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Notes:
In this publication, “$” refers to United States dollars.
The maps presented in this atlas reflect airports based on 2017 data from the Civil Aviation Authority of Maldives.

On the cover: An aerial view shows 1 of 26 natural atolls that make up Maldives, which also includes nearly 1,200 small coral islands and some of the world’s most beautiful beaches. Recognized as the seventh-largest in the world, the coral reefs and associated ecosystems of Maldives are key foundations for food security and means of livelihood. Yet, they are considered as among the most vulnerable to climate change (photo by Roberta Gerpacio).
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I.64 Vaavu Atoll, Land Use and Land Cover
Maldives is among the countries most vulnerable to the impacts of climate change as it is a small island nation with extremely low elevations. Maldives is also very vulnerable to impacts of rising air and sea surface temperatures and changes in rainfall patterns. Climate change impacts will therefore impose significant negative consequences on the Maldivian economy and society. Some of the priority vulnerabilities to climate change are land loss and beach erosion, infrastructure damage, degradation of coral reefs, and adverse impacts on water resources, food security, human health, and the overall economy.

Sustainable coastal resources management is of particular importance to Maldives, such that all regulations involving various development activities have coastal components. Despite the government’s continued efforts in improving and sustaining coastal resources management, critical issues remain, such as the need for systematized coastal monitoring, clear definition of coastal boundaries and coastal development, enhanced regulatory and monitoring capacities for coastal resources protection, and sustainable long-term strategies on land reclamation and marine area protection. At a time when climate is rapidly changing and extreme weather events are frequently occurring, the critical roles that marine and coastal environments play in mitigating and adapting to climate change need to be sufficiently documented and properly recognized. It is therefore essential for Maldives to develop and establish a comprehensive digital database of marine and coastal ecosystem features and services that can be regularly monitored.

The Multihazard Risk Atlas of Maldives was developed through the project “Establishing a National Geospatial Database for Mainstreaming Climate Change Adaptation into Development Activities and Policies in Maldives” under the Asian Development Bank’s regional knowledge and support (capacity development) technical assistance Action on Climate Change in South Asia (2013–2018). This five-volume atlas aims to promote the sustainable development of coastal and marine ecosystems and their various components, by enhancing the awareness of stakeholders on and enjoining them to address climate and disaster risks (including hazards, exposures, and vulnerabilities) to which ecosystems are exposed. The atlas presents spatial information and maps necessary for assessing future development investments in terms of their risks to climate and geophysical hazards.

The target audience of the Multihazard Risk Atlas of Maldives are the concerned stakeholders with current or planned development activities in the country, including public and private sectors, nongovernment organizations, research and academic community, development partner agencies, other financial institutions, and the general public. The atlas will also be a useful reference for other developing countries with similar geographical and environmental conditions, particularly small island developing states. It is envisioned that the atlas will significantly contribute to rendering important sector development investments more resilient to hazard-specific risk scenarios in the short, medium, and long terms.

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Ministry of Environment, Malé

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Vice-President for Operations 1
Asian Development Bank, Manila
Acknowledgments

Government Ministries, Departments, and Agencies in Maldives
- Civil Aviation Authority
- Land and Survey Authority
- Marine Research Institute
- Meteorological Service
- Ministry of Economic Development
- Ministry of Education
- Ministry of Environment
- Ministry of Fisheries, Marine Resources and Agriculture
- Ministry of Health
- Ministry of National Planning and Infrastructure
- Ministry of Tourism
- National Bureau of Statistics
- National Disaster Management Center

International Institutions
- Manila Observatory
- Marine Spatial Ecology Lab, University of Queensland, Australia
- SANDER + PARTNER
- United Nations Development Programme

International Institutions in Maldives
- International Union for Conservation of Nature, Maldives
- United Nations Development Programme, Maldives

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- Mahmood Riyaz, Climate Change Risk Assessment Specialist
Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
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<tr>
<td>BODC</td>
<td>British Oceanographic Data Centre</td>
</tr>
<tr>
<td>CAA</td>
<td>Maldives Civil Aviation Authority</td>
</tr>
<tr>
<td>GEBCO</td>
<td>General Bathymetric Chart of the Oceans</td>
</tr>
<tr>
<td>IHO</td>
<td>International Hydrographic Organization</td>
</tr>
<tr>
<td>IOC</td>
<td>Intergovernmental Oceanographic Commission</td>
</tr>
<tr>
<td>km$^2$</td>
<td>square kilometer</td>
</tr>
<tr>
<td>ME</td>
<td>Ministry of Environment</td>
</tr>
<tr>
<td>MED</td>
<td>Ministry of Economic Development</td>
</tr>
<tr>
<td>MLSA</td>
<td>Maldives Land and Survey Authority</td>
</tr>
<tr>
<td>MNPI</td>
<td>Ministry of National Planning and Infrastructure</td>
</tr>
<tr>
<td>UTM</td>
<td>Universal Transverse Mercator</td>
</tr>
<tr>
<td>WGS</td>
<td>World Geodetic System</td>
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</table>
Maps have changed the way we see the world. By symbolizing the features of the earth and drawing its visible and invisible boundaries, maps give humans a wider perspective, which allows us to understand the patterns, trends, and interconnected components of our planet and see beyond where we have traveled. What used to be invisible to some became visible for all through maps.

At the global scale, the size of Maldives fades in comparison with its neighboring countries such as India and Sri Lanka. Sitting in the middle of the Indian Ocean, Maldives is barely visible but greatly vulnerable to natural hazardous elements, and it strives to overcome these challenges. People have lived in this beautiful nation for thousands of years despite limited land space and multiple hazards. However, their lives, livelihoods, and properties are becoming increasingly exposed to hydrometeorological, climatological, and geological hazards.

