



Introduction of Financial Instruments to Cover and Transfer the Risks of Climate Hazards in the Sector of Tourism for the Maldives

Increasing Climate Change Resilience of Maldives through Adaptation in the Tourism Sector

TOURISM ADAPTATION PROJECT (TAP)



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Ministry of Tourism

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RISKS OF CLIMATE HAZARDS IN THE SECTOR OF TOURISM FOR THE MALDIVES**

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TOURISM ADAPTATION PROJECT (TAP)

Consultant

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Cover Photo By: Abdulla Adam

Beach rocks in Maalhos Island in Baa Atoll. Beach rocks are a natural feature of many of the Maldivian islands that act as a natural barrier to coastal erosion.

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EXECUTIVE SUMMARY

This report is meant to provide the Maldives Ministry of Tourism, Arts, and Culture, as well as the United Nations Development Programme (UNDP), with guidance on the introduction of financial instruments to cover climate hazard risks that threaten the Maldives' tourism sector. The primary purpose of the project is to investigate the current status of the sector and country, and investigate what considerations are needed in setting up any financial instruments for helping the tourism sector cope with climate hazards.

The report highlights the impact of climate hazards on the tourism sector, its related vulnerable associated communities, and the Maldives economy, by extension. It considers input from an external study, as well as several interviews conducted by the Consultant of major stakeholders in the sector including representatives of resorts, safari operators, travel agencies, the Maldives Local Government Authority, representatives of an island council, and the insurance regulator. The meetings were meant to help the Consultant gather information and investigate potential clients, partners, the regulatory landscape, the current infrastructural and data challenges as well as opportunities that need to be considered in developing financial risk management instruments to help the Maldives' tourism sector cope with climate hazard risks. These interviews and external study help inform the needs to be met if financial instruments (including adequate insurance mechanisms) are introduced to address the issues posed by climate hazards.

Given the Maldives' geographical and economic exposure as well as its social fabric, it is concluded there are gaps in the availability of risk management tools that make the sector vulnerable. In particular, concerns were raised over the current insurance market's ability to cope with extreme losses from events affecting resorts, as well as low penetration of insurance among tourism-associated island communities. Guest houses were also found to be underinsured, and safari operators expressed desires for what they believe are more appropriate policies to the risks they face. They also expressed some dissatisfaction with current packages offered.

Providing appropriate financial risk management tools to address the issues discovered has significant challenges including the limited awareness of certain stakeholders in the sector, sources of premium for island communities, and how best to engage resorts and other private sector organizations in helping such communities develop a solution, limited meteorological data and infrastructure which are critical for developing most financial risk management instruments, and a general low level of maturity of the industry as well as its regulation.

Several potential solutions for addressing these gaps and challenges were considered including the development of a parametric insurance facility, a micro-insurance product, the use of catastrophe bonds, creation of an insurance pooling mechanism, weather guarantee products, captives and the use of a reserve pool. Based on extensive research and interview feedback with stakeholders regarding gaps in insurance and the feasibility of elements of the different instruments considered, the proposal is for two separate instruments that best fit the current limitations in the Maldives. The first is a risk insurance pool targeting severe multi-peril risks and not just climate risks and should target insurers, making it mandatory for them to place extreme level risks for tourism stakeholders (particularly resorts and guest houses) through the pooling facility. One of the main problems faced by this facility is at least two-fold. Firstly, it ensures that certain stakeholders such as guest houses who may currently not purchase insurance to cover some very real climate risks are made to do so, and secondly (and of greater concern) is the possibility that the insurers of resort risks may not be able to cope in the event of extreme climate hazard events. The second solution proposed is for a microinsurance solution targeting vulnerable island communities. The facility is chosen because of its ability to reduce losses for as many people in the country as possible, particularly those who currently have no access to insurance mechanisms. The suggestion is made for a pilot covering damage to island communities following rainfall-induced flooding, which is the most significant risks affecting island communities in Maldives. Suggestions are also made on the use of government allocation of funds to address pre-disaster funding. Finally, a case is made for the development of meteorological infrastructure in Maldives as such developments will help in the development of some other financial risk management instruments in Maldives.

1 INTRODUCTION

The issue of climate hazards is of significant concern, particularly to small island developing states such as the Maldives. In particular, climate change threatens the survival of the tourism sector, and thereby its contribution to the country's economy. Severe events related to climate hazards can cause abrupt increases in tourism sector spending by the government and tourism operators, while reducing their revenues. On a sovereign level, such risks can result in abrupt increases in government expenditure and have significant impact on the government's finances including exposure to increases in government debt, and significant decreases in GDP. On a micro level, the effects of these risks pose a disproportionate impact on communities which supply the tourism sector with agriculture products, labour, transportation and other services. The impact of such events can have financial consequences and significantly affect livelihoods of members of such communities for extended periods of time.

The effects of climate hazards are particularly threatening to the tourism sector, as the country's largest economic industry, contributing 28% of GDP, and over 60% of foreign exchange receipts (CIA Factbook, 2012). According to tourism statistics, there were over 27,700 registered beds and an occupancy rate of just over 70% in 2012. The Maldives also attracted over 900,000 tourists in 2012. The impact of the 1987 and May 2007 floods provide first-hand examples of the type of significant effects these risks pose. The 2004 tsunami exposed some of the vulnerabilities of the country, and the tourism sector, which experienced a 33% drop in tourism arrivals following the event. In severe cases, such shocks to the economy can lead to unsustainable debt levels if the right mechanisms aren't in place to protect the government and the tourism sector.

The tourism sector of the Maldives is vulnerable to several climate hazards including rising storm surge levels, sea swells, temperature variations, ocean water temperature variations,

acidification, and coral bleaching. The region is also vulnerable to windstorms, excess rainfall, and coastal erosion. These hazards occur with varying frequencies and have potential to cause both direct physical damage to tourism infrastructure, as well as indirect revenue losses through loss of tourists, and tourism dependent institutions (including resorts, guest house, souvenir shops, safari operators, and so on) whose businesses are disrupted during or following such events. Events associated with climate hazards may also discourage potential tourists to the country if there are is no guaranty that these events will not affect their vacation plans (particularly for the leisure tourist), and in extreme cases discourage growth of the tourist market, and thereby result in further indirect losses through loss of business revenue.

This report presents the background for developing a framework to address these risks through the use of financial risk transfer instruments. Such instruments can help reduce uncertainty and encourage investments and economic development planning, by giving investors some assurance that loss of their investments (including investments in travel plans or in some tourism operation) is limited. The need to give assurance to tourists and investors is particularly important for tourism operators such as resorts. For vulnerable populations and communities, the effects of losses due to extreme events are even more significant (relative to income levels, and overall exposure). Financial risk transfer tools not only minimize these losses, but also prevent members of such populations from behaviours that pose significant challenges to their livelihoods and that may jeopardize their future (such as selling assets they need for future income generation to cope with present day losses).

Another benefit of insurance and the financial instruments considered in this study is their timeliness and reliability when compared to reliance on post- event donor assistance or foreign aid. The effect of this is important as there is considerable evidence that suggest that the speed at which an institution or people receive a payout following an event has significant positive implications in their long and medium-term economic development following such events. Such schemes also help governments avoid fiscal deficits and costly post-event loans.

The report builds on the economic impact of these hazards (Chapter 2), a review of the insurance landscape in Maldives and insurance packages offered (as described in Chapter 3), and the demand for a risk management framework (Chapter 4) to develop a framework for addressing the needs of the communities and tourism sector (Chapters 6 and 7). In Chapters 6 and 7, potential risk management solutions presented, along with associated challenges (presented in Chapter 10) and considerations if these, or some similar framework, is developed in the Maldives.

The increasing trend in severe weather hazards due to climate change in the face of global economic challenges has exacerbated the necessity for safety nets to protect the most vulnerable communities and institutions. Small island developing states such as the Maldives are among the most exposed to climate change and by extension, catastrophe events that form part of the impacts. Climate hazards are particularly burdensome for countries such as the Maldives because of its high reliance on one sector, tourism, which by its very nature is vulnerable to climate hazards.

The country's exposure to natural hazards and climate change effects has significant implications for its public finances, as events linked to these hazards can result in economic shocks to the government (and tourism sector), particularly through increases in government expenditures tied to relief activities and reconstruction efforts. Such events can disrupt a variety of revenue sources, particularly from tourism, reduced labour productivity and can also lead to reduced tax revenues, worsened trade balances and increased inflationary pressures. These increases in government expenditure and decreases in revenue have both short and long term implications, leading to, for example, increased primary and structural deficits, which in turn increases government debt and propagates concerns on the country's debt levels, its ability to service such debt, and ultimately to increased borrowing costs. Figure 1.1 illustrates the impact of these events on both the sovereign and micro level.

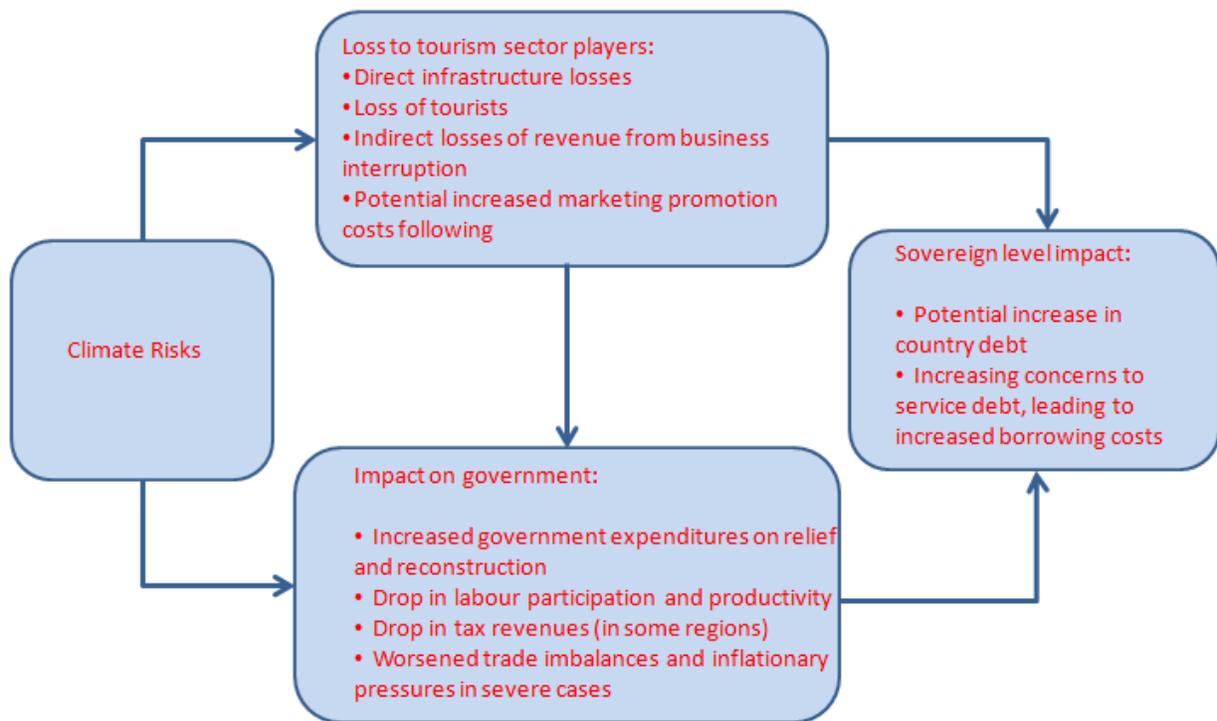


Figure 1.1: Economic impact of climate hazards

Addressing climate hazard risks should therefore be a priority, as such risks affect the entire economy and its people. Finding solutions for minimizing the impact of these risks is therefore critical.

2 CLIMATE RISK EXPOSURE AND NATURAL HAZARD PROFILE OF THE MALDIVES

This chapter provides a brief overview of the natural hazard exposures of the Maldives. An analysis of the natural hazard profile of the Maldives is important as previous exposures to these risks highlight the vulnerability of the country and its tourism sector. Hence, they highlight the potential exposure to effects of climate change. The geography of the country exposes it to a range of climate hazards. In particular, the variations in sea-levels and surface temperatures of the surrounding Indian Ocean influence the climate risks faced in the Maldives. In addition, the relatively low elevation terrain of and small size of the country's islands make the impact of natural and climate hazards particularly destructive in certain cases. The following table (Table 2.1) summarizes the critical natural hazards faced in the Maldives, and some significant historical events. Please note that not all of these risks are climate risks. However, they provide an idea of the vulnerability of the country to climate hazards.

HAZARD	DESCRIPTION
Flooding	<p>Flooding may result from heavy rainfall, storm surge, swell waves, and local wind-induced waves. The monsoons and storms bring heavy rainfall to the region, which in islands with depressions can lead to flooding. Heavy rainfall is more common in the southern atolls.</p> <p>The May 2007 floods resulted in sea swells between 10 to 15 feet and hit an estimated 68 islands in 16 atolls (particularly Gaafu, Dhaalu, Thaa and Laamu) across the Maldives, causing inundation of up to 600 metres from the coastline. The high tides occur on an annual basis, but not on this magnitude. The flood damaged 579 housing units, and caused minor damage to harbours and jetties in 17 islands. It resulted in an evacuation of 1649 people, with 33 islands affected by salt water</p>

	that caused significant damage to crops, agriculture, farms, and vegetation, which most people depend on for their livelihood and food supplies. Source: <i>UN Office for the Coordination of Humanitarian Affairs</i>
Storms of Cyclonic Strength	These are rare, but do occur. They typically affect the northern part of the country, and can damage vegetation, houses, roads, and other infrastructure. They may also induce storm surge and be accompanied by heavy rainfall, which can lead to flooding.
Erosion	Coastal erosion is a serious issue in the Maldives, and poses high costs for resorts and tourism-dependent communities. Improperly designed and constructed coastal structures have played a role in exacerbating the effects of coastal erosion (<i>P.S. Kench et al., 2003; Readshaw, 1994; Shaig, 2006a; Shaig 2006b</i>). In 2004, 97% of inhabited islands in the Maldives experienced coastal erosion.
Tsunami	<p>The December 2004 tsunami showcased the impact that this type of natural disaster can have on the Maldives, causing flooding in 71 inhabited islands (Government of Maldives, 2006). While this event was not been a result of climate change effects, it highlights the vulnerability of the Maldives and altered perceptions of the public and policy makers on natural hazard risks.</p> <p>The tsunami was a result of an earthquake in the Pacific Ocean measuring 9.0 on the Richter scale that reached the Maldives, and inundated all 199 inhabited islands. The tsunami resulted in an oil spill in Thilafushi island, wide spread waste management problems, severe damage to vegetation and crops, pollution of groundwater and raised</p>

	<p>concerns on the potential to damage coral reefs, which has long-term consequences. Three weeks after the impact, there were reports of 82 deaths, 26 missing people, and 20,000 people displaced with 3997 housing units damaged. On some of the worst affected islands such as Vilifushi and Thaa Atoll, all the houses were completely destroyed. The dispersed nature of the islands posed difficulties for aid delivery and communication. Salt water inundation also affected crops, and thus livelihood of many. Source: <i>UNDAC Rapid Environmental Assessment Report – Republic of Maldives</i>.</p> <p>According to the National Recovery and Reconstruction Programme of the government, the 2004 tsunami caused an estimated total loss of US\$470.1 million, or 67% of GDP, with major losses in earnings to tourism (estimated at US\$230 million), housing (US\$64.8 million), and loss of livelihoods including fishing, equipment, agricultural land, and family savings.</p>
<p>Earthquake</p>	<p>While there have been few earthquake impacts in the region, there are a number of seismic faults in the Indian Ocean, though most are not in the immediate vicinity of the Maldives.</p>
<p>Wind storms, Storm Surges and Tidal Waves</p>	<p>In May 1991, storms and surges affected the far southern and far northern parts of the country with wind speeds of 90 miles per hour recorded. Over 3000 homes were damaged or destroyed, and over 23,000 people displaced. There was widespread crop destruction including about 130,000 banana/ plantain trees destroyed. Source: <i>UN Department of Humanitarian Affairs</i>, June 1991.</p>

	<p>The April 1987 tidal waves were the highest tidal waves experienced in the Maldives in years. These resulted in serious damage. One third of the capital, Malé, was affected by severe flooding that damaged retaining walls, coastal roads, the international airport, harbours, and jetties. Several houses were destroyed resulting in some 300 people evacuated. Source: <i>UN Department of Humanitarian Affairs</i>, April 1987.</p>
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Table 2.1: Critical natural hazards faced in the Maldives, and associated historical experiences.

The adverse experiences from natural hazards are exacerbated by climate change. Some of these events related to climate risks occur more frequently or are believed to occur with greater severity, and some reflect the influence of global warming. For instance, a climate risk profile compiled by John Hay (*Climate Risk Profile for the Maldives*, John, Hay) showed the following trends observed for HulHulé (which clearly does not represent the entire Maldives but provides an example of the changes):

- The observed maximum hourly sea-level for HulHulé is increasing by a rate in excess of the global trends in sea-level.
- An hourly sea level of 70cm above sea level is currently a 100-year event in HulHulé, but will likely be an annual event by 2050.
- An extreme daily rainfall event of 180mm is currently a 100-year event, but will likely occur twice as often on average by 2050.
- An extreme three hourly rainfall of 100mm is currently a 25-year event but will likely become at least twice as common, on average by 2050.
- The annual maximum daily temperature is projected to increase by about 1.5° C by 2100.
- An extreme wind gust of 60 knots has a return period of 16 years, but it's estimated this will fall to 9 years by 2025.

