiyan stood at over 6,200 people, about 1,800 were missing, and over 16 million were affected. This was the worst human damage in the history of the Philippines. The economic loss was estimated to be 89.5 billion pesos.[34] Many of the deaths are said to have been from the storm surges, which reached heights of up to 6 m and hit the coast like a tsunami. Many people were also forced to evacuate because of all the damage the storm inflicted on houses and buildings. The evacuations were delayed, however, because high tides warnings were not issued in time, and because when the media reported "storm surges," many people did not understand because there is no equivalent word in Tagalog or Waray. At a UNFCCC meeting held immediately after Haiyan made landfall, a representative of the Philippine government drew attention to the affected people's plight by saying that he would fast until a meaningful consensus could be reached about them.[35] Japan and many countries took action to provide emergency humanitarian and reconstruction assistance.

About 4 million people evacuated when Typhoon Haiyan struck. While most of them were back in or returning to their original homes after half a year, over 2 million were unable to get adequate housing. Of these, more than 26,000 were in temporary shelters at the time.[36] The affected people relied on relatives and others, evacuated to Manila and other areas and cities in the country, or even decided to evacuate or migrate abroad.

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32 Dina Ionesco, Daria Mokhnacheva, and François Gemenne op. cit. p.16-p.17.

33 David Eckstein et al. (2019), *Global Climate Risk Index 2020* Germanwatch e.V. https://germanwatch.org/sites/default/files/20-2-01e%20Global%20Climate%20Risk%20Index%20 2020_14.pdf (accessed on 21 April 2021).

34 Misa Kemmiya and Atsutoshi Hirabayashi (2018), "No Roof, No House, But Hope for the Future: Recovery From Typhoon Yolanda in the Philippines," *Project History*, JICA Ogata Research Institute, vol. 19, Tokyo: Saiki Communications.

35 Sayaka Mori (2018), "Haiyan, the Strongest Super Typhoon in History: Five Years On from Its Landfall in the Philippines," https://news.yahoo.co.jp/byline/morisayaka/20181108-00103459/ (accessed on 10 May 2021).

36 Government of the Philippines, Department of Social Welfare and Development (DSWD) et al. (2014), *The Evolving Picture of Displacement in the Wake of Typhoon Haiyan, an Evidence-based Overview*. https://www.internal-displacement.org/sites/default/files/publications/documents/The-Evolving-Picture-of-Displacement-in-the-Wake-of-Typhoon-Haiyan.pdf (accessed on 21 April 2021).

The following issues were highlighted: government-driven key support points (e.g., evacuation centers, shelters, and temporary housing) needed to coordinate their efforts; and it was important to represent the information on vulnerable internally displaced people visually so their plight would not become invisible or ignored by the outside world. The reconstruction is still not complete, and there are also concerns that in the future, rising sea temperatures will cause not only more powerful typhoons but rising sea levels as well, resulting in increased storm surge damage.[37]

(2) *Hurricane Katrina's impact on the Southern United States*

When Hurricane Katrina hit the US coastline in the Gulf of Mexico in 2005, it caused a tremendous amount of damage. It was the United States' first natural disaster in 80 years to kill more than 1,000 people, and the total cost of the damage came to USD 75 billion (estimated by major insurance company AIG). A Category 5 hurricane (the strongest level), Katrina caused widespread strong winds, rainfall, and storm surges, resulting in 1,420 deaths (932 in Louisiana and 221 in Mississippi). The city of New Orleans was at the center of the disaster. Eighty percent of it was submerged, and a million people were affected. A huge number of people—some 400,000—had to live in shelters, and 270,000 of them were evacuated far away to other states.[38] Some 10,000 National Guard personnel were mobilized in Louisiana and Mississippi to respond to the emergency. Lester Brown of the Earth Policy Institute ominously warned that Katrina had produced the world's first climate refugees.[39] "Climate internally displaced people" would have been a more accurate term in this case, given that the people affected were mainly displaced internally. Nevertheless, it was an effective way to draw the public's and politicians' attention to a new aspect of hurricane disasters.

Another aspect to note is that if the state is unable to respond effectively with disaster mitigation or relief efforts, victims can demand a trial and claim compensation. In a landmark decision issued on November 18, 2009, the court found that the Army Corps of Engineers had failed to properly maintain and operate the Mississippi River-Gulf Outlet, and this had caused the dykes to collapse and resulted in the large-scale flooding of New Orleans.[40]

In recent years, the western US has experienced frequent forest fires, and the hurricane seasons have repeatedly caused damage along the US coast. More and more reports are saying a full-blown climate refugee crisis in the United States lies ahead.[41] For example, Joel Mathis of *The Week* magazine pointed out that migration within the US due to climate change had already begun before the recent fires. The Urban Institute estimates that more than 1.2 million Americans left their homes in 2018 for climate-related reasons.[42] Some were fleeing long-term problems, while others fled short-term disasters and then permanently settled where they had evacuated to. Mathis also said that rising sea levels could force millions of coastal residents to migrate in the future.[43]

And as noted in an article by Tim McDonnell in *Quartz* magazine, coastal communities in Louisiana are being devastated by population decline. Conversely, there are also communities that have grown due to climate refugees. For example, St. Tammany Parish has been growing since Hurricane Katrina thanks to a steady influx of new residents. It is now one of the fastest growing parishes in the state: the popula-

37 Mori (2018) op. cit.

38 Hayashi Haruo et al. (2006), "U.S., Emergency Responses Following the 2004 Hurricane Katrina Disaster," DPRI Annuals (49), 9-21.

39 NBC News, Katrina evacuees called 'climate refugees' (2006), https://www.nbcnews.com/id/wbna14382870 (accessed on 21 April 2021).

40 Vesselin Popovski and Kieran G. Mundy (2012), "Defining Climate-Change Victims," United Nations University, Research Articles. https://jp.unu.edu/publications/articles/climate-change-victims.html (accessed on 10 May 2021).

41 Oliver Milman (2018), "'We're moving to higher ground': America's era of climate mass migration is here," *The Guardian*. Https://www.theguardian.com/environment/2018/sep/24/americas-era-of-climate-mass-migration-is-here.theguardian.com/environment/2018/ (accessed on 21 April 2021).

42 Carlos Martín (2019), "Who Are America's 'Climate Migrants,' and Where Will They Go?" Urban Institute. https://www.urban.org/urban-wire/who-are-americas-climate-migrants-and-where-will-they-go (accessed on 21 April 2021).

43 Joel Mathis (2020), "The climate refugees are here. They're Americans," *The Week*. (https://theweek.com/articles/937357/climate-refugees-are-here-theyre-americans) (accessed on 21 April 2021).

tion has reached 250,000—four times what it was in 1970—and is expected to be double that by 2030.

In post-Katrina 2007, the Center for Strategic and International Studies (CSIS) and the Center for a New American Security (CNAS) released a report titled *The Age of Consequences: The Foreign Policy and National Security Implications of Global Climate Change*.[44] In this report, they argued that in the long term, global climate change will become a more decisive threat to national security, large-scale internal and international human migration will cause tensions within and around national borders, and in the worst-case scenario, the effects of climate change could prompt armed nations to use force to seize neighboring fertile lands with milder environments. Shortly after taking office in January 2021, US President Joe Biden signed an executive order to put climate change at the center of foreign policy and national security. In addition to domestic policy, he stressed the importance of promoting climate change measures through international cooperation and financing, and of internationally addressing the following: promoting clean energy, aviation and shipping, the Arctic, the oceans, sustainable development, and migration issues.

The National Oceanic and Atmospheric Administration (NOAA)'s website currently has a section called Sea Level Rise Viewer that provides detailed information on the predicted sea level rise in coastal areas all over the United States. In addition to encouraging state and other local governments to take action, it can help individuals take adaptation measures themselves. For example, when buying or moving to a new home, it does not come as a surprise when more people become cautious about checking hazard and predicted sea level rise maps, and avoiding waterfronts in favor of higher ground or environments they deem safer overall. Wealthy people who have the assets to make choices like that may be able to act early and prepare for future disasters. The same trend seen in both developed and developing countries is that of it is the people living in high-risk areas, usually the poor, who end up left behind and suffer catastrophic damages.

(3) *Relocation program in Carteret Atoll, Papua New Guinea*

Residents of Carteret Atoll in Papua New Guinea's Autonomous Region of Bougainville have created a relocation program that has attracted international attention. This section will be based on the research by Volker Boege and Ursula Rakova.[45] Carteret Atoll consists of six low-lying islands. It has a total area of only 0.6 square kilometers, and is currently home to around 3,000 people. Climate change is said to have caused salinization of the atoll's freshwater wells and soil, making it difficult to maintain its self-sufficient economy (which is based on fish, bananas, taro, and other vegetables). Malaria has increased, and people have become drastically more dependent on food relief. On top of that, rough storms occurring almost all year round have made it dangerous to go to the main island of Bougainville by boat. Carteret residents themselves set up a non-governmental organization (NGO) called Tulele Peisa (which means "sailing the waves on our own"). They then drew up Carteret's Integrated Relocation Plan, in which about 1,700 Carteret residents planned to voluntarily settle in relocation sites on the mainland of Bougainville 86 km away. These would mainly be donated by Catholic parishes.

Tulele Peisa's relocation plan addresses developing housing and social infrastructure; projects to generate income; medical, education, and training facilities; and the accepting community's needs. The NGO's seven-strong board of directors includes the chairpersons from the local governing bodies in the Carteret Islands and at the migrants' destination (the Tinputz area). This is to ensure the voices of both migrants and locals will be represented. However, only about 100 people have resettled so far, and there is little support either domestically or from overseas. The Papua New Guinea government allocated a

44 Kurt M. Campbell et al. (2007), *The Age of Consequences: The Foreign Policy and National Security Implications of Global Climate Change*. Center for Strategic and International Studies (CSIS), Center for a New American Security. https://csis-website-prod.s3.amazonaws.com/s3fs-public/legacy_files/files/media/csis/pubs/071105_ageofconsequences.pdf (accessed on 21 April 2021).

45 Volker Boege and Ursula Rakova, With Community Input, Improving climate change-induced resettlement planning, Toda Peace Institute Policy Brief No. 33. https://toda.org/jp/policy-briefs-and-resources/policy-briefs/climate-change-induced-relocation-problems-and-achievements-the-carterets-case.html (accessed on 10 April 2021).

budget equivalent to $800,000 for the Carteret relocation plan in October 2007, but resettlement is basically proceeding through the residents' own self-help efforts. Factors making resettlement difficult include that land is scarce in Bougainville, and its land ownership traditions have led to a culture that does not readily accept newcomers. Even if newcomers do find land, it will be difficult for them to obtain clear legal ownership of it if it has always been inherited per the custom. It is estimated that it would take about $5.3 million to relocate all the families who want to make the move, so it is a major financial challenge.

If the islanders leave their ancestral lands, they will risk losing their cultural heritage, identity, dignity, and connections to their sacred places. In addition, Carteret's matrilineal society has traditionally meant that land is inherited by women. They are faced with a heavy decision: losing their land could be traumatic, but they also feel they need to migrate so that their children can have a future. It is important to note that besides being a material issue, resettlement has important cultural, psychological, and spiritual aspects.

7. Conclusion

The history of human migration can be considered as the history of humankind itself. People will continue to make lands their homes amid various circumstances and hopes, but climate change and other environmental factors will likely play a decisive role in how people choose to live and, ultimately, whether they migrate. While comprehensive international law and regional frameworks on climate-induced migration have yet to be developed, various deliberations have begun. However, changes that had previously been thought slow (like sea level rise) are accelerating, and having diverse, significant impacts on people's lives. Including refugees and internally displaced people, there are already over 91.9 million people in the world who need assistance from the Office of the United Nations High Commissioner for Refugees (UNHCR). It would be unwise to increase that number. If it is deemed necessary after various approaches have been considered, one practical option could be to help large numbers of people migrate in a dignified way, based on adequate preparations and choices. This could form part of the adaptation measures. There is virtually no financial support for relocation and migration, however, either domestically or internationally. International funding systems like the Global Environment Facility (GEF) and Green Climate Fund have not set up any specific programs. As real cases show, people who actually try to migrate can suffer many hardships, and so can the communities that accept them. From the viewpoint that climate change is a new threat to nations, and from the perspective of human security to ensure the security of individuals, this is a challenge that humankind should surely dedicate all its wisdom to overcoming. It must be stressed that migration can also bring about positive changes in people's new lives and destinations. For Japan—a disaster-prone country with many immigrants—this is an important issue that cannot be ignored. For the world, it can rightly be called a race against time.

Climate Security and Natural Disasters: International Cooperation on Disaster Response in the Asia-Pacific Region

Nagisa Shiiba

1. Introduction

2020 was a year that showed just how serious climate change is becoming. Notably, it saw the second-highest global average temperature ever recorded (the highest-ever having been in 2016), and large-scale meteorological disasters the world over. Cyclone Amphan, the strongest cyclone ever recorded in the Bay of Bengal, battered India and Bangladesh in May. Two other powerful cyclones—Harold and Yasa—caused human and material losses in Fiji and elsewhere in the South Pacific. Disaster struck the Philippines in November when Typhoons Goni and Vamco made landfall there in quick succession, causing large-scale flooding in the capital, Manila. Record-breaking torrential rain in China caused massive flooding on a historic scale that shocked the whole world.

In Japan, the memory of catastrophic damage from torrential rain in Kyushu in the summer of 2020 remains fresh. Extreme weather events are happening all over the world. Overall losses from natural disasters in 2020 for Asia have been estimated at $67 billion.[1] There are heightened concerns about the intensifying natural disasters accompanying climate change that shake global stability. How will the growing threat of natural disasters affect multinational cooperation on disaster response? Focusing on Southeast Asia and the Pacific region, this chapter considers what effects climate change might have on the security environments that surround the region, and on multinational cooperation on disaster response.

2. Climate change and natural disasters in the Asia-Pacific region

The Asia-Pacific region is one of the world's most vulnerable areas to natural disasters. The World Risk Report 2020[2] assessed the natural disasters and social vulnerabilities of 171 countries. Six of the ten countries with the highest risk were in the Pacific and Southeast Asia (namely, Vanuatu, Tonga, the Solomon Islands, Brunei, Papua New Guinea, and the Philippines). In particular, the coast and the small island developing states (SIDS) are extremely vulnerable to meteorological disasters like floods and typhoons. In addition to damage from large-scale cyclones (Cyclones Pam in 2015 and Winston in 2016 being notable examples), coastal areas are subjected to frequent storm surges and floods. Climate change and the resulting intensifying disasters particularly threaten the lives and safety of people in developing countries with inadequate infrastructure.

1 Munich Re. (7 January 2021). *Record hurricane season and major wildfires — The natural disaster figures for 2020*, Media Release. (https://www.munichre.com/content/dam/munichre/mrwebsiteslaunches/natcat-2021/Printversion_NatCat_2021_EN.pdf/_jcr_content/renditions/original./Printversion_NatCat_2021_EN.pdf).

2 Behlert, B., Diekjobst, R., Felgentreff, C., Manandhar, T., Mucke, P., Pries, L., Radtke, K., & Weller, D. (2021). *World Risk Report 2020 Focus: Forced Displacement and Migration*. Bündnis Entwicklung Hilft and Ruhr University Bochum — Institute for International Law of Peace and Armed Conflict (IFHV).

Japan is no exception. According to the 2020 edition of the Global Climate Risk Index published every year by environmental NGO Germanwatch, out of 183 countries worldwide, Japan was the most affected by meteorological disasters in 2018.[3] Amid concerns that global warming will cause more frequent and severe torrential rain, etc., awareness of the impact of climate change is also gradually growing in Japan. This is evidenced, for example, by the Climate Emergency Declaration that was passed by both houses of the Diet in November 2020.

Intensifying natural disasters are also of great interest to the industrial sector. One symbolic event is the flood of the Chao Phraya River in Thailand in October 2011, which caused significant losses to Japanese companies. Based on the accumulated scientific knowledge and the frequent occurrence of large-scale disasters in recent years, the whole world now has a shared awareness that climate change will increase the threat of natural disasters.

The Special Report on the Ocean and Cryosphere in a Changing Climate (SROCC) released by the Intergovernmental Panel on Climate Change (IPCC) in 2019 predicts that the global mean sea level will rise by as much as a meter or more by the end of the century.[4] It also indicates that this will increase the frequency of extreme events involving the sea level, such as storm surges at high tide and during storms.

The report suggests that by the middle of this century, many cities and SIDS in coastal lowlands might be seeing hitherto once-a-century events happen every year as global warming raises the temperature by 1°C. The same is predicted to happen around Japan too, albeit later on.[5]

The report also predicts that although tropical cyclones could become less common in some areas,[6] Category 4 and 5 cyclones could increase in both frequency and intensity all around the globe. Scientific knowledge compiled by the IPCC has already had an impact on countries' policies, and the SROCC has contributed to a wider understanding of the importance of regional disaster response in island and coastal areas.

These threats from climate change are raising questions about countries' security systems that are based on assuming the risks will be the same as up to now. According to the Global Risks Report published that lists the highest risks for the next decade, extreme weather has ranked first every year since 2017, and "climate action failure" has ranked second since 2019.[7]

Policies and systems are already starting to be reviewed in light of climate change. For example, the United States' Biden administration announced an executive order on January 27, 2021, stating that climate crisis would be at the center of its foreign policy. The White House is also calling on the Department of Defense and other relevant organizations to assess the impact of climate change on national security. This review of policies and systems could have a major impact on how countries respond to disasters. The Asia-Pacific region is clearly at the center of this dynamism, given that it is hit by large-scale meteorological disasters so often.

3. Climate change and humanitarian assistance and disaster relief (HA/DR)

Along with terrorism and infectious diseases, natural disasters are an epitomic threat in terms of non-traditional security. At the 2000 UN Millennium Summit, the then Secretary-General of the United Nations Kofi Annan said that the spirit of human security was about keeping people "free from fear" and "free from want." This is exactly what people need when natural disasters force them from their

3 Eckstein, D., Künzel, V., Schäfer, L., & Winges, M. (2019). *Global Climate Risk Index 2020. Who Suffers Most from Extreme Weather Events? Weather-Related Loss Events in 2018 and 1999 to 2018*. Bonn: Germanwatch.

4 Intergovernmental Panel on Climate Change. (2019). Summary for Policymakers. In: IPCC Special Report on the Ocean and Cryosphere in a Changing Climate [H.-O. Pörtner, D.C. Roberts, V. Masson-Delmotte, P. Zhai, M. Tignor, E. Poloczanska, K. Mintenbeck, A. Alegría, M. Nicolai, A. Okem, J. Petzold, B. Rama, N.M. Weyer (eds.)]. In press.

5 *Ibid.,* SPM B3.4, Figure SPM.4.

6 Many studies predict that tropical cyclones are becoming less frequent worldwide, but they are not very reliable regarding how the frequency is changing (IPCC, 2019).

7 World Economic Forum. (2021). *The Global Risks Report 2021,* 16th ed. (https://www.weforum.org/reports/the-global-risks-report-2021/)

homes and deprive them of the freedom to live with dignity.

The focus of human security has shifted from "nations" to "people," and it is now about protecting people's dignity and freedom from various modern social ills, natural disasters among them. Mushakoji (2013) states that human security is creating new "spaces of awareness," enabling the discussion of security to expand from the traditional notions based on individual nations, and now broadly encompassing security for humans' diverse ways of life.[8] Consequently, the actors involved in human security are also becoming diverse, with researchers, NGOs and other civil sector agencies, UN organizations, development aid donors, and more each doing their part.

However, the involvement of the military organizations—the main players in traditional security based on individual nations—is no weaker than before. As discussed below, in principle, humanitarian assistance in the event of natural disasters or conflicts is conducted by civilians, and military organizations should only be used when a civilian response alone will not suffice. However, factors such as the recent intensifying of large-scale natural disasters are causing military organizations to play increasingly important roles in humanitarian assistance.

Meanwhile, amid growing interest in global governance, disaster response is coming to be regarded as serving the good of all human beings. In this connection, it has been suggested that countries' military organizations are becoming increasingly involved in HA/DR.[9] While it is important for security that different countries' military organizations not be too wary of each other, military exercises and joint training aimed at cooperation in the event of disasters can be done in a spirit of peace. Consequently, they are thought to be useful tools for building trust between nations.

Yamamoto (2011) describes how militaries are shifting from only serving their traditional roles related to policing activities and the use of force, and are now also taking on new roles related to responding to non-human threats from natural and environmental factors. He calls this "Postmodernism II," and says that humanitarian and disaster assistance is forming a framework for international cooperation.[10] The idea that cooperation in the field of HA/DR is important for regional security is now spreading worldwide. Calls for HA/DR are clearly going to increase as concern heightens regarding climate change issues and the natural disasters that will ensue. Two perspectives allow us to clarify the increasing natural disaster risk in terms of security against a background of climate change.

Firstly, there are concerns that military organizations could be swamped by the burden of increased HA/DR duties and national defense threats. As the frequency and intensity of natural disasters increase due to climate change, countries' military organizations will need to allocate more human and financial resources to HA/DR in order to maintain regional stability. While we need not immediately conclude that climate change will make natural disasters more intense and frequent, there can be no doubt that many governments are aware of the increasing risk of such disasters due to climate change.

In an assessment report released in 2018, the New Zealand Ministry of Defence states that the impacts of climate change may increase the frequency of HA/DR, stability operations, and rescue missions. It also says that the New Zealand Defence Force may need to commit to more frequent operations, forcing it to divide its resources and potentially rendering it less prepared for other demands.[11]

The impacts of climate change also threaten the maintenance and guaranteeing of defense functions. This could become an additional burden. For example, a report released by the US Department of Defense in 2019 states that the impacts of climate change could pose an imminent threat to two-thirds of the 79 military facilities within the homeland.[12] In addition to hurricanes and other meteorological disasters, climate change will affect military facilities through rising sea levels and other slow-onset

8 Mushakoji, K. (ed.) (2013), *Human Security: Beyond the State-centric*. Minervashobo.

9 Tomonori, Y. (2013). The Military and Humanitarian Assistance and Disaster Relief: Its Implications for International Security. *The Journal of International Security*, 41(2), 1-14.

10 Yamamoto, Y. (2011). The Transformation of International System and Security: The Modern, the Post-Modern, the Post-Modern/Modern Complex. *Japan Maritime Self-Defense Force Command and Staff College Review*, 1(2), 4-29.

11 New Zealand Ministry of Defence. (2018). *The Climate Crisis: Defence Readiness and Response*. (https://www.defence.govt.nz/publications/publication/the-climate-crisis-defence-readiness-and-response).

12 U.S. Office of the Under Secretary of Defense for Acquisition and Sustainment. (2019). *Report on Effects of a Changing Climate to the Department of Defense*. (https://media.defense.gov/2019/Jan/29/2002084200/-1/-1/1/CLIMATE-CHANGE-REPORT-2019.PDF).

events. For example, the above-mentioned report also states that the Langley Air Force Base in Virginia is facing an increasing threat of sudden floods caused by rising sea levels. Military organizations will be forced to take action against natural disasters that could damage their bases, facilities, and equipment, and against conflicts and other security threats that could arise in the event of a disaster. Moreover, there are fears that if existing threats to security such as conflicts and water resources are exacerbated, then military organizations could be overwhelmed.

The second perspective is that global concerns about climate change issues are predicted to cause substantial changes in, and increase the influence of, the political signals that cooperation in disaster-related fields sends. While conflicts and similar humanitarian crises happen at random, the impacts of climate change are to an extent predictable, and communities have a shared understanding that the risk of them is going to increase. Accordingly, developed countries are already being called on to give further assistance in order to address the impacts of climate change preemptively.

International discussions about climate change include "loss and damage" that features in Article 8 of the Paris Agreement adopted under the United Nations Framework Convention on Climate Change in 2015. However, the debate over whether developed countries should take historical responsibility for greenhouse gas emissions and compensate developing ones is in a state of deadlock, and consequently, there are no effective mechanisms through which developed countries provide assistance to address the actual damage caused by climate change. In this regard, strengthening multinational cooperation on disaster response could provide a concrete way to meet the calls for aid regarding damage caused by climate change. HA/DR in particular is regarded as an effective tool for the military to secure its operational capability and procure equipment, so it has merits for the aid donors and recipient countries alike.

In fact, the US military has already been expanding HA/DR's position as an important core of its external policy.[13] After the Foreign Assistance Act was formulated in 1961, HA/DR was used to secure the influence of the military during the Cold War. It has become more systematic and efficient since then, and is now being used as a means of smart power to gain international credibility.[14] Disaster response—and in particular providing assistance in the field of HA/DR—will acquire even greater value and influence than before by virtue of being a response to the new threats of climate change.

In light of these perspectives, international cooperation in disaster-related fields can be viewed as an important climate security issue as well. The next section gives an overview of how multinational cooperation on disaster response is done, and what kinds of roles international and military organizations fulfill in the security environments surrounding the Asia-Pacific region. It also clarifies how climate change is perceived within the current systems of cooperation.

4. Cooperation on disaster response in the Asia-Pacific region

Predictions suggest that approximately 40% of the damage caused by disasters around the world will be concentrated in the Asia-Pacific region.[15] If climate change increases the uncertainty regarding future disaster risks, then it will inevitably affect the perceptions and actions of the countries involved in the region. This means that there will be some considerable changes in the regional security systems that surround the Asia-Pacific, as countries try to respond to the disaster threats. Multinational cooperation in disaster-related fields in the Asia-Pacific region involves an extremely diverse range of countries, and is being discussed within each of their frameworks. Examples include regional communities such as the Association of Southeast Asian Nations (ASEAN) and the South Asian Association for Regional

13 Leong, T.K. (2008). Humanitarian assistance disaster relief as a core military competency. EWS Contemporary Issues Paper. United States Marine Corps Command and Staff College, Quantico.

14 Ishihara, T. (2011). The HA/DR Developments of the US Military. *Japan Maritime Self-Defense Force Staff College Review*, 1(2), 71-86.

15 UNESCAP. (2017). *Disaster Resilience for Sustainable Development. Asia-Pacific Disaster Report 2017*. (https://www.unescap.org/sites/default/d8files/knowledge-products/0_Disaster%20Report%202017%20High%20res.pdf).

Cooperation (SAARC). In addition to these, there are organizations such as Asia Pacific Economic Cooperation (APEC), of which 21 countries and regions in the Asia-Pacific are members, and the East Asia Summit (EAS), whose members include the 10 ASEAN countries, Japan, China, Korea, the United States, Russia, India, Australia, and New Zealand. Efficient disaster response would be impossible without their cooperation.

To conclude: there is growing interest in international cooperation in disaster-related fields—and particularly HA/DR—in the Asia-Pacific region, and it is beginning to match the expanding needs regarding responding to the climate change issues the region is facing. Some of the reasons behind this include the following: mindful of China's expanding influence, the countries neighboring the region are increasing their involvement in it; responding to natural disasters is becoming an urgent issue among Pacific island countries and ASEAN Member States; and these factors are forging the foundations of cooperation in the form of a shared awareness of the climate change issues. The sections below clarify the trends regarding climate change and natural disasters in Southeast Asia and the Pacific region, in order to give an overview of the status quo concerning the above matters. They also look at the disaster response to date by China, which is increasing its presence in those regions.

(1) *Southeast Asia*

The crossroads between the Indian Ocean and the Pacific Ocean, Southeast Asia is one of the world's most vulnerable regions to natural disasters, and as such is facing an increasingly urgent need to respond to them. At the same time, it is engulfed in a maelstrom of competition between the major powers involved in the Indo-Pacific.

ASEAN has been actively developing cooperation systems for disaster response in the region. Cooperation on disaster response within the organization's region is being promoted under the following three conference bodies: the ASEAN Regional Forum (ARF), the ASEAN Committee for Disaster Management (ACDM), and the ASEAN Defense Ministers Meeting (ADMM).[16]

ASEAN had its starkest-ever illustration of the importance of international cooperation in the field of HA/DR when the Sumatra-Andaman Earthquake and Indian Ocean Tsunami struck in 2004. The United States, Japan, the United Kingdom, Australia, China, France, Germany, and New Zealand were among the countries that took part in the response. The event prompted the establishment of a multinational cooperation system for disaster response and focused interest on cooperation between Southeast Asian countries. The ASEAN Agreement on Disaster Management and Emergency Response (AADMER) was formulated under the ACDM the following year (2005). It made the mandates and chain of command clearer, paving the way for efficient disaster response that would be free from the complications in the collaborations between organizations that past efforts had been prone to.[17]

The ARF also has been expanding cooperation on disaster response through discussions at, for example, the ASEAN Regional Forum Inter-Sessional Meeting on Disaster Relief (ARF ISM-DR) and the ASEAN Regional Forum Disaster Relief Exercise (ARF DiREx) (the latter held biennially since 2009).

Two points that should be noted about ASEAN are as follows: it has been holding the Asia-Pacific Conferences on Military Assistance to Disaster Relief Operations (APC-MADRO) since 2005, based on the lessons learned from the Sumatra-Andaman Earthquake and Indian Ocean Tsunami the previous year; and it created a unique set of APC-MADRO Guidelines in 2014.

These new guidelines brought the traditional standards regarding accepting international emergency assistance into line with the realities in the region. Up until then, UN organizations had used foreign military and private defense assets for disaster relief in accordance with the Oslo Guidelines, which were

16 Flint, J., Eggleston, B., Shevach, S. A., & Rosas, A. (2017). *Humanitarian Civil-Military Coordination in Emergencies: Towards a Predictable Model*. The Regional Consultative Group on Humanitarian Civil-Military Coordination for Asia and the Pacific.

17 Silingardi, S. (2012). From Theory to Practice: The Role of Disaster Response Missions. In A. de Guttry, M. Gestri, & G. Venturini (Eds.), *International Disaster Response Law.* 465-484. The Hague: T.M.C. Asser Press, pp. 465-484.

created in 1994 by the United Nations Office for Coordination of Humanitarian Affairs (UNOCHA) and the 45 countries and 25 international organizations related to it.

These guidelines stipulated that the main disaster relief actors were to be civilian organizations, and in principle, the military was to be used only as a last resort when there were no suitable civilian alternatives. However, the ASEAN Member States had a shared awareness of how the military had played a major role in the initial response to large-scale disasters that had hit Southeast Asia in recent years. Reflecting this fact, the APC-MADRO Guidelines—a set of policies intended to complement the Oslo Guidelines—take into account the role of the military in humanitarian assistance.[18]

The massive Typhoon Haiyan that struck the Philippines in November 2013 was one of the largest disasters in the region's history. It left some 8,000 dead and affected as many as 16 million others. However, Due to the focus on consensus and respecting national sovereignty, ASEAN Member States failed to take the lead in HA/DR for the disaster, and the central role was played by outside assistance alone.[19] Moreover, the coordination between civilian and military efforts did not achieve the ideals specified in the APC-MADRO Guidelines, and there were issues regarding the understanding of coordination between civilians and the military at national, state, and local levels, and regarding forming a shared understanding of what military capabilities can be used for humanitarian assistance.[20]

National defense agencies had hardly ever been involved in the AADMER process up to then. However, Typhoon Haiyan made ASEAN Member States more aware than ever of the importance of the military's role in the field of HA/DR, and of the importance of coordination between military agencies and between civilian and military ones. Consequently, they are now rapidly systematizing multinational military cooperation.[21] They appear to be seeking regionally unified HA/DR. Notable evidence of this includes the launch in 2020 of the ASEAN Militaries Ready Group, whose aim is to enhance operational cooperation in the event of a disaster. This concept had been adopted at the ASEAN Defense Ministers' Meeting in March 2015. The foundations for disaster response cooperation in ASEAN appear to have been fully laid at last. Recent developments in that regard include the updating of the work program to be formulated under AADMER in November 2020, and the formulation of a five-year plan for 2021 onward.

The 27th ARF Ministerial Meeting (held in 2020) adopted the ARF Hanoi Plan of Action II, which provides guidelines for cooperation up to 2025. The plan makes disaster relief one of seven areas of cooperation, so further cooperation on disaster response can be expected.

Southeast Asia has seen a wide variety of natural disasters throughout its history, and with typhoons, droughts, and other meteorological disasters becoming visibly more intense in recent years. Therefore, a crisis awareness regarding climate change issues is widely shared among people in the region. The Southeast Asia Climate Outlook 2020 Survey that targeted more than 500 people, including ASEAN policy makers, experts, and business sector, showed that climate change.showed that climate change issues were among the greatest threats to regional security, ranking alongside terrorism and military tensions. Some also say that disasters related to climate change will increase the risk of the terrorism that plagues the region.

The new security framework being promoted under the Free and Open Indo-Pacific (FOIP) concept advocated by Japan cannot ignore concerns about disaster risks due to climate change, either. ASEAN lies in the center of the Indo-Pacific and is a geopolitically important region for achieving the FOIP. The Quadrilateral Security Dialogue (QUAD) consisting of Japan, the United States, Australia, and India is leading the strategy and strengthening its relations with ASEAN, so these countries are also interested

18 Kawashima, T. (2019). The Civil-Military Relations in the International Emergency Assistance Operations. Japan Peacekeeping Training & Research Center, Joint Staff College.

19 Loh, D. M. H. (2016). ASEAN's Norm Adherence and Its Unintended Consequences in HADR and SAR Operations. *The Pacific Review*, 29(4), 549-572.

20 Akahoshi, S. & Watabe, M. (2014). International Norms and Standards on Humanitarian Civil-Military Coordination (CMCoord) in Responding to Natural Disasters. *International Public Policy Studies*, 19(1), 83-97.

21 Ishihara, Y. (2015). The Concept of Synergy in Multinational Security Architectures: Hints from HA/DR Cooperation Centered on ASEAN. *NIDS Commentary No. 47*. The National Institute for Defense Studies. (http:// www.nids.mod.go.jp/publication/commentary/pdf/commentary047.pdf).

in the climate change issues in Southeast Asia.

Against this background, the ASEAN Member States are progressively forging relationships in the field of climate change with neighbors outside the region. There is a shared understanding in Southeast Asia that long-term responses to the impacts of climate change are necessary. The issues have been referred to in statements and declarations made at the ASEAN Ministerial Meetings almost every year since 2007, and the ASEAN leaders' vision for a "Resilient and Innovative ASEAN" announced in 2018 also includes strengthening the organization's response to climate change.[22] Indonesia in particular is strengthening its cooperative relationship with the United States in the field of climate change. The United States has promised cooperation to the tune of $450 million in the comprehensive partnership between the two countries. It has also provided $3.7 million in support toward conducting climate change and disaster risk management in accordance with the Indonesia National Action Plan on Climate Change Adaptation (RAN-API).[23]

ASEAN is also strengthening the foundations of cooperation on climate change with India. In connection with its Act East policy, in 2007 India established a Green Fund jointly with ASEAN to support cooperation in environmental fields, and from 2015 to 2017, it produced predictions of climate change, constructed models for assessing its impacts, and worked on building up capabilities.

Japan is pursuing cooperation and support regarding climate change based on the ASEAN Climate Change Action Agenda. Whether the cooperation in the field of HA/DR within and outside ASEAN will lead organically to the establishment of cooperative systems regarding climate change remains to be seen.

(2) *The Pacific region*

The Pacific island countries are vulnerable to the impacts of natural disasters such as rising sea levels and tropical cyclones, so it is no overstatement to say that responding to climate change is a matter of life and death for them. Spurred on by this crisis awareness, the concept of security is spreading, and climate change issues are increasingly being placed at its core. The BOE Declaration adopted at the 49th Pacific Islands Forum in Nauru in 2018 identified climate change as "the single greatest threat" to the security of the Pacific region.

Fourteen countries dot the Pacific Ocean, divided into the subregions Micronesia, Polynesia, and Melanesia. Security in the region will be difficult to understand without looking at these countries' individual historical backgrounds and relationships with other nations. The three titular signatories to the 1951 Australia, New Zealand, United States Security Treaty (ANZUS Treaty) shared responsibility for the region's post-war security along with the United Kingdom and France, which have territory there. All five have supported the Pacific island countries' development and economies.

Meanwhile, the Pacific Islands Forum (PIF)—which consists of Australia, New Zealand, and the Pacific island countries—is an organization responsible for regional policy, and as such, it has been promoting cooperation on regional security among Member States. However, ongoing confusion has resulted from the breaking of a gentleman's agreement between the leaders to select a candidate from Micronesia as the next Secretary-General. (One from Polynesia was chosen instead.) For example, the affair prompted the five Micronesian countries to declare they would withdraw from the forum entirely.

In addition, former colonial powers such as Australia, New Zealand, and the United Kingdom are working proactively to ensure stability in the region in response to China's growing economic presence and political influence. In the Pacific, this fluidity of the regional security environments is intimately related to multinational cooperation on disaster response. Australia and New Zealand play a leading role in disaster response in the region through HA/DR, and are a core theme regarding strengthening in-

22 ASEAN. (2018). ASEAN Leaders' Vision for a Resilient and Innovative ASEAN. (24 April 2018). (https://asean.org/wp-content/uploads/2018/04/ASEAN-Leaders-Vision-for-a-Resilient-and-Innovative-ASEAN.pdf).

23 U.S. Mission to ASEAN. (2021). Advancing Sustainable Recovery. (https://asean.usmission.gov/connect/advancingsustainablerecovery/?_ga=2.160692414.2075680774.1619749729-144413485.1619749729) (accessed on May 10, 2021).

volvement in the future. Meanwhile, the Pacific island countries have growing concerns about the frequent large-scale disasters in recent years, given that they currently have to depend on former colonial powers and other donors for assistance.

Only three of the Pacific island countries—Papua New Guinea, Tonga, and Fiji—have their own militaries,[24] and even these are not large. Consequently, all of them will need to ask their neighbors for assistance if a major disaster strikes. There is a boundary line regarding who assists whom: Australia and New Zealand initially respond to disasters in Melanesia, and the United States responds to ones in the signatories to the Compact of Free Association—namely, the Marshall Islands, the Federated States of Micronesia, and Palau. Moreover, besides military organizations' roles in disaster assistance, those played by aid organizations and the private sector cannot be ignored.

To give just one example of the kind of assistance provided when a major disaster strikes the Pacific region, let us look at the process that ensued after the development of Tropical Cyclone Yasa, which wreaked havoc in Fiji in December 2020.

The development of a tropical cyclone off the coast of Vanuatu was confirmed on December 12, 2020, and the Fiji Meteorological Service named it Yasa on the 13th. Yasa developed into a Category 5 cyclone, and Fiji's Prime Minister urged citizens to prepare for a disaster in a video message on the 16th. A National Disaster Management Office (NDMO) was established the same day, and the police and military started their initial response. On the 17th, the storm made landfall on the Fijian island of Vanua Levu, causing significant damage everywhere. The Fijian government declared a State of Natural Disaster. Yasa was the worst disaster Fiji had seen since it was hit by Super Cyclone Winston in 2016. Although it did not cause many deaths, numerous villages suffered catastrophic damage, and more than 20,000 people were forced to evacuate. The death toll was confirmed to be four on the 19th.

Fijian government survey teams began assessing the damage on the ground the same day. In the early days of the disaster, the domestic military and the police and fire departments adeptly divided their roles as they conducted the evacuations and other response work. The Australian and New Zealand Defence Forces began providing initial assistance two days after Yasa's landfall, used aircraft to ascertain the damage, and were among the first to provide supplies.

The International Federation of Red Cross and Red Crescent Societies (IFRC) released information on the initial emergency response fund shortly after the storm made landfall, and provided $97,000 in relief supplies. China was also among the first to donate, giving FJ$210,000 through the Red Cross. As the full extent of the damage became clear, relief supplies were provided. The Red Cross began providing them on the 21st, and the United States also provided initial support through it the same day. Chinese Minister of Foreign Affairs Wang Yi expressed his sympathy to Fiji's Prime Minister Bainimarama on the 21st as well. On the 22nd, additional relief supplies arrived from the Australian Defense Force, which also helped transport supplies provided by the United Kingdom, United Nations Children's Fund (UNICEF), Care International, and other donors. Organizations in Fiji also provided assistance toward the disaster relief, among them Fiji Development Bank, private companies (Vodafone Fiji, Energy Fiji Limited, etc.), civilian organizations (Oxfam Pacific, etc.), and religious organizations (the Methodist Church). A cluster system meeting was held on December 23 (about a week after the disaster), with the aim of coordinating efforts between the United Nations, other international organizations, local aid partners, and high-level Fijian government officials.

In the event of emergency humanitarian assistance, each actor in principle coordinates and provides its assistance in line with a cluster system set up by the United Nations. The purpose of a cluster system is to decide which organizations will take the lead in the various fields and to facilitate coordination between international and local government organizations, NGOs, etc. In the case of Yasa, the NDMO run by the local government took the leading role in six clusters: food security, health care, water and sanitation, emergency evacuation, communication, and safety and protection.

24 Yoshikawa, N. (2020). The Pacific Island Countries and the Belt and Road Initiative: Reformation of International Order and China (Special Feature: Maritime Order in an Age of Competition between Major Powers). *Japan Maritime Self-Defense Force Staff College Review*, 10(1), 85-108.

Reviewing the development of events after Yasa reveals that Australia and New Zealand dispatched troops to conduct HA/DR in the initial stage, China immediately provided funds and sent a message, and the United States, United Kingdom, EU, and Asian Development Bank provided relief supplies and funds after that. When Yasa struck, New Zealand called Fiji its "Pacific whānau" (family in the Pacific) when providing assistance, and Australia's Minister for Foreign Affairs Marise Payne said Fiji and Australia were not just neighbors, but also family. These acts show how seriously both countries take their responsibilities toward regional stability in the Southwest Pacific. China's conduct also reveals that it regards Fiji as an important strategic partner.

In recent years, the colonial powers and other traditional development partners have been growing more wary of the increasing influence of China—a non-traditional one. Prompted by these recent geopolitical changes in the Pacific region, the United States, Australia, and New Zealand have been placing greater emphasis on aid for Pacific island countries in recent years.[25]

This is also clear from how, concerned about its declining relative influence in the region, the New Zealand government announced "Pacific Reset: A New Perspective and Strengthening of Policy Against the Pacific Region" in 2018, expressing its commitment to strengthening its aid for the Pacific island countries. Australia and New Zealand are members of the ANZUS Treaty, and both include ensuring the stability of their neighbors in the South Pacific in their defense white papers. Disaster assistance in the region is their current response. The Humanitarian Action Policy released by New Zealand's Ministry of Foreign Affairs and Trade in 2019 says that early response to natural disasters in the Pacific region is a priority issue. Disaster assistance for the Pacific island countries is therefore expected to play a central role in the nation's aid diplomacy.

The Humanitarian Strategy announced by Australia's Department of Foreign Affairs and Trade in 2016 also says that aid regarding preparedness for and effective responses to disasters is an important area. Disaster assistance for the Pacific island countries is therefore also key to Australia's involvement in the region, just as it is for New Zealand's.

In Australia, in a federal election held in September 2013, a coalition government was voted in, and the Australian Agency for International Development (AusAID) was absorbed into the Department of Foreign Affairs and Trade. A new aid policy was promulgated in 2014 to clarify the nation's national interests, and the high priority it places on support in the field of economic development.[26] The Humanitarian Action Policy[27] announced by AusAID in 2011 used the term "Asia-Pacific region." However, the new aid policy uses the combined term "Indo-Pacific." This also indicates that Australia is strengthening its strategic involvement in the region.

France has also deepened cooperation with Australia and New Zealand through HA/DR, thereby gaining a foothold toward being involved in joint security in the South Pacific.[28] In April 2021, the European Union also agreed to compile an Indo-Pacific Strategy, with the aim of strengthening economic and security relations with countries around the region in light of China's expanding influence. It is only a matter of time before these moves affect disaster response cooperation as well.

It should be noted that Japan is also strengthening cooperation in the Pacific region with Australia and New Zealand under the Free and Open Indo-Pacific Strategy, and Japan's Air Self-Defense Force is strengthening cooperation in regions such as the Northern Mariana Islands, Palau, and the Federated States of Micronesia. For example, it participated in the HA/DR joint training Operation Christmas Drop with the air forces of the United States, Australia, and New Zealand.

The fact that Japan, the ANZUS members, France, China, and other countries are becoming more

25 Newby, V. (2020). ANZUS Cooperation in Humanitarian Assistance and Disaster Response in the Asia-Pacific: Ships in the Night?. *Australian Journal of International Affairs*, 74(1), 72-88.

26 Ministry of Foreign Affairs of Japan (2020), Section 3: Overview of Economic Cooperation by Major Donors and Regional Organizations. *Development Cooperation Reference Collection 2019 Edition*.

27 Australian Agency for International Development. (2011). Humanitarian Action Policy. (https://www.dfat.gov.au/sites/default/files/ausaid-hap-dec-11.pdf).

28 Kanda, H. (2016). France's South Pacific Strategy: The Role of Maritime Regional Stability. *National Defense Academy Bulletin (Volume Regarding Social Science)*, 113(28.9). Separate Print.

involved in the Pacific region through HA/DR is interconnected to their moves toward deepening their involvement with the island countries there through assistance in the field of climate change. For the island countries as well, climate change is certainly key to receiving assistance from and strengthening relations with these development partners.

After Cyclone Yasa struck Fiji, Prime Minister Bainimarama declared a State of Natural Disaster and said immediately afterward, "This is a climate emergency."[29] While there were probably various motives behind this — for example, enhancing the sense of crisis on climate change issues in the international community and encouraging developed countries in particular to pursue climate change countermeasures — it also reveals how strongly the Pacific island countries are linking climate change with the increasing threat of disasters. In the moves toward strengthening multinational response to disasters in the context of climate change, the nations involved and the Pacific island countries all want the same thing.

(3) *China's expansion and disaster diplomacy*

Against this background, China is enhancing its presence in humanitarian assistance and disaster management in the Asia-Pacific region. It established the China International Search and Rescue (CISAR) team in 2001, and in particular has become more proactive in international cooperation on natural disasters abroad since 2003. While enhancing its presence as a "responsible great power" and strengthening its influence in the Asia-Pacific region are certainly among the reasons behind this, its policy-making process involves complex, multilayered national interests.[30]

HA/DR is an effective means for current China to improve the capability of the People's Liberation Army and build bilateral relations with its neighbors, and its military organizations have been proactively participating in joint HA/DR exercises with those of other countries.[31] In 2016, for example, the Chinese People's Liberation Army participated in humanitarian assistance and disaster response training in the Pacific region held by the New Zealand Defence Force. Also taking part were the United States, France, Australia, and Tonga. China established the China International Development Cooperation Agency in 2018 with the aim of promoting humanitarian assistance for natural disasters abroad. While some ridicule this as "disaster diplomacy," China's contribution as a new humanitarian actor and its proactive participation in multinational cooperation (including sharing HA/DR expertise) can be expected to improve disaster response capability in the region.

However, China tends to conduct HA/DR in light of political interests rather than from a humanitarian viewpoint. For example, it was severely criticized by its neighbors for its tardy emergency assistance in 2013 when Typhoon Haiyan struck the Philippines, with whose government it had tense relations in the South China Sea.[32]

The scale of China's humanitarian assistance is not very large from an international standpoint, but a large proportion of it consists of assistance for natural disasters, because they are considered less political than civil wars and other complex crises.[33] On the other hand, apart from the Sichuan Earthquake in 2008, China itself has almost never accepted international relief teams from abroad. However, given that climate change risks are also likely to increase in China, responding to disasters within its own borders will also become more important. The flood risk is reportedly particularly high around the midstream to the downstream sections of the Huai and Yangtze Rivers in the north, and around the Pearl

29 The Fiji Times. (18 December, 2020). TC Yasa: 'Something is not right' — Fijian PM. (https://www.fijitimes.com.fj/tc-yasa-something-is-not-right-fijian-pm/).

30 Hirono, M. (2019). Linkage between Chinese Humanitarian Action and Foreign Policy. *Journal of Law, Politics and Sociology*, 92(1).

31 Southerland, M. (2019). The Chinese Military's Role in Overseas Humanitarian Assistance and Disaster Relief: Contributions and Concerns. US-China Economic and Security Review Commission.

32 The Diplomat. (28 July, 2014). *HADR and US-China Military Cooperation*. (https://thediplomat.com/2014/07/hadr-and-us-china-military-cooperation/).

33 Shao-Hong, W., Tao, P., & Shan-Feng, H. (2012). Climate Change Risk Research: A Case Study on Flood Disaster Risk in China. *Advances in Climate Change Research*, 3(2), 92-98.

River as well.[33] The flooding in the Yangtze River Basin caused by torrential rain in June 2020 resulted in significant damage, including 15 million evacuees.[34] China is currently focusing its efforts on expanding its external disaster assistance, but given the impacts of climate change in the future, it will also be forced to consider strengthening its internal disaster management, accepting external assistance.

This situation is also drawing attention to the possibility of cooperation between the United States and China in the field of HA/DR, which will probably be possible in Southeast Asia. Given China's expansion into the South China Sea, the United States is unlikely to lessen its involvement in HA/DR in the ASEAN Member States. In April 2021, the United States and China released a joint statement that they will cooperate on addressing climate change. However, the cooperation will solely be on action to reduce greenhouse gas emissions, and the statement contains nothing about applying it to the impacts of climate change.

There is debate among experts as well over whether a cooperative relationship will be formed between the two countries regarding preparing for disasters. However, there should be potential for cooperation in HA/DR now that the two nations have announced they will cooperate on addressing climate change. But it will only happen if China adopts a humanitarian rather than political standpoint for its disaster response and contribution to multinational cooperation in the region.

Cooperation between China and ASEAN is worthy of note in this regard. Disaster response cooperation also serves as a buffer in national relations. For example, while the Philippines is pursuing bilateral relations with China cautiously because of the South China Sea issue, it has also shown that it is willing to accept cooperation from China in the field of HA/DR as long as the scope is controllable.[35] ASEAN Member States have been encouraging China to participate in the multinationalism in the Asia-Pacific region, and this has helped stabilize the international environment. The key to disaster response cooperation probably lies in whether a regional framework that includes China can be formed.

5. The future of disaster response cooperation

The previous section summarized the current situation regarding multinational cooperation on disaster response in Southeast Asia, the Pacific region, and China. In view of China's recent expansion, Japan, the United States, and other countries around those regions are becoming more involved in them, with emergency assistance for disasters at the core of their stances. Meanwhile, concerns about climate change issues and the needs regarding responding to them are growing in the countries that constitute the region. In particular, the Pacific island countries consider climate change to be one of their most important security issues. The situation in the Asia-Pacific region is currently being formed by the major powers around it that want to get more involved there, and by the countries in it that require assistance. Interest in disaster response cooperation is mounting as a result.