The Multihazard Risk Atlas of Maldives examines the often-unexplored networks of human and environmental paradigms, producing a compound picture of risk that hinders development. It compiles the maps generated for Action on Climate Change in South Asia: Establishing a National Geospatial Database for Mainstreaming Climate Change Adaptation into Development Activities and Policies in Maldives, an Asian Development Bank–Maldives Ministry of Environment technical assistance (TA) project.

The national and atoll-scale maps were produced to paint a clearer picture of climate and disaster risk in Maldives and can hopefully be useful in formulating action plans and policies and in communicating risk information toward averting economic losses and harm. They can become useful tools in visually comparing spatial and temporal variations, spotting interaction among layers, and in guiding possible development directions considering future climate scenarios in the context of the changing geography, demographics, climate, economy, and environmental conditions of Maldives.

This atlas is divided into thematic sections: geography, climate and geophysical hazards, economy and demographics, and biodiversity. A summary volume provides the highlights and key messages from the overall TA activities in Maldives. The main goal of this atlas is to capture often-unmapped factors shaping Maldives’ contrasting picture of paradise in the midst of an evolving world, which generates natural hazards to the islands.
Map of the world. A map visualizing the different countries of the world (photo from Crates, World Map without Boundaries, Creative Commons).
In the middle of the Indian Ocean, southwest of India, lies a chain of atolls with islands forming a small low-lying island nation called Maldives. These tropical islands, emerging from corals and sprinkled across turquoise crystal calm waters caressing white sand beaches, paint a picture of a paradise.

The flatlands and surrounding seas form mangrove and aquatic ecosystems supporting the life of the communities that inhabit a tenth of the nation’s total islands. These communities have witnessed the continuous formation and transformation of the islands as a product of natural tidal action eroding and depositing sand or of human hands reclaiming or dredging the land. They are also highly vulnerable to strong waves during storms or earthquakes (Waheed and Shakoor 2015). Moreover, a 1-meter high increase in sea level due to a warmer world (Khan et al. 2002) could inundate two-thirds of the country’s land (Ahmed and Suphachalasai 2014). Rising seas could wipe away Maldives as most of its islands are less than 3 meters high (Khan et al. 2002). In addition, the natural biota in the islands might not be able to cope with the fast-paced development and could be displaced (ADB 2017). Geologic events and the changing climate pose a threat to the future of the islands and its inhabitants.

This volume examines Maldives, its geography, and the different atolls and their features.
Geography of Maldives

Exclamation Point on the Ocean

Maldives sits like an exclamation point, marking the middle of the Indian Ocean and drawn vertically almost at the equator. Currently, there are about 1,900 islands forming 26 atolls scattered across 870 kilometers from north to south. Less than 200 islands are inhabited. These numbers might change in the coming years due to the dynamic shifts in factors shaping the island such as sea level and land reclamation. Islands rising up to 2.4 meters above mean sea level subtly punctuate the flatness of the sea.

This volume explores the atolls, the transformation of the islands through land reclamation, and how the land is being managed.

Map 1.1: Maldives Atolls and Islands

Source: Administrative area data from the Ministry of Environment, 2016.
Map I.2: Maldives, Basemap

Data Sources:
Other data from Maldives agencies: CAA (airports); ME (administrative areas and atolls, island shorelines, reef boundaries, and water bodies); MED (ports); and MLSA (atoll capital islands and cities).

Legend
- Administrative Area
- Atoll Capital Island
- City
- Domestic Airport
- International Airport
- Port

Island Shoreline
Reef Boundary
Water Body
Map I.3: Addu City, Basemap

Legend
- Administrative Area
- City
- International Airport
- Port
- Island Shoreline
- Reef Boundary
- Water Body

Data Sources:
- Other data from Maldives agencies: CAA (airports), ME (administrative areas, island shorelines, reef boundaries, and water bodies), MED (ports), and MLSA (cities).

WGS 1984 UTM Zone 43N
Data Sources:
BODC, IHO, and IOC. 2003. GEBCO Digital Atlas (bathymetry). Other data from Maldives agencies: ME (administrative areas, island shorelines, reef boundaries, and water bodies); and MLSA (atoll capital islands).
Map I.5: Alifu Dhaalu Atoll, Basemap

Legend
- Administrative Area
- Atoll Capital Island
- International Airport
- Island Shoreline
- Reef Boundary
- Water Body

Data Sources:
Other data from Maldives agencies: CAA (airports); ME (administrative areas, island shorelines, reef boundaries, and water bodies); and MLSA (atoll capital islands).

WGS 1984 UTM Zone 43N

0 2.75 5.5 11 Kilometers
Map I.6: Baa Atoll, Basemap

Legend
- Administrative Area
- Atoll Capital Island
- Domestic Airport
- Island Shoreline
- Reef Boundary
- Water Body

Data Sources:
BODC, IHO, and IOC. 2003. GEBCO Digital Atlas (bathymetry). Other data from Maldives agencies: CAA (airports); ME (administrative areas, island shorelines, reef boundaries, and water bodies); and MLSA (atoll capital islands).
Map I.7: Dhaalu Atoll, Basemap

Legend
- Administrative Area
- Atoll Capital Island
- Domestic Airport
- Island Shoreline
- Reef Boundary
- Water Body

Data Sources:
Other data from Maldives agencies: CAA (airports); ME (administrative areas, island shorelines, reef boundaries, and water bodies); and MLSA (atoll capital islands).
Map I.8: Faafu Atoll, Basemap

Legend
- Administrative Area
- Atoll Capital Island
- Island Shoreline
- Reef Boundary
- Water Body

Data Sources:
Other data from Maldives agencies: ME (administrative areas, island shorelines, reef boundaries, and water bodies); and MLSA (atoll capital islands).
Map I.9: Gaafu Alifu Atoll, Basemap

Legend
- Administrative Area
- Atoll Capital Island
- Domestic Airport
- Island Shoreline
- Reef Boundary
- Water Body

Data Sources:
Other data from Maldives agencies: CAA (airports); ME (administrative areas, island shorelines, reef boundaries, and water bodies); and MLSA (atoll capital islands).
Map I.10: Gaafu Dhaalu Atoll, Basemap

Data Sources:
BODC, IHO, and IOC. 2003. GEBCO Digital Atlas (bathymetry). Other data from Maldives agencies: CAA (airports); ME (administrative areas, island shorelines, reef boundaries, and water bodies); and MLSA (atoll capital islands).

