



# THE MALDIVES

A CLIMATE CHANGE  
KALEIDOSCOPE

**Ministry of Environment and Energy**  
**November 2015**



Ministry of Environment & Energy (MEE)  
Green Building,  
Handhuvaree Hingun, Maafannu,  
Male', 20392,  
Republic of Maldives



+ (960) 301 8300



secretariat@environment.gov.mv



<http://www.environment.gov.mv>

Design by: Azmee Ali

Print: M7 Print Private Limited, Male', Maldives

**Male', November 2015**



# Content

- \* Foreword - His Excellency President Abdulla Yameen Abdul Gayoom
- \* Message - Minister of Environment & Energy Mr. Thoriq Ibrahim
- \* The Maldives
- \* Vulnerabilities & Climate Change Challenges
- \* Achievements & Future Climate Actions
- \* The Alliance of Small Island States



# FOREWORD

by The president of Maldives



Climate change is the most pressing contemporary challenge faced by Small Island Developing States, such as the Maldives, to their sustainable development agendas. Thus, addressing climate change is one of our highest priorities.

A broad consensus now exists among the global scientific community that, if timely action is not undertaken to address climate change issues, the economic burden of addressing these issues in the long run will be very high. As a developing nation, the Maldives simply cannot afford these astronomical costs.

The low-lying nature of our islands, coupled with their geographic dispersion, fragile environment, remoteness, vulnerability to natural disaster, and narrow economic base, further exacerbate our vulnerability to climate change. The Maldivian people must now fight for their survival in the face of unprecedented challenges, including the increased salinization of groundwater, the degradation of our coastal environment, severe erosion, frequent flooding, and prolonged dry periods.

Now is the time for the international community to take bold and decisive action to combat climate change. The Road to Paris campaign shows that the international community is beginning to take bold steps forward to halt climate change. We believe COP21 is our best chance yet to secure a strong international agreement that includes meaningful emission reduction commitments based on national circumstances, a system of periodic review for these commitments and a long-term goal of net zero carbon emissions.

Our national efforts to reduce the vulnerability and increase the resilience of our island nation against this global phenomenon will prove futile without the strong support of our international partners. As we embark on developing and adopting a new global climate change agreement, the Maldives, as the current Chair of the Alliance of Small Island States (AOSIS), remains committed to working towards a universal and sustainable agreement.

***Abdulla Yameen Abdul Gayoom***

# MESSAGE

by The Minister of Environment & Energy



As a small island developing state, climate change concerns have been high on the Maldives agenda for the past quarter century. In 1989, Maldives convened the Small Island States Conference on Sea Level Rise, to seek international attention for the plight of island states which are particularly vulnerable to climate change impacts. The meeting gave birth to the Alliance of Small Island States. Since then, Maldives has continued to lead island nations through international fora to advocate for climate action.

Climate change threatens Maldives on multiple fronts. Our narrow economic base depends on the vitality of our fragile coral reef ecosystems. Climate change is expected to increase risks to human health, food and water security. These combined, threaten the livelihoods and wellbeing of our people. Yet despite these bleak prospects, Maldives is determined to continue its efforts to strive for climate resilience and sustainable development, and demonstrate ourselves as a leader to other small island nations.

The level of resources required to fully implement our aims into action is enormous. Hence, it is impossible for us to go forward without the support of our international partners. As such, for Maldives and the 44 members of the Alliance of Small Island States, finance would be the lynchpin of the new climate agreement to be adopted in Paris in December, to translate ambition into action.

I am happy that this publication 'The Maldives: A Climate Change Kaleidoscope' captures a snapshot of our vulnerability to climate change and national action to address this issue. It is our hope that this would lead to enhanced understanding of our realities as a small island developing state.

***Thoriq Ibrahim***

# THE MALDIVES



# The Maldives




***“The Maldives  
The sea is central  
to the country’s  
past and present.”***

Tourists seeking unparalleled nature, unique coral reefs, and isolation can hardly do better than the Maldives, an island archipelago in the Indian Ocean. But life in the Maldives is about much more than its touristic charm. With a landmass of approximately 300sq kilometers, the Maldives is the sixth smallest sovereign state in the world. The country consists of 25 low-lying coral atolls and 1,192 islands, although only 188 of them are inhabited. The population is about 341,256 people, roughly 1/3rd of whom live in Male’, the lively capital, which is located around 600 kilometers south-west of India.

