Climate Change Assessment: *Enhancing Climate Resilience and Food Security Project*

SUBMISSION AND REVIEW DATES:	
1st submission:	5 January 2024
GoM comments:	10 January 2024
2nd submission:	22 May 2024
ADB/GoM comments:	

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Abbreviations

ADB	-	Asian Development Bank
amsl	-	above mean sea level
AR6	-	Sixth Assessment Report
CMIP6	-	Coupled Model Intercomparison Project Phase 6
CRU	-	Climate Research Unit
ESGF	-	Earth System Grid Federation
GCM	-	Global Climate Model
GEV	-	Generalized Extreme Value
IPCC	-	Intergovernmental Panel on Climate Change
KNMI	-	Royal Netherlands Meteorological Institute
MMS	-	Maldives Meteorological Service
SSP	-	Shared Socioeconomic Pathways

Weights and Measures

ha	-	hectares
m, m^2, m^3	-	metre, square metre and cubic metres
km	-	kilometre

I. INTRODUCTION

1. The Maldives is a low-lying island nation that faces multiple natural hazards and climate change impacts that threaten its population and economy. The country's climate conditions, geographical characteristics, physical exposure and socio-economic vulnerability make it prone to various hazards[1] such as hydrological hazards (pluvial floods caused by heavy rainfall, coastal flood, coastal erosion, and wave action), meteorological hazards (cyclone wind and storm surges, and heat waves), climatological hazards (droughts) and geophysical hazards (earthquake and tsunami). Climate change is expected to exacerbate the frequency, extent and intensity of climate-related hazards, increasing the likelihood of extreme weather events such as monsoonal heavy rains, storms, swells and coastal erosion.[2] These events have devastating impacts on the Maldives such as loss of live, injury and displacement of people, damage to infrastructure, housing and livelihoods, disruption of essential services, degradation of natural resources such as coral reefs, fisheries and biodiversity, reduced economic productivity and activity, including for tourism, and a potential increase in poverty and social vulnerability.

2. In the past 25 years, Maldives has been affected by three major climate extremes; the 1997-1998 ENSO event; the 2007 floods; and the 2016 ENSO event.[3] While large-scale disasters are rare, minor coastal and rainfall floods are common across the country.[4] Over 90% of islands reported annual flooding.[5] Swell waves generated at distance in the Indian Ocean and off the coast of Madagascar occur two to three times a year. While cyclone hazard risk is lower than other Pacific or Atlantic small islands, storm surges and strong winds are frequent especially in the northern part of the country.[6]

3. To address some of these challenges, the Asian Development Bank (ADB) has prepared an investment project on climate change adaptation and resilience. The project will be implemented by the Ministry of Climate Change, Environment and Energy and focus on three main components of resilience: i) strengthened capacity and awareness to plan, adapt and respond to climate change; ii) infrastructure and nature-based solutions for improved climate resilience developed, and iii) enhanced resilience of island agri-food systems.

4. The aim of this report is to provide an overview of historical hazard occurrence and the latest climate change projections as baseline assessment and background analysis for the development of the investment project. The report also includes the results of a national-level risk assessment to support the geographical scoping and prioritization for the investment project. A Summary Climate Change Assessment is accompanied to this report.

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[1] IRDR. 2014. *Peril Classification and Hazard Glossary.* Integrated Research on Disaster Risk DATA Publication No. 1. Beijing.
[2] Ministry of Environment. 2020. *Updated Nationally Determined Contribution of Maldives.* Malé.
[3] C. Morri et al. 2015. Through Bleaching and Tsunami: Coral Reef Recovery in the Maldives. *Marine Pollution Bulletin.* 98 (1-2). pp. 188–200.
[4] Ministry of Environment and Energy. 2016. *Second National Communication of Maldives to the UNFCCC*. Malé.
[5] M. Nachmany et al. 2015. *Climate Change Legislation in Maldives – an Excerpt from the 2015 Global Climate Leglislation Study – A Review of Climate Change Legislation in 99 countries*. Grantham Research Institute, London.
[6] Ministry of Environment, Energy and Water. 2007. *National Adaptation Program of Action.* Malé.

II. CLIMATE IN MALDIVES

A. Climate baseline

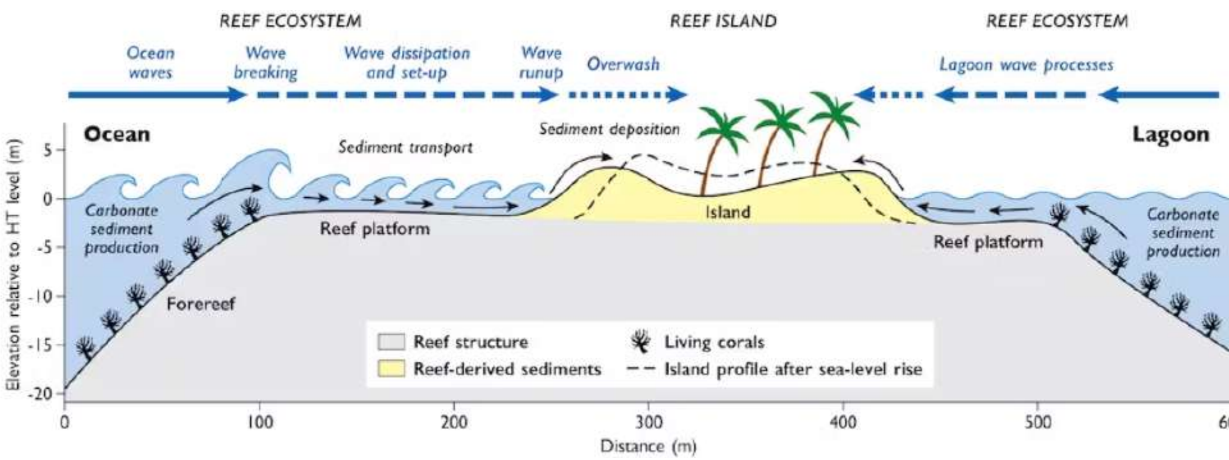
1. Background

5. Maldives spans about 860 km in length and 80 to 120 km in width. However, the total land area of the Maldives is only about 298 km^2, making it the sixth smallest country in the world by land area, and one of the most dispersed countries in the world by geography. Maldives is also one of the lowest and flattest countries in the world, with more than 80% of its land area being less than 1 meter above mean sea level (amsl).

6. Maldives is a tropical island nation located over the equator in the Indian Ocean, southwest of the Indian subcontinent. It consists of 26 coral atolls and 1,192 small islands, which are the peaks of extinct submarine volcanoes. The atolls and associated reef islands are geologically young features formed about 6,000 years ago as global sea levels stabilized. The old volcanic islands subsided below the ocean surface, leaving behind a ring of coral reefs around a lagoon. Inside the lagoon, new islands formed from the erosion and deposition of coral and sand. Maldivian atolls compose the seventh largest reef system in the world.[7]

7. Atoll islands are low-lying, usually less than two metres above sea level. Islands are primarily formed from wave action and sedimentation processes (Figure 1). They are composed of the sediment that washes up from the living coral reef platforms around them, with material gradually deposited on the island's shoreline by wave and tides.

Figure 1: Atoll island wave action and sedimentation processes



Source: Masselink, G. and Simon Kench, P. [Coastal flooding could save atoll islands from rising seas – but only if their reefs remain healthy](). 20 September, 2021 (accessed on 6 December 2023).

