

Fall 2013

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Recommended Citation

Maria Antonia Tigre, *Insuring Island States: The Role of Insurance for Small Island States in Responding to the Adverse Effects of Sea Level Rise*, *N.Y. Envtl. Law.*, Fall/Winter 2013, at 36, available at <http://digitalcommons.pace.edu/lawstudents/16/>.

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Insuring Island States: The Role of Insurance for Small Island States in Responding to the Adverse Effects of Sea Level Rise

By Maria Antonia Tigre

"We, the people, still believe that our obligations as Americans are not just to ourselves, but to all posterity. We will respond to the threat of climate change, knowing that the failure to do so would betray our children and future generations. Some may still deny the overwhelming judgment of science, **but none can avoid the devastating impact of raging fires, and crippling drought, and more powerful storms.**"

President Obama, Inauguration Speech 2013¹

Introduction

Climate change² is an acknowledged scientific phenomena, even though there are still those trying to deny its serious impact.³ The last United Nations Framework Convention on Climate Change (UNFCCC) in Doha (Conference of the Parties 18—COP18) met with limited success in finding consensus. However, the attendees from all 190 participating countries, including the United States, managed to get an important declaration.⁴ Those countries acknowledged that the world will experience global average temperature rise of at least 2° C (3.6° F) in the near future, which, as agreed by them, is the limit for purposely managing global warming as a practical matter.⁵ Climate change will—and already has—generated several changes in global weather and atmospheric patterns, and these are unlikely to be reversed. The world will continue to get warmer. Wet areas will continue to get wetter. Dry areas will continue to get drier. More extreme temperatures will continue to occur, along with other severe weather events such as tsunamis, cyclones, hurricanes, flooding and high winds.⁶

In addition to these effects, the sea level will continue to rise.⁷ The entire world will be impacted by these developments, some geographical regions and economies more than others. A few countries, though, are likely to suffer the greatest impact. The most affected will be, almost undoubtedly, the Small Island Developing States (SIDS).⁸ SIDS will experience disproportionate impacts along with other low-lying coastal countries such as Bangladesh and the Netherlands. SIDS in particular are threatened with the risk of completely disappearing.

Only a few meters above static sea level at their highest points, these islands and countries are already largely dependent on their coastal resources. First, they have dense concentrations of infrastructure and settlements on their coasts. In addition, most of their economic activities, such as fishing, agriculture, and tourism, take place near the ocean. Moreover, these states tend to be geographically isolated and have limited economic and financial resources.

Small island states are also generally low emitters of greenhouse gas emissions (GHGs), meaning they have contributed little to the problem of human-induced climate change. For an array of reasons, including their reduced economic and political power relative to the international power of other states, these smaller islands and states have come together, forming the Alliance of Small Island States (AOSIS).⁹ Jointly, they have been battling to gain the attention of the international community in their search for solutions. However, they are still left with many unanswered questions and no clear path on how to deal with their issues.

Will there be a future for them? Is anyone responsible for the damages and losses they will suffer? What will happen to their population and their resources? Do other countries have responsibility in light of their possible contributions to these circumstances? This article will discuss risks, present trends and theories, as well as possible ways to start answering some of these questions. It will then address how insurance companies play a part, considering the uncertainties of the consequences of climate change and the insurability of the risks associated with it.

Climate Change and Sea Level Rise—Some Technical Aspects¹⁰

Rising sea level is one of the most pressing consequences of climate change, especially for nations with low elevation above mean sea level. It is also one of the most important risks to consider in this context. As John Coomber, former CEO of Swiss Reinsurance Co. (Swiss Re),¹¹ said, climate change "is the number one risk in the world ahead of terrorism, demographic change and other global risk scenarios...."¹²

Changes in sea level occur due to a variation in the mass and volume of water in the ocean. In other words, when water is added or removed, a change in the level of the sea is takes place. These changes frequently happen due to an imbalance between evaporation and precipitation or when water flows from land to sea, via rivers or due to melting ice. The same mass of water may also alter

in volume when seawater warms or freshens. Likewise, vertical land motion contributes to these changes, due to redistribution of the mass of ice and water, glacial melt water or water moving through the ocean basins. Finally, groundwater extraction or tectonic activity may contribute to sea level changes as well.

All of these processes have been taking place ever since early on in the Earth's formation, and small changes were likely to occur, although always maintaining some pattern of variation. Human activities, however, have accelerated those changes, thus significantly altering the patterns. The industrial revolution that started about 100 years ago has played an important role in this regard. Carbon dioxide (CO₂) emissions, along with other greenhouse gases (GHGs), raise the average global temperature, affecting the mass and volume of seawater through increased melting of land ice and higher ocean temperatures. The melting of polar ice sheets, mountain glaciers, snow and permafrost also contribute to this phenomenon.

Sea level rise will affect the world. As a result of global climate change, the world has undoubtedly changed. In the last 30 years, the incidence of natural catastrophes, either geophysical, meteorological, hydrological or climatological events, has risen exponentially, to the rate of 400%.¹³ Although the sea level rose at about 2mm per year during the 20th century, it is expected to rise 5mm per year during the 21st century. A four-meter rise in sea level is unlikely, but a two-meter rise is possible, and one-meter seems unavoidable.¹⁴ Several island nations, such as the Maldives, Kiribati, the Cook Islands, the Marshall Islands and Tuvalu, are only a few meters above present-day sea level, and will be highly compromised even with a one-meter sea level rise.

Climate Change, Sea Level Rise, Risk and Regulation

Even though some skeptics still challenge the effects—or even the existence—of climate change, the science cannot be ignored. Countries and companies have invested significant sums to understand their vulnerabilities and strengths, to better prepare for what comes ahead. Insurance companies are an important part of that group. The risks may be varied and wide, including different sectors such as agriculture, forests, human health, marine productivity, and energy supply and demand.

Rising tides also pose additional risks. Historically, people have preferred settlements near water for logistical reasons. As a consequence, over 40%¹⁵ of the world's population lives within 100 kilometers of the coast.¹⁶ Low-lying countries, especially island nations, are even more vulnerable and may entirely disappear. Sea level rise will threaten human settlements, forcing migration from densely populated areas, impacting freshwater resources, and generating losses of land, property and crops. These economic impacts will have long-term ef-

fects, but because they are global, no one country can respond effectively.