The sea is central to the country’s past and present. Ferries and the traditional boats called Dhonis are the main way of travelling between islands. While the digital age has most definitely arrived in the Maldives, life on the outer islands tends to be laid back, with locals still reliant on fishing to eat and to earn a living. With many tourists visiting the country, Maldivians are trying to adapt to the modern world while upholding their distinctive identity, traditions, and beliefs.





An aerial photograph of a tropical coastline. The water is a vibrant turquoise color, transitioning to a deep blue further out. White sand beaches are visible, with some areas appearing to be under construction or development. The overall scene is bright and sunny, with high contrast between the water and the land.

Situated along old trading routes in the Indian Ocean, the Maldives has long been a melting pot. Maldivians trace their descent to Sri Lanka, India, Arab countries and Africa, but shared language and religion bind the country together.

Islam has been the national religion since the mid-12th century, and remains central to daily life.

*Dhivehi*, an Indo-Aryan language, is the Maldives' official language, and *thaana* is the Maldivian script – which, like Arabic, is written from right to left. English is effectively the country's second language, following decades of being under British protectorate. Since all instruction at school is in English, young people in the Maldives have a particularly strong command of the language.

Agriculture and manufacturing are less important in the Maldives, since there are only 27 km<sup>2</sup> of cultivable land in the whole country. Its main subsistence crops include bananas, watermelons, and other fruit and vegetables.



A tropical beach scene featuring a rocky shore in the foreground, a line of palm trees along the coast, and a cloudy sky. The text is overlaid on a light blue rectangular background.

# THE VULNERABILITIES & CLIMATE CHANGE CHALLENGES

# The Vulnerabilities

## Vulnerabilities & Climate Change Challenges

*...consequences of the climate change pose great danger to the Maldives.*

Nature is central to the Maldivian life – it enables the functioning and growth of the economy, underpins private profits, as well as assuring the economic survival and wellbeing of the Maldivian population.

However, the country's unique natural beauty poses challenges due to its small size, remote location, and vulnerability to climate change and natural disasters. Recent history is full of examples of the impact of extreme weather in the Maldives. In 1987 tidal waves inundated Male': a coastal protection system of tetrapods funded by the Japanese government is now protecting the capital from similar events. The 2004 Tsunami and, the warming of sea surface temperature such as El Niño in 1998 had devastating impacts on the islands and their inhabitants.

The likely consequences of climate change pose great danger to the Maldives. The country's low-lying nature, with over 80% of the total land area less than 1m above sea level, makes it particularly vulnerable to sea level rise.

Homes and infrastructure are defenseless against severe weather events and storm surges – particularly since climate change hazards were not taken into account when they were built.