-
- A maximum temperature of 33.5° C is currently a 20-year event, and will likely have a return period of three years by 2025.

With over 75% of the Maldives land area below one meter above sea level, the threat of sea level rise not only threatens loss of land, but also has potential for flooding of low-lying areas, reduction in crop yield, salinization, beach erosion, impacts coastal aquaculture, and impact storm surge. Rise in sea levels and temperatures are important to marine life, and therefore critically linked to the livelihoods of many Maldivians and supply of food to the tourism sector, as well as sustainable tourism in general.

With regards to climate change impact on rainfall, there don't appear to be significant long-term trends in daily, monthly, annual or maximum daily rainfall. However, there are predictions of changes in the severity and seasonality of rainfall events, the frequency of extreme occurrences of which are likely to increase.

There are predictions of greater extreme risks of drought and floods, and tropical cyclones (even though rare, and predominantly in the northern Maldives), are predicted to increase in intensity. Such events will have critical impact on vulnerable tourism-dependent communities.

Part of the intention of this study is to investigate financial instruments that are most appropriate for minimizing impact of climate hazards caused by climate hazards. This involves analyzing the impact of potential climate risks (including rising storm surge levels, sea swells, variations in temperatures, variations in ocean water temperature, acidification, and coral bleaching, as well as increased severity or frequency of windstorms and excess rainfall), and which of these risks, financial instruments are most feasible for addressing.

While using insurance or some other risk management solution is key to addressing some of these risks, determining the appropriate insurance or risk management solution for these risks is complicated by the fact that traditional insurance for covering such risks are either limited in

availability or cost prohibitive. As such, any climate risk finance framework proposed must therefore account for limited availability of insurance solutions, as well as their high costs. Some of these issues are addressed later in the report’s analysis of the risk protection mechanisms for climate hazards. However, it is first important to understand the current tools used (including insurance and the insurance landscape), as well as the market demand for these mechanisms. The next two chapters address these issues and are based on the Consultant’s interviews with representatives of several stakeholders, as well as results from the “Baseline Analysis of Adaptation Capacity and Climate Change Vulnerability Impacts in the Tourism Sector” report created by the Ministry of Tourism, Arts, and Culture in 2013.

3 INSURANCE LANDSCAPE AND TOURISM SECTOR PACKAGES OFFERED.

Interviews of representatives of resorts, safari operators, insurers, and regulators helped determine what risk management instruments are currently used in the Maldives to address climate hazard and other risks. Discussions revealed that some of the financial mechanisms used include insurance (which is the focus of this chapter), fining mechanisms for acts that damage the country's environment (such as fines on vessels that damage reefs due to negligence facing heavy fines upwards of MVR 80,000 per cubic meter of damaged reefs), delivery of climate adaptation grants and climate adaptation funds.

Of particular concern for this study is the role of insurers, its regulator, and the insurance packages offered to different stakeholders in the tourism sector. Also important is how the institutions in this sector may help in developing or delivering any proposed financial risk management tools to help the tourism sector cope with climate risk hazards. In this chapter, the Maldives' insurance regulator is reviewed, followed by an analysis of the insurers in the space and the insurance packages offered in the Maldives.

3.1 Review Of The MMA's Role As The Insurance Regulator

The insurance industry is part of the financial sector of Maldives, and is regulated by the Maldives Monetary Authority (MMA). The MMA regulates and controls the guidelines for all local and foreign financial institutions working in the Maldives. Currently the financial sector consists of the MMA, six commercial banks, and several non-bank financial institutions (a finance leasing company, a specialized finance institution, money transfer businesses and insurers/ insurance agents), as shown in Figure 3.1.

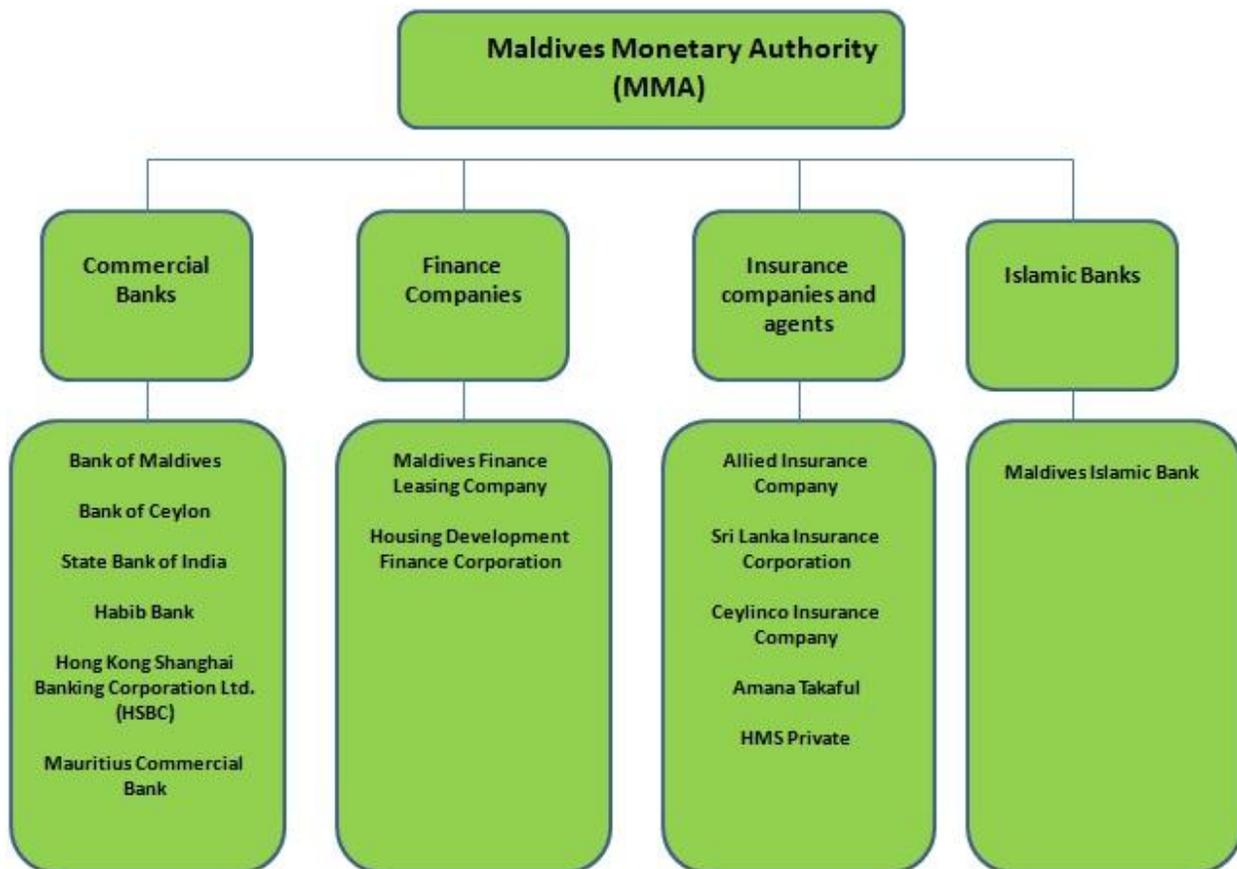


Figure 3.1: Structure of the financial sector in the Maldives.

The principal objectives of the MMA are:

- a) To issue currency and determine the international value of the Maldivian Rufiyaa.
- b) To advise the government on banking and monetary matters.
- c) To supervise and regulate banking activities.
- d) To promote the stability of the Maldivian currency.

Among the commercial banks, the Bank of the Maldives is the only domestic bank which is jointly owned by the government, the general public and other entities. It has the largest branch network, and reaches highly dispersed populations of the country. All other banks are foreign commercial banks with branches in Malé, and with the State Bank of India having an extra branch in a southern atoll.

The insurance industry is part of the financial sector of Maldives, and is regulated by the Maldives Monetary Authority (MMA). Under the guidelines of the 1981 MMA Act, all local and foreign financial institutions (including insurers) must obtain a license from the MMA and all companies are registered under the “Companies Act of Republic of Maldives”. In addition, according to the Finance Act 2006, any financial intermediation (including insurance), must be done through the banking system. Consideration of these acts has consequences for the way any financial instrument is licensed and used in the Maldives, and the types of delivery channel institutions (choice of delivery channels is discussed in a later section of this chapter) to be considered when reaching customers.

As part of its role as regulator of insurance and insurance agents, the MMA also maintains solvency regulation guidelines to ensure that insurers are financially sustainable. All insurers and insurance agents must register with the MMA, and show proof of solvency when they do so. While the MMA does no solvency modelling, it requires that an actuarial evaluation be submitted by insurers when registering lines of business. However, there are currently no checks

for the implications of climate risks in such analysis. This is an area where the MMA will need to address given the exposure of Maldives.

According to MMA reports, the insurance market was virtually unregulated until September 2004 when new regulations were set up to facilitate the development of the sector. Under the assistance of the World Bank's FIRST initiative, the MMA has begun establishing a supervisory regime for the insurance sector, with the first mission under the project taking place in May 2008. Under this mission, the first draft of the proposed Insurance Act was proposed. As of the publication date of this report, a new insurance act is being developed and is in draft mode. The new act will give more guidelines on investments of insurers, and stipulate more of the MMA's actions.

The MMA currently has no experience with regulating many of the financial risk management instruments being considered for the Maldives in this study such as catastrophe pools, captives, parametric insurance, weather derivatives, microinsurance, or weather Guarantee products. The MMA has apparently never received registration applications for the development of such products. In addition, the new Insurance Act (which was in draft mode at the time of this report's production) does not speak to any of these instruments. The MMA representatives interviewed for this study saw no issue with developing such facilities in Maldives except that the MMA will require that the facility developed has the right management team, is able to show proof of solvency, work with local insurers, and examples in other regions where such tools have been implemented. When asked about their suggestions for the types of backgrounds needed on the management team, they mentioned that such a team should at least include representatives of insurers, regulators, Maldives Tourism Association, and the Ministry of Tourism. As long as the insurance facility is registered with the MMA, or working through a registered insurer in the Maldives, MMA will have no issues. The MMA has no say on what reinsurers are chosen (if reinsurers are indeed needed for the proposed facility), or the premiums such reinsurers may charge. Regarding taxation, all insurance facilities in Maldives are currently taxed like regular companies, and no special tax laws will apply to development of such a facility.

It is clear that both the insurance sector, as well as the regulation of the sector is relatively immature in Maldives. As a result of the only recent history of regulation in the country, regulations aren't stringent, and regulators may need external assistance if new financial instruments are introduced. It is recommended that in addition to its current duties, the MMA lead insurers to use insurance as a form of adaptive capacity for impacts of climate change by:

- 1) Requiring that insurers collect and analyse more data on weather-related losses. This may be done in coordination with the Maldives Meteorological Services.
- 2) In addition to requiring solvency analysis of insurance facilities during registration, that some monitoring mechanism be implemented to ensure that investments of insurers and their reinsurers are adequately placed in highly rated securities with risk exposures that are not correlated to risks in Maldives. There should also be monitoring mechanisms on the liquidity of these investments.
- 3) Encourage that solvency analyses on insurance facilities consider at least to some extent the implications of climate hazard exposures.
- 4) Promote any relationships between insurers and catastrophe modelling agencies that may encourage the development of climate friendly insurance products and premium incentives.

3.2 Review Of The Insurers

3.2.1 General Market

The Maldives' insurance sector and its regulatory body is still very immature. According to a 2008 World Bank report (and conversations held by the Consultant with insurers in 2014), insurance products are unavailable to most atolls, and the widespread use of cash means that people's earnings are vulnerable to losses from climate hazards and natural disasters. The list of insurance companies comprises of Allied Insurance Company of the Maldives (incorporated in 1984, this is the only local insurance company in the country), the Sri Lanka Insurance Corporation (which established its branch office in the country in 1976, and is the oldest insurance service provider), Ceylinco Insurance Company Limited (a Sri Lankan company represented through a local agent RSH Financial Service Ltd, and bringing its experience from the Sri Lankan market), and Amana Takaful(which has been providing general insurance in Maldives since 2005). There are also four insurance agents. Allied Insurance, Amana Takaful, and Ceylinco have permanent licenses issued in 2010 to write general insurance. Allied insurance also has a temporary license to write life insurance. Amana Takaful has served the Maldives market since 2003, and provides Shari'ah compliant Takaful (insurance) to the market. The institution focuses on adhering to Islamic Finance guidelines, and make no interests on investments. Amana Takaful is regulated in the same way as other insurers in Maldives.

There are currently no micro-insurers in Maldives, and the regulators believe that it may take some effort to raise awareness of the need for insurance from target clients of micro-insurers. However, Ceylinco has been attempting to develop a micro-insurance program in Maldives. There are no reinsurance companies in the Maldives. Reinsurance businesses relating to the activities of insurers are currently being provided by overseas re-insurers.

3.2.2 Insurance For Resorts

Insurers' main experience with extreme losses followed the 2004 tsunami. After the 2004 tsunami experience, insurers and resorts realized that the business interruption losses were higher than the property damage losses. Risks exposure has increased since the tsunami because of increasing values of resorts, and new building structures are that are now more vulnerable, as resorts are focusing more on aesthetics.

Resorts are more vulnerable than the other risks in Malé covered by insurers, particularly because their property values are significantly higher and the vulnerability of the properties covered are higher (as a result of some of the complex building plans). The climate risks for resorts of greatest concern for insurers are wind, lightning and storm surge risks. Wind is the most significant climate hazard risk for insurers both in terms of frequency and severity of loss. Regarding the types of claims typically experienced at resorts, these include wind damage affecting trees, which fall on buildings and roofs, as well as wind blowing off roofs. The Consultant was told by one insurer that losses can be as high as US\$500,000 for a single wind event, and by another insurer that they receive 4 to 5 claims from windstorms annually which can result in damages of US\$ 4-5 million (on high end of range of losses.) Lightning risk is considered a high frequency, but low severity risk, while storm surge risk is significant both in terms of frequency and severity.

Two product packages offered by insurers to resorts in Maldives are fire and additional perils insurance, as well as property all risk insurance. These packages cover natural hazard risks including losses from tsunamis, earthquakes, wind storms, flooding, rainfall, flooding, and storm surge. Almost all resorts take these two packages. Exclusions in insurance packages offered include beach erosion, coral bleaching, and holiday interruption due to bad weather. One insurer interviewed lists business interruption cover due to bad weather as an exclusion on their policies, while another mentions that their policies cover business interruption.

One insurer, which provides all risk cover to resorts, has found that local resorts aren't happy with all risk cover, and prefer named risk cover. On the other hand, foreign resorts get directions from parent companies on what type of packages to purchase and don't have much say in the type of cover they purchase. Most of the foreign based resorts have risks management departments outside Maldives dealing with their insurance program, and making decisions on these programs. Foreign resorts also generally approach insurers with the terms of the cover they want, while representatives of local resorts rate very low in terms of knowledge of insurance.

All resorts interviewed by the Consultant claim to have Comprehensive Cover. One resort claims this was one of the effects of the 2004 tsunami, when after the event, resorts discovered that their insurance packages didn't cover costs fully. For instance, one representative mentioned that insurance only covered 10% of his resort's reconstruction costs at the time of the tsunami. As a result, the resorts purchase Comprehensive Cover to transfer as much of these risks.

Insurers in Maldives do not provide holiday interruption cover, and none of the resorts interviewed have this cover. Resorts claim that a lack of this cover is not a significant issue for them. Two potential areas that such insurance could cover are (i) Cancellations of activities due to extreme weather events. (ii) Resorts having to cover accommodation for visitors who have to overstay their visits because of bad weather resulting in them not being able to be transported between islands, or resulting in change in the type of transportation required to move visitors (for instance, having to use speed boats instead of planes, or vice versa, because of weather conditions).

According to representatives, most reinsurers don't have good appetite for Maldives' risks. Reinsurers are reluctant because of high value of resorts, and higher exposure (from wind storm and tidal waves). The main reinsurers worked with are Tokio Marine Global, Core Re, GIC Re, Swiss Re, Allianz, First Capital Singapore, Catlin, Score Singapore, and AIG. Amana Takaful

works with MNRB Retakaful, a Malaysian retakaful. Munich Re has moved away from covering Maldives' risks since 2012 because of high fire loss claims in recent years.

When resorts were asked about their experience with insurance, premiums charged, and time to payout of their insurance, they responded that they had not experienced delays in payouts following incidents. They described insurers as “very supportive”, and that insurers cover the risks they want addressed. They believe that while there is no insurance for certain risks, such as beach erosion, the resorts are better able to handle such risks than insurers. They also believe that taking additional risk management steps (such as investing in implementation of risk reduction mechanisms, or management officials taking insurance/risk management certificate courses), or developing risk surveys of their properties has no effect on premium. They do however believe that premiums are aligned with their claims and risk exposures.

One of the main takeaways from the discussions with the resorts is that they believe that weather and climate risks are not significant for them, so they do not express much interest in paying for any additional insurance mechanism. It should also be noted that the feedback gained from resorts could be either a lack of need for any product, or a from a fear that any changes in product offering or increased pricing would be an extra issue on the resorts' management agenda, which they may not want to deal with if implemented.

3.2.3 Insurance For Guest Houses And Communities

Some of the islands have guest houses, which caters to the lower end of the tourist market than the resorts. The number of guest houses increased significantly after the amendment brought to the Tourism Act 2/99 in 2011, which allows for development of guest houses on all local islands. By end of 2012, there were 75 guest houses with a total bed capacity of approximately 1,100. Customers of guest houses may be foreign, or seasonal local travellers (who want to explore island for fishing or picnics). Some of these guest houses are owned by communities, others by individuals. One insurer mentioned not knowing of any requirements from Ministry of Tourism on insurance regulation for guest houses, so provides no cover on personal liability because there is no regulation. This insurer only covers fire for the guest houses. Another insurer mentions that guest houses take liability cover, but do not take property cover, and few of them purchase comprehensive cover. Yet another insurance agent mentions that guest houses purchase basic cover including natural perils and fire, but that insurers can't provide guest houses with all risk cover because operation is too small. However, this insurer believes cover provided to guest houses is adequate.