8. The lagoons and inner islands forming the atoll are protected from ocean waves by their coral reefs.[8] In most cases, the outer reef creates a ridge rising from the sea floor and is near continuous in circumference with some channels through the reef to the lagoon. These gaps in

[7] Asian Development Bank. 2022. *Maldives Climate Change Adaptation and Resilience Project. Climate Change Vulnerability Assessment.* Consultant's Report. Manila, Philippines.
[8] Woodroffe, C. D. and Biribo, N. 2011. Atolls. In: Hopley, D. (eds.), *Encyclopedia of Modern Coral Reefs: structure, form and process* (pp. 51-71). The Netherlands: Springer.

the reef let water and sediment flow between the ocean and the lagoon. Lagoons are subject to gradual infilling from sediment produced within the lagoon and from the reef rim. Some atolls have an almost closed reef with no channels, but get water from waves spilling over the reef.

9. The availability of water in Maldives is very limited, with the only viable sources for naturally occurring freshwater on atoll islands being rainwater and groundwater. A thin freshwater groundwater lens lies 1.0 to 1.5 m below the surface of larger islands of the Maldives, recharged with rainwater that percolates through the island sand.[9]

10. Based on recent satellite data from 2022[10], Maldives has an estimated 5,494.2 ha of trees (3,283.2 ha for the inhabited islands), with coconut palms as the dominant species. Few islands have forests, but on the islands where shoreline forests and mangrove wetlands are found, they carry out important ecosystem services, acting as a natural barrier and windbreak and mitigating the effects of flooding and erosion.[11] The country's marine and coastal biodiversity is diverse and abundant but, due to minimal land area, terrestrial biodiversity is limited.

2. Baseline on temperature and precipitation

11. Maldives has a tropical monsoon climate, influenced by the seasonal movement of the Inter-Tropical Convergence Zone, resulting in wet and dry seasons. The country has a warm and humid climate throughout the year, with an average temperature of 28°C and an average rainfall of 1,948 mm. The country experiences two distinct seasons: the dry northeast monsoon from January to March, and the wet southwest monsoon from mid-May to November. The transitional periods between the two monsoons in December and April are marked by storms and strong winds.

Temperature

12. The temperature in Maldives is moderated by the vast sea and oceans that surround the small islands, creating a maritime influence. The temperature varies according to the latitude and the distance from the sea. The northern islands tend to be slightly warmer than the southern islands, and the islands closer to the sea tend to have more moderate temperatures than the islands further inland.

13. The average temperature ranges from 25°C to 32°C. With the influence of the monsoon, seasonal fluctuations in temperature are observed throughout the year (Figure 2). The warmest period is from March/April to mid-May, the onset of the southwest monsoon. The coolest period is usually from December to February, during the peak of the northeast monsoon. The highest temperature ever recorded in Maldives was 36.0°C, recorded at Kadhdhoo Meteorological Office on 12 September 1991. The lowest temperature ever recorded in Maldives was 18.2°C, recorded at the Hanimaadhoo Meteorological Office on 23 December 2002.[12]

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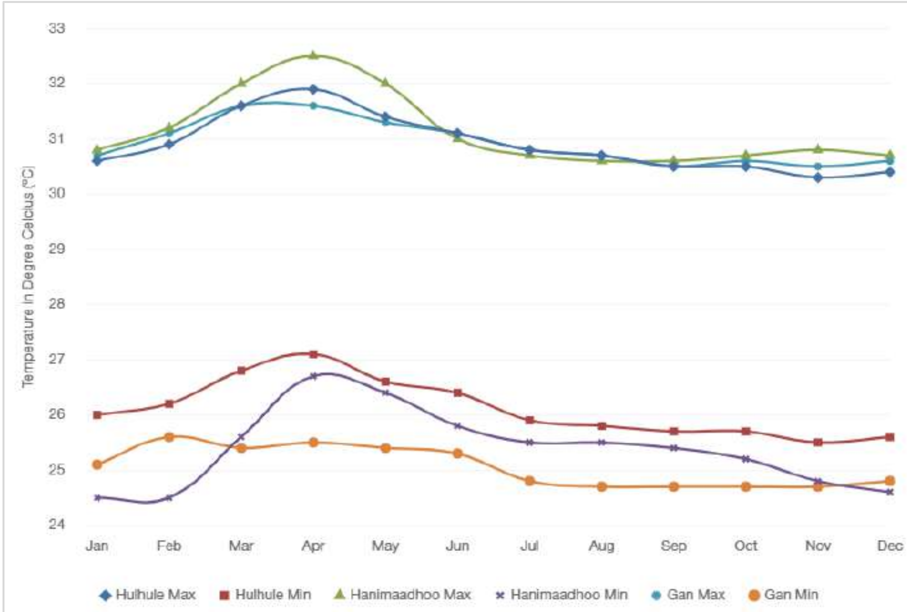
[9] Footnote 7.
[10] ESRI Sentinel-2 Land Cover Explorer (accessed on 20 November 2023).
[11] Footnote 7.
[12] Maldives Meteorological Service. https://www.meteorology.gov.mv/climate (accessed on 23 November 2023).

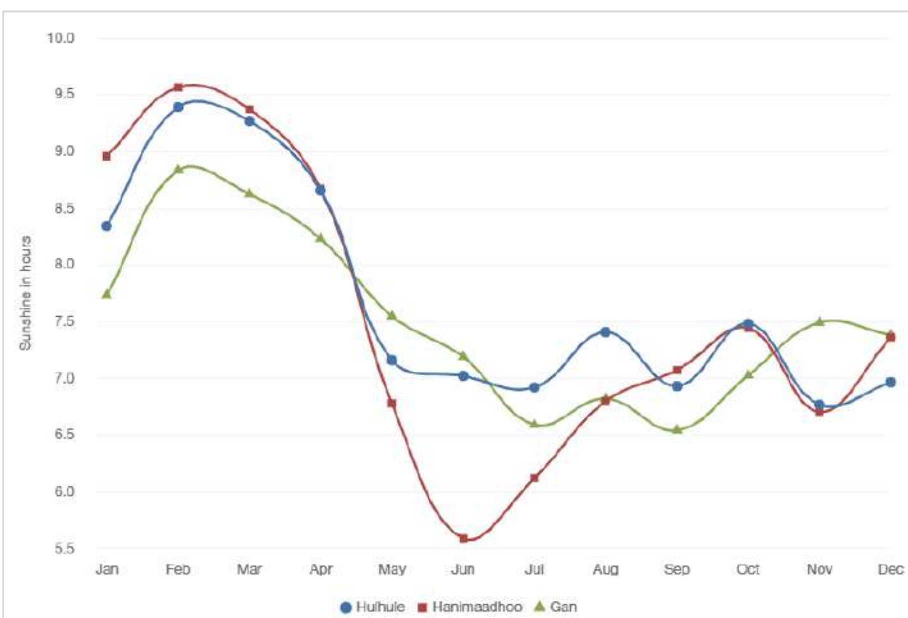
Figure 2: Minimum and maximum temperature per month at three stations in Maldives: north (Hanimaadhoo), central (Hulhule) and southern (Gan) atolls



Source: Maldives Meteorological Services (MMS)

14. Maldives receives abundant sunshine throughout the year. However, the average sunshine hours are slightly higher during the dry northeast monsoon period from January to March (Figure 3). On average, during this season, Maldives receives 10 to 11 hours of sunshine per day, while 7 to 9 hours of sunshine per day for the other months, which is still higher than many other tropical regions.