The region's shared threat of climate change and its associated natural disasters are also issue areas countries can seek to cooperate on. International cooperation on both "mitigation" (reducing greenhouse gas emissions) and "adaptation" (responding to the impacts of climate change) is essential for addressing climate change. The latter includes disaster response and is easier for countries to cooperate on than the former, with which economic trade-offs are always at the center of the discussion. Climate change issues have now been recognized as shared issues in the region, and disaster response cooperation is becoming a foundation for cooperation between countries. In light of these circumstances, the following section will discuss the future issues for further strengthening regional multinational cooperation on disaster response.

34 Associated Press (June 13, 2020). *China Reports 141 Dead or Missing in Flooding Since June*. (https://apnews.com/627aa15392c9704d3f22e2f3ffc7b639).

35 National Institute for Defense Studies. Ministry of Defense, ed. (2020). *East Asian Strategic Review 2021*.

(1) *Efficient coordination in the field of HA/DR*

Firstly, one urgent issue is to eliminate the complexity in the system of international emergency disaster assistance. A diverse range of actors conduct HA/DR, and the decisions have to be made in the face of uncertainty, so coordination and negotiation are essential. This issue is particularly noticeable in disaster response in developing countries that require assistance from outside.[36] The recent increase in the number of actors involved in humanitarian assistance is also leading to overlapping duties and political confrontations, and is hindering harmonious assistance.[37]

Moreover, if information and knowledge are not shared between the actors, this will prevent their resources from being leveraged fully in the event of an emergency.[38] Despite many meetings aimed at coordinating the multinational cooperation in the case of the Indian Ocean Earthquake in 2004, despite many meetings, there were still issues regarding the quality of the actual sharing of information and know-how.[39] The impacts of climate change will make this kind of cooperation between countries and stakeholders even more complex.

As discussed above, many countries have been getting more involved recently in the Asia-Pacific region. If their involvement becomes jumbled when a disaster strikes, then even more complex coordination will be required. This could easily prevent vital assistance from getting to where it is needed. Cyclone Yasa was an example where all the actors played their respective roles smoothly. These included the local military and police, and Australia and New Zealand, who are leading regional security.

However, the possibility must also be considered that assistance needs will emerge that exceed the existing response capabilities. For example, this might happen if disasters occur in quick succession more frequently, or if increased social vulnerabilities due to climate change mean that disasters tend to cause more damage. The countries involved will need to maintain close communication with each other in order to constantly seek suitable approaches to disaster response, including HA/DR.

(2) *Strengthening civil-military cooperation*

The QUAD Member States and other nations are pursuing stronger relations with the Pacific island and Southeast Asian countries under the Indo-Pacific Strategy. They are beginning to recognize that disaster response assistance is an effective means to exercise smart power, and they may well engage in disaster diplomacy with China in the future. However, as already mentioned, the ultimate goal of humanitarian assistance and disaster relief is to ensure human security, and helping disaster victims must not end up simply as a political game. Humanitarian assistance organizations sometimes express concern about having military forces involved, because there are often political, geopolitical, and military connotations when they are.

However, the frequency of major disasters in recent years has made it impossible to ensure people's security without military involvement. Therefore, cooperation between UN humanitarian organizations, NGOs, and the military—in other words, civil-military cooperation—looks set to become even more important. Military organizations also appear to be recognizing the benefits of cooperating with governments, experts, and humanitarian aid actors. Kiba and Yasutomi (2015) analyze the situation as follows: the increasing non-traditional security threats, including climate change, in Southeast Asia in recent years have changed the functions and roles of the military, and civil-military cooperation is receiving

36 Bui, T., Cho, S., Sankaran, S., & Sovereign, M. (2000). A framework for designing a global information network for multinational humanitarian assistance/disaster relief. *Information Systems Frontiers,* 1(4), 427-442.

37 Silingardi. (2012). op. cit.

38 Zhang, D., Zhou, L., & Nunamaker Jr, J. F. (2002). A knowledge management framework for the support of decision making in humanitarian assistance/disaster relief. *Knowledge and Information Systems*, 4(3), 370-385.

39 Bennett, J., Bertrand, W., Harkin, C., Samarasinghe, S., & Wickramatillake, H. (2006). *Coordination of International Humanitarian Assistance in Tsunami-Affected Countries*. Tsunami Evaluation Coalition. (https://www.unocha.org/sites/unocha/files/dms/Documents/TEC_Coordination_Report.pdf).

more interest as a way to adapt to that.[40] It will be important to promote discussions so as to ensure that these trends lead to effective civil-military cooperation across the Asia-Pacific region.

While they still have some issues, the ASEAN Member States' APC-MADRO Guidelines are a pioneering example of setting new international standards in accordance with the demands of the times. More complex civil-military coordination will be required in the Pacific island region—coordination that will also need to include foreign militaries, and action that anticipates longer, larger humanitarian crises due to climate change.

(3) *Promoting preventive approaches*

Assuming that climate change increases call for disaster response, the burden on military organizations and other emergency aid actors will increase. In view of that, Climate Change Adaptation and Disaster Risk Reduction (CCA and DRR) must be regarded as a security strategy. Many disaster risk mitigation measures have already been taken in developing countries in the Asia-Pacific region through external aid from other countries, but the monetary assistance is insufficient. Based on the Organisation for Economic Co-operation and Development (OECD)'s estimate, only a fifth of the aid funds mobilized by the 36 most developed countries in the world from 2013 to 2017 to address climate change were invested in disaster risk reduction and other adaptation measures.[41] Strategic disaster prevention based on multinational cooperation will need to be conducted in a framework of regional security.

The current situation, however, is that response to the impacts of climate change is not given an adequate place in the framework for regional disaster response. For instance, two ARF Workshops were held on climate change: the ARF Workshop on Climate Change Adaptation and Disaster Management in 2016 in Bangkok, Thailand, and the ARF Workshop on Regional Climate Change and Coastal Disaster Mitigation in 2018, in Tianjin, China, and co-chaired by the Australian, Chinese, and Thai governments. Their focus was on exchanging information and sharing best practices in the region. A necessary next step is to recognize that along with HA/DR, cooperation between countries on disaster risk reduction in terms of skills and knowledge is an important activity that contributes to order and stability in the region.

6. Conclusion

The global COVID-19 pandemic that has raged since 2020 has revealed social vulnerabilities throughout the world. At the same time, violent natural disasters have been striking all around the globe, combining with the infectious disease to leave many countries facing a double catastrophe. The frequent natural disasters have driven home that climate change is becoming a part of daily life. On the other hand, these complex disasters are giving the world opportunities to overcome vulnerabilities and build resilience. International cooperation on disaster response is imperative, and it urgently needs to be updated on the assumption that the impacts of climate change will become increasingly severe.

The Paris Agreement was adopted in 2015, and the same year saw the adoption of the Sendai Framework for Disaster Risk Reduction 2015-2030 at the Third UN World Conference on Disaster Risk Reduction in Sendai City. The framework provides guidelines for how to encourage further international cooperation on disaster response, and developed countries are assisting disaster response in developing countries in line with the following four priority actions it presents: (1) understanding disaster risk; (2) strengthening disaster risk governance to manage disaster risk; (3) investing in disaster risk reduction for resilience; and (4) enhancing disaster preparedness for effective response and to "build back better"

40 Kiba, S. & Yasutomi, A. (2015). Organizational Changes in the Militaries of Southeast Asia: Civil-Military Cooperation in Disaster Relief. *Journal of International Cooperation Studies*, 23(1), 21-41.

41 OECD. (2019). *Climate Finance Provided and Mobilised by Developed Countries in 2013-17*, OECD Publishing. (https://www.oecd.org/environment/climate-finance-provided-and-mobilised-by-developed-countries-in-2013-17-39faf4a7-en.htm).

in recovery, rehabilitation, and reconstruction. In addition to these two international frameworks, the Sustainable Development Goals (SDGs) adopted the same year identify threats from climate change and natural disasters. In order to achieve all of these global agendas, climate change issues should not be addressed as single problems but as an integrated part of efforts on disaster response, including those on disaster risk reduction. Japan is starting to consider integrated approaches to addressing climate change and natural disasters. Notable evidence of this includes the joint message announced by the Minister of the Environment and Minister of State for Disaster Management in June 2020 in which they outlined the strategy for effectively promoting coordinated measures on climate change and disaster risk reduction.

This chapter has illustrated how countries' disaster responses might be affected by recognizing that natural disasters due to climate change will destabilize the regional security systems in the Asia-Pacific. The security environments in the region are already changing through a shared recognition that climate change is a threat. While many issues will certainly be involved in order for countries to cooperate efficiently and for effective assistance to be delivered to disaster-afflicted areas, the various actors will need to provide smooth rehabilitation and reconstruction assistance to disaster-afflicted areas, accepting the risks appropriately as they do so. An essential part of this will be to understand the impacts of climate change in the region and calmly identify the gaps between crisis response and assistance systems. The efforts to minimize the loss caused by natural disasters will need to include establishing a cooperative system to make maximum use of local resources. Japan will be expected to do its part as a country that has extensive experience in disaster risk reduction.

Part 4

Climate Security in International Relations

Climate change affects all regions of the globe, but it's impacts vary considerably. This depends also on the affected populations and polities resilience and capacity to respond.

Part 4 focuses on Pacific island nations, which are most severely challenged by the climate crisis. It clarifies the Pacific islander's own perception of climate security and, additionally, examines the outlook of France with its overseas territories. The analysis highlights the importance of regional cooperation.

The Single Greatest Threat:

Climate Security in the Pacific Islands Region

Fabrizio Bozzato

As proclaimed by the Pacific Islands Forum Leaders in the 2018 Boe Declaration on Regional Security, future climate change poses a set of fundamental challenges to livelihoods in the Pacific Islands region. In the course of a century, globalization — through periods of both colonization and independence — has reconfigured human interactions with natural environments in many island societies, rendering many of these less sustainable than in the past. In addition, Pacific island countries and territories have become part of the global community and economic paradigm, and are now focused on development and economic growth, dependent on trade with other countries, and variably reliant on extra-regional aid (affording many initiatives associated with improving environmental sustainability). Over the past decades, ocean temperature has exhibited a net rise worldwide. In the Insular Pacific, the rising sea level has been causing widespread coastal flooding and shoreline erosion. There has also been a noticeable acidification in sea-surface pH, which is implicated in coral-reef degradation, and a general increase in both the frequency and intensity of tropical cyclones, bringing destruction to an increasingly larger part of the region. To date, accelerations in the rates of both temperature rise and sea-level rise remain unabated. Responses to these changes have been generally inadequate, not least because of problems associated with recognizing them as global and regional — rather than local — and a product of climate change, not just of climate variability.

The climate crisis is likely to have impacts on a range of livelihood factors, from food security to public health, while the ongoing sea-level rise will result in major changes to the habitability of Pacific Island coasts, where most people live. Coral-reef degradation will worsen, and the incidence and magnitude of coralline bleaching will augment. The present high frequency and intensity of tropical cyclones will continue into the foreseeable future. As a result, it is likely that food security in the Pacific region will be challenged from many directions by climate change over the coming decades.

The probable loss of food productivity from nearshore marine ecosystems is of grave concern. Rising ocean temperatures are also going to cause a massive eastward migration of the region's tuna stocks. The ensuing reduction of tuna biomass in the island states' exclusive economic zones will result in a sharp decrease of government revenue and heavy occupational loss, and unsettle the architecture of regional arrangements governing the tuna resources. The overall aspirations of many Pacific Island countries to economic development are likely to be stymied by climate change, particularly as the costs arising from changed geography are fronted. Signally, the natural, cultural, and climatic allure of the Pacific islands plays a crucial role in attracting tourists to the region. This formula is imperiled by climate change, even assuming that tourism will recover to pre-COVID-19 levels. Moreover, it seems unavoidable that, in the next few decades, large numbers of people will be displaced by sea-level rise and forced to relocate to less vulnerable locations. The key to mitigating the impacts of such changes includes effective communication of scientific agendas and appropriate adaptation options to a range of stakeholders, as well as the creation and consolidation of climate security alliances between the Pacific Island nations and committed extra-regional partners. In particular, it is crucial that international partners of Pacific Island nations intensify their efforts to ensure the effectiveness of their assistance for climate change adaptation and bring their own carbon footprint down. Also, regional agencies and gov-

ernments should realistically examine the cogency of their present aspirations around climate change adaptation, and redefine their roles accordingly. Most importantly, Pacific Island communities should be empowered to make informed and sustainable decisions about their ecological and developmental futures.

1. The Pacific Islands region

The Pacific Islands region comprises the island states and territories, excluding Australia (and New Zealand), distributed over an area of 70 million km^2 of ocean between East and Southeast Asia and the Americas. It is conventionally subdivided into the ethno-geographic triad of Melanesia, Micronesia, and Polynesia.[1] Twelve out of the total of twenty-two political entities of the region are United Nations members: Fiji, the Federated States of Micronesia, Kiribati, the Marshall Islands, Nauru, Palau, Papua New Guinea, the Solomon Islands, Samoa, Tonga, Tuvalu, and Vanuatu. To these can be added the Cook Islands and Niue, which are in a free association with New Zealand, and ten more territories annexed by the former colonial powers or continuing to be dependent.[2] The Pacific Islands have varied histories of governance. A series of foreign countries have, at different times, governed most island chains or individual islands. Notably, the Pacific Island countries belong to the last group of colonies that attained independence after World War II.[3]

The region has a demographically, culturally, and economically diverse population. The Pacific Islands are home to approximately nine million Papua New Guineans and about three million inhabitants of other states and territories.[4] Pacific societies are typically described as belonging to one of three broad ethno-cultural groups: Micronesian, Melanesian, or Polynesian. Minorities of Asian or European descent are present in some island states and territories.[5] Traditional Pacific economies were agricultural and subsistence-based. Post-independence, Pacific economies are reliant on fishing royalties, agricultural produce, natural resource extraction (timber, metals, and oil and gas in Papua New Guinea), tourism, and remittances. A large fraction of the population is still rural. As rural communities often depend on agriculture and other environmentally sensitive practices, they are extremely vulnerable to weather and climate conditions.[6]

The Pacific Island states have emerged from the synergy of the region's geography, cultures, and history. The archipelagic setting influenced the formation of nations and empires in ways not experienced in most other parts of the world: international relations were maritime, and while Pacific history does include international invasion and conquest, war and peace more often involved internal rather than external conflict.[7] Cultural differences have consequences also for the different ways in which "Western" models of democracy were received.[8] Global politics has taken (and often takes) the form of impositions on Pacific societies by outside forces, shaping their boundaries as well as their economic and political relations. The late Ron Crocombe, internationally renowned godfather of Pacific Studies, in his seminal study *The South Pacific* noted the peculiar position of the Pacific Island nations in the

1 Brij V. Lal and Kate Fortune (eds.), *The Pacific Islands: An Encyclopedia*, Honolulu: University of Hawaii Press (2000): 63.

2 Roland Seib, *China in the South Pacific: No New Hegemon on the Horizon*, PRIF-Report 90, Frankfurt: Peace Research Institute (2010): 3.

3 Richard Herr, "Restructuring Foreign and Defence Policy: The Pacific Islands," in Christopher Brook and Anthony McGrew (eds.), *Asia-Pacific in the New World Order*, London: Routledge (2013): 211-212.

4 Ralph Regenvanu, "Making Policies to Support Living Cultures: A Case Study in 'Mainstream Culture' from Vanuatu," in Tim Curtis (ed.), *Islands as Crossroads: Sustaining Cultural Diversity in Small Island Developing States*, Paris: United Nations Educational, Scientific and Cultural Organization (2011): 178.

5 See: Donald Denoon, Stewart Firth, Jocelyn Linnekin et al. (eds.), *The Cambridge History of the Pacific Islanders*, Cambridge (UK): Cambridge University Press (1997).

6 Johann Bell and Mary Taylor, *Building Climate-Resilient Food Systems for Pacific Islands*, Program Report 2015-15, Penang: Worldfish (2015): 6-10.

7 Matt K. Matsuda, *Pacific Worlds: A History of Seas, Peoples, and Cultures*, New York: Cambridge University Press (2012).

8 Jon Fraenkel and Bernard Grofman, "Political Culture, Representation and Electoral Systems in the Pacific Islands," *Commonwealth and Comparative Politics* 43, no. 3 (2005): 1-8.

larger scheme of things:

> *The world's largest, richest, most powerful nations are on the Pacific rim. The world's smallest are the Islands nations. If we focus on the word 'nation', the imbalance appears extreme. If we focus on people, however, the imbalance is reversed for, relative to population size, Pacific Islanders have the greatest power in the world in international forums. The 9 million people of the 14 Islands nations of the Pacific Islands Forum have more voting power than the 2,900 million people of China, India, Japan and the USA put together in many international forums. But it would be wise not to overuse that symbolic lever, lest the larger nations restructure the international system on a more democratic basis*.[9]

Actually, the circumstances "on the ground" are even more complex and problematic than Crocombe's remarks suggest, for the Pacific's twelve million inhabitants occupy the world's largest ocean and enjoy some of the broadest entitlements to marine resources through their exclusive economic zones (EEZs). Yet the region includes some of the world's smallest sovereign states, national populations, and economies, as well as a number of the world's remaining dependent territories and peoples.[10] To put it succinctly, Pacific Island nations exhibit significant economic, social, environmental, and political vulnerabilities, which combine to make their participation in global affairs uniquely challenging. At the same time, the vast ocean that connects and nourishes them also causes environmental and societal crises.[11]

2. "A Sea of Islands": Insularity, asymmetry, vulnerability

Insularity is the geographical feature that unites the Pacific Island nations as a region. The islands' physical landforms are very diverse, though. Low-lying atolls with vast central lagoons are characteristic of Polynesia and Micronesia. Nauru and Niue are raised atolls lacking lagoons. There are high volcanic islands in Polynesia and Melanesia, and continental islands in Melanesia include Papua New Guinea with its snow-topped mountain ranges.[12] Isolation has led to ecosystems that are unique, varied, and relatively pristine, with extremely large numbers of endemic species.[13] Yet the region's rich biodiversity is fragile vis-à-vis climate change and human activities.[14]

Another major regional dissymmetry is the ratio of land to sea. Successive developments in the law of the sea expanded the jurisdictional scope of the Pacific Island nations like nowhere else in the world. Some of the states with the smallest land areas have claims at sea that are among the largest on Earth. For example, the Republic of the Marshall Islands, with only 181 km^2 of land and an EEZ of 2.1 million km^2, has an outstanding land:sea ratio of 1:11,600. Kiribati lies well behind in second position, but it still boasts a land:sea ratio of 1:4,439. The disproportion between land and sea territories highlights another critical specificity of the region's political geography: with the exception of Nauru and Niue (and Guam), all Pacific Island polities are archipelagos.[15] This greatly impinges on their capacity to provide state services to all their citizens, as economies of scale are impossible to bring about.[16]

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9 Ron Crocombe, *The South Pacific*, Suva: University of the South Pacific (2008): 593.

10 Christian Huetz de Lemps, "The Pacific Islands, in the Middle or on the Sidelines of Globalization?" *GIS Asie*, 1 March 2007, http://www.reseau-asie.com/article-en/months-articles-archive/reseau-asie-s-editorial/the-pacific-islands-in-the-middle-or-on-the-sidelines-of-globalization-by-christian-huetz-de-lemps-p/

11 Teresia Teaiwa, "On Analogies: Rethinking the Pacific in a Global Context," *The Contemporary Pacific* 18, no. 1 (2006): 71-87.

12 Reilly Ridgel, *Pacific Nations and Territories: The Islands of Micronesia, Melanesia, and Polynesia*, Honolulu: Bess Press (1995): 3-9.

13 Harley I. Manner, Dieter Mueller-Dumbois, and Moshe Rapaport, "Terrestrial Ecosystems," in Moshe Rapaport (ed.), *The Pacific Islands: Environment & Society*, Honolulu: Bess Press (1999): 93-108.

14 United Nations Economic and Social Commission for Asia and the Pacific, *Integrating Economic and Environmental Policies: The Case of Pacific Island Countries*, Development Papers No. 25, Bangkok: United Nations (2004): 37-45.

15 Padma Narsey Lal, "Oceans and Marine Resource Management: Ecosystem Based Management and Sustainable Development," in Janet Strachan and Constance Vigilance (eds.), *Integrating Sustainable Development into National Frameworks: Policy Approaches for Key Sectors in Small States*, London: Commonwealth Secretariat (2011): 37-38.

16 Harvey W. Armstrong and Robert Read, "The Phantom of Liberty? Economic Growth and the Vulnerability of Small States," *Journal of International Development* 14, no. 4 (2002): 435-458.

Geographically, Pacific Island nations are among the smallest, most remote, and most dispersed polities in the world. Notably, they are substantially more remote from major markets than other small island countries, such as those of the Caribbean. Comprising island groups with up to several hundred islands, many Pacific Island countries are also highly dispersed internally, with small populations spread out over vastly distant islands. These inherent structural constraints have a direct impact on the performance of the Pacific Island economies. Thus the "tyranny of insularity" should be taken into consideration when analyzing the phenomenon described by the World Bank as the Pacific Paradox.[17] The paradox lies in the fact that, despite favorable levels of natural and human resources, high levels of public investment and aid, and reasonably prudent economic management, the development performance of Pacific Island states over the past three decades has been characterized by economic growth rates that are low on average and remarkably volatile.[18] In most Pacific Island nations, while some progress has been made on some of the Millennium Development Goals (MDGs), substantial challenges remain.[19] In particular, vulnerability to economic shocks and natural disasters has a great impact on national progress and human well-being in general. Economic stagnation, ineffective institutions, high population growth, conflicts over land, growing poverty, and erosion of cultural values are breeding political instability in several island states.[20]

Together with its insularity, the most salient and inescapable characteristic of the region appears to be the vulnerability of its states and territories: virtually every Pacific Island country is vulnerable in one way or another. The most socially and politically integrated states may be stable, but their small size makes them tragically vulnerable to natural and anthropogenic hazards.[21] At the other end of the spectrum, the larger states may be more capable of coping with disasters, but have a record of recurrent proneness to social instability.[22] Many of the above-mentioned factors contribute to lump the Pacific Island states together in their vulnerability to external pressures. The pygmy economies of the smaller polities, their relative paucity of resources, and their dependence on external development aid conspire to make Pacific microstates susceptible to external pressure.[23] Their vulnerability can be so accentuated that even non-state actors, including criminal syndicates and conservationist groups, may occasionally come to wield influence.[24] The larger regional states, on the other hand, are geopolitically vulnerable "because they have the resources to attract external interest, but suffer from their weak state capacity to manage or regulate that interest. From an extra-regional perspective, there's a highly contentious area of vulnerability that draws external intervention into the region."[25]

17 Langi Kavaliku, "Culture and Sustainable Development in the Pacific," in Antony Hooper (ed.), *Culture and Sustainable Development in the Pacific*, Canberra: ANU E Press and Asia Pacific Press (2005): 26.

18 Pacific Institute of Public Policy, *Small Can Be Beautiful: The Particular Needs of Micro States in Trade Policy*, Briefing Paper 04, Port Vila: Pacific Institute of Public Policy (2008).

19 Susan M. Roberts, Sarah Wright, and Phillip O'Neill, "Good Governance in the Pacific? Ambivalence and Possibility," *Geoforum* 38, no. 5 (2007): 964-970.

20 John Connell, "Pacific Islands in the Global Economy: Paradoxes of Migration and Culture," *Singapore Journal of Tropical Geography* 31, no. 1 (2010): 115-129.

21 See: World Bank, *Hardship and Vulnerability in the Pacific Island Countries. A Regional Companion to the World Development Report 2014*, Washington, DC: The World Bank Group (2014).

22 David Hegarty, "A Changing Oceania," in David Hegarty and Darrell Tryon (eds.), *Politics, Development and Security in Oceania*, Canberra: ANU E Press (2013): 2-18.

23 Miles McKenna, "Realizing Public Diplomacy Potential for Pacific Island Countries: The Case of the Commonwealth," *Public Diplomacy Magazine*, 22 May 2013, 47-49.

24 Daniel Flitton, "Pacific Islands May Be Selling Diplomatic Immunity," *The Age*, 23 March 2014, http://www.theage.com.au/comment/pacific-islands-may-be-selling-diplomatic-immunity-20140322-35a8a.html#ixzz3gcDX3ZxR (accessed July 20, 2015).

25 Richard Herr and Anthony Bergin, *Our Near Abroad: Australia and Pacific Islands Regionalism,* ASPI Strategy Report, Barton: Australia Strategic Policy Institute (2011): 11.

3. Regional security overview

As explained above, the Pacific Islands are very diverse in terms of territory, population, developmental and political dynamics, economic resilience, and governance capabilities. Yet Pacific Islanders are acutely aware that their countries and societies — their very land and ocean — are all vulnerable to the effects of climate change. In the 2018 Boe Declaration and the ensuing Action Plan of 2019, the leaders of Pacific Island Forum (PIF) nations conveyed that climate change is the "single greatest threat" to the security of their region and concurred on an expanded concept of security putting climate change center-stage, alongside traditional security issues. In the Pacific, the impact of climate change is multifarious, ranging from rising sea level to ocean acidification and extreme weather intensification. The gravity of those phenomena contrasts sharply with the fact that the Pacific Island states collectively emit only around 0.03% of global greenhouse gas emissions.[26]

The rapid geopolitical currents of the Indo-Pacific — flowing from the shores of Asia and Australia, as well as from American and European waters — converge in the Pacific Islands, which have become the arena where different security interests align, merge, or clash. In the words of Cristelle Pratt, former Deputy Secretary General of the Pacific Islands Forum Secretariat, "Great power competition is back! The post-cold war architecture which has provided security and stability is undergoing fundamental change driven by a range of players. Our region finds itself inextricably at the centre of this due to our geography and the strategic value of our Blue Pacific Continent."[27]

Yet geopolitics flows also from the Pacific Islands nations, which see in their newly found centrality and relevance as a geostrategic buffer zone between Asia and the United States an opportunity to be internationally relevant and consequential, and further their own interests. As a result, they have become diplomatically more proactive and versatile in their foreign relations, looking for enhanced or fresh development partnerships irrespectively of longstanding political and security alignments.[28]

The fast-evolving Indo-Pacific geopolitical ecosystem is generating shifts in the regional order. In particular, the region has attracted growing diplomatic and economic engagement from the People's Republic of China, which has conspicuously become an influence competitor of the traditional regional patrons: Australia, New Zealand, the United States, France, and other Western-aligned powers, which have a complex set of security and economic interests invested in the region, and provide the bulk of bilateral and regional foreign assistance.[29]

China's expanding regional footprint is effecting a change in the level of attention paid to the Pacific Islands by governments, international organizations, and analysts, which are preoccupied with the possibility of China's growing activism producing destabilizing consequences for the regional order. China's rising influence is also a weighty factor in the climate change policies of the Pacific Island countries' longstanding regional partners. These have a strong incentive to formulate their climate change discourses in a way appealing to the island states in order to maintain closeness of relations. The Pacific Island nations have the option of initiating climate security collaborations with China and, at the same time, use that possibility to receive more attention and assistance from their traditional partners.[30]

The COVID-19 global pandemic has reached even the Pacific Islands. Thanks to the timely and

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26 Murray Ackman, Anna Naupa, and Patrick Tuimalealiifano, "Boe Declaration: Navigating an Uncertain Pacific," *The Interpreter — Lowy Institute for International Policy*, 3 October 2018, https://www.lowyinstitute.org/the-interpreter/boe-declaration-navigating-uncertain-pacific

27 Cristelle Pratt as quoted in Pacific Islands Forum Secretariat, *Opening Remarks to the Center for Strategic & International Studies US-Pacific Dialogue* "*Strengthening the US-Pacific Islands Partnership" by Deputy Secretary General, Cristelle Pratt*, 4 March 2019, https://www.forumsec.org/2019/03/06/opening-remarks-to-the-center-for-strategic-international-studies-us-pacific-dialogue-strengthening-the-us-pacific-islands-partnership-by-deputy-secretary-general-cristelle-pratt/

28 Sandra Tarte, "The Changing Paradigm of Pacific Regional Politics," *The Round Table — The Commonwealth Journal of International Affairs* 106 (2017): 135-142.

29 Fabrizio Bozzato, "Pursuing Indo-Pacific Centrality: China's Geo-economic Strategy in the Pacific Islands," *Geopolitica.info*, 12 December 2018, https://www.geopolitica.info/indo-pacific-centrality-china/

30 Fabrizio Bozzato, "Gifts that Bind: China's Aid to the Pacific Island Nations," *Asia Japan Journal* 1, no. 12 (2017): 17-35.

proactive policies of national governments — combining preparedness, risk communication, monitoring, and response — infection rates continue ranging from no recorded cases in some countries to sporadic cases or micro-clusters in most island nations. The closing of international borders and the use of lockdowns and curfews had the double effect of preventing cross-border contagion and drastically curbing domestic transmission. Given the fragility of the health systems, the focus is on prevention rather than cure. Governments, with the aid of international partners, have ramped up health and medical facilities in preparation for outbreaks. Testing capabilities, however, remain insufficient.[31] In particular, the situation in Papua New Guinea presents aspects of criticality due to a fragile health system, slow and limited testing, vaccine hesitancy, and a loosely controlled land border with Indonesia.[32]

While the pandemic has been kept at the gates, its economic impacts have hit Pacific island countries severely. The stoppage of international travel has been especially deleterious for those island economies that rely considerably on tourism and hospitality, which have seen a massive job loss in those sectors. Governments have intervened with financial relief packages alleviating these impacts and, in some cases, budget support has come from development partners. However, such measures cannot be protracted indefinitely, since they would become unsustainable in the longer term. The way forward for the economies of the region will require some major rethinking when it comes to tourism, labor mobility, trade, debt, and development assistance.[33]

4. Pacific Islands' climate fragility and risk clusters

The climate change risk arising in the Pacific Islands is emerging in diverse pernicious forms. Rising ocean temperatures, shifting rainfall patterns, changing frequency and intensity of storms and drought, decreasing baseflow in streams, rising sea levels, and changing ocean chemistry affect ecosystems on land and in the ocean, as well as local communities, livelihoods, and cultures.[34] Climate change is impacting human health, infrastructure, coastal resources, disaster management, freshwater availability, agriculture, fisheries, forestry, marine ecosystems, and tourism.[35] Notably, climate impacts and risks differ significantly across the region, which comprises both "high islands" and coral atoll "low-lying islands," each with distinct characteristics. In the case of high-elevation islands, extreme weather and land erosion are among the most serious climate change-related factors. Low-elevation islands, for their part, are primarily threatened by sea-level rise and shoreline erosion, and suffer erratic rainfall and drought periods.[36] All Pacific Islands are experiencing recurrent abnormal climatic events, and the situation is expected to become more severe in the next decades.[37]

In fact, the *1.5°C Special Report for Policy Makers* — issued in 2018 by the Intergovernmental Panel on Climate Change (IPCC) — cautions that if the current rate of global warming continues, the temperature is projected to rise 1.5°C above pre-industrial levels between 2030 and 2052, with a critical impact on the planetary ecosystem that would strain the resilience of the Pacific islands. According to the Special Report, a temperature increment beyond 1.5°C would be devastating. The medium and

31 Tess Newton Cain, "Coronavirus in the Pacific Islands Region," *Pacific Trade Invest Australia*, June 2021, https://pacifictradeinvest.com/explore-our-work/insights/coronavirus-in-the-pacific-islands-region

32 Phil Mercer, "Papua New Guinea Covid-19: Mistrust Fuels Crisis as Infections Rise," *BBC News*, 3 May 2021, https://www.bbc.com/news/world-asia-56926131

33 Richard Herr, *The New in the "New Normal" for the Post-COVID Pacific Islands*, Asia Pacific Bulletin No. 510, Washington, DC: East-West Center (2020).

34 Hussain Rasheed Hassan and Valerie Cliff, "For Small Island Nations, Climate Change is Not a Threat. It's Already Here," *World Economic Forum*, 24 September 2019, https://www.weforum.org/agenda/2019/09/island-nations-maldives-climate-change/

35 Grant Wyeth, "For Pacific Island States, Climate Change Is an Existential Threat," 5 June 2017, *The Diplomat*, https://thediplomat.com/2017/06/for-pacific-island-states-climate-change-is-an-existential-threat/

36 Asian Development Bank, *An Existential Threat: How Climate Change Is Impacting the Atoll Countries*, video, 9 December 2019, https://www.adb.org/news/videos/existential-threat-how-climate-change-impacting-atoll-countries

37 Carly Cassella, "There's a Climate Threat Facing Pacific Islands That's More Dire Than Losing Land," *Science Alert*, 19 September 2019, https://www.sciencealert.com/pacific-islanders-are-in-a-climate-crisis-as-rising-sea-levels-threaten-water

long-term implications of exceeding 1.5°C for Pacific communities are stark; above this threshold there is a significant increase in the likelihood of exceeding tipping points that will make many low-lying islands uninhabitable, leading to mass and permanent migration. Furthermore, the demise of coral reefs would be noxious for the fisheries and the related industry depending on them, given that the totality of corals would be at risk of long-term degradation with a 2°C rise.[38]

Vis-à-vis the 2°C scenario, limiting the temperature rise to 1.5°C would result in more tolerable rainfall and drought intensity, as well as lower hydric stress and less disastrous rising sea level. Similarly, containing the warming to 1.5°C would keep at least 60,000 Pacific Islanders from displacement caused by inundation. Conversely, were a 2°C rise to occur, erosion, irregular precipitation cycles, and salinization from sea-level rise would be of such fierceness that many low-lying islands would be made uninhabitable. As the International Organization for Migration notes, for small island developing states (SIDS) it is no longer enough "to be satisfied with urging national disaster adaptation. Climate change is a matter of national security and stability for SIDS. It is a matter of physical survival."[39]

If future scenarios are alarming, the present is not less worrisome. In the last decade, the recurrence of calamities effected by climate change in the Pacific has caused substantial human and economic damage in countries that have very limited resources to prepare for and respond to them. For example, when the 2016 Tropical Cyclone Winston — one of the most powerful cyclones on record — made landfall in Fiji, it caused more than US$900 million in estimated damage and losses. A year earlier, impacts from Tropical Cyclone Pam exceeded 60% of Vanuatu's gross domestic product (GDP).[40] Such events have long-term economic repercussions because, apart from having enduring consequences on agriculture and tourism, they compel immediate reconstruction spending often leading to fiscal shocks. In fact, ten Pacific Island states are among the thirty countries in the world with the highest average annual losses as a GDP percentage.[41]

But the costs of these disasters go far beyond financial impacts alone. Resources lost to climatic hazards are lost for essential social investments in public health, education, infrastructure, housing, etc. In essence, natural disasters do not simply lay waste to communities within the impact circle, but can stifle development for an entire country, sometimes for decades.[42]

Drawing from the available literature — as well as from the examination of the Pacific Islands' socio-economic dynamics, regional policies, and political discourses — it is possible to identify six compound climate-fragility risk clusters for the region: 1) climate displacement and migration; 2) impacts on ocean economy (fisheries, tourism); 3) impacts on health, food, and water security; 4) natural disaster recurrence and coping capacity; 5) impacts of sea-level rise on maritime zones and boundaries; and 6) penetration of transnational organized crime and terrorism.

(1) *Climate displacement and migration*

The combined action of climate change, environmental degradation, and natural disasters causes displacement and forced migration, both internally and transnationally. For Pacific Islanders, whose livelihoods and sustenance depend on delicate ecosystem equilibria, degrading environmental conditions have dire consequences. Climate change can cause a reduction in land, livelihood, or habitat security for

38 Kosi Latu, "1.5 to Stay Alive: Reflecting on the IPCC Special Report on Global Warming of 1.5 Degrees Celsius," Secretariat of the South Pacific Regional Environment Programme, 8 October 2018, https://www.sprep.org/news/15-to-stay-alive-reflecting-on-the-ipcc-special-report-on-global-warming-of-15-degrees-celsius

39 International Organization for Migration, *Climate Change and Migration in Vulnerable Countries: A Snapshot of Least Developed Countries, Landlocked Developing Countries, and Small Island Developing States*, Geneva: International Organization for Migration (2019): vi.

40 Global Facility for Disaster Reduction and Recovery, "Weathering Financial Shocks from Disasters in the Pacific Islands," *Global Facility for Disaster Reduction and Recovery Feature*, November 2018, https://www.gfdrr.org/en/feature-story/weathering-financial-shocks-disasters-pacific-islands

41 Vijaya Ramachandran and Junaid Sadiq Masood, *Are the Pacific Islands Insurable? Challenges and Opportunities for Disaster Risk Finance*, Center for Global Development Working Paper 516, Washington, DC: Center for Global Development (2019).

42 Ilan Noy and Christopher Edmonds, The Economic and Fiscal Burdens of Disasters in the Pacific, CESifo Working Paper Series 6237, Munich: CESifo (2016).

Pacific communities. For example, the land in coastal areas and low-lying atolls, even before being inundated, is going to turn sterile due to saltwater infiltration and erosion. Human habitation would then become unsustainable, and people would be forced to resettle or migrate within and between countries.[43] The resettlement of the population of Carteret and three other atolls, in Papua New Guinea, to the larger and more fertile Bougainville Island is a case in point. In 2007, loss of land, creeping salinization, and ensuing food insecurity made population resettlement the only option.[44]

Since land is a scarce commodity in the Pacific Islands, and is often customarily owned, the resettlement of displaced people is likely to be resisted by local interests. This creates a risk of social tension and violence, especially if resettlements are conducted without proper consultations with host communities. Apart from the unavailability of land for resettling, factors like ethnic and cultural differences between the migrating or receiving communities, or the strain the newcomers put on local resources and services, can further complicate — or derail — the relocation process.[45]

Environmental change can also contribute to individual willingness to emigrate. Although economic and social reasons may be the primary drivers of migration, environmental degradation can precipitate the decision to migrate. The action of climate change can thus be the tipping point that results in an individual or family deciding to move away or overseas.[46]

(2) *Impacts on ocean-based industries*

The economies of many Pacific polities are heavily reliant on the revenues generated by fisheries and tourism, often referred to as the "ocean economy." Climate change threatens to adversely affect both the fishing and the tourism industries.

The Western and Central Pacific Ocean contains more than half the global tuna stocks, on which several Pacific SIDS are critically dependent. Five Pacific Island countries earn between 45% and 60% of their government revenue from tuna fishing concessions. Also, the tuna industry alone employs substantial sectors of the workforce. Global warming is undermining this important source of revenue and employment, because "as temperatures increase, marine species such as tuna are gradually moving away to seek colder water [...], threatening the livelihoods of many people directly employed in the fishing sector."[47]

The climate-spurred eastward migration of tuna stocks is going to significantly diminish the catches of both industrial and small-scale tuna fisheries in the Western and Central Pacific Ocean. According to the projections on regional tuna stocks redistribution, by 2050 the reduction of tuna biomass in the island states' EEZs could result in overall government revenue losses of up to 15% yearly for eight of them. The projected figures on tuna migration patterns — and the interrelated financial and occupational negativities — are causing great concern in the Pacific also because they would unsettle the architecture of regional arrangements governing the tuna resources.[48]

The case of the industrial purse-seine fishery, which represents 70% of tuna catches within the combined EEZs of Pacific Island states, is epitomic of the grim future ahead. In this sector, fishing rights (allocated in terms of vessel days) are granted on historical catches in the respective EEZs of the eight island states where most of the fishing occurs. The expected relocation of tuna stocks from the EEZs to

43 John R. Campbell, "Climate-Change Migration in the Pacific," *The Contemporary Pacific* 26, no. 1 (2014): 1-28.

44 John Connell, "Last days in the Carteret Islands? Climate Change, Livelihoods and Migration on Coral Atolls," *Asia Pacific Viewpoint* 57, no. 1 (2016): 3-15.

45 Adelle Thomas and Lisa Benjamin, "Policies and mechanisms to address climate-induced migration and displacement in Pacific and Caribbean Small Island Developing States," *International Journal of Climate Change Strategies and Management* 10, no. 1 (2018): 86-104.

46 United Nations University Institute for Environment and Human Security, "On the Frontlines of Climate Change: Migration in the Pacific Islands," press release, 2 December 2015, https://ehs.unu.edu/media/press-releases/on-the-frontlines-of-climate-change-migration-in-the-pacific-islands-2.html#info

47 Olivia DeSmit, "Pacific Islands Face Hardships as Tuna Follow Warming Waters," *Conversation International*, 1 July 2019, https://www.conservation.org/blog/pacific-islands-face-hardships-as-tuna-follow-warming-waters

48 Pita Ligaiula, "US$60 Million Loss in Revenue Expected from Tuna Industry by 2050 due to Climate Change," *Pacific Islands News Association*, 24 July 2019, http://www.pina.com.fj/index.php?p=pacnews&m=read&o=3772447225d393c993e44e011c4154

the contiguous high seas, and from some EEZs to others more eastward, is going to rearrange the resource equilibria. Therefore, the allocation of fishing quotas and rights would have to be renegotiated, with the risk of creating winners and losers.[49]

Apart from stirring frictions in the region, the climate change-driven shift of tuna fisheries will unavoidably lead to serious tension between the island nations and distant water-fishing states like China, the United States, South Korea, Japan, some European countries, and Taiwan. Presently, their fleets fish mainly within the Pacific Islands' EEZs, but in the future they will follow the tuna shoals to international waters. The resulting situation would be dismal: the island countries would see their economies and workforce suffer greatly, while distant water-fishing states — accounting for the vast majority of greenhouse gases emission — would have access to tuna fisheries in the high seas without paying license fees to the island nations.[50]

Climate change is also going to damage the region's tourism industry, a sector that before the outbreak of the COVID-19 pandemic was sound and promising. Positively, before the freeze imposed by travel bans, tourism constituted a sizable part of some regional economies, and expectations about its growth were high. Notions of tourism as a vector of economic development resonate in the 2016 World Bank assessment that "in 2040, transformational tourism opportunities could bring an additional US$1.7 billion in revenue and 116,000 jobs" to countries in the region.[51]

Unquestionably, the natural, cultural, and climatic allures of the Pacific islands play a crucial role in attracting tourists to the region. This formula is imperiled by climate change. For a start, most tourist infrastructure, being situated in coastal areas or on islets, is vulnerable to sea-level rise, coastal erosion, and wave inundation. Furthermore, global warming could make a lifeless bleached expanse of the coral reefs and wash away the sandy beaches sought after by tourists. Finally, coastal communities would have to relocate further inland or migrate elsewhere, thus depriving tourists of the cultural interaction.[52] Even assuming that tourism will recover to pre-COVID19 levels, the deterioration of the region's coral reefs alone may cut tourism revenues by 30%.[53]

(3) *Impacts on health, food, and water security*

Climate impacts are increasingly undermining Pacific peoples' health and quality of life, thereby impairing their ability to contribute productively to their economies and families. Healthcare systems in the region are under enormous stress and often unable to cope.[54] The potential diminution of healthy, traditional, and affordable food sources for local communities is particularly alarming. The aggravation of food and water security caused by climate change, combined with existing problems, would put at risk the livelihoods and health of Pacific Islanders, and bring about increased fragility with a potential for instability.[55]

Climate change is aggravating the food security situation in all Pacific Island nations. Food security is being undermined not only by factors like rapid population growth, soaring prices of basic staples, and insufficient logistics, but also by weather extremization, land degradation, and coastal fisheries

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49 Alister Doyle, "Islands, Rocks and Tuna: Pacific Nations Draw New Battle Lines Against Rising Seas," *Reuters*, 11 March 2021, https://www.reuters.com/article/us-climate-change-pacific-fishing-trfn-idUSKBN2B3054

50 James Borton, "South Pacific Islanders Threatened by Climate Change and Overfishing: Foreign Tuna-Fishing Vessels and a Changing Ocean are Putting Pressure on Small-Scale Fishers", *China Dialogue Ocean*, 22 July 2019, https://chinadialogueocean.net/9225-pacific-islanders-climate-change-overfishing/

51 John Perrottet and Andres F. Garcia, *Tourism*, Pacific Possible Background Paper No. 4, Washington, DC: The World Bank Group (2016): 4.

52 Joseph M. Cheer, Stephen Pratt, Denis Tolkach et al., "Tourism in Pacific Island Countries: A Status Quo Round-up," *Asia & the Pacific Policy Studies* 5, no. 3 (2018): 442-461.

53 Mark Spalding, Lauretta Burke, Spencer Wood et al., "Mapping the Global Value and Distribution of Coral Reef Tourism," *Marine Policy* 82 (2017): 104-113.

54 Lachlan McIver, Rokho Kim, Alistair Woodward et al., "Health Impacts of Climate Change in Pacific Island Countries: A Regional Assessment of Vulnerabilities and Adaptation Priorities," *Environmental Health Perspectives* 124, no. 11 (2016): 1707-1714.

55 Saber Salem, "Climate Change and Food Security in the Pacific," *E-International Relations*, 18 February 2020, https://www.e-ir.info/2020/02/18/climate-change-and-food-security-in-the-pacific/

depletion caused by climate change. As a result, average agricultural and fishing yields are decreasing, sometimes drastically. At the same time, the Pacific Islanders' dependency on imports of low-nutrition and highly processed food is worsened, adding up to the plight of non-communicable-diseases (NCDs) including cardiovascular diseases, diabetes, cancer, and chronic respiratory diseases.[56]

NCDs represent the leading cause of death and of premature mortality in most Pacific Island countries, ranging from an estimated 60% of deaths in the Solomon Islands to 80% of deaths in Fiji. They are driven primarily by unhealthy diets, combined with tobacco use, physical inactivity, and alcohol abuse. In addition, poor nutritional intake by children resulting in stunting remains one of the top development challenges in some Pacific Island nations. Because of the declining food security, the number of Pacific Islanders affected by NCDs is expected to rise substantially in the coming decades, with grievous reverberations on national economies and labor force capability.[57] In particular, diabetes is pervasive in the region, which includes seven of the top ten diabetes-prevalent countries in the world. In the face of this situation, Pacific Island leaders have formally declared an NCD crisis in the region. However, the capacity to tackle the problem is limited due to budgetary and fiscal constraints.[58]

Water security is another front of Pacific Island climate security. Many parts of the Insular Pacific suffer from a lack of access to safe piped water and deficient water sanitation. In addition, climate change phenomena like inundation, saltwater intrusion, and droughts threaten fresh water supplies for low-lying atolls and small islands, which recurrently declare states of emergency. As a result, water-borne diseases like typhoid, dysentery, dengue, and malaria are on the rise, and increases in temperature and rainfall threaten to expand outbreaks to new areas in the region.[59] The looming health emergency and the mounting challenge of supplying the population with safe water call into question the islands' capacity to cope in the long term. Moreover, Pacific Island countries often cannot afford solutions like capture, storage, desalination, and sanitation. Many in the region routinely buy bottled water; but for many others that is not an option, especially on the smaller, more remote islands.[60]

(4) *Natural disaster recurrence and coping capacity*

The Pacific Islands are in one of the most natural disaster-prone regions in the world. Tropical cyclones are the most common form of natural disasters in the Insular Pacific, and the main cause of destruction and economic loss. Such cyclones can inflict hefty damage on infrastructure, such as roads, port facilities, power, commercial buildings, and housing. Also, the agricultural sector can be hit tremendously hard, while reef fishing zones and forestry can be considerably impacted. Losses in other productive sectors, including manufacturing and tourism, can also be extensive. For small island countries with a high dependence on agriculture and limited sector diversification, the economic repercussions are especially traumatic.[61]

Global warming is causing more frequent and fiercer cyclones and extreme weather. Their increasing recurrence, with shortening recovery periods in between, drives up the fragility risks and foils the island states' development gains and potential in two ways. In the first place, damage to productive assets can result in serious loss of production and reduced economic growth. Secondly, climate change-instigated environmental hazards are augmenting the vulnerability of the Pacific Islands while

56 Mark W. Rosegrant, Rowena A. Valmonte-Santos, and Timothy Thomas, *Climate Change, Food Security, and Socioeconomic Livelihood in Pacific Islands*, Manila: The Asian Development Bank (2015).

57 Amy Savage, Lachlan McIver, and Lisa Schubert, "Review: The Nexus of Climate Change, Food and Nutrition Security and Diet-related Non-communicable Diseases in Pacific Island Countries and Territories," *Climate and Development* 12, no. 2 (2020): 120-133.

58 Hillary Tolley, Wendy Snowdon, Jillian Wate et al., "Monitoring and Accountability for the Pacific Response to the Non-communicable Diseases Crisis," *BMC Public Health* 16, art. 958 (2016): https://doi.org/10.1186/s12889-016-3614-8

59 Jon Barett, "Climate Change and Food Security in the Pacific Islands," in John Connell and Kristen Lowitt (eds.), *Food Security in Small Island States*, Singapore: Springer Nature (2020): 25-38.