Legend
- Administrative Area
- Atoll Capital Island
- Domestic Airport
- Island Shoreline
- Reef Boundary
- Water Body
Map I.11: Gnaviyani Atoll, Basemap

Data Sources:
Other data from Maldives agencies: CAA (airports); ME (administrative areas, island shorelines, reef boundaries, and water bodies); and MLSA (cities).

Legend
- Administrative Area
- City
- Domestic Airport
- Island Shoreline
- Reef Boundary
- Water Body

WGS 1984 UTM Zone 43N
Map I.12: Haa Alifu Atoll, Basemap

Data Sources:
BODC, IHO, and IOC. 2003. GEBCO Digital Atlas (bathymetry). Other data from Maldives agencies: ME (administrative areas, island shorelines, reef boundaries, and water bodies); and MLSA (atoll capital islands).
Multihazard Risk Atlas of Maldives—Geography

Map I.13: Haa Dhaalu Atoll, Basemap

Legend
- Administrative Area
- Atoll Capital Island
- Domestic Airport
- International Airport
- Port
- Island Shoreline
- Reef Boundary
- Water Body

Data Sources:
BODC, IHO, and IOC. 2003. GEBCO Digital Atlas (bathymetry). Other data from Maldives agencies: CAA (airports); ME (administrative areas, island shorelines, reef boundaries, and water bodies); MED (ports); and MLSA (atoll capital islands).
Map I.14: Laamu Atoll, Basemap

Data Sources:
BODC, IHO, and IOC, 2003. GEBCO Digital Atlas (bathymetry). Other data from Maldives agencies: CAA (airports); ME (administrative areas, island shorelines, reef boundaries, and water bodies); and MLSA (atoll capital islands).

Legend
- Administrative Area
- Atoll Capital Island
- Domestic Airport
- Island Shoreline
- Reef Boundary
- Water Body

WGS 1984 UTM Zone 43N
Map I.15: Lhaviyani Atoll, Basemap

Legend
- Administrative Area
- Atoll Capital Island
- Island Shoreline
- Reef Boundary
- Water Body

Data Sources:
Other data from Maldives agencies: ME (administrative areas, island shorelines, reef boundaries, and water bodies), and MLSA (atoll capital islands).
Map I.16: Meemu Atoll, Basemap

Data Sources:
Other data from Maldives agencies: ME (administrative areas, island shorelines, reef boundaries, and water bodies); and MLSA (atoll capital islands).

WGS 1984 UTM Zone 43N
Map I.17: Noonu Atoll, Basemap

Legend
- Administrative Area
- Atoll Capital Island
- Island Shoreline
- Reef Boundary
- Water Body

Data Sources:
Other data from Maldives agencies: ME (administrative areas, island shorelines, reef boundaries, and water bodies); and MLSA (atoll capital islands).

Noonu Atoll: Basemap

WGS 1984 UTM Zone 43N
Map I.18: North Malé Atoll, Basemap

Data Sources:
BODC, IHO, and IOC. 2003. GEBCO Digital Atlas (bathymetry). Other data from Maldives agencies: CAA (airports); ME (administrative areas, island shorelines, reef boundaries, and water bodies); MED (ports); and MLSA (atoll capital islands and cities).
Map I.19: Raa Atoll, Basemap

Legend
- Administrative Area
- Atoll Capital Island
- Domestic Airport
- Island Shoreline
- Reef Boundary
- Water Body

Data Sources:
Other data from Maldives agencies: CAA (airports); ME (administrative areas, island shorelines, reef boundaries, and water bodies); and MLSA (atoll capital islands).
Map I.20: Shaviyani Atoll, Basemap

Legend
- Administrative Area
- Atoll Capital Island
- Island Shoreline
- Reef Boundary
- Water Body

Data Sources:
Other data from Maldives agencies: ME (administrative areas, island shorelines, reef boundaries, and water bodies); and MLSA (atoll capital islands).

WGS 1984 UTM Zone 43N
Map I.21: South Malé Atoll, Basemap

Legend
- Administrative Area
- Island Shoreline
- Reef Boundary
- Water Body

Data Sources:
BODC, IHO, and IOC. 2003. GEBCO Digital Atlas (bathymetry). Other data from Maldives agency: ME (administrative areas, island shorelines, reef boundaries, and water bodies).
Map I.22: Thaa Atoll, Basemap

Data Sources:
BODC, IHO, and IOC. 2003. GEBCO Digital Atlas (bathymetry). Other data from Maldives agencies: CAA (airports); ME (administrative areas, island shorelines, reef boundaries, and water bodies); and MLSA (atoll capital islands).
Map I.23: Vaavu Atoll, Basemap

Data Sources:
Other data from Maldives agencies: ME (administrative areas, island shorelines, reef boundaries, and water bodies); and MLSA (atoll capital islands).
The natural geographic formation of Maldives presents challenges in urban expansion and development. Limited dry land combined with urban growth requires measures to maximize the available space for multiple activities. One mode of urban expansion is land reclamation. Land reclamation has become part of the development in the country and a solution to the limited available land, transforming the islands over the years to accommodate more human activities. Land reclamation is noticeable in the straightened coasts of Thinadhoo Island located in Gaafu Dhaalu Atoll (Map I.24). Other locations of land reclamation in Maldives are listed in Table I.1 and shown in Map I.25.