Though the exact consequences of climate change and sea level rise are still uncertain, its potential effects have been known for years. GHGs have been causing global warming and generating, as a consequence, adverse effects on the world's environment for some time now. An obvious policy solution would be to force risk-generating activities to internalize some of the social costs, offsetting marginal benefits by taking into account the full costs of certain activities.¹⁷ In other words, polluting industries should internalize some of the costs of climate change, because they share most of the benefits of polluting the world.

But, on the contrary, policy makers have been slow to provide a beneficial response and the international community has so far failed to reach a consensus on the subject.

One of the difficulties of regulation rises in yet another tricky aspect of climate change: global warming might also provide some benefits from the emissions themselves. To name a few examples, increased precipitation might turn dry areas into arable land; a warmer world might extend areas prone to forestry, thus increasing carbon sinks. But the fact remains that advantages are much smaller, and the disadvantages are borne disproportionately by the world's regions and population.

Despite the absence of clear answers, uncertainty cannot be an excuse. For ages, nations have regulated risks from uncertainty and ignorance due to the lack of sufficient scientific evidence. Although experts are better prepared to assess risk according to the best available science, there is often uncertainty in their assessment. However, the precautionary principle clearly states that the lack of scientific certainty cannot be used as an excuse, and action must be taken sooner rather than later. In view of the omission of stakeholders to deal with climate change, however, someone will have to pay the price.

The Cost of Climate Change

After considerable discussion of possible solutions, scholars and policy makers generally come back to three categories of results: mitigation, adaptation and compensation.¹⁸ There are many uncertainties with respect to climate change, but there is one sure thing about it: minimizing it, or adapting to it, costs money. So does doing nothing. All of the solutions are expensive, and while the first two options have more immediate costs the last one, even if it proves to be too little, too late, reflects a cost similar to the actual damage caused.

The equation seems to have therefore an easy answer. It is better to wait and pay the price later rather than sooner. But is it indeed better?

The price of inaction will probably account for other intangible factors that mitigation and adaptation by themselves would not: loss of cultures, traditional knowledge,¹⁹ and human rights violations,²⁰ to name a few. It will also be comparably higher for those who have not contributed much to the problem, thus creating an additional environmental justice issue that will probably give rise to claims for further compensation.

For insurance companies, environmental hazards can give rise to three broad categories of covered losses: (a) duty to defend in lawsuits—which are quite expensive—of alleged property damage and bodily or personal injury; (b) business interruption; (c) property coverage. In addition, shareholders might try to hold Directors and Officers (D&O) liable due to managerial decisions during a disaster, which might also incur in losses for the companies and insurance companies.²¹

Economies have already been highly vulnerable to rising disasters due to climate change, with risks being partly covered by insurance companies. As assessed in 2007, environmental catastrophes had a higher impact on insurers in the previous fifteen years than in their entire history.²² While between 1970 and 1990 the insured losses due to weather-related events averaged \$3 billion annually, between 1990 and 2004 the value increased to \$16 billion annually. Superstorm Sandy alone cost the insurance companies about \$25 billion, a number that might have increased since the total losses were not completely assessed.²³ It is also important to note that the National Flood Insurance Program incurred in the remainder of the \$70 billion in losses, evaluated for New York and New Jersey alone.²⁴

It is clear, given this example, that disasters are not cheap to handle, and that, at least for the U.S., insurance covers for a large portion of the damage. The problem for small island states is that there usually is no insurance to pay for the damage. First, local businesses usually do not have insurance, except for big resorts and hotels. Second, there is generally no national insurance program to cover for the rest of the expanses—although, as it will be further discussed, this scenario might be changing. While programs are being developed, governments have to incur in debts to help their citizens in coping with the damage. It remains unknown who will pay for those losses, but certainly the impacted will seek someone responsible.

A study ordered by Swiss Re²⁵ concluded that, on the whole, economic losses from man-made and natural catastrophes throughout the world amounted \$186 billion in 2012.²⁶ Considering insurance losses, 2012 was the third most expensive year on record, with \$77 billion in insured claims. Out of the \$119 billion in total economic losses in America during the year, more than half, \$65 billion, was insured, which amounted to about 0.68 percent of U.S. gross domestic product (GDP) for the year.

The predictions for the future are debatable, and numbers vary depending on the report ranging from some hundred millions to a few billions. According to DARA,²⁷ one of the most catastrophic studies,²⁸ extreme weather and climate change already account for 1.6 percent of the world's GDP, totaling \$1.2 trillion per year. By 2030, the percentage will rise to 3.2 due to carbon-related pollution and escalating temperatures. For lower-income countries, a lot of them small island states, losses are already rising at the rate of 11%. Major economies will also be highly affected: climate change will cost China \$1.2 trillion in 20 years. The United States will probably pay around 2 percent of its GDP and India over 5 percent.

A study led by the Oxford University Centre for the Environment²⁹ estimates that a meter sea level rise will cost Caribbean Community and Common Market (CARICOM)³⁰ nations \$1.2 billion per year in GDP (not including hurricane and storm impact), permanent land value loss of \$70 billion (over 2,700 km² of area), and \$4.6 billion in relocation and reconstruction costs.³¹ These figures do not include losses in agricultural production (1% of agricultural land will be lost), costs of changing energy needs, increased storm or hurricane damage and related insurance costs, necessary water supply construction, increased health care costs, or any non-market value impacts. On the long run, climate risks could cost countries up to 19 percent of the annual GDP, if no investments in adaptation are made.³²

The problem with using insured loss costs, however, is that they tend to be unevenly accounted for in the world. The ratio of economic losses³³ to insured losses is higher when there is a limited insurance market, such as in most developing countries, or in industrialized countries in which there are no minimum insurance requirements. On the other hand, in a market like America, the ratio is much lower given that banks and other financial institutions often require insurance for mortgages. Insurers often require the use of effective mitigation measures for reducing losses from natural disasters as well, thus inducing behavior. The ratio is therefore unevenly distributed, and does not reflect the actual impact of the disaster itself.