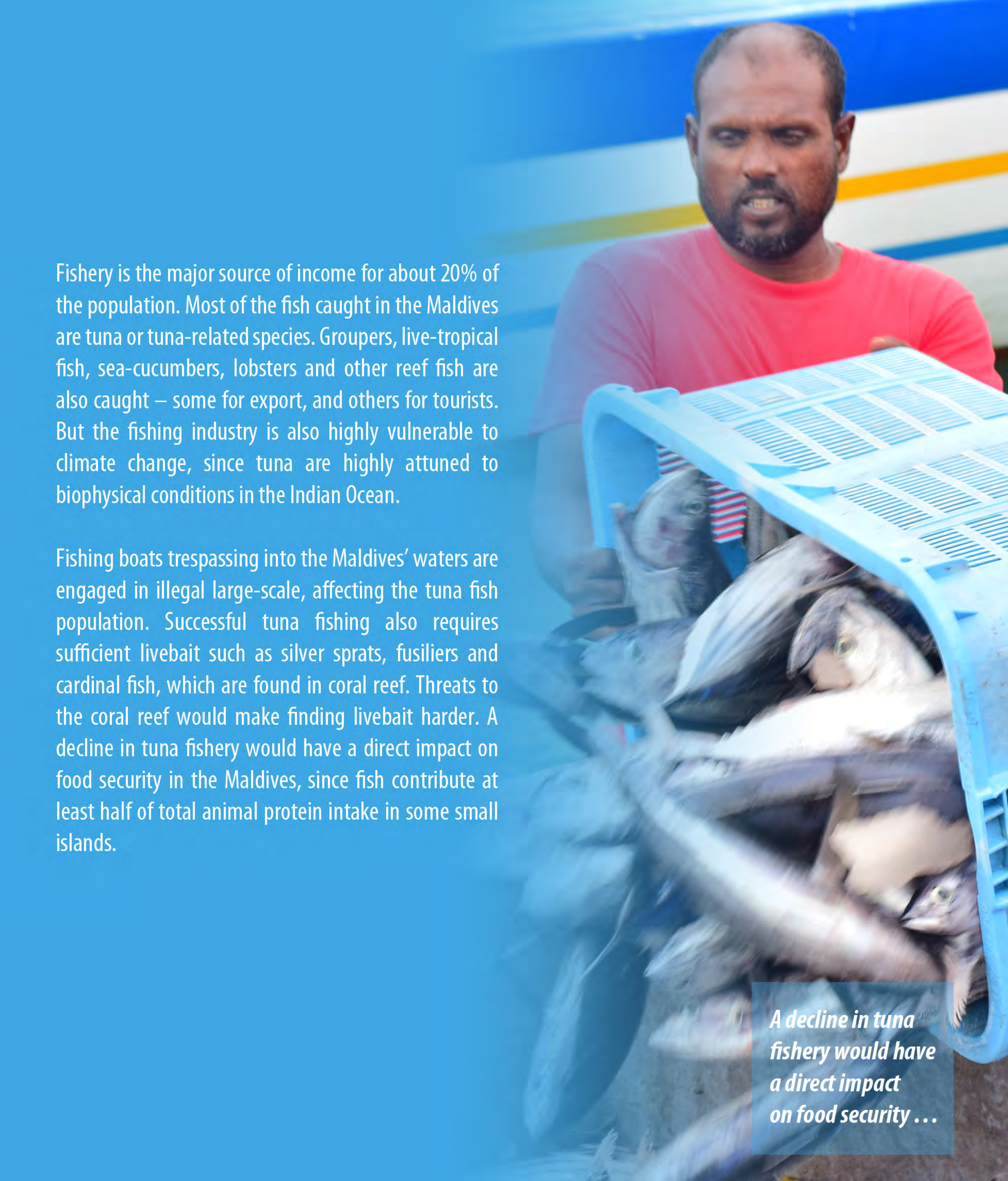


*... measures to protect the coastline infrastructure are urgently needed ...*

Since the vast majority of the islands that make up the Maldives are less than 1 km<sup>2</sup> in area, people are forced to live next to the sea. With 42% of the population, and 47% of all housing, within 100m of the coastline, people's homes, which tend to be low lying and often made of poor materials, are at severe risk of inundation with higher sea levels. The Maldives' four international airports are within 50m of the coastline. Almost all of the country's resort infrastructure and tourist accommodation are within 100m of the coastline. So too are most of the Maldives' fisheries, utility facilities, powerhouses, and communication infrastructure. Higher frequency and intensity flooding in the future could make these islands uninhabitable. Population growth and overcrowding, mainly in the capital Male', complicate the situation further, given the scarcity of available land. Further infrastructure and other measures to protect the coastline are urgently needed to defend the Maldives' human settlements.

Tourism as the main industry employs tens of thousands of people directly or indirectly. However, climate change threatens the tourist industry in multiple ways. Resort islands are vulnerable due to their size and low elevation. Seawater intrusion affects tropical vegetation, while coral bleaching harms the biological diversity of the marine ecosystems, which is one of the Maldives' main attractions.