Figure 3: Hours of sunshine per month in Maldives in the north (Hanimaadhoo), central (Hulhule) and southern (Gan) atolls

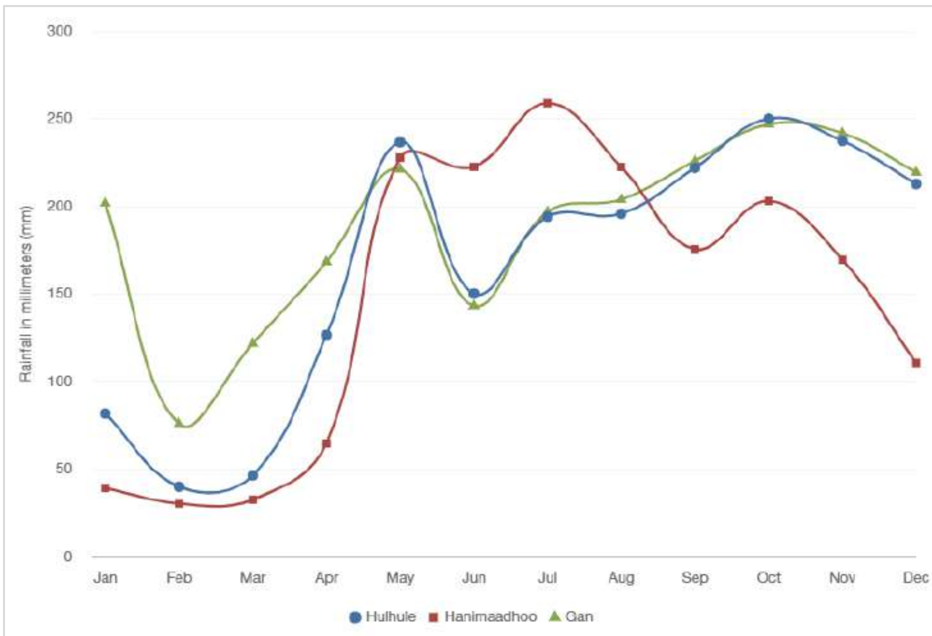


Source: Maldives Meteorological Services (MMS)

Rainfall

15. Rainfall in Maldives is the highest in the wet southwest monsoon from mid-May to November, but varies across the country; the amount of annual rainfall increases from the north to the south (Figure 4). On average, the southern atolls receive about 2,218 mm of rainfall per year, while the central and northern atolls receive about 1,966 mm and 1,779 mm of rainfall per year respectively. The heaviest rainfall over a 24 hours period was 228 mm, recorded at the Addu City Meteorological Office on 24 November 2015.

Figure 4: Mean monthly rainfall observed over north (Hanimaadhoo), central (Hulhule) and southern (Gan) atolls



Source: Maldives Meteorological Services (MMS)

Humidity

16. Maldives has a high humidity level, ranging from 73% to 85%. There is little variation throughout the year, but on average, October is the most humid month and March the least humid.

Wind speed

17. The average wind speed in Maldives is 10.4 miles per hour, ranging from 7.8 miles per hour in March-April to 12.4 miles per hour in January (Table 1).[13]

Table 1: Average wind speed in Maldives (miles per hour)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Miles per hour	12.4	10.6	7.8	7.8	12.2	11.6	10.8	10.5	10.8	10.9	8.5	10.5

[13] UK Met Office. Maldives holiday weather (accessed on 10 December 2023).

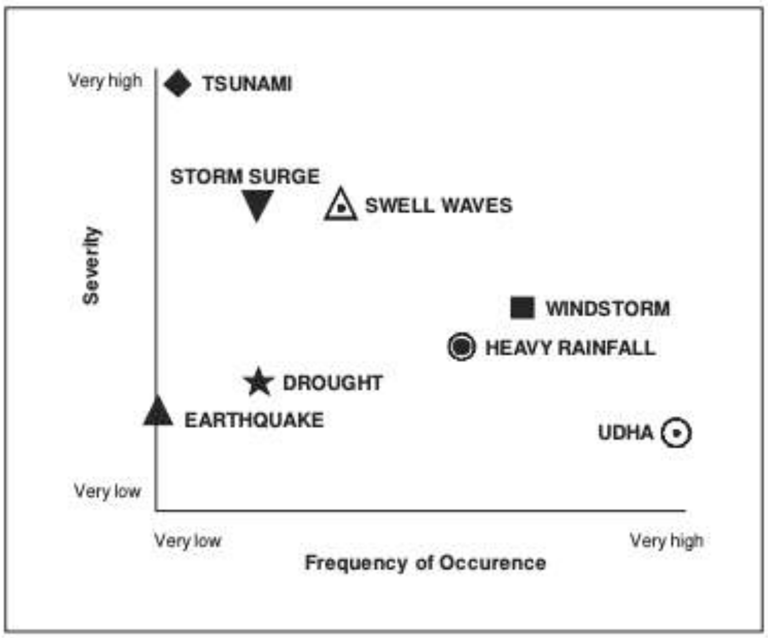
B. Natural hazards

19. According to the Maldives Disaster Management Act 2005, a hazard is a “source of potential harm, or a situation with a potential to cause loss”.[14] Maldives faces different types of hazards:

- (i) Hydrological hazards: pluvial flood caused by heavy rainfall, coastal flood from waves and tides, wave action such as *udha,* and coastal erosion;
- (ii) Meteorological hazards: cyclone wind and storm surge, and heat wave;
- (iii) Geophysical hazards: earthquake and tsunami; and
- (iv) Climatological hazards: drought.

20. Most hydrological and meteorological hazards occur with high or medium frequency and low to medium severity (Figure 5). A tsunami is a rare event, but with high potential impacts, as demonstrated during the 2004 Indian Ocean tsunami. Earthquakes and droughts occur with low frequency, and with relatively low impact.

Figure 5: Most common hazards in Maldives mapped along severity and frequency



Source: UNDP Maldives. 2007. Detailed Island Risk Assessment in Maldives (Final report). Malé.

21. While casualties caused by hazards are rare – with the exception of the 2004 Indian Ocean tsunami – damages to housing due to heavy rainfall and pluvial flooding, cyclone wind and surges are common. Records from 1970–2022 indicate 1,683 houses were damaged by flooding and rainfall, 3,191 by windstorms, 1,085 by storm surge, and 39 by tidal waves.[15]

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[14] Republic of Maldives. 2015. *Disaster Management Act.* Malé.
[15] United Nations Office for Disaster Risk Reduction. Disaster Loss Data for Sustainable Development Goals and Sendai Framework Monitoring System (accessed 29 November 2023).