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<td>Addu City</td>
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Table I.1: Islands with Reclamation

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<td>Thulusdhoo</td>
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<td></td>
<td></td>
<td>Himmafushi</td>
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<td></td>
<td>Hulhumalé</td>
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<tr>
<td></td>
<td></td>
<td>Malé</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vilin’gili</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hulhulé</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tilafushi</td>
</tr>
</tbody>
</table>

Land reclamation. To accommodate more people and urban activities, the coasts of major islands have been reclaimed. The Government of Maldives prioritized the Hulhumalé Land Reclamation and Development Project to address the need for more space around Malé City. This project will expand the island by 12.8 square kilometers in a sustainable manner (ADB 2017) (photo by Shahee Ilyas).
Map I.24: Thinadhoo, Basemap

Legend

Blocks
- Government Office
- Hospital
- Industrial Zone
- Institutional and Community Zone
- Residential Zone
- School
- Sports and Recreation Zone
- Telecom Institution
- Utility and Municipal Zone
- Quaywall

Waterline
- Low
- High

Data Sources:
Other data from Maldives agency: ME (blocks and waterlines).

WGS 1984 UTM Zone 43N
Map I.25: Maldives, Land Reclamation

Legend
- Administrative Area
- Administrative Atoll
- Atoll Capital Island
- City
- Domestic Airport
- International Airport
- Port
- Land Reclamation
- Island Shoreline
- Reef Boundary
- Water Body

Data Sources:
- Other data from Maldives agencies: CAA (airports); ME (administrative areas and atolls, island shorelines, water bodies, and reef boundaries); MED (ports); MLSA (atoll capital islands and cities); and MNPI (land reclamations).
Map I.26: Addu City, Land Reclamation

Data Sources:
Other data from Maldives agencies: CAA (airports); ME (administrative areas, island shorelines, reef boundaries, and water bodies); MED (ports); MLSA (cities); and MNPI (land reclamations).

Legend
- Administrative Area
- City
- International Airport
- Port
- Land Reclamation
- Island Shoreline
- Reef Boundary
- Water Body

WGS 1984 UTM Zone 43N

0 1 2 3 4
Kilometers

Addu City: Land Reclamation

BODC, IHO, and IOC. 2003. GEBCO Digital Atlas (bathymetry). Other data from Maldives agencies: CAA (airports); ME (administrative areas, island shorelines, reef boundaries, and water bodies); MED (ports); MLSA (cities); and MNPI (land reclamations).
Map I.27: Alifu Alifu Atoll, Land Reclamation

Data Sources:
Other data from Maldives agencies: ME (administrative areas, island shorelines, reef boundaries, and water bodies); MLSA (atoll capital islands); and MNPI (land reclamations).
Map I.28: Alifu Dhaalu Atoll, Land Reclamation

Legend
- Administrative Area
- Atoll Capital Island
- International Airport
- Land Reclamation
- Island Shoreline
- Reef Boundary
- Water Body

Data Sources:
Other data from Maldives agencies: CAA (airports); ME (administrative areas, island shorelines, reef boundaries, and water bodies); MLSA (atoll capital islands); and MNPI (land reclamations).

WGS 1984 UTM Zone 43N
Map I.29: Baa Atoll, Land Reclamation

Data Sources:
BODC, IHO, and IOC. 2003. GEBCO Digital Atlas (bathymetry). Other data from Maldives agencies: CAA (airports); ME (administrative areas, island shorelines, reef boundaries, and water bodies); MLSA (atoll capital islands); and MNPI (land reclamations).
Map I.30: Dhaalu Atoll, Land Reclamation

Data Sources:
Other data from Maldives agencies: CAA (airports); ME (administrative areas, island shorelines, reef boundaries, and water bodies); MLSA (atoll capital islands); and MNPI (land relocations).
Map I.31: Faafu Atoll, Land Reclamation

Data Sources:
Other data from Maldives agencies: ME (administrative areas, island shorelines, reef boundaries, and water bodies); MLSA (atoll capital islands); and MNPI (land reclaims).
Map I.32: Gaafu Alifu Atoll, Land Reclamation

Legend
- Administrative Area
- Atoll Capital Island
- Domestic Airport
- Land Reclamation
- Island Shoreline
- Reef Boundary
- Water Body

Data Sources:
BODC, IHO and IOC.2003. GEBCO Digital Atlas (bathymetry). Other data from Maldives agencies: CAA (airports); ME (administrative areas, island shorelines, reef boundaries, and water bodies); MLSA (atoll capital islands); and MNPI (land reclamations).
Map I.33: Gaafu Dhaalu Atoll, Land Reclamation

Legend
- Administrative Area
- Atoll Capital Island
- Domestic Airport
- Land Reclamation
- Island Shoreline
- Reef Boundary
- Water Body

Data Sources:
Other data from Maldives agencies: CAA (airports); ME (administrative areas, island shorelines, reef boundaries, and water bodies); MLSA (atoll capital islands); and MNPI (land reclamations).
Map I.34: Haa Alifu Atoll, Land Reclamation

Legend
- Administrative Area
- Atoll Capital Island
- Land Reclamation
- Island Shoreline
- Reef Boundary
- Water Body

Data Sources:
BODC, IHO, and IOC. 2003. GEBCO Digital Atlas (bathymetry). Other data from Maldives agencies: ME (administrative areas, island shorelines, reef boundaries, and water bodies); MLSA (atoll capital islands); and MNPI (land reclamations).
Map I.35: Haa Dhaalu Atoll, Land Reclamation

Data Sources:
BODC, IHO, and IOC. 2003. GEBCO Digital Atlas (bathymetry). Other data from Maldives agencies: CAA (airports); ME (administrative areas, island shorelines, reef boundaries, and water bodies); MED (ports); MLSA (atoll capital islands); and MNPI (land reclamations).