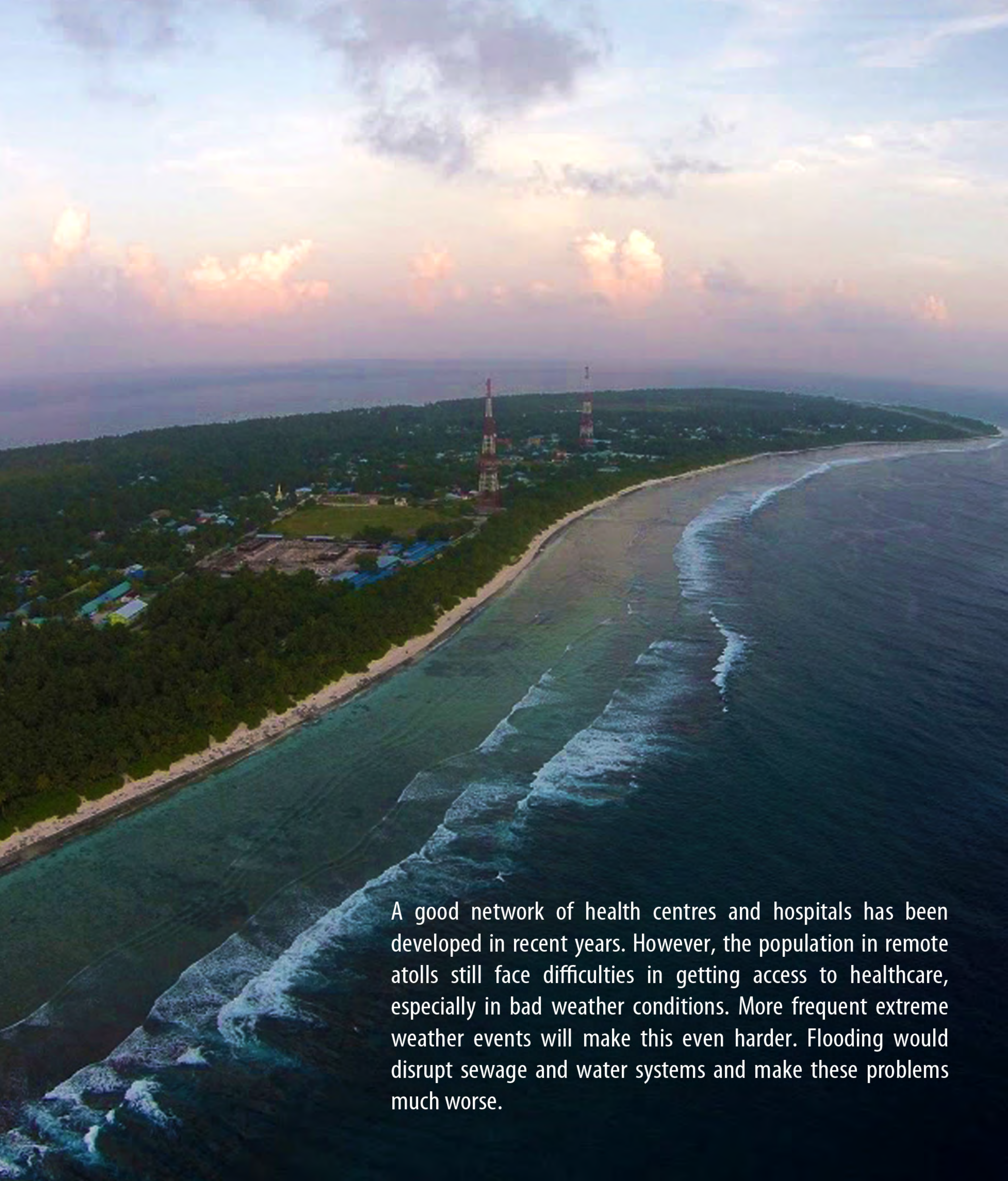


A man with a beard and a red t-shirt is shown from the chest up, holding a blue plastic crate filled with fish. The background is a blurred blue and white striped pattern, suggesting a boat. The overall image has a blue tint.

Fishery is the major source of income for about 20% of the population. Most of the fish caught in the Maldives are tuna or tuna-related species. Groupers, live-tropical fish, sea-cucumbers, lobsters and other reef fish are also caught – some for export, and others for tourists. But the fishing industry is also highly vulnerable to climate change, since tuna are highly attuned to biophysical conditions in the Indian Ocean.

Fishing boats trespassing into the Maldives' waters are engaged in illegal large-scale, affecting the tuna fish population. Successful tuna fishing also requires sufficient livebait such as silver sprats, fusiliers and cardinal fish, which are found in coral reef. Threats to the coral reef would make finding livebait harder. A decline in tuna fishery would have a direct impact on food security in the Maldives, since fish contribute at least half of total animal protein intake in some small islands.

*A decline in tuna fishery would have a direct impact on food security . . .*



A good network of health centres and hospitals has been developed in recent years. However, the population in remote atolls still face difficulties in getting access to healthcare, especially in bad weather conditions. More frequent extreme weather events will make this even harder. Flooding would disrupt sewage and water systems and make these problems much worse.







Water Resources are limited as groundwater is scarce with shallow underground freshwater lens and no surface freshwater. While the population of Male' and some outer islands has access to piped, desalinated water, 90% of atoll households use rainwater as their principal source of drinking water, and already face shortages. Rainwater storage facilities are already vulnerable to flooding and high waves. Although rainfall is predicted to increase as a whole, the slight decline forecast in the Indian Ocean region will make life even harder.



In addition, the predicted rise in sea levels and increased episodes of flooding heighten the risk of saltwater intruding into groundwater, which would affect the quality of life in the islands, as people depend on groundwater for washing, bathing and other non-potable uses. Saltwater intrusion would also affect soil and vegetation, decline agriculture and terrestrial ecosystem services.