1. Pluvial flooding

22. Pluvial flooding is the most common natural hazard in Maldives, with heavy rainfall caused by low pressure systems and thunderstorms.[16] The northern area is less prone to pluvial flooding than the south-central and southern region, which receives more rainfall (Figure 6). Events are not systematically tracked and recorded, partly due to their high frequency and low impact nature.[17] Rainfall of over 50 mm in 24 hours is considered extreme rainfall in Maldives. The main pluvial flood events in the last decade include:

(i) On 24 and 25 November 2015, Addu City was hit by 228.4 mm of rainfall in a 24-hour period, the highest recorded in the country's history. Economic losses of US$ 300,000 were estimated.[18]

(ii) In May and June 2017, heavy rain in combination with a strong winds damaged homes and infrastructure on 14 islands.[19]

(iii) Monsoon rains in May 2018 flooded the southern atolls with floods reported in Hithadhoo, Feydhoo and Hulhudhoo in Addu City. Six houses were damaged.[20]

(iv) In May-June 2019, 600 homes were damaged by pluvial flooding, mainly in the northern atolls. Kulhudhuffushi and Nolhivaram were some of the most affected islands.[21]

(v) In December 2019 torrential rain flooded Malé where floodwaters had to be pumped out of the worst affected areas. The heaviest rainfall was recorded in Meemu atoll (84.8 mm). Sandbags were used on some islands to protect homes.[22]

(vi) In May 2021 flooding was reported in Addu City, Lhaviyani atoll and Gnaviyani atoll, damaging 300 households and affecting approximately 1,500 people.[23]

23. Using Kulhudhuffushi City as an example of low intensity and high frequency pluvial flooding, the island experienced rainfall flooding in four of the last five years in May and July with mostly physical impacts (Table 2) and while no fatalities were recorded, the flooding led to associated disruption to livelihoods.

Table 2: Recent pluvial flood events and associated impacts in Kulhudhuffushi City

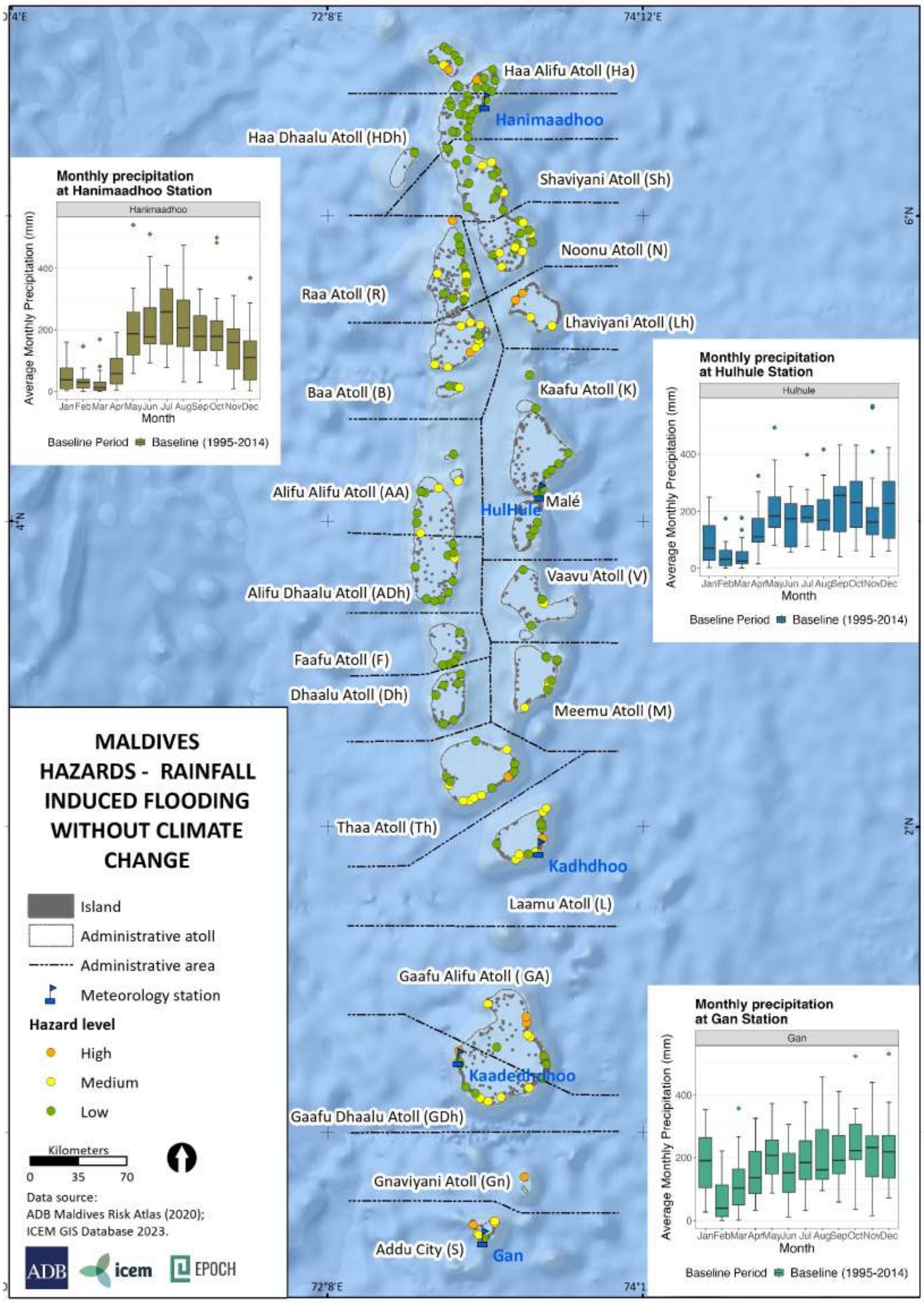
Year	Cause	Damage
2019	Heavy rainfall	20 homes damaged, 4 homes temporarily evacuated[a]
2020	Heavy rainfall	Not reported[b]
2021	Strong winds, heavy rainfall	1 home and 1 school damaged[c]
2023	Heavy rainfall	Not reported[d]

[a] Z. Zalif. 2019. Four households in Kulhudhuffushi heavily flooded. Raajje MV. 5 June.
[b] A. A. Hadi. 2020. Kulhudhuffushi City experiences heavy flooding. Sun Online International. 24 July.
[c] I. M. Naeem. 2021. Hoarafushi Airport operation stopped due to tidal surges. Times of Addu. 14 May.
[d] M. A. Hasaa. 2023. Monsoon rains cause damage in several islands. Ras Online. 7 June.

[16] Centre for Excellence in Disaster Management & Humanitarian Assistance. 2021. *Maldives Disaster Management Reference Handbook.* Hickam, Hawaii.
[17] Ministry of Environment and Energy. 2016. *Second National Communications of Maldives to the United Nations Convention on Climate Change*. Malé.
[18] Maldives National Disaster Management Center and Asian Disaster Reduction Center. 2018 *Republic of Maldives Country Report.* Kobe.
[19] Footnote 18.
[20] Footnote 16.
[21] European Commission's Directorate-General for European Civil Protection and Humanitarian Aid Operations. 2018. *ECHO Daily Flash of 08 June 2019, Maldives – Floods.*
[22] Footnote 16.
[23] Floodlist. 14 May 2021. *Maldives – Hundres of Homes Flooded After Days of Heavy Rain.*

Figure 6: Pluvial flood hazard level in Maldives

The 15 islands with high hazard levels of pluvial flooding are: Dhidhdhoo (HA) and Ihavandhoo (Haa Alifu atoll, north region), Eydhafushi (Baa atoll, north-central region), Hinnavaru and Naifaru (Lhaviyani atoll, north-central region), Alifushi (Raa atoll, north-central region), Gan (Laamu atoll, south-central region), Mulah (Meemu atoll, south-central region), Guraidhoo (Th) (Thaa atoll, south-central region), Maamendhoo (GA) and Vilin'gili (Gaafu Alifu atoll, south region), Thinadhoo (GDh) (Gaafu Dhaalu atoll, south region), Fuvahmulah (Gnaviyani atoll, south region), Feydhoo (S) and Hithadhoo (S) (Seenu atoll, south region).