Legend
- Administrative Area
- Atoll Capital Island
- Domestic Airport
- International Airport
- Port
- Land Reclamation
- Island Shoreline
- Reef Boundary
- Water Body

WGS 1984 UTM Zone 43N
Map I.36: Laamu Atoll, Land Reclamation

Data Sources:
- Other data from Maldives agencies: CAA (airports); ME (administrative areas, island shorelines, reef boundaries, and water bodies); MLSA (atoll capital islands); and MNPI (land reclamations).

Legend
- Administrative Area
- Atoll Capital Island
- Domestic Airport
- Land Reclamation
- Island Shoreline
- Reef Boundary
- Water Body

WGS 1984 UTM Zone 43N

Kilometers

73°33'0"E
73°33'0"E
73°27'30"E
73°27'30"E
73°22'0"E
73°22'0"E
73°16'30"E
73°16'30"E
2°6'0"N
2°6'0"N
1°57'0"N
1°57'0"N
1°48'0"N
1°48'0"N
1°39'0"N
1°39'0"N
Map I.37: Lhaviyani Atoll, Land Reclamation

Legend
- Administrative Area
- Atoll Capital Island
- Land Reclamation
- Island Shoreline
- Reef Boundary
- Water Body

Legend:
- Administrative Area
- Atoll Capital Island
- Land Reclamation
- Island Shoreline
- Reef Boundary
- Water Body

Data Sources:
BODC, IHO, and IOC. 2003. GEBCO Digital Atlas (bathymetry). Other data from Maldives agencies: ME (administrative areas, island shorelines, reef boundaries, and water bodies); MLSA (atoll capital islands); and MNPI (land reclamations).

WGS 1984 UTM Zone 43N
Map I.38: Meemu Atoll, Land Reclamation

Data Sources:
Other data from Maldives agencies: ME (administrative areas, island shorelines, reef boundaries, and water bodies); MLSA (atoll capital islands); and MNPI (land reclamation).

Legend
- Administrative Area
- Atoll Capital Island
- Land Reclamation
- Island Shoreline
- Reef Boundary
- Water Body

WGS 1984 UTM Zone 43N
Map I.39: Noonu Atoll, Land Reclamation

Legend
- Administrative Area
- Atoll Capital Island
- Land Reclamation
- Island Shoreline
- Reef Boundary
- Water Body

Data Sources:
- Other data from Maldives agencies: ME (administrative areas, island shorelines, reef boundaries, and water bodies); MLA (atoll capital islands); and MLPI (land reclamations).

WGS 1984 UTM Zone 43N

Noonu Atoll: Land Reclamation

BODC, IHO, and IOC. 2003. GEBCO Digital Atlas (bathymetry). Other data from Maldives agencies: ME (administrative areas, island shorelines, reef boundaries, and water bodies); MLA (atoll capital islands); and MLPI (land reclamations).
Multihazard Risk Atlas of Maldives—Geography

Map I.40: North Malé Atoll, Land Reclamation

Legend

- Administrative Area
- Atoll Capital Island
- City
- International Airport
- Port
- Land Reclamation
- Island Shoreline
- Reef Boundary
- Water Body

Data Sources:
Other data from Maldives agencies: CAA (airports); ME (administrative areas, island shorelines, reef boundaries, and water bodies); MED (ports); MLSA (atoll capital islands and cities); and MNPI (land relocations).
Map I.41: Shaviyani Atoll, Land Reclamation

Data Sources:
Other data from Maldives agencies: ME (administrative areas, island shorelines, reef boundaries, and water bodies); MLSA (atoll capital islands); and MNPI (land reclamation).

Legend
- Administrative Area
- Atoll Capital Island
- Land Reclamation
- Island Shoreline
- Reef Boundary
- Water Body

WGS 1984 UTM Zone 43N

Kilometers 0 7.5 15 22.5 30 37.5 45
Map I.42: South Malé Atoll, Land Reclamation

Legend
- Administrative Area
- Land Reclamation
- Island Shoreline
- Reef Boundary
- Water Body

Data Sources:
Other data from Maldives agencies: ME (administrative areas, island shorelines, reef boundaries, and water bodies); and MNPI (land reclamations).
Map I.43: Thaa Atoll, Land Reclamation

Data Sources:
Other data from Maldives agencies: CAA (airports);
ME (administrative areas, island shorelines, reef boundaries,
and water bodies); MLSA (atoll capital islands); and MNPI
(land reclamations).
Land space is a necessary resource for development. Maldives has only less than 250 square kilometers (km$^2$) of land. With its limited available land, allocation of space for specific land use is a challenge. Currently, the country has more vegetated land cover (shrubs, herbs, forest, and palm trees) than built-up areas (high density urban areas, road, airport, and low density urban areas). Huge land is allocated for beaches (20.9 km$^2$) and island resorts (16.8 km$^2$). A small portion (6.7 km$^2$) is for agriculture. Other spaces are classified as inland water and wetlands (Table I.2).