Another problem of using insured losses is that fatalities are generally not accounted for. Developing countries often have more deadly disasters,³⁴ but have, on the other hand, lower economic losses.³⁵

Whatever the uncertainties, it is clear that insurance companies have already been paying part of the price of climate change due to property losses, personal injuries, and business interruption in disasters and extreme weather events. Regardless, the capacity of the insurance industry to handle large-scale disasters without the assistance from the public sector can be discussed. Will they also pay the price for ongoing changes in the environment due to climate change when the affected people start searching for the ones responsible?

Who Is Responsible?

There is little doubt that global warming and its effects were caused by man-made GHGs emissions. The Intergovernmental Panel on Climate Change (IPCC), on the Fifth Assessment report, appraised that there is a 99% probability³⁶ that human activities are responsible for the increase global average surface temperature since the 1950s.³⁷

Although the world has known about the catastrophic potential effects of climate change, little effort has been put into effectively slowing it down. It can be argued that countries that continue to be inoperative in setting emissions reduction targets, or companies that continue to avoid more efficient technologies although that technology has long existed, are responsible for climate change and its effects on other countries that contributed a lot less to it.

Due to the lack of consensus on the best way to tackle climate change, a possible answer may result from the potential for liability. Several theories on which to rest a climate change suit, thus holding emitters accountable, have been academically discussed.³⁸ The United States, considering its international policy—or lack thereof—on the subject, and corporations therein, are the most viable targets for climate change liability suits.

The population affected by rising tides is, on the other hand, one of the most viable and ideal plaintiffs, since it is a group of individuals who have contributed the least but are harmed the most. They are an identifiable group who can demonstrate significant and specialized harms readily linked to GHGs emissions.³⁹ These potential plaintiffs may thus more easily establish a causal link between global warming and the harms suffered due to sea level rise.

Depending on the legal theory chosen to file a claim there might be several potential defendants, especially if you consider the overwhelming number of GHG emitters. Theoretically, every single person can be held accountable for global warming. Nonetheless, the electricity generation industry is one of the most obvious choices.⁴⁰ On top of being one of the world's highest emitting industries, it could be argued that the industry has intentionally failed to prevent or reduce its global warming impact.⁴¹ Since the technology for cleaner and more efficient energy generation has long existed—and been viable—the industry is particularly vulnerable.

Although there might be other potential defendants like high-emitting states,⁴² and also plaintiffs, this section will focus on citizens of drowned small island states versus American electricity generating companies. The potential solution of filing a climate change suit in a domestic federal or state court will be briefly discussed.⁴³ Given these premises, there are several challenges to successfully establish a climate change suit in the U.S.

First, considering that in some way or another every person contributes to climate change, causation has to be clearly established. It is already widely recognized that there is a causal link between anthropogenic emissions and global warming, with a U.S. Supreme Court holding that there is firm scientific consensus regarding climate change.⁴⁴ Nonetheless, it is nearly impossible to prove that a specific damage was suffered due to a single source of emissions. It can be argued that a combination of the emissions caused the damage, thus making it harder to prove a case. Then again, any carbon dioxide emissions, being similar in nature (the process for fuel combustion is similar in makeup and apportionment) form an equitable way of allocating the harms associated with climate change. The better strategy, in this sense, is to bring a large number of defendants jointly, who are all significant GHG contributors.⁴⁵

In any case, the U.S. Supreme Court already held that climate change science is sufficiently direct and tangible to form a basis for standing in public nuisance cases.⁴⁶ In fact, Judge Tatel specifically stated that the plaintiffs had standing because a rise in sea level would hurt Massachusetts, adding that sea level rises were caused by human emissions.⁴⁷ The small island nations' citizens claiming that climate change has submerged their homes could therefore use the same rationale.

To gain standing in a U.S. federal court, the plaintiff must show that (a) he suffered a concrete and actual or imminent injury, rather than hypothetical; (b) the injury is fairly traceable to the challenged action of the defendant; and that (c) the injury alleged is capable of redressability by the judiciary.⁴⁸ It must also be noted that "standing is not to be denied simply because many people suffer the same injury."⁴⁹

Given the difficulties of bringing a climate change suit under the federal common law of nuisance by non-citizens, an option would be to file a suit under the Alien Tort Statute (ATS).⁵⁰ The statute allows non-citizens to bring claims in the U.S. courts based on torts violating treaties and customary international human rights law, arguing that the emission of GHGs is a human rights violation.

To successfully prove a case, it is necessary to determine the "law of nations," thus proving that (a) a plaintiff identify a specific, universal, and obligatory norm of international law; (b) that a norm is recognized by the U.S.; and (c) that it adequately alleges its violation.⁵¹

There are, conversely, a few challenges to face, given that U.S. courts do not recognize a right to a healthy environment in customary international human rights law (the Stockholm Declaration of 1972⁵² and Rio Declaration of 1992⁵³ have recognized principles of a right to the environment, but there is no link with a human rights violation). Another discussion is whether it is desirable to have

U.S. courts award damages for climate change injury, thus acting as a climate change policy maker for the world.

Despite the advantages of this option, and the fact that it might be one of a few to hold American companies accountable for their actions overseas, the Supreme Court recently ruled that the ATS only applies to actions within the U.S. or on the high seas. The case was *Kiobel v. Royal Dutch Petroleum Co.*,⁵⁴ which arose from the torture and killing of Nigerians who protested against the exploitation of oil by a corrupt regime and international oil companies.