2. Wave action: tidal waves and swell surges

24. Tidal waves and swell surges are locally referred to as *udha* and occur annually at various degrees of severity in most islands (Figure 7).[24] Swell waves are generated through high intensity activity from the southern Indian Ocean between March and November, during the southwest monsoon period. Tidal waves result from gravitational forces of the moon, sun and planets on the ocean as well as the wind as it moves over the water. Most severe *udha* occurs when high swell and wind waves coincide with spring tide days, resulting in coastal flooding.[25]

25. Two major coastal flood events due to *udha* occurred in recent history:

(i) Severe swell wave floods affected the country from 10 to 13 April 1987 caused by a combination of high spring tides, long-period waves and local wave and wind conditions.[26] The flooding reached a water level of 1.77 m amsl. It affected 16 islands including Malé and displaced over 300 people.

(ii) Similarly, from 15 to 17 May 2007 energetic swells from the Southern Ocean during spring tides flooded 88 islands across 18 atolls, displacing over 1,600 people and damaging 500 homes.[27] Floodwaters reached a maximum water level of 1.64 amsl and reached up to 600 m inland in some islands.

26. On average, 2 to 3 small scale flood events caused by waves occur every year, based on data from 1991 to 2013.[28] Most records lack detail on source, depth, duration and severity of impacts, but indicate that minor events are common throughout the country with flooding within 20 m of the shoreline, depths of 1 m and mainly affecting reclaimed land and crops.[29] Some *udha* events recorded from 2005 to 2015 are presented in Table 3, though this list is likely not exhaustive. The events listed with specific dates (where known) coincide with high spring tides.

Table 3: Udha events between 2005–2015

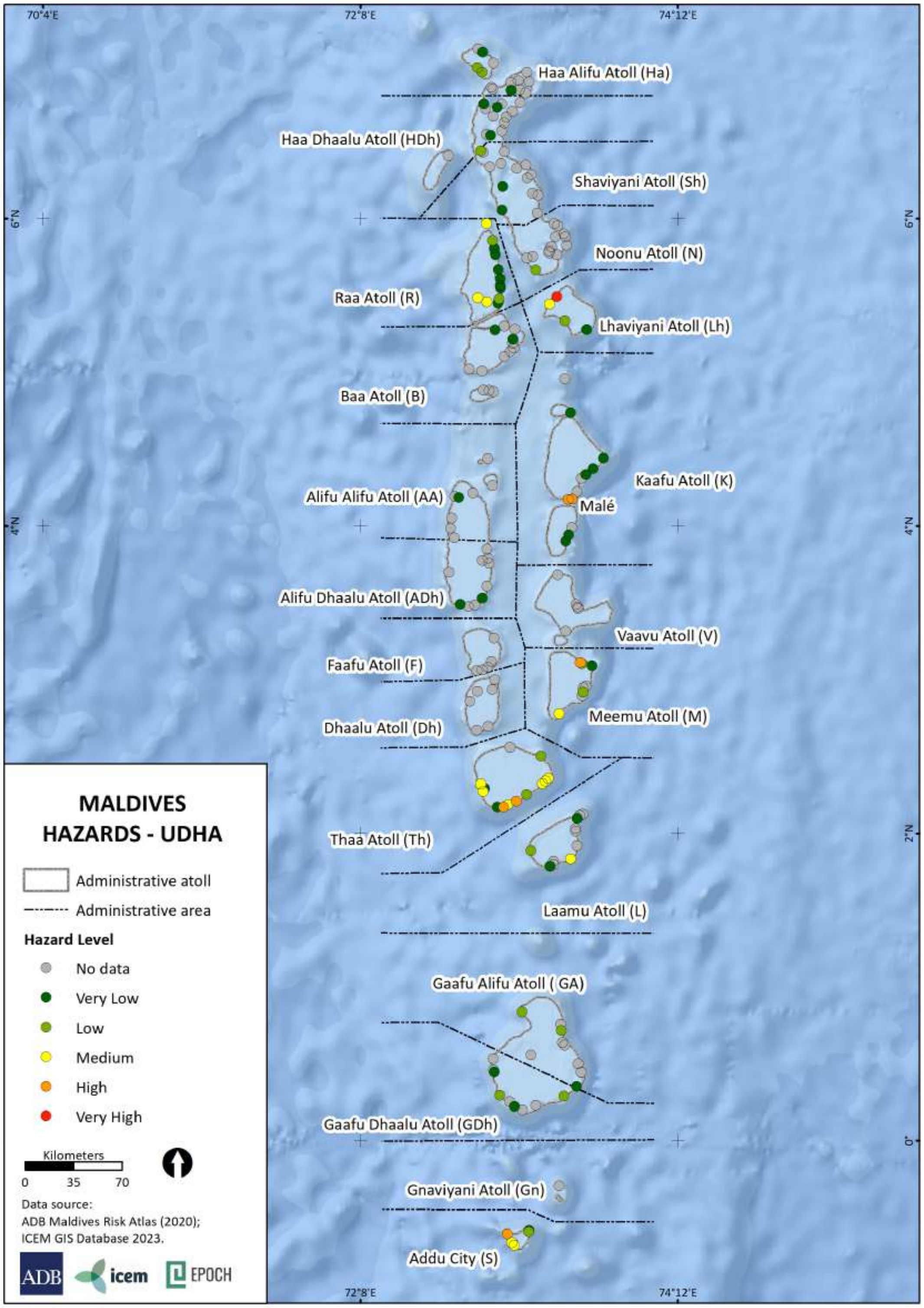
Date	Highest water height (m)	Significant wave height (m)	Peak period (s)	Peak 12 h power (Kw)
June – July 2005	2.24	-	-	40
18 September 2005	2.16	2.89	17.35	46
June 2006	2.19	-	-	26
4 September 2006	2.07	2.20	11.79	25
30 November 2006	2.04	1.26	16.18	14
15–17 May 2007	2.19	3.05	19.74	45
11–12 August 2015	2.07	2.28	11.58	24
27–30 September 2015	2.40	1.61	6.37	12
28 December 2015	2.15	1.20	20.33	2.04

Source: M. Wadey et al. 2017. Coastal Flooding in the Maldives: An Assessment of Historic Events and their Implications. *Natural Hazards*. 89. pp. 131–159.

[24] Maldives Meteorological Service. Awareness (accessed on 25 November 2023).
[25] M. Wadey et al. 2017. Coastal Flooding in the Maldives: An Assessment of Historic Events and their Implications. *Natural Hazards.* 89. pp. 131–159.
[26] S. A. Harangozo. 2013. Flooding in the Maldives and its Implications for the Global Sea Level Rise Debate. *American Geophysical Union.* pp 95–99 (first published 1 January 1992).
[27] Footnote 25.
[28] Footnote 17.
[29] Footnote 25.