### Table I.2: Land Use and Land Cover, Maldives

<table>
<thead>
<tr>
<th>Land Use and Land Cover</th>
<th>Area (km$^2$)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Land Use</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High density urban areas</td>
<td>1.79</td>
<td>0.76</td>
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<td>Roads</td>
<td>4.66</td>
<td>1.98</td>
</tr>
<tr>
<td>Airports</td>
<td>5.80</td>
<td>2.46</td>
</tr>
<tr>
<td>Harbors</td>
<td>7.32</td>
<td>3.11</td>
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<tr>
<td>Island resorts</td>
<td>16.78</td>
<td>7.12</td>
</tr>
<tr>
<td>Low density urban areas</td>
<td>29.62</td>
<td>12.56</td>
</tr>
<tr>
<td>Agricultural areas</td>
<td>6.65</td>
<td>2.82</td>
</tr>
<tr>
<td><strong>Land Cover</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inland waters</td>
<td>2.97</td>
<td>1.26</td>
</tr>
<tr>
<td>Wetlands</td>
<td>3.39</td>
<td>1.44</td>
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<tr>
<td>Barren, sparsely vegetated areas</td>
<td>8.88</td>
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<tr>
<td>Beaches and sand</td>
<td>20.85</td>
<td>8.84</td>
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<td>Shrubs and/or herbaceous vegetation areas</td>
<td>36.07</td>
<td>15.30</td>
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<tr>
<td>Forests</td>
<td>40.86</td>
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<td>Palm trees</td>
<td>50.10</td>
<td>21.25</td>
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<tr>
<td><strong>Total</strong></td>
<td>235.74</td>
<td>100.00</td>
</tr>
</tbody>
</table>

km$^2$ = square kilometer.

Note: Total may not add up due to rounding.

Land cover. Maldives’ national tree, the palm tree, covers a fifth of the country’s land area. Together with palm trees, forests and shrublands cover more than half of the country’s land (photo by Shifaaz Shamoon).
Buildings stand next to one another along the narrow roads of Male City in Maldives. Less than 1% of Maldives has high density urban land use classification (photo by Shahees Ilyas).
Map I.44: Addu City, Land Use and Land Cover

Legend
- Administrative Area
- Agricultural Area
- Airport
- Barren, Sparsely Vegetated Area
- Beaches and Sand
- Coral Reef
- Forest
- Harbor
- High Density Urban Area
- Inland Water
- Island Resort
- Lagoon
- Low Density Urban Area
- Palm Tree
- Road
- Shallow Lagoon
- Shrub and/or Herbaceous Vegetation Area
- Wetland

Data Sources:
BODC, IHO, and IOC. 2003. GEBCO Digital Atlas (bathymetry); and ME (administrative areas, land use and land cover).
Map I.45: Alifu Alifu Atoll, Land Use and Land Cover

Legend
- Administrative Area
- Agricultural Area
- Airport
- Barren, Sparsely Vegetated Area
- Beaches and Sand
- Coral Reef
- Forest
- Harbor
- High Density Urban Area
- Inland Water
- Island Resort
- Lagoon
- Low Density Urban Area
- Palm Tree
- Road
- Shallow Lagoon
- Shrub and/or Herbaceous Vegetation Area
- Wetland

Data Sources:
BODC, IHO, and IOC. 2003. GEBCO Digital Atlas (bathymetry); and ME (administrative areas, land use and land cover).
Map I.46: Alifu Dhaalu Atoll, Land Use and Land Cover

Legend
- Administrative Area
- Agricultural Area
- Airport
- Barren, Sparsely Vegetated Area
- Beaches and Sand
- Coral Reef
- Forest
- Harbor
- High Density Urban Area
- Inland Water
- Island Resort
- Lagoon
- Low Density Urban Area
- Palm Tree
- Road
- Shallow Lagoon
- Shrub and/or Herbaceous Vegetation Area
- Wetland

Data Sources:
BODC, IHO, and IOC. 2003. GEBCO Digital Atlas (bathymetry); and ME (administrative areas, land use and land cover). WGS 1984 UTM Zone 43N.
Map I.47: Baa Atoll, Land Use and Land Cover

Legend
- Administrative Area
- Agricultural Area
- Airport
- Barren, Sparsely Vegetated Area
- Beaches and Sand
- Coral Reef
- Forest
- Harbor
- High Density Urban Area
- Inland Water
- Island Resort
- Lagoon
- Low Density Urban Area
- Palm Tree
- Road
- Shallow Lagoon
- Shrub and/or Herbaceous Vegetation Area
- Wetland

Data Sources:
BODC, IHO, and IOC. 2003. GEBCO Digital Atlas (bathymetry); and ME (administrative areas, land use and land cover).
Map I.48: Dhaalu Atoll, Land Use and Land Cover

Legend

- Administrative Area
- Agricultural Area
- Airport
- Barren, Sparsely Vegetated Area
- Beaches and Sand
- Coral Reef
- Forest
- Harbor
- High Density Urban Area
- Inland Water
- Island Resort
- Lagoon
- Low Density Urban Area
- Palm Tree
- Road
- Shallow Lagoon
- Shrub and/or Herbaceous Vegetation Area
- Wetland

Data Sources:
BODC, IHO, and IOC. 2003. GEBCO Digital Atlas (bathymetry); and ME (administrative areas, land use and land cover).
Map I.49: Faafu Atoll, Land Use and Land Cover

Legend
- Administrative Area
- Agricultural Area
- Airport
- Barren, Sparsely Vegetated Area
- Beaches and Sand
- Coral Reef
- Forest
- Harbor
- High Density Urban Area
- Inland Water
- Island Resort
- Lagoon
- Low Density Urban Area
- Palm Tree
- Road
- Shallow Lagoon
- Shrub and/or Herbaceous Vegetation Area
- Wetland