60 Catherine Wilson, "Pacific's Fight Against Covid-19 Hamstrung by Lack of Clean Water," *The Guardian*, 28 August 2020, https://www.theguardian.com/world/2020/aug/29/pacifics-fight-against-covid-19-hamstrung-by-lack-of-clean-water

61 Dongyeol Lee, Huan Zhang, and Chau Nguyen, *The Economic Impact of Natural Disasters in Pacific Island Countries: Adaptation and Preparedness*, International Monetary Fund Working Paper 18/108, Washington, DC: International Monetary Fund (2018).

impairing their ability to invest in coping capacity. In fact, in response to post-disaster rehabilitation requirements, governments resort to a reallocation of budget expenditure and, in some cases, to cutting current expenditure in order to meet emergency and reconstruction needs. This normally involves drastic cuts in development budgeted expenditure.[62]

Climate change-spun disasters are particularly taxing on key coastal infrastructure and associated industries. According to the World Bank's *Pacific Possible 2017 Report*, adaptation costs for coastal protection in the Pacific Islands will reach US$285 million per year by 2040. Port reconstruction and upgrade is already conducted in the region, but many countries are experiencing difficulties in accessing the necessary financing due to debt levels and capacity limitations.[63]

(5) *Impacts of sea-level rise on maritime zones and boundaries*

Under the 1982 United Nations Convention on the Law of the Sea (UNCLOS), all coastal states are entitled to a marine jurisdiction defined by maritime boundaries. The zones of maritime boundaries are expressed in concentric limits surrounding coastal and feature baselines. Where countries' maritime zones overlap, states need to negotiate a shared boundary. Establishing maritime boundaries is a complex process, since states must conduct technical work — like surveying and mapping — legal work, and diplomatic toil before they can submit their final boundaries to the United Nations and publish the information officially.[64]

Maritime boundaries are critical for governance, security, law enforcement, and natural resource management within a country. Dr. Audrey Aumua, speaking as Deputy Director General of the Pacific Community, emphasized that "[…] For Pacific Island countries and territories, maritime boundaries are our national borders. They are not a distant and theoretical line in the ocean. They delineate our homes and our responsibilities. They strengthen law enforcement, support fisheries and natural resource management, and are critical for Pacific islands' governance, economic growth, and regional security."[65] Indeed, maritime boundaries play a critical role in the economic development of Pacific Island states. Key industries and sectors including fisheries, tourism, and transportation all rely upon these boundaries. For example, maritime boundaries determine who has the right to Pacific fisheries worth more than US$3 billion, a huge sum for a region with few sources of revenue.[66]

Soundly traced maritime borders are also essential for developing the Blue Economy potential of Pacific Island states and territories.[67] Once maritime boundaries are consolidated, "countries can capitalize on their rights to enforce fishing limits, to develop offshore windfarms, to investigate marine genetic resources that could contribute to a cure for cancer, to explore deep-sea minerals, or to establish marine protected areas."[68] These actualities and prospects are imperiled by the action of climate change.

Climate change, in the form of rising sea level and erosion, has profound implications for maritime boundaries in the Pacific islands. In the region, the coastal features that define maritime boundaries — low-elevation islands, atolls, sand bars, rocks, and reefs — often barely poke above the sea surface and

62 Ilan Noy, "Natural Disasters in the Pacific Island Countries: New Measurements of Impacts," *Natural Hazards: Journal of the International Society for the Prevention and Mitigation of Natural Hazards* 84, no. 1 (2016): 7-18.

63 World Bank, *Pacific Possible: Long-term Economic Opportunities and Challenges for Pacific Island Countries*, Pacific Possible Series, Washington, DC: World Bank Group (2017).

64 Andreas Østhagen, "Troubled Sseas? The Changing Politics of Maritime Boundary Disputes," *Ocean & Coastal Management* 205, (2021): https://doi.org/10.1016/j.ocecoaman.2021.105535.

65 Audrey Aumua as quoted in Secretariat of the Pacific Community, "Dr Audrey Aumua: Opening Remarks at Maritime Boundaries and Climate Change Workshop," Sydney, 11 February 2019, https://www.spc.int/updates/news/speeches/2019/02/dr-audrey-aumua-opening-remarks-at-maritime-boundaries-and-climate

66 Robert Gillett, *Fisheries in the Economies of Pacific Island Countries and Territories*, Noumea: Pacific Community (2016): 4-5.

67 "The Blue Economy comprises all economic activities related to oceans, seas and coasts. It covers a wide range of interlinked established and emerging sectors and the ocean economy as a growth opportunity for both developed and developing countries. It integrates fully the need to address the environmental and ecological sustainability of the oceans. It also includes economic benefits that may not be marketed, such as carbon storage, coastal protection, cultural values and biodiversity." Pierre Rousseau, "What Is the Right Definition for the Blue Economy?" LinkedIn article, 15 July 2020, https://www.linkedin.com/pulse/what-right-definition-blue-economy-pierre-cg-rousseau/

68 Audrey Aumua, note 65.

are thus vulnerable to environmental changes. The submersion of many of those seemingly permanent markers would lead to the disappearance of critical maritime boundaries basepoints. Hence it is not only the region's natural geography which is in danger, its political geography is at risk of being reshaped as well. Settling maritime boundaries is therefore a priority action to ensure that climate change does not grind at the jurisdiction of the Pacific Islands.[69] This is especially so given that the letter of UNCLOS, which was written when the rising seas scenario seemed remote, is largely silent on the matter. Moreover, there are several contested borders in the region, and some governments might come to see the changing oceanscape as a unique chance for pressing their claims.[70]

Pacific leaders are acutely aware that rising seas could scramble maritime boundaries throughout the region. Accordingly, at the Pacific Islands Forum Leaders Meeting in September 2018, they stressed "the urgency and importance of securing the region's maritime boundaries as a key issue for the development and security of our region, and thereby for the security and well-being of the Blue Pacific Continent."[71] A year later, the Leaders committed to urgently conclude maritime boundary negotiations and to make a collective effort, including developing international law, to ensure that, once Forum Members' maritime zones are delineated in accordance with UNCLOS, they cannot be subsequently challenged or modified as a result of sea-level rise and climate change.[72] Finally, on 6 August 2021, the Pacific Island Forum Leaders Meeting produced the *Declaration on Preserving Maritime Zones in the Face of Climate-Change Related Sea-Level Rise*. This forward-thinking document sets a pivotal precedent on maintaining maritime boundaries in the face of climate change-related sea-level rise.[73] It aims to temper the loss of resources for island nations, "demonstrating a significant interpretation of UNCLOS to maintain rights and entitlements of national maritime zones despite shrinking coastlines, something that scholars have suggested provides the most environmentally just solution."[74]

(6) *Penetration of transnational organized crime and terrorism*

The correlation between climate change and state fragility is both causal and circular. As explained above, climate change is deeply interconnected with economic and social vulnerability. Specifically, economic and social consequences of climate change are likely to generate demands that governments may struggle to meet and may be overwhelmed by. In fact, expanding demand for adaptation and mitigation policies incrementally divert resources from governments' core budgets, causing increasing destabilization and reduced state resilience. Acting as a stressor on state capacities, climate change can thus aggravate the circumstances of small island states, even to the point of a breakdown in governance. In turn, serious state fragility may lead to the creation or consolidation of functional spaces in which organized crime and terrorist groups may penetrate, settle, and thrive.[75]

Pacific Islands states generally have problematic governance, both at political and administrative levels, and are economically precarious. Since transnational organized crime impacts the nexus intersecting security, institutions, and development, Pacific Island societies are vulnerable to exploitation by international crime networks. Five major types of transnational criminal activities are recorded in the Insular Pacific: trafficking in persons and smuggling of migrants; drug and precursor trafficking; environmental crimes; financial and technology-enabled crime; and small arms trafficking. Over the

69 Karen Scott, "Rising Seas and Pacific Maritime Boundaries," *Australian Outlook — Australian Institute of International Affairs*, 3 September 2018, https://www.internationalaffairs.org.au/australianoutlook/rising-seas-and-pacific-maritime-boundaries/

70 Madeleine Gordon, "The Impacts of Climate Change on Maritime Boundaries in the Western Pacific," *Royal Australian Navy Sea Power Soundings* 28 (2021): 1-32.

71 Forty-Ninth Pacific Islands Forum, *Forum Communiqué PIFS(18)10*, Yaren, Nauru, 3-6 September 2018, 5.

72 Fiftieth Pacific Islands Forum, *Forum Communiqué PIF(19)14*, Funafuti, Tuvalu, 13-16 August 2019, 5.

73 Géraldine Giraudeau, "Is the Pacific Shaping the Future of Maritime Limits and Boundaries?," *ASIL Insights* 25, no. 23 (2021): 1-5.

74 Anna Naupa, "Safeguarding Pacific Island Seas Starts with Indigenous Knowledge," *The Interpreter — Lowy Institute for International Policy*, 17 September 2021, https://www.lowyinstitute.org/the-interpreter/safeguarding-pacific-island-seas-starts-indigenous-knowledge

75 J. Scott Hauger, "Climate Change Challenges to Security in the Pacific Islands Region and Opportunities for Cooperation to Manage the Threat," in Rouben Azizian and Carleton Cramer (eds.), *Regionalism, Security & Cooperation in Oceania*, Honolulu: The Daniel K. Inouye Asia-Pacific Center for Security Studies (2015): 147-160.

last decade Pacific Island countries have seen crime rising significantly, including the emergence of regional indigenous criminal syndicates capitalizing on the emerging local market. Worryingly, the criminal landscape is developing much faster than the responses by the island states and their partners.[76]

The Insular Pacific is located between major markets for illicit activities and commodities. For example, Australia has some of the highest rates of methamphetamine, cocaine, and ecstasy use among the country's general population worldwide. East and Southeast Asia represent one of the largest synthetic drug markets, in particular methamphetamine, in the world. Moreover, Australia, New Zealand, and the United States remain primary destination countries for illicit goods and smuggled migrants transiting through the Pacific region.[77] In particular, the combination of limited policing capacity and a geographically large maritime region means that the Pacific Islands continue to be seen as attractive transit points for the trafficking of narcotics and illicit goods.[78] Criminal cartels may thus decide to take a firmer hold in the region, impacting governance, enabling corruption and the infiltration of law enforcement and security, and endangering the region's tourism industry.[79]

Even though terrorism is not a current threat within the region, the Pacific Islands have characteristics that may facilitate terrorist infiltration. In fact, while the region enjoys travel and logistical connectivity with the wider Asia-Pacific, its states' capability for determining terrorist threats or coordinating action against them is limited. By travelling along the "Crystal Road" — the illicit corridor of narcotics, particularly crystal methamphetamines and cocaine, traversing the region — and taking advantage of the aggravation of the governance, economic, and social crises induced by the climate crisis, terrorist entities could gain footholds in the region and use it as a base of operations against surrounding states. Moreover, they could turn some Pacific polities into financial safe havens or even training and recruiting grounds.[80]

Climate change is attacking the economic and societal fiber of Pacific Island nations, and debilitating their governance. In this difficult predicament, criminal syndicates may rise to prominence and be coopted by terrorists.[81] For example, yields from unchecked criminal activities, like money-laundering and drug trafficking, could be used to fund terrorist activities. Also, local authorities could be financially rewarded for turning a blind eye on the residence and transit of terrorist operatives or the passage of weapons and equipment. In addition, destitute locals could be used as laborers or lured into joining the ranks of terror outfits. In particular, deportees with criminal convictions returning to Pacific countries from Australia, New Zealand, and the United States — without community links, local language proficiency, or cultural competence — could be easily recruited by terrorist groups.[82]

Special attention should be given to specific state activities that could aid criminals and terrorists. Mostly, these relate to attempts to use sovereign prerogatives to raise revenue. Notably, in some Pacific Islands states, access to citizenship and its associated documents is not tightly controlled, and the conferral of passports in exchange for investments is a lucrative business.[83] In addition, in the past two decades, harvesting money was also the driver for some Pacific Island countries to open their shipping registers with little supervision.[84] For example, in 2002 Tonga closed its shipping register after com-

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76 Danielle Watson, Jose Luis Sousa-Santos, and Loene Howes, "Transnational and Organised Crime in Pacific Island Countries and Territories: Police Capacity to Respond to the Emerging Security Threat," *Development Bulletin* 82 (2021): 151-154.

77 Jose Sousa-Santos, "Bridging the Cultural Gap: Combatting Transnational Crime in the Pacific," *Australia Pacific Security College Blog*, 1 June 2021, https://pacificsecurity.net/bridging-the-cultural-gap-combatting-transnational-crime-in-the-pacific/#

78 *Radio New Zealand*, "UN Calls on Pacific to Sign Drug Treaties to Combat Trafficking," 28 February 2020, https://www.rnz.co.nz/international/pacific-news/410597/un-calls-on-pacific-to-sign-drug-treaties-to-combat-trafficking

79 Anthony Bergin, "Blue Crimes on the Rise in Pacific," *The Australian*, 31 October 2020, https://www.aspi.org.au/opinion/blue-crimes-rise-pacific

80 Jose Sousa-Santos, "The Pacific Is in Danger of Becoming a Semi-Narco Region," *The Guardian*, 26 June 2019, https://www.theguardian.com/world/commentisfree/2019/jun/26/the-pacific-is-in-danger-of-becoming-a-semi-narco-region

81 Louise van Schaik, Stefano Sarris, and Tobias von Lossow, *Fighting an Existential Threat: Small Island States Bringing Climate Change to the UN Security Council*, Planet Security Initiative Policy Brief, The Hague: Clingendael Institute (2018).

82 Government of Vanuatu, *Vanuatu National Security Strategy — Secure and Resilient*, Port Vila: Government of Vanuatu (2021): https://pacificsecurity.net/wp-content/uploads/2021/03/Vanuatu_National_Security_Strategy-1.pdf

83 Anthony van Fossen, "Passport Sales: How Island Microstates Use Strategic Management to Organise the New Economic Citizenship Industry," *Island Studies Journal* 13, no. 1 (2017): 285-300.

84 Michael Hansen, "Fraudulent International Ship Registration Scandals Hit Pacific Islands," *Hawai'i Free Press*, 15 May 2020, http://www.hawaiifreepress.com/Articles-Main/ID/25556/categoryId/103/Fraudulent-International-Ship-Registration-Scandals-hit-Pacific-Islands

plaints of malpractice by other governments, and in 2003 a ship registered in Tuvalu but operated by North Korean interests was boarded by the Royal Australian Navy and discovered to be carrying a load of heroin.[85] With the worsening of the climate crisis, the region may see a reversion to using sovereignty as a financial commodity again, with serious and far-reaching security implications.

Finally, the eventuality of a criminal group, a terrorist organization, or an extra-regional power with large financial means assuming control of a Pacific Island polity and using it to further its schemes cannot be excluded a priori. Such a possibility is remote, since its actualization presupposes economic collapse and institutional disarray causing vulnerability to economic manipulation and geopolitical assertiveness. Yet the impact of climate change could be so extreme as to create the conditions for the "narco state" or "puppet state" scenarios to occur.[86] Dire times breed chaos, and chaos can be a ladder for criminal organizations, terrorist groups, or hostile powers.

5. The Pacific Islands: Vulnerable, yet resilient

Pacific Island nations are often characterized *only* as vulnerable and essentially powerless vis-à-vis the climate crisis. There is a tendency, particularly in the popular media, to overplay the negative effects of climate change on the Pacific Islands region, and to downplay its resilience.[87] This has given rise to a victimhood narrative and despair in many Pacific Island nations about their presumed inability to adapt to future climate change. This, in turn, may propagate a culture of denial among communities in parts of the region: a belief that the changes they are witnessing are short-term climate variability, not long-term climate change. Also, external observers may surmise that Pacific Island leaders routinely plead for assistance at international meetings on the unquestioned assumption that their countries are inadequate to manage the challenges posed by future climate change without massive injections of cash to drive adaptation. Both these assumptions are flawed since, while Pacific Island nations may indeed be uncommonly vulnerable to many aspects of climate change, their ecosystems and communities are also uncommonly resilient.[88]

Perhaps the most fundamental aspect of environmental resilience in the Pacific Islands comes from its natural production systems. Large marine areas around Pacific Island coasts have been overexploited, but with appropriate management their sustainable productivity can be restored, which attests to their innate resilience. The key to regenerating the islands' environmental vitality is intelligent, informed, and sustained management.[89]

Many strands of the region's resilience directly involve its inhabitants. In terms of human interaction with island resources for subsistence purposes, it is clear that despite increasing urbanization, there are still ample areas in most high-elevation island nations to cater for its existing population. In most archipelagic countries, many outer islands have experienced out-migration over the past fifty years that has rendered some of them sparsely populated. Yet their potential for sustaining much larger numbers remains and could be part of future national (and sub-regional) adaptation strategies. Actually, many depopulated islands exist in larger archipelagos in the region.[90] One noteworthy example in which a

85 *Sydney Morning Herald*, "The Ships that Died of Shame," 14 January 2003, https://www.smh.com.au/world/the-ships-that-died-of-shame-20030114-gdg3rc.html

86 Sheldon Chanel, "Pacific in Danger of Becoming Semi-Narco Region, Says Expert," *Fiji Sun*, 20 September 2019, https://fijisun.com.fj/2019/09/20/pacific-in-danger-of-becoming-semi-narco-region-says-expert/

87 Meghan M. Shea, James Painter, and Shannon Osaka, "Representations of Pacific Islands and Climate Change in US, UK, and Australian Newspaper Reporting", *Climate Change* 161 (2020): 89-108.

88 Elizabeth Mcleod, Mae Bruton-Adams, Johannes Förster et al., "Lessons from the Pacific Islands — Adapting to Climate Change by Supporting Social and Ecological Resilience," *Frontiers in Marine Science* 6, Art. 289, https://www.frontiersin.org/article/10.3389/fmars.2019.00289

89 Anthony Colls, Neville Ash, and Ninni Ikkala Nyman, *Ecosystem-Based Adaptation: A Natural Response to Climate Change*, Gland: International Union for Conservation of Nature (2009).

90 Patrick D. Nunn, *Climate Change and Pacific Island Countries*, UNDP Background Paper 2012/07 for Asia-Pacific Human Development Report on Climate Change, New York: United Nations Development Program (2012), https://www.researchgate.net/publication/237085401_Climate_Change_and_Pacific_Island_Countries

government has attempted to systematically relieve population pressure on the center by re-locating people to the periphery comes from Kiribati, where a policy of subsidized relocation from the (overcrowded) Tarawa Atoll to outlying large Kiritimati (Christmas) Atoll was implemented.[91]

Another linchpin of resilience stems from an ingrained characteristic of Pacific Island societies, namely their emphasis on communal living and support that may have evolved as an adaptation to adversity in the past.[92] This mutual support system is most clearly manifested in the typical response of a Pacific Island community to a disaster that strikes one part of it (or a neighboring community). Assistance is usually immediately extended and sustained as long as needed; it may extend beyond mere material assistance and labor and include, for example, the adoption of orphaned children and the giving of land free of charge to newly landless families.[93] In the past, such responses were usually driven and coordinated by traditional leaders; today, it is common for religious groups to play a role in this. Such a cultural trait, still very strong in most parts of the region, should be given proper consideration when developing and implementing adaptation strategies for future climate change.[94]

An additional long-standing driver of resilience, found all over the region, is the tradition of community decision-making. While in places this model has been weakened since foreign colonization by the establishment of centralized government, it is precisely the limited ability of central government in many island countries to effectively reach all parts that has strengthened the determination of communities, especially in a country's peripheral areas, to develop and implement self-reliance strategies.[95] So any future plans for climate change adaptation in the Pacific Islands region should recognize this trait. At the same time, it should be understood that such communities are normally focused on short-term needs rather than long-term sustainable solutions.[96]

Finally, the circumstances of the people living in the islands should be duly appraised. Since they subsist from it, most Pacific Islanders are more aware of the idiosyncrasies of nature than any urban dwellers. Therefore, they are more receptive to information about how and why the natural environment may change in the future, and what they can do about that. Notably, most Pacific Islanders are literate, having received a formal education.[97]

This education factor has many implications, including an improved ability to comprehend the need for effective adaptation to climate change as well as the ability to understand and drive (at individual and communal levels) appropriate adaptation strategies. Should climate change create significant numbers of environmental refugees from the Pacific Islands, the fact that these are comparatively well-educated people should aid their successful absorption into other societies, although other adjustment challenges will emerge.[98]

The last major aspect of resilience to be considered concerns external assistance (aid). Some commentators contend that the Pacific Islands' high degree of aid dependency does not enable them to determine their own directions, especially if those diverge from the interests of donor countries; in

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91 Jakob Schou Kupferberg, Migration and Dignity — Relocation and Adaptation in the Face of Climate Change Displacement in the Pacific – A Human Rights Perspective, *The International Journal of Human Rights,* 2021, DOI: 10.1080/13642987.2021.1889515

92 Karen Elizabeth McNamara and Shirleen Shomila Prasad, "Valuing Indigenous Knowledge for Climate Change Adaptation Planning in Fiji and Vanuatu," *Traditional Knowledge Bulletin*, 28 August 2013, https://tkbulletin.wordpress.com/2013/08/28/guest-article-valuing-indigenous-knowledge-in-fiji-and-vanuatu-2/

93 Kjeld Rasmussen, Wilhelm May, Thomas Birk et al., "Climate Change on Three Polynesian Outliers in the Solomon Islands: Impacts, Vulnerability and Adaptation," *Geografisk Tidsskrift — Danish Journal of Geography* 109, no. 1 (2009): 1-13.

94 Johannes M. Luetz and Patrick D. Nunn, "Climate Change Adaptation in the Pacific Islands: A Review of Faith-Engaged Approaches and Opportunities," in Walter Leal Filho (ed.), *Managing Climate Change Adaptation in the Pacific Region. Climate Change Management*, Cham: Springer (2020): 293-311.

95 Patrick D. Nunn, William Aalbersberg, Shalini Lata et al., "Beyond the Core: Community Governance for Climate-Change Adaptation in Peripheral Parts of Pacific Island Countries," *Regional Environmental Change* 14 (2014): 221-235.

96 Olivia C. Warrick, *Local Voices, Local Choices? Vulnerability to Climate Change and Community-Based Adaptation in Rural Vanuatu*, unpublished doctoral dissertation in Geography, Hamilton: University of Waikato (2011).

97 Joel B. Johnson, Pritika Reddy, Ronil Chand et al., "Attitudes and Awareness of Regional Pacific Island Students Towards E-Learning," *International Journal of Educational Technology in Higher Education* 18, no. 13 (2021): https://doi.org/10.1186/s41239-021-00248-z

98 Elise Remling, "Migration as Climate Adaptation? Exploring Discourses Amongst Development Actors in the Pacific Island Region," *Regional Environmental Change* 20, no. 3 (2020): https://doi.org/10.1007/s10113-020-01583-z

other words, aid to Pacific Island nations "in effect remains budget aid."[99] There are other negative aspects to this degree of dependency that refer specifically to climate change. These include the tendency to uncritically adopt (environmental) policies and legislation from donor countries, to accept unfit adaptive solutions from donors, and to allow strategies to be developed by the international donor community (which inhibit in-country community buy-in).[100] Among the many examples, the focus on developing policy and legislation to address environmental issues is perhaps the best example of wasted effort in that these tools — so effective in "developed country" contexts — prove generally impotent in the Pacific Islands context.[101] This is largely because legislation can be ignored on the grounds of being neither effectively disseminated nor adequately enforced.[102]

Yet despite such negative facets of external assistance, it is clear that Pacific Island nations need it if they are to adapt their peoples' livelihoods to future climate change with minimal disruption. Ultimately, the continuing support by development and climate security partners to Pacific Island societies is crucial for keeping them highly resilient.[103]

6. Recommendations for pursuing regional climate change adaptation

In the light of the situation and specificities of the Insular Pacific, it is possible to issue several recommendations that are thought likely to bring about effective and sustainable adaptation to projected climate change in the Pacific Islands region. In this regard, it is worth dwelling for a moment on what is intended by "effective" and "sustainable" adaptation.

Adaptation must be effective in the sense that it is the right solution for the particular aspects of climate change that a nation or community wishes to adapt to. For example, it would be simplistic and counterproductive to uncritically transpose adaptive solutions from a continental to an island country or from a "developed" to a "developing" country.[104] Such adaptive solutions must be designed for the Pacific Islands' environment and regional system. They must also be structured in such a way that local stakeholders can agree upon and implement, with a clear understanding of how they are expected to solve specific problems.[105]

Adaptation must also be sustainable in the sense that Pacific Island governments and local communities should be able to sustain adaptive solutions over time. This requires that those stakeholders comprehend the proposed solutions and possess the resources — financial, material, and human — to operationalize them indefinitely. For example, artificial shoreline structures may be unduly expensive for a (largely) subsistence community to maintain, whereas a replanted mangrove forest along the coastal fringe would not be.[106]

The recommendations below are directed to the following key stakeholders in climate change adaptation in the Pacific Islands: a) international development partners, b) national governments and re-

99 Azmat Gani, "Governance and Foreign Aid in Pacific Island Countries," *Journal of International Development* 21 (2009): 112-125.

100 Patrick D. Nunn and Roselyn Kumar, "Pacific Islands Must Stop Relying on Foreign Aid to Adapt to Climate Change, Because the Money Won't Last," *The Conversation*, 31 July 2020, https://theconversation.com/pacific-islands-must-stop-relying-on-foreign-aid-to-adapt-to-climate-change-because-the-money-wont-last-132095

101 Matthew Dornan and Jonathan Pryke, "Foreign Aid to the Pacific: Trends and Developments in the Twenty-First Century," *Asia and the Pacific Policy Studies* 4, no. 3 (2017): 386-404.

102 Patrick D. Nunn, "Bridging the Gulf between Science and Society: Imperatives for Minimizing Societal Disruption from Climate Change in the Pacific," in Akimasa Sumi, Kensuke Fukushi, and Ai Hiramatsu (eds.), *Adaptation and Mitigation Strategies for Climate Change*, Berlin: Springer (2010): 233-248.

103 Fabrizio Bozzato, "Taiwan and the Pacific Islands: Exploring the Green/Blue Possibilities," *Green Humanities* 1, no. 2 (2017): 127-155.

104 Karen E. McNamara, Rachel Clissold, Ross Westoby et al., "An Assessment of Community-Based Adaptation Initiatives in the Pacific Islands," *Nature Climate Change* 10 (2020): 628-639.

105 Daniela Medina Hidalgo, Patrick D. Nunn, Harriot Beazley et al., "Climate Change Adaptation Planning in Remote Contexts: insights from Community-Based Natural Resource Management and Rural Development Initiatives in the Pacific Islands," *Climate and Development* (2021) DOI: 10.1080/17565529.2020.1867046

106 United Nations Development Programme, *Vital Programme: Pacific Adaptation to Climate Change (PACC)*, video, 24 April 2013, https://www.youtube.com/watch?v=61xMO65L2oY

gional intergovernmental organizations, c) civil society and local communities, d) non-government organizations (NGOs), and e) individuals.

a) International development partners: Effective interventions and assistance

Most plausibly, international assistance (aid) will continue to flow into the Pacific Islands over the next three decades, including support for underwriting the costs of climate change adaptation. Some of this aid will be bilateral, flowing from one country to another. Some will be for the region as a whole, channeled largely through regional agencies or international bodies (such as the Global Environment Facility). The latter aid will include many traditional flows but also far larger sums through initiatives like the Global Adaptation Fund for developing countries that was established post-COP-15 in 2010.[107] As the challenges posed by climate change become more serious and pervasive globally in the next twenty years, so international partners will likely step up their aid commitment to and partnership with the Pacific Island nations.[108]

Recommendation 1: *It is recommended that international development partners of Pacific Island nations increase their climate change adaptation and alleviation assistance while taking action to maximize its effectiveness.*

This would entail understanding the pathways of environmental decision-making in the Pacific Islands and intervening where it can be most effectual. At this point in time, this translates into providing less assistance directly to regional agencies and to national governments, which generally have a problematic track record of delivering sustainable adaptation, and more directly to communities where the basic environmental decision-making is actually carried out. Additionally, less emphasis should be placed on capacity-building through formal qualifications and more attention given to empowering community leaders to make sensible and far-sighted decisions about their constituencies.[109]

It is advisable that the communication for empowerment is conveyed also in vernacular languages, employing familiar concepts, and acknowledging cultural mores. There should be less emphasis on financing and more focus on actionable assistance. For example, international partner countries should give consideration to training teams of climate change educators and volunteers to go and live, for prolonged periods, in vulnerable communities for disseminating knowledge about effective and sustainable adaptation.[110]

International partners should also refine their ability to intervene strategically. For example, in assisting with the relocation of vulnerable communities, oftentimes neither governments nor community leaders regard internal resettlement as a viable option because of the prohibitively high costs involved. Knowing that international partners are willing to assist with identifying and developing relocation sites, Pacific Island governments would be more inclined to adopt resettlement as a long-term adaptive strategy and, more pragmatically, start transferring communities. Additionally, that may induce hesitant climate crisis impacted communities to opt for resettlement.[111]

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107 Aaron Atteridge and Nella Canales, *Climate Finance in the Pacific: An Overview of Flows to the Region's Small Island Developing States*, Stockholm Environment Institute Working Paper 2017-04, Stockholm: Stockholm Environment Institute (2017), https://www.preventionweb.net/files/51664_seiwp201704pacificclimatefinanceflo.pdf

108 Good Will Hunters, "Jonathan Pryke and Roland Rajah — What Does the Future of Aid to the Pacific Look Like?" *Good Will Hunters Podcasts* 84, 28 June 2020, https://goodwillhunterspodcast.com.au/episodes/jonathan-pryke-and-roland-rajah-what-does-the-future-of-aid-to-the-pacific-look-like/

109 Elizabeth Mcleod, Seema Arora-Jonsson, and Yuta J. Masuda, "Raising the Voices of Pacific Island Women to Inform Climate Adaptation Policies," *Marine Policy* 93 (201): 178-185.

110 United Nations Volunteers, "Taking Bold Action to Address Development Challenges in the Pacific," 12 August 2020, *UN Volunteers*, https://www.unv.org/Success-stories/taking-bold-action-address-development-challenges-pacific

111 Disaster Displacement, "Project Launch: Enhancing Protection and Empowerment of Migrants and Communities Affected by Climate Change and Disasters in the Pacific Region," *Platform on Disaster Displacement*, 21 March 2019, https://disasterdisplacement.org/project-launch

b) Regional intergovernmental organizations and national governments

With a trend towards expanding and more specialized (sub)regionalism in the Pacific Islands, the time is ripe for regional agencies to be invested with more decisional and operational responsibilities, enabling them to develop proactive agendas, particularly regarding climate change. This, in combination with a larger and steady inflow of external funding of their core budgets, would allow them to enhance their environmental stewardship role and consolidate their long-term strategic outlook. As long as these regional agencies remain too financially reliant on member governments, they will continue to be largely reactive and decisionally constrained in developing and implementing long-term and sustainable adaptive strategies.[112]

For the purposes of environmental management in the face to climate change, regional agencies should be encouraged to think beyond political boundaries more than they do. There are many commonalities among island types and environments within the region that transcend political borders. For example, the problems faced by atoll islands in Kiribati are much the same as those in Tuvalu. Regional agencies should also be at the forefront of new approaches to pursuing effective and sustainable adaptation to climate change.[113]

National governments should themselves rethink their roles in climate change adaptation. It is crucial that governments plan long-term and their citizens be socialized in the process so that the latter can understand why the former may have to pursue policies that appear economically questionable. In sum, participatory policy-making is essential for the viability of and consensus on national climate change adaptation strategies.[114]

In larger and archipelagic Pacific Island countries, governments should be open to renegotiate some of their aspirations about mainstreaming effective and sustainable climate change adaptation throughout their national institutions, for the sake of supporting their international partners in reaching out directly to local communities. Such mutually enabling convergence of efforts should be informed by the principles of synergy and subsidiarity.[115]

Recommendation 2: *Regional agencies and governments should realistically examine the validity of their present outlook on climate change adaptation, and redefine their roles accordingly.*

c) Civil society and local communities

An essential vector of effective and sustainable climate change adaptation in the Insular Pacific is the spreading of awareness and dissemination of knowledge about regional climate dynamics among local communities and the civil society in general. In fact, only an informed population is empowered to make informed decisions about building climate resilience and choose a developmental path accordingly.

On the grounds of the traditional structure of most Pacific Island societies, "persons of influence" (such as community leaders like traditional authority figures, religious leaders, and educators, as well as private sector leaders) within local communities should be invested with the task of raising awareness and propagating knowledge about the climate crisis and climate change adaptation. In this regard, emphasis should be placed on community participation in decision-making. At the same time, climate change education should also include scientific information about future climate change. In this context,

112 Marc Williams and Duncan McDuie-Ra, *Combatting Climate Change in the Pacific: The Role of Regional Organizations*, London: Palgrave Macmillan (2018).

113 Sarina Theys, Book Review, "Combatting Climate Change in the Pacific: The Role of Regional Organizations," *Environmental Politics* 30, no. 4 (2021): 684-686.

114 Cecili Aipira, Alannah Kidd, and Morioka Kate, "Climate Change Adaptation in Pacific Countries: Fostering Resilience Through Gender Equality," in Walter Leal Filho (ed.), *Climate Change Adaptation in Pacific Countries. Climate Change Management*, Cham: Springer (2017): 225-239.

115 Global Taskforce of Local and Regional Governments, *Towards the Localization of the SDGs — 4th Report 2020 — How to Accelerate Transformative Actions in the Aftermath of the COVID-19 Outbreak*, Barcelona: United Cities and Local Governments (2020).

it is also important to harness the structural resilience of Pacific Island societies by ensuring, for example, that traditional support networks based on kinship are activated for climate change adaptation.[116]
Recommendation 3: *Persons of influence and traditional leaders in Pacific Island societies should be tasked with disseminating knowledge about climate change for the sake of community empowerment in climate change adaptation decision-making.*

d) Non-governmental organizations (NGOs)

Some policies and projects for climate change adaptation — especially at the community level — may not be actionable or accomplished because they lie outside the normal areas in which governments, regional agencies, and their international partners operate. In this regard, non-governmental organizations (NGOs) have a key — if not primary — role to play. NGOs are non-profit groups that, at least programmatically, function independently of any government. They are organized either at the community, national, or international level to serve social, political, humanitarian, religious, or environmental causes. Normally, they are organizationally present in the areas where they conduct their projects. For this reason, they can both create synergies with other stakeholders and serve as a transmission belt between them. Notably, the most effective communication in Pacific Island societies remains face-to-face, and NGOs (including religious organizations) are well placed to inform, connect, and involve.[117]
Recommendation 4: *NGOs should facilitate dialogue on climate security within Pacific Island civil societies, and between governments and citizens. In particular, NGOs should act as knowledge brokers in the production and communication of climate information. NGOs should also play an advocacy — as well as advocacy training — role in climate security policy-making processes.*

e) Individual Pacific Islanders

Climate change awareness alone is necessary but not sufficient for enabling communities to implement climate change adaptation policies and micro-strategies. Most people in the Pacific Islands presently know of climate change and its potential to adversely affect their livelihoods over the next decades. Yet education on behavioral proactivity, at individual and grassroot levels, toward optimal climate adaptation needs to be pursued more effectively and systematically.

Many social formations in the region have the potential and capacity to socialize their fellow Pacific Islanders — especially the women and the youth — in climate change adaptation. For example, climate change education should be furthered by formally including it in school and university syllabi. There is also a need for printed and online material in appropriate vernaculars, as well as dedicated audiovisual resources, in order to facilitate capillary social diffusion and inculturation of the "climate message." Also, government agencies and NGOs can work together to help improving Pacific Islanders' understanding of the vulnerability and adaptability of the ecospheres of which they are the custodians.[118] In particular, the media — ranging from radio stations to social media platforms — have a crucial role in promoting individual and societal action for climate change adaptation.[119]
Recommendation 5: *Individual Pacific Islanders should be recognized as stakeholders in the climate resilience vision and strategy of their region, and thus encouraged and enabled to participate in the collective climate change adaptation effort.*

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116 Ainka A. Granderson, "The Role of Traditional Knowledge in Building Adaptive Capacity for Climate Change: Perspectives from Vanuatu," *Weather, Climate, and Society* 9, no. 3 (2017): 545-561.

117 Ian McGregor, Hilary Yerbury, and Ahmed Shahid, "The Voices of Local NGOs in Climate Change Issues: Examples from Climate Vulnerable Nations," *Cosmopolitan Civil Societies: An Interdisciplinary Journal* 10, no. 3 (2018): 63-80.

118 Japan International Cooperation Agency, "We Are Islanders! For the Future of the Pacific," brochure, May 2009, https://www.jica.go.jp/english/publications/jica_archive/brochures/pdf/islanders.pdf

119 Aaron Inamara and Verena Thomas, "Pacific Climate Change Adaptation: The Use of Participatory Media to Promote Indigenous Knowledge," *Pacific Journalism Review: Te Koakoa* 23, no. 1 (2017): 113-132.

7. Conclusion

This is a time of consequences for the peoples of the Pacific. The Pacific Islands are facing devastating impacts of climate change threatening their ecosystems, population, and sovereignty. As a result of that, in comparison with other regions of the world, Pacific Island nations have a high awareness of climate change issues and the imperative to adapt. For them, the climate security challenge represents both an urgency and an opportunity to reinforce the links between adaptation responses and societal resilience. For this reason, Pacific Island states, regional organizations, and communities are leading climate adaptation efforts. A strategic vision and a practical model are thus emerging in the region for managing climate change and mainstreaming adaptation while pursuing development and security.

The Pacific Island climate security strategic outlook can be described as holistic, since it seeks to integrate peace and climate security, sustainable development and societal well-being. It is holistic also in the sense that it recognizes the interdependence of all elements in the interaction among ocean, islands, and humans. In this regard, it valorizes the Pacific Islanders' traditional wisdom, lifestyle, and institutions by turning their ancestral oceanicity into *poiesis* and *praxis* for the future, thus enabling Pacific Islanders to become the agents of their own change and makers of their own sustainability. For example, some communities in the Pacific are implementing robust networks of marine protected areas using new technologies while strengthening tribal governance to manage these networks.

Far from being a utopian ecocentric doctrine demanding stasis and deprivation, the Pacific Islands' climate security roadmap propounds a qualitative growth model in which ocean, land, people, ancestral practices, and science, as well as international cooperation, play a synergistic role. Remarkably, Pacific Island traditional knowledge systems include valuable insights on seasonal cycles, ecological processes, and the management of biocultural diversity that are relevant at a broad scale for understanding resilience and adaptability to the social-ecological effects of climate change. Community-based and participatory modes can then complement and ground-truth climate models and — concomitantly — direct culturally appropriate resource management, research, and adaptation measures.

The Pacific Island climate security strategy can be also qualified as programmatically inclusive, collective, and multi-scalar, leveraging on the traditional Pacific Island "Four Cs": coordination, cooperation, commitment, and care. The Four Cs are not new, but they are being rejuvenated with proactive diplomacy, development cooperation, and investments to support the island nations in coping with the climate change crisis and its long-lasting shocks. This integrated model has the potential to activate, mobilize, and empower all the forces within the island societies.[120] "The responsibility as well as sharing in the costs and benefits does not rest with one entity such as the State but it should be spread among all stakeholders. It is the responsibility of all stakeholders […] at the level of the individual, the locality, the community, the society, the region, the national level and the international, public and particularly private sectors."[121]

Being confronted with a common existential challenge, Pacific Island states tend to manage shared responsibilities and exercise collective action in their climate diplomacy and policies. Notably, Pacific Island leaders, along with leaders from other SIDS, have been decisive in shaping international climate policies and the Paris Climate Agreement. Regionally, the leaders' commitment to act purposefully and coordinately is demonstrated in the 2019 [Pacific Islands] Forum Leaders' endorsement of the 2050 Strategy for the Blue Pacific Continent. This plan — together with the Framework for Pacific Regionalism, the Samoa Pathway, the Blue Pacific Narrative, the Agenda 2030, and other documents — lays out a clear strategy for action. Overall, the leaders recognize that building a climate-resilient region and ensuring social, cultural, environmental, and economic integrity needs careful planning with realistic tar-

120 Amelia Kinahoi Siamomu, "Reigniting Pacific Regionalism for Transition to a Post-COVID Era," *Matangi Tonga Online*, 10 August 2020, https://matangitonga.to/2020/08/10/pacific-regionalism

121 Awni Behnam, *Tracing the Blue Economy*, Valletta: Fondation de Malte (2013): 43.

gets, and the capacity and resources to achieve them.[122]

Partnerships are therefore fundamental for sustaining a regional climate assessment process and addressing the impacts of climate change across the ocean. Key partners include a large array of stakeholders, ranging from extra-regional governments to community-level organizations. In fact, cross-sectoral and transnational collaboration from multiple actors is essential to enable appropriate and effective adaptation and mitigation measures.[123] Clearly, Pacific Island national governments hold the central role in the process. For their part, regional networks are also key in facilitating communication, coordinating and leveraging resources, and efficiently linking community leaders, scientists, and institutions to develop actionable information and decision-support tools. In addition, coordinating adaptation efforts and the monitoring and reporting of the results of those efforts via regional networks will help to streamline adaptation planning.[124]

Yet there will be times and situations in which regional or national resources and capabilities will be insufficient to address the magnitude of climate change impacts and local development needs. In those instances, the assistance of reliable, commited, and empathetic international development partners will be all-important.[125] By necessity, The Pacific Islands have become hubs of innovation, where climate strategies are piloted and refined to inform adaptation efforts worldwide.[126] Hence, it is in the interest of the global community that the climate security challenge in the Pacific is won. The Pacific Island nations are determined to fight and win, but they need the earnest support of all their friends in the near and far seas.[127]

122 Griffith Asia Institute, "Charting a Course to 2050 in the Pacific," *Griffith Asia Insights*, 9 December 2020, https://blogs.griffith.edu.au/asiainsights/charting-a-course-to-2050-in-the-pacific/

123 Daniel Gilfillan, Stacy-Ann Robinson, and Hannah Barrowman, "Action Research to Enhance Inter-Organizational Coordination of Climate Change Adaptation in the Pacific," *Challenges* 11, no. 1 (2020): 8.

124 Ashlie Denton, "Evaluating Collective Action in the Pacific Islands Through Commitment to Narrative-Networks," June 18, 2015, https://ssrn.com/abstract=2620440

125 The Sasakawa Peace Foundation — Ocean Policy Research Institute, *Ocean Forum "Challenges of Pacific Island Countries" (June 16, 2021)*, video, 16 June 2021, https://www.youtube.com/watch?v=uvcwC8k3ZOE

126 Lynae Bresser, "Necessity Is the Mother of Invention: Islands as the Vanguard of Climate Adaptation," *New Security Beat*, Woodrow Wilson International Center for Scholars, 25 October 2016, https://www.newsecuritybeat.org/2016/10/developing-climate-resilience-island-perspective/

127 Izumi Kobayashi, "Japan's Diplomacy towards Member Countries of Pacific Islands Forum: Significance of Pacific Islands Leaders Meeting (PALM)," *Asia-Pacific Review* 25, no. 2 (2018): 89-103.

Climate Security from the Oceans

Climate Security in the Indo-Pacific: A French Perspective

Tom Haristias

Terrible, and faster than expected. The first statement (August 2021) of the sixth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) is irrevocable.[1] In 2019, atmospheric carbon dioxide concentrations were higher than any time in at least the last two million years. Global surface temperature has increased at a rate that is unprecedented in at least two millennia, and global mean sea level has risen faster since 1900 than over any preceding century in 3,000 years. Global warming could reach 1.5°C around 2030, ten years earlier than estimated in the previous 2018 IPCC Report, threatening humanity with calamitous disasters. By 2050, the increase will continue beyond this threshold, and even if greenhouse gas emissions were drastically reduced, the 2°C limit would likely be reached before the end of the 21st century.[2]

While current global warming is "only" 1.2°C above pre-industrial levels, the consequences of these changes on security — in the broadest sense of the term — are already visible (increased intensity of tropical cyclones, wildfires, heavy rainfall, multiplication of severe droughts, etc.). Some very recent events — all of which happened during the same year — are particularly telling: devastating wildfires in Greece, Turkey, and the western United States; major floods in Germany and China; 50°C+ temperatures in Canada; Yaas and Tauktae cyclones in India; Tropical Storm Grace in Haiti a few weeks after a 7.2 magnitude earthquake.[3] If climate change was for a long time perceived as an abstract concept, it now comes forward in a very concrete way: at sea and on land as well.

Human responsibility for these changes is now widely accepted and unequivocally confirmed by the IPCC. Progress is slow, and often quite out of step with the seriousness of the topic. However, environmental issues have risen to the top of the international agenda over the years. The need to mitigate anthropic impacts on the natural environment, to cut our greenhouse gas (GHG) emissions, or to protect ecosystems is now a crucial political issue. However, the physical impacts of climate change already underway are visible and projected to increase over the coming decades. Indeed, because of the thermal inertia of the oceans and the slow processes in the cryosphere and on land, the climate would continue to change even if the composition of the atmosphere remained at present values[4] — which, besides, seems quite unrealistic.

This is why anticipating and adapting to these climate impacts, in parallel with reducing emissions,

1 IPCC (2021), Summary for Policymakers. In: *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [Masson-Delmotte, V., P. Zhai, A. Pirani, S. L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M. I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T. K. Maycock, T. Waterfield, O. Yelekçi, R. Yu and B. Zhou (eds.)]. Cambridge University Press. In press.

2 Based on the IPCC report, global warming of 2°C would be exceeded during the 21st century under the high and very high GHG emissions scenarios (SSP3-7.0 and SSP5-8.5, respectively). It would be extremely likely to be exceeded in the intermediate scenario (SSP2-4.5). The limit of 2°C is unlikely to be exceeded in the low and very low scenarios (SSP1-2.6 and SSP1-1.9, respectively).

3 Not related to climate change.

4 IPCC (2013), Glossaire [Planton, S. (coord.)]. In: *Changements climatiques 2013: Les éléments scientifiques. Contribution du Groupe de travail I au cinquième Rapport d'évaluation du Groupe d'experts intergouvernemental sur l'évolution du climat*. [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex et P.M. Midgley (dir. publ.)]. Cambridge University Press, Cambridge, Royaume-Uni et New York, NY, États-Unis d'Amérique.

is important for security, at all levels. The effects of climate change on security are diverse and far-reaching. By interfering with other phenomena, it can undermine human security and global stability. Climate change and its consequences are thus considered a "risk multiplier/amplifier" that interferes with other socio-economic, demographic, and political factors in a country or region, and that can ultimately exacerbate existing tensions and crises. However, the climate-security nexus is complex and mainly studied through the prism of human security. With the exception of a few countries[5] and research institutes,[6] climate change implications on Defence and more precisely on the Armed Forces are even less understood, if not totally set aside. Yet, these climate trends will clearly have serious implications for militaries, which are essential national and international security actors, and whose resilience is increasingly challenged.

1. Specific issues for defense actors

Defense institutions are naturally concerned by these potential disruptions, in direct and indirect ways. Nevertheless, climate change is often perceived as an issue that does not fall within their remit. Most of the time, it is considered an issue that should only be taken into account by other ministries, such as development, energy, foreign affairs, agriculture, etc. It is rarely enough to talk about migration, cyclones, and food security to convince militaries that climate change is also their business. Consequently, it must be made clear that the doctrines, missions, infrastructures, training, and equipment of the defense forces are and will be increasingly concerned. This is the only way to get them to take action now, which is not yet the norm at the international level.

(1) *Climate change: A strategic issue*

As mentioned in the 2021 "Strategic Update" published by the French Ministry for the Armed Forces in early 2021, our strategic environment has been in a constant state of flux: certain trends that were already in play have been confirmed, while others have accelerated and a number of disruptive events have made their mark. In addition, the COVID-19 pandemic has provoked major social and economic upheavals, magnifying divisions and power relationships, creating new tensions over resources and, above all, catalyzing threats. In this context, every single weakness can and will be exploited and for this reason, climate change appears to fully fall within the strategic scope.

From a doctrinal point of view, the necessity of taking into account the strategic impacts of climate change is mainly considered by high-income, modern countries, whereas the severity of the impacts is overall greater for the poorest populations and countries (particularly in Sub-Saharan Africa, Latin America, and Southeast Asia). As early as the 1990s, the United States recognized climate change as a risk amplifier and considered it a national and international security issue.[7] For its part, the French Ministry for the Armed Forces is aware of climate change strategic implications, as mentioned in its Defence and National Security White Paper (2008, updated in 2013), in the *Defence Strategic Review* (2017, updated in 2021) and in a document called "Defence and Climate": France is committed".

Also, in a context where interrelations between climate change and maritime security have just started to be recognized as a complex and urgent challenge by states and institutions,[8] France was one of the first countries, along with the US, Spain, and India, to include climate change in a reference national strategic document on maritime security (2015 National Strategy for Security of Maritime Areas, updated in 2019).

5 US, France, and New Zealand, for instance, to only cite a few.

6 French Institute for International and Strategic Relations (IRIS), International Military Council on Climate Change and Security (IMCCS), and Clingendael Institute, for instance.

7 US Naval War College report (1990).

8 Germond, B. & Mazaris, A.D. (2019) *Climate Change and Maritime Security Science Direct*.

Overall, only a very small number of states (including France, the US, the UK, New Zealand, and Australia) have begun to turn strategic thinking into concrete action.

(2) *Military infrastructures, equipment, and training*

Military infrastructures, equipment, and training will have to be adapted to changing environmental conditions. The impacts of climate change, whether extreme or slow, affect military camps located on national territory and abroad. Given their intensification, and the strategic issue of maintaining military effect, it seems crucial to assess the vulnerability of these sites and to adapt them consequently.

Some Western countries have started to work on this issue. This is for example the case of the United States, the United Kingdom, and France, which have developed methodologies to assess the vulnerability of their facilities to climate change (US *Army Climate Handbook, Department of Defense Climate Assessment Tool*, UK *Climate Impact Risk Assessment Methodology, French Climate Change Evaluation Methodology for Military Camps*). The US, in particular, is quite far ahead and has developed different projects, like an interactive tool to visualize floods or nature-based solutions to protect some of their installations from coastal erosion.[9] The country also finances different research programs, in partnership with civilian bodies such as the Louisiana State University (LSU).[10] The methodology developed by the French Ministry for the Armed Forces (CEMC) allows assessment of climate change impacts on military camps' essential functions (ammunition storage, communication systems, intelligence, access to harbors and airports, etc.) and missions of studied camps,[11] at different time horizons (2030, 2050).

Extreme climatic conditions can also cause faster wear and tear of equipment (weapons, for instance). Regarding the development of weapon systems (which requires an average of ten to twenty years before they can be commissioned into theaters of operations), there are two priority objectives:

- offering the best available technologies to the Armed Forces in order to guarantee them operational superiority;
- avoiding breakdown situations, i.e., the non-replacement of a capability when it becomes obsolete.

In this context, the adaptation of weapon systems to climate change needs to include both the reduction of environmental impact — the search for energy efficiency — and adaptation to climatic events to maintain operational capabilities.