One conclusion from the discussions with insurers regarding guest houses is that the Ministry of Tourism needs to provide clear guidelines on insurance requirements for guest houses. It is apparent that several (if not most) guest houses are not fully protected against the risks they face. Further work need to be done to investigate the vulnerability and extent of risk exposure of these guest houses for the entire country.

The main risks faced by the tourism associated island communities are excess rainfall leading to flooding, changing weather patterns, high winds, and beach erosion. Excess rainfall leading to flooding impact result in road damage, and also property damage to a lesser extent. Change in weather patterns, particularly changes in the time of the wet season, makes it difficult for the islands to plan storage and use of water. The result is sometimes a lack of drinking water due to unexpected timing of dry periods. The dry periods can also affect water sewerage systems,

leading to a health hazard. Lack of water also affects agriculture in southern Maldives. Wind interrupts travel of sea transport to other islands from Malé, and also results in islanders getting stuck on different islands from where they need to be. Costs include not just down time, but also transportation and accommodation. Almost all islands experience beach erosion problems.

One island council President interviewed Estimates that about 5 or 6 houses on his island get damaged every year by flooding. He estimates that about 10 million rufiyaas is total loss, including 3 to 4 million rufiyaas as loss to houses, and about 7 million rufiyass in furniture and electronics damage (which may be totally damaged). Loss includes furniture and electronic equipment (which may all be totally damaged). This does not include any out of pocket ferry losses. It may be worthwhile to estimate how these losses scale up for the entire country due to flooding and other hazards.

Insurance products offered to island communities is virtually non-existent. Communities don't even take traditional insurance except mandatory insurance cover like motor bike insurance. Some islands have ferries, but insurance on these is not mandatory by law, but often required by lenders. Communities neither have nor request insurance because of lack of funding, low awareness, and the sense that insurance is not one of the important issues on their minds. They also don't like the fact that premiums are requested in annual lump-sums. A representative of one of the island communities interviewed as part of this study states that following climate related events, individuals who experience losses often have to rely on neighbours and the island councils. Recovery efforts following such events is a financial burden for the island councils. They also sometimes request assistance from external parts such as resorts, UNDP, and business people in their recovery efforts.

When asked about current and potential insurance packages for island communities, one insurer mention that there has been no demand or requirements on providing insurance to this market. The insurer does however, see a potential gap in product offering particularly for insurance covering the transportation of goods between Malé and the island communities/resorts. Another

insurer mentions attempts to provide micro-insurance packages to these islands, but mentions that physically reaching these islands is a challenge, and when they do reach them, insurers run the risk of finding that there is nothing to insure there. In targeting island communities, the insurer has started using mobile insurance mechanisms, but developments under this initiative are very recent. It also realizes that a significant issue with providing insurance to these communities is lack of awareness, and has also tried setting up an insurance institute and association, as a means of raising awareness on insurance, and to train people who will help distribute packages. The insurer believes that the first step in developing a micro-insurance product is to raise awareness of people through promotional activities. A second step is to work with the different associations in the islands. The insurer also appears willing to work with other institutions to develop a micro-insurance facility in Maldives.

3.2.4 Insurance Safari Operators And Travel Agencies

The main climate-related risks of concern for safari operators and travel agencies are changing patterns of seasons and wind risks. With recent changes patterns of seasons, safaris are less likely to predict when good weather will prevail, and can't promise customers that they'll be compensated if the experience is not ideal. Changing patterns of seasons, it also makes it more challenging to schedule maintenance of vessels. Wind can also cause loss of shades on windows of vessels. The vessel company usually covers such costs. In addition, high winds can be a threat for vessels, particularly since they have to stick to a schedule.

According to the safari operators, insurance is not made mandatory by government. However, financial institutions will require insurance to secure loans used to purchase vessels.

Two packages are offered to safari boat operators:

- 1) Total loss package.
- 2) Comprehensive package.

The safari representatives interviewed say that business interruption is not covered for safari operations, and that no one offers this type of insurance to safaris in Maldives.

The insurance packages currently offered for travel agencies include:

- 1) Insured for incidents at airport.
- 2) Third party insurance.
- 3) Fire, burglary, theft, property, health insurance for staff.
- 4) Liability insurance: Covering incidents to guests while on boats.
- 5) The docks are insured, and so are incidents occurring at docks.

In addition, during the diving season, diving centers have the option to purchase DAN (Divers Alert Network) insurance provided by Allied Insurance and Bandos Resorts.

There seem to be some negative experiences with insurers regarding payouts, insurance packages available and desired products. This is in contrast to the resorts, which all seemed content with their coverage.

Regarding premiums, travel agencies seem to value the after-service that comes with their packages, as they say premiums don't vary much between insurers. Regarding payouts from claims, one travel agency claims that payouts usually take a significant amount of time to be received, but finds insurers supportive during this process. Safari operators also mention that claims usually involve a long dispute process. Cash flow is an issue for most safaris. So paying lump-sum annual premium is difficult. Safaris believe premiums are high. The safari representatives also mention that older insurance companies have standard rates. However, the new companies have other schemes. For instance, Amana Takaful offers a payback to clients if there is no claim in a year.

4 DEMAND FOR RISK MANAGEMENT FRAMEWORK

The “Baseline Analysis of Adaptation Capacity and Climate Change Vulnerability Impacts In The Tourism Sector” report created by the Ministry of Tourism, Arts, and Culture in 2013 highlighted the results of a survey of parties involved in the tourism sector. The results from that report, as well as interviews held by the Consultant with tourism sector stakeholders have helped form a basis for the approach used in this report, by providing information on gaps in risk management, and needs to be addressed.

The most important concerning impacts for tourism operators (resorts, safari boats, tour operators) are beach erosion, coral bleaching, and “increase in extreme events”. For tourism associated communities, the most concerning climate change risks for them were those related to beach erosion, drought, rainfall induced flooding (which was reported as having the most devastating impact, and is likely to affect farming communities most), and storms, as shown in Figure 4.1.

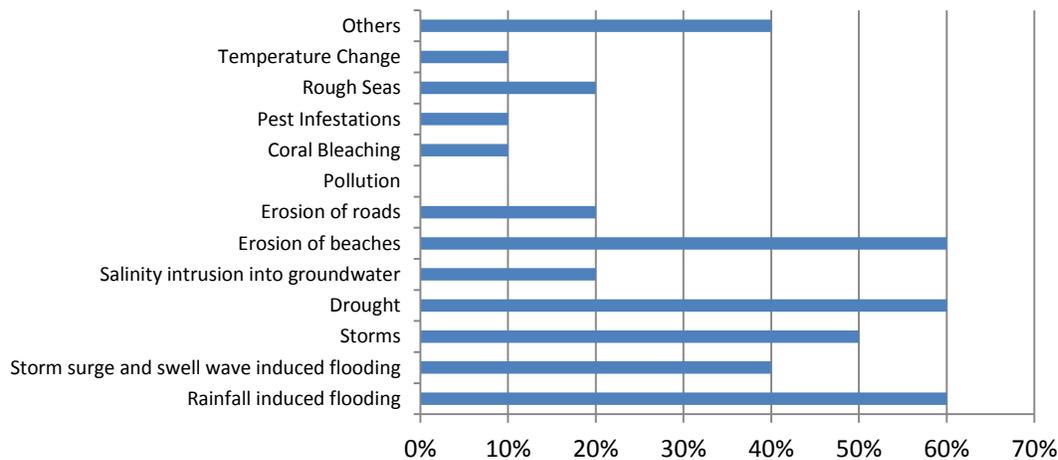


Figure 4.1: Observed impacts of climate change among tourism based communities. Source: *Baseline Analysis of Adaptation Capacity and Climate Change Vulnerability Impacts in the Tourism Sector, 2013.*

According to the TAP baseline study, more than 69% of the resorts, 62% of safaris, and 50% of the tour operators have insurance coverage for climate related hazards, including insurance for storm surges, rainfall induced flooding and storms. A few of these have other financial mechanisms (such as tourist donations, revolving funds, and environmental fees) implemented to address environmental and climate change issues, while 75% stated that “there are preferences for certain risk insurance for which currently there aren’t insurance products available in the Maldives”. Based on the baseline study, it isn’t clear exactly what these preferences for which no insurance products exist are. However, discussions with resorts and other tourism operators by the Consultant revealed some of these demands as described in the following sections.

4.1 Risk Management Packages Demanded By Resorts

When resorts and insurers were asked what insurance and risk management packages were either unavailable to resorts or requested by them, the resorts and insurers expressed the following:

- 1) A resort manager mentions that the insurance packages available do not cover sea walls.
- 2) No cover for coral bleaching. However, developing an insurance product for this isn't realistic, as no reinsurer would cover it.
- 3) Beach erosion not covered. However, resorts perceive maintenance of beach erosion as a cost of operation and the resorts interviewed have no desire to purchase insurance for this. Some insurance representatives interviewed also believe that this risk is better handled through risk mitigation efforts such as construction efforts by resorts.
- 4) One resort expressed an interest in insurance for El Niño effects. It should be noted that there is an insurance product for these effects developed in Peru but targeting micro-finance institutions.
- 5) When asked about lack of holiday interruption cover, one resort manager interviewed said he would need to see more statistics on weather-related cancellations to make any conclusions if it is indeed a problem for resorts. Another resort manager hypothesizes that weather-related cancellations may have more significant impacts on northern islands because they are so far away from Malé, and less accessible. If weather is bad, sea planes can't land (and this is the only way to get to northern islands). He observed that there is a very low percentage of these cases in Malé area. However, he recommends checking with resorts in other areas, particularly in northern Maldives. He stated that in such situations, he was unsure about who pays for flights to cancelled flights to and from Malé airport, as well as flights from Malé to other parts of the world.
- 6) One insurer has received requests for packages covering political unrest in Malé, which some tourists believe may interrupt their travel plans to intended resorts outside of Malé. While this is not a climate risk hazard, it is worth noting because of the central nature of

Malé for travel to other parts of Maldives, and so events in Malé have potential to disrupt such arrangements.

- 7) One insurance representative interviewed mentioned that following the 2004 tsunami, insurers discovered that most resorts were underinsured, even though appropriate insurance packages were available. Following the tsunami, a Sri Lankan insurer in Maldives had problems getting one of their reinsurers to support them. The reinsurer pulled out of the market, and the insurer had problems moving forward, and eventually pulled out of Maldives. If an event were to occur today (or a series of extreme events were to occur), the number of insurers and their ability to cover claims may not be sufficient as either all insurers would be affected, or one or two will take a heavy loss. As a result, the insurer may not be able to cope in the future, as it may have solvency issues. The representative believes there is a need to investigate the ability of the insurance industry as a whole can take on an extreme loss (of say US\$200million or greater). He believes there is need for some facility that will address this extreme level of loss.

4.2 Summary Of Resorts' Desire For Risk Management Instruments

Resorts described insurers as “very supportive”, and covering the risks they want addressed. They believe that while there is no insurance for certain risks, such as beach erosion, the resorts are better able to handle such risks than an insurer. The only main desire for a gap needed to be filled by risk management instruments came from the representative of one of the three general insurers in Maldives, who believes that developing an insurance pooling mechanism can help manage the risks insurers bear of resorts’ risk exposure. Another insurer believe that a pool can also be created to address issues of deductibles chosen by resorts

4.3 Risk Management Packages Demanded By Safari Operators

When asked what insurance and risk management packages were either unavailable to them or desired, the safari operators and travel agencies expressed a desire for the following:

- 1) Holiday interruption is not covered through local insurers, but may be covered by insurance with foreign travel agencies. According to travel agencies, when tourists arrive, they usually already have some type of insurance package for their vacation. If an event occurs that interrupts travellers' vacation, some safari boats will refund customers for not meeting expectations of their experience.
- 2) When an event occurs, safaris may need to change transportation plans for getting customers to the airport. This includes the cost of the next fastest way to get customer out of the country including the cost of transportation to Malé airport, and the cost of flight out of the country. Such events happen only about once every two years per company. These costs may be a few thousand dollars for the big operators. It may be worthwhile to estimate the total annual losses from such incidents for all Maldives' operators.
- 3) There is no business interruption loss cover for safaris in Maldives.
- 4) All safari boat operators interviewed say they have property insurance. However, they believe they don't get enough from their packages. They mention that they have a high deductible and low cover.
- 5) According to one of the operators, insurers "seem to be implementing packages targeting risks that don't affect Maldives, without standardizing for Maldives." One safari operator believes the packages offered to them cover risks not affecting Maldives, but leaves out some of the risks important in Maldives. For instance, for one operator complained that his initial policy did not cover tsunami risks, but other risks not pertinent to Maldives were covered. Operator had to demand tsunami coverage, which he was granted.
- 6) No insurance cover for docking.

-
- 7) Insurance doesn't cover the significant "tolling costs" associated with moving boats to Malé following an incident.

According to one safari operator, clients of safari boats are more resilient (and adventure seeking) than typical resort guests, and therefore their satisfaction is less likely to be affected by events associated with climate hazard risks. Hence, losses due to climate risks appear less considerable than for resorts. However, there seems to be some desire for a risk management product by the operators, unlike the resorts which appear more vulnerable but don't seem to demand a product.

One insurer interviewed believes there is a deficiency in regulation of risk management strategies for vessels. In addition, the insurer believes premiums for vessels are high because vessels don't have GPS systems to help them navigate around reefs, which is important as channels aren't clear, making them more prone to incidents.

4.4 Summary Of Risk Management Packages Desired By Safari Operators

All safari boat operators interviewed say they have property insurance. However, they believe they don't get enough from their packages. They mention that they have a high deductible and low cover. According to one of the operators, insurers "seem to be implementing packages targeting risks that don't affect Maldives, without standardizing for Maldives." From the insurance perspective, one insurance representative interviewed believes there is a deficiency in regulation of risk management strategies for vessels.

4.5 Risk Management Packages Demanded By Tourism-Associated Communities

Regarding possible partnerships between the tourism operators and the communities, it is important to understand the relationship between these two types of parties. The TAP Baseline survey showed that 85% of tourism operators “are aware of climate change implications on the communities”, and “76% stated that if a nearby community is affected by climate related hazards, it would impact their business as well. However, most of the safaris do not believe that the impact on nearby communities would impact their business activities”. It is a good guess that resorts may be interested in some type of partnership that helps address climate change impact on tourism-based communities. As such, potential solutions that involve partnership programs (such as the potential risk management framework presented later), is likely feasible with resorts as partners, and almost certainly more so than with safaris as partners. In fact, the survey results show that 60% of communities report that resorts “have taken some form of action to protect the island communities from impacts of climate change.”

The TAP Baseline survey also reported that 60% of losses to communities by the impacts of climate change are due to infrastructure damage, and roughly 30% to loss of income. Following an event, roughly 65% of the communities surveyed reported that damage to property puts the biggest constrain on their income. The survey also noted that repair of infrastructure “cannot be a financially easy task for these communities who do not earn exorbitant incomes.” Figure 4.2 shows the losses that have the most constrain incomes of members of these communities with regards to climate hazards.

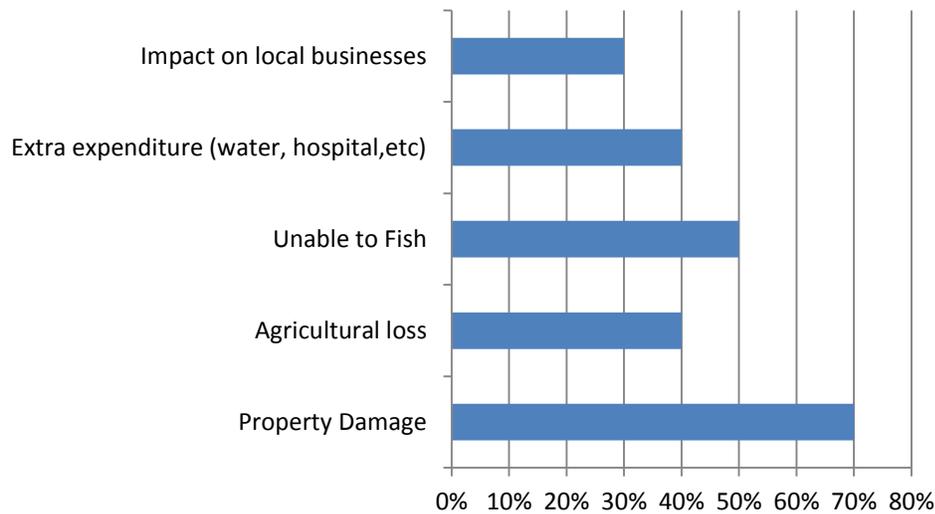


Figure 4.2: Issues putting biggest constraint on income for tourism-dependent communities.
 Source: *Baseline Analysis of Adaptation Capacity and Climate Change Vulnerability Impacts in the Tourism Sector*, 2013.

4.6 Summary Of Risk Management Packages Desired By Island Communities

Based on the TAP study, and interviews by the consultant, rainfall induced flooding appears to be a significant burden for the island and the island council that causes significant damage to property. Developing a solution for rainfall-induced flooding is likely to have the greatest impact on island communities as hypothesized in previous reports by the Consultant. Given the financial constraints of island communities and the lack of engagement of insurers, some form of microinsurance is likely the best option for island communities.