Data Sources:
BODC, IHO, and IOC. 2003. GEBCO Digital Atlas (bathymetry); and ME (administrative areas, land use and land cover).
Map I.50: Gaafu Alifu Atoll, Land Use and Land Cover

Legend
- Administrative Area
- Agricultural Area
- Airport
- Barren, Sparsely Vegetated Area
- Beaches and Sand
- Coral Reef
- Forest
- Harbor
- High Density Urban Area
- Inland Water
- Island Resort
- Lagoon
- Low Density Urban Area
- Palm Tree
- Road
- Shallow Lagoon
- Shrub and/or Herbaceous Vegetation Area
- Wetland

Data Sources:
BODC, IHO, and IOC. 2003. GEBCO Digital Atlas (bathymetry); and ME (administrative areas, land use and land cover).
Map I.51: Gaafu Dhaalu Atoll, Land Use and Land Cover

Legend
- Administrative Area
- Agricultural Area
- Airport
- Barren, Sparsely Vegetated Area
- Beaches and Sand
- Coral Reef
- Forest
- Harbor
- High Density Urban Area
- Inland Water
- Island Resort
- Lagoon
- Low Density Urban Area
- Palm Tree
- Road
- Shallow Lagoon
- Shrub and/or Herbaceous Vegetation Area
- Wetland

Data Sources:
BODC, IHO, and IOC. 2003. GEBCO Digital Atlas (bathymetry); and ME (administrative areas, land use and land cover).
Map I.52: Gnaviyani Atoll, Land Use and Land Cover

Legend

- Administrative Area
- Agricultural Area
- Airport
- Barren, Sparsely Vegetated Area
- Beaches and Sand
- Coral Reef
- Forest
- Harbor
- High Density Urban Area
- Inland Water
- Island Resort
- Lagoon
- Low Density Urban Area
- Palm Tree
- Road
- Shallow Lagoon
- Shrub and/or Herbaceous Vegetation Area
- Wetland

Data Sources:
BODC, IHO, and IOC. 2003. GEBCO Digital Atlas (bathymetry);
and ME (administrative areas, land use and land cover).
Map I.53: Haa Alifu Atoll, Land Use and Land Cover

Legend
- Administrative Area
  - Agricultural Area
  - Airport
  - Barren, Sparsely Vegetated Area
  - Beaches and Sand
  - Coral Reef
  - Forest
  - Harbor
  - High Density Urban Area
  - Inland Water
  - Island Resort
  - Lagoon
  - Low Density Urban Area
  - Palm Tree
  - Road
  - Shallow Lagoon
  - Shrub and/or Herbaceous Vegetation Area
  - Wetland

Data Sources:
BODC, IMO, and IOC, 2003. GEBCO Digital Atlas (bathymetry); and ME (administrative areas, land use and land cover).
Map I.54: Haa Dhaalu Atoll, Land Use and Land Cover

Legend

- Administrative Area
- Agricultural Area
- Airport
- Barren, Sparsely Vegetated Area
- Beaches and Sand
- Coral Reef
- Forest
- Harbor
- High Density Urban Area
- Inland Water
- Island Resort
- Lagoon
- Low Density Urban Area
- Palm Tree
- Road
- Shallow Lagoon
- Shrub and/or Herbaceous Vegetation Area
- Wetland

Data Sources:
BODC, IHO, and IOC. 2003. GEBCO Digital Atlas (bathymetry); and ME (administrative areas, land use and land cover).
Map I.55: Laamu Atoll, Land Use and Land Cover

Legend
- Administrative Area
- Agricultural Area
- Airport
- Barren, Sparsely Vegetated Area
- Beaches and Sand
- Coral Reef
- Forest
- Harbor
- High Density Urban Area
- Inland Water
- Island Resort
- Lagoon
- Low Density Urban Area
- Palm Tree
- Road
- Shallow Lagoon
- Shrub and/or Herbaceous Vegetation Area
- Wetland

Data Sources:
- BODC, IHO, and IOC. 2003. GEBCO Digital Atlas (bathymetry); and ME (administrative areas, land use and land cover).

WGS 1984 UTM Zone 43N

Kilometers

0 2.75 5.5 11

N
Map I.56: Lhaviyani Atoll, Land Use and Land Cover

Legend
- Administrative Area
- Agricultural Area
- Airport
- Barren, Sparsely Vegetated Area
- Beaches and Sand
- Coral Reef
- Forest
- Harbor
- High Density Urban Area
- Inland Water
- Island Resort
- Lagoon
- Low Density Urban Area
- Palm Tree
- Road
- Shallow Lagoon
- Shrub and/or Herbaceous Vegetation Area
- Wetland

Data Sources:
BODC, IHO, and IOC. 2003. GEBCO Digital Atlas (bathymetry);
and ME (administrative areas, land use and land cover).

WGS 1984 UTM Zone 43N
Map I.57: Meemu Atoll, Land Use and Land Cover

Data Sources:
BODC, IHO, and IOC. 2003. GEBCO Digital Atlas (bathymetry); and ME (administrative areas, land use and land cover).
Map I.58: Noonu Atoll, Land Use and Land Cover

Legend
- Administrative Area
- Agricultural Area
- Airport
- Barren, Sparsely Vegetated Area
- Beaches and Sand
- Coral Reef
- Forest
- Harbor
- High Density Urban Area
- Inland Water
- Island Resort
- Lagoon
- Low Density Urban Area
- Palm Tree
- Road
- Shallow Lagoon
- Shrub and/or Herbaceous Vegetation Area
- Wetland

Data Sources:
BODC, IHO, and IOC. 2003. GEBCO Digital Atlas (bathymetry); and ME (administrative areas, land use and land cover).
Map I.59: North Malé Atoll, Land Use and Land Cover