The ruling follows a decision by the Second Circuit⁵⁵ that the ATS is inapplicable to corporations, given that corporate liability is not a discernible norm of customary international law.⁵⁶

The rationale of the finding, which was unanimous, relied on the argument that it was not the 1789 Congress' intent to apply its statutes extraterritorially, unless with a clear indication otherwise. The decision also follows the rationale of the prospective foreign policy issue of having American courts rule on events that occurred in another country possibly leading to an unlimited influx of international cases and possible diplomatic friction.⁵⁷ Justice Breyer, however, noted that the doctrines of *forum non conveniens*, comity, and exhaustion of remedies serve as limiters to address those problems.⁵⁸

It is still unknown whether the case will apply to prospective claims of sea level rise plaintiffs. The majority opinion recognized that ATS cases in which a portion of the conduct occurred overseas might still be sustainable, as long as a portion of the relevant conduct occurred within the U.S. Justice Kennedy, in a concurring opinion, highlighted that: "Other cases may arise with allegations of serious violations of international law principles protecting persons, cases covered neither by the [Torture Victim Protection Act] nor by the reasoning and holding of today's case; and in those disputes the proper implementation of the presumption against extraterritorial application may require some further elaboration and explanation."⁵⁹

Justice Breyer concluded that the ATS provides jurisdiction where (i) the alleged tort occurs on U.S. soil; (ii) the defendant is an American national; and (iii) the defendant's conduct substantially and adversely affects an important American national interest, such as keeping the U.S. from becoming a safe harbor for a "common enemy of mankind."⁶⁰

Considering these specific arguments raised by the judges, sea level rise plaintiffs might still be able to prove a case under the ATS. Since the conduct of emitting GHGs happens within the U.S., and only the effects are overseas, the presumption of extraterritoriality might not be applied. The tort would thus have occurred on U.S. soil, falling under one of the categories of the ATS jurisdiction.

If, however, the ATS cannot be applied for sea level rise plaintiffs, the ruling will thus raise yet another issue. Since a lot of the environmental damage is caused by companies with no assets in the islands affected by sea level rise, a decision from a local court would not be locally enforced. Even if a favorable verdict is reached, prospective plaintiffs will have to enforce the decision elsewhere, probably facing more difficulties in trying to reach the companies' assets.

Another option would be to file a claim under the nuisance doctrine. There was already a precedent of a climate change suit brought under the federal common law public nuisance claims. The Village of Kivalina, in Alaska,⁶¹ filed a suit against 24 major oil companies seeking relocation costs and damages regarding fisheries. Besides the monetary damages, the village asked for a declaratory judgment for past and future damage caused by global warming. The federal nuisance was dismissed based on the attenuated nature of the causal link between the claimed damage and a particular conduct by any of the defendants, and on the basis that the regulation of GHGs was an issue to be dealt with by the political branches of government. There was an appeal to the 9th Circuit,⁶² which held that the Clean Air Act (CAA) and agency action authorized thereunder displaced federal common law, precluding a claim for public nuisance.

It is still uncertain whether insurance companies will pay for the losses in those potential suits. In the U.S., specific insurance companies offer climate change coverage within environmental insurance (Chartis US is one example). One of the challenges for insurance is how new risks are incorporated into old coverage, and new causal bases for filing claims for losses. The problem is that the cause—emission of GHGs—is often old and continuous.

Climate Change Insurance

Regardless of how the accountability for climate change loss and damage will play out, given the risks and uncertainties, insurance is part of the answer. The intersection between climate change, insurance and finance is a rapidly growing area of inquiry. For a few years the insurance industry has been warning of its escalating exposure to climate change-related claims in extreme weather events as well as the effects of sea level rise.

Insurance in its commercial sense has been advocated by small island states for more than 20 years.⁶³ Given the uneven distribution of losses, the prospects of property loss, and the need of moving people to safer areas, an insurance pooling system for the small island states would be advisable. There are a few major ways in which insurance can be a part of the solution: (a) global insurance scheme paid with donations from developed countries; (b) partnership between insurance and local/regional governments; and (c) private insurance for homeowners and business developers. In either case, insurers and rein-

urers can contribute with their risk management expertise, by modeling risks, reinforcing risk prevention, supporting climate adaptation infrastructure, and developing new and innovative risk transfer solutions.⁶⁴

Small Island States' Climate Insurance Fund

For more than 20 years the island nations have been advocating for a specific "loss and damage" mechanism that would function as an insurance policy. A proposed protocol⁶⁵ to the UNFCCC established a Multilateral Fund on Climate Change, and, within this context, an international mechanism addressing risk management and risk reduction strategies and insurance-related risk sharing and risk transfer mechanisms. It was not clearly defined, though, how this insurance mechanism would function, with just a brief explanation that developed countries should fund it.

The global insurance fund is set up according to the principle of common but differentiated responsibilities:⁶⁶ small island states, as well as other poor nations that are at risk of sea level rise, will pay an annual premium; rich developed nations, on the other hand, will provide the larger amount as aid. The funds shall be privately invested in order to extend the amount available in the event of a crisis.

The payouts would be according to the damage, when assessed that the weather variations were directly caused by climate change. There is also an additional requirement that nations that benefit from the payouts have taken preventive measures to avoid further damage, so that the amounts are only used for extreme events.

The insurance payouts can be used to repair the damaged infrastructure such as roads and airports. On an extreme level, insurance payouts could be used for drowned nations to buy a new homeland if the sea level rise threatens their maintenance in their own homes.

Although the idea is interesting, it has not gained many advocates from developed countries, since many of them, especially the U.S. and the European Union, are still wary of the proposal due to potential legal liabilities and open-ended financial obligations.⁶⁷

Partnership of Insurance Companies With Local Governments

In least developed countries (LDCs), which require a strong public intervention, insurers tend to work alongside governments. While governments regulate risk through mandatory safety measures, insurers use a broad menu of safety choices and corresponding prices, thus inducing the insured to self-select safety. Given the opposite ways in which to achieve the same objective, a partnership between governments and insurers might provide a halfway solution.

In areas more prone to disasters, governments may require mandatory insurance, hence creating an additional incentive for insurers to develop a specific local program where they otherwise would not. The mandatory facet of the insurance creates a set amount of clients. Through government's incentives premiums may become more affordable for homeowners and local businesses.

This solution provides a win-win situation, with cost-effective approaches to the insurer, government and insured. Some programs even have a fourth party, a financing partner that provides aid in paying for the premium. Safety standards are an incentive as discounts are given for additional precautions taken. This is a clear example of how private insurance markets can be profitably used to supplement or even replace legal controls.