Figure 7: *Udha* (swell surges) hazard level in Maldives

The 7 islands with high to very high hazard levels of udha are: Malé and Villimale (Malé), Hinnavaru (Lhaviyani atoll, north-central region), Dhiggaru (Meemu atoll, south-central region), Kin'bidhoo and Thimarafushi (Thaa atoll, south-central region), and Hithadhoo (S) (Seenu atoll, south region). Only data for 74 out of the 189 inhabited islands is available.



3. Coastal erosion

27. First reported as a significant problem in the 1970s,[30] at present over 80% of the inhabited islands in Maldives are facing some level of shoreline erosion.[31] While erosion is a natural process, anthropogenic modifications of the coastline including land reclamation, harbor construction, cutting channels, removal of vegetation and sand mining affect the natural coastal balance. These modifications alter the patterns of currents, which in turn control the sediment transport along coastlines.[32] Already occurring increases in extreme weather events and sea level rise due to climate change can also increase the rate of coastal erosion.

28. Erosion trends are not regularly monitored in Maldives. A case study undertaken by the Ministry of Environment and Energy on the four islands of Thurakunu (Haa Alifu atoll, north region), Hithaadhoo (Baa atoll, north-central region), Kuda Bandos (Kaafu atoll, central region) and Fuvahmulah (Gan atoll, south region) showed that erosion is more extreme in islands subject to coastal modifications.[33]

29. Earlier risk mapping indicates that 40 out of the 189 inhabited islands in Maldives have very high levels of coastal erosion and 20 islands have high levels of erosion (Figure 8).[34] These islands are dispersed across the country.

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[30] Ministry of Environment and Energy. 2015. *Survey of Climate Change Adaptation Measures in Maldives. Integrating Climate Change Risks into Resilient Island Planning in the Maldives Project.* Malé.

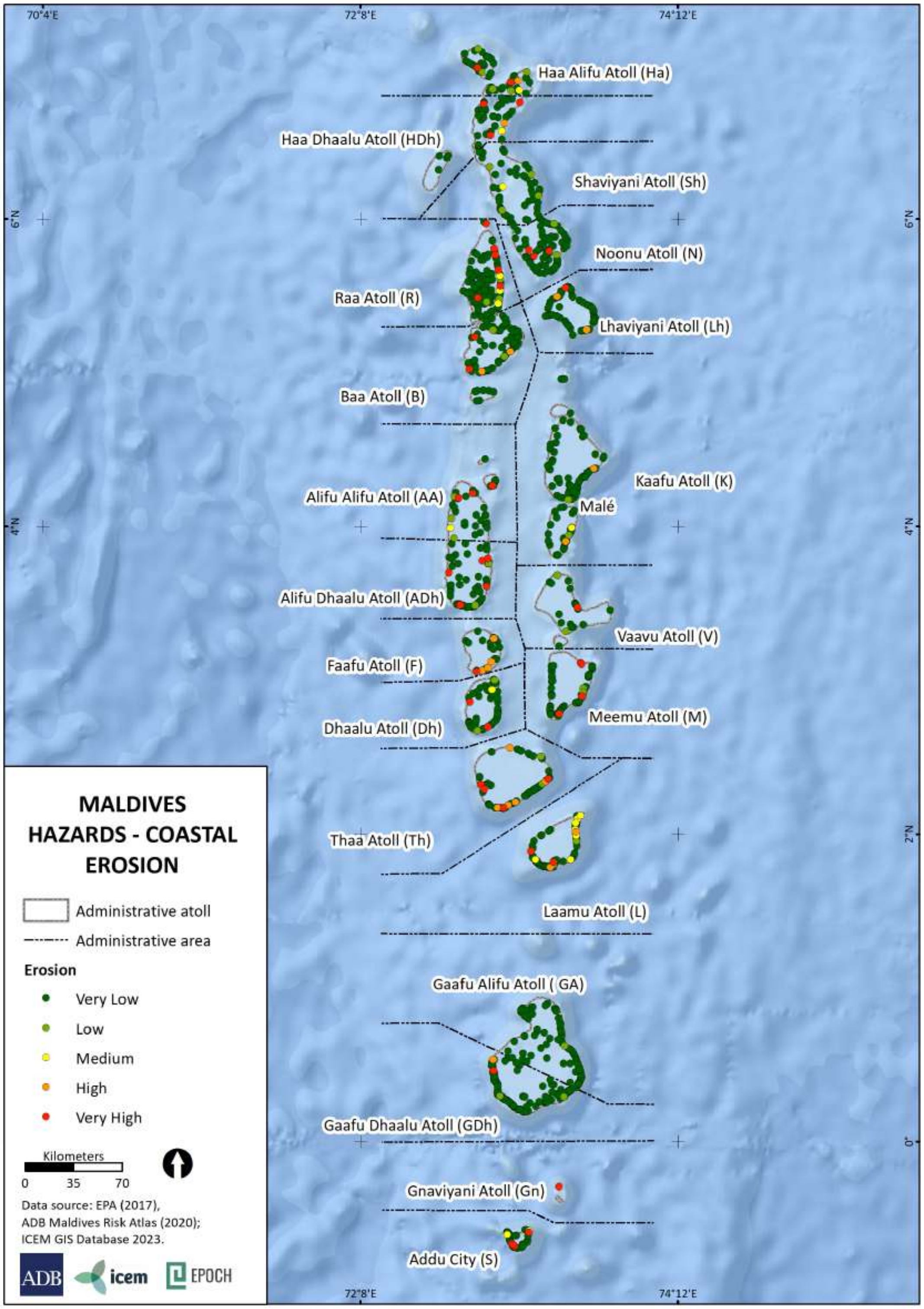
[31] Ministry of Energy and Environment. 2016. *State of the Environment.* Malé.

[32] A. Amores et al. 2021. Coastal Flooding in Maldives Induced by Mean Sea-Level Rise and Wind-Waves: From Global to Local Coastal Modelling. *Frontiers in Marine Science.* 8.

[33] Footnote 30.

[34] Asian Development Bank. 2020. *Multihazard Risk Atlas of Maldives*. Manila, Philippines.

Figure 8: Coastal erosion hazard level in Maldives



4. Cyclone wind and storm surge

30. Maldives is exposed to cyclonic winds and associated storm surges, particularly in the north of the country which can be affected by cyclones over the Bay of Bengal and the Arabian Sea (Figure 9). While the frequency of cyclones that make landfall in Maldives is not very high, when they do occur the damage can be extensive.[35] It is more common for cyclones in the region to affect Maldives indirectly, such as through increased rainfall, winds and high seas (Figure 10 and Figure 11).