5 REVIEW OF THE MALDIVES METEOROLOGICAL SERVICES (MMS).

At this point, it is important to do a review of the Maldives Meteorological Service (MMS), as its potential and limitations were key deciding factors in determining what solutions to emphasize in this study.

The Maldives Meteorological Service has 20 – 24 automatic weather stations (AWSs), with about seven of them in operation at any given time. The AWSs are mainly installed in inhabited islands. The office has a plan to install more than roughly 1000 – 2000 additional AWSs. As a first step, the MMS would like to place another 20 extra AWSs on islands of 1000 to 2,000 people. This is the number of AWSs that the MMS determines that it requires to properly service the country. The MMS also operates just one Doppler radar system. However, it currently does not work. The MMS utilizes satellite picture output developed on supercomputer systems in India, Bangkok and China. However, the MMS doesn't have access to global satellite data.

The MMS has historical weather data from 1974 onwards for two locations – Malé and Gan. It also has historical data for a third location starting in 1990, a fourth starting in 1992, and a final location from 1994. Types of data collected at each of these locations are wind, rain, humidity, and air pressure. The data is collected hourly in some cases, and every three hours in others.

The Maldives Meteorological Service (MMS) currently provides forecasts of three to five days because of the type of infrastructure currently available to the MMS services. If the office had a dense network of observation stations, it could provide longer forecasts.

More information on the MMS is detailed in Chapters 6 and 11.

6 PROPOSED FINANCIAL RISK MANAGEMENT SOLUTION FOR RESORTS/GUEST HOUSES

Several risk management solutions were considered for tourism operators and tourism associated communities. These included weather derivatives, micro-insurance solutions, captives, catastrophe insurance pools, index insurance solutions, and weather guarantee products. Based on interviews conducted with stakeholders (particularly those representing resorts, guest houses and insurers), the main gap in the development of a financial risk management tool is in the development of a risk pool to support insurers in the event of an event causing a significant loss to resorts.

Based on interviews by the Consultant, the main gap in provision of insurance and risk management to resorts is the potential for insurers being unable to sustain the effects of a severe hazard loss event. Of the tools available for addressing this severity and frequency of risk, a risk pooling mechanism is the most viable instrument. The proposal is for a pool targeting insurers of resorts. However, the same instrument can address the issues faced by guest houses, which is a lack of regulation on insurance for these institutions, which may leave them potentially underinsured. Ideally such a pool would be a parametric insurance facility (meaning that payouts are based on the severity of the hazard event) to reduce cost of administration and management. However, given the limited meteorological infrastructure in the Maldives, and limited historical meteorological data and technical resources, a parametric solution cannot be advised. In the short run without significant modelling input and infrastructure investment.

Such a pool will need to cover at the very least the climate hazards that result in the most significant loss for resort, losses from wind and storm surge. However, from an operational cost optimization perspective, it is best to create the pool to cover most climate and natural hazard risks. Examples where similar mechanisms for natural hazard risk management exist are in Turkish Catastrophe Insurance Pool (TCIP), and the California Earthquake Authority. The TCIP is an insurance system which compensates beneficiaries following earthquakes in Turkey. The TCIP works through Turkish insurers to provide compulsory earthquake insurance through the

scheme. The goal of the scheme is to insure all covered houses against earthquake risks using affordable premiums.

6.2 Operations Of The Tourism Risk Insurance Pool

The proposal is to create an insurance facility that sells climate risk insurance policies (and potentially policies covering other hazards) through Maldives' insurers that encourages tourism operators (resorts and guest houses) to reduce their risk exposure to climate risk losses particularly low probability but high impact events.

The differences in the needs of the different stakeholders and the severity of risks make the structure of the pool somewhat more complicated than a normal catastrophe pool as explained below:

- 1) For guest houses, insurance is not mandatory, and as a result guest houses currently appear to purchase basic insurance packages, and not comprehensive cover. One reason for this is that insurers consider these institutions too small to provide comprehensive packages for them. As a result, guest houses face significant risk from severe events related to climate and natural hazards that are not covered by current insurance policies. However, with the growing number of guest houses in Maldives, the exposure of this class of tourism operator is growing. If guest house insurance is made mandatory, and pooled (as proposed to be done through the insurance pooling mechanism), this increases the chances of finding comprehensive cover for this class of assets at affordable rates. The target for the pool regarding guest houses is to provide affordable comprehensive cover for them, as such cover is not currently available.

- 2) For resorts, discussions with insurers reveal that there is a risk that insurers may not be capable of enduring significant losses if a severe event related to climate risks occurs, or if a series of smaller events were to occur and impacting several high value resorts get impacted simultaneously. It is possible that such events could make even more reinsurers

lose appetite for Maldives's risk, which would have a ripple effect on insuring other risks in the country. In a sense, a pooling mechanism not only helps resorts, but also insurers who don't have to worry about the burden of compensating clients following severe risk events related to climate and natural hazards.

The proposed pool will work with insurers, which will act as the delivery channel for policies, meaning the insurers will sell policies directly to resorts and guest houses, be responsible for marketing of insurance policies, and for delivery of compensation to the resorts following events. The insurers will educate resorts on processes for claims, triggers, and payouts following incidents. Following incidents on the resort, the insurer is contacted, and a claims agent will visit the resort, determine the losses and create a loss report. Compensation will be based on what these claims agents report as the loss to the resort, and the insurer will then work with the insurance pool to deliver a payout, depending on the payout, and if a payout is actually approved.

Achieving financial sustainability will require a reliable source of premium income, and a strategy for reducing costs of the facility. The main sources of income will need to be premium payment by the resort to the insurer depending on the claims history of the resort as well as the risk layer being absorbed by the pool. The insurer will then work with the pooling facility to determine the premium to be paid to the pool to cover extreme risks. In return for its delivery channels jobs and marketing of insurance, the insurer receives a commission. The commission serves as a means by which the pool incentivizes insurers to sell more policies, and therefore ensure that all beneficiary resorts and guest houses have sufficient coverage.

To ensure long-term sustainability of the pool, certain structures need to be implemented. To reduce the risk exposure of the pool, it will be best for the risks of the pool to be placed with multiple reinsurers. This reduces exposure to any one reinsurer, and it also gives some bargaining power to the pool regarding pricing.

To reduce the cost of administration, and to avoid moral hazard impacts, such a pool would ideally be a parametric insurance facility, meaning that the payout to the participating parties would be directly related to the severity of the impact that affects them. Studies on catastrophe finance also indicate that the affected institutions which recover best in the long term are those that receive a significant payout immediately following an event, and this is one advantage of a parametric insurance facility. Costs are reduced because it reduces the administrative costs of administration and adjusting, including travel and accommodation costs for adjusters servicing far out islands following incidents. However, the meteorological infrastructure in the Maldives is currently not able to support a parametric insurance facility. Hence, the proposal is for an indemnity based pool, in the short to medium term, with a possibility of transitioning to a parametric facility in the long term, providing investment in meteorological infrastructure and data collection allow for such a case.

6.3 Roadmap For Creating A Tourism Risk Insurance Pool

The most important steps for developing a risk insurance pool facility follows:

1. Determine what climate risks to cover. The pool should at the very least cover losses from wind and storm surge, but ideally need to be a multi-peril instrument. For resorts, the main climate risk is potentially greater wind damage to roofs. However, natural hazard risks such as tsunami risks are also a significant threat. The pool proposed is expected to cover losses from medium (for guest houses) to severe events (for both guest houses and resorts). Typically catastrophe risk pools address only the most severe events. However, for the risk profile of the Maldives, a key issue is the need to make insurance and risk management accessible to several aspects of the tourism sector, and hence the pool proposed can only do this if it targets some events which are less severe than in the case of most catastrophe pools, but severe enough to be a burden on the stakeholders impacted. The advantage of such a pool for tourism operators is that it ensures that insured parties are adequately covered. By pooling risks, there is a possibility that the insured will be more affordable for certain parties.
2. The Ministry of Tourism (with the backing of the MMA) will need to have a requirement that insurers pass on some level of risk from guest houses and resorts to the pool. One of the most important aspects of such a pool is that it will need a large enough value of risks to be insured through it. Such a pool will require a large number of parties, preferably in geographically diverse locations. The government can play a role here, by mandating that all insurers place the most extreme layer of resort risk exposures (as well as lower level risks for guest houses) through the pool.
3. The pool will need to be licensed as an insurer in Maldives. This needs to be coordinated with the MMA. Discussions with the MMA reveal that the institution will need to show how sum insured for the assets to be insured is derived, an

actuarial/solvency analysis of the proposed facility, and details of the management team of the proposed facility. Their suggested management team for resort pool should at least include representatives of insurers, regulators, Maldives Tourism Association, and the Ministry of Tourism. The MMA will also look at the facility's projected finance for next five years. As long as the insurance company is registered, or working through as registered insurer in the Maldives, MMA will have no issues. The MMA will require a 2,000,000 rufiyaa security deposit per class of insurance, an annual fee of 20,000 rufiyaas per class of insurance, a minimum capacity requirement of 10 million rufiyaas per class of business, and an application fee of 50,000 rufiyaas per class of insurance.

6.4 Potential Role For The Maldives Meteorological Services (MMS)

The pool described can be an indemnity based pool or a parametric insurance based pool. The former is one where beneficiaries of pool's policies are compensated on their actual economic loss, up to the limiting amount of the insurance policy. A parametric insurance facility is one where beneficiaries are compensated based on the severity of the event affecting the insured, and as a result there may be differences between the actual loss to the beneficiary, and the amount compensated. The benefits of a parametric insurance facility include quick payouts, and lower costs of administration, which potentially can translate to lower premiums. There is also potential to create a hybrid indemnity based /parametric product, where some aspects of the pool are handled like an indemnity insurance facility, and others like a parametric facility. For both the parametric and indemnity based products, good historical meteorological and claims data is key. However, data is much more relevant for parametric insurance products. Also essential for parametric products are sources of independent, verifiable meteorological data. Given the limited historical meteorological data, and infrastructure in Maldives, the Consultant proposes an indemnity based product. However, there is significant opportunity for a parametric insurance facility, and if the right infrastructure were available, this would be the suggested mechanism given the high costs that may be involved managing an insurance product on so many islands, where transportation will present challenges for insurers and insurance agents..

For a parametric pooling product to be developed, weather stations will need to be installed on each resort involved, and close enough to each of the guest houses and island communities involved. According to an MMS representative interviewed, getting an automatic weather station (AWS) "close" to a resort, may not be good enough, as there will be differences between even very close islands regarding certain types of risks, particularly flooding and wind. The AWS will have to be at a maximum distance of 10km to 20km from the points it is to be representative of. One challenge raised by stakeholders during the Consultant's visit to Maldives was with having an AWS on the resort, and its potential for data from the AWS to be manipulated. However, the representative of the MMS interviewed suggests that data manipulation is not a serious concern.

To ensure that data from AWSs on resorts is not manipulated by the resorts, the MMS can do checks on temperature, humidity and other weather conditions to check for consistency of data received and to help verify data reported by AWSs. Checks for consistency will ensure that no manipulation was done to AWSs at the resorts.

According to the MMS, the best source of wind data in Maldives for such a pool would be from installing a system of AWSs. Regarding rainfall an alternative used in other countries is TRMM data. However, when the MMS representative was asked about any potential challenges with using TRMM data, he lists the following problems with using TRMM:

- A) Resolution of TRMM data is too large relative to the small size of the islands of the Maldives and so TRMM data may not be good enough.
- B) Topography variation within any specific island varies to an extent that TRMM data will not appropriately capture rainfall impact information on several islands.

When asked about any issues he foresees with placing AWSs on island communities, the representative says the problem with this method is vandalism and people interfering with equipment.

7 OPERATIONS OF SOLUTION FOR ISLAND COMMUNITIES

This chapter is an extension of Chapter 5, but focusing more on the operational aspects of a separate solution targeting tourism-associated island communities. This section deals with the considerations and challenges for setting up a risk management pilot program for island communities. Regarding the considerations needed to develop financial instruments to deal with climate hazards for island communities, the most important considerations are as follows:

- Affordability of the solution for the client including any external potential sources of premium, or overcoming barriers to involvement in the pool, say through use of credit facilities to overcome issues with lump-sum annual payments.
- The geographical spread and hazard exposure diversity of the targeted islands must also be considered. The greater the geographical spread and hazard exposure diversity, the more likely the risk exposure of the financial instrument(s) used will be diversified away, and be able to manage the risks it addresses. Diversification also reduces the cost of the scheme. The wide spread of the islands of the Maldives makes it a good alternative for developing such a scheme. However, an even better scheme would be development of a pool of risks located in some of the other countries in Asia, and the Indian and Pacific oceans.
- Best practice involves use of financial risk transfer tools in coordination with loss prevention activities such as improving early warning systems, developing hazard-resistant infrastructures, maintaining and building sea walls, developing disaster preparedness plans, and encouraging a culture where prevention and resilience are of the utmost importance.

7.1 Proposed Financial Risk Management Instrument For Island Communities

This section will focus on the major steps for developing a financial risk transfer tool for tourism associated island communities. As opposed to most tourism operators, island communities have a different set of challenges which must be considered in developing a solution for them and which makes their solution somewhat different from that for resorts, guest houses and safari operators.

Four critical challenges are lack of awareness of risk management products among island communities, lack of insurance packages available to them, the relatively small total value of the property to be insured, and the wide distribution of these small values across the country which make them less appealing for insurers. They also have little exposure to risk management instruments for dealing with climate risks – insurance has very low penetration.

Several solutions were considered for these communities including weather insurance, and index-based insurance products. However, there is a lack of meteorological infrastructure and data on most of these islands that poses significant barriers to developing such solutions. Instruments such as catastrophe pools and catastrophe bonds are only ideal for addressing a large value of risks, which these communities do not appear to have. Given the expected small value of the risks on many of these islands, and the limited financial resources available to many of inhabitants and island councils, premium income from such a solution is expected to be small. It is proposed that a microinsurance solution works best for targeting island communities.

Microinsurance is an insurance product catering to low-income individuals. Most microinsurance models are based on low-premiums, but high number of policies where the transaction costs for the facility is kept to a minimum. The target populations for such facilities are usually highly vulnerable to the effects of climate hazards and their effects.

Costs for developing such a product in Maldives can be reduced by sharing resources with the pool proposed for resorts and guest houses. A micro-insurance facility managed by the pool is proposed. It is possible that such a pool be backed by an index insurance mechanism, as proposed in an earlier draft report. However, recent interviews with stakeholders show that not only is the meteorological infrastructure and data on most of these islands unavailable (as pointed out as a challenge in the previous report), but the beneficiary education and technical expertise required present significant challenges for such a facility at this point. Even though an index-based solution would be more cost-effective, it will be a significant education and infrastructure development challenge to develop this mechanism at this point.

It is worth detailing feedback from one of the interviews held by the Consultant with a representative of one of the insurers in Maldives, Ceylinco, as the proposed solution is based on some of the points raised in this interview. The following is a summary of part of the interview with the Ceylinco representative.

When the representative was asked about developing a micro-insurance product for community islands, the representative mentions that Ceylinco is planning on developing a micro-insurance package, and have reached out to the MMA (regulators of insurance in Maldives) about setting up this facility. Ceylinco, however, is having problems accessing some of the islands. It also runs the risk of finding that there may be nothing to insure on some of the islands. They have tapped island councils and set up one office in Addu, and another planned in Fuvahmulah to target main population centres.

In targeting island communities, they have started using mobile insurance, but developments under this initiative are very recent. The Ceylinco representative also realizes that a significant issue with providing insurance to these communities is lack of awareness, and has also tried setting up an insurance institute and association, as a means of raising awareness on insurance, and to train people who will help distribute packages. The representative believes that the first step in developing a microinsurance product is to raise awareness of people through promotional activities. A second step is to work with the different associations in the islands.

When asked if Ceylinco would be willing to work with other institutions to develop a microinsurance facility in Maldives, the representative mentions that Ceylinco is willing to work with other parties on developing a microinsurance product.

Figure 7.1: Summary of interview with Ceylinco representative concerning microinsurance.

In lieu of the challenges to developing an index based product, an alternative solution is presented here that is likely more feasible in the short term. The proposal is to work with Ceylinco (and any other willing insurer in Maldives) to develop a microinsurance product in Maldives. Ceylinco already has previous experience developing microinsurance products in Sri

Lanka. However, it should be noted that efforts to develop such a facility presents challenges, as the Ceylinco representative pointed out. Not only may the risks in these islands be small, the costs of reaching the islands high, but most importantly the island communities don't have ready access to financial resources to pay premiums. In addition, most similar schemes take advantage of the reach of an existing microfinance institution to reach customers. However, the Maldives has very little experience with micro-finance. However, by partnering with a willing insurer, and further cutting costs through the use of the pooling mechanism proposed already, costs may be reduced to a point where such a facility is viable.

7.2 Premium Sources, Compensation, Insurance Partners

The main challenges for operating a microinsurance product in Maldives are:

- 1) Achieving scale given geographic spread and climate risks.
- 2) Financial sustainability.
- 3) Compensation and loss determination mechanism.
- 4) Education of beneficiaries.
- 5) Development of technical staff.

Microinsurance solutions tend to depend on low premiums, but a high volume of policies sold to achieve scale. To achieve the number of insured addressed, it is recommended that any solution targeting communities not be restricted to just the tourism sector, but include providing insurance and risk management solutions to people associated with other sectors.