The international framework on the need to develop more eco-responsible equipment ("eco-conception") is fairly advanced for numerous countries. Of course, defense institutions need to assume their share of responsibility regarding their impact on the environment.[12] They must adapt, resolutely tracing a difficult path: moving forward in the field of sustainable development while absolutely preserving the operational effectiveness of the Armed Forces.[13] Besides the well-known ecological benefits of eco-conception and energy transition (more eco-friendly materials, reduction of GHG emissions), some "green solutions" can also help the Armed Forces to preserve, sometimes even improve their operational capabilities. The benefits of these efforts are already visible in several areas, such as the ability to understand the environment, to operate in austere locations, to operate efficiently and with low emission footprint, and to reduce lengthy or vulnerable energy supply chain. The United States, for

9 Observatory of Climate Change Impacts on Defence and Security (2021), *Integration of Climate and Environmental Issues by Foreign Armed Forces*, French Institute for International and Strategic Relations (IRIS)/French Ministry for the Armed Forces (Directorate General for International Relations and Strategy).

10 Tristan Baurick (2020), "LSU awarded $9.3 million grant to help military plan for climate change".

11 Observatory of Climate Change Impacts on Defence and Security (2021), *CEMC: Climate Change Evaluation Methodology for Military Camps*, French Institute for International and Strategic Relations (IRIS)/French Ministry for the Armed Forces (Directorate General for International Relations and Strategy).

12 Florence Parly, Minister for the Armed Forces, speech presenting the ministry's new biodiversity strategy, September 2021.

13 General François Lecointre (2021), French Chief of the Defence Staff (2017-2021). Introduction speech of the seminar *Climate change challenges facing armies*, organized by the Joint Centre for Concept, Doctrine and Experimentation of the French Ministry for the Armed Forces (CICDE).

example, realized during the wars in Afghanistan and Iraq that supply convoys were attacked on a very regular basis, and that it was precisely there that they had the greatest number of casualties. To reduce the convoys, they had to increase the autonomy of the outposts. That meant either renewable solutions, water recycling, or electricity production from renewable sources.[14] NATO Allied operations in Afghanistan have also offered lessons about the risks entailed by long fuel supply lines and the impact that temperature and weather can have on platform effectiveness. The French "Eco-Camp 2025 programme"[15] was initiated in this logic, in order to reinforce the energy and water autonomy of French camps abroad, thus reducing their dependence on logistic flows and their potential vulnerability.

Strategies for adapting equipment to the potential impacts of climate change ("climato-conception"), however, are rarer. Yet, soldiers' clothing and equipment must withstand more extreme climatic events such as more intense rainfall or extreme temperatures, which requires a more systematic adaptation of materials and even a cooling process for some equipment, particularly electronics. Heat and desertification also favor the presence of sandy winds, which are harmful to equipment. Worth being mentioned also, climate change impacts the effectiveness of sonar devices that naval ships use to map the sea around them. Navies around the world use these tools for many applications: "passive" sonars, for instance, simply listen to the environment around them for signs of marine life, communications, or enemy ships (propeller, engine, pump noises, etc.). "Active" systems send out a blast of sound and listen for the echo, allowing for a more detailed mapping of the surrounding area. However, in the future, their effectiveness/reliability in warming oceans[16] will be put to the test. It could be harder to make statistical range predictions, for instance. Indeed, the speed of underwater sounds depends on the water temperature, but also on salinity, which are both evolving under the pressure of climate change. To preserve their operational capabilities and effectiveness (transmitting messages, detecting enemy submarines, avoiding whales, etc.), navies will have to seriously consider those factors. Norway and Russia stand out for their targeted investments in adapting equipment to Arctic conditions, for example by developing specific communication satellites for the zone (Norway), vehicles, icebreakers, all-terrain vehicles adapted to snow, creation of an autonomous camp on Kotelny Island (Russia), etc.[17] New Zealand forces published in 2019 a $20bn plan to upgrade defense equipment to deal with the effects of climate change.[18] In France, the General Directorate for Armament (DGA) has also initiated a reflection on these issues.

With regard to training adaptation, despite this overall lead of the military of rich countries,[19] some countries with lower incomes – but particularly vulnerable to climate change impacts — are already implementing very concrete responses in terms of adapting equipment or training. It is for instance the case in Jordan, where soldiers receive trainings by NGOs on how to use minimal quantities of water. On the US side, although there is no specific communication on this issue, it is very likely that the Pentagon has already started some work.[20]

(3) *Increased number of assistance operations*

In March 2019, Tropical Cyclone Idai pummeled through southeastern Africa to become one of the deadliest storms ever recorded to hit the Southern Hemisphere.[21] More than 750 people were killed in Mozambique, Zimbabwe, and Malawi. Thousands of people were displaced by flooding. According to

14 Bastien Alex (2015), *Le Géopolitologue : Bastien Alex, Les Armes de la Transition*.

15 PONCET, G. (2020), *Le plan des armées pour réduire (un peu) leur empreinte carbone*, Le Point, 7 juillet 2020.

16 KELLY, D. (2016), "Sonar in Warming Oceans Put to Test," *Environmental Monitor*, 20 June 2016.

17 Observatory of Climate Change Impacts on Defence and Security (2021), *Integration of Climate and Environmental Issues by Foreign Armed Forces,* op. cit.

18 Van Schaik, L. Zandee, D. Von Lossow, T. Dekker, B. Van Der Maas, Z. Halima, A. (2021), *Ready for Take-Off? Military Responses to Climate Change*, Planetary Security Initiative, p.18.

19 Scenarios Development or Simulations That Replicate the Expected Developments and Consequences of Climate Change Impacts; Adaptation of Training Sites to the Impacts of Climate Change (Floods, Droughts, etc.) and Support Missions to Civil Authorities in Response to Disasters.

20 Observatoire Défense et Climat, op. cit.

21 Nature (2019), *Why Cyclone Idai is one of the Southern Hemisphere's most devastating storms*, March 26th 2019.

the Center for Research on the Epidemiology of Disasters of the Catholic University of Louvain (Belgium), six of the ten deadliest cyclones to hit the Southern Hemisphere since 1900 have occurred since 1994. It is always important to remember, though, that the vulnerability of a community depends on different factors, like its exposure to climate conditions, its adaptive capacity, and the robustness of its governance. The level of prosperity, both national and individual, also influences the degree of vulnerability, as it reduces the risk of disasters, allows people to be informed about their occurrence, to respond more quickly to them and to manage the direct consequences more effectively. For example, a natural disaster of comparable intensity is likely to affect more people in one country than in another, as was the case, for example, in Bangladesh and the United States in 1991-92.[22]

Climate change, however, also has a role to play: there is scientific evidence that over the last four decades, the global proportion of major tropical cyclones occurrence has increased (categories 3-4). According to the United Nations Office for Disaster Risk Reduction (UNDRR),[23] in the last 20 years (2000-2019), 7,348 natural disasters have been recorded worldwide (for an estimated cost of nearly $3 trillion) — almost twice as many as between 1980 and 1999. The proportion of intense tropical cyclones (categories 4-5) and peak wind speeds of the most intense ones are projected to increase, at the global scale with increasing global warming,[24] as warmer sea surface temperature (SST) facilitates their formation and intensification. In the Western Indian Ocean, for instance, which is the warmest of all five oceans, a cyclone increase of 8% per decade is expected.[25]

It is expected that this higher tempo and intensity of extreme climate events will demand more support for our civil authorities, and require more frequent interventions of militaries for Humanitarian Assistance and Disaster Relief (HADR) operations. Therefore, our militaries' readiness could be tested, and our capabilities stressed. This increased demand for military intervention comes with a certain number of strategic challenges:[26] coordination between stakeholders is likely to become more complex, resources will be stretched (funding, equipment, personnel, skills, increased quantity of needed supply, etc.), the delivery of logistics support is likely to become more challenging, and harsher climate conditions could hinder access to certain zones. It is worth noting, however, that military and civil defense assets should be seen as a "tool complementing existing relief mechanisms in order to provide specific support to specific requirements, in response to the acknowledged 'humanitarian gap' between the disaster needs that the relief community is being asked to satisfy and the resources available to meet them."[27] Most of the time and according to the Oslo Guidelines governing the use of foreign military and civil defense assets, the humanitarian response will be coordinated by a civilian agency, government department, or responsible agency within an international or intergovernmental organization. The Armed Forces are seen as an efficient and effective "early responder" to whom governments and other organizations look for help.

In the case of Idai, for instance, the French Armed Forces of the Southern Indian Ocean Zone (FAZSOI) answered Mozambique's call for help to the international community and sent the amphibious helicoptercarrier *Tonnerre* as well as the *Nivôse* surveillance frigate to help the population.[28] The aim of Operation Caouanne was to "contribute to the support operations for the endangered populations, to reinforce the already existing support structures and to provide medical reinforcement." The *Tonnerre* was finally diverted to Mayotte to load humanitarian cargo (27 tons) for Beira.

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22 Comparisons of the Human Casualties of Cyclone Gorky (Bangladesh, 1991, 138,000 deaths and 10 million displaced) and Hurricane Andrew (Florida, 1992, 65 deaths) of Comparable Intensity.

23 United Nations Office for Disaster Risk Reduction (UNDRR), 2020 Annual Report.

24 IPCC, 2021, op. cit.

25 Observatory of Climate Change Impacts on Defence and Security (2021), Climate Security in the Western Indian Ocean French Institute for International and Strategic Relations (IRIS)/French Ministry for the Armed Forces (General Directorate for International Relations and Strategy).

26 RAND Europe (2021), Crisis Response in a Changing Climate — Implications of Climate Change for UK Defense Logistics in Humanitarian and Disaster Relief (HADR) and Military Aid to the Civil Authorities (MACA) Operations.

27 Office for the Coordination of Humanitarian Affairs (2007), *Oslo Guidelines, Guidelines for the Use of Foreign Military and Civil Defense Assets in Disaster Relief.*

28 Ministère des Armées (2019), Cols bleus, *Marine Nationale, Mozambique: Le Tonnerre Débarque du Fret Humanitaire*.

French forces are also mobilized to respond to natural disasters in the Indo-Pacific region through the FRANZ mechanism, together with Australia and New Zealand (information exchange and trilateral coordination for emergency humanitarian response to natural disasters in the South Pacific island states). This mechanism has emerged as an effective tool, activated many times since its creation – most recently in April 2020 after the massive destruction caused by Hurricane Harold. On this occasion, France delivered 25 tons of humanitarian aid in several operations carried out in record time and despite the difficulties caused by the COVID-19 pandemic and the closure of borders.

2. Climate change from the oceans

(1) *The oceans, spaces of climate regulation*

By absorbing heat and GHG emissions (25%), the ocean has an important moderating effect on the climate and its changes. Ocean currents are major contributors to global thermal regulation and influence precipitation patterns. Thus, the ocean is at the heart of the climate system and plays a crucial role in limiting global warming. However, it is also particularly vulnerable to climate change.

According to the IPCC Special Report on the Ocean and Cryosphere, global average sea level rose by about 15 cm during the 20th century and could reach 2m by 2100 under the high emission scenario.[29] This phenomenon is the result of an increase in the volume of the ocean due to two main factors: addition of water to the ocean because of the melting of continental glaciers (22%) and ice caps (20%), and expansion of water in the ocean due to the increase in its temperature (thermal expansion phenomenon, 50%).[30]

In the longer term, sea level is committed to rise for centuries to millennia due to continuing deep ocean warming and ice sheet melt, and will probably remain elevated for thousands of years.

Human-caused GHG emissions warm up the global upper ocean (0-700m) and are the main driver of current ocean acidification and deoxygenation. These changes could be irreversible on a centennial to millennial time scale. Higher SST lead to intense evaporation and moisture transfer to the atmosphere, contributing to extreme events (typhoons, hurricanes, cyclones) becoming increasingly intense.

(2) *The importance of the ocean for human societies from an anthropological point of view*

Rising sea levels are affecting millions of people worldwide. Three out of ten people live less than 100 km from the coastline and less than 100 m above sea level. More than one out of ten people live less than 10 m above sea level. Many densely populated coastal megacities continue to expand in terms of population, economy, and infrastructure. The ocean and cryosphere also provide resources, including food, water, and energy. Fisheries are an essential source of food (fish, shellfish) accounting for more than 50% of the animal protein consumed in many developing countries. As a result, nearly 3 billion people depend on marine protein resources, and this appetite has tripled since the 1970s. The ocean and cryosphere provide jobs in fishing and recreation, and sustain traditions, local cultures, and religious beliefs.[31]

The IPCC report also highlights, in an unprecedented way, the importance of the social and cultural values associated with the environment, which qualify these sometimes vital links between humans and nature and which are particularly true in the Pacific, for example. The Boe Declaration, approved by the Pacific Island Forum (PIF) leaders, elevates climate change as the single greatest threat to the

29 SSP5-8.5.

30 Studied period: 1971-2018.

31 Cotte, C. & Guilyardi, E. (2020), *L'océan face aux changements climatiques*, études marines n°18 p. 10-19, Centre d'études stratégique de la Marine (CESM).

livelihoods, security and wellbeing of the peoples of the Pacific. Nature, and in particular the ocean, are a constituent of the individual and collective identity of a population. It is therefore often the guarantor of its long-term social cohesion.

Although difficult to assess, in the same way as the notion of "well-being," the role of these values is no less decisive. In many of these societies, a growing number of individuals are experiencing a loss of reference points, as well as serious psychological fragility in the face of the loss of ecosystems. In many French overseas territories, the value placed by local populations on land ownership is one of these "cultural values." For an individual or a family, owning land remains an identifying element that connects them to their family genealogy and to a deep local or regional history. Coastal erosion due to rising sea level is a problem that goes far beyond the economic, food, or habitability values of a disappeared plot of land. Giving up land to the rising seas is like witnessing a part of its culture eroding.[32] Of course, this issue also raises the question of human migrations. Although the precise and measurable anticipation of the direct and indirect consequences of climate change on population movements is very complex, it will most likely play an increasingly important role in the migration choice. According to the World Bank,[33] by 2050, some 216 million people in the developing world could be forced to migrate, mainly within their country.

(3) *Maritime spaces and climate change*

If giving up land to the rising seas is like witnessing a part of its culture eroding, it will also have potential key strategic implications. More than 70 states are already or are likely to be affected by sea level rise, including many in low-lying least developed coastal states and small islands that are or that face the risk of being flooded, if not submerged. Yet, the United Nations Convention on the Law of the Sea (UNCLOS) makes no explicit reference to climate change and its potential legal consequences[34] on the "shifting baselines" and outer limits of the maritime spaces measured from the baselines[35] (territorial sea and contiguous zone, archipelagic waters, EEZs, or continental shelf).

Adaptation solutions are being developed, some artificial (construction of floating artificial islands, for instance) and some natural (replanting of mangroves to combat coastline erosion, or transferring sand from the seabed). Research also plays an important role, and some island states are experimenting with hybrid crops that can withstand salt water or heatproof corals that can resist ocean warming. Other solutions include buying land on other islands to relocate part of the population, as is the case for Kiribati in Fiji or Vanuatu in New Zealand and Australia. In any case, this issue raises a large number of political, moral, and humanitarian challenges that can grow the seeds of instability and that the international community must address as soon as possible.

These climatic considerations are particularly important in the current context, marked by the return of the strategic use of the sea, and by the growing contestation of maritime spaces. These spaces, including the EEZs, are at the heart of a highly contested battle to gain maritime influence, which constitutes an undeniable power multiplier.[36] This is the reason why, in 2021, a president like Emmanuel Macron has no choice but to declare that "the 21st century will be maritime."[37]

France is primarily concerned. It is always good to remember that it is the only country in the world to be present on four continents, in all the world's oceans and seas. Ninety-seven percent of the 11 million km² of the French EEZ, moreover, is located overseas, in areas particularly exposed to climate change. Polynesia and the Pacific archipelagos provide the largest surface area of French maritime space, with 4.5 million km². With the Southern and Antarctic Lands (TAAF), formed by the islands of

32 Camus, G. (2019), *Sociétés humaines et montée du niveau de la mer : quelques points essentiels du rapport du GIEC sur l'océan et la cryosphère*, Le Monde, December 2, 2019.

33 World Bank (2021), *Groundswell Report Part 2: Acting on Internal Climate Migration*, September 2021.

34 For island states, in the case of total submersion, the question of citizenship without territory also arises.

35 Guilloux, B. (2020), *The International Laws for Ocean and Climate*, Ocean Climate.

36 Labeviere, R. (2020), *Reconquérir par la mer, la France face à la nouvelle géopolitique des océans*, éditions Temporis.

37 President Emmanuel Macron, Assises de l'économie de la mer, December 2019.

Saint-Paul and Amsterdam, the Crozet archipelago, the Kerguelen archipelago, and Terre Adélie, the contribution reaches almost 2 million km². In the North Pacific, the uninhabited atoll of Clipperton, with a surface area of barely 2 km², concedes nearly 440,000 km² of EEZ, while metropolitan France concedes 350,000 km².

Figure 1 France in the Indo-Pacific
(Source: Directorate General for International Relations and Strategy, French Ministry for the Armed Forces)

(4) *Climate change — Maritime security nexus*

The existence of correlation links between climate change and maritime criminality has been recognized by the IPCC in its fifth assessment report. The impacts of climate change can fuel social unrest, affecting livelihood systems and food security. Floods, rising sea levels, salinization of arable land, and coastal erosion put pressure on the coastal communities, which are then more likely to engage in some forms of maritime criminality. Climate change-induced oceanic disturbances exacerbate existing issues (overfishing, marine pollution), and will modify the environments in which fish resources evolve. It is already possible to observe a migration of certain species towards the poles and colder waters in order to find optimal living conditions. This shifting of fish stocks can increase the risk of (militarized) disputes even between states that enjoy stable diplomatic relationships.

It can also force populations to adopt alternative strategies to survive: deprived of their main means of subsistence (and under the cumulative effects of demography, poverty, inequality, and lack of state response), they may turn to illegal activities at sea (piracy, trafficking, etc.). Local criminal groups could take advantage of the deteriorated living conditions of the population due to the effects of climate change. Although climate change does not have a direct impact on the creation of these groups, it nevertheless contributes to creating a fertile ground in which they can operate more freely. Illegal fishing is projected to increase, as fishermen will have to explore faraway waters — often without lots of consideration for the law of the sea. Clashes between fishermen for resources could increase. This will directly affect the Armed Forces, as it will lead to an increased need regarding maritime space surveillance.

Figure 2 Synergistic links between climate change impacts and maritime criminality[38]

"Climate change affects natural systems, which in turn has negative impacts on human systems, which can engender, or contribute to engender, the occurrence of maritime crimes. The proliferation of one form of maritime crime (e.g. illegal fishing) can contribute to the emergence of another (e.g. piracy). Eventually the occurrence of maritime crime can in turn negatively impact natural and human systems by reinforcing existing issues such as resource scarcities, poverty and grievance."[39]

(5) *France's commitments*

1) Green defense

The French Ministry for the Armed Forces contributed to different governmental initiatives in a very active way and in particular to the decisions taken in 2007 after the "Grenelle de l'environnement" — a set of political meetings between the government, NGOs, businesses, and employees — from which emerged different commitments in terms of GHG emissions, waste treatment, and renewable energies. These commitments led to the development of a "defense sustainable development strategy" placed under the responsibility of a senior official for sustainable development in 2012 and updated in 2016. In addition, in September 2019, the French Minister for the Armed Forces entrusted a ministerial Task Force with the care of defining a defense energy strategy for the years to come, aiming at improving the Ministry consumption and use of energies. Its main goals are to limit our environmental footprint and to reduce our dependence on oil supplies, which will be made possible by an increased use of biojet, the development of hybrid tanks, and better consumption measurement tools.

The joint staff has also appointed a General Officer for Sustainable Development whose responsibilities (operations) are complementary to those of the Senior Officer for Sustainable Development.

Finally, an industrial/technological innovation policy has been developed for the last 20 years, to take into account the evolution of the environmental norms, increasingly binding, and the growing necessity to combine environmental imperatives and operational necessities. An emblematic example of this policy is our multi-mission frigate (FREMM), equipped with a mixed propulsion system that decreases energy consumption and increases its autonomy. Three areas are particularly concerned:

- the use of hazardous substances during the life cycle of weapon systems (manufacture and maintenance), which is increasingly strictly regulated at French and especially European levels;
- the energy consumption and pollutant discharges (air, water, soil) of systems in use;
- the end-of-life dismantling and the control of associated pollution.

38 GERMOND, B. & MAZARIS, A.D. op. cit. *Climate Change and Maritime Security*.
39 *Ibid*.

2) Climate security

France's active engagement in the field of climate security started in 2015. COP21 was a wake-up call for going beyond the "green defense" traditional dimension. The then Defense Minister, Mr. Jean-Yves le Drian, chaired, the same year (2015), an international conference of defense ministers and high officials on the implications of climate change on defense. This was the first time that an international ministerial-level conference was organized to discuss these issues and the responses as to how to address this global challenge. It has enabled a large audience composed of 600 representatives of defense institutions, national and international administrations, and the academic, non-profit, and private sectors to take the full measure of the concerns that climate change raises for senior political officials in the defense sector and the adaptation or risk prevention measures that they propose or are already implementing. This initiative served not only to send a strong message from the top political authorities responsible for defense issues in favor of the success of the Paris Conference, but also to create a dynamic of dialogue and cooperation between defense ministers all over the world on climate and security issues.

This event created a robust foundation, which enabled the French Ministry for the Armed Forces to launch a series of initiatives in several domains, in particular in the Indo-Pacific. In 2016, the Ministry decided to invest in research — a fundamental first step to understand the complex links between climate change, security, and defense. This led to the creation of a multi-year research program (Observatory of Climate Change Impacts on Defense and Security), designed to:

- develop and manage a network of French researchers on the topic;
- contribute to a better understanding of climatic and environmental factors' influence on potential areas of instability;
- more specifically, through case studies and appropriate monitoring, to shed light on long-term trends, disruptive scenarios, and their consequences on geostrategic balances;
- enable the development of a typology of crises for the most vulnerable regions.

Eventually, this observatory has established itself as a very versatile tool, at the service of all and perfectly adapted to different objectives:

- identifying the risks for France and its strategic area of influence;
- understanding the correlations between climate change and conflicts;
- predicting theaters of operations geophysical evolutions;
- analyzing the impacts on the spectrum of Armed Forces' missions;
- anticipating normative requirements and constraints.

Figure 3 Climate Change Evaluation Methodology for Military Infrastructures (CEMC)

In 2019, a comprehensive methodology to anticipate and assess climate change potential impact on critical mainland and overseas military and civilian infrastructures was developed based on a field study in West Africa. This work was consolidated in 2021 and a strengthened version was proposed to the Ministry for the Armed Forces: the CEMC, whose approach is characterized by four features, as explained below: 1) systemic/interactive, 2) systematic, 3) qualitative, and 4) quantitative. This methodology will be applied to all our military bases in France, abroad and overseas, over the next few years.

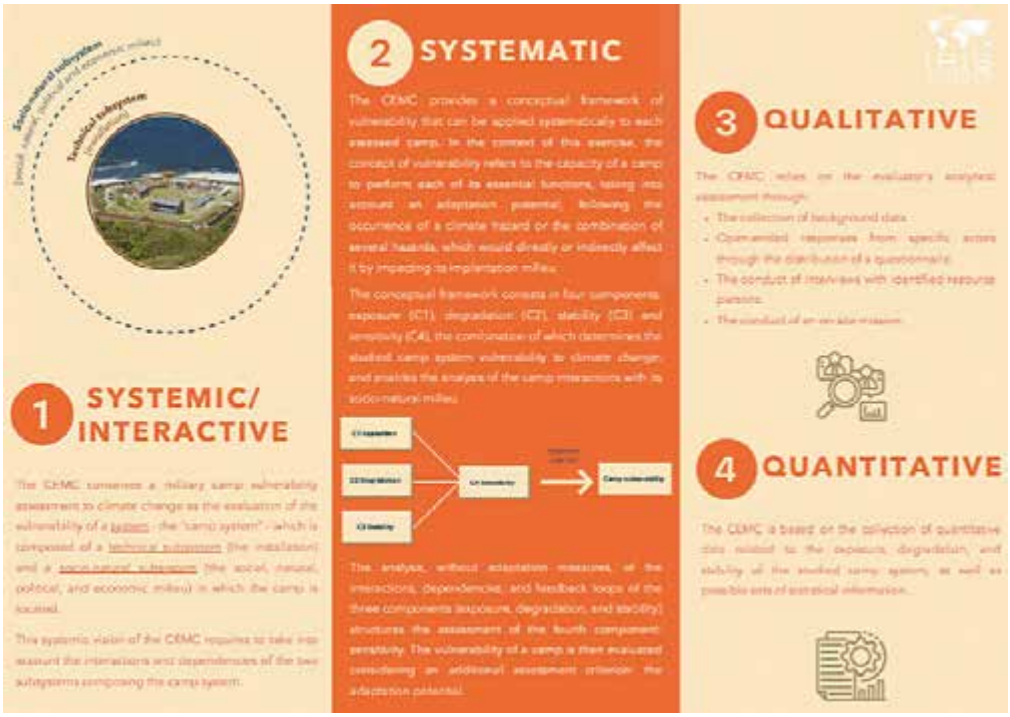

Figure 4 Climate Evaluation Methodology for Military Camps (CEMC)
(Source: Observatory of Climate Change Impacts on Defence and Security, 2021)

(6) *Kivi Kuaka*

The Ministry for the Armed Forces has launched and supported a scientific study (implemented by the National Museum of Natural History, with the support of other agencies and ministries) on Pacific migratory birds (bristle-thighed curlew and bar-tailed godwit), which have the particularity of adapting their transpacific flight (11 days and 11,000 km non-stop) to natural events (tsunamis, tropical storms, or cyclones). This study, name *Kivi Kuaka*, has now entered an active phase, in which the birds are being fitted with rings that transmit weather information to the International Space Station. This could eventually supplement conventional sources of weather information and possibly help improve early warning systems, which are essential to preventing the catastrophic effects of the tropical storms that regularly ravage the Pacific countries. Through international collaboration, the ultimate goal of this interdisciplinary project is to increase safety in the Pacific for human populations suffering the dramatic consequences of devastating natural disasters.[40]

40 *Kivi Kuaka* official website: https://kivikuaka.fr/theproject/

Figure 5 French Navy support to *Kivi Kuaka* project
(Source: French Armed Forces in Polynesia (FAPF))

In 2021, *Kivi Kuaka's* scientific team benefited from the logistical support of the French Navy and embarked aboard the Overseas Support and Assistance Ship (BSAOM) *Bougainville*, on the island of Fakarava in the Tuamotu Archipelago, 500 km east of Tahiti.

The importance of international cooperation : **Many efforts have been made to raise awareness of climate security issues at the international level, particularly in the Indo-Pacific, and to introduce these issues into regional cooperation forums.**

As a member of the South Pacific Defense Ministers Meeting (SPDMM) – gathering Australia, Chile, Fiji, France, New Zealand, Papua New Guinea, and Tonga) – France has proposed and led a joint study on the impact of climate change on defence and security in the South Pacific by 2030.[41] The study was focused on three domains in particular: climate change impact on critical infrastructures resilience, on HADR operations, and on maritime surveillance. The study and two dozen recommendations for action have been submitted to the fourth SPDMM that took place in May 2019, during which all the report's recommendations for action were improved.

In addition, following the first France-India-Australia track 1.5 seminar in May 2018, France and Australia committed to mapping environmental risks in the Indian Ocean in order to understand and anticipate the consequences of climate change, particularly in terms of security and defense. This project took the form of two workshops held in Australia, one in Hobart in 2018 (dedicated to the eastern part of the Indian Ocean) and the other in Perth in 2019 (dedicated to the southern part, i.e., below 60° South latitude). The results were published by Australia the same year.[42] France, responsible for the western Indian Ocean, held two meetings on the same model (in Paris, and Saint-Denis de La Réunion). The French conclusions were published in September 2020.[43] In 2021, the Observatory organized an online seminar, bringing together for the first time French and Australian stakeholders, but also the Indian National Maritime Foundation, thus paving the way for enhanced trilateral cooperation on this issue of common interest to our three countries. This joint study was also presented at the 2021 edition of the Indian Ocean Naval Symposium, in La Réunion, for which environmental security was chosen by

41 Observatory of Climate Change Impacts on Defence and Security (2021), *Implications of Climate Change on Defence and Security in the South Pacific 2030*, French Institute for International and Strategic Relations (IRIS)/French Ministry for the Armed Forces (General Directorate for International Relations and Strategy).
(https://www.defense.gouv.fr/content/download/558235/9668091/file/OBS_Climat%20et%20d%C3%A9fense_201905-ES-Implications%20of%20climate%20change%20SPDMM%20study.pdf)

42 Bergin, A., Brewster, D., Gemenne, F., Barnes, P. (2019), *Environmental Security in Antarctica, the Southern Ocean and the Eastern Indian Ocean: A Risk Mapping Approach*.

43 Observatory of Climate Change Impacts on Defence and Security (2021), *Climate Security in the Western Indian Ocean,* French Institute for International and Strategic Relations (IRIS)/French Ministry for the Armed Forces (General Directorate for International Relations and Strategy).

France (taking over the presidency of the symposium) as the central theme.

In order to have an even more comprehensive view of this area, the Directorate General for International Relations and Strategy (DGRIS, *via* the Observatory) and the French Development Agency (AFD) co-organized in 2021 an international seminar[44] on Climate Change Impacts on Biodiversity and Maritime Security in the Bay of Bengal. This seminar brought together researchers and practitioners from the scientific, development, security, and defense fields working on the impacts of climate change in the Bay of Bengal. It was the first contribution of France as the leader of the marine resource pillar of the Indo-Pacific Ocean Initiative, launched by the Indian Prime Minister Narendra Modi.

Finally, France also participates in the Pacific Environmental Security Forum (PESF) — a key initiative of the US Indo-Pacific Command on the topic — and has played an active role in its transformation into a partnership (PESP). All these initiatives illustrate the crucial role of strategic research in developing a common strategic vision, an indispensable basis for international cooperation.

At the European Union level, foreign ministers have decided to reinforce the organization strategic focus, presence, and actions in the Indo-Pacific. It will thus develop its engagement on the region – in particular, with the partners that have already announced Indo-Pacific approaches of their own.[45] In this context, climate security needs to be placed at the heart of the preoccupations, especially since the development of a "climate change and defense roadmap"[46] in November 2020.

3. Conclusion

For many decades, climate change has only been considered as an ecological and environmental problem. Now, as its consequences become more visible and as research advances, awareness is actually starting to progress. It is however still very imperfect, and there is still a great deal of work to be done in terms of education and consciousness-raising, especially towards Defence and security actors. All too often, climate change remains considered by military leaders as a simple operational variable, as opposed to a major strategic variable. This is why there is an acute need for institutionalized prospective frameworks in which scientific research and operational actors work closely together.

As the Indo-Pacific increasingly emerges as the strategic space of the 21st century, we cannot turn our back on these challenges. It is the very security of our citizens that is at stake, and France has a role to play.

The impact of climate change in the coming decades will undoubtedly be one of the major challenges for which we must continue to prepare. This requires both the ability to anticipate changes and to define applicable solutions to deal with them. For this to happen, the mobilization of all actors, public and private, collective and individual, is essential, as well as major governance and cooperation efforts. Multilateralism needs to be the cornerstone of our action. This is what we will strive for.

44 https://www.youtube.com/watch?v=AQ5x7tLDH4c

45 European Union External Action Service (2021), *EU Strategy for Cooperation in the Indo-Pacific.*

46 https://data.consilium.europa.eu/doc/document/ST-12741-2020-INIT/en/pdf

Geo-environmental Challenges in the Indian Ocean

The Interaction of Environmental Security Threats and the Need for Regional Collaboration

David Brewster

In coming years, the Indian Ocean will face a growing number of environmental security threats driven by climate change and other human activities. These include increased occurrence of severe weather events, rising sea levels, environmental pressures on fish stocks and the environmental consequence of major shipping accidents. For many Indian Ocean states these threats could be more important than traditional state-based threats or maritime crime. Moreover, environmental security threats can't be properly understood or addressed in isolation from each other, but can combine and cascade into geo-environmental challenges that can affect the entire region. These challenges are often beyond the ability of individual states to respond to and generally demand a collective response. But the Indian Ocean region (IOR) currently has few institutions that are well suited to organising collective action.

This chapter will first review some of the key environmental security threats faced by Indian Ocean states. It then examines how these threats can interact with each other and have wide-reaching strategic impacts. These are illustrated through three case studies: the strategic consequences of destruction of Somali fish stocks in the 1990s; the potential impact of climate change on the Syrian civil war; and the security impacts of the 2004 Tsunami on Sri Lanka, Maldives and Indonesia. Finally this chapter examines the need for regional arrangements to collectively address geo-environmental challenges.[1]

1. Growing environmental security threats in the Indian Ocean region

Significant disruptions in the natural environment are likely to give rise to a range of security threats in the IOR in coming years. This section will focus on how climate change and other human activities can contribute to environmental security threats.

The IOR has long been an epicentre for a range of natural occurring hazards, including climatological (cyclones and droughts), geological and tectonic (earthquakes and tsunamis) and hydrological hazards (such as floods and tidal surges). Along with the Pacific, the Indian Ocean experiences the most serious natural hazards in the world, but it is also one of the regions with the least capacity to respond. The impact of many natural hazards, such as cyclones, floods and earthquakes, is magnified by the relatively high population density of parts of the region. This may be further exacerbated by the growth of huge, dense, urban areas, particularly in coastal areas.

The Indian Ocean, particularly its eastern edge, is also prone to earthquakes, volcanoes and tsunamis. The intersection of the Eurasian and Indian and Australian tectonic plates creates a subduction zone that extends along the coast of Java, Sumatra and through the Andaman Sea, which is particularly prone to earthquakes and tsunamis caused by undersea earthquakes and landslides. These natural events have the potential to cause massive deaths, population displacement and material and economic destruction.

1 This chapter builds on issues discussed in David Brewster, *Geo-environmental Security Challenges in the Indian Ocean Region: Setting a Regional Agenda*, Emirates Diplomatic Academy, 2019. See also *Environmental Security in the eastern Indian Ocean, Antarctica and the Southern Ocean: A risk mapping approach*, National Security College, 2019.

The natural environment in the IOR is now being strongly affected by climate change and other human interactions. This will likely act as an impact multiplier, exacerbating existing human security threats, including socioeconomic, water, energy, food and health challenges that diminish resilience and increase the likelihood of conflict. As Robert Glasser, former head of the UN Office of Disaster Risk Reduction, has commented, as a consequence of climate change, we may now be entering the "Era of Disasters" with profound implications for the way we organise ourselves.[2]

This chapter focuses on the potential for the following climate or human-related environmental security threats in the IOR:

- increase in severity of tropical cyclones and other severe weather events
- rise in sea levels
- decline in fish stocks and growing competition for fish resources
- shipping accidents

(1) *Increase in severity of tropical cyclones and other severe weather events*

Tropical cyclones have historically been a major source of death and destruction across the Indian Ocean. They may become even more destructive as a result of climate change, although there are still considerable uncertainties. The Intergovernmental Panel on Climate Change (IPCC) states that while it is likely that overall global frequency in tropical cyclones will either decrease or remain essentially unchanged, it is more likely than not that the frequency of the most intense storms will increase substantially in some ocean basins.[3]

Increased intensity of weather events may have the biggest impacts on two parts of the Indian Ocean. In the Bay of Bengal (India, Bangladesh, Myanmar), tropical cyclones have historically exacted near apocalyptic death tolls from the shallow farming and fishing settlements of the Ganges River Delta and Deccan plateaus. According to the Indian Government, the intensity of extreme weather events is increasing in the Bay of Bengal and elsewhere in the northern Indian Ocean.[4] In the southwest Indian Ocean, countries such as Madagascar[5] and Mozambique[6] are also facing more frequent and severe weather events such as cyclones, floods and droughts.

(2) *Rise in sea levels*

The rise in sea levels associated with climate change could have a significant impact on many states in the IOR in several ways. Sea level rises would be expected to lead to increases in the frequency and severity of flooding events, especially when combined with increases in the severity of storms and ground subsidence. Sea-level rise is projected to aggravate storm surge, flooding, erosion and other coastal hazards, resulting in significant losses of coastal ecosystems. An increase in sea level would also be expected to cause the intrusion of seawater and salinisation of groundwater that will challenge freshwater availability and reduce soil fertility.

For island states such as the Maldives, a significant rise in sea levels, when combined with the impact of waves, could represent an existential threat. As long ago as 1987, Maldives President Gayoom told the UN General Assembly that a rise of 2 metres above mean sea level would virtually submerge

2 Robert Glasser, *Preparing for the era of disasters*, ASPI Special Report, March 2019.

3 Intergovernmental Panel on Climate Change, *Managing the risks of extreme events and disasters to advance climate change Adaptation*, 2012, Chapter 9.

4 "Severe Cyclonic Storms Intensity in Northern Indian Ocean Increasing" *Mint*, 29 July 2021. https://www.livemint.com/news/india/severe-cyclonic-storms-intensity-in-north-indian-ocean-region-increasing-11627551191939.html

5 USAid, "Climate Change Risk Profile: Madagascar" 2016. https://www.climatelinks.org/sites/default/files/asset/document/2016%20CRM%20Factsheet%20Madagascar_use%20this.pdf

6 Rebecca Hersher, "Mozambique Is Racing To Adapt To Climate Change. The Weather Is Winning" National Public Radio, 27 December 2019. https://www.npr.org/sections/goatsandsoda/2019/12/27/788552728/mozambique-is-racing-to-adapt-to-climate-change-the-weather-is-winning

the entire country and that a mere 1 metre rise could also be catastrophic, and possibly fatal to the nation. With some 99% of tourist accommodation within 100m of the ocean, any significant rise in sea levels may effectively destroy the Maldives' most profitable industry even before it renders the country uninhabitable.[7]

There are other impacts as well. Already, many of the Maldives' 200 inhabited islands are experiencing serious salinification of groundwater (traditionally used for drinking and agriculture) and severe coastal erosion. This increasingly requires emergency deliveries of desalinated water from the country's capital. When combined with the loss of fish stocks (discussed below), there may be an accelerated displacement of agricultural and regional population to the main urban centres.

Sea level rises could also have a dramatic impact on Bangladesh, particularly when combined with storm surges. According to the Global Military Advisory Council on Climate Change,[8] a 1m rise in sea level would inundate around 17% of Bangladesh's land area, directly affecting around 15 million people, and a 1.5m rise would affect around 18 million people. The Bangladesh government estimates that some 20 million people will be displaced by climate change in that country, while other studies go as high as 30–35 million people.[9] Increased salinity of land would also lead to reduced agricultural production.

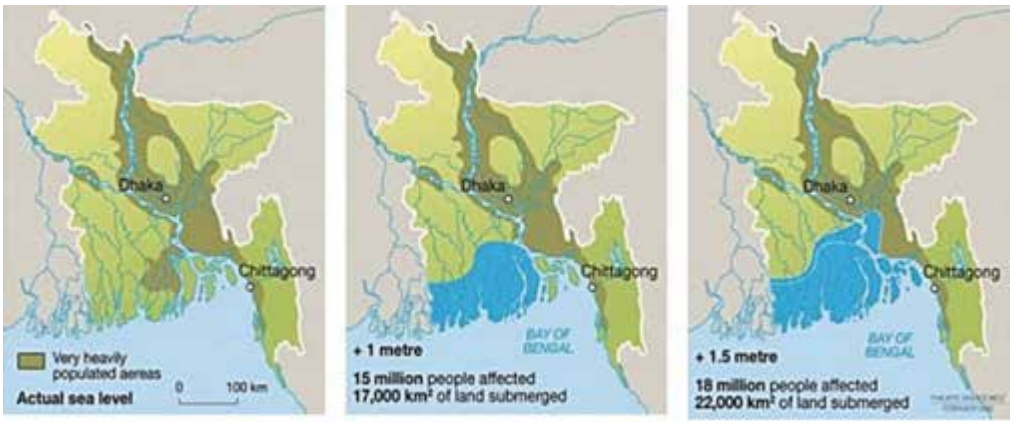

Figure 1 Impact of Sea Level Rise in Bangladesh

(Source: Global Military Advisory Council on Climate Change, Climate change and security in South Asia, GMACCC, May 2016.)

The regional/international consequences of climate change-related population displacement are not yet clear. According to the IPCC, it is widely established that extreme weather events displace populations in the short term because of their loss of place of residence or economic disruption. However, only a proportion of displacement leads to more permanent migration.[10] The United Nations International Strategy for Disaster Reduction states that 'due to the multidimensional and complex dynamics of migration and displacement, quantitative projections of future trends have low confidence levels, even though there is agreement that climate change will drive future displacement and patterns of movement.'[11] However, even if climate change-related population displacements remain largely intra-state, these could have significant impacts on social and political stability for the states concerned.

7 Sanjay Chatuvedi & Vijay Sakhuja, *Climate change and the Bay of Bengal: evolving geographies of fear and hope*, ISEAS, 2015, p.156.

8 Global Military Advisory Council on Climate Change, *Climate change & security in South Asia*, GMACCC paper no. 2, May 2016.

9 *Ibid*.

10 IPCC AR5 Climate Change 2014: Impacts, Adaptation, and Vulnerability, Chapter 12 – Human Security.

11 UNISDR, *Global assessment report on disaster risk reduction* 2015, p.107.

(3) *Decline in fish stocks and growing competition for fish resources*

There is also the potential for significant (and perhaps, unpredictable) declines in fish stocks across the Indian Ocean as a consequence the interaction of several factors, including:

- overfishing by local and extra-regional fishers, acting both legally and illegally
- climate change-related changes in the marine environment, including due to acidification, marine heatwaves and hypoxic areas, as well as marine pollution.

Many states in the Indian Ocean rely heavily on fish as a source of income and as a major source of animal protein. According to the Food and Agriculture Organisation (FAO), for Indonesia fish contributed to 54% of total animal protein, with Bangladesh at 56% and Sri Lanka 57%.[12]

Fishing is also a major contributor to employment. For example, as of 2014, the Bay of Bengal fishery provided food for approximately 400 million people, with 2.2 million fishers providing a livelihood for 4.5 million people.[13] The decline in sustainable fish stocks is therefore a major problem for economic and food security.

The threat to fish stocks comes from overexploitation from legal as well as illegal, unreported and unregulated (IUU) fishing, by both local and extra-regional fishers. The FAO estimates that 90% of the commercial fish stocks it tracks worldwide have been overfished or fully fished, with estimates of the proportion of illegal catch to reported catch in the Indian Ocean among the highest of any region in the world.[14]

The problem of unsustainable fishing will likely grow, driven by growing population, falling fish stocks and relatively weak enforcement arrangements. Extra-regional states such as Spain, Taiwan, Japan, and Uruguay have long been active fishers in the Indian Ocean and they are now being joined and surpassed by China. The decline of fish stocks in Chinese waters and growing demand for fish protein has led the Chinese government to build a subsidised fishing industry to operate far from Chinese waters. The World Bank estimates that China will account for some 37% of the global catch by 2030, many times that of any other country.[15]

Significant declines in fish stocks from overfishing are likely to be exacerbated, perhaps in some unpredictable ways, by climate change and other human impacts. This includes the impact on fish stocks from changes to oceanic currents, the occurrence of marine heatwaves, ocean acidification, the development of hypoxic areas (where normal oxygen levels are depleted), and marine pollution (including plastics). The Indian Ocean is reportedly the second most polluted ocean in the world.[16] Ocean pollution results from waste from the general population, agricultural activities, shipping and transportation, ocean exploration and other industries.[17] Marine pollution contributes to the destruction of marine habitats, loss of fish stocks and the bleaching of coral reefs. Fish stock modelling that principally addresses the impact of legal and IUU fishing on stocks and not these other factors may be dramatically inaccurate.

Despite significant concerns about the sustainability of Indian Ocean fisheries, there is currently insufficient data to properly assess the risks presented by the combination of overfishing, climate change and other environmental impacts. Data is currently collated by the Indian Ocean Tuna Commission and national agencies principally for the purpose of the allocation of quotas rather than as an environmental security risk assessment. One recent study argued that actual fish catches in the eastern Indian Ocean over the last 60 years have been much higher than those reported by the FAO, and that catches are cur-

12 Food and Agriculture Organisation, *State of world fisheries and aquaculture 2014*.

13 Hermes, R. and O'Brien, C. 'Fish and fisheries of the Bay of Bengal large marine ecosystem' 3rd Global LME Conference Swakopmund, Namibia, 2014.

14 Agnew D., et al., 'Estimating the worldwide extent of illegal fishing', *PLoS ONE*, 2009, 4(2).

15 World Bank, *Fish to 2030: prospects for fisheries and aquaculture*, 2013.

16 'Indian Ocean second-most polluted in the world,' *Northglen News*, 2 June 2016.

17 Hardesty, B., et al, 'Estimating quantities and sources of marine debris on a continental scale' *Frontiers in Ecology & Evolution* Vol 15 2016; J Jambeck et al, 'Plastic waste inputs from land into the ocean' *Science*, 13 February 2015, 3.

rently declining at a much higher rate than is generally believed.[18] Anecdotally, catches have declined considerably in recent years in some regions.

For countries that rely on fish for income and protein, a significant decline in fish resources could contribute towards economic dislocation/decline in living standards, violent extremism, political instability and potentially population displacement.

Declining fish stocks could also affect regional stability. A 2013 report by the US National Intelligence Council found that stresses in Indian Ocean fisheries might undermine the internal stability of countries such as Bangladesh, as well as bilateral and regional relations such as those of India–Bangladesh, India–Pakistan and India–Sri Lanka as fishing becomes an ever more contested activity.[19]

An intensification of competition for fish resources could create security threats in a variety of ways, including through the operation of international fishing management regimes, national agencies, and non-state actors.[20] Competition over resources will likely put states under greater pressure to assert claims over and to police their exclusive economic zones (EEZ) against other fishers.

In addition, competition for fish resources may become a security issue in relationships with extra-regional powers.[21] Elsewhere, illegal fishers have used force to prevent interventions by local enforcement agencies, and extra-regional fishers could increasingly seek protection from their own governments. Contests between state agencies over access to fishing resources may increasingly meld into grey zone operations in the maritime domain.[22]

Future fishing disputes may also increasingly involve non-state actors. In the western Indian Ocean, there has been growing use of armed private security contractors on fishing boats. Fishing enforcement disputes also increasingly involve NGOs such as Sea Shepherd, which has worked with local authorities to catch IUU fishers in Gabon, Tanzania, and Timor Leste. The presence of NGOs could substantially complicate fishing-related disputes.

(4) *Shipping accidents*

Other human activities not connected to climate change can also have major environmental impacts. Indeed, shipping accidents, particularly those involving oil and chemical spills, may represent the biggest threat to the maritime environment of several island states.

At the end of July 2020, the Japanese-owned bulk carrier MV *Wakashio* became stranded on a coral reef off the Mauritius coast. By 10 August, around 1,000 tonnes of fuel had spilled from the ship, threatening the Blue Bay Marine Park, one of the marine treasures of Mauritius and a sensitive ecology site. The oil spill was an environmental catastrophe for Mauritius with dire consequences for Mauritius' economy, food security, public health, and the environment.[23] The MV *Wakashio* oil spill disaster demonstrated that weak regional and international security mechanisms prolonged the site oil spill management and mitigation, despite millions being spent on capacity building.[24] Although several countries (including France, India and Australia) provided assistance, a truly regional response appears to have been largely absent during the incident.

In October 2020 following closely the Mauritius spill, an explosion and fire occurred on board the 270,000 tonne supertanker MT *New Diamond* off Sri Lanka. A joint team from Sri Lanka and India put out the fire and secured the cargo of 270,000 tonnes of crude oil, averting a potentially catastrophic di-

18 Pauly, D. and Zeller, D., 'Catch reconstructions reveal that global marine fisheries catches are higher than reported and declining' *Nature Communications*, 2016, Issue 7.

19 Office of the Director of National Intelligence, *The future of Indian Ocean and South China sea fisheries: implications for the United States*, National Intelligence Council Report NICR 2013–38, 30 July 2013.

20 Rumley, D., 'A policy framework for fisheries conflicts in the Indian Ocean' in D Rumley, S Chaturvedi and V Sakhuja, eds, *Fisheries exploitation in the Indian Ocean: threats and opportunities*, 2009.

21 Brewster, D.,'Chinese fishing fleet a security issue for Australia,' *Lowy Interpreter*, 17 November 2018.

22 Goldrick, J., *Grey zone operations and the maritime domain, ASPI Special Report*, 30 October 2018.

23 https://www.orfonline.org/expert-speak/mauritius-oil-spill-reveals-weakness-of-maritime-security-architecture-in-the-western-indian-ocean/?amp

24 https://www.lowyinstitute.org/the-interpreter/tackling-environmental-security-threats-indian-ocean

saster.[25] Local authorities commented: "If the ship capsized, that would have been one of the worst marine environment disasters to occur, considering the amount of oil it was carrying... We consider this an eye-opener for Sri Lanka and identify our need to strengthen its capacities to address major oil spills."[26] In May 2021, the MV *Express Pearl*, a container ship, caught fire and subsequently sank off Colombo. The sinking released chemicals and plastics from several containers, which covered Sri Lanka's tourist beaches, causing much of the damage that had been averted from the MT *New Diamond* episode.

There are up to around 100,000 international shipping movements per annum through the northern and central Indian Ocean (based on shipping movements through Malacca Strait). Roughly around one third of these ships are VLCCs or other tankers carrying crude or other petroleum products. Together, tankers carrying around 16 million barrels of crude and petroleum products per day between Hormuz and Malacca.[26] The density of shipping traffic, particularly of tankers, makes the risk of a serious shipping incident is very high.

The heavy reliance of Indian Ocean coastal states, particularly island states, on maritime-based tourism and fishing means that a major oil spill could have a devastating economic impact. It is not inconceivable that the sinking of a single supertanker could economically devastate large parts of the Indian Ocean. Alone or in conjunction with other events, this could have significant indirect human security consequences for local communities.

2. The interaction of geo-environmental and geo-strategic challenges

The previous section of this chapter explained why the incidence and severity of environmental disruptions in the IOR will likely grow in coming years. But, importantly, these environmental security threats can't be properly understood in isolation from each other, or in isolation from 'conventional' security threats. Indeed, they can have a significant impact on broader strategic dynamics.

In practice future environmental disruptions in the IOR have the potential to go far beyond what is normally understood as discrete environmental challenges. We may increasingly need to understand them as 'geo-environmental' challenges, on par with geopolitical challenges in terms of their potential to disrupt the regional strategic order.