Agriculture and Food Security are also highly vulnerable to climate change. Domestic agricultural production, although limited in scope, would be imperiled by changes in temperature, precipitation and increased episodes of extreme weather.



Meanwhile, the Maldives' heavy reliance on imports – which includes everything from rice and flour to fruit and vegetables – makes it vulnerable to the impact of climate change on agricultural production in other countries. Moreover, limited food storage capacity in the Maldives, coupled with the logistical difficulties of food distribution between the different islands, would further compromise food security in extreme weather episodes.





Coral Reef Biodiversity is the basis for the country's two largest economic sectors, as tourism and fisheries are reef-based. The coral reef contributes significantly to the islands' natural resiliency. The Maldives' coral reef system is the seventh largest in the world, and one of the most diverse in terms of species. The reefs function as natural sea defenses for the most vulnerable islands. Corals are highly sensitive to changes in temperature, and some species of corals are already at or near their thermal limits.

***The reefs function as natural sea defences for the most vulnerable islands.***



Further climate change will result in greater bleaching. Reef fish may also have their spawning cycles disrupted by changes in the environmental conditions. Coral reefs may not be able to keep pace with projected rises in sea level, because of increased oceanic carbon dioxide and sea surface temperature. Because of the centrality of coral reefs to life in the Maldives, their vulnerability to climate change could prove catastrophic to the country as a whole.

# *The Achievements & Future Climate Actions*



*The Maldives will recognize and fulfil its international commitments and obligations ...*

The Maldives intends to build its capacity to ensure a safe, sustainable, resilient and prosperous future, despite its vulnerabilities and challenges in addressing climate change. It believes in the importance of appropriate action to reduce the greenhouse gas emissions and adapt to changing climatic conditions, and will do everything it can to safeguard its future. The country has demonstrated strong political commitment and “climate leadership” at the highest levels of government, including the President, the Cabinet, the Parliament, island and atoll councilors, and non-governmental partners.

The country plans to mainstream climate change considerations into its core economic and social development goals. The Maldives will recognise and fulfill, to the fullest extent possible, its international commitments and obligations, including those under the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol. It will also leverage sub-regional, regional and international opportunities and partnerships in order to achieve commitments and targets set out internationally.



It will collaborate as appropriate and feasible with regional and international partners and organizations to pursue its climate change agenda by mobilising the resources to implement specific climate change programmes and projects. The Maldives recognizes the inherent complexity of the climate change challenge, and the need for multi-focal and cross-sectoral responses, designed and implemented in a coherent and coordinated way.

Meeting international obligations and commitments, and cooperation at all levels are essential steps to achieve the desired safe, sustainable, resilient and prosperous future. The Maldives' Government will also plan mechanisms to fund respective measures, including seeking international cooperation, knowledge sharing and support.

The first step is ensuring and integrating sustainable financing into climate change adaptation opportunities and low emission development measures. It is also important to create a more sustainable and stable economy independent of external shocks to economic factors such as fluctuating energy prices, and to strengthen a low emission development future and ensure energy security for the Maldives. Protecting critical infrastructure such as international airports, sea ports, utilities, storages from sea-related hazards and other predicted climate change impacts is also pivotal. The final, critical element is raising public awareness of the problem and of efforts to address it.



*Some projects, with the support of international donors, are already underway*

Some projects, with the support of international donors, are already underway. The Preparing Outer Island Sustainable Electricity Development (POISED) program, for example, aims to cut diesel-based energy generation in 160 islands by boosting solar photo-voltaics, and wind in some locations. It is funded by Climate Investment Funds and supports renewable energy systems on 10 small electricity-consuming islands, and deploys renewable energy-diesel hybrids on some medium and large electricity-consuming islands.

Germany's support of the Maldives' low emission strategy features exemplary renewable energy technologies for electricity generation. Energy efficient measures have also been introduced in two model islands, Kudahuvadho and Ungoofaaru, as learning and reference projects. These measures serve to create awareness and to demonstrate the economic feasibility of mitigation actions for the whole country. The project is part of International Climate Initiative funded by the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) and implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ).

In 2011 the Adaptation Fund targeted three densely populated islands – Haa Alif Ihavandhoo, Alif Dhaal Mahibadhoo and Gaaf Dhaal Gadhdhoo – to address climate-change-induced decline of freshwater security through an integrated water resource management (IWRM). The Adaptation Fund is a multilateral fund formed by the United Nations Framework Convention on Climate Change (UNFCCC). The four-year program integrates rainwater harvesting, ground water recharging, and desalinated water supply to support the population in combating the shortage of drinking water during dry periods.