Another aspect of scale that is important to achieve is to develop enough insurance representatives to cover the entire Maldives (or at least the most likely islands where an impact can be made), while keeping the costs of hiring minimal. The job of the representatives would be monitor, manage and report on risks in the different atolls. Each representative may be

assigned to manage operations for a group of islands, and would be responsible for working directly with island councils and tourism associations to understand and know what relevant assets including houses and roads (including their value, and their normal condition) exist on each major island. Once a representative is familiar with these risks, he/she can work with willing insurers (or the insurance pool facility proposed) to develop a policy for each island in his or her territory. The representative will report back to the island councils which they represent to highlight requirements for claims, triggers, and payouts following incidents. Following incidents on the island reported by the island council to the representative, the representative would visit the island(s), determine the losses and create a loss report. The representative then works with the insurer (or insurance pool) to determine a payout, which is delivered to the island council, and expected to be used by the island council for recovery efforts.

Achieving financial sustainability will require a reliable source of premium income, and a strategy for reducing costs of the facility. The two main sources of income will need to be some type of premium payment by the government, and contributions from resorts. Two other sources of premium include grants from development agencies and local businesses in Maldives. Resorts may also be encouraged to participate in the development of such funds through their Corporate Social Responsibility (CSR) programs for the islands that are most closely associated with. Interviews with stakeholders reveal that it would be important that such islands be in close proximity to the resorts to ensure that there isn't disputes of fairness of contributions by different island resorts. A pilot program should therefore consider this point when determining what islands to initially target. Regarding island councils, while they perceive recovery costs as a significant costs for them and they realize the importance of insurance, there is likely to be some resistance for them to pay premiums. It is likely that the government will have to pay some of the premiums for island councils. The government already makes annual budget allocations to the island councils. It is recommended that the government allocate some funding to each council specifically for pre-disaster risk management including allocation for microinsurance premium payment on behalf of the island councils. The different island councils will likely have to negotiate with government on what a reasonable allocation would be. This can be done through a

sub-allocation of the budgets they are allocated by the government. Also, to incentivize island councils to participate, it will be important to educate them on the benefits of such a program, and offer a credit mechanism to allow them to pay premiums in instalments. To help build starting capital for the facility, it may be important to request assistance from development agencies and commercial businesses, particularly those linked to the island beneficiary in some way. To reduce costs of the pool, the insurance representatives hired will likely need to be seasonal or temporary workers. It is hoped that as more islands are covered, the operational cost (including training and transportation costs) of the pool will be reduced, and the trust of customers needed to increase the likelihood of adding more customers and premium contributions will increase, and therefore the likelihood of financial sustainability will increase.

Scaling up this facility will involve developing a pilot program in one location, and scaling it up to cover the different risks faced in the different island communities, while training and hiring the required number of insurance representatives required to service the growing insurance portfolio.

The following sections detail a scale up plan for the facility.

7.3 Identification Of The Climate Risks To Be Covered.

As outlined in Chapter 4, the climate risks that impact island communities most are heavy rainfall leading to flooding, drought, beach erosion and heavy winds. This was the conclusion drawn from both the TAP baseline study, and interviews held by the Consultant with representatives of island communities. Based on both investigations, rainfall induced flooding was the most significant concern for tourism-dependent communities. A product targeted at rainfall induced flooding will likely have the most impact (in terms of number of people protected and number of island councils that will be interested in the product). It is worth noting that rainfall was not the most significant climate risk of concern for tourism operators. If the goal is to have an impact on as many people as possible, then a product targeted at the tourism-associated communities will be a preference over those only addressing tourism operators for developing a pilot program. For these reasons, the suggestion is that a pilot program for island communities be based on a rainfall index in the first phase. A second phase should consider the introduction of wind and drought products. With time, and the development of the right technologies and modelling processes, future phases of development should consider a product addressing swell wave risk.

7.3 Identification Of The Potential Pilot Location.

In choosing a pilot location, it is important to consider the regions of the country where these risks persist. The initial location needs to be one that is exposed to the type of risks we are trying to address, and the location should have a significant enough population of the communities targeted (where it is assumed that population is a somewhat good proxy for the total value of assets to be insured on an island), as well as a significant number of the tourism operations in its vicinity. In particular, the islands chosen will need to be in close proximity to a resort with which it is associated to increase chances of premium contribution from associated resorts. It may also be worth determining before a pilot, what resorts would be most interested in contributing premium to the facility, and using this as a decision factor in determining the pilot locations and scale up plans.

In determining the ideal location for a pilot study, we use a combination of the population of the atolls along with the number of resorts in the vicinity of the atolls. Table 7.1 shows the number of resorts in each atoll as determined from a combination of different sources. Please note that the number of resorts may not be exact, as they were gathered from several secondary sources. The table also shows the population of each atoll based on data from the Ministry of Planning & National Development.

ATOLLS IN IN CLOSE PROXIMITY TO:	NUMBER OF RESORTS IN ATOLL	POPULATION OF ATOLL	POPULATION EMPLOYED BY HOTELS AND RESTAURANTS
Hanimaadhoo			
Haa Alifu	3	13,495	170
Haa Dhaalu	3	16,237	114
Shaviyani	1	11,940	48
Male			
North/SouthMale	40	15,441	3,953
North/SouthAri	24	14,155	2,679
Kadhdhoo			
Laamu	1	11,990	68
Thaa	1	8,493	120
Kaadedhdhoo			
Gaafu Alifu	2	8,262	12
Ghaafu Dhaalu	2	11,013	69
Gan			
Seenu	3	18,026	175
Gnaviyani	1	7,636	47

Table 7.1: Number of resorts, population of atolls, and number of employees of hotels and restaurants in atolls close to weather stations. Sources: The number of resorts was obtained from several secondary sources and are only estimates. The population and employment figures are from the Ministry of Planning & Natural Development.

An obvious flaw to using the populations and employment figures in Table 7.1 is that they do not necessarily reflect the population of the tourism dependent communities we would like to address. However, in the absence of better data, and limited time and resources available for this project, these numbers are considered as a proxy, and serve as a good starting point for determining potential candidates for the location of a pilot program.

One insight here is that the population of these atolls is small. Limiting the scope of this study to communities that are dependent on tourism has serious implications for the market size and viability of a microinsurance product. As such, a suggestion is to broaden the scope of those to be reached from just tourism dependent communities, to anyone living in an island community who wishes to participate in the facility.

The data suggests that the region which offers the greatest impact is in the Malé and Ari region. This area may offer a good region for a pilot program. Another consideration is the climate risk exposure between the different parts of the Maldives. Figure 7.3 shows the latitudinal natural hazard variation across the Maldives.

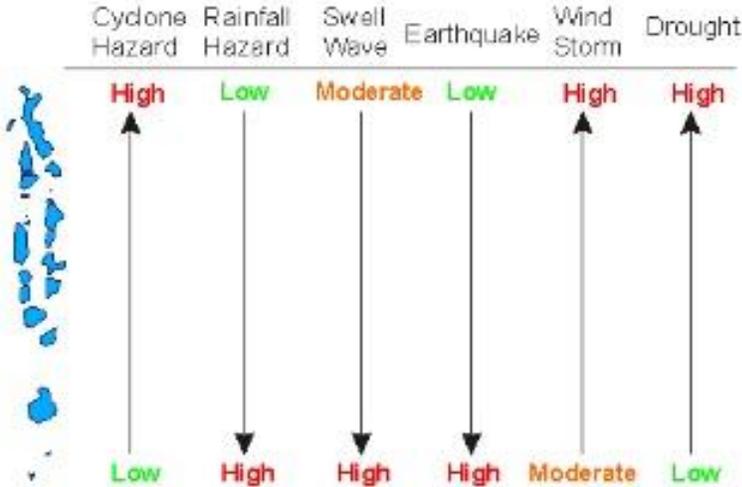


Figure 7.3: Lateral natural hazard variation across Maldives. Source: Detailed Island Risk Assessment In Maldives, December 2007 (Draft Final Report).

Given the differences in exposure of the different atolls, an expansion plan for a rainfall product would look different from a wind or drought based product. A suggested phased strategy for growing the facility is detailed in the following section.

7.4 Roadmap For Scale Up Plan For Pilot Program

- 1) Develop a Memorandum of Understanding (MOU) with one or more Maldives insurers interested in microinsurance (such as Ceylinco) to act as a partner in developing its microinsurance facility.
- 2) Facilitate the hiring of microinsurance agents to help market the products and who will be responsible for knowledge of risks on targeted islands. The agents will also have to work closely with the island councils, but be perceived by the communities as politically independent.
- 3) Develop a solvency analysis of the planned facility, showing where such products have been developed in other regions, and the financial forecasts of such a facility. Submit these as well as details on management team to the MMA as part of the registration process for creating a microinsurer.
- 4) Work with reinsurance broker and reinsurers to develop policies for the product, firstly for a product protecting island community assets against rainfall induced flooding.
- 5) Scale up facility as follows:

Phase 1: Launch of a rainfall index insurance scheme in the Malé area to cover as many people in tourism associated communities as possible.

Phase 2: Extend the rainfall index insurance scheme to atolls south of the Malé area, where rainfall risks increase.

Phase 3: Launch of a wind/drought insurance scheme in the Malé area.

Phase 4: Extend both the rainfall and wind/drought products north to increase coverage of drought and wind coverage, and rainfall induced flooding to a lesser extent.

Phase 5: Extend the rainfall, wind, and drought insurance products across the entire Maldives.

7.5 Key Stakeholders, Partners And Delivery Channels.

In rolling out the proposed financial risk transfer instrument, a key step is the identification of stakeholders in the target atolls that have access to the customers the product is to reach. The purpose of these delivery channel stakeholders is to provide a convenient way for the insurance facility to quickly reach targeted associated communities while minimizing set-up and operating costs. The goal of the partners as delivery channels would be to facilitate the purchase of microinsurance policies for targeted clients, to educate these customers, and to facilitate payouts to customers following events.

In this proposal, insurance representatives (to be hired) act as the primary delivery channel. Also important are the roles of the insurer (for instance, Ceylinco seems willing to partner with other agencies to deliver a microinsurance product), and the island councils.

Regarding the education of clients, the primary responsibility of education should fall on the insurance representatives, who will need to educate the island council members as well as island community members. They will need to ensure that the island council members and community members truly understand the risks faced, the need of the insurers to request a premium, and how compensation is made, and under what conditions compensation is made. They will also need to understand the behaviours of community members towards risk management, and what tactics are used by the communities to manage climate risk impacts. The representatives will need to understand the financial health of their community, the government, and the resorts with which these communities are associated, and how best to incentivize members of the community (particularly island councils) to participate.

The insurance representatives will need to interact with insurers, as they'll to work with them to issue insurance policies and compensation packages following events. They will also need certification, some of which can be earned through education programs developed by insurers.

In the proposed system, the hiring and training of insurance representatives is preferred because it allows for choosing individuals with complete independence from the compensation decision making process, which other alternatives may not. Some of the other types of institutions considered involved the following, but were deemed to lack the independence required.

- 1) Microfinance institutions: Unfortunately, there aren't any significant microfinance institutions in Maldives with the nationwide reach required by this program.
- 2) Potential channels are financial institutions, associations, and NGOs which deal with the associated communities being targeted. The following are associations and NGOs which were initially of interest as delivery partners to communities:
 - a) Maldives Association of Tourism.
 - b) Tourism Employees Association of the Maldives.
 - c) Maldives Association of Travel Agents and Tour operators.
 - d) Divers Association of Maldives.
 - e) Maldives Fishermen Association.
 - f) Liveboard Association of Maldives.
 - g) Maldivian Farmer Association
- 3) The use of financial institutions as delivery channels for reaching, educating and marketing of financial risk transfer instruments addressing climate risks is common in regions where such instruments are used to reach vulnerable communities. In reviewing the status of the financial sector, the unique position of the sector within the context of developing countries, and South Asian countries in particular must be addressed. While the country's per capita GDP ratio is high compared to most South Asian countries, there are wide disparities in the reach and usage level of the sector. Studies show that about 30-35% of the atoll populations and about 55-65% of the Malé population is banked, reflecting the limited access to finance faced in the country (compared to most developed countries), which some argue has restricted private sector development. The limited reach

of the banking sector presents a challenge for the delivery of financial risk management instruments. At the same time, the targeted vulnerable communities in the case of the Maldives are of a very different nature to those in other South Asian countries. For instance, these communities have better access to credit and have higher incomes on average than in other South Asian countries. Therefore the typical microinsurance programs seen in many developing countries may not work in the case of the Maldives.

Of the financial institutions, the most promising delivery channel partner was the Bank of Maldives (BML), particularly if targeted through its Development Banking Cell (DBC), which was started in 1990 to provide financial services that reach distant atolls. While there are other financial institutions in the Maldives, the BML is an automatic choice given its substantial outreach and branches covering almost all atolls. The BML network accounts for the majority of financial institution branches in the country, with 25 branches (*BML 2012 Finance Report*). In addition to reaching customers through its branches, the bank employs a fleet of mobile banking boats (Dhonis) to provide financial services to regions not easily accessible. Such reach will be beneficial if the insurance product is to scale up to reach communities across the Maldives. The DBC has also tried several programs to reach communities in the outer atolls and their experiences dealing with these communities can provide lessons in the design of an insurance scheme targeting similar populations.

The argument can also be made that the BML will be a willing and likely partner given its previous initiatives to reach vulnerable communities that are similar to those being targeted in this project. The BML has been involved in several microfinance and credit outreach programs to reach similar communities through the “Atolls Credit and Development banking Project”, the “Southern Atolls Development Project”, as well as several other projects initiated by donor agencies related to recovery efforts from the 2004 tsunami. Such programs targeted communities involved in transportation, small and medium sized businesses, agriculture workers, fishermen. Some of the people involved

may have been linked to tourist activities. Experiences gained by the BML through these programs will be invaluable in reaching tourism-dependent communities, and other communities that may be affected by such risks.

8 USE OF BUDGETARY ALLOCATIONS, RISK RESERVES AND RISK RETENTION

Budgetary allocations, building of risk reserves and risk retention are instruments generally used to address high frequency/low severity events. High frequency risk events are those that occur more than once every year to once every two to five years. Examples of these are recurrent flooding and beach erosion. These are events that happen with high certainty under different climate change scenarios. They also include losses from long-term foreseeable risks such as sea level rise. Traditional insurance is generally not appropriate for these types of events. One clear gap in the proposals developed so far are that they cover high loss severity events (as in the case of the risk pool for resorts and guest houses), and medium severity events (as in the case of the microinsurance facility, and the pooling of guest houses). In general, the most appropriate financial options for dealing with such risks associated with low severity/high frequency events are risk retention , risk reserves (where the tourism institution builds up capital over time to help it cover the costs of events, should they occur) and budgeting mechanisms (where such institutions or communities can set aside annual or periodical budget allocations that help it build a reserve.)

For resorts in Maldives, financing of such efforts is seen by resorts as an operational activity, and not one that necessarily needs dedicated instruments. Interviews with resorts show that they have no desire for such instruments. This is because the type of resorts in Maldives have enough financial and human resources to address these problems should they occur, even for extreme events. Also, resorts deal with these high frequency/low severity issues on such a frequent basis that they expect these events to occur, and so have developed infrastructural, engineering and budgetary resources to address them. The potential losses from these risks is already incorporated as a cost of doing business for resorts, and therefore no separate external mechanism is desired by resorts for dealing with these risks.

Based on conversations with resorts and insurers, as well as an analysis of the nature of resorts in Maldives, it is concluded that developing financial instruments to help the resorts deal with high

frequency/low severity risks would be inefficient as the resorts do not demand this type of mechanism. Safari operators also appear resistant to such risks. However, island communities are prone to these risks and lack sufficient resources for addressing them.

Island communities do not appear to have the financial resources to develop such a mechanism without intervention from the government (or other agency support). In addition, as expressed by an island council representative interviewed, there is a feeling that risk management is not one of the most important issue on the minds of community members. It is unlikely that building reserves would be a feasible alternative if the island councils or community members are relied on to fund such a mechanism on their own. Of the financial risk management instruments available, the most feasible option is some type of budgetary allocation mechanism made by the government for the various islands and specifically intended to fund pre-disaster preparedness. Budgetary allocations are most realistic mechanism in the short to medium term because the island councils already have a mechanism for managing budgetary allocations from the government (regardless of any arguments about the level of sophistication of such management).

Consideration can be made to using a portion of the budget allocations for building up adaptation measures including coastal protection, beach nourishment, groundwater recharge, improved ground water and waste management, water efficiency measures, coral reef and lagoon protections measures, and so on. Given the limited resources of island communities, these mechanisms will need to be developed by the government (and other institutions that have the financial or technical resources such as resorts or development agencies) on behalf of the island communities, and in coordination with island council members who will be in the best position to determine level of funding or budget allocations required, and make the best case to the government on how such mechanisms will be used. To encourage private-sector participation in such a scheme, the government may offer tax breaks to external parties (such as resorts or commercial businesses) which contribute financially to the capitalization of such mechanisms. Resorts may also be encouraged to contribute to allocations through their CSR programs and as a way to boost employee morale of staff.

9 ROLE OF GOVERNMENT AND REGULATORY/LEGISLATIVE CHANGES REQUIRED

9.1 Role Of Government, Regulator, And Ministry

There is low penetration of insurance in the Maldives. In the tourism sector, this lack of penetration is clearest among island communities. With respect to island communities, insurers have found it difficult to reach some of these communities, and even when they are able to access such communities, the question is raised as to if property on such islands is valuable enough to be insured. There are limits on how private sector institutions can fix the insurance and risk management issues in Maldives. Government intervention will be needed to develop a mechanism that: 1) incentivizes socially adequate levels of insurance for island communities 2) enables mechanisms that ensure reinsurers' appetite for Maldives risk is at least maintained 3) provides adequate cover for private sector stakeholders such as guesthouses, resorts and safari operators.