(1) *Cascading and compounding events*

First, it would be an error to plan for or respond to environmental disruptions individually (e.g. a decline in fish stocks, or the salinification of groundwater). They frequently do not occur as isolated events, but often occur in combination or as a cascading or compounding series of events. One environmental disruption can contribute to or exacerbate the occurrence of another. One event might significantly reduce a community's resilience or its ability to respond to subsequent, unrelated, events. This potential for magnification or cascading influences can make it difficult to predict the consequences of what may individually appear to be moderate or manageable threats. This is cascading influence effect is illustrated below.

25 https://news.mongabay.com/2020/10/oil-tanker-fire-in-sri-lankas-rich-waters-highlights-need-for-preparedness/

26 US Energy Information Administration, 2020.

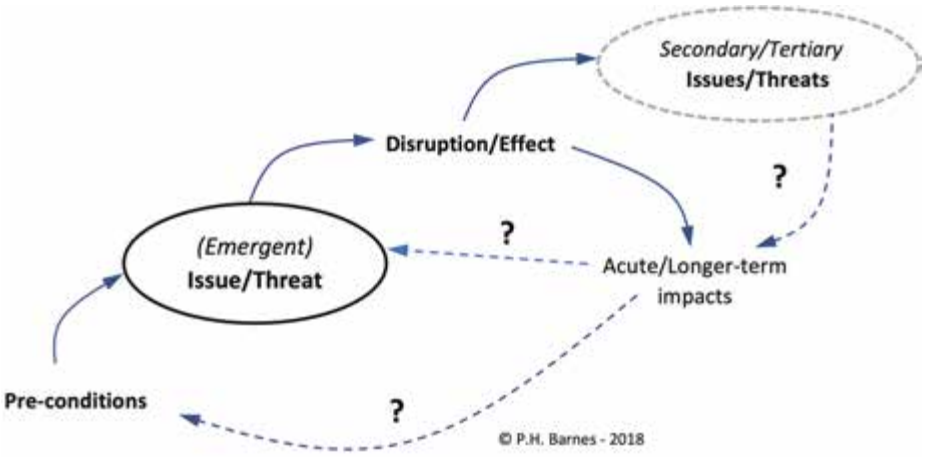

Figure 2 Cascading/compounding effects

Climate change, in particular, can lead to the cascading/compounding of natural hazards.[27] What may begin as what appears to be an isolated 'natural' hazard can also combine with industrial accidents to significantly magnify their normal individual impacts. For example, cyclones or storm surges could trigger accidents in petrochemical plants or nuclear power plants that are often located in coastal areas.

A good illustration of the potential concurrent or cascading impacts (in that case, a combination of natural hazards and an industrial accident) was the 2011 Great East Japan Earthquake. The Magnitude 9.1 earthquake itself caused immediate major devastation in many parts of Japan, but also generated tsunamis that then further devasted coastal areas. These combined to cause the meltdown of the Fukushima nuclear facility north of Tokyo after the earthquake first shut down the electricity grid and the tsunami then disabled back-up generators and pumps. The ensuing nuclear melt-down led to the long-term evacuation of large areas of Japan — and a long-term move by Japan away from nuclear energy, which itself could have considerable further strategic implications. As was demonstrated in the case of Fukushima, a combination of events can overcome contingency plans that would have been effective for single events.

The impact of environmental disruptions in the Indian Ocean can also be complicated by other factors. The high population density of parts of the region and the location of many large cities on the coast can significantly magnify the impact of maritime-related disruptions. Threats and disruptions in the maritime domain also tend to be more international in nature than those that occur only on land. Many environmental threats occur outside of national jurisdictions. Even where maritime-related disruptions initially occur within national EEZs or national waters, they will likely have interrelated impacts elsewhere. This means that maritime-related environmental disruptions will often require a regional response.

In the IOR, the interaction of environmental disruptions is further complicated by the strategic instability already being experienced. The potential interaction of geo-environmental challenges and strategic and security threats is demonstrated by the following case studies.

Case Study 1: *Somali fish stocks and the strategic balance in the western Indian Ocean*

The problem of Somali-based piracy over the last 20 years provides another example of the interrelationship between environmental, non-traditional and conventional security threats — in that case, triggered by degradation of natural resources through overfishing.

One of the consequences of the collapse of the Somali state in the 1990s was the cessation of en-

27 Glasser, R., *Preparing for the Era of Disasters*, ASPI Special Report, March 2019.

forcement of national laws on land and at sea. This failure in governance led to the severe degradation of the rich fishing grounds off the Somali coast, through the failure to prevent overfishing by IUU fishers, many of them from outside the region. This had a major negative impact on food and economic security of local fishing communities. Many Somali fishermen, in search of new forms of livelihood, turned to piracy.[28]

This had a significant and lasting impact on regional security. The threat of piracy to international trade in and around the Gulf of Aden prompted a large and sustained international military response, including the deployment of high-end naval vessels into the western Indian Ocean from many countries inside and outside the region.

But despite the significant reduction in Somali-based piracy over the last several years, many countries continue to maintain a regular naval presence in the western Indian Ocean. The presence of large numbers of extra-regional naval vessels, further militarising the northwest Indian Ocean, has had a long-term impact on the regional balance of power. The presence of a Chinese naval task force to combat piracy was used as justification for the establishment of naval support facilities by China in Djibouti, which has led to responses from other countries.

The Somali piracy threat also spurred the widespread use of military personnel and private security contractors aboard commercial vessels. This has had its own consequences for regional security, including the advent of private floating armouries in the central and northwest Indian Ocean. Countries such as Maldives, for example, are concerned that these floating armouries in their waters could become a source of weapons for violent extremists.

It is possible that some of these consequences may have been different if the region had addressed the Somali piracy issue in a different way. For example, if it had been addressed as primarily a law enforcement issue rather than a military issue, then perhaps the strategic impact on the region might have been lessened. In any event, countries in the region now have to deal with what may be more or less permanent consequences of the destruction of fish stocks in Somali waters.

Case Study 2: *The role of drought/climate change in causing the Syrian Civil War*

Some analysts believe that climate change played a significant role in escalating 2011 civil protests in Syria into its long-running civil war, which has had major strategic consequences for the region and the world. They argue that a drought caused mass migration from the countryside to the cities and sparked an anti-government uprising. But the links between environmental and security threats in the case of Syria are less direct compared with the case of Somalia, and the mechanisms more uncertain.

Between 2006 and 2011 Syria experienced a severe multi-season drought that left farmers particularly vulnerable. Environmental degradation through unsustainable land use and mismanagement of water resources was further exacerbated by Syrian government policies. A 2008 US diplomatic cable (unverified, published by Wikileaks) described the drought as a ''perfect storm'' when combined with other economic and social pressures. It commented that population displacements ''could act as a multiplier on social and economic pressures already at play and undermine stability in Syria.''[29] By 2011, around 2-3 million people were suffering from significant food and economic security threats, leading to the displacement of around 1.5 million people from agricultural areas to major cities.[30]

Some argue that the Syrian regime's failure to put in place economic measures to alleviate the effects of drought was a critical driver in propelling massive mobilizations of dissent in urban areas, beginning in urban areas most affected by population displacement. But while there is consensus among analysts that climatic conditions played an important role in the deterioration of Syria's economic conditions, most would also recognise that the Syrian civil war was a culmination of several interconnected

28 "Somali Perspectives on Piracy and Illegal Fishing" *Oceans Beyond Piracy*, http://oceansbeyondpiracy.org/publications/somali-perspectives-piracy-and-illegal-fishing; and M Sow, Piracy and illegal fishing in Somalia, Brookings Institution, 12 April 2017.

29 https://wikileaks.org/plusd/cables/08DAMASCUS847_a.html

30 Gleick, Peter, 'Water, Drought, Climate Change, and Conflict in Syria,' *Weather, Climate and Society*, Vol.6 (2014), p.331.

factors that had been developing over a long period.

Some analysts are cautious about making a direct causal link between the drought and the civil war, arguing that while there was a temporal correlation, causation is difficult to prove. Even those analysts would concede, however, that the economic impact of the drought did contribute to dissatisfaction with the government and helped unite opposition against the government.[31]

This provides a good illustration of how difficult it can be in some cases to clearly differentiate the security impacts of climate change from a myriad of other social or political factors that may also be in play.

Case Study 3: *The strategic impact of the 2004 Indian Ocean Tsunami*

The security consequences of natural disasters can also be highly unpredictable. The widely differing security impacts of the 2004 Indian Ocean Tsunami in different countries provides an illustration of how unpredictable the potential strategic consequences can be of what might be categorised as 'just' a natural disaster.

The Indian Ocean Tsunami that occurred in December 2004 was a consequence of a major undersea earthquake off the coast of Sumatra, Indonesia. This generated waves up to 30 metres high which led to the deaths of around 227,000 people in 14 countries. Major impacts were experienced in Indonesia, Sri Lanka, India, Maldives and Thailand.

The disruption caused by the Tsunami had a negative security impact in some countries. At that time in Sri Lanka, a tenuous truce existed between government and insurgent forces, led by the LTTE, in that country's long-running civil conflict. But following the Tsunami, the LTTE used the opportunities presented by the chaos and inflow of economic aid to rearm and resume their insurgency. The flood of post-war Tsunami aid money, and the LTTE's control of portions of northern and eastern Sri Lanka meant they could dictate terms to aid agencies. Tens of millions of dollars of aid was diverted to acquire weapons to use against government forces.[32] The resumption of the civil conflict following the Tsunami led to a further 30,000 deaths over the next 3 years, and ultimately resulted in the defeat of the insurgency.

In the Maldives, the Tsunami also caused major economic damage and considerable internal displacement islands, but with quite different security consequences compared with Sri Lanka. Anecdotally, many analysts believe that the Tsunami was an important factor in radicalising many local communities, with continuing implications for the region today. According to one report, the Tsunami was "… a turning point in Maldivian religious beliefs, largely due to the fact that many of the clerics used it to convince people that it was God's wrath wreaked upon them for not practicing the right Islam and straying from the path of Allah."[33] In the aftermath, Pakistan-based jihadist groups such as Lashkar-e-Toiba (LeT) also exploited existing social fault lines through their charitable front organisation to establish a foothold especially in southern Maldives in the garb of relief operations.[34] There has been a significant growth in violent extremism in Maldives since around 2004, although the full long-term consequences of this are yet to be seen.

But in Indonesia, the security and strategic consequences of the Tsunami were quite different, and in many ways more unexpected. Indonesia, which experienced around 160,000 deaths, mostly in Aceh province, was the hardest hit of any country. The devastation of Aceh province, including the massive death toll, significantly weakened a long-running separatist insurgency. The Free Aceh Movement (GAM) immediately declared a unilateral ceasefire, which was transformed into a permanent peace

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31 Eklund, L. and Thompson, D., 'Is Syria really a 'climate war'? We examined the links between drought, migration and conflict" *The Conversation*, 21 July 2017.

32 Hull, B., 'Tale of war and peace in the 2004 tsunami', *Reuters*, 18 December 2009.

33 Maldivian Democracy Network, "Preliminary Assessment of Radicalisation in the Maldives" 2016. http://mdn.mv/wp-content/uploads/2016/09/Preliminary-Assessment-of-Radicalisation-in-the-Maldives-Final.pdf

34 Manoharan, N., 'Divergent Maldives: too close for comfort', *Deccan Herald*, 4 September 2018. https://www.deccanherald.com/opinion/perspective/divergent-maldives-too-close-691129.html

agreement with the Indonesian government in 2005.[35] The Tsunami also destroyed most of the boats used by local pirates (many of them associated with the insurgency), which is also believed to have been an important factor in the significant decline in piracy in the Malacca Strait.[36]

The 2004 Tsunami also had an unexpected, long term, impact on strategic dynamics of the Indo-Pacific region. The US, Australian, Japanese and Indian navies were at the forefront in providing relief to countries in the eastern Indian Ocean, and their ad hoc cooperation as part of the 'Tsunami Core Group' later evolved into the so-called 'Quadrilateral' security grouping among those countries.[37] The so-called 'Quad' has now become an important factor in the regional strategic balance.

China's failure to play a significant role in international relief efforts in natural disasters such as the 2004 Tsunami (and later Typhoon Haiyan in the Philippines in 2013) also led to a greater understanding in Beijing of HADR operations as an important form of soft power. This has led the Chinese navy to build a fleet of hospital ships to project soft power around the region. Beijing has also become much more aware of the soft power benefits of responding to large scale disasters, as was demonstrated by the rise of 'Covid diplomacy' in the wake of the COVID-19 pandemic.

The 2004 Indian Ocean Tsunami also provides a good example of how external disaster relief efforts can also have strategic implications, for good or bad. Outside efforts to provide assistance in natural disasters will not always be welcomed. Some countries may resist external efforts to provide aid, fearing the presence of foreign aid workers or military. This needs to be considered in developing regional responses to geo-environmental challenges.

3. Regional responses to geo-environmental challenges

The rise of Somali-based piracy following the destruction of Somali fish stocks, the contribution of climate change to the Syrian civil war, and the disparate impacts of the 2004 Tsunami provide good illustrations of how what might initially appear to be a single disruption to the natural environment could have significant, widespread, and unexpected strategic consequences for the region. As discussed, environmental disruptions often do not occur as isolated events, but instead can occur in combination or as a cascading or compounding series of events that can multiply security impacts.

The likely growth in the incidence and severity of environmental disruptions in the Indian Ocean in coming years, particularly due to climate change, has the potential to create severe geo-environmental challenges for the region. This will require a collective response, preferably one that is organised by the Indian Ocean region itself.

Environmental disruptions that are likely to be faced by the Indian Ocean region in coming years are of a nature and severity that should be understood as 'geo-environmental' challenges which may grow to rival the geopolitical challenges. Importantly, the nature of these geo-environmental challenges calls for a collective response, either through existing regional groupings or new regional arrangements.

The Indian Ocean region suffers from deficits in regional governance. The region currently has relatively few and weak mechanisms to promote cooperation in respect of geo-political or geo-environmental challenges. There is currently no forum within the region devoted to creating shared understandings among civil and military agencies and non-governmental groups in respect of environmental security threats. Nor is there any mechanism for regional cooperation among agencies such as coast guards, which are often on the front line of these issues.

The peak regional political organisation in the Indian Ocean, the Indian Ocean Rim Association (IORA), has long been perceived to 'punch below its weight', although the recent establishment by

35 Aspinall, Edward, *Islam and Nation: Separatist Rebellion in Aceh, Indonesia*. Singapore: National University of Singapore Press, 2009.

36 Burton, J., 'Piracy in Aceh waters ceases after tsunami,' *Financial Times*, 6 January 2005.

37 Madan, T., 'The Rise, Fall, and Rebirth of the 'Quad,'' War on the Rocks, 16 November 2017. https://warontherocks.com/2017/11/rise-fall-rebirth-quad/

IORA of Working Groups on Maritime Safety and Security and Disaster Risk Reduction could provide a useful forum for some of these issues. However, IORA's organisational structure makes it extremely difficult to achieve concrete outcomes. This means that regional initiatives to address environmental security challenges may need to be approached in innovative ways.

The following regional initiatives should be considered:

- ***Indian Ocean Environmental Security Partnership:*** Like-minded Indian Ocean countries should work together to establish an Indian Ocean Environmental Security Partnership. This could draw from the experience of the US-sponsored Pacific Environmental Security Partnership which was established in 2012.[38] An Indian Ocean environmental security partnership would bring together representatives from military and civilian agencies and non-governmental organisations across the Indian Ocean region to create shared understandings on environmental security threats and help establish habits of dialogue in the field of environmental security.[39]

- ***Regional coast guard cooperation:*** Coast guards are often the best vehicles for regional cooperation in respect of a variety of maritime security threats. Their status as civilian law enforcement agencies often allows them to cooperate with partners and in ways that would be politically difficult for navies. There is currently no mechanism for cooperation among coast guards of the Indian Ocean. The Heads of Asian Coast Guard Agencies Meeting (HACGAM) brings together Asian coast guards between Japan and Turkey, but there is no such network devoted to building coast guards across the Indian Ocean, including East Africa and the Indian Ocean island states. There is an opportunity for like-minded partners to create arrangements for dialogue, cooperation and training among Indian Ocean coas guards in the Indian Ocean. This could include ongoing arrangements for professional development of senior coast guard practitioners in a dedicated coast guard regional training centre.

- ***Research on fish stocks:*** IORA and/or other relevant agencies should undertake environmental risk assessments of all species of fish in the Indian Ocean, including studies on the potential impact of climate change on those fish stocks.

- ***Disaster risk reduction:*** There is considerable scope for developing framework disaster management arrangements among key Indian Ocean states. Such an arrangement should focus on developing pre-existing coordination mechanisms for responding to disasters among the most capable states. This could draw from the experience of ASEAN and the FRANZ arrangements among Australia, France and New Zealand in the South Pacific.

4. Conclusion

In coming years, the Indian Ocean will face a growing number of environmental security threats driven by climate change and other human activities. This chapter argues that these threats should increasingly be seen as representing *geo-environmental challenges* to regional stability and security, on par with geopolitical and geo-economic challenges. Importantly, environmental security threats can't be properly understood or addressed in isolation from each other, but can combine and cascade with other threats into challenges that can affect the entire region. These challenges are often beyond the ability of individual states to respond to and generally demand a collective response. This will require building new collective institutions in the Indian Ocean with a major focus on environmental security.

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38 Originally called the Pacific Environmental Security Forum.

39 "Oil on troubled waters: coordinating responses to environmental disasters in Indian Ocean island states" *ASPI Strategist*, 27 November 2020.
https://www.aspistrategist.org.au/oil-on-troubled-waters-coordinating-responses-to-environmental-disasters-in-indian-ocean-island-states/

Part 5

Climate Security in a Free and Open Indo-Pacific

How should Japan, which advocates the vision of a Free and Open Indo-Pacific, develop its climate security in the unstable security environment and fluid international relations caused by major power rivalries and regional conflicts?

Part 5 will focus on the cooperation between Japan and the United States, including the maintenance of defense capabilities in areas affected by major natural disasters and rising sea levels, based on the US-Japan security system, which is the foundation of Japan's security policy. In addition, this part will discuss how to address climate security in the context of realizing a Free and Open Indo-Pacific vision based on law.

Climate Security in the Free and Open Indo-Pacific Vision

Kazumine Akimoto

"War is the continuation of politics by other means." That is how Carl von Clausewitz describes the essence of war.[1] If we think of politics and war as two sides of a coin, we can also say, "

"International politics is but a phase of war conducted by different means."

That description may be even closer to reality today, with a higher threshold to cross before we use force to impose our will on others.

1. International politics as war by different means

(1) *Decarbonization and geopolitics*

Because every country's energy situation and economic and industrial policies are different, international responses to climate change inevitably reflect contrasting political strategies centered on national interest. This has manifested itself when agreements at international conferences reach a stalemate—the Intergovernmental Panel on Climate Change (IPCC) being a notable example. On the other hand, we can predict that the main greenhouse gas emitting countries and the major powers will change their strategic approaches to fossil fuel resource supplies in the Middle East and elsewhere in the process of promoting measures to stop global warming. If the United States relies less on its allies and friends for fossil fuels, its military presence in the Middle East could shrink. In the 1990s, the United States is said to have spent three times as much on keeping its troops in the Middle East as it spent on importing oil from the region. Some estimates calculate that adding the military costs to the oil import costs at the time would have raised the price by $77 per barrel.[2] In other words, if other countries were paying $50 a barrel to get crude oil, the United States would have been paying an exorbitant $120 or more. If the United States withdrew even some of its troops from the Middle East amid declining demand for fossil fuel resources, the security environment and power balance in that unstable region would undoubtedly change significantly. The impact would not be limited to the Middle East; it would lead to paradigm shifts in geopolitical concepts the world over.

Meanwhile, the international stage is undoubtedly going to see heated competition between countries and companies as they aim to decarbonize their societies and switch to electricity by creating and spreading clean energy. There will be ever-fiercer international competition to acquire rare earth metals, nickel, cobalt, lithium, and other resources needed to produce, and new technologies for, renewable energy (like wind and solar power) and other environmental measures (like zero-emission automobiles). Regions that supply those resources and manufactured components will become the focus of countries' new strategic approaches. In turn, this will have a considerable impact on the security and

1 Carl von Clausewitz, *On War*, trans. Hideo Shinoda (Iwanami Bunko, 1968), 58. The phrase is repeated throughout the book.

2 Amory Lovins, *Reinventing Fire*, trans. Yasushi Santo (Diamond, Inc., 2012), 39.

international relations in those regions.

There is no doubt that the shift to renewable energy will further accelerate geopolitical changes in oil-producing regions such as the Middle East. Crude oil prices have been on a downward trend since 2015. Increased production of shale gas and oil and the decrease in production activities and human movement due to COVID-19 have also had an impact, but the rapid progress of decarbonization is also certainly affecting the market. Sixty percent of the world's crude oil demand is related to transportation such as automobiles, but there is increasing anticipation that they will be replaced by electric vehicles, etc. If this continues, it will have a major impact not only on the economies of Gulf countries such as Saudi Arabia, Iraq, and Iran, but also on those of African countries such as Nigeria and Libya and of South American countries such as Venezuela and Brazil. Their economic decline will also affect their standing in the international community, and change their geopolitical implications.

The decarbonization trend will certainly increase the power of China, a producer of rare mineral resources. China is one of the world's leading technological powers in solar power generation, and is also intervening in the production of blades for Europe's wind power generation efforts. It is also poised to dominate the electric vehicle field, and it is one step ahead in aligning its own development with the global trend against global warming.

However, China's supply of rare mineral resources is being shaken by human rights issues. The United States and other countries have labeled the Chinese government's repression and abuse of the Uyghurs as genocide. China (including the Xinjiang Uyghur Autonomous Region) accounts for 50% of the world's production of polysilicon, an essential material for solar power generators. The international human rights organization Human Rights Watch has also condemned the repression of the Uyghurs in Xinjiang as a "crime against humanity," and is urging the UN Human Rights Council to launch a fact-finding committee on it. If the Uyghur issue grows, the source of essential mineral resources for clean energy could change. Struggles over human rights issues will likely accelerate the fluidization of security environments as decarbonization progresses.

The fluidization of security environments resulting from the international community's and individual countries' measures against climate change should also be addressed as a side issue to climate security. It is likely to become one of the most important themes involved in considering security in the rule-based "Free and Open Indo-Pacific" advocated by Japan and its allies and friends.

(2) *The trends in American diplomacy, and the Chinese philosophy of all-out war*

With geopolitical concepts expected to change as the world heads toward global decarbonization, what national strategies will the major countries form in order to deploy their politics and diplomacy? Let us move away from the topic of climate security, and consider the trends in international politics centered on the United States.

On April 28, 2021, US President Joe Biden delivered a policy address to the Joint Session of Congress. In it, he said, "[America is] in competition with China and other countries to win the 21st Century. ... I also told President Xi that we'll maintain a strong military presence in the Indo-Pacific, just as we do with NATO in Europe—not to start a conflict, but to prevent one. ... America will not back away from our commitments ... to human rights and fundamental freedoms ... We have to prove democracy still works ..." He went on to express his resolve to cooperate with democracies and win the competition against autocracies.[3]

Some say that the backbone of President Biden's address was *Making U.S. Foreign Policy Work Better for the Middle Class*, written in 2020 by National Security Advisor Jake Sullivan.[4] This states that the source of US vitality is its middle class, and that it must develop foreign policies whereby their power can be wielded on the world stage. It also says that the United States needs to best China in var-

3 "President Biden's First Speech to Congress," April 28, 2021. (https://asia.nikkei.com/Politics/Full-transcript-President-Biden-s-first-speech-to-Congress).

4 Carnegie Endowment for International Peace, *Making U.S. Foreign Policy Work Better for the Middle Class,* 2020.

ious regards in order to achieve this, and proposes several measures toward doing so. The key to its policy is to wield the United States' comprehensive national power via a system of international cooperation with other democracies. It focuses on the economic development of its middle class, who are the core of that power, and linking it with the country's diplomatic power. Rather than the "America First" approach advocated (at the time) by the Trump administration, it stresses the necessity of maintaining the important supply chains that support economic security, in order to win the strategic, economic, and technological competitions with China through cooperation with allies and friends, and through economic development focused on the US middle class. The document also says that geopolitical confrontation with China will not induce the US allies to follow suit as much as they did during the Cold War with the Soviet Union. It also states that treating climate change as a serious security threat, and having a shared recognition of basic human rights and freedoms, should become advantageous in the new Cold War.

In other words, the backbone of the nation's strategy is to win the new Cold War with China by working with global partners to obtain diplomatic power and techno-hegemony. On the military side, the recommended approach is to promote withdrawal from Afghanistan and strengthen the defense of the global commons surrounding the supply chains.

China might be one step ahead in terms of seeking dominance through its comprehensive national power (of total war). *Unrestricted Warfare*,[5] written by Air Force Colonel Qiao Liang and Air Force Lieutenant Colonel Wang Xiangsui of the People's Liberation Army, was published in China in February 1992. Very much in the spirit of "war by different means," it describes how to win all forms of conflict through all-out war. It is a more worthwhile read now than ever, offering a glimpse of the ideas underlying China's strategy in international politics, and a clearer understanding of what they mean.

The authors say that future wars will be fought using every means available, without being restricted to just military power, and with no distinction between peacetime and a state of emergency. They describe more than 20 methods, including diplomatic warfare, terrorism, information warfare, financial warfare, network warfare, legal warfare (lawfare), psychological warfare, and media warfare. In 2003, the Chinese Communist Party revised the People's Liberation Army Political Work Regulations to explicitly include developing public opinion warfare, psychological warfare, and lawfare. These are known as the "three warfares." *Unrestricted Warfare* does not stop at these. It says that war means achieving the nation's political goals by developing a wide variety of means (e.g., diplomatic warfare, network warfare, and legal warfare) into "supranational," "supraregional," "suprainstrumental," and "suprastage" means. The argument also links with Sun Tzu's *The Art of War*, and the unbroken flow of Chinese strategic thinking from ancient times is palpable. If unrestricted warfare describes China's war doctrine, then it is fair to say it belongs to a government strategy that has taken strategies such as Mao Zedong's people's war and the guerrilla warfare advocated by Vo Nguyen Giap and Che Guevara, absorbed them, and developed them further.

2. What is the Indo-Pacific?

How will the Indo-Pacific be affected by the change in geopolitical concepts resulting from decarbonization, by the trends in American diplomacy since 2021, and by the political strategy China is pursuing? Before discussing climate security in the Free and Open Indo-Pacific Vision, let us explore the world of the Indo-Pacific.

In August 2016, then Prime Minister Shinzo Abe's second administration delivered an opening address at the Sixth Tokyo International Conference on African Development (TICAD) titled "A Free and Open Indo-Pacific." The phrase has since been used by many countries. While countries seem to differ in how they interpret it, the strategy's main message is to promote development through, among other things, the following: democratic international politics based on law; a free, open, and fair market

5 Qiao Liang and Wang Xiangsui, *Unrestricted Warfare: The 21st Century's New War* (Kyodo News, December 2001).

economy; equitable rather than hegemonic diplomatic relations; and cooperation on security in order to make all of the above possible. In 2007—before the Free and Open Indo-Pacific Strategy was announced—Prime Minister Abe (then in his first administration) delivered a speech titled "The Confluence of the Two Seas" in the Indian Parliament. He began by quoting the great Indian religious leader Swami Vivekananda: "The different streams, having their sources in different places, all mingle their water in the sea."[6] He then said, "My friends, where exactly do we now stand historically and geographically? To answer this question, I would like to quote here the title of a book authored by the Mughal prince Dara Shikoh in 1655. We are now at a point at which the Confluence of the Two Seas is coming into being." He continued, "The Pacific and Indian Oceans are now bringing about a dynamic coupling as seas of freedom and of prosperity. ... a region called the Arc of Freedom and Prosperity will be formed along the outer rim of the Eurasian continent." What will the confluence of the two seas bring?

In his book *The Mediterranean*,[7] Fernand Braudel analyzes the history of the Mediterranean by dividing it into three elements: unchanging "persistent states" governed by geographical and natural conditions, etc.; "fluctuating phases" that change through human interactions; and the "events" that triggered those changes. In this section, we will regard the history of the Indo-Pacific—and the respective "fluctuating phases" and their triggering "events" in the worlds of the Indian and Pacific Oceans—as forming paradigms for how humans have accessed (used) the oceans. Based on this view, we will discuss the security environments those paradigms have provided.

(1) *A paradigmatic view of the history of the Indian Ocean world*

Several changes can be seen in the paradigms of the interactions between humankind and the Indian Ocean. Since prehistoric times, a cosmopolitan maritime world plied by merchants from Nanyue, Dravida, and Arabia had been spreading across its waters. From the beginning of the 15th century (1405) onward, Zheng He from Ming China (a continental state) conducted numerous so-called "naval voyages to southern seas," and the Indian Ocean transformed into a "maritime world of pioneering nations." About 90 years after the beginning of Zheng He's naval voyages, while the rise of the Ottoman Empire closed overland routes to the Orient, Spain and Portugal were at the forefront of the dawning Age of Discovery in the Western Hemisphere,. With the Ming Dynasty facing worsening economic conditions due to barbarian threats from the North and food shortages from population growth, Zheng He's naval voyages came to an end in 1431. This was about half a century before Vasco da Gama's voyage across the Indian Ocean (1498). With the Ottoman navy destroyed in the Battle of Lepanto (1571), the Christian sea powers began to send their navies out of the Mediterranean to accompany merchant fleets further afield. Securing sea-lanes and bridgeheads to overseas markets, they thus came to dominate the Indian Ocean. From then on, the Indian Ocean was a hegemonic "maritime world of competing sea powers," with nations like Portugal, the Netherlands, and the United Kingdom vying for supremacy. World War I saw the Indian Ocean at last become a "maritime world of military confrontation"—between the great powers until the end of World War II, then between the United States and Soviet Union in the Cold War.

The "maritime world of military confrontation" in the Indian Ocean ended with the Cold War, and a "cosmopolitan maritime world" spread across it once again, as it took center stage in economic activity by actors outside the region—activity that transcended national frameworks. Globalization of economic activity transformed the Indian Ocean into a logistics crossroads between the East and West. The Indian Ocean connects the Mediterranean with the Pacific Ocean, with the Bab el-Mandeb Strait, Suez Canal, Strait of Hormuz, and Strait of Malacca serving as the gateways. As such, it occupies a strategically important geographic position that affects all the world's politics, economies, militaries, and cultures.

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6 The original text is, "The different streams, having their sources in different places, all mingle their water in the sea." Ministry of Foreign Affairs, "Speech by H.E. Mr. Shinzo Abe, Prime Minister of Japan at the Parliament of the Republic of India," 2007. (https://www.mofa.go.jp/mofaj/press/enzetsu/19/eabe_0822.html).

7 Fernand Braudel, *The Mediterranean*, trans. Masami Hamana (Fujiwara Shoten, 1995). The original title is *La Méditerranée et le Monde Méditerranéen à l'époque de Philippe II*.

With many countries and various actors involved, systems or regimes to regulate use of the Indian Ocean have not necessarily been established. Furthermore, power voids are arising in terms of security. The situation in the Indian Ocean today could appropriately be described as "chaotic" rather than "free," and viewed as "fluid" rather than "vibrant." As part of its Belt and Road Initiative, China is developing infrastructure and making investments all the way from South and Southeast Asia to the Middle East and Africa, and similarly building ports to enable naval expansion. At first glance, it seems like a Chinese "maritime world of pioneering nations." On the other hand, several countries are cooperating with the Free and Open Indo-Pacific Strategy proposed by Japan, and openly opposing China's actions. Notable examples are European countries like former colonial power the United Kingdom; countries like France and the United States that have territory in the region; and countries like India and Australia that are located in it.

The Indian Ocean is currently in a fluctuation phase as it undergoes a paradigm shift from a "cosmopolitan maritime world" to a "maritime world of competing sea powers," as opposed to one of "pioneering nations." From a historical perspective, will the next phase be a "maritime world of military confrontation"? We should think of history as something that builds up rather than flows. The history of the past lies piled up and buried beneath the feet of the present. Those buried historical "events" sometimes have a major impact on how modern "events" develop. Close to home, issues like the ill feelings between Japan and its neighbors China and Korea are as though history is shaking the ground beneath our feet like the aftershocks of an earthquake. On the other hand, some also say that history repeats itself because people try to learn from it. When an "event" occurs, we try to solve it by looking for similar ones in history to see how people responded back then. It may be that history does not necessarily have to repeat itself, but our decisions are making it do so. Strategies will likely be sought that will not make history repeat itself.

(2) *A paradigmatic view of the history of the Pacific world*

Until the end of the 19th century, there were very few "fluctuation phases" that formed the paradigms of ocean use in the Pacific region. If we geographically categorize the Asian continent's coastal waters (namely the South China Sea, the East China Sea, and the waters around the Indonesian archipelago) as the West Pacific, then during the Age of Discovery, for example, Islamic merchants and Portuguese ships sailed to the Maluku Islands, while the Netherlands and Spain aimed to trade in East Asia using the island of Taiwan as a base. Against this background, guns and Christianity were introduced into Japan—the latter by Francis Xavier. However, we could say these events did not have enough impact to form a paradigm of ocean use in the Indian Ocean.

The origins of human activity in the Pacific world lay in Oceania, where unique cultural patterns were created and a "cosmopolitan maritime world" spread as people voyaged from the Melanesian islands to Micronesia and Polynesia. Apart from the Asian continent's coastal regions, there are no other cases of countries embarking on voyages in the Pacific Ocean as was done in the Indian Ocean until Commodore Matthew Perry and the US East India Squadron sailed to Uraga in 1853. Before the arrival of Perry's fleet, the Pacific Ocean was what Braudel would describe as in a "persistent state." Perry's fleet had come to Asia via the Indian Ocean, and its arrival brought about a "fluctuation phase" of interaction between different cultures from opposite sides of the Pacific Ocean. As a result, the Japanese and American civilizations first merged, then eventually collided over their interests.

Since Perry's arrival, there have been four "events" in the Pacific Ocean—and particularly the West Pacific—that have dramatically changed international relations regarding security. The first "event" is the First Sino-Japanese War. An armed conflict that broke out in 1894 between Japan and the Qing dynasty over the Korean Peninsula, it can be viewed a geopolitical struggle between the maritime nation of Japan and the continental nation of Qing China. Some might object that at the time, Japan was an agricultural island nation rather than a maritime one. However, Japan was at the helm of the so-called "Quit Asia" policy, in contrast to the Qing state, a nation that had interacted with the West but failed to incorporate Western culture and develop further. In 1859, six years after Perry's arrival, the Edo Shogunate

dispatched delegates on the US warship Powhatan to exchange the instruments of ratification for the Treaty of Amity and Commerce between Japan and the United States. It also sent the Kanrin Maru as an escort ship. In other words, this marked Japan's access to the Pacific, and its emergence as a maritime nation. Incidentally, Japan's isolationist policy had ended with the US-Japan Treaty of Peace and Amity signed in 1854.

The second "event" is the Russo-Japanese War, which broke out in 1904. This was an armed conflict over interests involving Manchuria and the Korean Peninsula. However, it was on a different geographical scale from the Sino-Japanese War. The deployment of naval power in the Russo-Japanese War took as its stage the oceans surrounding the Eurasian continent, as seen in the expedition of the Baltic Fleet. It can be viewed as a classic geopolitical struggle between "Heartland" and "Rimland."

The third "event" is the Pacific War (the Greater East Asia War), which began in 1941. As its name suggests, the Pacific War was fought between maritime nations. Victory went to the Allies led by the United States, and defeated Japan became a member of their sphere.

Finally, the fourth "event" is the Cold War and its end. Although the Cold War was triggered by seeking to enclose regions through hegemony based on political ideology, the geopolitical confrontation arose at their boundaries, and like the Russo-Japanese War, it also had aspects of a struggle between "Heartland" and "Rimland." The Cold War ended with the collapse of Eastern Europe and the Soviet Union, leaving the United States as the strongest nation in the world.

These four "events" in the Pacific world were all causally related and happened in relentless succession, and the "fluctuation phase" that formed the paradigms of ocean use was not fixed. Nevertheless, through Perry's arrival, the United States brought about a "maritime world of pioneering nations." The two World Wars then saw the emergence of a "maritime world of competing sea powers." And finally, a "maritime world of military confrontation" endured from the Pacific War until the end of the Cold War, its nature varying over time. Strangely, the paradigm shifts in the Pacific world that began with a "cosmopolitan maritime world" are exactly the same as those in the Indian Ocean world.

Various actors are developing borderless economic activities in the post-Cold War Pacific Ocean, and countries like the United States, Japan, Australia, New Zealand, and France are providing the assistance needed to ensure freedom of navigation and sustainable development, and for island countries to build up their capabilities. On the other hand, China has been strengthening its presence in the South Pacific by securing resources and forging relations with island countries, and there are concerns that it will also build military bases there as it has in the Indian Ocean. The Pacific world is now facing a situation where a "maritime world of pioneering nations" and a contrasting "maritime world of competing sea powers" coexist.

The Cold War saw fierce military confrontation between the United States and the Soviet Union in the West Pacific. The war was originally a confrontation between the Soviet Union, which sought world communization, and the United States and Western Europe, which wanted to prevent a domino effect that would lead to it. The idea of "containment" advocated by US diplomat George Kennan in his so-called "Long Telegram" of 1946 and "X Article" of 1947 ("The Sources of Soviet Conduct," published in *Foreign Affairs* the same year)[8] became the foundation of the United States' anti-Soviet diplomacy. Against this background, Dean Acheson, the Secretary of State under the Truman administration, announced in 1950 a line of defense running from the Philippines through Okinawa and Japan to the Aleutian Islands. This so-called "Acheson Line" has become a remnant of the Cold War, and now forms the "first island chain" and "second island chain"—the line of confrontation between the United States and China. It has transformed from being a line to prevent the spread of communism and the domino effect to being one of confrontation between the Chinese People's Liberation Army and the US military.

By the way, Kennan's "containment" did not mean military containment. Seeing through the contradictions between communism and the Soviet Union's domestic politics, Kennan took the view that if the United States patiently contained the spread of communism, then the Soviet Union would col-

8 George F. Kennan, *American Diplomacy 1900-1950*, trans. Shinichi Kondo et al. (Iwanami Gendai Bunko, October 2000).

lapse. He accordingly advocated refraining from military action. However, in reality, matters developed contrary to Kennan's proposal: following setbacks in its détente (peaceful coexistence) with the Soviet Union, the United States pursued strong military containment in the 1980s, and this was undoubtedly one of the factors that led to the internal collapse of its rival. Are there any internal contradictions in the "socialism with Chinese characteristics" that China advocates? If so, can we continue to oppose and compete with it patiently until those contradictions force it to change its foreign policy? Or will that be impossible, so we end up entering a "maritime world of military confrontation" as history suggests?

3. Climate security in a world of competition, coexistence, and division

As discussed in Section 2, the Indian and Pacific Oceans have strangely seen similar paradigm shifts in how humans access them, as stated below. The fear now is that the paradigm will shift to a "maritime world of military confrontation."

(1) "Cosmopolitan maritime world"
↓
(2) "Maritime world of pioneering nations"
↓
(3) "Maritime world of competing sea powers"
↓
(4) "Maritime world of military confrontation"
↓
(5) "Cosmopolitan maritime world"
↓
(6) "Maritime world of pioneering nations" + "Maritime world of competing sea powers"
↓
(7) "Maritime world of military confrontation"?

The "Confluence of the Two Seas" can be thought of thus: a "maritime world of pioneering nations" and "maritime world of competing sea powers" are intertwined throughout the Indo-Pacific, and the coming "fluctuation phase" will give rise to a "maritime world of military confrontation" there.

There is one factor ("event") that will undoubtedly influence that "fluctuation phase." That is the impact of global warming on habitats and international relations, and the responses to it. Climate crises like frequent cyclones and rising sea levels and—most importantly—geopolitical changes caused by responses to climate change will cause the security environments to become more fluid. Combined with factors like the global economy and international security, countries' responses to climate security will make the fluctuation phase complicated.

(1) *Where the restructuring of the world order is heading*

China has a different political and social system from Western democracy. Moreover, it is actively attacking the latter in a wide range of fields throughout the world, including politics, economics, and security. Four countries—the United States, Japan, Australia, and India—are working together to create a world order to opposite it. They also are joined in this endeavor by several European countries.

In his above-mentioned address of April 28, 2021, President Biden said the confrontation between the United States and China was a 21st-century struggle between democracy and autocracy, and averred that the future would not be won by the latter. The Chinese media responded that their nation's development is proving its system's strengths, that people should squarely face the reality that the world is developing in multiple ways, and that the Western model of development cannot be the only one that

exists.[9] On April 29, the Chinese embassy in Japan posted an image depicting the United States as the Grim Reaper on its official Twitter account, adding in Japanese, "This is what will happen if the United States brings democracy." Although the post was deleted the next day, it was a sign that the social and political differences in relation to human rights and freedom had become a major arena in the confrontation between the two countries.

As a remnant of the Cold War, a similar situation can be seen between Europe and Russia and countries had once been part of the Soviet Union. There are still former Soviet states where the people in power have imposed authoritarian rule and refuse to relinquish it. Notable examples are, Belarus, Azerbaijan, Tajikistan, and Turkmenistan, all of which chose to adopt democratic systems when they became independent with the collapse of the Soviet Union in 1991. In Russia, too, President Vladimir Vladimirovich Putin is also trying to hold on to long-term power. There are many countries that do not have a functioning Western democratic system. Participating in the Meeting of NATO Ministers of Defense on February 17 to 18 (not long after taking office), President Biden expressed his intention to reestablish relations with the United States' Indo-Pacific and European allies and partners in order to oppose China, Russia, and other authoritarian states. Amid division and competition, the international community is still exploring how to coexist.

On March 16, 2021, the Japan-US Security Consultative Committee (Japan-US "2+2") was held in Tokyo by the ministers and secretaries responsible for foreign affairs and defense, marking the first meeting between the two countries since the beginning of the Biden administration. Among topics including growing geopolitical competition, COVID-19, climate change, and revitalizing democracy, the four ministers and secretaries from Japan and the United States agreed in the meeting that their nations would promote a free and open Indo-Pacific and a rules-based international order.[10] In a joint statement following the talks, they singled out China for criticism as follows: "China's behavior, where inconsistent with the existing international order, presents political, economic, military, and technological challenges to the Alliance and to the international community. The Ministers committed to opposing coercion and destabilizing behavior toward others in the region, which undermines the rules-based international system." They went on to state, "The Ministers also expressed serious concerns about recent disruptive developments in the region, such as the China Coast Guard law. ... The United States and Japan remain opposed to any unilateral action that seeks to change the status quo or to undermine Japan's administration of the Senkaku Islands. The Ministers underscored the importance of peace and stability in the Taiwan Strait. They reiterated their objections to China's unlawful maritime claims and activities in the South China Sea."[11]

Prime Minister Suga and President Biden held a summit in Washington on April 16, a month after the US-Japan "2+2." In a joint statement titled "US-Japan Global Partnership for a New Era," they criticized China's unilateral attempts to change the status quo in the East China and South China seas: "... free and democratic nations, working together, are able to address the global threats from COVID-19 and climate variation while resisting challenges to the free and open rules-based international order. ... President Biden and Prime Minister Suga ... shared their concerns over Chinese activities that are inconsistent with the international rules-based order."[12] The US-Japan summit also discussed efforts to address climate change. The two countries promised to work together toward the Leaders Summit on Climate hosted by the United States a week later on April 22, and released a separate joint statement titled "U.S.-Japan Climate Partnership on Ambition, Decarbonization, and Clean Energy."[13] In response to the joint statement from the US-Japan summit, a spokesperson for the Chinese Ministry of Foreign Affairs said that Japan and the United States were not qualified to represent the international community,

9 *Global Times*, April 30, 2021.

10 Ministry of Foreign Affairs, "Joint Statement by the Japan-US Security Consultative Committee (2+2)," March 16, 2021. (https://www.mofa.go.jp/mofaj/files/100161034.pdf).

11 *Ibid*.

12 Ministry of Foreign Affairs, "Japan-U.S. Joint Statement," April 16, 2021. (https://www.mofa.go.jp/mofaj/files/100202832.pdf).

13 *Ibid*.

or to enforce their own standards.[14]

Moves with China in mind have also been emerging in European countries. In particular, France and the United Kingdom have adopted a stance of actively expanding their military presence in the Indo-Pacific. Possessing Réunion, New Caledonia, French Polynesia, and other territories in the Indo-Pacific, France has dispatched naval ships and other vessels to patrol disputed waters between China and Southeast Asian countries, and participated in joint military exercises with the US Navy and Marine Corps and Japan's Ground and Maritime Self-Defense Forces in May 2021. With the Royal Navy aircraft carrier Queen Elizabeth at the core, a British force left the carrier's home in Portsmouth on May 22 bound for the Indo-Pacific, to expand strategic operations in the region. The force consisted of ten vessels: one aircraft carrier, two destroyers, two frigates, one submarine, one replenishment oiler, one supply ship, one US Navy destroyer, and one Royal Netherlands Navy frigate. The aircraft carrier had F-35 fighters and other aircraft aboard. The aim of the French and British forces deployed to the Indo-Pacific is clearly to restrain China's attempts to change the status quo.

The Foreign Ministers' Meeting of the Group of Seven (G7) was held in London over three days starting on May 3, 2021. Representatives from India, Australia, South Korea, and ASEAN were also invited, and the participants showed a stance of opposing China as it seeks to put increasing military and economic pressure on the rest of the world. US Secretary of State Antony Blinken said at a news conference that he would respond strongly to the Chinese authorities' mass detention of minorities in the Xinjiang Uyghur Autonomous Region and suppression of Hong Kong's democratization movements.

However, there are undeniably differences within the G7 and the EU regarding the level of commitment toward opposing China. The EU agreed to create a common Indo-Pacific strategy at a Foreign Ministers meeting held on April 19. However, some countries, Germany and Italy among them, are placing importance on economic relations with China, and their stances toward it are not the same as other countries'. The EU has imposed sanctions in response to the suppression of human rights in the Xinjiang Uyghur Autonomous Region, but does not recognize it as genocide, as the United States does.

The United Kingdom, Canada, Australia, the United States, and New Zealand have formed a system for exchanging strategic information called the "Five Eyes." On May 3, New Zealand's Prime Minister Ardern said that it was becoming more difficult to reconcile the differences in views with China as its role in the world expands and changes, and stated that New Zealand wanted to avoid worsening relations with it.[15] Then on May 7, New Zealand's Minister of Foreign Affairs said it would maintain strong relations with China.

The trend toward restructuring the world order with China in mind has led to division between democratic nations and ones deemed to be autocratic. However, from the viewpoints of maintaining economic relations and securing supply chains, if the two sides compromised with each other in order to coexist, the strength of the division would probably become fluid.

(2) *International efforts to promote climate security amid divisive trends*

The Leaders Summit on Climate was organized by the United States and held online on April 22 and 23, 2021. In the session held in the afternoon of the first day, US Secretary of Defense Lloyd Austin delivered an opening address on the subject of climate security. This was followed by presentations by UK Secretary of State for Defence Ben Wallace, NATO Secretary General Jens Stoltenberg, and Japanese Minister of Defense Nobuo Kishi.

In his opening address, Secretary of Defense Austin said that the climate crisis was threatening global security and destabilizing military capability. He went on to stress the need to maintain military operational capability in regions affected by climate change. The United States says that it is also working to understand the reality of climate security, through the combined efforts of its 18 domestic

14 *Sankei Shimbun*, April 21, 2021.

15 *Reuters*, "New Zealand Wants a Mature Relationship with China," May 7, 2021. (https://www.reuters.com/world/asia-pacific/new-zealand-wants-mature-relationship-with-china-foreign-minister-says-2021-05-07/).

intelligence agencies.[16]

Secretary General Stoltenberg said that NATO was working to strengthen its responses in line with NATO 2030[17] in order to address the crisis caused by global warming as a security issue, and that it would strive to understand the situation, to ensure that it can operate in any environment, and to reduce greenhouse gas emissions by the military.

Speaking of the need to address climate change as a security issue, Minister of Defense Kishi said that it threatened world peace and stability beyond just environmental issues, with the risk of triggering a chain reaction of misfortune whereby intensifying extreme weather (e.g., increased floods and droughts) is not only causing social instability but also sparking conflicts over territory and resources, and these in turn are causing further environmental destruction. In this connection, he spoke of Japan's commitment to regional stability, including its support toward building up Southeast Asian and Pacific island countries' disaster response capabilities. He also noted that Japan dispatched over a million Self-Defense Force personnel to conduct disaster relief in 2018 and 2019, and that disasters could interfere with the performance of their duties. He also mentioned the glacial melting in the Arctic, and advocated the importance of ensuring freedom of navigation and stabilizing the security environment in the region.[18]

This United States-led Leaders Summit on Climate included a session on climate security in which important security issues were discussed. Among these were the following: measures to reduce global warming; rescue and reconstruction in the event of large-scale natural disasters; and maintaining and securing defense functions. The participants reaffirmed the need to address these matters on an international level.

In areas hit by major disasters, the military and disaster relief organizations in the affected countries could become unable to function. If that happens, multinational humanitarian assistance and rescue operations will be required—and this will also include military support. As global warming depletes marine biological resources and causes changes in habitat distributions, it could lead to illegal fishing and to fishing disputes between countries. If that happens, island countries will also need assistance with monitoring and policing the waters under their jurisdiction if they cannot do so alone. This means that other countries' military forces will enter sovereign states' territories or waters. The latter might be able to accept that, if the forces are from allies or friends. However, if the military support is provided by a country that has a different political and social system to theirs and is deploying coercive diplomacy, they will be reluctant to accept it unless it is their last resort.

If the world is divided between democracies and autocracies, then like traditional security, climate security could also become divided between the two opposing camps. Climate security is in essence one aspect of addressing climate change, and should not be handled from two different camps. However, it should also not be handled while compromising political ideologies that promote authoritarianism or nationalism. As discussed in Section 1 of this chapter, the international community's and countries' responses to climate change might increase the fluidity of security environments, and if we also regard the measures taken to address this situation as a derivative form of climate security, then the matter will be even more important.