The Caribbean Catastrophe Risk Insurance Facility

Considering the possible savings countries could have by pooling their risks together, 18 Caribbean countries, together with the World Bank, established the Caribbean Catastrophe Risk Insurance Facility (CCRIF),⁶⁸ the first multi-country catastrophe insurance pool. The initiative came from the Caribbean Community (CARICOM), who requested the World Bank's help in establishing an insurance system. The Caribbean Hazard Mitigation Capacity Building Programme of CARICOM is helping Caribbean countries create national hazard vulnerability reduction policies; and CCRIF is piloting a scheme for small island states to buy parametric insurance coverage against natural disaster risk.

The CCRIF enables governments to purchase catastrophe coverage akin to business interruption insurance. If a country is hit by a natural disaster, the CCRIF will provide the participating governments with immediate liquidity, without the need of a prior damage assessment.

Even though being an interesting development and pattern shifting, the CCRIF only provides response to immediate disasters, and not to the slow effects of climate change such as sea level rise. In this regard, the Alliance of the Small Island States (AOSIS) has been lobbying for insurance as a funding option to support mitigation and adaptation.

The Pacific Catastrophe Risk Insurance

Swiss Re has recently announced⁶⁹ the Pacific Catastrophe Risk Insurance Pilot arranged by the World Bank, Government of Japan and the Secretariat of the Pacific Community (SPC). The program is part of the Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI), a joint initiative of the World Bank, SPC, and the Asian Development Bank, and depends on financial support of the Global Facility for Disaster Reduction and Recovery (GFDRR) and the European Union, as well as from Japan. The Marshall Islands, Samoa, Solomon Islands, Tonga and Vanuatu will receive protection against

earthquake, tsunami and tropical cyclone risks from Swiss Re and other insurers. After its pilot phase, which will test whether a risk transfer arrangement modeled on an insurance plan can help Pacific island nations deal with the immediate financial effects of natural disasters, more countries will be included in the program.

Private Insurance Market for Small Island States

It is interesting to observe that most of the current insurance options or even additional prospective ideas are focused on government-based solutions. While risk transfer is a widely used policy tool in the developed world, it is still emerging in developing countries. Given the assessed losses from the latest disasters, insurers and reinsurers are asking whether severe weather related events are insurable, and, if so, at what price.

Considering that most of the island states are also LDCs, the private insurance market is harder to develop. In addition, depending on aggressive intervention by the local government or on international aid for funding the payouts in case of damage may expand the funding available to address the risk even further.

Through insurance and reinsurance a substantial portion of the losses from natural catastrophes can be borne by others rather than the victims and governments from those countries. Currently, most of the costs of infrastructure damage and other losses have to be relocated from domestic budgets, approved loans, aid or new loans, as well as voluntary donations.

There is a big underdeveloped market for private insurance, but it is highly dependable on a combination of an affordable premium and an expanded coverage of good quality. First, an insurer shall identify, quantify, and estimate the chances of the event occurring and the extent of losses likely to be incurred. Secondly, the insurer must be able to set premiums for each potential customer or class of customers. If both issues are presented, the risk is insurable, and the insurer must finally ask the question of whether it is also profitable.⁷⁰

For homeowners or business developers at the coast with a high risk of disappearing due to rising sea, insurance could be the answer to secure a house or business elsewhere instead of facing the property losses and depending on governmental or foreign aid.

Risk transfer could occur through micro-insurance, catastrophe bonds and reduced insurance premiums as an incentive to take preventative measures. Insurance is often cited as an option with high potential. However, the small risk pool and lack of financial mechanisms act as an obstacle to insurance initiatives.

If an insurer decides the risk of sea level rise is insurable and profitable, then comes the challenge of offering an affordable product in a highly vulnerable area. In order to reduce premium prices and thus increase their

market share in small island states, there is an incentive to induce efficient risk-reducing behavior. Since risk reduction measures often occur after the policy has been issued and the premium paid, insurers have the incentive to induce measures and hence minimize their potential loss.⁷¹

However, insurers have a significant concern about uncertainty in estimating the premium, given that disasters involve potentially high losses with extreme uncertainty of occurring; the medium loss is low, and the maximum loss is very high.⁷² A decision to cover the risk must therefore address the issue of maximizing the expected insurer's profits.

In this context, a partnership with local governments is usually a viable answer. After the 1994 Northridge earthquake that devastated California, insurers refused to renew homeowners' policies, and the California Earthquake Authority was formed by the state with funds from insurers and reinsurers.⁷³

On a broader level, high-emitting companies that may be targeted by the affected to pay for their losses may also have an incentive to invest in efficiency and greener solutions in order to increase their coverage and reduce their premiums. As an example, insurers often refine their premiums through the practice of "feature rating," by adjusting the premium according to the insured's individual risk characteristics. Additionally, previous insured's loss experience also may impact the premium price through "experience rating" to either retroactively or prospectively adjust it.⁷⁴

Insurance companies therefore have an important role as regulators while performing the functions of risk reduction and risk management, additionally focusing only in *ex post* indemnification. Since insurers have the expertise to quantify the effect of the precaution on risk reduction, as well as to ascertain that a cost of precaution is justified, insurance can be used to efficiently choose precaution measures.

The educational function of insurance with risk management practices has the potential to greatly help SIDS in preparing for climate change impacts, especially in the form of increased extreme events. For example, the United Insurance Company of Barbados⁷⁵ gives financial incentives for homeowners to put preventative measures in place.

Nonetheless, it can be argued that insurers face challenges that are too hard to overcome. For example, insurance companies cannot cover losses for which the affected parties cannot afford to purchase coverage, and likewise do not cover "known unknowns," contingencies that are known to exist, but to which neither the probability nor the magnitude can be actuarially allocated.⁷⁶ As Ben-Sharar and Logue⁷⁷ explained, climate change can put insurers in a poor regulatory position, with far into the future costs and a large set of diffuse victims that will

probably not be covered by present insurers. Although they assess that the insurance industry will likely bear a large portion of the costs of climate change, "it may be ill positioned to overcome the coordination-across-time problem," thus leaving the regulation exclusively to governments.

Conclusion

Although there has been some development, there is still a long way to go in order to provide small island states with some financial assistance in coping with the adverse effects of climate change. There are a few potential paths to follow, all of them with several advantages and disadvantages.