As a result of lack of insurance, and general lack of awareness or economic incentives, island communities generally adopt a reactive response to incidents for fixing or replacement of damaged assets from events related to climate hazards. These include island councils relying on their budget for recovery efforts, diversion of resources from other projects, financing from business people, and the organizations such as the UNDP. Relying on such methods of funding raises several problems including limitations on reliability of source of funds and the speed at which some of these sources can be reach the communities. The mechanism proposed should help provide faster access to financial resources needed following events, and reduce reliance on external sources.

The government can create conditions for private market solutions to emerge by incentivizing a government-sponsored pool of insurers, as proposed to ensure that insurance is available and

adequate to tourism operations such as resorts and guest houses, and to island communities through a microinsurance facility. The following are suggested roles for the government:

- 1) Make insurance compulsory for certain target groups, such as guesthouses and also mandate that insurers place some of their risks concerning resorts through the pooling mechanism. Regarding resorts, the insurance needs to be mandatory to prevent insurers from only placing “bad” risks in the pool. Regarding guest houses, it needs to be mandatory to ensure that the value of risk is large enough to make attractive to (re)insurers, and also to ensure that guest houses are indeed actually protected against climate hazard risks.
- 2) Ensure that the pool is financially sustainable in a way that ensures that it is sufficient to meet claim requirements should they arise, and also limits the government’s fiscal exposure to extreme risk events. A solvency analysis of the pool will need to be done on a periodic basis.
- 3) Regulatory hurdles for maintaining such a pool are developed, and ensure that at least the minimal enforcement mechanisms are instituted.
- 4) Develop a mechanism to ensure that information on the insured held by the pool is accurate. This may involve training and development of insurance agents to survey properties, and act as enablers of claims payments.
- 5) Development of a both a pool management team and a funds management team. The pool management team should comprise of individuals with good knowledge of the insurance market in Maldives, as well as individuals with experience in tourism, insurance regulation, and insurance pool management. The pool’s management team will also need to be astute about any political and social situations of current and potential clients following incidents. The fund management team will need to comprise individuals with experience in investments, with consideration for any political, social, or Islamic principles.
- 6) Conduct regular (at least annual) analysis of the pool to ensure that it is sufficiently capitalized to make the claims payments that it is intended to at all times. This also

involves ensuring that the pool's investments are liquid enough to meet claims payments, and uncorrelated to the risks being protected against.

- 7) Encouragement of the insured parties to promote risk management strategies by enforcing risk-based premium rates that ultimately encourage mitigation including enforcement of building codes and other strategies that have the potential to reduce insurance premiums such as installation of navigation systems of safari vessels, if this is determined will help address high premiums.
- 8) It creates a countrywide public awareness and education campaign to train more insurance professionals to manage the different aspects of the project, and enable clients understand the purpose, costs, benefits, value and limitations of the pool.
- 9) Allows for the government to build up reserves over time which it can use to address uninsurable risks such as coral bleaching. There may be potential to develop a risk reserve mechanism within the pool to ensure this. The important question here would be the source of such funding. Potentially it could come from investment returns of the pool, government budgetary allocations, or from resorts willing to develop such a mechanism.
- 10) Provide incentives to the private sector to cooperate in developing insurance programs, potentially through the following ways:
 - a. Commission rates paid by the pool to insurers will need to be instituted. Commissions for resorts should be set to cover the administrative costs of insurers working with the pool. Regarding other insurance operators, setting of commission rates should be done to incentivize them to service the underinsured. The pool's management team will need to determine ways that make insuring guest houses and island communities attractive for insurers by allowing for higher commission rates for such insurers.
 - b. Exploration of potential tax breaks on funding used to pay premiums by guest houses and safari operators.
 - c. Exploration of potential tax holidays for institutions affected by extreme events related to climate hazards.

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- d. Provision of short term credit facilities for guest houses, safari operators and island councils to help them meet premium payments. It was noted from discussions with these safari operators and island communities that one of the problems had with insurance was the idea of paying premiums as lump-sum payments, as this affects their cash flow. Premiums would be more manageable if done as instalments. The government can investigate avenues that provide these institutions with short term loans specifically intended for premium payments. However, such a mechanism requires that the pool's administration will need to address issues concerning bad credit and bad debts.
- 11) Determine ways to reduce cost of insurance for safaris by mandating the use of technology that will make them safer to operate. For instance, one insurer speculates that the high premiums for safari is because of a lack of GPS and navigation systems, which makes them more prone to accidents. Creating mandates for safari vessels that can be proven to (re)insurers may help reduce premiums, or possibly help increase insurance cover for safaris.
- 12) Regarding regulators, there are no issues with developing such a pool except that the regulators will require that the pool has the right management team, and is able to show proof of solvency. Their suggested management team for such a pool should at least include representatives of insurers, regulators, Maldives Tourism Association, and the Ministry of Tourism. As long as the insurance company is registered, or working through as registered insurer in the Maldives, the regulators will have no issues.

9.2 Regulatory And Legislative Changes Required For Implementation

A few legislations and new regulations will need to be implemented before the proposed facilities can operate effectively. These include:

- 1) Regulation will need to be passed mandating that resorts purchase full insurance cover, and that insurers pass the risks from covering extreme events to the insurance pool proposed.
- 2) Insurance guidelines for guest houses will need to be tightened and enforced to mandate that guest houses also purchase adequate full cover for their businesses.
- 3) There are currently no legislations on insurance for island communities and safari operators. These need to be developed to ensure that each group is sufficiently covered at least to a realistic level or risk that they face.
- 4) If the government is to fund premiums for the microinsurance facility and for any budget allocations addressing high frequency events, regulation will be needed to ensure that these allocations are made fairly to island communities, and that they will be restrictions on their use for risk reduction and premium purposes only.
- 5) Finally, interviews with stakeholders revealed that there is no legislation on the types of securities and the stability of reinsurers that Maldives' insurers work with. This is a significant risk for the insurance sector of the Maldives, and legislation needs to be enacted restricting investments or use of reinsurers with inadequate financial fundamentals to cover compensation of beneficiaries in Maldives should incidents occur.
- 6) Further studies may need to investigate the role of taxation in development of these instruments. If tax relief is a recommended option for financial feasibility of the mechanisms, legislation on taxation of the facility may be needed.
- 7) It is suggested that the MMA require that insurers collect and analyse more data on weather-related losses. This may be done in coordination with the Maldives Meteorological Services.

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- 8) It is suggested that the MMA include (or request) the potential impact of climate risk hazards in requested solvency analysis of insurance facilities during registration.

10 SUMMARY OF OTHER FINANCIAL RISK MANAGEMENT TOOLS EXPLORED

For this project, the proposal is to supplement the current insurance packages in Maldives with a catastrophe pool targeting climate risks posed to resorts and guest houses, as well as the creation of a microinsurance facility that potentially can sit within the context of the pool to address island communities. However, the use of other instruments were considered before this conclusion was reached. Some of the other forms of financial risk management tools considered include weather guarantee products, microinsurance, reserve pools, catastrophe pools, parametric insurance, catastrophe bonds, weather derivatives, and contingent credit. Some of these tools aren't appropriate for the Maldives because of the limited meteorological infrastructure and data in the country. Others, such as the last three instruments mentioned are more appropriate for larger volume transactions, and are more complex financial tools requiring advanced technical resources.

10.1 Instruments Requiring Meteorological Infrastructure And Data

Some of the instruments mentioned require access to sound meteorological infrastructure and historical data. These include parametric insurance products, weather derivatives, and weather guarantee products. However, it is feasible to produce synthetic weather data on the limited historical data available to fill the data availability issue. It is also possible to invest in the development of the meteorological infrastructure to make it up to par for the development of some of these instruments. However, both of these actions will require time to implement, and require training and development of technical capacity to manage such resources. For these reasons, such instruments are not suggested for Maldives at this time. It is however worth noting that some of the issues faced by tourism operators could be addressed with one of these tools if the right meteorological infrastructure was available. Each of these is described as follows.

10.2 Parametric Insurance Instruments

Parametric insurance schemes base payouts on the severity of the peril, as opposed to actual loss. The payouts are indicative of, and should be correlated with, and representative of, the expected losses of the insured. One of the advantages of such schemes is their lower cost, as there is no need for a loss adjustment process, and administrative costs are lower compared to traditional insurance. In addition, payouts are more easily and quickly determined, and moral hazard is negligible. The main disadvantage of these schemes is that of basis risk, the difference between the actual loss and the modelled loss. This difference may be a result of several factors including product design, inadequate loss data, insufficient meteorological data and infrastructure, variations in weather patterns, and geographical differences. A goal in the design of a parametric insurance scheme is to minimize such risk, and educate the insured on them.

One example of a parametric insurance facility is the Caribbean Catastrophe Risk Insurance Facility (CCRIF), a risk pooling facility, owned, operated, and registered in the Caribbean for Caribbean governments. The CCRIF is the world's first regional fund that uses parametric insurance, and was designed to address the short term liquidity issues that typically follow the impact of catastrophic hurricanes and earthquakes. The facility was developed through funding from the Japanese Government, and capitalisation from a multi-donor Trust Fund by the Government of Canada, the European Union, the World Bank, the government of the UK and France, the Caribbean Development Bank and the governments of Ireland and Bermuda, as well as through membership fees paid by its sixteen participating governments. Since its inception in 2007, the CCRIF has made approximately US\$33 million in payouts to seven of its 16 member countries.

This type of instrument could have been useful in the context of Maldives if the appropriate meteorological infrastructure and data were available. For instance, a parametric based

catastrophe risk pool for resorts could reduce cost of administration and transportation for the two solutions proposed, and also minimized several logistics issues.

10.3 Weather Index, Guarantees and Derivative Products

The use of weather derivatives emerged in the late 1990s to protect against weather-related loss of revenue mainly in the energy and agriculture sectors. They have since found important value propositions in other sectors such as tourism. Weather derivatives and index insurance differ from weather and travel insurance (which have been used by some tourism operators for some time now). As opposed to traditional insurance products (such as travel or weather insurance), which pay out only in the event of an actual economic loss and reimburse only the actual amount of loss via a claims and adjustment process, weather derivative and index insurance contracts pay a fixed amount based on weather conditions regardless of whether actual damages can be demonstrated, or the extent of loss verified. In other words, the payout from a traditional travel or weather insurance policy is dependent on the actual loss as verified by an insurance agent, while the payout from weather index and derivative products is based on a modelled loss.

One of the main advantages of weather index and derivative products is the speed of payout, since these payouts are based on a modelled loss that relates the severity of a weather or climate event to an expected loss, and therefore, as soon as an event occurs, a loss amount can be determined. For insurance products, the process following such events typically involve an insurance adjuster or some other insurance agent going to the site to help quantify the loss, and the claims process may take a significant time to complete. As a consequence of the risk modelling and payout capacities involved, weather derivatives and weather index insurance products are highly scalable and flexible, and can be used to cover individuals, small businesses, large businesses and even governments.

As Table 10.1 illustrates, there are examples of weather derivative and index insurance that have been used in other tourism dependent regions that can serve as models to help the Maldives' tourism sector reduce weather and climate related losses.

Tourism Operator – Destination	Stakeholders	Description
Barbados (Product - The Perfect Weather Guarantee)	Barbados Tourism Association, Weatherbill.	<p>The product (called the “Perfect Weather Guarantee”) was run in the year 2009 as part of the island’s marketing campaign. Tourists to the island pay no fee to purchase the policy, but must opt in to receive benefits. As stated earlier, there are forecasts of greater rainfall in the Maldives as a result of climate change. Similar products can be used to provide tourists with some compensation in the event that heavy rainfall affects their travel plans.</p> <p>The Barbados Tourism Authority describes the product as follows:</p> <p><i>“After purchasing a non-cancelled, weather-guaranteed trip, a consumer will be eligible for a \$100 rebate per booking for each day the average daily temperature in Barbados falls below 78 degrees Fahrenheit AND the daily rainfall is more than a quarter-inch (.25”). Weather triggers must fail to meet both weather conditions in the same day in order to receive the \$100 payout. Daily weather conditions will</i></p>

		<p><i>be solely determined by weather data provided by Grantley Adams International Airport (BGI), as well as a third-party weather server provided through the company WeatherBill. By opting in to this program, a consumer agrees that their right to payment is determined solely through weather data provided by BGI and the third-party server.”</i></p>
<p>City of Victoria, British Columbia, Canada (Product – “Sunshine Guarantee”)</p>	<p>Tourism Victoria</p>	<p>This was a product launched by the city of Victoria as part of its marketing campaign to distinguish itself from the rest of Canada, stating that it is more “spring-like” than the rest of Canada, and receives less rain than Vancouver. While temperatures in the Maldives are generally higher than Victoria, the same principles can be used for establishing a rainfall product, which is an important climate risk event in the central and southern atolls of the Maldives.</p> <p>The following is adapted from a paper by CelcuisPro, but based on information from Tourism Victoria:</p> <p><i>“In the current economic crisis, it is evident that the tourism industry becomes especially challenging. Therefore Tourism Victoria needs to reach out directly to consumers in an innovative way. They are currently taking advantage of this spring’s arrivals and are offering a special promotion for travelers looking for an April getaway. When</i></p>

		<p><i>guests book a minimum of two nights and if it rains more than 1.25 cm during any day of their stay, Tourism Victoria will pay out CAD\$500 to each traveler per rain day (rainfall levels will be monitored at Victoria International Airport). This sunshine guaranteed weather refund promotion can stimulate people’s desire to go to Victoria at a time of year when the weather is traditionally unpredictable. As a result, it will increase bookings for hotels and encourage further traffic in the attractions and other retail and service establishment in Victoria, BC (Tourism Victoria, March 23, 2009)”</i></p>
<p>Corney & Barrow, a wine bar and restaurant chain in London.</p>	<p>Corney & Barrow</p>	<p>The following is an example of a product specifically designed by a private hospitality operator, and so differ from the previous two which cover a municipality and a country.</p> <p>The following is adapted from a paper by CelcuisPro, but based on information from The Economist:</p> <p><i>“People enjoy the occasional drink after work. If it’s a warm summer day, consumption of beer, wine and cocktails is likely to last all evening long. If it rains and it is cold outside; customers still drink, but not nearly as much and they tend shorten their stay. That’s why in 1999 Corney &Barrow, a wine bar and restaurant chain with</i></p>

		<p><i>outlets in the city of London, decided to cover its business against losses caused by lower than average temperatures: Corney & Barrow has 12 restaurants of which six have outside terraces. The firm noticed that although it has a lot of regulars, one fifth of its summer profits stem from customers that come to enjoy the sun while having a drink. In order to avoid this volatility, Corney & Barrow bought “put” options (the right to sell) from a global energy firm. If the temperature fell below 24°C on a Thursday or Friday (heating degree days) between June and September, a payment of £15’000 (US\$22’500) per day, up to a maximum of £100’000 (US\$167’000) for the whole summer, would be made to Corney & Barrow. Eventually, payment was made on seven days which helped the business cover some of its losses. On the other hand, if the temperature rose above 24°C, Corney & Barrow benefited from increased sales above the amount of the premium. Although the Corney & Barrow deal was of relatively small proportion, the chain received huge publicity for having made the first deal of this kind within the European hospitality industry (The Economist, June 15, 2000).”</i></p>
Caribbean, Mexico,	Thomas Cook Canada	The following is adapted from a paper by CelcuisPro, but based on information from Travel Week:

<p>Hawaii, Florida and California (Product – RainCheck)</p>		<p><i>Weather conditions such as rain or clouds can ruin travelers’ beach vacation. Thomas Cook Canada therefore worked with a weather risk management company in the US and responded to the above statement by introducing RainCheck. RainCheck is a weather protection guarantee that entitles the traveler to a future travel voucher representing the base cost of the holiday, should it rain for more than half of their holiday. This offer is available on package vacations (minimum 3 nights / maximum 21 nightso) to the Caribbean, Mexico, Hawaii, Florida and California. If it rains half an inch (12.7mm) or more in a 24 hour period for at least half of their booked vacation, customers who purchased a RainCheck will get to replace that vacation with another one. The rain measurements will be taken at the closest official weather station to the customer’s hotel. RainCheck is sold for \$310.95 per adult (kids under 12 are free provided that they are sharing a room with 2 full paying adults that bought RainCheck). As consumers are desperate to make the most of their short time off work to beach locations, using innovative marketing lead deals such as this proves the travel industry is a hot target for weather risk management firms (Travel Week, November 28, 2008).</i></p>
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Other regions and products.		<p>A few other regions facing some of the climate risks faced in the Maldives have designed products. The PGA Championships in North Carolina USA had a product designed to protect against rain interruption if rain accumulation exceeds 0.75 inches during the tournament.</p> <p>Organizers of the “Taste of Antwerp (Belgium)”, receive a payment should rainfall exceed 10.7 mm.</p> <p>Priceline “Sunshine Guaranteed” vacation offered consumers a refund if it rained in over 100 destinations in the US., the Caribbean, Canada, and Europe.</p>

Table 10.1: Some weather derivative contracts used for tourism sector in other parts of the world. They could be models for the tourism operators in the Maldives.