US Special Presidential Envoy for Climate John Kerry and China's Special Envoy for Climate Change Xie Zhenhua met in Shanghai on April 15 and 16 and agreed that their respective nations would raise their greenhouse gas emission reduction targets for the 2020s. However, at the Leaders Summit on Climate a week later, the Chinese side did not present any revised targets. The United States and China are switching back and forth between competition and cooperation over the issue of climate change. Cooperation over climate security efforts is often proving difficult because the military is involved in

16 U.S. Department of Defense, Secretary Austin Remarks at Climate Change Summit, April 21, 2021. (https://www.defense.gov/News/Transcripts/Transcript/Article/2582828/secretary-austin-remarks-at-climate-change-summit/).

17 *NATO 2030: United for a New Era*, 25 November 2020. (https://www.nato.int/nato_static_fl2014/assets/pdf/2020/12/pdf/201201-Reflection-Group-Final-Report-Uni.pdf).

18 Attendance by the Ministry of Defense and Minister of Defense Kishi at "Summit on Climate: Climate Security." (https://www.mod.go.jp/j/press/news/2021/04/23b.pdf).

some way. Because climate security accompanied by military action can affect the world's power balances, there is a strong feeling that Western-style democracies should not yield the initiative to autocracies.

If the world is divided between democratic nations and ones deemed to be autocratic, then climate security could become a tool that both camps use to exercise their influence. Climate security has two mutually contradictory sides: contribution to humanitarian assistance and peace-building; and the exercise of influence.

(3) *The "4+4+5 Synchronized Strategy" for climate security*

In the Indo-Pacific, where a "cosmopolitan maritime world" and a "maritime world of competing sea powers" are intertwined, the security environments are unstable and fluid. In order to create a stable world order, it will paradoxically be necessary to establish and consolidate a power balance that is conducive to stabilizing security environments. During the Cold War, Europe and East Asia maintained a moderate power balance, and their security environments were stable even amid tension.

The "4+4+5 Synchronized Strategy" is proposed as the current approach to climate security in the security environment of the Indo-Pacific.[19] The "4+4+5 Synchronized Strategy" is a multinational response to security in the Indo-Pacific. Its name refers to synchronized operations by three alliances: the QUAD, which consists of Australia, India, Japan, and the United States and focuses on the Indian Ocean and coastal waters of the Asian continent; the Pacific Quadrilateral Defense Coordinating Group, formed by Australia, France, New Zealand, and the United States, which covers the whole of the Pacific Ocean; and the Five Power Defense Arrangements, which consist of the United Kingdom, Australia, New Zealand, Singapore, and Malaysia. The "Confluence of the Two Seas" means that incidents ("events") that arise in the Indo-Pacific will spread to affect the whole region as a single space. For this reason, the objective of the "4+4+5 Synchronized Strategy" is to create stability throughout the Indo-Pacific by having the three frameworks respond equally and with the same purpose with regard to any single event. Climate security should be included in that security response. The QUAD framework was formed in 2004 as part of the disaster response for the Indian Ocean tsunami. Australia, France, New Zealand, and the United States' Quadrilateral Defense Coordinating Group in the Pacific Ocean also focuses on humanitarian assistance and disaster relief. Specifically, the strategy involves developing standard procedures and manuals for multinational disaster relief that will be common to all three frameworks, and establishing a system that will enable them to coordinate their efforts. Climate security should emphasize humanitarian assistance, post-disaster reconstruction, and assistance to help countries in the region build up their capabilities. With regard to the security conditions derivative from the measures against global warming as mentioned in Section 1 of this chapter, an important point is that they be addressed as inherent, or traditional, security measures. Doing so will enable us to constrain coercive political means that violate international rules.

19 For more information, see "Sea-Lane Defense in a Free and Open Indo-Pacific Strategy" in *Marine Security Information Special Reports* (Sasakawa Peace Foundation Ocean Policy Research Institute, 2018). (https://www.spf.org/oceans/analysis_ja02/post_1.html).

The US-Japan Alliance Cooperation on Addressing Climate Security

Hideshi Tokuchi

1. Introduction

The Commander of the United States Pacific Command (now the United States Indo-Pacific Command) during the Obama administration, Samuel J. Locklear, stated that climate change is the greatest long-term security threat in the Pacific region.[1] The Obama administration had said climate change was an important issue for it, but Japanese stakeholders apparently took Locklear's statement as a sign that the United States underestimated the threat of China, or lacked interest in Asia.

In retrospect, he may rather have been sounding a warning about instability in the Asia-Pacific—a region that occupies a central position in the world economy and is relatively stable, unlike places like the Middle East that are plagued by ceaseless armed conflicts. It is unlikely that Locklear himself underestimated China, or that the US security community was indifferent to the Asia-Pacific region. That should be obvious simply in light of the frequent large-scale disasters in the region that are thought to be caused by global warming. Moreover, even when addressing climate change countermeasures and other non-traditional security issues, US-China cooperation is not a given. Rather, it could be an issue that actually deepens their geopolitical confrontation. It is thus highly understandable that when asked by the US Senate Armed Services Committee about the major challenges facing the United States Indo-Pacific Command, its new Commander John Aquilino stated in a written reply submitted on March 23, 2021, that disasters and the effects of climate change ranked alongside the geopolitical threats from China, Russia, North Korea, and so on.[2]

The US-Japan alliance is a pillar of Japan's security and defense policy, and the latter's partner, the United States, has made climate change a security priority with the transition from the Trump administration to the Biden administration. Consequently, climate security issues will have a significant impact on the future alliance cooperation. This chapter will therefore consider the implication of climate security in both Japan's and U.S.'s security strategy, discuss climate change's impact on the military aspects of their security, and present the author's own views on what directions the alliance cooperation on climate security might take.

2. Climate security in both strategies of U.S. and Japan

Japan established its first National Security Strategy in a cabinet meeting held in December 2013. It was thought to be valid for around 10 years. It identifies climate change and other environmental

1 Bryan Bender, "Chief of US Pacific forces calls climate biggest worry," *Boston Globe*, March 9, 2013, https://www.bostonglobe.com/news/nation/2013/03/09/admiral-samuel-locklear-commander-pacific-forces-warns-that-climate-change-top-threat/BHdPVCLrWEMxRe9IXJZcHL/story.html.

2 "Advance Policy Questions for Admiral John C. Aquilino, USN Nominee for Commander, U.S. Indo-Pacific Command," March 23, 2021, https://www.armed-services.senate.gov/imo/media/doc/Aquilino_APQs_03-23-21.pdf.

issues as human security challenges, alongside things like poverty and increasing inequality. In relation to environmental issues, the strategy also states that in the future, increased demand for energy, food, and water resources due to population growth and economic expansion in developing countries could also cause new conflicts.[3] It also states that as a part of strengthening cooperation through universal values to resolve global issues, Japan will take further action toward reducing its own emissions. It will develop the proactive Action for Cool Earth (ACE) strategy, which is about taking advantage of Japan's strengths like its outstanding environmental energy technologies and support for developing countries. The strategy also states that Japan will play an active role in building a new fair and effective international framework for all countries to participate in, reduce global emissions, and contribute to resolving climate change issues.[4] The National Security Strategy does not actually use the term "environmental security," but it is clear from the above that the Japanese government considers environmental issues—including climate change—to be security issues.

However, the basic document stating Japan's defense policy—i.e., the National Defense Program Guidelines—does not mention climate change or any other environmental issues. This is true not only of the current guidelines[5] formulated in 2018, but of the previous ones as well,[6] which were formulated at the same time as the National Security Strategy. The purpose of these guidelines is not to present Japan's overall security policy. Rather, it is mainly to define the significance and role of Japan's defense capabilities and the future structure of the Self-Defense Forces. Therefore, the guidelines do not directly address climate security itself, although they do mention large-scale natural disasters and the Self-Defense Forces' response to them.[7]

In 2021, Defense Minister Nobuo Kishi attended a Climate Security session chaired by Secretary of Defense Lloyd Austin at the Leaders Summit on Climate organized by the United States. He also launched a Climate Change Task Force within the Ministry of Defense.[8] These developments indicate that the Ministry of Defense's and Self-Defense Forces' interest in and efforts toward the issue could be getting stronger. The defense white paper published in July 2021 devotes three pages to explaining the impacts of climate change on Japan's security environment and military.[9]

In the United States, on the other hand, the Obama administration placed importance on climate change and environmental issues. This is widely known. In fact, the US military was working hard to address them as well. For example, in 2009, the then Secretary of the Navy Ray Mabus announced the Great Green Fleet[10] initiative. This aimed to cover 50% of the Navy's overall energy consumption with alternative forms of energy by 2020, and to deploy a Green Strike Group that uses biofuels, etc., by 2016. A Green Strike Group was actually launched in January 2016, and later also served in the South China Sea.[11] In contrast to this, the former Trump administration's stance of turning its back on environmental protection issues was clear from its National Security Strategy alone.[12] However, the new Biden administration is taking a drastically different direction. On January 27—very soon after he took

3 National Security Council and Cabinet, "National Security Strategy," December 17, 2013, 8-9.

4 *Ibid*., 30.

5 National Security Council and Cabinet, "National Defense Program Guidelines for FY 2014 and Beyond," December 17, 2013.

6 National Security Council and Cabinet, "National Defense Program Guidelines for FY 2019 and Beyond," December 18, 2018.

7 *Ibid.,* 6 and 11.

8 Ministry of Defense, "Minister of Defense Mr. Kishi Nobuo Attended the Climate Security Session in the Leaders Summit on Climate," April 23, 2021.

9 Ministry of Defense, *Defense of Japan 2021*, 2021, 161-163.

10 "Secretary of the Navy Launches Great Green Fleet," *Currents*, Spring 2016, 16-17, https://navysustainability.dodlive.mil/files/2016/06/Spr16_SECNAV_Great_Green_Fleet.pdf.

11 Christopher Frost, "The Great Green Fleet Operates in the South China Sea," *PACOM News*, March 4, 2016, https://www.pacom.mil/Media/News/Article/686331/the-great-green-fleet-operates-in-the-south-china-sea/.

12 The Trump administration's National Security Strategy stated, "U.S. leadership is indispensable to countering an anti-growth energy agenda that is detrimental to U.S. economic and energy security interests. Given future global energy demand, much of the developing world will require fossil fuels, as well as other forms of energy, to power their economies and lift their people out of poverty. The United States will continue to advance an approach that balances energy security, economic development, and environmental protection." It also said, "Excessive environmental and infrastructure regulations impeded American energy trade and the development of new infrastructure projects." (White House, *The National Security Strategy of the United States of America*, December 2017, 22 and 18.)

office—Biden's administration issued an executive order toward tackling the climate crisis. For example, its paragraph 103 states that climate issues are to be considered priorities in foreign policy and national security, and that the Director of National Intelligence is to prepare National Intelligence Estimates (NIEs) on climate change's impacts on national and economic security. It also instructs the Secretary of State to analyze the risk of security impacts from climate change, report the findings (Climate Risk Analysis) to the President, and incorporate them into the National Security Strategy.[13] The Interim National Security Strategic Guidance released on March 3 also discusses climate change, placing it next after biological risks (such as pandemics) in its list of threats that transcend borders. In its list of national security priorities, the next item after strengthening alliances and partnerships is re-engaging with international organizations, and the climate change framework features as a prominent example.[14] The following day (March 4), Secretary of Defense Austin issued a memorandum to all Department of Defense employees specifying responding to the climate crisis as a concrete part of defending the nation.[15] In its Annual Threat Assessment of the US Intelligence Community released on April 9, the National Intelligence Council included a section on climate change and environmental deterioration. Therein, it states that according to its analysis, these issues pose both direct and indirect threats, giving rise to economic risks, increased political instability, refugee problems, and in addition, new sources of geopolitical competition that is likely to persist for at least the next decade. The assessment also highlights the adverse effects these issues will have on infrastructure, water, food, facilities, health, and so on.[16] Secretary of Defense Austin also chaired the Leaders Summit on Climate organized by the United States, as mentioned above.

The United States is now prioritizing climate change as a security issue in these ways, a remarkable change brought about by the transition from Trump to Biden. Even under the Trump administration, however, the Department of Defense was not entirely unconcerned about the impacts of climate change on US military facilities and operations, and did not turn its back on them. In January 2019, for example, the Office of the Under Secretary of Defense for Acquisition and Sustainment compiled a Report on Effects of a Changing Climate to the Department of Defense[17] in which it identities the risks that climate change poses to US military facilities and operations, and presents measures to enhance their resilience and sustainability, respectively. In July of the same year, the United States Army War College compiled a research report titled "Implications of Climate Change for the US Army"[18] in which it proposes changes be made to doctrine, organization, equipment, training, and other areas as countermeasures. In addition, although the Department of Defense's Arctic Strategy[19] seems to carefully avoid using the term "climate change" itself, it does discuss the security implications of melting ice and various other changes in the Arctic's physical environment due to climate change (for example, ensuring freedom of navigation accompanying establishing new routes). The Department of Defense is the US federal government organization with the largest energy consumption,[20] so regardless of the overall government policies on climate change, it was well aware of the problems regarding efficient energy use in terms of matters like efficient logistics support operations. In that sense, addressing climate change issues was one of its major military challenges, as well.

13 White House, *Executive Order on Tackling the Climate Crisis at Home and Abroad*, January 27, 2021, https://www.whitehouse.gov/briefing-room/presidential-actions/2021/01/27/executive-order-on-tackling-the-climate-crisis-at-home-and-abroad/.

14 White House, *Interim National Security Strategic Guidance*, March 2021, 11.

15 Secretary of Defense, *Memorandum for All Department of Defense Employees*, March 4, 2021, 2, https://media.defense.gov/2021/Mar/04/2002593656/-1/-1/0/SECRETARY-LLOYD-J-AUSTIN-III-MESSAGE-TO-THE-FORCE.PDF.

16 Office of the Director of National Intelligence, *Annual Threat Assessment of the US Intelligence Community*, April 9, 2021, 18-19, https://www.dni.gov/files/ODNI/documents/assessments/ATA-2021-Unclassified-Report.pdf.

17 Office of the Under Secretary of Defense for Acquisition and Sustainment, *Report on Effects of a Changing Climate to the Department of Defense*, January 2019.

18 United States Army War College, *Implications of Climate Change for the U.S. Army*, July 2019.

19 Office of the Under Secretary of Defense for Policy, *Report to Congress: Department of Defense Arctic Strategy*, June 2019.

20 According to Heather Greenley, it accounted for approximately 77% of all energy consumption, and approximately 76% of all energy expenditure. (Heather Greenley, "Department of Defense Energy Management: Background and Issues for Congress," *CRS Report*, R45832, July 25, 2019, 1-2, https://fas.org/sgp/crs/natsec/R45832.pdf.)

3. Impact of climate change on military security in both Japan and the United States

As is clear from the previous section, as of the first half of 2021, both Japan and the United States view climate change as a matter of national security. This suggests new possibilities for US-Japan defense cooperation, which is the core of the US-Japan alliance. As such, it is one of the most important developments in recent years.

However, there have been few attempts to discuss the US-Japan alliance—and US-Japan defense cooperation in particular—in terms of climate change. This section will therefore look at the two countries' general security issues from a climate change perspective, before discussing the specific nature of defense cooperation between them.

Japan's National Security Strategy and the United States' (Biden's) Interim National Security Strategic Guidance do both regard natural environmental changes, and particularly climate change itself, as threats that must be reduced. Of course, the concept of environmental security in this sense stands, but as it could become indistinguishable from mere environmental protection, it could also lead to a meaningless broadening of the concept of security. Unwarranted broadening of the concept of security often obscures the priority of various issues viewed as security problems. Japan in particular has tended to use the concept as broadly as possible so as not to highlight the significance and roles of the military regarding security.[21] Care must therefore be taken over how the concept of security is used. In light of this, this section will discuss the impacts of climate change by focusing primarily on military security issues.

(1) *Impacts on the international security environment*

(a) Destabilization of its security environment

Climate change's various negative effects on human society are now on everyone's lips throughout the world. They obstruct food and water supplies essential for human survival. For example, they reduce the yield and quality of crops; cause changes in arable land and fishing resources' migration routes and spawning and feeding grounds; alter the flow of rivers; reduce the quality of water; and cause droughts. In addition, rising temperatures cause sea levels to rise, depriving people of their livelihoods and countries of their territory. Natural disasters like huge typhoons and frequent forest fires also destroy many people's livelihoods. These phenomena widen inequality, spread starvation, increase crime, and lead to large-scale human migration, more refugees, and more severe confrontation between states and ethnic groups. These in turn cause regional instability and armed conflict.

It goes without saying that these phenomena happening the world over are obviously a security concern for the United States, being a global military superpower. However, in today's highly globalized international society, Japan cannot view climate change's worldwide adverse effects as someone else's problem.

(b) Geopolitical changes

Global warming is also reducing the ice in the Arctic Ocean. The decreasing sea ice is drawing the international community's attention to the region as a marine trade route. However, this also means the Northern Sea Route is becoming more important as a path for military expansion and mobilization. There are also concerns that its increasing use as a marine trade route could lead to maritime accidents.[22]

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21 In his comparative study of various security concepts that have emerged in security discussions since the end of the Cold War, Matake Kamiya notes that in Japan, while using the term "comprehensive security," people have tended to unjustly pass over the military aspects, or even view them as a crime, reflecting the Japanese people's extremely wary post-war attitudes toward anything military. (Matake Kamiya, "The Concept of National Defense," Security Studies Research Group, National Defense Academy of Japan, *Introduction to National Defense Studies, Fifth Revised Edition*, 2018, Aki Shobo, 21.)

The melting ice could also lead to conflicts over the oil, natural gas, and mineral and fishery resources that are thought to be abundant in the region.

The United States has Arctic Ocean coastline, and is a member of the Arctic Council along with Russia and other countries. As such, it has interests and concerns in the region. However, the region is important for Japan as well. If the Northern Sea Route becomes available, then ships will be able to sail between East Asia and Europe far quicker, and with no concerns about pirates, unlike off the coast of Somalia, for example. This must be of interest to Japan, a maritime nation that relies on sea traffic for its survival and prosperity.

Another undeniable possibility is that the Middle East, Strait of Hormuz, and the Indian Ocean might become less important to security in the future, once measures against global warming have significantly reduced the world's dependence on fossil fuels. In addition, if decarbonization progresses worldwide, it will have a considerable impact on the national power and military posture of Russia and other countries that are financially dependent on revenue from fossil fuels.

(2) *Impact on the missions and roles of the military*

As mentioned above, if climate change leads to regional instability and increased regional conflicts, then the military will inevitably be increasingly called upon to respond.

The military's role in natural disaster relief will become more and more important as climate change makes the disasters more severe, and many countries may frequently require their militaries to devote significant resources to relief efforts. Military forces are self-sufficient so that they can continue to operate in the field under the severe conditions of war. Their inherent self-sufficiency will be essential not only for search and rescue operations but also for conducting long-term, large-scale activities to support people's lives, transport relief supplies, and assist recovery from disaster.[23]

Also, regardless of whether it happens in the near future, if the Northern Sea Route becomes significantly more available, it could lead to increased military operations in the Arctic Ocean—for example, sea lane defense and marine search and rescue.

In the Climate Security session at the Leaders Summit on Climate, Defense Minister Kishi described Japan's situation as follows: if there are more natural disasters, then the Self-Defense Forces will have to dispatch more personnel, and for longer periods, hindering the maintenance and improvement of their proficiency.[24] Regarding this point, increased disaster relief could understandably hinder the Self-Defense Forces' main mission, which is national defense. However, with large-scale disasters now becoming universally recognized as security issues, care must also be taken not to present disaster relief in a misleadingly negative light.[25]

(3) *Impact on military resources*

(a) Impact on personnel (military personnel's physical health)

Extreme global warming due to climate change has adverse effects on the human body. It increases the risk of heatstroke and spreads tropical infectious diseases, causing health problems and reduced human activity. The impact on military personnel's physical health will be all the more serious given that they operate in tough environments with heavy equipment, and live and act in groups even during peacetime.

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22 Hideshi Tokuchi, "Changes in Global Environment and Security," *Security Studies*, Vol. 02, No. 01, March, 2020, 95.

23 In Japan, the total number of Self-Defense Force personnel active in disaster relief operations was over a million consecutively in 2018 and 2019. (Ministry of Defense, "Minister of Defense Mr. Kishi Nobuo attended the Climate Security session in the Leaders Summit on Climate.")

24 Ministry of Defense, "Minister of Defense Mr. Kishi Nobuo attended the Climate Security session in the Leaders Summit on Climate."

25 All National Defense Program Guidelines released since 2004 have mentioned Japan's susceptibility to natural disasters as one of its characteristics when analyzing the security environments surrounding it. (For recent statements, see the National Security Council and Cabinet's National Defense Program Guidelines for FY 2019 and Beyond, 6.)

Stable water supply and thorough measures to prevent infectious diseases are particularly difficult during operations. Even if no personnel catch any diseases, climate change will undoubtedly reduce the efficiency of military operations.

(b) Impact on defense facilities, equipment, etc.

Just as society in general suffers damage from sea level rise and frequent large disasters, military facilities and equipment are also greatly affected by climate change. The US Department of Defense made that point specifically in its aforementioned Report on Effects of a Changing Climate to the Department of Defense. The report focuses on five matters: recurring floods, droughts, desertification, wildfires, and thawing permafrost. It analyzes what adverse effects these can have on US military facilities. These include submersion due to flooding; cracked ground due to droughts; changes in vegetation due to desertification; wildfire damage to facilities; and structural instability of facilities due to thawing permafrost.[26]

Climate change also has a significant impact on the operation of military equipment. For example, Hurricane Michael caused major damage to Tyndall Air Force Base in Florida when it struck it in October 2018. Two squadrons of F-22 stealth fighters were stationed at the base, and 17 of their 55 planes were reportedly damaged. The US Air Force apparently had a total of 186 in service, which means around 10% of them were damaged.[27]

If global warming also reduces air density and therefore aircraft lift, aircraft weight restrictions will become stricter, and longer runways will be required.[28] This will also affect the deployment and operation of military aircraft. Climate change is also known to change the flow and strength of jet streams, leading to increased turbulence, and then, affecting the operation of military aircraft.[29]

(4) *Increased need to limit military carbon dioxide emissions*

Militaries generally own and operate large numbers of land vehicles, vessels, and aircraft, and have many facilities. Given that they operate 24 hours a day, their carbon footprints are certainly not low compared to those of other national organizations. The US Department of Defense's carbon dioxide emissions are estimated to be about 1% of the national total.[30]

With countries being called on to take government-wide measures to combat climate change, action will also have to target military emissions. One example of this is the US Navy's Great Green Fleet initiative as mentioned above. Another is furnished by Japan's Ministry of Defense, which began procuring electricity generated from a high percentage of renewable energy sources[31] on a trial basis since fiscal year 2020.

Regarding military equipment, former Defense Minister Morimoto predicts that there will be limits to how many CO_2-producing vessels Japan can have, and this will affect the introduction of new large vessels. However, he said deciding whether to adopt electric propulsion combat vehicles will take time, since aspects such as functions, maintenance, and supply will also need to be considered. In the case of electric aircraft, the Minister said the development of storage batteries and high-efficiency

26 Office of the Under Secretary of Defense for Acquisition and Sustainment, *Report on Effects of a Changing Climate*, 5-7.

27 Ankit Panda, "Nearly 10 Percent of the US F-22 Inventory Was Damaged or Destroyed in Hurricane Michael," *Diplomat*, October 15, 2018, https://thediplomat.com/2018/10/nearly-10-percent-of-the-us-f-22-inventory-was-damaged-or-destroyed-in-hurricane-michael/.

28 Keisuke Katori, "If Global Warming Continues, 10 to 30% of Airplanes Won't Have Enough Lift Even with Weight Restrictions," *Asahi Shimbun*, July 14, 2017, https://www.asahi.com/articles/ASK7F4FWYK7FUHBI00V.html.

29 Japan Agency for Marine-Earth Science and Technology, "Global Warming Will Significantly Change Turbulence Distribution over the North Pacific: Impacts on Rapidly Increasing Asia-Pacific Air Traffic?", March 13, 2019, https://www. jamstec.go.jp/j/about/press_release/20190313/.

30 Eric Wolff, "How the Department of Defense could help win the war on climate change," *Politico*, January 4, 2021, https://www.politico.com/news/2021/01/04/biden-pentagon- climate-change-454404.

31 Ministry of Defense, "Press Conference by the Defense Minister," December 23, 2019, https://warp.da.ndl.go.jp/info:ndljp/pid/11623291/www.mod.go.jp/j/press/kisha/2019/1223a.html.

motors is the key factor, and electric fighters will be very difficult to develop.[32] If these points are correct, then military decarbonization will not be technologically easy, either.

Also, it is not just a matter of technology. If it were simply about improving equipment's fuel efficiency, then the prospects of lower fuel costs and less need to refuel could motivate moves to decarbonize. However, reducing CO_2 emissions will not lead directly to improved operational efficiency or enhanced military potential. Consequently, effort for the reduction will inevitably face criticism and resistance on grounds that it is getting things the wrong way round if it helps to defend the global environment, but not to defend the nation against armed aggression. Therefore, besides needing the cost of developing new technologies to be kept down, the issue will also require strong political leadership, as well as understanding and response on the side of the military.

4. US-Japan alliance cooperation for climate security

Around a month before the Leaders Summit on Climate organized by the United States, when the US-Japan Security Consultative Committee (also called the US-Japan "2+2" ministerial meeting) was held in Tokyo, it issued a joint statement that included climate change as one of four issues in the two countries' commitment to promoting a free and open Indo-Pacific and rules-based international order.[33] However, the issue was only mentioned there. Neither is there any evidence that it was raised in the US-Japan Defense Ministerial Meeting held in conjunction with the US-Japan "2+2."[34] Consequently, climate security can hardly be said to be a current major issue for US-Japan alliance cooperation—and particularly for US-Japan defense cooperation—but it will undoubtedly be an important one in the future.

As Minister of Defense Kishi stated at the Climate Security session during the Leaders Summit on Climate, joint research between Japan and the United States on hybrid electric vehicle systems is already underway, and the results are expected to improve the performance of large armored land vehicles in the future.[35]

What should the two countries do to promote the alliance cooperation to give this emerging new momentum further impetus? These are five points as follows.

(1) *Strengthening intelligence cooperation*

With the security environment surrounding Japan and the United States becoming increasingly tough and complex, intelligence cooperation is always essential in order to address shared risks. However, as a prerequisite for alliance cooperation, it will probably be increasingly necessary to view climate change as an important element of analysis. Perhaps insights from meteorological and oceanological experts in both sides' defense agencies could also be utilized in the analysis.

The United States and China have the world's first and second largest carbon footprints respectively, and cooperation between them will be important for responding to humanity's shared issue of climate change. They both appear to be pursuing the possibility of cooperating, but caution will be necessary, as this area could also contribute to the confrontation between them.[36] In other words, to state the obvious,

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32 Satoshi Morimoto, "Climate Change Issues Are Security Issues" *The Sankei News*, February 28, 2021, https://special.sankei.com/f/seiron/article/20210208/0001.html.

33 Ministry of Defense, "Japan-U.S. Security Consultative Committee (Japan-U.S. "2+2")," March 16, 2021, para. 1, https://www.mod.go.jp/j/approach/anpo/kyougi/2021/0316b_usa-j.html.

34 The official release (Ministry of Defense, "Japan-U.S. Defense Ministerial Meeting (summary)," March 16, 2021, https://www.mod.go.jp/j/approach/anpo/kyougi/2021/0316a_usa-j.html) does not seem to contain anything related.

35 Acquisition, Technology & Logistics Agency, "Signing of Project Agreement between the Ministry of Defense and the U.S. Department of Defense for 'Joint research on Modular Hybrid Electric Vehicle System,'" October 16, 2020, https:// www.mod.go.jp/atla/nichibei_05.html.

36 Some in the US argue that trying to cooperate with China on climate change issues is a mistake, and that carbon taxes should be applied to increase international pressure on it. (For example: Andrew Erickson and Gabriel Collins, "Competition With China Can Save the Planet: Pressure, Not Partnership, Will Spur Progress on Climate Change," Foreign Affairs, Vol. 100, No. 3, May/June 2021, 136-149.)

confrontation between the United States and China over the response to the climate change issue also needs to be analyzed in terms of how it might cause the security environment to deteriorate.[37]

The increasing possibilities of the Northern Sea Route are also causing confrontations between major powers. Russia's increasing military presence in the Arctic Ocean and its regulation of the passage of ships are sparking new confrontations with the United States. On top of that, China is also calling the Northern Sea Route the Ice Silk Road and including it in its Belt and Road Initiative.[38] All in all, then, this region is also becoming a stage for confrontation of major powers, and as such, developments there must be watched carefully.

(2) *Operational cooperation on humanitarian assistance and disaster relief (HA/DR), etc.*

There have already been several examples of operational cooperation between Japan's Self-Defense Forces and the US military in the field of HA/DR.[39] The 2015 Guidelines for US-Japan Defense Cooperation also indicate how the two nations should cooperate on international HA/DR as a part of their wider cooperation on international activities.[40]

The primary aim of Japan's emergency assistance activities is to provide a temporary relief to natural disasters in developing countries. However, major disasters are now problems for both developing and developed countries alike.[41] When a typhoon hit the Philippines in 2013, the Self-Defense Forces organized their first-ever joint task force for international emergency assistance activities. The relief operation was the largest they had ever conducted, with some 1100 personnel mobilized.[42] In light of these recent trends, it is highly likely that the Self-Defense Forces and the US military are going to have even more opportunities to cooperate in this area, and the cooperation will become increasingly important for regional stability. In order for them to cooperate more closely on actual operations, it will be important that they formulate plans and procedures in the area of HA/DR and conduct joint training during peacetime.

The US-Japan alliance must also promote the goals of "Women, Peace and Security" (WPS), which include involving women in conflict prevention and the like, and protecting women, girls, etc., from sexual and gender-based violence.[43] The goals of WPS were drawn up bearing in mind, for example, that women, girls, etc., are particularly vulnerable not only during or immediately after conflicts, but while emergency humanitarian assistance is being provided immediately after disasters.

The Arctic will need to be watched in terms of HA/DR as well. Although Japan itself is not in the Arctic Circle, it is an observer state in the Arctic Council, and if the Northern Sea Route becomes active, the Arctic Ocean will become an increasingly important sea lane. As a result, search and rescue in the event of a disaster or maritime accident in the Arctic Ocean will no longer be someone else's problem. The United States is also an Arctic state, so cooperation with it is expected to become all the more important in the future. In March 2020, Japan also participated in the ice exercise (ICEX) the US Navy's Arctic Submarine Laboratory holds once every two years.[44] The Self-Defense Forces should

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37 The United States is one of the sides in US-Japan intelligence cooperation and one of the sides in US-China confrontation, so it is debatable whether this can be strictly called intelligence cooperation. However, there at least seems to be intelligence cooperation regarding China's attitude.

38 *The Sankei News*, "US and Russia Locked in Arctic Standoff: US Condemns Russia's Arms Buildup, China Seeks Involvement," May 20, 2021,https://www.sankei.com/world/news/ 210520/wor2105200021-n1.html.

39 Cooperation thus far includes on the Haitian earthquake of 2010, the Great East Japan Earthquake in 2011, and the Philippine typhoon of 2013.

40 Section 2, "International Humanitarian Assistance/Disaster Relief," in Article V, "Cooperation for Regional and Global Peace and Security," of "The Guidelines for Japan-U.S. Defense Cooperation," April 27, 2015.

41 In January and February 2020, the Self-Defense Forces air transported goods and personnel emergency assistance in response to a large forest fire in Australia that struck in December 2019. (Ministry of Defense, *Defense of Japan 2020*, 2020, 401.)

42 Ministry of Defense, *Defense of Japan 2014*, 2014, 309.

43 Ministry of Foreign Affairs of Japan, "National Action Plan on Women, Peace and Security: Second Edition (2019-2022)," March 2019. https://www.mofa.go.jp/mofaj/files/000459524.pdf.

44 Christopher Woody, "With Russia keeping watch, US Navy subs ventured back to the high north to train where there's 'no safe haven'," *Insider*, June 11, 2020, https://www.businessinsider.com/navy-submarine-connecticut-drills-during-icex-2020-in-the-arctic-2020-6.

also accumulate its expertise on the Arctic Ocean with cooperation from the United States.[45]

(3) *Cooperation on capacity-building support*

The Self-Defense Forces have been providing capacity-building support in the field of HA/DR for some time—recently, in Laos, Indonesia, and Papua New Guinea, for example.[46] This is international cooperation that utilizes the Self-Defense Forces' expertise on disaster relief in Japan. It is therefore an area where they can amply demonstrate their strengths.

In connection with point (2) above, Japan and the United States are actively cooperating to support security capacity building in partner countries, and this is contributing to maintaining and strengthening peace and stability in the international community. Based on the Self-Defense Forces' aforementioned strengths, the framework of US-Japan cooperation in the field of capacity-building support already includes improving HA/DR capabilities.[47]

Supporting capacity building in Indo-Pacific countries is also seen as part of the United States' and Japan's cooperative efforts toward achieving the Free and Open Indo-Pacific vision.[48] From the viewpoint of achieving this, it will be important that going forward, the two nations cooperate to support HA/DR capacity-building more actively not only for Southeast Asian countries' militaries, but also for those of South Asian, Pacific Island, and African countries as well. When this happens, the Ministry of Defense and Self-Defense Forces will need to cooperate not only with the US Indo-Pacific Command but also with US Africa Command.

(4) *Cooperation on technological research and development (R&D)*

As mentioned above, it is not the case that military forces alone can be allowed to lack environmental friendliness. It may not be easy for them to reconcile environmental friendliness with their essential mission of protecting the nation from invasion by foreign enemies, but they will need to try to do so, and in particular aim to reduce their CO_2 emissions. If they do not, they will lose the understanding of the public when conducting exercises in peacetime, and purchasing and developing equipment, no matter how important their defense activities may be for the safety of the nation and its nationals' lives in the event of military aggression.

The US military has experience from the Great Green Fleet concept during the Obama administration, and also has the fruits of all the research and analysis it has conducted to date. Therefore, while learning from the insights thus gained, the United States and Japan should jointly pursue R&D on equipment and technology toward using fuel efficiently and reducing CO_2 emissions.

The R&D of equipment technology requires advanced technology and a lot of time and money, so it is a field where international cooperation will be particularly necessary. In addition, it is very unlikely that Japan will be able to use nuclear power for ships and other vehicles in the future, and therefore Japan's options will be more limited than the United States', and it requires more effort accordingly.

(5) *Cooperation on military medicine*

With the spread of COVID-19 since 2020, importance is now also being placed on the military's role in preventing infectious diseases. Prompted by this, new progress on the issue is now also being made between Japan and other countries regarding international cooperation in the field of military

45 Incidentally, a Maritime Self-Defense Force sent a training squadron to the Arctic Ocean for an overseas training cruise for the first time ever in 2020. (Japan Maritime Self-Defense Force, "Overseas Training Cruise 2020 (Second Half)," accessed on May 23, 2021, https://www.mod.go.jp/msdf/operation/training/enyo/2020a/; Ministry of Defense, "Minister of Defense Mr. Kishi Nobuo attended the Climate Security session in the Leaders Summit on Climate.")

46 Ministry of Defense, *Defense of Japan 2021*, 349.

47 Section 4, "Partner Capacity Building," in Article V, "Cooperation for Regional and Global Peace and Security," of the "Guidelines for Japan-US Defense Cooperation," April 27, 2015.

48 Ministry of Defense, *Defense of Japan 2021*, 311.

medicine. In particular, in the two US-Japan Defense Ministerial Meetings held between April and May 2020, the two sides confirmed that they would coordinate and cooperate with each other in order to beat COVID-19.[49]

Japan and the United States should likewise pursue cooperation in the field of military medicine with regard to analyzing the impacts of climate change on military personnel's physical health and activities, finding ways to combat those impacts. This will probably include research on tropical medicine, and perhaps also developing clothing suitable for military activities in extremely hot environments.

5. Conclusion

Even amid the spread of COVID-19, maintaining close coordination and cooperation between Japan's and the United States' defense establishments and strengthening their alliance's capability to deter and respond remains essential for peace and stability in the international community, including the Indo-Pacific region. Addressing climate change is also a major issue that requires urgent attention, and the two nations must strengthen their cooperation on it within the context of their alliance relationship.

COVID-19 and climate change are of course global issues, not just ones between the United States and Japan. However, as the US-Japan Joint Leaders' Statement says with regard to strengthening their alliance cooperation, there are probably a considerable number of people in both countries who believe that if free and democratic nations work together, then they will be able to prove that they can address the global threats posed by COVID-19 and climate change.[50]

The alliance is between the two states and not just between their militaries, but as their joint military defense posture is its pillar, cooperation between their defense establishments is also extremely important. In that sense, it is strongly hoped that the two allies will strengthen their defense cooperation on climate change issues in a wide variety of ways.

The fact that climate change is now being discussed not only as an environmental issue but as a security one as well testifies to how broad and complex it is. Scientific understanding of the fundamental aspects of how climate change actually affects nature is indispensable. The scientific knowledge must also be widely shared among not only experts but the majority of people in the international community as well. That is not just because it is a serious issue for humankind, but also because it is affecting security discussions beyond the realms of climate security as well. To end this section, let me mention one final point in this last regard.

The Permanent Court of Arbitration in The Hague made a historic decision in July 2016 on the dispute between the Philippines and China over the South China Sea. The points at issue in the trial went beyond the legal status of maritime features in the South China Sea and the legality of the nine-dash line asserted by China. The court ruled that China had caused severe harm to coral reef environment through its large-scale reclamation and construction of artificial islands, and had therefore violated its obligation to protect vulnerable ecosystems and the habitats of endangered species. It also found that the Chinese authorities were aware their fishermen harvested turtles, coral, and giant clams on a substantial scale using methods that inflict severe damage on the South China Sea's coral reefs, but did not fulfill their obligation to stop them.[51] From the beginning, the Chinese government rejected the court proceedings and called the ruling waste paper. However, China's environmental destruction in the South China Sea has also been disclosed by the United States' Center for Strategic and International

49 Since the spread of COVID-19, the Ministry of Defense and Self-Defense Forces have been furthering cooperation on infectious disease control, including sharing knowledge and lessons learned by the Self-Defense Forces regarding this and various other fields. (*Defense of Japan 2021*, 310.)

50 "U.S.-Japan Joint Leaders' Statement: U.S.-Japan Global Partnership for a New Era," April 16, 2021, para. 1.

51 Permanent Court of Arbitration, *Press Release: The South China Sea Arbitration (The Republic of the Philippines v. The People's Republic of China)*, July 12, 2016, 2.

Studies through analysis of satellite images.[52]

China is showing no signs of accepting this, either. Shortly before the Permanent Court of Arbitration's ruling, the Deputy Director-General of the Chinese Ministry of Foreign Affairs had reportedly said that the reclamation projects in the South China Sea were being carefully planned and carried out so as to minimize their environmental impact, calling them a "green project."[53] However, when citing this ruling at an international conference on security, the author asked a Chinese participant what kinds of environmental protection measures China had taken for its reclamation projects in the South China Sea, he answered that the damage to the corals was due to global warming, not due to the reclamation. The remarks were made in a closed session and not by environmental experts, but nevertheless, a response like that does seem to lack integrity. Making scientific knowledge widespread will be important for preventing situations like this.

Remembering that the United States had had an administration that placed no trust in scientific knowledge for the four years until the beginning of 2021, promoting US-Japan cooperation on climate change will also need to be founded on trust in science.

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52 For example, see here for information on the destruction of coral reefs caused by fishing giant clams: "China's Most Destructive Boats Return to the South China Sea," *Asia Maritime Transparency Initiative*, May 20, 2019, https://amti.csis.org/chinas-most-destructive-boats-return-to-the-south-china-sea/.

53 Bethany Allen-Ebrahimian, "Beijing Calls South China Sea Island Reclamation a 'Green Project'," *FP*, May 26, 2016, https://foreignpolicy.com/2016/05/26/china-calls-south-china-sea-island-reclamation-a-green-project-spratly-islands/.

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Part 6

Recommendations for Climate Security Efforts in the Indo-Pacific Region

The sections thus far have clarified why climate change could become a security threat and identified the serious impacts it could have on international diplomacy, security, and relations in general. They have also clarified the issues that should be addressed and the prospects regarding them, in light of the efforts being pursued by developed and industrialized nations.

Part 6 will summarize the preceding sections and give an overview of the latest trends from the 9th Pacific Islands Leaders Meeting (PALM9) held in July 2021; the current state of climate security in Japan; transnational and transregional efforts; and so on. It will then suggest what measures must be taken to achieve climate security.

The Pacific Islands Leaders Meetings: Past, Present, and Future

Hideyuki Shiozawa

The stability and prosperity of the Pacific Islands region is one of the foundations supporting Japan's security. In that context, the Pacific island countries scattered across the region are important for Japan because of their stewardship of sea lanes and marine resources and their basic positions as sympathizers of Japan in the international community.

In recent years, the situation surrounding the Pacific island countries has been changing as a result of geopolitical factors, the impact of climate change, and the global COVID-19 pandemic. Therefore, the 9th Pacific Islands Leaders Meeting (PALM9) in July 2021 was an important opportunity to strengthen future relations between the Pacific island countries and Japan.

This chapter will review the historical background of the region, regional structure, geopolitical changes, and relations of regional organizations and Japan. It will then discuss the significance of the PALM and its expected future form.

1. The diversity and historical background of the Pacific island countries

(1) *The diversity of the Pacific island countries*

(a) The Pacific island countries and overseas territories

The Pacific Islands region consists of fourteen Pacific island countries and eight overseas territories governed by the United States, New Zealand, France, and the United Kingdom (Figure 1).

The Pacific island countries are categorized into subregions: Micronesia (Palau, the Federated States of Micronesia, the Marshall Islands, Kiribati, and Nauru), Melanesia (Papua New Guinea, the Solomon Islands, Vanuatu, and Fiji), and Polynesia (Samoa, Tonga, Tuvalu, the Cook Islands, and Niue). The subregions differ from each other in terms of their socioeconomics, geographical environments, traditional cultures, relations with former colonial powers, diplomatic relations, development issues, and so on. The issues are not consistent within each subregion, either. For example, Palau, the Federated States of Micronesia, the Marshall Islands, Kiribati, Nauru, Tuvalu, the Cook Islands, and Niue are sometimes grouped together as Smaller Island States (SIS).[1]

Of the eight overseas territories, Guam (United States), American Samoa, New Caledonia (France), French Polynesia, Tokelau (New Zealand), and the Pitcairn Islands (United Kingdom) are on the United Nations' list of Non-Self-Governing Territories, and their forms of self-governance will be decided by referendums in the future.

1 PIF Secretariat, https://www.forumsec.org/smaller-island-states/

Figure 1 Pacific island countries and development partners
(Created by the author based on Sasakawa Peace Foundation Pacific maps)

(b) Differences in economic structure

Papua New Guinea is large and rich in natural resources. Apart from that, the economic structures of all the other Pacific island countries are divided into three categories: (1) those with a strong private sector (Fiji, Palau, the Cook Islands, and Vanuatu); (2) those whose private and public sectors are equally strong (Samoa, Tonga, and the Solomon Islands); and (3) those with an extremely strong public sector (the Marshall Islands, the Federated States of Micronesia, Kiribati, Tuvalu, and Nauru) (Table 1).[2]

The countries in category (1) have well-developed tourism industries. For Samoa[3] and Tonga[4] in category (2), remittance from family overseas makes up 20-30% of the gross domestic product (GDP). Category (3) contains many small countries, and their main sources of revenue are fishing license fees, returns from trust fund investments, and development assistance by development partners. The ratio of government spending is over 60% of the GDP.

(2) *Postcolonialism*

The basic structure of order in the Pacific islands region was formed about 100 years ago, after World War I. Under the Treaty of Versailles, Germany's former territory was divided north and south along the equator. The northern part was governed by Japan as a League of Nations mandate. After World War II, it became the Trust Territory of the Pacific Islands (TTPI), governed by the United States under the United Nations. This is the root of the differences between the Pacific islands in the Northern and Southern hemispheres. Here, we will divide the historical changes in the Pacific island countries into four phases of postcolonialism, or decolonization process.

(a) Phase 1: Independence

Following the Declaration on the Granting of Independence to Colonial Countries and Peoples by

2 Asian Development Bank (2020), Key Indicators 2020, https://www.adb.org/publications/key-indicators-Asia-and-Pacific-2020
3 World Bank, https://data.worldbank.org/indicator/BX.TRF.PWKR.DT.GD.ZS?locations=WS
4 World Bank, https://data.worldbank.org/indicator/BX.TRF.PWKR.DT.GD.ZS?locations=TO

Table 1 Comparison of Socioeconomic Statistics for the Pacific Island Countries
(Created by the author using the Asian Development Bank's Key Indicators)

Country	Year	Population (People)	Nominal GDP (Million US$)	Government spending (Million US$)	Government spending vs. GDP (%)
Papua New Guinea	2017	8,438,038	23,633	4,159	17.6
Fiji	2017	884,900	5,187	1,374	26.5
Vanuatu	2017	278,400	880	210	23.8
Cook Islands	2017	19,500	345	104	30.1
Palau	2017	17,900	286	115	40.2
Tonga	2018	99,600	475	127	26.8
Samoa	2017	196,300	810	245	34.7
Solomon Islands	2016	639,400	1,099	471	42.9
Marshall Islands	2017	54,400	208	129	64.5
Federated States of Micronesia	2016	102,500	330	203	61.5
Kiribati	2016	111,600	182	140	76.9
Tuvalu	2016	11,300	41	54	121.9
Nauru	2017	11,200	116	116	99.9
Niue	2017	1,719	26	-	-

the United Nations in 1960, 14 Pacific island countries have gradually gained sovereignty by independence from the United States, the United Kingdom, Australia, New Zealand, or France. Samoa was the first (1962) and Palau the last (1994). Palau, the Federated States of Micronesia, and the Marshall Islands in the Northern Hemisphere gained their independence later than the 11 Commonwealth nations in the Southern Hemisphere. Their socioeconomic situations were different from the latter's because after independence they remained under the United States' protection as US Freely Associated States, and received generous economic assistance from it (Figure 2).

(b) Phase 2: Foundation building

The independent Pacific island countries were still young and needed economic, financial, and human resource assistance from their former colonial powers. The 1980s to mid-2000s saw the Bougainville conflict in Papua New Guinea (1988-98), ethnic tensions in the Solomon Islands (1998-2003), and coups in Fiji (2000 and 2006). In response, Australia and New Zealand strengthened their management of the Pacific island countries to ensure stability in the region.

(c) Phase 3: Autonomy

From the mid-2000s to the 2010s, various factors brought about changes.

The first factor was revision of the US Compacts of Free Association (COFA, or Compacts).[5] Revisions were made to the Compacts of the Federated States of Micronesia and Marshall Islands in 2003 and to that of Palau in 2009, including the termination of economic assistance from the United States in 2023 and 2024, respectively. This prompted the US Freely Associated States to pursue economic autonomy.

The second factor was the global financial crisis and soaring oil and grain prices from 2007 to 2009. The global financial crisis adversely affected trust funds that countries like the Marshall Islands, Kiribati, and Tuvalu had set up to stabilize revenue. In addition, the soaring oil and grain prices

5 US Department of the Interior, https://www.doi.gov/oia/compacts-of-free-association

Figure 2 Differences between northern and southern Pacific island countries
(Created by the author based on Sasakawa Peace Foundation Pacific maps)

caused prices to skyrocket in Pacific island countries that relied on imports.

The third factor was national reforms in Fiji. After the bloodless coup in December 2006, Fiji spent time gradually reforming into a multiracial, multicultural country and diversifying its diplomatic relations, resisting pressures from developed countries like Australia and New Zealand to restore democracy at the earliest possible in three years.

An additional factor could be aid fatigue among developed countries in the 2000s.

This series of factors has induced the Pacific island countries to share development issues with each other across the equator, and encouraged them to take the lead more proactively in order to address them. In 2010s, the Pacific island countries enhanced autonomy upheld by some factors including measures taken by the Parties to the Nauru Agreement (PNA)[6] or increasing revenue from fishing license fees, financial recovery in Nauru, improvement of trust fund investments, diversification of development partners, and expansion of their influence in the international community on matters like climate change.

(d) Phase 4: National particularism and rebuilding relations with former colonial powers

The Pacific island countries had been enhancing autonomy, but the global COVID-19 pandemic has changed all that. Since 2020, the Pacific island countries have been in state of emergency due to the threat to the safety of their people, and economic and financial crisis to which they cannot respond by themselves. As a result, they have each prioritized solving their own issues over uniting as a region, and are deepening their relationships with the former colonial powers again.

6 Parties to the Nauru Agreement, https://www.pnatuna.com/

2. The multilayered regional structure

The structure of the Pacific islands region consists of various frameworks.[7] We will review the main ones in order to examine the relationships between Japan and the region.

(1) *Security frameworks based on the former colonial powers*

(a) Former colonial powers that support the safety and stability of the region

When we think of traditional security in the Pacific islands region, we can recall the Australia, New Zealand, United States Security Treaty (ANZUS Treaty)[8] signed in 1951. With the treaty, the United States mainly protects the islands in the Northern Hemisphere, and Australia for Melanesia, Kiribati, and Nauru, and New Zealand for Polynesia, respectively, in the Southern Hemisphere to help keep the region stable.

(b) US Compact of Free Association

The Compact is an agreement to specify the status of a US Freely Associated State, covering its governance, economic relations, security and defense, and general provisions. The Federated States of Micronesia and Marshall Islands gained independence by signing ones in 1986, and Palau did likewise in 1994. Under the Compacts, the US Freely Associated States have their own diplomatic rights, receive economic assistance from the United States that accounts for 30% to 60% of their revenue, and are also eligible for federal programs. Their citizens have the same rights as US citizens in US territories (including visa-free status in the US) and can apply to join the US military. However, the United States has full authority and responsibility over the Freely Associated States' security and defense, and in addition to eliminating military contact of third us party countries, it can set up military facilities in them as necessary.

The Compacts of the Federated States of Micronesia and Marshall Islands have no expiry date, but the ones from 1986 were revised in 2003 with effect for another 20 years or until 2023. Palau's Compact had a 50-year term or until 2044, but was partially renewed in 2009 with effect until 2024. All three US Freely Associated States will soon revise their Compacts with the United States again.