An option for the small island nations is to achieve compensation through climate change litigation. In order to successfully do so, academics have presented a few incremental steps: a small number of plaintiffs, a group of defendants, modest damage requests. This option, however, seems to be their last resort, when all other paths have failed, and the international community and local governments have not taken significant steps in finding other viable options.

In light of the difficulties of the options presented, insurance can be used to enhance small island nations' options, while providing solutions and safeties before the actual damage happens. While acting as regulators and enhancing mitigation and adaptation, insurers can also be valuable stakeholders as the world manages its new climate. Although a private market might have challenges that are too big to overcome, a partnership between governments and insurers can be a good resort. As per the examples in the Pacific and Caribbean mentioned in this article, it seems that investments have been made in this regard.

It will be interesting to follow how the insurance market develops in small island states in the Pacific and Caribbean, for surely there will be much progress in the future.

Endnotes

1. Office of the Press Secretary, *Inaugural Address by President Barack Obama*, THE WHITE HOUSE (Jan. 21, 2013), <http://www.whitehouse.gov/the-press-office/2013/01/21/inaugural-address-president-barack-obama>.
2. It is important to clarify that every time this article uses "climate change," we are talking about human-induced climate change. This will be better explained in the next section, while discussing the technical aspects of climate change and sea level rise.
3. See Billy McKibben, *Hot Mess*, NEW REPUBLIC (Oct. 6, 2010), <http://www.newrepublic.com/article/environment-energy/magazine/78208/gop-global-warming-denial-insanity#>.
4. United Nations, *Doha Climate Conference Opens Gateway to Greater Ambition and Action on Climate Change*, UNITED NATIONS (Dec. 8, 2012), http://www.un.org/wcm/content/site/climatechange/pages/gateway/the-negotiations/template/news_item.jsp?cid=37700.
5. United Nations Framework Convention on Climate Change, *Background on the UNFCCC: The international response to climate change* (last visited Oct. 10, 2013), http://unfccc.int/essential_background/items/6031.php.
6. U.S. Climate Change Science Program, *Weather and Climate Extremes in a Changing Climate*, 81 (June 2008), available at <http://www.climatechange.gov/Library/sap/sap3-3/final-report/sap3-3-final-all.pdf>.
7. IPCC Fourth Assessment Report: Climate Change 2007, *Projections of Future Changes in Climate* (last visited Oct. 10, 2013), http://www.ipcc.ch/publications_and_data/ar4/wg1/en/spmsspmpm-projections-of.html.
8. The Small Island Developing States are low-lying coastal countries, mainly from the Pacific and Caribbean, which were first recognized as a developing countries group at the United Nations in 1992.
9. The AOSIS is a coalition of 44 small islands and low-lying coastal countries that share specific concerns due to their vulnerability to the adverse effects of global climate change, thus functioning as an *ad hoc* lobby and negotiating voice for SIDS within the United Nations system. See AOSIS, <http://aosis.org> (last visited Apr. 3, 2013).
10. For more information on the science of sea level rise see Mary-Elena Carr et al., *Sea Level Rise in a Changing Climate: What Do We Know?*, in THREATENED ISLAND NATIONS: LEGAL IMPLICATIONS OF RISING SEAS AND A CHANGING CLIMATE, 15-54 (Michael B. Gerrard & Gregory E. Wannier, eds., 2013).
11. Swiss Reinsurance Company or Schweizerische Rückversicherungs-Gesellschaft AG, better known as Swiss Re, is the biggest insurance and reinsurance company in the world, operating in more than 30 countries.
12. John Coomber, *Interviews*, THE CLIMATE GRP. (2006), available at <http://www.theclimategroup.org/what-we-do/interviews/John-Coomber/>.
13. PETER HOEPPE, WATER AND DISASTERS, 3 (2013) (Munich RE presentation at the United Nations Special Thematic Session on Water and Disasters).
14. Gregory E. Wannier & Michael B. Gerrard, *Overview*, in THREATENED ISLAND NATIONS: LEGAL IMPLICATIONS OF RISING SEAS AND A CHANGING CLIMATE, *supra* note 10, at 4.
15. Center for International Earth Science Information Network at Columbia University-CIESIN, Percentage of Total Population Living in Coastal Areas, NASA Socioeconomic Data and Applications Center (SEDAC), 1, http://sedac.ciesin.columbia.edu/es/papers/Coastal_Zone_Pop_Method.pdf (last visited Apr. 4, 2013, 10:04AM).
16. The Millennium Ecosystem Assessment establishes a 100 kilometer buffer zone: a coastal zone is defined either by 100 kilometers from the coast as a distance threshold, and 50 meters as an elevation threshold, whichever is closer to the sea.
17. Christopher D. Stone, *Beyond Rio: "Insuring" Against Global Warming*, 86 AM. J. INT'L L. 445, 4-6 (1992).
18. Adaptation is a solution more focused on the present, providing means to act immediately, although in the face of uncertainty. Mitigation is a post-catastrophe action, whilst compensation only provides some recovery for what has already been lost. See United Nations Framework Convention on Climate Change, art. 3, par. 2, May 9, 1992. See Sally Kane and Jason F. Shogren, *Linking Adaptation and Mitigation in Climate Change Policy*, 45 CLIMATE CHANGE, 75 (2000).
19. For example, loss of indigenous languages and knowledge through the disappearing of native land and dispersed population. See UNESCO, *Weathering Uncertainty: Traditional knowledge for climate change assessment and adaptation* (2012), available at <http://unesdoc.unesco.org/images/0021/002166/216613e.pdf>.