Some of the products mentioned in the table able can be customized to meet some of the issues faced by tourism operators in Maldives to help reduce customer dissatisfaction as a result of events interruption their holidays or resulting in them having a different experience from their

expectations. Such products may be most appropriate for safari operators, whose customer satisfaction is affected by weather events that interfere with their experiences. In such cases, customers complain about not getting the experiences they paid safari operators for. In such cases, safaris normally either refund customers, or offer some other form of compensation (only some, and not all safaris do this). Two examples of this were given by safari operators. The first was the case where a safari vessel could not cross an atoll due to bad weather. Clients were given US\$1,500 supplements. In a second case, a safari vessel's route had to be diverted to a different atoll. The safari operator offered clients meal packages worth US\$200. Safaris note that such events are rare, and an estimate by one operator was 4 or 5 times per 6 month period. While the safari operators categorize these losses as a "small loss", it may be worthwhile to quantify the annual loss to all safaris for Maldives to get a sense of the scale of this risk. While the safari operators interviewed only lose a few thousand dollars to such events each year, if they had access to similar products as those described in Table 10.1, the aggregate loss to safari operators across the country may be significantly reduced. In addition to the meteorological infrastructure limitations on developing one of these products in Maldives, the Consultant has not recommended these instruments because the tourism operators interviewed regard the losses from the types of events these products would cover as small. However, the Consultant believes it would be worth investigating the magnitude of the issue across a large cross-section of the tourism operators (particularly safari operators), to quantify the losses to such business for the entire country.

Other tourism operators including resorts and travel agencies could in theory benefit from such products, particularly since holiday interruption is not covered for them. However, interviews with resorts suggest that none of them were concerned with losses from holiday interruption, as they do not see such losses as significant, but one manager did suggest that it may be worthwhile investigating losses from resorts in the northern islands, and another suggests that while such impact is not a concern for his resort, it may be worth looking at aggregate impact of such events across the entire country.

10.4 Products Requiring Significant Volume

Certain products require a large volume of risk to make the cost of such instruments worthwhile. These include catastrophe bonds and weather derivatives. In the case of the Maldives, the total value of risks faced by safari operators, hotels, and guest houses is not large enough to warrant such instruments. The only class of assets with a large enough total value to make use of these instruments worthwhile are resorts. However, the use of weather derivatives does not fit the demands of resorts. Catastrophe bonds however may be a feasible alternative and was considered.

10.5 Catastrophe Bonds

Catastrophe bonds are insurance-linked securities (ILS) that transfer a specified set of risks from a sponsor to investors, and hence protect (re)insurers from catastrophe risks. They were first used in the mid-1990s following the impact of Hurricane Andrew and the Northridge earthquake.

The process for developing such instruments can be complex, with the insurer of the risk issuing bonds typically through an investment bank, and sold to investors (such as hedge funds and asset managers). Once issued, if no catastrophe occurs, the insurer makes a coupon payment to the investors (who therefore make a return on their investment). On the other hand, if a catastrophe occurs, then the principal would be forgiven, and the insurer uses the funds to pay the insured. The specifics of the structure of the bond, including the risks to protect against and the bond's term period (length of time for which it is viable), will need to be determined. The bond terms may range from one to ten years, and may cover one or multiple perils in one or multiple territories. The triggers are linked to the occurrence of a catastrophic event. Their investment grades are based on the probability of default caused by the occurrence of this catastrophe which causes a loss of principal. In the past, most of these types of bonds were rated below investment grade (credit rating of BB or B), but over time, the issuance of catastrophe bonds that provide coverage for high deductibles have received investment grade ratings.

Development of a catastrophe bond involves choosing the payout triggers for the bond. Catastrophe bonds may be classified into five payout trigger groups:

- **Indemnity Triggers:** In this approach, the trigger is based on the issuer's actual loss. It is similar to traditional (re)insurance protection, whereby payments are due to the size of the (re)insurer's actual losses.
- **Parametric Index Triggers:** Instead of claim payments being based on the re/insurer's actual losses, payouts are linked to parametric indices. Parametric indices are defined by physical parameters of a natural disaster. For example, the wind speed and location (for a hurricane bond), or the ground acceleration (for an earthquake bond), or whatever parameter is most appropriate for the peril(s) being covered.
- **Industry Loss Triggers:** A catastrophe bond designed in this way triggers if the estimated loss of the entire insurance industry from a catastrophic event exceeds a predetermined threshold value.
- **Modelled Loss Triggers:** In the case of a modelled loss trigger, instead of dealing with the insured's actual claims, payouts are made once estimated losses (from the modelled losses produced by a catastrophe model) are higher than a specified threshold. Estimated losses are calculated by running the parameters of the natural hazard event that has occurred against a catastrophe modelling database.
- **Hybrid Triggers:** A combination of more than one of the above trigger types can be used in the construction of a cat bond. The trigger types may be applied in a sequential or simultaneous form when determining the estimated loss from a covered event. Such structures are called hybrid trigger bonds.

One of the advantages of the use of catastrophe bonds is that they provide access to significant resources of the of capital market investments. Pricing of such bonds may also be more

competitive than traditional (re)insurance pricing. The disadvantages of catastrophe bonds is the upfront costs involved with developing such transactions, making them most suitable for large amounts of financing, typically in the range of US\$100million or more. They also require technical expertise that is usually out of reach for most institutions. As a result of these issues, their application in the context of developing countries, is largely only appropriate at a national level.

A few countries/regions have turned to catastrophe bonds to help manage their catastrophe risk exposure. For instance, in 2006, FONDEN issued a US\$160 million catastrophe bond to transfer Mexico's earthquake risk to international capital markets. It was the first parametric catastrophe bond issued by a sovereign. In 2009, when the bond matured, Mexico decided to further diversify by pooling multiple risks, and including hurricane exposure. In 2011, the California Earthquake Authority directly issued a catastrophe bond transaction, which transferred \$150 million of earthquake-only risks directly to capital market investors. In July 2013, a US\$200 million catastrophe bond was issued to help New York's Metropolitan Authority guard against the risk of storm surge, in response to the 2012 impact of Hurricane Sandy on the New York area.

The use of catastrophe bonds in Maldives has not been ruled out for protection of resorts. In fact, it is possible that the insurance pooling solution proposed may ultimately be backed by a catastrophe bond. However, this is an issue that will likely be determined by the reinsurers of the facility. The main obstacles here are: (i) it is unlikely that a bond will be based on a parametric index trigger given the meteorological infrastructure in Maldives, and therefore a non-parametric trigger may be required. (ii) The large value of the assets required to make such a solution feasible means that the only class of tourism assets that can potentially be covered using such an instrument is a pool of resorts (or a pool of resorts and some other assets) (iii) A highly technical team is required to implement and maintain such a solution, and none of the current insurers in Maldives have the type of experience needed to work with such a facility. Hence, significant external help will be required.

10.6 Contingent Credit

The use of contingent credit is another means of risk financing that is made in advance of the impact of an event to secure credit when an emergency arises. The advantage of this mechanism over post-event financing is that there is an arrangement that allows for quick and reliable access to funds following an event. The advantage of this mechanism over parametric insurance and catastrophe bonds is the greater flexibility it provides with regards to the amount of disbursement, thus making it effective for addressing moderate frequency and severity risk events. However, most contingency credit lines target large volume risks, and again, will be most appropriate only for resorts in this case. However, resorts in Maldives appear comfortable with their handling of moderate frequency and severity risks, which they address using traditional insurance programs.

11 THE CASE FOR DEVELOPMENT OF METEOROLOGICAL INFRASTRUCTURE AND DATA

As noted in the previous chapter, the availability of meteorological infrastructure and historical data presented limitations in the feasibility of developing several risk management instruments that could otherwise have been appropriate in Maldives. The recommendation is therefore made to develop the meteorological infrastructure network, and it is hoped that the information provided in this chapter can help in development of such a plan.

This chapter includes perspectives of different stakeholders on the value of meteorological infrastructure needed, potential for resorts to help in providing space for automatic weather stations (AWSs), the cost of this infrastructure, and other areas in the tourism sector where such infrastructure may help outside of development of risk management solutions.

11.1 Meteorological Infrastructure needed for risk management solutions

For any risk management solution dependent on meteorological infrastructure to be developed, an AWS will need to be installed on each resort involved and in each island community. According to the Maldives Meteorological Services (MMS) representative interviewed, getting an AWS “close” to a resort, may not be good enough, as there will be differences between even very close islands regarding certain types of risks, particularly for flooding and wind data. An AWS will have to be at a maximum distance of 10km to 20km from the points it is to be representative of.

As part of the consideration for developing risk management solutions that use meteorological data, the potential for installing AWSs at resorts and island communities was investigated. Resorts interviewed were asked about their willingness to have an AWS at their resort. Part of the argument used to try to convince resorts is that AWSs are small, and can be installed on rooftops, and hence do not require much space, and can be set up in locations that don’t interfere

with the aesthetic nature of the resorts. The AWSs also don't require external sources of energy. Finally, they can help a resort boost its image by implementing such a solution part of their CSR programs.

The advantage of having an AWS at every resort is that more accurate weather data at the particular resort can be collected for resort locations, and hence allowing for development of risk management solutions that are dependent on the weather at each resort. For the MMS, such a system would benefit it, as such the plan will result in reduced transportation, accommodation, and subsistence costs (such as food and other travel costs) for the MMS' staff travel to service the stations. One potential disadvantage discussed was the potential for data from the AWS to be manipulated if installed at resorts. However, the representative of the MMS suggests that data manipulation is not a serious concern, as there are checks for such manipulation. To ensure that data from AWSs on resorts is not manipulated by the resorts, the MMS can do checks on temperature, humidity and other weather conditions to ensure for consistency of data received and to help verify data reported by AWS. Checks for consistency will ensure that no manipulation was done to AWSs at the resorts.

Most resorts were willing to accommodate an AWS on their property. However, one resort manager was reluctant, claiming that he wouldn't have anywhere to install it, regardless of its small size.

One alternative to weather stations for monitoring rainfall data is the use of TRMM data. When the representative was asked about any potential challenges with using TRMM data, he lists the following problems with using TRMM:

- A) Resolution of TRMM data is too large relative to the small size of the islands of the Maldives and so TRMM data may not be good enough.
- B) Topography variation within any specific island varies to an extent that TRMM data will not appropriately capture rainfall impact information on several islands.

When asked about best way to monitor wind data, the representative's response was that an AWS is best data source. When asked what type of historical information MMS would need from the resorts, the representative says data on incidents and inundation (from flooding) will be useful. When asked about any issues he foresees with placing AWSs on island communities, the representative says the problem with this method is vandalism and people interfering with equipment.

11.2 Costs

To quantify costs of investing in new meteorological infrastructure and maintenance of such, the following costs were estimated by the representative:

- 1) Estimated cost of each new AWS of US\$15,000.
- 2) Maintenance cost. This includes:
 - a) The cost of two trips per year per AWS.
 - b) May need some fixing every 6 months to a year. Infrastructure replacement cost per visit may be about US\$ 1,000 per visit. However, this depends on what fixes are needed, and so there is quite a range in this cost.
- 3) Cost of one new Doppler system of US\$2,000,000. The MMS ideally needs two new systems, giving a cost of US \$4,000,000. In addition, the estimated annual cost of maintenance of each Doppler system is US\$ 50,000. The MMS will also need to fix the current Doppler System, which is not working at the moment.
- 4) In summary, if the MMS expects to develop its ideal network of 1,000 to 2,000, and the two Doppler systems, this would cost US\$24 to 40 million excluding maintenance cost.

Considering costs of having AWSs in a pilot investigation, the Consultant made some rough assumptions to determine costs and viability. Earlier, it was estimated that there are roughly 64 resorts in the Malé/Ari atoll. If a pilot program is developed in the Malé/Ari atoll that requires the installation of AWSs at 50% of the atolls (32 resorts), the cost of the AWS network would be roughly US\$480,000 excluding the Doppler systems and any

installation and maintenance costs. The Consultant estimates based on data collected from insurers and reinsurers that annual premiums for resorts range from US\$15,000 to US\$1.05 million. Assuming 10% of this premium is paid into the pool solution developed for a pilot of 32 resorts with annual premiums of US 0.5 million, a premium income of US\$ 1.6 million is achievable from a pilot of 32 resorts in the Malé/Ari atoll. It is conceivable that some portion of this funding may be used to cover part of the cost of meteorological infrastructure. However, other sources of funding will likely be needed as well. Please note that the figures used here are rough estimates based on data collected during interviews, and do not include the actual premiums, administrative cost and ROLs involved in reinsurance of the pool, which cannot be done at this stage without further analysis involving reinsurers. The Consultant recommends that a follow-up study be done that includes a more accurate costing of such a pilot with scenarios for inclusion and exclusion of AWSs to help determine if a parametric pool may be feasible with some funding from premiums going to contributions of payments for AWSs.

11.3 Achieving desirable infrastructure for tourism operators

While most tourism operators seem to have lost faith in the data received from the MMS, and rely on external weather data sources instead of the local service, many of the institutions expressed a willingness to pay for better weather data from the MMS depending on the price of such data and the quality going forward.

Tourism operators interviewed are not content with the current meteorological data from the MMS. In addition to reports on information not being updated for extended periods, to information being “far from reality”, the operators mention having to rely on foreign services for their weather data, as these services are found to be closer to reality. Resorts and other tourism operators also typically desire a forecast of at least seven days to help them better plan their customer and engineering operations. The MMS only provides three to five day forecasts. However, a representative of the MMS believes it can achieve a seven forecast if the government

invested in more observation stations. A dense network of observation stations is required to collect the required data for such long term forecasts. Currently only one observation station exists, and it is located in the most southern atoll. Ideally, the MMS would also need one in the north and in a central atoll. The data from these observation stations will need to be fed into computer models that will be used to develop such forecasts. However, the MMS service doesn't have access to the computer infrastructure required for such modelling. The meteorological services of the USA and other major service providers use supercomputers to create their forecasts which the MMS does not have access to. The human resource capacity needed for the modelling aspect of this type of initiative is lacking in Maldives. Technical expertise will also need to be developed, and a dedicated team of people will need to be trained to focus on this area.

Only one Doppler system is in use in Maldives, and this system is not currently working. A realistic and effective scenario is one with three Doppler systems (two more systems). In addition Currently, all AWSs are located on islands, and none in the ocean. Ideally, there should be AWSs in the ocean waters surrounding Maldives. These can be placed on observation buoys in the seas surrounding the Maldives. At least two needed will be needed, but four of these AWSs would be even better. The AWSs are needed for collecting ocean temperature.

In summary, for the MMS to provide more accurate weather forecasts and real-time information, it will need access to satellite data (as opposed to just the satellite pictures it currently has access to), investments to develop a dense network of AWSs, supercomputing power and technical human resources to work with the more sophisticated models and supercomputer systems. The costs of developing such a system is highly significant. However, if even some headway is made to develop at least some of the goals of the meteorological services, this could allow for more accurate data services to resorts and safari operators, and will help in the development of more cost-effective financial risk management systems.

12 CHALLENGES FOR DEVELOPMENT OF PROPOSED INSTRUMENTS

Several potential challenges exist in the design and implementation of sustainable financial instruments for addressing climate hazards. These include affordability, lack of appropriate data and meteorological infrastructure, significant education of clients, potential tax implications, a desirable regulatory environment, governance, and the uncertainty in predictability of climate changes. The following are some of the challenges likely to be faced if the solutions described in earlier sections are implemented.

- 1) Shortage of qualified insurance personnel including insurance risk surveyors, adjusters, and underwriters to develop the capacities of the pooling facility and the microinsurance facility. The government will need to include developing the technical insurance expertise in its awareness and development campaign.
- 2) Getting island communities and island safaris to make lump sum payments for insurance. This is already an issue raised by both parties. This may be addressed through the development of a credit facility for premium payments. However, without a proper credit rating facility, this problem may be challenging to solve.
- 3) Like most insurance facilities, the issue of uncollectible accounts receivables will be an issue for both the pooling facility recommended and the microinsurance product. Most businesses do not see insurance as the most important issue for them, and the same is true for island communities. This problem may even be an issue when dealing with insurers. One solution is to have all insured parties have a deposit with the pool when first agree to be participants. However, such a solution may be challenging for guesthouses, safari operators and island communities as these institutions are very dependent on their cash flow. The solution proposed is to only request such deposits from insurance companies, which may have more access to cash than the insured.
- 4) In reviewing the status of the financial sector, the unique position of the finance and insurance sector within the context of developing countries, and South Asian countries in particular must be addressed. While the country's per capita GDP ratio is

high compared to most South Asian countries, there are wide disparities in the reach and usage level of the sector. Studies show that about 30-35% of the atoll populations and about 55-65% of the Malé population is banked, reflecting the limited access to finance faced in the country (compared to most developed countries), which some argue has restricted private sector development. Insurance penetration is even less. The limited reach of the banking and insurance sector presents a challenge for the delivery of financial risk management instruments. At the same time, the targeted vulnerable communities in the case of the Maldives are of a very different nature to those in other South Asian countries. For instance, these communities have better access to credit and have higher incomes on average than in other South Asian countries. Therefore the typical micro index insurance programs seen in many developing countries may not work in the case of the Maldives.

- 5) Regarding the issue of affordability, the proposed microinsurance scheme will require funding sources to support the financial instrument(s) in its initial development. Funding will be needed for start-up capitalization, initial premium payments, maintenance capitalization, technical support and development of education programs. One must also consider the ability of the sector and stakeholders to provide funding to support development and maintenance of the financial instrument(s). Regardless of the cost of the financial instrument, it is advisable that some portion of the funding come from the insured to avoid issues of moral hazard and incentivize other forms of loss prevention behaviours by the insured. However, the budget constraints, lack of insurance awareness and the priorities of these communities will present a challenge
- 6) Regarding the microinsurance product proposed, the small population of Maldives, and widespread nature of the islands may increase costs of delivering this product, and therefore premiums.
- 7) Resorts are a substantial part of the tourism market. However, they don't appear as interested in developing instruments that may help increase availability or affordability of risk management instruments available for the sector.