(2) *The frameworks of the former colonial powers and Pacific island countries*

(a) The Pacific Islands Forum and the Council of Regional Organisations of the Pacific agencies

In 1971, the already independent Western Samoa (Samoa), the Cook Islands, Nauru, Tonga, Fiji, established new framework called the South Pacific Forum (SPF) with Australia and New Zealand. Headquartered in Suva (Fiji), it was different from the South Pacific Commission (SPC) established by the United States, Australia, New Zealand, the United Kingdom, France, and the Netherlands in 1947. Indeed, its purpose was to protest against a series of nuclear tests France was planning to conduct in French Polynesia. The SPF was renamed the Pacific Islands Forum (PIF) in 2000, and will be referred to as such from here on.[9]

Besides protests against the nuclear tests, the main items on the agenda at the first PIF leaders' meeting were as follows: trade, transportation, civil aviation, tourism, investment from overseas, the

7 Hideyuki Shiozawa (2020), Ocean Policy Research Institute, *White Paper on the Oceans and Ocean Policy 2020*, p. 93

8 US Department of State, https://history.state.gov/milestones/1945-1952/anzus

9 PIF Secretariat, https://www.forumsec.org/who-we-arepacific-islands-forum/

law of the sea, development of seabed resources, education, communication, environmental protection, disaster response, and regional cooperation. Full membership in the PIF became a status symbol of independence, which encouraged Pacific island countries to gain it.[10] Vanuatu joined the PIF in 1981, a year after gaining its independence from the condominial government by the United Kingdom and France. With that, the PIF became a regional framework of the Commonwealth nations consisting of the Pacific island countries in the Southern Hemisphere, Australia, and New Zealand.

Several years after all the Commonwealth nations joined, the Federated States of Micronesia and Marshall Islands gained full PIF memberships in 1987, followed by Palau in 1995 from the Northern Hemisphere. As mentioned above, the organization changed its name from the South Pacific Forum (SPF) to the Pacific Islands Forum (PIF) in 2000.[11]

The legal basis of the PIF as an organization is the 2000 Agreement Establishing the Pacific Islands Forum Secretariat[12] and the 2005 Agreement Establishing the Pacific Islands Forum,[13] although the latter has not come into force yet.

As its number of Member States increased, the discussions in the PIF became more diverse, and regional organizations were established for different fields (listed here by name, year of establishment, abbreviation, and field): the Pacific Community (1998, SPC, science and technology), which developed from the South Pacific Commission; the University of the South Pacific (1968, USP, education); the Forum Fisheries Agency (1979, FFA, fisheries); the Pacific Islands Development Program (1989, PIDP, human resource development); the Pacific Power Association (1992, PPA, electric power); the Secretariat of the Pacific Regional Environment Programme (1993, SPREP, the environment); the South Pacific Tourism Organisation (1999, SPTO, tourism); and the Pacific Aviation Safety Office (2002, PASO, civil aviation safety). For example, the FFA was established in order to manage the Pacific island countries' Exclusive Economic Zones (EEZs), following long-running discussions on the United Nations Convention on the Law of the Sea (UNCLOS).

The nine organizations—these field-specific regional ones and the PIF—are called the Council of Regional Organisations of the Pacific (CROP) agencies, and the PIF Secretariat serves as the secretariat of CROP.[14] However, the Member States and territories of each CROP agency do not necessarily coincide with those of the PIF. Furthermore, although all of the CROP agencies aim to promote regional cooperation, none of them can take over the policy-making and diplomatic authority of the Pacific island countries.

(b) The PIF's visions and categories

The PIF today serves primarily as a regional policy organization for economics, development cooperation, and security. With its visions of peace, harmony, security, social inclusion, and prosperity in the Pacific islands region,[15] the PIF supports securing the sovereignty and self-determination rights of Pacific island countries, the rule of law, the values of freedom and democracy, and respect for traditional cultures. It also places importance on relations with the United Nations.

In addition to its full membership, the PIF has the statuses of associate member and observer. Many of its members participated as observers first, were later promoted to associate members, and then acquired full membership status after independence.

As of June 2021, the PIF includes 14 Pacific island countries, Australia, New Zealand, New Caledonia (France), and French Polynesia, giving a total of 18 member countries and territories. These

10 PIF Secretariat, https://www.forumsec.org/1971/08/05/south-pacific-forum-wellington-5-7-august-1971/

11 PIF Secretariat, https://www.for umsec.org/wp-content/uploads/2017/11/2000-Communique%CC%81-Tarawa-27-30-Oct.pdf

12 PIF Secretariat, http://www.forumsec.org/wp-content/uploads/2018/02/Agreement-Establishing-the-Pacific-Islands-Forum-Secretariat-2000.pdf

13 PIF Secretariat, https://www.forumsec.org/wp-content/uploads/2018/02/Agreement-Establishing-the-Pacific-Islands-Forum-Secretariat-2005-1.pdf

14 PIF Secretariat, https://www.forumsec.org/council-of-regional-organisations-of-the-pacific/

15 PIF Secretariat, https://www.forumsec.org/who-we-arepacific-islands-forum/

members make consensus on regional policies at the annual PIF leaders' forums. The following are also registered and allowed to participate in relevant meetings: as the only associate member,[16] Tokelau (New Zealand); as observers, American Samoa, Commonwealth of the Northern Mariana Islands (United States), Guam, Wallis and Futuna (France), and East Timor; and as observer organizations,[17] the Organisation of African, Caribbean, and Pacific (ACP) States Secretariat, the Asian Development Bank (ADB), the Commonwealth Secretariat, the International Organization for Migration (IOM), the United Nations Secretariat, the Western and Central Pacific Fisheries Commission (WCPFC), and the World Bank.

The following countries and regions outside the Pacific islands region are recognized as Dialogue Partners and allowed to participate in relevant meetings and Post-Forum Dialogues during PIF leaders' forums:[18] Japan, the United States, the United Kingdom, France, Canada, Germany, Italy, Spain, the EU, India, China, South Korea, Indonesia, Malaysia, the Philippines, Thailand, Cuba, and Turkey. Taiwan has not obtained this status, but based on its continued cooperation with the PIF since the 1990s, it is allowed to meet with the leaders of its diplomatic allies during the PIF leaders' forums.

(c) Movements toward regional integration

The PIF has aimed for economic and political integration in the region, led by Australia and New Zealand.

The Pacific Island Countries Trade Agreement (PICTA)[19] was signed in 2001 by the 14 Pacific island countries, and the Pacific Agreement on Closer Economic Relations Plus (PACER Plus)[20] was signed by them, Australia, and New Zealand in 2008.

Australia and New Zealand also led the Pacific Plan,[21] which was signed in 2005 with the aim of furthering regional integration. They followed this in 2009 with the Cairns Compact,[22] whose aim was to manage and improve efficiency of development assistance by Dialogue Partners and Taiwan.

Amid movements toward autonomy, the Pacific island countries indicated their willingness to realize sustainable societies by developing the Framework for Pacific Regionalism in 2014 from the Pacific Plan, and the Blue Pacific Identity in 2017 for showing the pride of Pacific islanders as stewards of the oceanic "blue continent," followed by the 2050 Strategy for the Blue Pacific Continent in 2020.

(3) *Subregional frameworks of Pacific island countries*

(a) Melanesia

The Melanesian Spearhead Group (MSG) was established in Melanesia in 1986. Headquartered in Port Vila (Vanuatu), it has as members Papua New Guinea, the Solomon Islands, Vanuatu, Fiji, and the Kanak and Socialist National Liberation Front (FLNKS), an organization of indigenous people in New Caledonia. Its focus was strongly on sovereignty and other political matters in its early days. However, its main objective now is to promote economic partnership and trade.

(b) Micronesia

Micronesia is home to the Micronesian Presidents' Summit (MPS) (which was launched in 2001),

16 PIF Secretariat, https://www.forumsec.org/forum-observer-countries-territories/

17 PIF Secretariat, https://www.forumsec.org/forum-observer-organisations/

18 PIF Secretariat, https://www.forumsec.org/dialogue-partners/

19 World Bank, https://wits.worldbank.org/GPTAD/PDF/archive/picta.pdf

20 Australian Government Department of Foreign Affairs and Trade, https://www.dfat.gov.au/trade/agreements/in-force/pacer/pacific-agreement-on-close-economic-relations-plus

21 PIF Secretariat, https://www.forumsec.org/wp-content/uploads/2017/11/2005-Forum-Communique_-Madang-25-27-Oct-05.pdf

22 PIF Secretariat, https://www.forumsec.org/wp-content/uploads/2017/11/2009-Forum-Communique_-Cairns_-Australia-5-6-Aug.pdf

and the Micronesian Islands Forum (MIF) (which was formed by the Micronesian Chief Executives' Summit in 2016 and is headquartered in Palau). The former consists of Palau, the Federated States of Micronesia, the Marshall Islands, Kiribati, and Nauru. The latter consists of these MPS members and Guam, the Commonwealth of the Northern Mariana Islands, and the four states of the Federated States of Micronesia, namely Yap, Chuuk, Pohnpei, and Kosrae.

(c) Polynesia

The Polynesian Leaders Group (PLG) was formed in Polynesia in 2011. It has six member countries—namely Samoa, Tonga, Tuvalu, the Cook Islands, Niue, and New Zealand—and six member territories—namely American Samoa, French Polynesia, Tokelau (New Zealand), Wallis and Futuna (France), Hawaii (United States), and Easter Island (Chile). It is not a formal organization yet, and does not have a secretariat.

(4) *Frameworks led by Pacific island countries*

In pursuit of further autonomy, Pacific island countries built new frameworks in the 2010s that would not be influenced by Australia, New Zealand, or any other former colonial powers.

(a) The Parties to the Nauru Agreement (PNA)

The FFA was responsible for coordinating fishery agreements with fishing countries regarding tuna resources in EEZs in the Pacific islands region. For example, the United States signed a long-term multilateral fishery agreement through the FFA in the past by which fishing license fees were distributed to the 14 Pacific island countries and Tokelau, its members other than Australia and New Zealand. However, in the Marshall Islands and elsewhere, there was growing dissatisfaction that the annual revenue from fishing license fees of around US$4 million did not match the amount of catch by the fishing countries.

The PNA was formed in 2010 based on the Nauru Agreement Concerning Cooperation in the Management of Fisheries of Common Interest, in line with negotiations over revising the multilateral fishery agreement between the United States and FFA.[23] The Nauru Agreement had been signed by eight countries that had abundant tuna resources: Palau, the Federated States of Micronesia, the Marshall Islands, Nauru, Kiribati, Tuvalu, the Solomon Islands, and Papua New Guinea in 1982 (Tokelau also joined later, in 2012). The PNA's secretariat was established in the Marshall Islands' capital, Majuro. The PNA was an attempt to shift fishery negotiations from prioritizing fishing countries to being led by coastal ones, and thereby obtain fair fishing license fees. Another aim was to indirectly manage the fishery resources in the high-seas pockets surrounded by its members.

The PNA introduced the Vessel Day Scheme (VDS),[24] a new method for selling fishing licenses that consisted of setting the unit price per day per fishing vessel and limiting the annual number of days sold. As a result, VDS unit prices rose from around US$2,000 in 2010 to over US$10,000 in 2019, and revenue from fishing license fees in the Marshall Islands increased to US$30-40 million a year.[25] This is equivalent to 40% of the country's general account, and is of a similar scale to the economic assistance it receives from the United States. Kiribati also began to see huge profits, with rising of revenue from fishing license fees to account for 80% of the government's revenue of approximately AU$200 million.[26]

By taking the lead in fishery negotiations and acquiring independent sources of government

23 PNA Secretariat, https://www.pnatuna.com/content/nauru-agreement
24 PNA Secretariat, https://www.pnatuna.com/content/pna-vessel-day-scheme
25 IMF (2018), *Marshall Islands Article IV Consultation Report*, p. 20
26 IMF (2018), *Kiribati Article IV Consultation Report*, p. 21

revenue that do not depend on financial assistance, the PNA member countries have successfully increased their voices in their dealings with development partners.

(b) National reformation in Fiji and the Pacific Islands Development Forum

Over 50% of Fiji's population are indigenous Fijians, just under 40% are Indo-Fijians, descendants of Indian contract laborers brought in in the 19th century by the British colonial powers, and the remainder have European, Asian, or Rotuman origins. Every time an Indo-Fijian-led government came to power, coups occurred (two in 1987 and one in 2000). These factors resulted in a society led by elite indigenous Fijians who held traditional authority.

In a bloodless coup in December 2006, the indigenous Fijian-led government was overthrown by the Republic of Fiji Military Forces (RFMF) led by indigenous Fijians. The interim government eliminated the divisions between indigenous Fijians and Indo-Fijians that had prevented the country from growing, and proceeded to reform the nation into a multiethnic, multiracial one where everyone was united as Fijians.

Meanwhile, the developed countries, Australia and New Zealand in particular, did not accept Fiji's interim government and urged it to hold an election and restore democracy by March 2009. However, the interim government did not hold the election on the grounds that it needed enough time to change people's mindset. Consequently, Fiji was suspended from the PIF in 2009.[27] While Fiji's economy declined due to deteriorated relations with developed countries, China supported it through economic assistance. Then, Fiji proceeded to diversify its diplomatic relations and strengthened its ties with the United Nations without giving in to pressure from Australia and New Zealand. It also aimed to establish a new organization led by Pacific island countries and territories to replace the PIF, which Australia and New Zealand were members of.

The international community held the United Nations Conference on Sustainable Development (Rio+20) in 2012, and Fiji's relations with the United Nations deepened around this time. In 2013, Fiji chaired the G77[28] framework of developing countries. It also took the lead in establishing the Pacific Islands Development Forum (PIDF) in the same year.[29]

Unlike the PIF, the PIDF formulated an organizational charter as its legal basis when it was established, and placed importance on relations with the United Nations right from the beginning. The PIDF currently has United Nations Observer status, and cooperates with the United Nations Office for South-South Cooperation (UNOSSC). However, it is not a CROP agency.

Fiji went on to restore democracy through a general election in September 2014. Its Permanent Representative to the United Nations, Ambassador Peter Thomson, was elected President of the United Nations General Assembly in 2016,[30] and Fiji held the presidency of the 23rd Session of the Conference of Parties to the UN Framework Convention on Climate Change (UNFCCC COP23) in 2017.[31] Having established a status in the international community through its own efforts, Fiji rejoined the PIF in August 2019 in a dignified manner, unswayed by Australia and New Zealand's wishes. That September, Fiji signed the Vuvale Partnership[32] with Australia, in which "Vuvale" means "family." The Permanent Representative of Fiji to the United Nations Office in Geneva, Ambassador Nazhat Shameem Khan, was appointed President of the United Nations Human Rights Council in January 2021.[33]

The series of efforts by Fiji had furthered the Pacific island countries' autonomy and altered their

27 PIF Secretariat, https://www.forumsec.org/wp-content/uploads/2017/11/2009-Forum-Communique_-Cairns_-Australia-5-6-Aug.pdf

28 Fijian Government, https://www.fiji.gov.fj/Media-Centre/News/FIJI-ELECTED-TO-CHAIRMANSHIP-FOR-G77

29 PIDF Secretariat, http://www.pidf.int/history/

30 United Nations Secretariat, https://www.un.org/press/en/2016/ga11791.doc.htm

31 Japan's Ministry of the Environment, http://www.env.go.jp/earth/post_30.html

32 Australian Government Department of Foreign Affairs and Trade, https://www.dfat.gov.au/geo/fiji/Pages/fiji-australia-vuvale-partnership

33 United Nations Human Rights Council, https://www.ohchr.org/EN/HRBodies/HRC/Pages/NewsDetail.aspx?NewsID=26663&LangID=E

relationships with their former colonial powers and development partners.

(c) Pacific Small Island Developing States (PSIDS)

Rio+20 in 2012 and the Third International Conference on Small Island Developing States (SIDS) in Samoa in 2014 strengthened the solidarity of 14 Pacific island countries in the United Nations as the Pacific SIDS (PSIDS). For matters related to climate change and sustainable development in particular, the Pacific island countries use the PIF framework (which included Australia and New Zealand) in the Pacific islands region, whereas they use the PSIDS framework (which consisted only of the Pacific island countries) in the international community.

(5) *China's South-South Cooperation framework*

(a) China's status as an alternative development partner in the Pacific islands region

Since the 1990s, China has been providing economic assistance to Pacific island countries in order to secure hubs for its economic activities, influence over the regional organizations, and reduce the number of diplomatic allies of Taiwan. It became a formal member of the South Pacific Tourism Organization (SPTO) in 2004, making it the only country outside the region to become a member of a CROP agency. In April 2006, its then Prime Minister Wen Jiabao visited Fiji before the coup[34] and signed a bilateral economic cooperation agreement with the government of Fiji led by Prime Minister Qarase. The Chinese Prime Minister also announced in the PIF that China would provide 3 billion yuan (around US$400 million) in development assistance to the region over a period of three years. China has been actively pursuing economic cooperation in the Pacific islands region through both the government and private sectors ever since. Its contributions include constructing government buildings, improving infrastructure, supporting health care, developing human resources, promoting trade and investment, providing technical assistance, funding scholarships, and granting Approved Destination Status (ADS) for Chinese national group tourists visits.

President Xi Jinping visited Fiji (Nadi) in November 2014, after the restoration of democracy.[35] His visit strengthened China's bilateral relations with Fiji, and summit talks were held with the (at the time) eight Pacific island countries that had diplomatic ties with China. Since then, China began to connect their assistance in the region provided randomly in the past under its Belt and Road Initiative, and to show its strategic nature. However, Fiji also strengthened its bilateral relations with India through a visit (to Fiji's capital Suva) by Indian Prime Minister Modi a few days before the Chinese President's visit.[36]

China's development cooperation is regarded as South-South Cooperation between developing countries, so it does not need to comply with Official Development Assistance (ODA) rules set by developed ones. This has enabled China to become a new, alternative development partner for Pacific island countries.

(b) Responses from the liberal democratic powers

Developed countries have strengthened their engagements with the Pacific islands region in response to China's expanding influence: Australia with Pacific Step-up (September 2016); the United States with the Free and Open Indo-Pacific Strategy (November 2017); New Zealand with Pacific Reset (March 2018); the United Kingdom with an agreement at the Commonwealth Heads of Government

34 RNZ (April 4, 2006), https://www.rnz.co.nz/international/Pacific-news/161269/wen-jiabao-makes-first-ever-visit-chinese-leader-to-fiji

35 RNZ (November 17, 2014), https://www.rnz.co.nz/international/Pacific-news/259556/XI-to-meet-eight-regional-leaders-in-fiji

36 *Fiji Sun* (November 17, 2014), https://fijisun.com.fj/2014/11/17/why-modi-is-good-news-for-fiji/

Meeting (April 2018); and Japan by reflecting the Free and Open Indo-Pacific vision in the PALM8 Leaders' Declaration (May 2018). In May 2019, the then US President Trump met the Presidents of the three US Freely Associated States. This marked the first-ever direct talks between leaders of those countries.[37] However, prompted by Chinese plans for large-scale economic assistance, the Solomon Islands and Kiribati switched their diplomatic relations from Taiwan to China in September 2019, reducing to four the number of diplomatic allies of Taiwan. Meanwhile, China relations had been changed to security matters from economic and diplomatic ones in US Freely Associated States after the then US Secretary of Defense Esper defined China as a security threat during his historical visit in Palau in September 2020. Currently, the United States has authority and responsibility for China relations based on the Compacts.

3. Security in the Pacific islands region

Security in the Pacific islands region is divided into traditional and non-traditional security.

(1) *Traditional security*

The post-war order still remains strong, and the former colonial powers, namely the United States, Australia, New Zealand, the United Kingdom, and France, have territories and play roles in the traditional security, or military defense, in the Pacific islands region. Meanwhile, the Pacific island countries are aware that traditional security in the region is an issue between the major powers, since it was a theater for the Pacific War and used for nuclear tests afterward. Only Papua New Guinea, Fiji, and Tonga have armed forces among 14 Pacific island countries, but their main purpose is to maintain public order. In recent years, international contributions have been conducted through UN peacekeeping operations.

After the war, Palau, the Federated States of Micronesia, and the Marshall Islands became strategic Trust Territories[38] of the United States, then independent as the US Freely Associated States. They are important for national security of the United States, and the US government has full authority and responsibility for their defense, making their situation different from that of the Commonwealth nations in the Southern Hemisphere. There is recognition that the citizens of the US Freely Associated States have volunteered to join the US military, have been sent to the front lines in Iraq and Afghanistan, and are fighting alongside US citizens for the sake of freedom and democracy even now. Fiji has a similarly deep relationship with the United Kingdom, and approximately 2,000 of its citizens join the British armed forces every year. That means that if the United States and United Kingdom are in military emergencies, these countries will fight alongside them.

(2) *Non-traditional security*

(a) Regional declarations[39]

The Pacific island countries have agreed to the following under the PIF framework: the Honiara Declaration on Law Enforcement Cooperation (1992), the Niue Treaty on Cooperation in Fisheries Surveillance and Law Enforcement in the South Pacific Region (1992),[40] the Aitutaki Declaration on Regional Security Cooperation (1997), the Biketawa Declaration (2000), and the Boe Declaration on Regional Security (2018).

They have identified climate change as the greatest threat to their national securities, and the Boe

37 ABC News (May 22, 2019), https://www.abc.net.au/news/2019-05-22/dual-trump-hosts-pacific-leaders-at-white-house/11138356

38 John Foster Dulles (1950), *War or Peace*. New York: The Macmillan Company, p. 79.

39 PIF Secretariat, https://www.forumsec.org/category/declarations/

40 FFA Secretariat, https://www.ffa.int/system/files/Niue%20Treaty_0.pdf

Declaration has defined the following as coming under regional security: climate change; natural disasters; food supplies; energy; the marine environment; conservation of biodiversity; resource management; trade and investment; tourism; the economy; human security (including education and health care); cybersecurity; transnational crime; and human trafficking. The Pacific Fusion Centre is also being set up pursuant to the declaration, with Australia in the leading role. Headquartered in Vanuatu, it will aim to include building Maritime Domain Awareness (MDA) in the region.

(b) Regional Assistance Mission to Solomon Islands (RAMSI)[41]

There was tribal conflict in Honiara, the capital of the Solomon Islands, from 1998 to 2003 between people from Guadalcanal island and settlers from Malaita island. The Solomon Islands government requested regional assistance from the PIF under the Biketawa Declaration. In response to this, RAMSI, a regional mission led by the Australian Defence Force and consisting of police and troops from the PIF members, was dispatched to the Solomon Islands from 2003 to 2017 and restored the public order in the country as the region.

(c) Measures against illegal, unreported, and unregulated (IUU) fishing and maritime surveillance

Pacific island countries have been cooperating on law enforcement under the Honiara Declaration and Niue Treaty since 1992. As part of its regional cooperation on maritime surveillance, Australia has provided patrol boats to the 12 Pacific island countries other than Nauru and Niue. Led by the FFA, headquartered in Honiara, the Solomon Islands, the joint maritime surveillance operations, namely, Big Eye, Rai Balang, Island Chief, and Kurukuru, are conducted with the United States, Australia, New Zealand, France, and Maritime Safety Authorities from Pacific island countries every year. The FFA also provides aerial surveillance support to the member countries. Meanwhile, the United States is setting up several radar systems in Palau to monitor the waters and airspace against the threat of North Korean ballistic missiles, and the system will also provide data for the maritime surveillance activities.

(d) Disaster response

In recent years, natural disasters caused by flooding, cyclones, and typhoons frequently occur in the Pacific islands region. In the event of a disaster, the National Disaster Management Authority takes a central role for response in each Pacific island country. Depending on the scale of the disaster, the Australian and New Zealand Defence Forces will cooperate with the local military and police forces in the affected areas for the initial response and emergency assistance in the Southern Hemisphere. The US military and Coast Guard will do likewise in the Northern Hemisphere. There are strong personnel-based relationships between the Pacific island countries' military and law enforcement authorities and those of the United States, Australia, and New Zealand.

4. Recent regional issues

(1) *Impact of COVID-19*

The ongoing global COVID-19 pandemic is having a growing impact on both the safety of people in the Pacific island countries and on their economies and finances.

41 RAMSI Secretariat, https://www.ramsi.org/

(a) Ensuring the safety of people

The Pacific island countries have a history of epidemics, and are very wary about them. When Samoa suffered the outbreak of measles in 2019 due to a low vaccination rate, around 5,700 out of a population of about 200,000 were infected, and the disease claimed 83 lives, mainly children under the age of five.[42] The tragedy raised awareness about epidemics and vaccines in the Pacific island countries again. That December in the Marshall Islands, led by the National Disaster Management Office, measles vaccination was carried out for all inhabitants, and the national government closed its border and banned travel from the capital to the outer islands for anyone without a measles vaccination certificate.[43]

In the midst of growing concerns about measles in the region, COVID-19 emerged at the end of 2019. Beginning with the Federated States of Micronesia at the end of January 2020,[44] all the Pacific island countries declared a state of emergency and introduced entry restrictions and other strict border measures, secured domestic testing facilities and personal protective equipment (PPE), encouraged preventive behavior such as hand washing and social distancing, and introduced curfews and lockdowns. Many of them stayed COVID-free as a result. However, as the pandemic has dragged on, some of the countries began to see cracks appear in their border measures.

In Papua New Guinea, the largest country in the region, many people had crossed its borders from neighboring West Papua in Indonesia, and the number of infected people began to rise in February 2021. As of June 24, 2021, the cumulative total has increased to 17,041, up from 700-800 in December 2020,[45] resulting in 173 deaths.[46] Fiji had some community-acquired infections in March 2020, but by thoroughly tracking the movements of the infected and people who had contact with them, the government managed to stop the spread. It also prevented community-acquired infections by the quarantining and isolation of infected people at the airports. However, the Delta variant began spreading throughout urban areas in mid-April 2021 after an airport quarantine officer came into contact with someone returning from India who had tested positive. The officer had then attended a large funeral without going through quarantine. Despite curbing the rapid spread of the disease through lockdowns and curfews, Fiji suffered an outbreak in mid-June 2021 that resulted in more than 200 new infected people a day in a population of just under 900,000. As of June 28, 2021, its cumulative number of infected is 3,832 (of whom 3,762 contracted the disease after mid-April), and 17 people have died (15 of them in the above period). The situation is still getting worse,[47] and there are also concerns about effects on neighboring countries.

With regard to vaccines, the three US Freely Associated States started administering them to inhabitants near the end of 2020, supported by the United States. As of June 28, 2021, 75% of their populations—and 96% of people aged 18 and over—have had their second dose in Palau.[48] Meanwhile, vaccinations are proceeding more slowly in the Commonwealth nations in the Southern Hemisphere. These are acquiring the vaccines through COVID-19 Vaccines Global Access (COVAX), an international framework for co-purchasing and distributing them to developing countries. Fiji was the first to begin, doing so in March 2021,[49] but some—like Vanuatu—started in June.[50] The spread of the disease in Papua New Guinea also caused neighboring countries to raise serious concerns, and the Solomon

42 WHO, https://www.who.int/docs/default-source/wpro---documents/dps/outbreaks-and-emergencies/measles-2019/20200122-measles-pacific-who-unicef-sitrep-11.pdf?sfvrsn=9e1851f5_2

43 US Embassy in the Republic of the Marshall Islands, https://mh.usembassy.gov/travel-advisory-health-alert-protection-against-measles-importation-into-the-rmi/

44 Government of the Federated States of Micronesia, https://www.fsmgov.org/fsmun/pubhealth.pdf

45 RNZ (December 17, 2020), https://www.rnz.co.nz/international/pacific-news/432928/in-brief- news-from-around-the-pacific

46 RNZ (June 24, 2021), https://www.rnz.co.nz/international/pacific-news/445410/in-brief-news-from-around-the-pacific

47 Fijian Ministry of Health and Medical Services (June 28, 2021), http://www.health.gov.fj/28-06-2021/

48 Palauan Ministry of Health and Human Services (June 28, 2021), http://www.palauhealth.org/2019nCoV_SitRep/MOH-COVID-19% 20Situation% 20Report.PDF

49 RNZ (March 6, 2021), https://www.rnz.co.nz/international/pacific-news/437844/fiji-first-pacific-country-to-benefit-from-covax-covid-19-vaccines

50 RNZ (May 21, 2021), https://www.rnz.co.nz/international/pacific-news/443060/in-brief-news-from-around-the-pacific

Islands decided to accept Chinese vaccines to make up for the shortage.[51] However, some Papua New Guineans are reluctant to get vaccinated, and this is one of the reasons that vaccination is not widespread.[52]

(b) Economies and finances

As discussed above, the Pacific island countries are divided into those with a strong private sector and those with a strong public sector. Fiji, Palau, the Cook Islands, and Vanuatu have a strong private sector and tourism. Consequently, their economies have shrunk drastically as a result of the strict border measures and prolonged pandemic. Palau's revenue in its fiscal year 2020 fell about 40% short, and the government had to raise funds by borrowing from international organizations.[53] It is also considering securing stable financing by inviting in the US military, and began experimentally receiving tourists from Taiwan in April 2021 in order to revitalize its economy through the Taiwan travel bubble.[54]

Meanwhile, the Cook Islands similarly began a New Zealand tourism bubble in May 2021 as a first step toward economic recovery.[55] Fiji was also considering letting in tourists from Australia and New Zealand, but the plan was suspended as a result of the citywide spread of the Delta variant.

(2) *Micronesia's withdrawal from the PIF*

In February 2021, the five Micronesian countries announced their withdrawals from the PIF over the election of the next Secretary General,[56] and the three US Freely Associated States—Palau, the Federated States of Micronesia, and the Marshall Islands—transmitted the diplomatic notes to Fiji, the custodian of the Agreement Establishing the Pacific Islands Forum. Consider the background and events that led to this.

In early February 2019, the then Secretary General Meg Taylor expressed hopes that the PIF would strengthen its relations with China.[57] It was not the PIF Secretary General's place to overstep the member countries' diplomatic authority, and her words angered the diplomatic allies of Taiwan. At the Micronesian Presidents' Summit (MPS) in late February, the leaders of the five Micronesian countries urged the PIF to treat China and Taiwan equally, and agreed to unite for preventing the next PIF Secretary General from them claiming the Micronesian turn.[58]

In May 2019, the three US Freely Associated States met directly with the US President, strengthening their solidarity with the United States. At the 50th PIF leaders' forum in Tuvalu that August, the Pacific island countries' confronted with Australia over its inadequate actions for mitigating climate change, and in contrast, some of them praised China's stance on the issue.[59] That September, the Solomon Islands and Kiribati switched their diplomatic relations from Taiwan to China.[60]

At the MPS held that October, the Marshall Islands' Ambassador to the United States and former

51 RNZ (April 13, 2021), https://www.rnz.co.nz/international/pacific-news/440379/in-brief-news-from-around-the-pacific

52 RNZ (April 10, 2021), https://www.rnz.co.nz/international/programmes/datelinepacific/audio/2018790953/vaccine-hesitancy-complicates-png-s-covid-crisis

53 RNZ (August 1, 2020), https://www.rnz.co.nz/international/pacific-news/422456/economic-contraction-of-15-percent-expected-in-two-pacific-adb

54 RNZ (April 2, 2021), https://www.rnz.co.nz/international/pacific-news/439732/historic-palau-taiwan-travel-bubble-under-way

55 RNZ (May 17, 2021), https://www.rnz.co.nz/national/programmes/first-up/audio/2018795709/cook-islands-travel-bubble-finally-open-to-nz-travellers

56 RNZ (February 9, 2021), https://www.rnz.co.nz/international/pacific-news/436039/five-micronesian-countries-leave-pacific-islands-forum

57 PIF Secretariat, https://www.forumsec.org/2019/02/12/keynote-address-by-dame-meg-taylor-secretary-general-the-china-alternative-changing-regional-order-in-the-pacific-islands/

58 *Fiji Times* (February 26, 2019), https://www.fijitimes.com/micronesian-leaders-urged-pacific-islands-forum-to-treat-china-and-taiwan-equally/

59 ABC (August 19, 2019), https://www.abc.net.au/news/2019-08-19/Australia-climate-change-interaction-damaging-pacific-relation/11426390

60 ABC (September 20, 2019), https://www.abc.net.au/news/2019-09-20/kiribati-to-switch-diplomatic-ties-from-Taiwan-to-China/11532192

Minister of Foreign Affairs Gerald Zackios was put up as a candidate to be the next PIF Secretary General.[61] In June 2020, however, the Cook Islands' then Prime Minister Henry Tuakeu Puna announced that he would also run for the post, and step down as Prime Minister in September.[62] Fiji, Tonga, and the Solomon Islands also put up candidates of their own. Mr. Puna's announcement of resignation also put pressure on the PIF member countries and territories.

Palau's then President Thomas Remengesau Jr. expressed his discomfort at the South Pacific countries' moves to break the gentlemen's agreement. At the Micronesian Presidents' Summit held in Palau that October, the five Micronesian countries accordingly issued a joint statement warning the PIF member countries and territories that they would withdraw from the forum if the agreement was actually broken.[63] Two months earlier, the then US Defense Secretary Mark Thomas Esper had visited Palau to strengthen its security relations with the US Freely Associated States.

In a special PIF leaders' meeting held online on February 3, 2021, former Prime Minister Puna was elected as the next Secretary General through a secret ballot, winning by nine votes to eight.[64] This result meant that Puna, former Prime Minister of Chinese ally the Cook Islands, had obstructed the appointment of a Secretary General from Taiwanese ally the Marshall Islands. The following day (the 4th), the Palau government transmitted a diplomatic note to the Fiji government of its decision to withdraw from the PIF and close its embassy in Fiji by the end of the month. At a Micronesian Presidents' Summit held online on the 8th, the five countries agreed to withdraw from the PIF. The Federated States of Micronesia officially announced the start of the withdrawal procedure on the 14th, followed by the Marshall Islands on the 19th. In accordance with the 2000 Agreement Establishing the Pacific Islands Forum Secretariat, these three countries will officially withdraw a year later.

In an unconventional move, Papua New Guinea's Prime Minister James Marape, Fiji's Prime Minister Josaia Voreqe Bainimarama, Samoa's Prime Minister Tuila'epa Sa'ilele Malielegaoi, and Secretary General Taylor apologized to the Micronesian countries in late April 2021.[65] Nevertheless, former Prime Minister Puna was appointed the PIF Secretary General in May 2021.

5. The role of the Pacific Islands Leaders Meeting (PALM), and future expectations

(1) *The background and significance of the PALM*

Forming diplomatic ties with the Pacific island countries as soon as they gained independence, Japan has built up visible bilateral relationships with them. One example of this is the dispatching of Japan Overseas Cooperation Volunteers to Samoa from 1972 onward. On the other hand, japan's relations with the PIF has a complex history, and influence today's PALM meetings. This section will review the history of Japan's relations with the PIF, referring to PIF Leaders' Meeting Communiques (the Forum Communiques) since 1971.[66]

61 The National Government of the Federated States of Micronesia, https://www.gov.fm/index.php/component/content/article/35-pio-articles/news-and-updates/171-the-five-sovereign-micronesian-nations-unanimously-nominate-gerald-m-zackios-to-be-secretary-general-of-the-pacific-islands-forum?Itemid=177

62 RNZ (June 17, 2020), https://www.rnz.co.nz/international/Pacific-news/419204/the-book-islands-pm-to-stand-down-in-sepmember

63 RNZ (October 1, 2020), https://www.rnz.co.nz/international/pacific-news/427342/palau-threatens-to-leave-forum-if-secretary-general-agreement-not-honored

64 RNZ (February 4, 2021), https://www.rnz.co.nz/international/pacific-news/435765/former-cook-islands-pm-is-the-new-secretary-general-of-the-pif

65 RNZ (April 28, 2021), https://www.rnz.co.nz/international/pacific-news/441343/surprise-apology-to-micronesia-over-forum-election-row

66 PIF Secretariat, https://www.forumsec.org/category/communiques/

(a) Relations between Japan and the PIF

Japan's first appearance in a communique was in the 12th PIF Leaders' Meeting, which was held in 1981 in Port Vila, Vanuatu.[67] It mentioned its protests against France for its nuclear tests and Japan and the United States for their plans to dump nuclear waste in the ocean. The protests against France and Japan were reiterated in the 15th PIF Leaders' Meeting in Tuvalu in 1984.[68] This trend raised concerns that, being a major power, Japan might not adequately hear the Pacific island countries' voices.

A major turning point came in 1985. Yasuhiro Nakasone became the first Japanese Prime Minister to visit Pacific island countries. He visited Fiji and Papua New Guinea, and clearly stated that Japan had no intention of dumping radioactive waste in the Pacific Ocean in disregard of the concerns expressed by the communities of the region. His words were welcomed at the 16th PIF Leaders' Meeting in the Cook Islands held that year.[69] Consequently, the PIF reaffirmed the importance of Japan's assistance that had been provided to the Pacific island countries and gained momentum to develop dialogues with Japan. The 17th PIF Leaders' Meeting in Fiji in 1986 included the first Forum Dialogue with Japan. This led to today's Post-Forum Dialogues between PIF members and Dialogue Partners.[70]

Visiting Fiji in January 1987, the then Minister of Foreign Affairs Tadashi Kuranari announced the Kuranari Doctrine, consisting of five principles: (1) respect for independence and autonomy; (2) support for existing arrangements for regional cooperation; (3) assistance in preserving political stability; (4) provision of assistance to make the region more prosperous; and (5) promotion of people-to-people exchanges. The Doctrine formed the foundation of Japan's relations with the Pacific island countries today.[71]

In 1988, the Sasakawa Peace Foundation invited heads of state and representatives from ten Pacific island countries to Tokyo and held the first-ever Pacific Island Nations Conference, chaired by the former Minister of Foreign Affairs Kuranari. However, new issues surfaced.

At the 22nd PIF Leaders' Meeting in the Solomon Islands in 1992, concerns were raised about Japan's plans to transport plutonium from Europe.[72] The PIF asked Japan to consult with it and provide accurate information, and the issue dragged on until 2000.

On the other hand, at the 25th PIF Leaders' Meeting in Brisbane in 1994, Japan pledged to set up a PIF Tokyo office for promoting trade, investment, and tourism. In October 1996, the Japanese government and the PIF established and jointly funded the Pacific Islands Centre (PIC) (officially called the South Pacific Economic Exchange Support Centre).[73] The PIF opened its Beijing office the following year.

At the 28th PIF Leaders' Meeting in the Cook Islands in September 1997, the PIF Secretariat asked the leaders of the member countries to attend a new event called the Pacific Islands Leaders Meeting.[74] The first was held in Tokyo that October.

The issue of plutonium transportation was resolved in 2000 when Japan created a privately funded Pacific Islands Development Cooperation Fund of approximately US$10 million.[75] The fund would be used to cover the cost for initial response in the event of an accident involving nuclear material transportation, but the investment profits were to be placed at the PIF's disposal to use toward human resource development and technical cooperation.

In this way, the nuclear issue ended up deepening relations between Japan and the PIF, and the PIF was involved in the beginning of the PALM.

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67 PIF Secretariat, https://www.forumsec.org/1981/08/10/twelfth-south-pacific-forum-port-vila-vanuatu-10-11-august-1981/

68 PIF Secretariat, https://www.forumsec.org/1984/08/27/fifteenth-south-pacific-forum-funafuti-tuvalu-27-28-august-1984/

69 PIF Secretariat, https://www.forumsec.org/1985/08/05/sixteenth-south-pacific-forum-rarotonga-cook-islands-5-6-august-1985/

70 PIF Secretariat, https://www.forumsec.org/1986/08/08/seventeenth-south-pacific-forum-suva-fiji-8-11-august-1986/

71 Japan's Ministry of Foreign Affairs (2019), Speech by Minister for Foreign Affairs Kono on Policies regarding the Pacific Island Countries, https://www.mofa.go.jp/mofaj/files/000504746.pdf

72 PIF Secretariat, https://www.forumsec.org/1992/07/08/twenty-third-south-pacific-forum-honiara-solomon-islands-8-9-july-1992/

73 PIF Secretariat, https://www.forumsec.org/wp-content/uploads/2017/11/1996-Communique%CC%81-Majuro-3-5-Sep.pdf

74 PIF Secretariat, https://www.forumsec.org/wp-content/uploads/2017/11/1997-Communique%CC%81-Rarotonga-17-19-Sep.pdf

75 PIF Secretariat, https://www.forumsec.org/wp-content/uploads/2017/11/2000-Communique%CC%81-Tarawa-27-30-Oct.pdf

(b) Changes in the PALM's significance

The first Pacific Islands Leaders Meeting (PALM1, Tokyo) in 1997 was welcomed by the Pacific island countries and the PIF as the first-ever summit meeting with a country outside the region other than former colonial powers the United States, Australia, and New Zealand. The leaders of the Pacific island countries gathered in Japan again for the second Pacific Islands Leaders Meeting (PALM2, Miyazaki) in 2000 and the third (PALM3, Okinawa) in 2003. The meetings were tremendously significant in terms of deepening mutual understanding.

At the fourth one (PALM4, Okinawa) in May 2006, Japan announced that it would provide 45 billion yen (approx. US$400 million) in assistance over three years. This was in response to the then Chinese Prime Minister Wen Jiabao's announcement of 42 billion yen in assistance at the PIF Secretariat in Fiji that April. At the 5th Pacific Island Leaders Meeting (PALM5, Hokkaido) in 2009, Japan promised the PIF Secretariat that it would provide about 50 billion yen (approx. US$450 million) in assistance, including setting up a Pacific Environment Community Fund (PEC Fund) of about 6.8 billion yen (approx. US$60 million) at the PIF Secretariat under Japan's Pacific Environment Community Initiative to cooperate on and address environmental and climate change issues. At the 6th meeting (PALM6, Okinawa) in 2012, Japan announced that it would endeavor to provide up to US$500 million in assistance over three years. At the 7th meeting (PALM7, Fukushima) in 2015, it pledged more than 55 billion yen (approx. US$460 million) in assistance over three years.[76] In this way, the PALM meetings became occasions for assembling the leaders of the Pacific island countries in Japan and unveiling Japan's assistance packages. On the other hand, as their moves toward autonomy progressed, the Pacific island countries expected Japan to understand the changing situation in the region, and hold frank dialogues and cooperation on a variety of regional and global issues.

(2) *PALM8 for building foundations for a new partnership*

In September 2015, after PALM7, "Transforming Our World: The 2030 Agenda for Sustainable Development" (2030 Agenda) was adopted at the United Nations Sustainable Development Summit held at the UN Headquarters in New York, transitioning from the Millennium Development Goals (MDGs). Fiji and other Pacific island countries successfully expressed their views on the Sustainable Development Goals (SDGs) after a series of discussions under the slogans "post-MDGs" and "local to global" since 2013, and they strengthened ties with the international community.

They expected Japan to change the PALM meetings from being occasions for hearing about Japan's three-year assistance packages as recipients to platforms for discussing diverse challenges they face in the region as equal partners toward concrete actions, setting aside the geopolitical confrontations between major powers.

On the other hand, Japan was considering the PALM8 to be used to articulate a geopolitical viewpoint against China's advance into the Pacific Ocean. Specifically, Japan expected the Pacific island countries to support the Free and Open Indo-Pacific (FOIP) vision[77] which consists of the three pillars: (1) the promotion and establishment of the rule of law, freedom of navigation, free trade, etc.; (2) the pursuit of economic prosperity by improving connectivity through developing quality infrastructure according to international standards, etc.; and (3) commitment to peace and stability by building capacity for maritime law enforcement, anti-piracy measures, disaster relief, etc.

The Pacific island countries that had intimate relationships with China were wary about this, but ultimately, five countries—namely Palau, the Federated States of Micronesia, and the Marshall Islands, the US Freely Associated States, and Fiji and Papua New Guinea, which thought it would help their economic development—showed clear support for Japan's FOIP, and Japan's efforts based on the FOIP Strategy were welcomed in the PALM8 Leaders' Declaration.

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76 Japan's Ministry of Foreign Affairs, https://www.mofa.go.jp/mofaj/area/ps_summit/index.html

77 Japan's Ministry of Foreign Affairs (2018), White Paper on Development Cooperation in 2017, pp. 2-7

Besides the FOIP, the PALM8 discussions also covered traditional development challenges, and trade, investment, tourism, climate change, furthering their relations with local governments in Japan, and building disaster-resilient societies, which the Pacific island countries had been hoping to address. Overall, the foundations were built for establishing a new partnership in which the Pacific island countries and Japan cooperate as equals.[78]

(3) *PALM9*

(a) From dots to a line

Like isolated dots, the meetings from PALM1 in 1997 up to PALM7 in 2015 were all separate opportunities to reaffirm the relations between Japan and the Pacific island countries every three years. After PALM8, Japan set up the Interagency Committee for Promoting Cooperation with Pacific Island Countries in February 2019, and continued to work toward fulfilling the promises it had made in the PALM8 Leaders' Declaration under the FOIP vision.[79] This changed the PALM from a succession of dots to a line of three-year periods under its consistent policy, and the PALM turned to a process to build the foundations for a partnership in which the Pacific island countries and Japan would tackle regional and global challenges not through a donor-recipient relationship but as equals. PALM9 will be an occasion for sharing a guideline for the next three years, building on the PALM8 period.

(b) PALM9 discussions and development of the partnership

The PALM9 meeting will cover diverse challenges and major changes happening in the Pacific island countries, adding to the following up on and advancement of the PALM8 Leaders' Declaration.

The first matter is the impact of COVID-19. In addition to the need to secure the safety of people's lives, some countries are in an economic and financial crisis caused by the prolonged pandemic and face serious debt problems.

The second matter is the Pacific island countries' shift to a national particularism. In 2010s, they became more confident of their economies and positions in the international community, and strengthened regional unity through collective actions. However, the pandemic stopped the flow of people across the region and plunged the countries into existential crisis. This has led them to shift to a homeland-first principle and to rebuild relations with their former colonial powers.

The third matter is the changes in the PIF. For historical reasons, the PIF Secretariat has been taking a role as a PALM secretariat in the region. However, the Micronesian countries' moves to withdraw from the PIF raised questions about whether its secretariat could properly represent the will of all of the Pacific island countries.

Moreover, it needs to be acknowledged that the Pacific island countries have long been inclined toward "less talk, more action" and "leaving geopolitical issues out of PALM discussions."

In light of the factors described above, PALM9 will likely include reports and discussions on the following items in the context of following up on and advancement of PALM8: reaffirmation of the meaning of the FOIP; rules-based maritime order; marine resource management; cooperation on maritime safety, including measures against IUU fishing; the economy; sustainable development; climate change; building disaster-resilient countries; people-to-people exchanges; and cooperation in the international arena.

The pressing issue of COVID-19 will also be discussed. To address their economic and financial issues, the Pacific island countries might seek any funding resources without inhibition, and financial assistance by developed countries must be required the geopolitical aspect. Some kind of message about

78 Shiozawa (2018), Relations between Japan and the Pacific Islands Heading toward a New Stage (1) — The Significance of the 8th Pacific Islands Leaders Meeting in Iwaki City, Fukushima Prefecture

79 Japan's Ministry of Foreign Affairs (2018), https://www.mofa.go.jp/mofaj/a_o/ocn/page4_004026.html

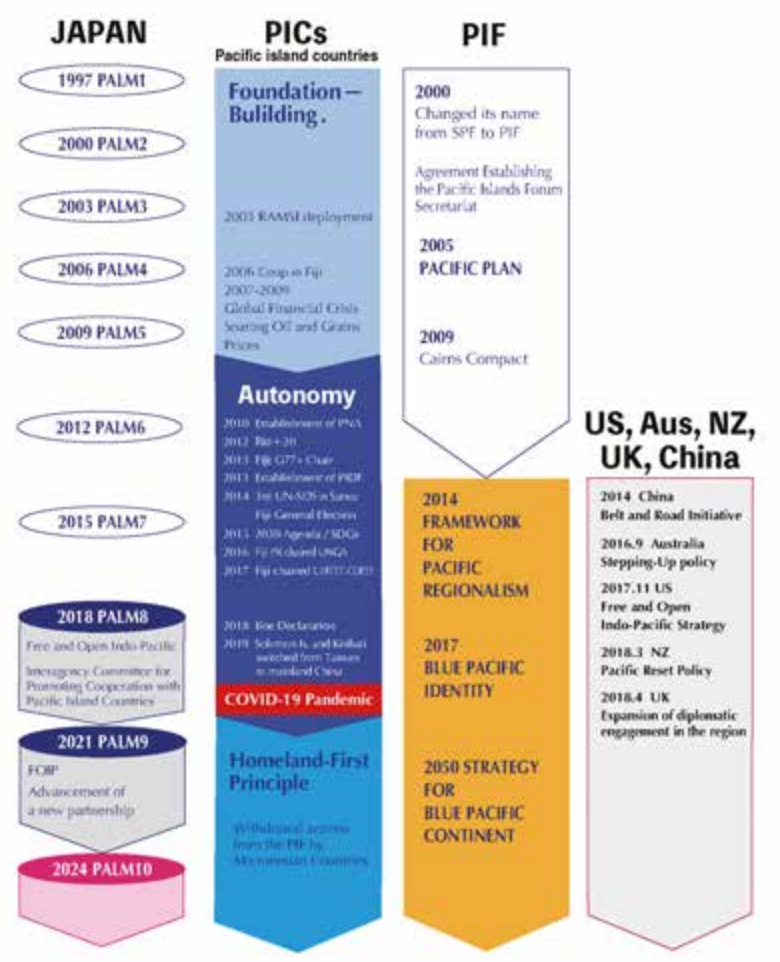

Figure 3 Changing situations of PALM, Pacific island countries, and PIF
(Created by the author)

debt issues can also be expected. In terms of climate change, Japan will probably explain benefits to the Pacific island countries and future actions to be derived by the US-Japan Climate Partnership on Ambition, Decarbonization, and Clean Energy signed at the US-Japan Summit Meeting in April 2021.

Whatever the agenda, the Pacific island countries should not be treated as mere beneficiaries, but given a share of the responsibility and a place in the discussions as collaborative partners. Consequently, the Pacific island countries and Japan will be able to establish an equal partnership in which both parties can frankly exchange their views. Under the new partnership, future-oriented discussions will be expected on reconstruction and creation of a new society after COVID-19 (Figure 3).