20. Through the lack of efficient warning systems for catastrophes and response mechanisms. See International Council on Human Rights, Climate Change and Human Rights Policy: A Rough Guide (2008), available at http://www.ichrp.org/files/reports/45/136_report.pdf.
21. An important risk analysis that has been made by insurance companies is related to liability issues associated with climate change due to the potential risk of shareholders accusing companies of failing to properly analyze climate-related financial exposure. If those cases are taken to court, insurers have to defend those companies who have purchased Directors' and Officers' (D&O) liability coverage. Insurance companies providing D&O policies could, however, resist covering claims in which the environmental liability—and in this specific case, the potential carbon exposure—on financial statements has not been adequately disclosed. See Howard C. Kunreuther & Erwann O. Michel-Kerjan, *Insurability of Large-Scale Disasters, and the Emerging Liability Challenge*, 155 U. PA. L. REV. 1795, 19-24 (2007).
22. Howard C. Kunreuther & Erwann O. Michel-Kerjan, *id.*, at 3.
23. LUCIA BEVERE ET AL., SIGMA: NATURAL CATASTROPHES AND MAN-MADE DISASTERS IN 2012: A YEAR OF EXTREME WEATHER EVENTS IN THE US, 13 (Kurt Karl ed., no. 2/2013, 2013), available at http://media.swissre.com/documents/sigma2_2013_en.pdf (Swiss Re).
24. World Economic Forum, *Global Risks 2013: An Initiative of the Risk Response Network*, 18, (April 1st, 2013, 4:05PM), http://media.swissre.com/documents/WEF_GlobalRisks_Report_2013.pdf.
25. LUCIA BEVERE ET AL., *supra* note 23.
26. 2011 was the costliest year, with \$126 billion in insured losses, especially due to earthquakes and flooding in the Asia Pacific region. LUCIA BEVERE ET AL., *supra* note 23, at 1.
27. DARA is a non-profit organization from Spain that provides support in the field of humanitarian aid as well as climate change, disaster and risk reduction. See DARA, <http://daraint.org/about-us/> (last visited Apr. 26, 2013).
28. CLIMATE VULNERABLE FORUM & DARA, CLIMATE VULNERABILITY MONITOR: A GUIDE TO THE COLD CALCULUS OF A HOT PLANET, 2 (2nd ed., 2012), available at <http://www.daraint.org/wp-content/uploads/2012/10/CVM2-Low.pdf>.
29. Murray Simpson et al., An overview of modeling climate change : Impacts in the Caribbean Region with contribution from the Pacific Islands (2009), <http://www.caribsav.org/assets/files/7dec09/Summary%20Document%20Final%20Caribbean%20CC%20UNDP%20Report.pdf> (CARICOM, Caribbean Cmty.-Climate Change Ctr., Dep't for Int'l Dev., Caribsav and UNDP).
30. See CARICOM, <http://www.caricom.org> (last visited Apr. 27, 2013).
31. MURRAY SIMPSON ET AL., *supra* note 29, at 26.
32. PATRICK REICHENMILLER ET AL., WEATHERING CLIMATE CHANGE: INSURANCE SOLUTIONS FOR MORE RESILIENT COMMUNITIES, 3 (Esther Baur ed., 2010), available at http://media.swissre.com/documents/pub_climate_adaption_en.pdf (Swiss Re).
33. Howard C. Kunreuther & Erwann O. Michel-Kerjan, *supra* note 21, at 4-5.
34. The 2004 Asian tsunami cost the insurance industry about \$5 billion, but the disaster killed over 280,000 people.
35. The 2011 Thailand floods had an estimated cost of \$15 to 20 billion; Hurricane Katrina \$125 billion; Superstorm Sandy \$70 billion.
36. IPCC, Climate Change 2013, The Physical Science Basis, available at <http://www.ipcc.ch/report/ar5/wg1/> (last revised October 24, 2013).
37. Leo Hickman, *Landmark Climate Change Report Leaked Online*, THE GUARDIAN ONLINE (Dec. 14, 2012, 09:07 EST), <http://www.guardian.co.uk/environment/2012/dec/14/ipcc-climate-change-report-leaked-online>.
38. See THREATENED ISLAND NATIONS: LEGAL IMPLICATIONS OF RISING SEAS AND A CHANGING CLIMATE, PART IV: ESTABLISHING ACCOUNTABILITY, *supra* note 10.
39. Jennifer Kilinski, Symposium: Arctic Law in an Era of Climate Change, Comments, *International Climate Change Liability: A Myth or a Reality?*, 18 J. TRANSNAT'L L. & POL'Y 377, 3 (2009).
40. According to data gathered by Ms. Kilinski, the U.S. power plants account for 63% of all U.S. sulfur dioxide emissions and 39% of carbon dioxide emissions. The top fifty U.S. greenhouse gas emitters collectively account for more than 25% of U.S., and nearly 5.5% of worldwide, emissions. See Jennifer Kilinski, *id.*, at 5.
41. Jennifer Kilinski, *id.*, at 5.
42. Some theories have risen to recover damages based on violation of international law. An option would be to argue a breach of treaty claims under the UNFCCC. See THREATENED ISLAND NATIONS: LEGAL IMPLICATIONS OF RISING SEAS AND A CHANGING CLIMATE, Chapter 13, *supra* note 10. A second option would be to base a claim on ocean acidification, which could have worked as natural barriers to sea level rise, and thus litigate under the LOSC, which offers a compulsory dispute-settlement mechanism. See THREATENED ISLAND NATIONS: LEGAL IMPLICATIONS OF RISING SEAS AND A CHANGING CLIMATE, Chapter 15, *supra* note 10. A third option is establishing liability under the World Heritage Convention. See THREATENED ISLAND NATIONS: LEGAL IMPLICATIONS OF RISING SEAS AND A CHANGING CLIMATE, Chapter 13, *supra* note 10. A last option would be to challenge environmental impact assessments for failure to consider climate impacts internationally. This option was carried out by the Federal States of Micronesia, through a submission to the Czech Ministry of Environment rather than a lawsuit. See THREATENED ISLAND NATIONS: LEGAL IMPLICATIONS OF RISING SEAS AND A CHANGING CLIMATE, Chapter 17, *supra* note 10. An advisory opinion from the ICJ on damages from climate has been sought by Palau, in order to discuss the potential responsibility of states. See Kysar, Douglas A., *Climate Change and the International Court of Justice* (August 14, 2013), available at <http://ssrn.com/abstract=2309943> or <http://dx.doi.org/10.2139/ssrn.2309943>.
43. Other options have been academically discussed: claims under the UNFCCC and the Kyoto Protocol; the International Court of Justice (ICC); the Inter-American Commission on Human Rights; and the United Nations Conference on the Law of the Seas (UNCLOS) and the United Nations Fish Stocks Agreement. For more information on the pros and cons of each of those options, as well as the challenges, see Jennifer Kilinski, *supra* note 39, at 6-11.
44. Mass. v. EPA, 549 U.S. at 521-27.
45. Jennifer Kilinski, *supra* note 39, at 6-11.
46. Mass. v. EPA, 549 U.S. at n.24.
47. Mass. v. EPA, 415 F.3d 50, 64-74 (D.C. Cir. 2005).
48. Lujan v. Defenders of Wildlife, 504 U.S. 555, 560-61 (1992).
49. Nw. Env'tl. Def. Ctr. v. Owens Corning Corp., 434 F. Supp. 2d 957 (D.Or. 2006); Friends of Earth, Inc. v. Watson, 2005 WL 2035596 (N.D. Cal.); Korsinsky v. Env'tl. Prot. Agency, 2005 WL 2414744 (S.D.N.Y.).
50. 28 U.S.C. § 1350 (2000).
51. Kiobel v. Royal Dutch Petroleum, No. 10-1491, 2013 U.S., WL 1628935 (U.S., Apr. 17, 2013).
52. Declaration of the United Nations Conference on the Human Environment (Stockholm Declaration), principle 1 (1972).
Principle 1: Man has the fundamental right to freedom, equality and adequate conditions of life, in an environment of a quality that permits a life of dignity and well-being, and he bears a solemn responsibility to protect and improve the environment for present and future generations. In this respect, policies promoting or perpetuating apartheid, racial segregation, discrimination, colonial and other forms of oppression and