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- 8) The impact of data availability and limited meteorological infrastructure must not be underestimated. Overcoming this obstacle is important, yet very costly. The ideal environment for developing the financial instruments proposed (particularly for index-based and parametric products) requires a spatially dense network of weather stations with many years of continuous history. The Maldives currently very few weather stations (and the station with the longest history of weather data only has 30 years of data), which do not cover the country at sufficient granularity making the design of any index-based or parametric product more challenging. One option discussed with the Meteorological Service is additional investments in automated weather stations. However, such a system will be very high. The next best option (and certainly a more feasible option in terms of cost) is the use of satellite data. One drawback of this approach is that even satellite data does not provide the granularity needed to provide accurate data on all of the islands given that several of the islands too small compared to the resolution of the data. Other types of data that will be required for dealing with extreme events using index-based or parametric insurance include data on historical weather and climate events, inventories of all buildings, assets and risks of the tourism sector, a good log of the revenue streams of the sector, and experiences of the insured during impacts following natural disasters such as the 1987 floods and the 2004 tsunami, which shed light on the vulnerability of different aspects of the sector.
- 9) Education of clients, stakeholders, and potential donors is also a significant task in the design and implementation of financial instruments. Many insurance schemes fail because of a lack of understanding of that the intricacies of the schemes. Education of the client will be particularly important for any solution targeted at tourism associated communities. Education tasks should involve significant training in advance of the launch of the insurance scheme on the advantages and shortcomings of any instrument used, what risks are being covered, the cost of the risk transfer, how premiums should be paid, and the method for determining payouts to the insured

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- following events . Such tasks may be both costly and time consuming, and involve development of a technical expertise that can support the solution after its implementation.
- 10) Development of a solution must also consider the regulatory environment under which the solution is to be enacted. In the case of the Maldives, the Maldives Monetary Authority regulates the insurance sector. As regulators in Maldives have no experience with any of the instruments investigate, there will be need for further technical development on their part. Regulators are also encouraged to incorporate (or request incorporation of) perspectives on climate risks in their analysis of solvency reviews.
 - 11) Before implementation of any risk management solution, attention needs to be paid to the planned governance of the solution, such that the communities and establishments involved are treated fairly and have some level of representation in the implementation of the final instrument. This is particularly the case for the microinsurance product proposed, as it will involve government budgeting for each atoll, which may lead to grievances.
 - 12) The modelling and measurement of climate changes and events is still highly inconsistent, and far from precise, even with advances in meteorological science, weather measurement technologies, and advanced computing power for pricing, predicting, and measuring these risks. Predictions in climate change scenarios vary significantly, and projections of climate change for developing countries are sometimes inconsistent.
 - 13) Despite the challenges in implementing risk management solutions, it is important to realize the future consequences of not doing so. When considering climate risks, managing losses involves avoiding future potential losses through mitigation and

adaptation measures, as well as preparing for the actual losses should they occur. Addressing mitigation responses will be key to reducing losses in the future as the severity of the climatic risks and variability increase. Decisions not to proactively implement risk mitigation strategies (through risk transfer and other means) and actively invest in adaptation could lead to loss and damage in the future that is beyond the ability of society to cope with.

13 RECOMMENDATIONS, CONCLUSIONS AND NEXT STEPS

Developing an analysis to underpin development of a financial risk management framework to address climate risks affecting the tourism sector relies on information regarding the geography, regulatory institutions, meteorological infrastructure, and current risk management mechanisms (in this case insurance mechanisms). The following are a list of recommendations, next steps and conclusions at this stage of the project:

- 1) A catastrophe pooling mechanism has been proposed. Ideally, the pool should target severe multi-peril risks and not just climate risks and should target insurers, making it mandatory for them to place extreme level risks for tourism stakeholders through the pooling facility. The pool helps address the following issues:
 - a. Regarding resorts, discussions with insurers reveal that there is a risk that insurers may not be capable of enduring significant losses if a severe hazard risk event occurs, or if a series of smaller events were to occur resulting in several high value resorts being impacted simultaneously. It is possible that such events could make even more reinsurers lose appetite for Maldives' risks, which would have a ripple effect on insuring other risks in the country. In a sense, a pooling mechanism not only helps resorts, but also insurers which may face a serious burden from compensating clients following severe risk events related to climate and natural hazards.
 - b. It ensures adequacy of coverage for guest houses, most of which currently do not have comprehensive insurance coverage. It is also recommended that the government tightens its insurance guidelines for guesthouses. One conclusion from the discussions with insurers regarding guest houses is that the Ministry of Tourism needs to provide clear guidelines on insurance requirements for guest houses. It is apparent that several (if not most) guest houses are not fully protected against the risks they face. One insurer mentioned not knowing of any requirements from Ministry of Tourism on insurance regulation for guest

houses, so provides no cover on personal liability because there is no regulation.

By mandating guest houses to meet certain insurance requirements, the loss that these institutions will bear following events is reduced, and potential impact to government and funding resources reduced as well. It is recommended that the government investigate the impact of mandating full coverage for guest houses, particularly on the financial sustainability of these institutions, and the costs it implies.

The wide spread of the islands of the Maldives makes it a good alternative for developing such a risk pooling scheme. However, an even better scheme would be development of a pool of risks located in some of the other countries in Asia, and the Indian and Pacific oceans.

The following is a roadmap for the pool facility's development.

1. Determine what climate risks to cover. The pool should at the very least cover losses from wind and storm surge, but ideally need to be a multi-peril instrument. For resorts, the main climate risk is potentially greater wind damage to roofs. However, natural hazard risks such as tsunami risks are also a significant threat.
2. The Ministry of Tourism (with the backing of the MMA) will need to have a requirement that insurers pass on some level of risk from guest houses and resorts to the pool. One of the most important aspects of such a pool is that it will need a large enough value of risks to be insured through it. Such a pool will require a large number of parties, preferably in geographically diverse locations. The government can play a role here, by mandating that all insurers place the most extreme layer of resort risk exposures (as well as lower level risks for guest houses) through the pool.
3. The pool will need to be licensed as an insurer in Maldives. This needs to be coordinated with the MMA. Discussions with the MMA reveal that the institution will need to show how sum insured for the assets to be insured is derived, an actuarial/solvency analysis of the proposed facility, and details of the management team of the proposed facility. Their suggested management team for resort pool should at least include representatives of insurers, regulators, Maldives Tourism Association, and the Ministry of Tourism. The MMA will also look at the facility's projected finance for next five years. As long as the insurance company is registered, or working through as registered insurer in the Maldives, MMA will have no issues. The MMA will require a 2,000,000 rufiyaa security deposit per class of insurance, an annual fee of 20,000 rufiyaa per class of insurance, a minimum capacity requirement of 10 million rufiyaa per class of business, and an application fee of 50,000 rufiyaa per class of insurance.

- 2) Similar to guest houses, insurance is not mandatory for safari operators. Safari operators also experience high premiums, high deductibles and limited cover. According to one insurer, one reason for the high premiums is a lack of risk reduction mechanisms such as navigation systems on these vessels. There needs to be some investigation into the impact of risk reduction mechanisms on premium costs for safari operators. In addition, the safari vessels and their clients appear resilient to climate and extreme weather hazards, and so the effects of climate hazards on this

group is limited. Participation of safari operators in the insurance pool proposed for resorts and guest houses will likely not make much of a difference for these institutions. A more appropriate strategy for safari operators is to find ways to make premiums more affordable for them, possibly through implementing risk reduction strategies and technology that encourage insurers to reduce premiums. An alternative strategy considered for safari operators is to develop weather guarantee products to compensate customers for poor weather events. However, this will require significant investments in meteorological infrastructure. In addition, safari operators don't see losses from compensating clients for poor weather or travel interruption as a burden for them.

- 3) The lack of insurance for island communities, and the limited financial resources available to these communities leads to the proposal for a microinsurance facility. It is suggested that the facility work with insurers that are willing to entertain this type of product, such as Ceylinco, which is trying to develop a microinsurance product in Maldives. The proposed plan is for a pilot microinsurance program covering loss of assets from rainfall induced flooding starting in the Malé/Ari atoll region. Rainfall induced flooding is the most critical risk faced by island communities. It is proposed that insurance representatives be trained through cooperation with insurers such as Ceylinco, which is willing to work with other agencies on microinsurance solutions, and has developed microinsurance solutions in Sri Lanka. The insurance representatives will be hired by the facility and act as the delivery channel between the insurer(s), and the island councils (who will act as representatives of the communities.) An issue with microinsurance is the feasibility of affordability of the solution for the beneficiaries including their ability to pay premiums (which is proposed be supplemented by government allocations and resorts) to make lump-sum payments for insurance. Credit facilities to overcome issues such as this should be enabled. Lack of awareness of insurance and risk management is also a hurdle for the development of an instrument.

The following is the roadmap for creating the microinsurance facility.

- 1) Develop a Memorandum of Understanding (MOU) with one or more Maldives insurers interested in microinsurance (such as Ceylinco) to act as a partner in developing its microinsurance facility.
- 2) Facilitate the hiring of microinsurance agents to help market the products and who will be responsible for knowledge of risks on targeted islands. The agents will also have to work closely with the island councils, but be perceived by the communities as politically independent.
- 3) Develop a solvency analysis of the planned facility, showing where such products have been developed in other regions, and the financial forecasts of such a facility. Submit these as well as details on management team to the MMA as part of the registration process for creating a micro insurer.
- 4) Work with reinsurance broker and reinsurers to develop policies for the product, firstly for a product protecting island community assets against rainfall induced flooding.
- 5) Scale up facility as follows:
 - Phase 1: Launch of a rainfall index insurance scheme in the Malé area to cover as many people in tourism associated communities as possible.
 - Phase 2: Extend the rainfall index insurance scheme to atolls south of the Malé area, where rainfall risks increase.
 - Phase 3: Launch of a wind/drought insurance scheme in the Malé area.
 - Phase 4: Extend both the rainfall and wind/drought products north to increase coverage of drought and wind coverage, and rainfall induced flooding to a lesser extent.
 - Phase 5: Extend the rainfall, wind, and drought insurance products across the entire Maldives.

- 4) Commission rates paid by the proposed pool to insurers will need to be instituted. Commissions for resorts should be set to cover the administrative costs of insurers working with the pool. Regarding other insurance operators, setting of commission rates should be done to incentivize insurers to service the underinsured such as guest houses. The pool's management team will need to determine ways that make insuring guest houses and island communities attractive for insurers by allowing for higher commission rates for such insurers.
- 5) Apart from the catastrophe risk pool and microinsurance pool proposed, other financial risk management instruments were also investigated for their potential to

address the Maldives tourism sector. Some of the other forms of financial risk management tools considered include weather guarantee products, reserve pools, parametric insurance, catastrophe bonds, weather derivatives, budgetary allocations, and contingent credit. Some of these tools aren't appropriate for the Maldives because of the limited meteorological infrastructure and data in the country. Others are more appropriate for larger volume transactions, and are more complex financial tools requiring advanced technical resources. For these reasons, they have not been considered as part of the short term solution. However, there is potential for some of these tools to be used in Maldives in the future, for instance in the development of a parametric insurance pool, or the use of a catastrophe bond for covering losses to the proposed pool. In addition, budgetary allocations by the government is suggested as a potential short term solution to address high frequency/low severity risks as well as development of risk reduction mechanisms.

- 6) Several of the financial risk management instruments considered were not proposed because of limitations on meteorological infrastructure and historical data in Maldives. While the investments required to create an ideal system for the MMS is very costly, it is recommended that the MMS and government determine ways to facilitate investments in the development of MMS' infrastructure and technical expertise. It is conceivable that some portion of premium income from the pooling mechanism proposed may be used to cover part of the cost of meteorological infrastructure. However, other sources of funding will almost certainly be needed as well. The Consultant recommends that a follow-up study be done on the financial feasibility of the pooling mechanism suggested with scenario cases for contribution to the development of meteorological infrastructure as part of a pilot program.
- 7) A few regulations will need to be passed to make the facilities proposed operational. One is a mandate that resorts purchase appropriate insurance cover, and that insurers pass the risks from covering extreme events to the insurance pool proposed. Another is a revisiting of the insurance guidelines for guest houses, which needs to mandate that guest houses also purchase adequate cover for their businesses. If the government

is to fund premiums for the microinsurance facility, regulation will be needed to ensure that these allocations are made fairly to island communities, and that they will be used for risk reduction and premium purposes only. Finally, interviews with stakeholders revealed that there is no legislation on the types of securities and the stability of reinsurers that Maldives' insurers work with. This is a significant risk for the insurance sector of the Maldives, and legislation needs to be enacted restricting investments or reinsurers with appropriate financial fundamentals to cover compensation of beneficiaries in Maldives should incidents occur. Finally, further studies may need to investigate the role of taxation in development of these instruments. If tax relief is a recommended option for financial feasibility of the mechanisms, legislation on taxation of the facility may be needed.

- 8) A few recommendations are also made regarding the MMA as insurance regulator. While the MMA does no solvency modelling, it requires that an actuarial evaluation be submitted by insurers when registering lines of business. However, there are currently no checks for the implications of climate risks in such analysis. This is an area where the MMA will need to address given the exposure of Maldives to such risks. In addition, the MMA currently has no experience with regulating many of the financial risk management instruments being considered for the Maldives in this study such as catastrophe pools, captives, parametric insurance, weather derivatives, micro-insurance, or weather guarantee products. This is understandable given the low maturity of the industry in Maldives, and that some of these products are new innovations. However, development of skills in these areas would be beneficial to staff of the MMA, who will need to address regulations regarding the risk transfer mechanisms proposed here. Finally the MMA may also consider taking a leadership role in promoting schemes that encourage insurers (and their clients) to collect data regarding climate risk impacts as well as promote relationships between insurers and catastrophe modelling agencies that may encourage the development of climate friendly insurance products and premium incentives.

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- 9) It is recommended that the focus of the product targeting tourism-dependent communities be broadened to not only include tourism-dependent communities, but be open to anyone interested in purchasing a policy. This will increase the market size of the targeted population, and will include other communities that suffer as a result of climate risk impacts. Thereby, increasing likelihood of financial sustainability of the proposed mechanism.
- 10) As certain types of risks such as coral bleaching and beach erosion cannot be reinsured (and therefore cannot be insured), there is scope for investigation of other adaptation programs. It is recommended that such work be done outside the scope of this particular study. It is recommended that a study including a cost-benefit analysis of different mechanisms pertains to such risks be done as a further study.
- 11) Best practice involves use of financial risk transfer tools in coordination with loss prevention activities such as improving early warning systems, developing hazard-resistant infrastructures, maintaining and building sea walls, developing disaster preparedness plans, and encouraging a culture where prevention and resilience are of the utmost importance.
- 12) It is recommended that follow-up feasibility studies be conducted to determine the financial feasibility of both the insurance pool and the microinsurance facility. Some of the suggested issues to be investigated in the study (or studies) include:
- a) A quantitative solvency analysis study that involves input from risk modellers (on estimated potential losses from climate hazard scenarios), reinsurers (on reinsurance pricing, cover and retention levels), and reinsurance brokers on pricing and financial sustainability.
 - b) Development of coverage terms and conditions of both the insurance pool and microinsurance pool policies.

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- c) Investigate the degree of capitalization of insurers, and compare to the risk exposure (particularly resort risk exposures) in Maldives tourism sector.
 - d) Investigate appropriate commissions for insurers and how these may vary by location and type of risk in such a way that insurers are incentivized to increase availability of insurance products for Maldives' market.
 - e) Determine appropriate initial deposit required by pool of insurance company beneficiaries to reduce impact of accounts receivables.
 - f) Review of skillsets for a steering committee that will manage the insurance pool and microinsurance facility, and that meets the requirements of the MMA
 - g) Review potential to diversify pool product offering to other regions with tourism based economies, and diversify the island based community base of the microinsurance facility outside of tourism based clients to other sectors, say communities reliant on agriculture/fisheries?
 - h) Review appetite of reinsurers and reinsurance brokers for Maldives' tourism sector risks

It will be useful to involve reinsurers in the development of some of the points listed, particularly concerning the proposed structure of the facilities proposed and reinsurance premiums and cover. Preliminary conversations by the Consultant with two reinsurers have been had. Based on the Consultant's interviews, representatives of Allianz seems willing to participate in further discussions regarding such a study. Munich Re may potentially also be interested, although they temporarily do not reinsure Maldives' risks. It will also be beneficial to include a reinsurance broker and Maldives' insurers in such a study.

Increasing Climate Change Resilience of Maldives through Adaptation in the Tourism Sector, also referred to as the Tourism Adaptation Project (TAP) is a project implemented by the Ministry of Tourism (MoT) with the support of the United Nations Development Programme (UNDP) and financial support of the Global Environment Facility (GEF) least developed country fund (LDCF).

The project is intended to provide the tourism sector in Maldives with the required policy environment, regulatory guidance, technical skills and knowledge to ensure that climate change-related risks can be systematically factored into day-to-day tourism operations and in the tourism dependent communities.

Since 2011, TAP has undertaken activities to strengthen the capacity of the Ministry of Tourism and tourism businesses to recognize evident climate risk issues in tourism operations and adopt appropriate adaptation measures to address them.

Similarly, tourism-dependent communities benefit from the project by cooperating with associated tourism operations and the government to plan and implement joint adaptation activities which address shared vulnerabilities through a small grants programme.

This publication is based on a study undertaken by TAP. For more information on TAP programme and activities please visit www.tourism.gov.mv



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