Legend
- Administrative Area
- Agricultural Area
- Airport
- Barren, Sparsely Vegetated Area
- Beaches and Sand
- Coral Reef
- Forest
- Harbor
- High Density Urban Area
- Inland Water
- Island Resort
- Lagoon
- Low Density Urban Area
- Palm Tree
- Road
- Shallow Lagoon
- Shrub and/or Herbaceous Vegetation Area
- Wetland

Data Sources:
BODC, IHO, and IOC. 2003. GEBCO Digital Atlas (bathymetry); and ME (administrative areas, land use and land cover).
Map I.60: Raa Atoll, Land Use and Land Cover

Legend

- Administrative Area
- Agricultural Area
- Airport
- Barren, Sparsely Vegetated Area
- Beaches and Sand
- Coral Reef
- Forest
- Harbor
- High Density Urban Area
- Inland Water
- Island Resort
- Lagoon
- Low Density Urban Area
- Palm Tree
- Road
- Shallow Lagoon
- Shrub and/or Herbaceous Vegetation Area
- Wetland

Data Sources:
BODC, IHO, and IOC. 2003. GEBCO Digital Atlas (bathymetry);
and ME (administrative areas, land use and land cover).
Map I.61: Shaviyani Atoll, Land Use and Land Cover

Data Sources:
BODC, IHO, and IOC. 2003. GEBCO Digital Atlas (bathymetry); and ME (administrative areas, land use and land cover).

Legend
- Administrative Area
- Agricultural Area
- Airport
- Barren, Sparsely Vegetated Area
- Beaches and Sand
- Coral Reef
- Forest
- Harbor
- High Density Urban Area
- Inland Water
- Island Resort
- Lagoon
- Low Density Urban Area
- Palm Tree
- Road
- Shallow Lagoon
- Shrub and/or Herbaceous Vegetation Area
- Wetland
Map I.62: South Malé Atoll, Land Use and Land Cover

Legend
- Administrative Area
- Agricultural Area
- Airport
- Barren, Sparsely Vegetated Area
- Beaches and Sand
- Coral Reef
- Forest
- Harbor
- High Density Urban Area
- Inland Water
- Island Resort
- Lagoon
- Low Density Urban Area
- Palm Tree
- Road
- Shallow Lagoon
- Shrub and/or Herbaceous Vegetation Area
- Wetland

Data Sources:
BODC, IHO, and IOC. 2003. GEBCO Digital Atlas (bathymetry); and ME (administrative areas, land use and land cover).

WGS 1984 UTM Zone 43N
Map I.63: Thaa Atoll, Land Use and Land Cover

Legend
- Administrative Area
- Agricultural Area
- Airport
- Barren, Sparsely Vegetated Area
- Beaches and Sand
- Coral Reef
- Forest
- Harbor
- High Density Urban Area
- Inland Water
- Island Resort
- Lagoon
- Low Density Urban Area
- Palm Tree
- Road
- Shallow Lagoon
- Shrub and/or Herbaceous Vegetation Area
- Wetland

Data Sources: BODC, IHO, and IOC, 2003. GEBCO Digital Atlas (bathymetry); and ME (administrative areas, land use and land cover).

WGS 1984 UTM Zone 43N

Kilometers

0 3.5 7 14
Map I.64: Vaavu Atoll, Land Use and Land Cover

Legend

- Administrative Area
- Agricultural Area
- Airport
- Barren, Sparsely Vegetated Area
- Beaches and Sand
- Coral Reef
- Forest
- Harbor
- High Density Urban Area
- Inland Water
- Island Resort
- Lagoon
- Low Density Urban Area
- Palm Tree
- Road
- Shallow Lagoon
- Shrub and/or Herbaceous Vegetation Area
- Wetland

Data Sources:
BODC, IHO, and IOC. 2003. GEBCO Digital Atlas (bathymetry); and ME (administrative areas, land use and land cover)
Map Data Sources

Government Ministries, Departments, and Agencies in Maldives
   Civil Aviation Authority
      Airports
   Land and Survey Authority
      Atoll capital islands
      Cities
   Ministry of Economic Development
      Ports
   Ministry of Environment
      Administrative area
      Administrative atoll
      Island shorelines
      Land use and land cover
      Reef boundaries
      Water bodies
   Ministry of National Planning and Infrastructure
      Land reclamation


Maps were prepared by the Country Consultant Team and the Manila Observatory on behalf of the Asian Development Bank.
Multihazard Risk Atlas of Maldives

*Geography—Volume I*

This atlas provides spatial information about Maldives and thematic maps necessary for assessing future development investments in terms of climate risks and geophysical hazards. It is also intended to support the formulation of cobeneficial options for climate change adaptation and disaster risk reduction and management. The five-volume atlas is a major output of the project “Establishing a National Geospatial Database for Mainstreaming Climate Change Adaptation into Development Activities and Policies in Maldives” under the Asian Development Bank’s regional knowledge and support (capacity development) technical assistance Action on Climate Change in South Asia (2013–2018).

The **Multihazard Risk Atlas of Maldives** is composed of *Geography—Volume I, Climate and Geophysical Hazards—Volume II, Economy and Demographics—Volume III, Biodiversity—Volume IV, and Summary—Volume V.*

**About the Asian Development Bank**

ADB is committed to achieving a prosperous, inclusive, resilient, and sustainable Asia and the Pacific, while sustaining its efforts to eradicate extreme poverty. Established in 1966, it is owned by 68 members—49 from the region. Its main instruments for helping its developing member countries are policy dialogue, loans, equity investments, guarantees, grants, and technical assistance.