foreign domination stand condemned and must be eliminated.

53. Rio Declaration on Environment and Development (Rio Declaration), pr. 1, Aug. 12, 1992, A/CONF.151/26 (Vol. I). "Principle 1: Human beings are at the centre of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature."
54. *Kiobel v. Royal Dutch Petroleum (U.S.)*, *supra* note 51.
55. *Kiobel v. Royal Dutch Petroleum*, 642 F.3d 268 (2nd Circuit, 2011).
56. "All the cases of the class affected by this case involve transnational corporations, many of them foreign. Such foreign companies are creatures of other states. They are subject to corporate governance and government regulation at home. (...) I cannot think that there is some consensus among nations that American courts and lawyers have the power to bring to court transnational corporations of other countries, to inquire into their operations in third countries, to regulate them—and to beggar them by rendering their assets into compensatory damages, punitive damages, and (American) legal fees. Such proceedings have the natural tendency to provoke international rivalry, divisive interests, competition, and grievance—the very opposite of the universal consensus that sustains customary international law."
57. *Kiobel v. Royal Dutch Petroleum (U.S.)*, *supra* note 51, at 2.
58. *Kiobel v. Royal Dutch Petroleum (U.S.)*, *supra* note 51, at *16 (Justice Breyer, concurring).
59. *Kiobel v. Royal Dutch Petroleum (U.S.)*, *supra* note 51, at *11 (Justice Kennedy, concurring).
60. *Kiobel v. Royal Dutch Petroleum (U.S.)*, *supra* note 51, at *12 (Justice Breyer, concurring).
61. *Native Village of Kivalina v. Exxon Mobil Corp.*, 663 F. Supp. 2d 863 (2009).
62. *Native Village of Kivalina v. Exxon Mobil Corp.*, 696 F.3d 849 (9th Circuit, 2012).
63. See *Small Island Nations to Seek Accord on Creating Insurance Pool to Cover Risk*, 14 Int'l Env'tl. Rep. (BNA) 561-62 (Oct, 23, 1991).
64. Patrick Reichenmiller et al., *supra* note 32, at 5.
65. AOSIS, *Proposal by the Alliance of Small Island States (AOSIS) for the Survival of the Kyoto Protocol and a Copenhagen Protocol to Enhance the Implementation of the United Nations Framework Convention on Climate Change*, WASH. POST, <http://www.washingtonpost.com/wp-srv/photo/homepage/AOSIS1.pdf>.
66. Principle 7 of the Rio Declaration: "In view of the different contributions to global environmental degradation, States have common but differentiated responsibilities. The developed countries acknowledge the responsibility that they bear in the international pursuit of sustainable development in view of the pressures their societies place on the global environment and of the technologies and financial resources they command."
67. Louise Gray, *Cancun climate change summit: small island states in danger of "extinction,"* THE TELEGRAPH (2010), <http://www.telegraph.co.uk/earth/environment/climatechange/8170075/Cancun-climate-change-summit-small-island-states-in-danger-of-extinction.html>.
68. See THE CARIBBEAN CATASTROPHE RISK INSURANCE FACILITY'S, <http://www.ccrif.org> (Mar. 25, 9:45AM).
69. The program was launched on January 18, 2013, according to the Swiss Re website. See Swiss Re, *Swiss Re supports first sovereign catastrophe risk insurance in Asia Pacific*, SWISS RE (Jan. 18, 2013), available at http://www.swissre.com/about_us/global_partnerships/Swiss_Re_supports_first_sovereign_catastrophe_risk_insurance_in_Asia_Pacific.html and The World Bank, News Release, *5 Pacific Island Nations to be Insured Against Natural Disasters: Pilot Program to Help Governments Respond to Natural Disasters*, SWISS RE (Jan. 18, 2013), http://media.swissre.com/documents/WB_press_release_five_pacific_island_nations_to_be_insured.pdf.
70. Howard C. Kunreuther & Erwann O. Michel-Kerjan, *supra* note 21, at 9.
71. Omri Ben-Shahar and Kyle D. Logue, *Outsourcing Regulation: How Insurance Reduces Moral Hazard*, 111 MICH. L. REV. 197, 5 (2012).
72. Howard C. Kunreuther & Erwann O. Michel-Kerjan, *supra* note 21, at 12.
73. *Id.* at 13.
74. Ben-Shahar and Logue, *supra* note 71, at 7.
75. See UNITED, <http://www.unitedinsure.com/united.cfm?LID=inside%20united> (last visited Apr. 6, 2013).
76. See Ben-Shahar and Logue, *supra* note 71, at 18.
77. Ben-Shahar and Logue, *supra* note 71, at 19.

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