***... tourism operators  
and local communities  
can work together on  
joint initiatives ...***

The multilateral Least Developed Countries Fund (LDCF) of the Global Environment Facility established ten public/ private investment partnerships between the government and tourism resorts between 2011 and 2014 to showcase the economic and environmental benefits of no-regrets adaptation in tourism operations. Moreover, ten community-based adaptation projects showed how tourism operators and local communities can work together on joint initiatives to reduce common vulnerabilities.

Since 2012, the Climate Change Trust Fund (CCTF) program has tackled three major effects of climate change: energy, coral reef monitoring, and conservation.



***The clean energy for climate mitigation aimed at reducing the dependence on imported fossil fuels, boosting gridconnected solar photovoltaic systems.***

It is supported inter alia by the European Union (EU) and the Australian Agency for International Development (AusAID). The Clean Energy for Climate Mitigation (CECM) in Gaaf Dhaal Thinadhoo island aimed at reducing the dependence on imported fossil fuels, boosting grid-connected solar photovoltaic systems.

The World Bank-administered coral reef monitoring aims at providing stronger evidence base on the status of coral reef, while the wetland conservation project in Hithadhoo and Fuvahmulah islands supports the implementation of community-based wetland management plans.



An aerial photograph of a tropical island chain, likely the Maldives, showing several small islands with white sand beaches and turquoise lagoon waters, set against a deep blue ocean and sky. The text is overlaid on the upper portion of the image.

*The Alliance  
of Small Island States*

# **The Alliance**

## ***The Alliance of Small Island States***

***AOSIS members share  
similar development  
challenges and  
concerns about the  
environment...***

In 1990, the Maldives joined forces with a few other small island developing states to found the Alliance of Small Island States (AOSIS) to advocate for climate action at the United Nations. The Maldives is currently (2015 - 2017) the Chair of AOSIS.

represent 28% of the developing countries and 20% of the total UN membership. Together, their inhabitants constitute some five percent of the global population.

AOSIS members share similar development challenges and concerns about the environment, especially their vulnerability to the adverse effects of global climate change. The represented 44 states and observers are drawn from all oceans and regions of the world: Africa, Caribbean, Indian Ocean, Mediterranean, Pacific and South China Sea.

Taken individually the island states are small, but collectively they are far more significant. Their combined population of 63.2 million people is comparable to the total population of the United Kingdom (UK). They have a combined GDP of \$575.3 billion, roughly equaling the GDP of a country such as Sweden. AOSIS countries represent 28% of the developing countries and 20% of the total UN membership. Together, their inhabitants constitute some five percent of the global population.



While AOSIS members are diverse, they all share the concern that climate change will directly affect their inhabitants and their future. The remoteness of most member states poses specific challenges to development, such as distance to markets, achieving economies of scale, high costs of transport, and extreme vulnerability to shocks.

Although their contribution to global greenhouse gas emissions and, by extension, to the causes of climate change, is negligible, small islands are greatly affected by changes in climate patterns. Rises in sea level can cause loss of land along coastlines of low-lying islands, disrupting economies and livelihoods. For example, a 50-centimeter rise in sea level will result in Grenada losing 60% of its beaches, while a 1m rise would inundate the Maldives and Tuvalu. The cyclone that hit Vanuatu in March 2015 has once again highlighted the urgency for small islands and low-lying coastal countries to act.

However, the small size of AOSIS members also offers opportunities. Pilot projects can easily be tested in small islands and then rolled out to other countries on a larger scale. Renewable energy is a particularly promising case in point.

***Pilot projects can easily be tested in small islands ...***



For twenty-five years the Alliance has strongly pushed for emissions reductions to help give low-lying states the best chance for survival by avoiding a lock-in of heat-trapping gases in time to avert catastrophic warming. AOSIS' work diverted from attempts to reach an international agreement on climate change to focus squarely on the technological and policy solutions already proven to rapidly cut emissions.

Moving towards 2015 United Nations Climate Change Conference (COP21) in Paris, AOSIS is very interested in a legally binding outcome that would compel the international community to cut emissions responsible for climate change, and would provide the support necessary to help vulnerable communities adapt to unavoidable climate impacts.

As the Chair of AOSIS, the Maldives is taking a leading role in negotiating and shaping solutions to drive this agenda forward, for the sake of all its members.

***As the Chair of AOSIS,  
the Maldives will  
take a leading role in  
negotiating and shaping  
solutions ...***