However, as discussed above, the Pacific island countries have long taken a serious line on nuclear issues, and relations between Japan and the PIF also began with the PIF's protests against Japan's plans to dispose of nuclear waste in the ocean. Consequently, to advance its partnership with the Pacific island countries under the Free and Open Indo-Pacific vision, Japan will need to explain more accurately how it will release the treated wastewater from the Fukushima Daiichi Power Plant.

(4) *Toward a new PALM regional framework*

Because the PALM has historically been a summit meeting between Japan and the PIF member

countries and territories, Australia, New Zealand, New Caledonia (France), and French Polynesia also take part in discussions even though they are not eligible for Japan's ODA. In addition, the PIF Secretariat can be influenced by other development partners, and sometimes puts itself above the inclinations of its member countries. These facts hamper one of the PALM's essential functions for fostering frank dialogues among leaders of the Pacific island countries and Japan.

The Pacific islands region has entered an era in which its countries have a homeland-first principle and are rebuilding ties with former colonial powers, and the PIF framework is changing. This will likely increasingly render ineffective the traditional framework of having regional organizations that serve as intermediaries between Japan and the Pacific island countries.

Japan has built good bilateral relations with each of the 14 Pacific island countries without relying on regional frameworks, and can share nuances with them as a fellow island nation in the Pacific Ocean. Japan also has strong relations with the United States, Australia, and New Zealand, and other former colonial powers in the region. In light of these factors, several points can be made in conclusion about the future of the PALM.

The first point here is that Japan should pursue "all-Japan" efforts on a country-by-country basis. With such efforts, the public and private sectors would make use of their respective specialties, cooperate with, and complement each other. For example, it is expected that while the national government makes agreements and frameworks with a Pacific island country, the private sector practices under them and reflect the principles and policies in the actual lives of the community.

The second point is that Japan should advance cooperation with former colonial powers on a country-by-country basis. Japan, the United States, Australia, and New Zealand have different assistance schemes and personnel networks, so it might be more effective if they work together and make full use of their respective salient characteristics. In Palau, for example, the United States and Japan could take on a central role for forming a team of five with Australia, New Zealand, and Palau. In Fiji, it will be important that Australia and New Zealand lead to form a team of five with the United States, Japan, and Fiji.

The third point is that with such practices on a country-by-country basis, grouping of Pacific island countries by issues will be possible rather than by subregions. For example, countries like the Marshall Islands, Kiribati, Nauru, and Tuvalu could be grouped together under the theme of securing drinking water. This will enable a special group to be formed for traditional security as well.

The fourth point is that the PALM should be split into three meetings and set up its permanent secretariat in Japan.

The first meeting should only be between the leaders of Japan and the Pacific island countries. This will aggregate the above-mentioned efforts, and because Japan and the Pacific island countries have a partnership based on practical experience, it will enable them to frankly discuss and form joint strategies toward achieving a sustainable society. The second meeting should be among Japan, the United States, Australia, and New Zealand, in which four nations focus exclusively on development assistance. This will enable the four of them to discuss mutual cooperation, and be open to other development partners with common values. The third meeting should be closed, and cover traditional security in the context of geopolitical changes. The only participants should be Japan, the United States, Australia, New Zealand, and Pacific island countries like Palau that can be reliable on the field of traditional security. It might also be a good idea to widen participation to India, the United Kingdom, France, and other development partners with common values.

Building up these four points, the PALM will evolve from a single meeting body to a new regional framework with the Japan's FOIP vision. This will in turn enable Japan, the Pacific island countries, the former colonial powers, and development partners with common values to cooperate and work effectively on climate security in the Pacific island region. Making the PALM into a regional framework will hopefully be discussed further with a view toward PALM10 in 2024.

Toward Comprehensive Climate Security

Yuta Komori

1. Introduction

(1) *The matters considered thus far, and the aim of this chapter*

This book has looked at how changes in marine environments and ecosystems due to global warming will affect our diplomatic and security policies and the foundations of our very survival, and what measures we are taking to address this. It has done so from a variety of perspectives, most notably that of ocean policy, and ocean security policy in particular.

Through this, Part 1 clarified that so-called climate change, epitomized by global warming, could have a significant impact on marine environments and our habitats, and that its effects have often presented themselves throughout the history of humankind as the background to various changes. Part 2 confirmed that climate change now needs to be addressed not merely as an environmental issues, but as an issue requiring the involvement of law enforcement agencies and navies, coast guards, and other defense agencies. In addition, Part 3 clarified that environmental issues due to climate change are already indirectly causing conflicts, terrorism, and refugee and other issues, and that these must be urgently addressed. Part 4 highlighted how responses to climate change can have a major impact not only on traditional diplomatic and security policies or existing international relations, but on systems as well, with the most notable example being changes in countries' political systems.

In light of the new insights, issues, and prospects identified through considering these matters, the previous chapter looked at how climate change is having serious impacts on the Pacific island countries in Micronesia, Melanesia, and Polynesia, whose issues include having lands that are small and scattered, being far from the international markets, and being vulnerable to environmental change due to natural disasters, climate change, and so on. The chapter looked at how their leaders are dealing with climate change at the Pacific Islands Leaders Meetings (PALMs), and what the issues and prospects are.

In light of all these discussions, this chapter will examine what we should do—and from what kinds of perspectives—to address climate change as an issue that will have a significant impact on all marine fields.

(2) *Ocean governance, this chapter's premise: Understanding it, and how it is connected with climate change*

This chapter aims to examine measures we should take to counter climate change, but the aim of those measures will be to establish or develop ocean governance. To that end, it will give an overview of ocean governance first, then look at it in detail.

Ocean governance—also called "comprehensive management of the oceans"—is regarded as a concept based on two principles: constructing a law-based order to manage the oceans, and by formulating and implementing policies and action plans related to managing them comprehensively and developing

them sustainably.[1] This was made concrete as a law-based order by the United Nations Convention on the Law of the Sea (UNCLOS) adopted in 1982, and as a policy or action plan by the Rio Declaration on Environment and Development and Agenda 21 adopted in 1992, the United Nations Millennium Declaration and Millennium Development Goals (MDGs) adopted in 2000, the Johannesburg Declaration on Sustainable Development adopted in 2002, the Future We Want adopted in 2012, and the 2030 Agenda for Sustainable Development and Sustainable Development Goals (SDGs) adopted in 2015. In light of these international trends, Japan and other major powers are compiling—in the form of laws, regulations, etc.—basic policies for measures to help establish ocean governance.[2]

In this way, ocean governance is being worked on in parallel and complementarily both internationally and within individual countries. More concretely, the goal is to overcome the global trilemma of "development," "environment," and "peace"[3]—in other words, taking all the issues regarding marine economic promotion, marine environmental conservation, and maritime security, measures and either solving or expanding them in balanced ways. However, in reality, these issues are being addressed individually, and sometimes also being connected to national interests. This is particularly true of ocean security, and notably its military aspects.[4]

However, the discussions up to the previous chapter have clarified that addressing maritime security, promoting marine industry, and protecting the marine environments as individual issues will not just be an inadequate way to achieve their goals, but could also fail to adequately contribute to establishing and developing ocean governance. Perspectives or measures therefore need to be proposed to address these issues comprehensively. Looking at climate change as discussed in this book with these issues in mind, we see that both its impacts and the measures required are comprehensive in scope, and that establishing ocean governance will be directly linked to finding solutions. Establishing ocean governance therefore harbors tremendous opportunities for responding to climate change, and could help improve the situation greatly.

In response to this situation, the Ocean Policy Research Institute of the Sasakawa Peace Foundation has been working both in Japan and internationally toward developing all the fields related to ocean governance, and response to climate change is no exception (Table 1).[5] It has been pursuing this work for a quarter of a century, both in its current capacity as an NGO with a Special Consultative Status under the United Nations Economic and Social Council (ECOSOC), and before then, when it was the Ocean Policy Research Foundation (officially the Ship and Ocean Foundation).

It also did pioneering work in advance of when the Paris Agreement came into force in 2016. Examples include being the first organization in Japan to identify that climate change would have significant impacts on marine policy and maritime security in particular, and that the current situation regarding military forces should be reexamined.[6, 7]

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1 Hiroshi Terashima (2016), "Issues and Prospects for Ocean Governance: Forming an Order and Sustainably Developing the Oceans," *Policy Opinion*, Vol. 45, 1-8.

2 For example, Japan enacted the Basic Act on Ocean Policy in 2007, Korea enacted the Basic Law on Marine Fishery Development in 2002, and China has stated that it will enact a Basic Act on Ocean Policy by 2020, doing so in the draft of the 13th Five-Year Plan (2016-2020). In addition, ahead of establishing international ocean governance, the Pacific island countries are pursuing measures like stipulating exclusive economic zones (EEZs) in their constitutions and laws. (These countries will be seriously affected by climate change.) Ocean Policy Research Institute of the Sasakawa Peace Foundation (2019), *Research on Formulating and Promoting Comprehensive Ocean Policy in FY 2018: Report on National and International Community Trends in Ocean Policy*, 10-16.

3 Yuta Komori (2021), "Speculations on Maritime Security: Focusing on a Multilevel Approach," Japan Forum on International Relations, *Multifaceted Expansion of Building a Maritime Order—Toward Creating and Expanding "Ocean Theory" (Ministry of Foreign Affairs Diplomacy and Security Research Project Subsidies (Research Projects) Field D (Maritime Issues))* Project, Annual Report (Commentary), 5 pages in total, (http://www.komed.j.or.jp/) /2020/maritime/210226.htm).

4 In this regard, Elisabeth Mann Borgese, vice chair of the Independent World Commission on the Oceans (IWCO), said that the United Nations Convention on the Law of the Sea has become divorced from navies. She highlighted the importance of ocean security by saying that there can be no maritime peace without the help of healthy naval power. Shinya Takai (June 1998), "The Significance and New Roles of Maritime Defense Forces: Ocean Peace Keeping," *Proceedings of the National Institute for Defense Studies*, Vol. 1, No.1, 106-129.

5 Hiroshi Terashima, Keita Furukawa, Wilf Swartz, Miko Maekawa, Mai Fujii, Satoko Takahara, and John Dolan (2017), "Bulletin from the UN Ocean Conference: Conservation and Sustainable Use of the Oceans and Their Resources," lecture materials for the 143rd Ocean Forum; Kenta Furukawa, Wilf Swartz (2017), "Toward Conservation and Sustainable Development of the Oceans and Their Resources: Bulletin from the UN Ocean Conference," lecture materials for the 139th Ocean Forum, website of the Ocean Policy Research Institute of the Sasakawa Peace Foundation (https://www.spf.org/opri/) (accessed: May 1, 2021).

Table 1 Main activities on climate change issues
by the Ocean Policy Research Institute of the Sasakawa Peace Foundation

Date	Details	Co-organizers, etc.
September 3, 2014	Host a side event held at the 3rd International Conference on Small Island Developing States (SIDS2014) toward better conservation and management of islands and their surrounding waters	Australian National Centre for Ocean Resources & Security, University of Wollongong (ANCORS)
December 4, 2015	Host Oceans Day (a side event at the 21st United Nations Framework Convention on Climate Change (UNFCCC-COP21))	Global Ocean Forum (GOF), Intergovernmental Oceanographic Commission of UNESCO (UNESCO-IOC), United Nations Environment Programme (UNEP), etc.
May 25-26, 2015	Host the "Islands and Oceans Net" 1st General Meeting	Australian National Centre for Ocean Resources & Security (ANCORS), University of Tokyo Ocean Alliance
November 12, 2016	Host Oceans Action Event at COP22	Government of Morocco, Food and Agriculture Organization of the United Nations (FAO), Global Ocean Forum (GOF), Intergovernmental Oceanographic Commission of UNESCO (UNESCO-IOC), World Bank, etc.
December 6-7, 2016	Host the "Islands and Oceans Net" 2nd General Meeting	Australian National Centre for Ocean Resources & Security (ANCORS), University of Wollongong, Nippon Foundation (special cooperation)
November 11, 2017	Host Oceans Action Day (a side event at the 23rd United Nations Framework Convention on Climate Change (UNFCCC-COP23))	Global Ocean Forum (United States), Intergovernmental Oceanographic Commission of UNESCO (UNESCO-IOC), etc.
December 8, 2018	Host Oceans Action Day (a side event at the 24th United Nations Framework Convention on Climate Change (UNFCCC-COP24))	Global Ocean Forum (United States), Oceano Azul Foundation (Portugal), Intergovernmental Oceanographic Commission of UNESCO (UNESCO-IOC), etc.
June 25, 2019	Host Addressing the IPCC Findings Relevant to the Ocean and Climate Nexus (a Special Report on Global Warming of 1.5°C) (a side event at the 50th session of UNFCCC Subsidiary Bodies (SB50))	Government of Maldives, Global Ocean Forum (United States), etc.
December 6-7, 2019	Host Oceans Action Day (a side event at the 25th United Nations Framework Convention on Climate Change (UNFCCC COP25))	Global Ocean Forum (United States), Oceano Azul Foundation (Portugal), Intergovernmental Oceanographic Commission of UNESCO (UNESCO-IOC), etc.
October 15, 2019	Announced ten proposals in response to the Intergovernmental Panel on Climate Change (IPCC)'s Special Report on the Ocean and Cryosphere in a Changing Climate (SROCC)	
October 15, 2019	Host a symposium to commemorate the publication of the Intergovernmental Panel on Climate Change (IPCC)'s Special Report on the Ocean and Cryosphere in a Changing Climate (SROCC)	Japanese Ministry of the Environment
October 17-18, 2019	Host the 2019 2nd East Asia Forum on Climate Change Adaptation and Disaster Management Law and Policy	National University of Kaohsiung's School of Law and International Relations Research Center (NUK-IRRC), Taiwan's Ocean Affairs Council (OAC), etc.
January 22, 2020	Host an international seminar on climate change immigration and the related vulnerabilities (*Journal of Disaster Research* special edition commemorative event)	

Sources: Created by the author based on Terashima, Furukawa, Swartz, Maekawa, Fujii, Takahara, and Dolan (2017), Furukawa and Swartz (2017), and the website of the Ocean Policy Research Institute of the Sasakawa Peace Foundation (https://www.spf.org/opri/).

6 Kazumine Akimoto, Tsutomu Inuzuka and Yuko Yoshikawa (2014), "The Impact of Climate Variation and Change on Marine Security, and the Role of the Navies—Part 1: From a Report by the Australian National Centre for Ocean Resources & Security," *Intelligence Analysis Quarterly*, No. 7, 108-129.

7 The Sasakawa Peace Foundation is also conducting various studies on climate security. For example, its International Peace and Security Department recently published the following editorial. Jun Nagashima (2021), "Climate Change as a Security Threat: From the Perspective of Strengthening Military Resilience," International Information Network Analysis IINA (Sasakawa Peace Foundation International Peace and Security Department) (https://www.spf.org/iina/articles/nagashima_07.html) (accessed: August 1, 2021).

These efforts may have seemed vague particularly in Japan, but through them, responding to climate change appears to have now been acknowledged as an important policy issue toward establishing ocean governance. On the other hand, given that climate change will affect all fields, there will clearly just be limited effects if efforts are only pursued by some research institutions and NGOs. Consequently, multinational frameworks and other efforts by the public sector will also be important, with notable examples being national and international organizations and international treaties. With these issues in mind, the following sections will use Japan as an example to examine the status quo regarding interagency cooperation and the impacts of climate change on international relations. They will also examine the status quo regarding climate security, from the perspective of measures based on the latest technologies that could have a significant effect on these issues.

2. Interagency cooperation in response to climate change: Using Japan as an example

(1) *Climate change as a jurisdictional affair*

With the exception of the legislative body, i.e., the Diet (House of Representatives and House of Councillors), and the judicial bodies, i.e., the courts (Supreme Court and lower courts) of Japan, most of the government's constituent organizations have been established on the grounds of some kind of law (the National Government Organization Act, the Act for Establishment of the Cabinet Office, and the acts for the establishment of the ministries), and most of the affairs under their jurisdiction are also specified by laws and regulations. Climate change is no exception to this, and Table 2 shows the laws that actually contain provisions on it. In Japan, the following all have jurisdiction over issues related to it: the Ministry of the Environment, the Ministry of Economy, Trade and Industry, the Cabinet Secretariat, the Ministry of Foreign Affairs, the Ministry of Agriculture, Forestry and Fisheries, the Ministry of Land, Infrastructure, Transport and Tourism, and the National Personnel Authority.

Of course, other government agencies besides these are also in fact involved in the response to climate change. Notable examples include the Cabinet Office; Ministry of Internal Affairs and Communications; Fire and Disaster Management Agency; Ministry of Education, Culture, Sports, Science and Technology; Ministry of Health, Labor, and Welfare; and Ministry of Agriculture, Forestry and Fisheries.[8] However, the Self-Defense Forces, Japan Coast Guard, police, and other national defense and law enforcement agencies are not involved. This shows that in Japan, climate change is regarded as an environmental or economic issue rather than a security one.[9]

However, as noted throughout this book, the impacts of climate change go beyond being just environmental or economic issues, and are global ones related to the very survival of the human race. Action

8 At the Climate Change Adaption Information Platform (A-PLAT) run by the National Institute for Environmental Studies, these ministries' and agencies' efforts are introduced as "Efforts by Ministries and Agencies." Also introduced (as "Research institutions' efforts") are efforts by the following: National Institute of Information and Communications Technology, JICA Ogata Sadako Research Institute for Peace and Development, National Research Institute for Earth Science and Disaster Resilience, Japan Science and Technology Agency, Institute of Physical and Chemical Research, Japan Aerospace Exploration Agency, Japan Agency for Marine-Earth Science and Technology, National Institute of Polar Research, National Institute of Public Health, National Institute of Infectious Diseases, National Agriculture and Food Research Organization, Japan International Research Center for Agricultural Sciences, Forestry and Forest Products Research Institute, National Institute of Advanced Industrial Science and Technology, Meteorological Research Institute, National Institute for Land and Infrastructure Management, Public Works Research Institute, National Institute for Environmental Studies. Climate Change Adaptation Information Platform (A-PLAT) (https://adaptation-platform.nies.go.jp/plan/) (accessed: May 1, 2021).

9 The Ministry of Defense and Self-Defense Forces are closely monitoring the impacts of climate change on security. For example, the *Defense of Japan 2008 whitepaper* included an item on the impacts of climate change on security environments. Also, the 2nd Tokyo Seminar on Shared Security Issues held in March 2010 included a session on the roles of defense agencies regarding climate change. (The seminar was held in conjunction with the 2nd Japan-ASEAN Defense Vice-Ministerial Forum (Defense Vice-Ministerial Forum on Shared Security Issues in the Asia-Pacific Region).) Ministry of Defense (2008), *Defense of Japan 2008 whitepaper*, Gyosei, 20; Ministry of Defense (2011), *Defense of Japan 2011 whitepaper*, Gyosei, 330. In addition, efforts have recently been progressing on matters such as establishing a cross-ministerial task force on climate change. "Ministry of Defense also Earnest about Having Climate Change Task Force and Using Renewable Energy," *Mainichi Shimbun* (electronic edition) (April 23, 2021, 18:45).

is therefore urgently required that also encompasses the fields of diplomacy and security. In light of the above issues, we will now consider which government agencies within the Japanese administrative apparatus should also work on climate change.

(2) *Which government agencies should work on climate change?*

Article 12, paragraph 2 of the Cabinet Act specifies that the affairs shown in Table 3 come under the jurisdiction of the Cabinet Secretariat. Among these, those related to the overall coordination specified in items 2 to 5 of the article are the first of the policy coordination systems prescribed in the Basic Act on Central Government Reform.[10] They were expected to solve the adverse effects the management principles after the Meiji Restoration had had on the central organizations.[11] However, given that many of the important policy issues the Cabinet addresses call for interagency action, the work is inevitably becoming increasingly concentrated in the Cabinet Secretariat and Cabinet Office. As of April 2015, the Cabinet Secretariat's staff had exceeded more than triple of the prescribed number, it was handling its affairs at 20 headquarters, etc., and had more than six times as many branch offices as before.[12] Work continued to become significantly concentrated despite this, so three necessary changes were identified to solve the situation. The first was to strengthen the overall coordination and other functions regarding important Cabinet policies by tasking ministries, etc., with assisting its work on certain ones. To that end, the second was to make ministries, etc., responsible for the planning, drafting, and overall coordination necessary to unify all the administrative branches' tentative drafts, etc., in relation to these important policies. The third was to take measures such as transferring affairs under the Cabinet Secretariat's jurisdiction to the Cabinet Office's, and ones under the Cabinet Office's to ministries', etc., An amendment to the National Government Organization Act was passed in September 2015 to effect these changes. (The amendment's title states that it is a law to partially amend the National Government Organization Act, etc., to strengthen the functions related to comprehensive coordination, etc., regarding important Cabinet policies.)[13] Agencies consequently transferred to the Cabinet Office include the Intellectual Property Strategy Headquarters and Headquarters for Ocean Policy (in April 2016 and April 2018, respectively). There were also integrations into the Cabinet Office—the Strategic Headquarters Secretariat for Space Development (in April 2016) is a notable example. Other measures taken include transferring traffic safety policy to the National Public Safety Commission and Ministry of Land, Infrastructure, Transport, and Tourism (also in April 2016).[14]

This process made it possible to deal with interagency policy issues by systematically having the government agencies play leading roles. Despite these efforts, however, the significant current trend toward becoming an administrative state means that work is still increasingly being concentrated in the Cabinet Secretariat and Cabinet Office, and some studies have suggested they need to be drastically improved.[15] Furthermore, the Cabinet must clearly take the lead on matters related to national security,

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10 Article 8, paragraph 2 of the Basic Act on Central Government Reform specifies that in addition to handling the administrative work related to Cabinet Meetings, the Cabinet Secretariat—as an institution that supports the Cabinet and the Prime Minister—is also to serve the following functions in relation to governing the nation: planning and drafting for basic policies; overall coordination for important matters; gathering and analyzing information; crisis management; and public relations. It is also to take the necessary measures to strengthen these functions. The act also specifies overall coordination by the Cabinet Office as the second policy coordination system (article 10, paragraph 1) and coordination between ministries and the Cabinet Office as the third policy coordination system (article 28). Katsuya Uga (2021), *The Government Organization Act in Theory and Practice*, Yuhikaku, 11-12.

11 Izuru Makihara (2009), *Government Reform and Coordination Systems*, University of Tokyo Press.

12 Junichi Setoyama (2015), "Streamlining the Duties of the Cabinet Secretariat and Cabinet Office: Draft Law to Partially Amend the National Government Organization Act, etc. to Strengthen the Functions Related to Comprehensive Coordination, etc. Regarding Important Cabinet Policies," *Lawmaking and Research*, No. 364, 3-17.

13 *The Nikkei* (electronic edition), "Cabinet Office Streamlining Law Passed: Nine Jurisdiction Areas Transferred to Other Government Agencies" (September 4, 2015, 11:16).

14 Reviewing the Cabinet Secretariat's and Cabinet Office's Duties (Cabinet decision of January 27, 2015). The jurisdictional transfers, etc., were basically done pursuant to the policy indicated in this Cabinet decision, but the changes regarding the General Ocean Policy Headquarters Secretariat were brought forward a year and done in April 2017, and there were some other differences, too.

15 Ittoku Miyazaki (2016), "Diet Members' Legislative Roles and Expansion of the Cabinet Secretariat and Cabinet Office," *Public Policy and Social Governance*, No. 4, 59-74.

Table 2 List of laws and regulations that contain provisions on climate change (as of May 1, 2021)

Type	Name	Mainly under the jurisdiction of	Promulgated on	Last brought into force on	Remarks
Law	Basic Environment Law (Act No. 91 of 1993)	Ministry of the Environment	November 19, 1993	December 1, 2018	Amended by Act No. 50 of June 13, 2018
Law	Law Concerning the Promotion of the Measures to Cope with Global Warming (Act No. 117 of 1998)	Ministry of the Environment and Ministry of Economy, Trade and Industry	October 9, 1998	December 1, 2018	Amended by Act No. 45 of June 13, 2018
Law	National Institute for Environmental Studies Act (Act No. 216 of 1999)	Ministry of the Environment	December 22, 1999	April 1, 2021	Amended by Act No. 63 of June 24, 2020
Law	Basic Act on Biodiversity (Act No. 58 of 2008)	Ministry of the Environment	June 6, 2008	June 6, 2008	
Law	Basic Act on Water Cycle (Act No. 16 of 2014)	Cabinet Secretariat (Secretariat of the Headquarters for Water Cycle Policy)	April 2, 2014	April 1, 2016	Amended by Act No. 66 of September 11, 2015
Law	Act on Contributions to the Green Climate Fund and Accompanying Measures (Act No. 24 of 2015)	Ministry of Foreign Affairs	May 20, 2015	May 20, 2015	
Law	Climate Change Adaptation Act (Act No. 50 of 2018)	Ministry of the Environment	June 13, 2018	December 1, 2018	Newly enacted
Cabinet Order	Enforcement Order for the Law Concerning the Promotion of the Measures to Cope with Global Warming (Cabinet Order No. 143 of 1999)	Ministry of the Environment and Ministry of Economy, Trade and Industry	April 7, 1999	December 16, 2019	Amended by Cabinet Order No. 183 of December 13, 2019
Cabinet Order	Order on the Organization of the Ministry of Foreign Affairs (Cabinet Order No. 249 of 2000)	Ministry of Foreign Affairs	June 7, 2000	August 3, 2020	Amended by Cabinet Order No. 232 of July 31, 2020
Ordinance	Ministerial ordinance specifying the following marks, etc., stipulated in Article 16, paragraphs 1 and 3 and Article 17 of the Unfair Competition Prevention Act: foreign states' national flags, armorial bearings, or similar emblems; seals or signs used by foreign states' governments or local public organizations for control or certification purposes; and marks representing international organizations (Ministry of Trade, Industry Ordinance No. 36 of 1994)	Ministry of Economy, Trade and Industry	April 19, 1994	October 30, 2020	Amended by Ministry of Economy, Trade and Industry Ordinance No. 80 of September 30, 2020
Ordinance	Ordinance for Enforcement of the Law Concerning the Promotion of the Measures to Cope with Global Warming (Prime Minister's Office Ordinance No. 31 of 1999)	Ministry of the Environment	April 7, 1999	May 27, 2016	Amended by Ministry of the Environment Ordinance No. 11 of May 27, 2016
Ordinance	Ordinance on the Organization of the Ministry of the Environment (Ministry of the Environment Ordinance No. 1 of 2001)	Ministry of the Environment	January 6, 2001	April 1, 2021	Amended by Ministry of the Environment Ordinance No. 4 of March 31, 2021
Ordinance	Ordinance on the Organization of the Ministry of Agriculture, Forestry and Fisheries (Ministry of Agriculture, Forestry and Fisheries Ordinance No. 1 of 2001)	Ministry of Agriculture, Forestry and Fisheries	January 6, 2001	July 1, 2020	Amended by Ministry of Agriculture, Forestry and Fisheries Ordinance No. 45 of June 30, 2020

Type	Name	Mainly under the jurisdiction of	Promulgated on	Last brought into force on	Remarks
Ordinance	Ordinance on the Organization of the Japan Meteorological Agency (Ministry of Land, Infrastructure, Transport and Tourism Ordinance No. 3 of 2001)	Ministry of Land, Infrastructure, Transport and Tourism	January 6, 2001	October 1, 2020	Amended by Ministry of Land, Infrastructure, Transport and Tourism Ordinance No. 80 of September 30, 2020
Ordinance	Ordinance on the Operations, Finances, and Accounting, etc. of the National Institute for Environmental Studies (Ministry of the Environment Ordinance No. 14 of 2001)		April 3, 2001	July 18, 2019	Amended by Ministry of the Environment Ordinance No. 3 of July 18, 2019
Ordinance	Ordinance on the Organization of Regional Environment Offices (Ministry of the Environment Ordinance No. 19 of 2005)	Ministry of the Environment	September 20, 2005	April 1, 2021	Amended by Ministry of the Environment Ordinance No. 6 of March 31, 2021
Regulations	National Personnel Authority Regulations 17-0 (Scope of Managerial Staff, Etc.) (National Personnel Authority Regulations 17-0 of 1966)	National Personnel Authority	July 9, 1966	December 15, 2020	Amended by National Personnel Authority Regulations No. 17-0-135 of December 15, 2020

Sources: Created by the author based on e-Gov's law search, etc.

Table 3 Affairs under the jurisdiction of the Cabinet Secretariat pursuant to Article 12, paragraph 2 of the Cabinet Act

1	Organizing Cabinet matters, and handling other general Cabinet affairs
2	Affairs related to the planning, drafting, and overall coordination for basic policies regarding important Cabinet policies
3	Affairs related to the planning, drafting, and overall coordination for important matters pertaining to the Cabinet
4	Affairs related to the planning, drafting, and overall coordination necessary to unify all the administrative branches' measures
5	In addition to the affairs in the three preceding items, any others related to the planning, drafting, and overall coordination necessary to maintain the unity of all the administrative branches' measures
6	Affairs related to the collecting and surveying of information regarding important Cabinet policies
7	Affairs related to the planning and drafting for systems regarding national public servants
8	Affairs related to those specified in Article 18-2 of the National Public Service Act (Act No. 120 of 1947) (including cases where Article 54, paragraph 1 of the Act on General Rules for Incorporated Administrative Agencies (Act No. 103 of 1999) is applied mutatis mutandis)
9	Affairs related to the retirement benefit systems for national public servants
10	Affairs related to the salary systems for national public servants with special posts
11	Affairs related to the planning, drafting, and coordination for basic policies regarding the total personnel expenses for national public servants and to policies for the allocation of personnel expense budgets
12	In addition to the affairs in items 7 to the preceding one, any others related to personnel administration for national public servants (excluding those under the jurisdiction of other government agencies)
13	Affairs related to the planning, drafting, and coordination for matters related to the mechanisms and staffing of government agencies
14	Affairs related to examinations regarding establishing, increasing, reducing, and abolishing staffing for and establishing, revising, and abolishing mechanisms for the government agencies

Sources: Created by the author.

as exemplified by the Legislation for Peace and Security enacted at the same time as the revised National Government Organization Act.[16] Therefore, if climate change is viewed as a threat to national peace, then relevant measures need to be implemented comprehensively by the Cabinet Office—with the Cabinet Secretariat serving as the agency responsible—and not by government agencies like the Ministry of the Environment and Ministry of Economy, Trade and Industry mentioned above.[17]

In particular, as highlighted in the previous and preceding chapters, people generally want climate change measures that (so to speak) step on the brakes and gas at the same time, so as to balance conserving the environment with promoting industry.[18] Consequently, there are concerns that if any of the government agencies responsible for either promoting industry or conserving the environment take the lead, then the measures will end up biased toward one or the other. It will therefore be important to view climate change as a national crisis and have the Cabinet Secretariat comprehensively pursue relevant measures, serving as a kind of government agency responsible for it as it does so.

Furthermore—and this has also been stated repeatedly in the previous chapters—climate change is not just a Japanese issue, but an international one, too. In Japan as well, therefore, departments are being established and other efforts pursued to address climate change not just by the aforementioned government and affiliated agencies and independent administrative institutions, but also by the Ministry of Foreign Affairs and international agencies that cooperated with it when it took part in drawing up the United Nations Framework Convention on Climate Change (UNFCCC) (1992) and the Kyoto Protocol to the UNFCCC (1997) and Paris Agreement (i.e., the pre- and post-2020 frameworks, respectively). In these ways, the nation is revealing that it recognizes climate change to be an important issue for diplomacy and security policy.

In light of these analyses, the government agencies responsible for the overall coordination of policies—for example, the Cabinet Secretariat in Japan—should be the ones responsible for addressing climate change. On the other hand, we cannot ignore that international affairs are also important factors. The following sections will therefore look overseas, give an overview of the correlations between international affairs and climate change, then examine comprehensive responses to it.

3. Climate change in international affairs

(1) *The US-China conflict and climate change*

The possible origins of the international confrontation between the United States of America and People's Republic of China (referred to below as the United States (or US) and China, respectively) are being discussed from a wide range of perspectives. For example, some say it stems from two countries' domestic situations—in the United States, criticism of the internationalist mindset based on having consistently played a central role in forming and maintaining the international order since World War II, and in China, concerns that the unignorable social inequalities might lead to criticism of the Communist Party's rule. Others say that it is about two political systems—the liberal democracy born in Western Europe and the imperial dictatorship that China formed over the course of a millennium—competing through 21st-century technology.[19] Some say promoting ocean governance could be a trigger to improve US-China relations.[20] Other say even the transition from the Trump to the Biden administration

16 For example, in the case of diplomatic and security policy, besides the Ministry of Defense (which is the government agency with jurisdiction), the National Security Council also has considerable authority over matters such as formulating the National Security Strategy and the National Defense Program Guidelines (Defense Guidelines). However, the existence of government agencies with jurisdiction does not prevent the Cabinet Secretariat or Cabinet Office from comprehensively coordinating affairs.

17 Chapter 3 of the Law Concerning the Promotion of the Measures to Cope with Global Warming (Act No. 117 of 1998) specifies that there be a Global Warming Prevention Headquarters with the Prime Minister as its director, the Chief Cabinet Secretary, Minister of the Environment, Minister of Economy, Trade and Industry as its deputy directors, and the Cabinet Office as its secretariat.

18 The Expert Panel on Climate Change was established in March 2021 with the following stated aim: "... to discuss climate change in a cross-sectoral manner and consider policy directions to realize a green society from the perspective of a positive cycle of economic growth and environmental protection." This is also eloquently conveying that climate change measures should encompass both economic growth and environmental conservation.

will not improve them.[21] Either way, the US-China confrontation will definitely not improve overnight, but inevitably become an enduring international structure much like the Cold War between the United States and the Soviet Union—and one that international efforts will definitely have to take into account.

On the other hand, countries in confrontation in terms of diplomacy and security can make exceptions and actively cooperate with each other on other fields, a notable example being search and rescue (SAR).[22] It is therefore still possible for the United States and China to cooperate toward addressing the global issue of climate change.

One such opportunity was the Leaders Summit on Climate organized by the United States and held in April 2021. Streamed live online for the general public, the event invited leaders from 40 countries and regions to discuss an agenda that included the following topics: the major economies' efforts for the next ten years; support for developing countries; transitioning to clean energy; innovation; local governments; and solutions based on environmental considerations. The summit also marked the return of the Major Economies Forum on Energy and Climate Change (MEF), which had been launched in 2009 under the aegis of the then US President Barack Obama, and had not been held again since. It was attended by 17 major CO_2-emitters: Japan, the United States, China, Russia, India, Germany, Canada, the United Kingdom, Italy, South Korea, France, Mexico, Australia, South Africa, Indonesia, Brazil, Denmark, EU, and UN. [23]

The Biden administration's US Special Presidential Envoy for Climate John Kerry had discussed the summit with China's Special Envoy for Climate Change Xie Zhenhua shortly before it (April 17), and the two had released a joint statement in which they pledged that the United States and China would cooperate with each other. In this and other ways, the two countries are therefore making it clear that while they may vehemently oppose each other on matters like security and human rights, they will cooperate in fields where their interests coincide.[24] However, confrontation between them is rapidly emerging over which should have the initiative in the response to climate change: the United States, which aims to create domestic jobs and economic growth by expanding renewable energy, or China, which seems to be wary of excessive regulations that will hinder economic growth despite seeking to restrain the United States when the latter temporarily withdrew from the Paris Agreement.[25] These trends make it impossible to predict how the US-China confrontation will develop, but climate change could help resolve it.

(2) *A manual for international efforts: How concrete can they be made?*

While they may have different objectives and be like bitter enemies in the same boat, the United States and China can be at least be said to have linked hands over climate change. However, before re-

19 Satoshi Machidori (2019), "The US-China Confrontation is Consequence of Domestic Circumstances," *NIRA My Vision*, No. 41, 10-11; Hiroshi Nakanishi (2019), "The Western Nations Must Increase the Appeal of Liberal Democracy," *NIRA My Vision*, No. 41, 12-13.

20 Hajime Kuramochi (2020), "Prospects for East Asian Maritime Security after the US Presidential Election: From a Geopolitical and Geoscience Perspective," *Intelligence Analysis Quarterly*, No. 29, 132-142.

21 Chi Hung Kwan (2020), "Will the Advent of the Biden Administration Improve US-China Relations?—Toward Cooperative Competition," *Shi Shi Qiu Shi* (website of the Research Institute of Economy, Trade and Industry) (https://www .rieti.go.jp/users/china-tr/jp/ssqs/201210ssqs.html)(accessed: May 1, 2021).

22 Yuta Komori (2020), "Status Quo and Prospects Regarding SAR in Japan: From the Perspective of Ocean Governance," Atsushi Sunami and Shizon Go (editorial supervisors), *Research on Ocean Issues in East Asia: Toward New Cooperation between Japan and China*, Tokai University Press, 215-227.

23 "Prime Minister Suga's attendance at the Leaders Summit on Climate," website of the Ministry of Foreign Affairs (https://www.mofa.go.jp/mofaj/ic/ch/page6_000548.html) (search: May 1, 2021); "Major Economies Forum (MEF) on Energy and Climate," website of the Ministry of Foreign Affairs (https://www.mofa.go.jp/mofaj/gaiko/kankyo/kiko/mef_index.html) (accessed: May 1, 2021).

24 *Asahi Shimbun* (electronic edition), "Leaders Summit on Climate: China Positive about Participation, Joint Statement with US" (April 18, 2021, 12:56).

25 *The Sankei News* (electronic edition), "Leaders Summit on Climate: US and China Compete for Initiative, EU Takes Lead with Reduction Targets," (April 20, 2021, 21:16); *The Nikkei* (electronic edition), "China's Xi Ping Committed to Cutting Coal Consumption, Climate Summits US-Led for 5 Years from 2026" (April 22, 2021, 22:10).

sults are seen like curbing the rise in the average temperature and alleviating food issues, many difficult obstacles will of course need to be overcome even just to make efforts on climate change concrete.

As mentioned above, responses to climate change will need to strike a balance between economic growth and environmental conservation. That said, however, the issue is directly linked to national sustainability—that is, national security—inasmuch as it affects economic growth. For example, the Cold War framework that followed World War II involved two famous military alliances: the North Atlantic Treaty Organization (NATO) centered on the United States and Western Europe, and the Warsaw Treaty Organization (Warsaw Pact—officially the Treaty of Friendship, Cooperation and Mutual Assistance) centered on the Soviet Union. In addition to these, however, there were also two systems of economic cooperation: the United States-led European Recovery Program (ERP)—called the Marshall Plan—and the Soviet-led Council for Mutual Economic Assistance (COMECON). These international organizations ended up supporting their countries' militaries and economies, but that was because economic growth would clearly have a significant impact on national security.[26] Consequently, there are concerns that focusing too heavily on environmental conservation in addressing climate change will not only impede economic growth, but also seriously harm national security. Therefore, it is important to formulate action plans that are feasible for countries to work toward, by taking into account national security.

International efforts premised on national security include the following: (1) the hegemony model, (2) the balance of power model, (3) the collective security model, (4) the collective defense model, (5) the cooperative security model, and (6) the common security model.[27] All these models are premised to the construction of a system, including a permanent secretariat, that is effective to some extent, but the matters considered thus far in this book show that pursuing similar efforts is also very possible in the field of climate security as well. Early examples of these international efforts on security other than military alliances in the broad sense are the Washington and London Naval Treaties (1922 and 1930, respectively). Current examples are the Strategic Arms Reduction Treaty (START) and the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) and other international treaties on reducing or controlling arms, or both.[28] For these as well, a system that is effective to some extent has been established, including setting up a permanent secretariat and inspection system with considerable authority. These efforts could therefore also be a useful reference for international ones on climate security.

Of course, international efforts on climate change also include international pledges like the aforementioned Paris Agreement and Intergovernmental Panel on Climate Change (IPCC) and the permanent agencies based on them. Moreover, some of the efforts are producing steady results. However, they can also hardly be said to encompass the whole field of security, including humanitarian assistance and disaster recovery (HA/DR). Furthermore, given that the targets for reducing CO_2 emissions countries announced at the aforementioned Leaders Summit on Climate have different base years and levels, it will also be important to set standards that are uniform to an extent.

4. Providing the data collected by navies: The need for MDA regarding climate security

The previous section pointed out that standards that are to an extent uniform will be required when pursuing the international efforts necessary to progress with climate security. Maritime Domain

26 Ryo Oshiba (2008), "Major Developed Countries' Trends (2): United States, Canada, and Australia," ODA Study Group, *Survey of Overseas Assistance Systems and Trends in Major Developed Countries*, 49-65; Satoshi Shimizu (2021), "Economic Reforms and Political Crises in the Soviet Union and Eastern Bloc: 1960s German Political Diplomacy and the Prague Spring," *Kaichi International University Bulletin*, No. 20, 5-16.

27 Security Studies Research Group, National Defense Academy of Japan (editor) (2009), *Introduction to National Defense Studies Fourth Revised Edition*, Aki Shobo, 57-86.

28 For more information on what reducing and controlling arms are taken to mean here, please refer to the following: Security Studies Research Group, National Defense Academy of Japan (editor) (2009), *Introduction to National Defense Studies Fourth Revised Edition*, Aki Shobo, 133-160.

Awareness (MDA) could be the key to this.

An initiative started in the United States in response to the terrorist attacks of September 11, 2001, MDA is defined as a mechanism for effectively sharing maritime information that could affect national-level issues (defense, security, the economy, etc.) with government agencies.[29] In Japan's Third Basic Plan on Ocean Policy decided by the Cabinet in May 2018, Chapter 2 (Ocean Measures for Comprehensive and Systematic Implementation by the Government) also contains a section "4. Strengthening the Capacity for Maritime Domain Awareness (MDA)" that stipulates those systems for gathering, aggregating, and sharing information should be established and international cooperation be promoted in light of the importance of MDA. Furthermore, in the basic guidelines for Japan's security policy—namely, the National Defense Program Guidelines for FY 2019 and Beyond (FY 2018 Guidelines)—the section on "Responding to global issues" also highlights the importance of MDA. Establishing a system for implementing MDA is therefore an urgent security issue. In order to for these efforts to bear actual fruit, work is also progressing on aggregating and organizing maritime information essential to implementing MDA. In this connection, the Japan Coast Guard launched a system called "MDA Situational Indication Linkages" in April 2019. This is an information service that aggregates a variety of maritime information and overlays it onto maps.[30]

With MDA as well, centrally managing and operating not just maritime information but information in general will certainly be beneficial, but these efforts must also be based on unified standard. However, since these efforts could be directly linked to security, countries' interests will presumably not coincide. For example, Japan and the United States are working on MDA to contribute to security, as exemplified by the Free and Open Indo-Pacific vision (FOIP),[31] but unlike them, European countries are aiming to build a system of international cooperation for maritime observations as a whole, and not just for monitoring shipping. These efforts will also be a useful reference.[32]

In either case, if the MDA hitherto based on security is expanded to cover all maritime fields, it can be expected to contribute to international ocean policy overall and not just responding to climate change. Reflecting the climate security presented in this book in evidence-based policy (EBP) is another area where it will be important to promote cooperation in the fields of diplomacy and security, and to gather, analyze, and evaluate scientific insights through initiatives like MDA based on uniform standards. The work will not be easy, but can be expected to successfully supersede approaches based on diplomacy and security that are directly linked to national interests.[33]

5. Conclusion

In light of the various issues and prospects considered in this book, this chapter has examined what we should do—and from what kinds of perspectives—to address climate change as an issue that will have a significant impact on all marine fields. In the case of Japan, it has highlighted the importance of building a system for government agencies to comprehensively coordinate their policies, and of cooperating between countries in light of the US-China confrontation. It has also clarified that developing international MDA based on scientific research will be essential for promoting climate security as EBP.

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29 Koichi Furusho (2017), "Maritime Domain Awareness (MDA) for Being a Maritime Nation," *Ocean Newsletter*, No. 407, 6-7. In Europe, it has also been expanded to include the aim of preserving the marine environments, and is now being deepened as a foundation and framework for sharing information toward responding to various human or natural threats from the oceans.

30 Tomohiko Tsunoda (2019), "New Developments in Marine Information Management in Japan," *OPRI Perspectives*, No. 1, 1-6.

31 Teruaki Aizawa (2020), "Recent Trends Regarding Indo-Pacific Policy and the FOIP," *Intelligence Analysis Quarterly*, No. 30, 189-215; Eiichi Funada (2020), "Security Cooperation in a Free and Open Indo-Pacific: From the Perspective of Maintaining and Strengthening Marine Order," The Japan Institute of International Affairs, *Bottom-Up Review of Security Policy*, 39-49.

32 Japan Space Forum (2017), *Survey of International Cooperation and the Status Quo in Europe Regarding Space-Based Maritime Domain Awareness (MDA)*, 4. However, navies and coastal guards are at the core of implementing MDA in Europe as well, the same as in Japan and the United States.

33 One example of coordinated efforts by stakeholder countries conducted through environmental conservation is the Regional Seas Programme that the United Nations Environment Programme is implementing in 18 sea areas worldwide. Kanako Hasegawa (2017), "What is the United Nations Environment Programme's Regional Seas Programme?", *Ocean Newsletter*, No. 417, 6-7.

Based on these insights, I would now like to present some of my own views on the future of climate security.

The climate change addressed by climate security is change on a global scale. Its impacts are therefore difficult to actually feel in everyday life unless they take on visible forms like typhoons in summer and snowstorms in winter. Even if we do feel them, it is still difficult to understand how they are linked together on a global scale. On the other hand, as discussed in this book, there are already several technologies and initiatives aimed at reducing the impact of climate change, recovering from potential damage, and so on.[34] We are therefore also waiting for these to become commonplace. Consequently, the tasks we have been set are intangible rather than tangible ones. One of them is to form and share values on climate change, and thereby all head in the right direction. In this sense, history has taught us first-hand that sharing values is the both the most important and hardest thing to do.[35] However, stopping these initiatives could lead to negating not just climate security, but also sustainable development, and the sustainability of humankind. Preventing that is another reason we should use the various insights presented in this book to fuel further efforts, regardless of possible ridicule for making snail's pace progress. In conclusion, I believe this book will provide academic support for those efforts and, most importantly, give them courage.

34 In addition to the research presented in this book, Sasakawa Peace Foundation's Ocean Policy Research Institute is also pursuing policy research on the launch of an international organization to run an artificial satellite-based VHF Data Exchange System (VDES), which is expected to operate as a next-generation Automatic Identification System (AIS). The institute is conducting this research as part of a project on marine-space cooperation in the age of digitalization. Tadakazu Watanabe (2020), "Marine-Space Cooperation and the Present and Future of Space Utilization in the Oceans," 3rd Cabinet Office Roundtable Meeting on the Present and Future of Space Utilization, Document 3.

35 Hide Sakaguchi (2021), "On Being Appointed President of the Sasakawa Peace Foundation's Ocean Policy Research Institute," *Ocean Newsletter*, No. 500, 6-7.

Afterword

This book has explained in great detail the approaches and regional characteristics regarding a wide range of topics, with a particular focus on the situations in the Indo-Pacific, island countries, between Japan and the US across the Pacific, and in Japan itself. The topics covered include the following: national defense; security; water security; natural disasters and cooperation on disaster response; organizing, defining, and systematizing the concept of climate security; descriptions of the status quo and predictions regarding climate change and the phenomena it causes; and detailed analyses of the impacts of climate change-induced phenomena on a wide range of aspects, including economic assessments. The authors are all leading experts in their fields. There was some reiteration among the authors regarding the concept and definition of climate security, but since promoting a deeper understanding of this issue was a crucial aim of the book, I left them in intentionally, sacrificing brevity for intelligibility.

I would appreciate the reader's patience and understanding in this regard, and if it made it difficult to read, the editor is solely to blame.

That said, spotlighting climate security from an extremely wide range of perspectives has made this book a very comprehensive introduction to and commentary on the subject. I am deeply grateful to the authors for all their hard work, and truly hope that this book will serve as a reliable reference on a variety of topics for people involved in international issues, people working on this issue in Japan, people who have just begun to study it, people who address it in seminars and lectures, and many others. Mr. Kunihiko Harada, President of Tokai Institute of Education, and Mr. Hiroshi Ina of Darwin Room, who was in charge of editing, faced many difficulties in contributing to the publication of this book in spite of the ongoing COVID-19 situation. Thank you again.

The year this book was published—2021—highlighted a whole variety of global challenges besides the COVID-19 pandemic that began in 2020. In particular, large-scale wildfires broke out across hemispheres and continents, engulfing vast tracts of Asia, Africa, Europe, Oceania, and North and South America. They caused major damage worldwide, and were in the news on TV, in the papers, and on the internet throughout the year. In Japan, too, the wildfire that struck Ashikaga City in Tochigi Prefecture and took several days to put out is still fresh in the memory. Wildfires are said to have human causes more often than natural ones—things like carelessly throwing away cigarettes, leaving campfires unattended, and arson. In any event, the difficulty of putting them out in hot, dry climates abundantly demonstrates how utterly uncontrollably they spread. In fact, while I was living in Australia, I experienced a huge wildfire first-hand when one spread to within a kilometer of my home. In Australia they are called "bush fires," and as it is a country with many dry places, they are a major issue. The rising smoke covers the sky, turning sunny days as dark as a solar eclipse. This makes the orange glow of the roaring flames all the more vivid and dreadful. I clearly remember how the whole area was filled with heat and smoke from the flames, terrifying me with the feeling I could not do anything to protect my house.

The climate security issue is about taking action to counter the threat of things—be they natural or human in origin—that begin on such a minor scale no one even notices them, but will already be beyond control by the time anyone does. In a sense, it is the kind of action that both individuals and societies as a whole are poorest at taking. Simply being aware of the problem will not solve it: we must also understand the mechanisms behind the phenomena, and carefully implement effective, strategic measures. However, in addition to the difficulty in determining their cause-and-effect relationships, it is also hard to recognize the spread of these phenomena in space and time. Consequently, individuals and society alike will hesitate to invest money and manpower in combating them, even if strongly urged to do so.

I sincerely hope that this book will help solve this dilemma as well as offer a guide for confidently pursuing action to prevent the situation from getting out of control.

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Hide Sakaguchi

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