31. Cyclones directly impacting Maldives in the last twenty years include:

(i) Cyclone Nilam originated from the Bay of Bengal and affected Maldives in late October and early November in 2012. 51 islands reported flooding, of which 29 severe and four in critical state. Over 33,000 people were impacted and damages were estimated at US$133,090;[36]

(ii) Cyclone Madi in 2013 caused extensive damage due to high winds and flooding experienced in several parts of the country;[37]

(iii) Cyclone Ockhi in 2017 caused damage to households and property in 62 islands across Maldives including flooding on 36 islands, torn off roofs and felled trees on 22 islands, and coastal swells on four islands. The police and armed forces were called on to drain and pump out floodwaters on several islands;[38]

(iv) In May 2021 Cyclone Tuaktae, originating from the Arabian Sea, affected the upper northern regions of the country with strong winds and high seas. 440 households were affected.[39]

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[35] Footnote 17.
[36] Footnote 17.
[37] Ministry of Environment. 2017. *Summary Report on National Adaptation Plan Process in the Maldives.* Malé.
[38] Footnote 17.
[39] European Commission's Directorate-General for European Civil Protection and Humanitarian Aid Operations. 2021. *ECHO Daily Flash of 17 May 2021, Tropical Cyclone TUAKTAE.*

Figure 9: Historical storm tracks affecting Maldives

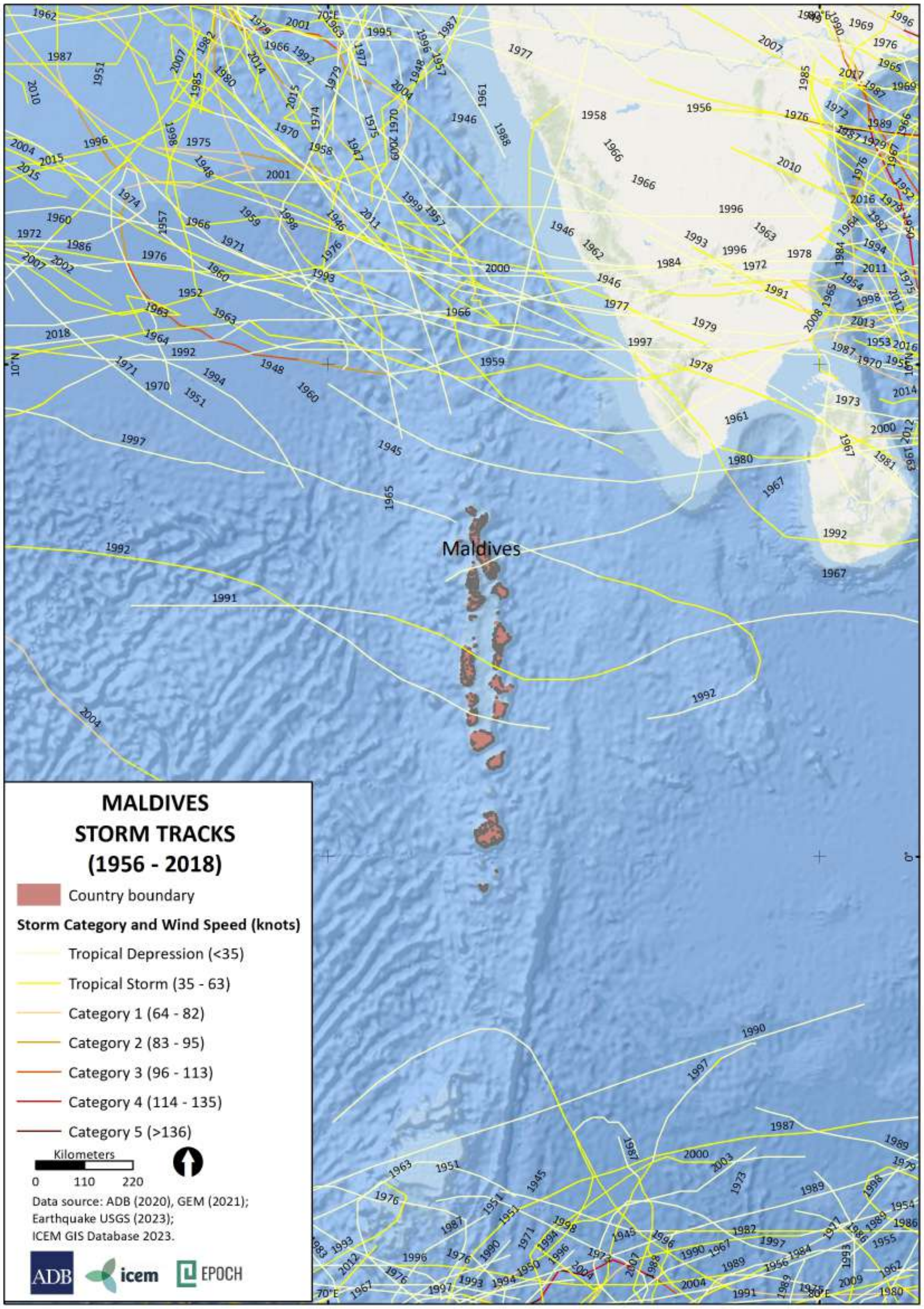


Figure 10: Cyclone wind hazard level in Maldives

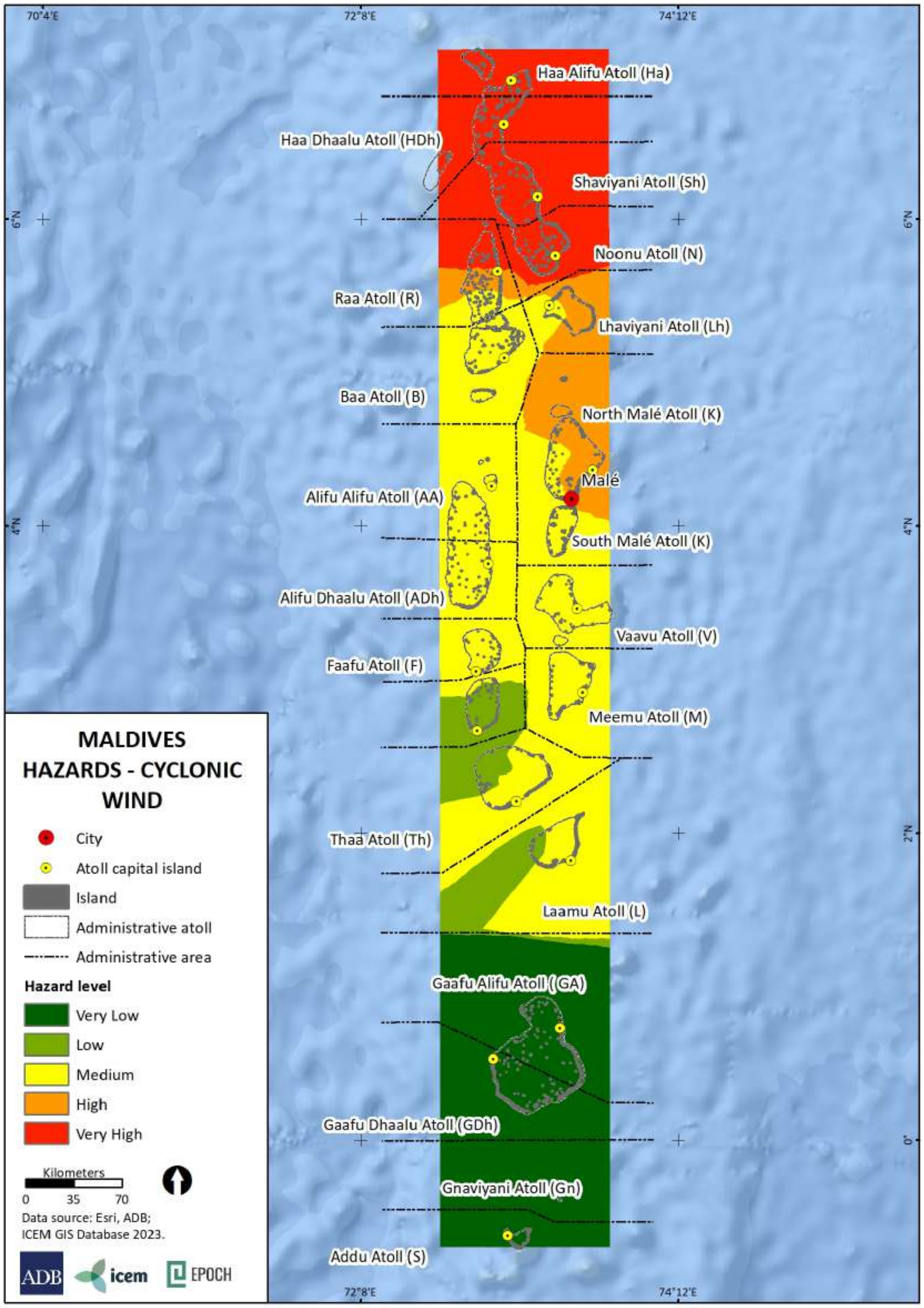
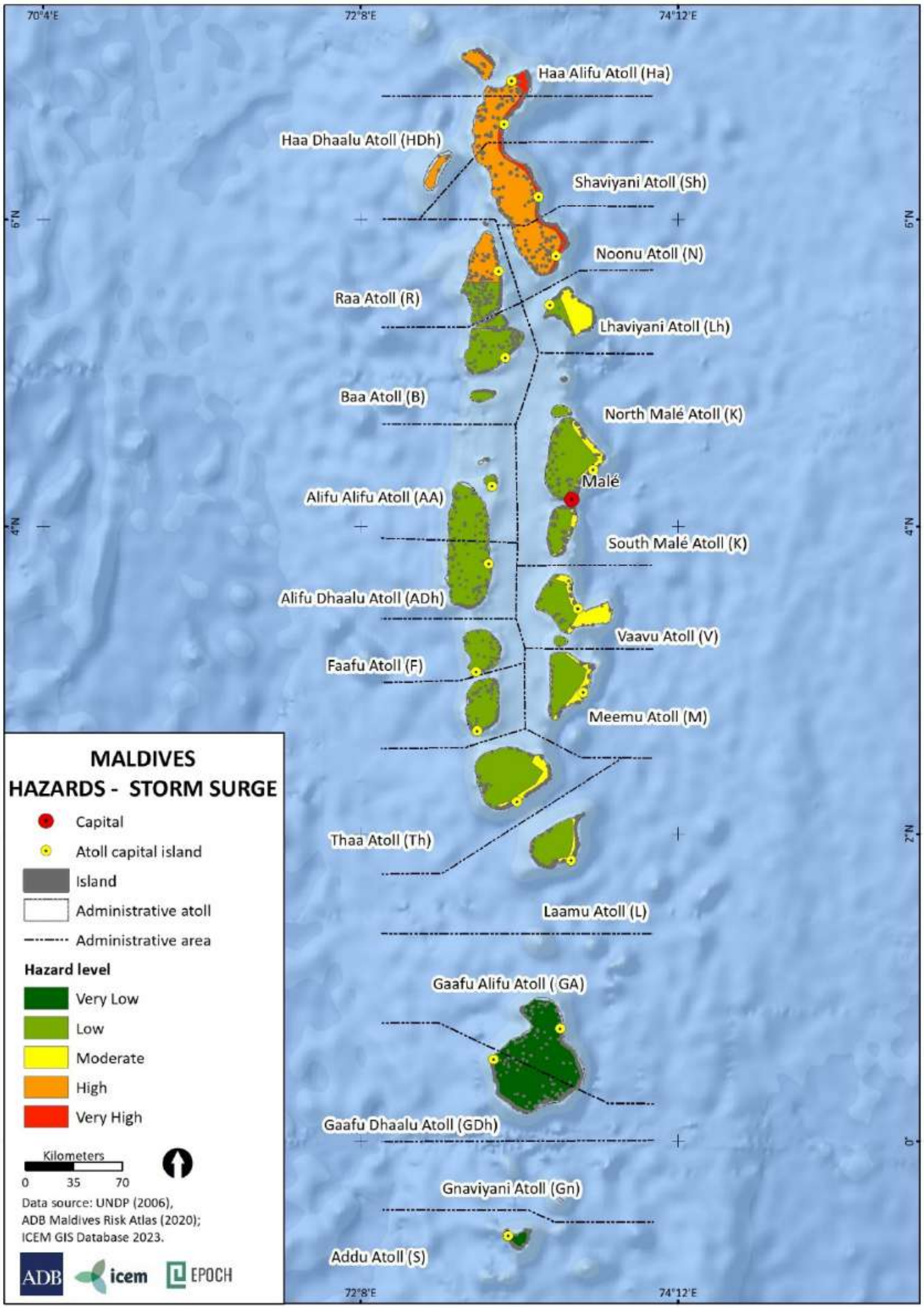


Figure 11: Storm surge hazard level in Maldives



5. Earthquake and tsunami

32. Maldives is located on the western side and Indian part of the Indo-Australian plate. Tectonically the country is stable and a-seismic. While earthquakes are rare, tectonic events in highly active seismic regions such as Sumatra, western India and the Carlsberg ridge[40] have been felt in Maldives.[41] The southern atolls are more exposed to earthquakes (Figure 13).

33. In recent history Maldives has been affected by three major earthquakes of magnitude 7.0 or above; in 1944, 1983 and 2003 (Figure 12). Typically, earthquakes are felt as tremors without notable damages, although the 2003 event with a moment magnitude of 7.6 located 444 km from the southern part of the country caused damage to properties in Addu City.[42] The strongest earthquake in the past ten years near Maldives occurred on 12 October 2016, with a magnitude of 4.9. The epicenter was 299 km east-northeast of Malé at a depth of 10 km. No impacts were recorded.

34. Tsunamis are caused by earthquakes in fault zones around Maldives, with islands on the eastern side of the eastern atolls being more exposed to tsunami risk (Figure 14). Tsunamis in the region have been observed 80 times since 1816; 67 originating from the Sumatra subduction zone in the east and 13 from the Makran coast in the north and Carlsberg ridge in the south.[43] Historical records do not indicate that the country has been affected by these tsunamis, except for the 2004 Indian Ocean tsunami.

35. In December 2004 wave heights between 2.1–2.5 m generated by the Indian Ocean tsunami struck islands across the country leading to 83 casualties, 26 missing, and over 1,300 injured. 39 islands were severely affected, with 14 completely evacuated. Nearly 12,000 people were displaced from their islands. Total damages were estimated at 62% of GDP, or approximately US$470 million.[44]

36. The return period of a tsunami of a scale similar to the event in 2004 is estimated at 219 years. The probable maximum tsunami wave height is estimated between 3.2 and 4.5 m in the eastern side of eastern islands.[45]

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[40] The Carlsberg Ridge is the northern section of the Central Indian Ridge, a divergent tectonic plate boundary between the African Plate and the Indo-Australian Plate, traversing the western regions of the Indian Ocean.
[41] Footnote 17.
[42] Footnote 17.
[43] United Nations Development Programme. 2006. *Developing a Disaster Risk Profile for the Maldives*. Volume 1: Main Report. Consultant's report.
[44] The World Bank, ADB and UN. 2005. *Maldives Tsunami: Impact and Recovery – Joint Needs Assessment*.
[45] Footnote 37.

Figure 12: Historical earthquake events affecting Maldives

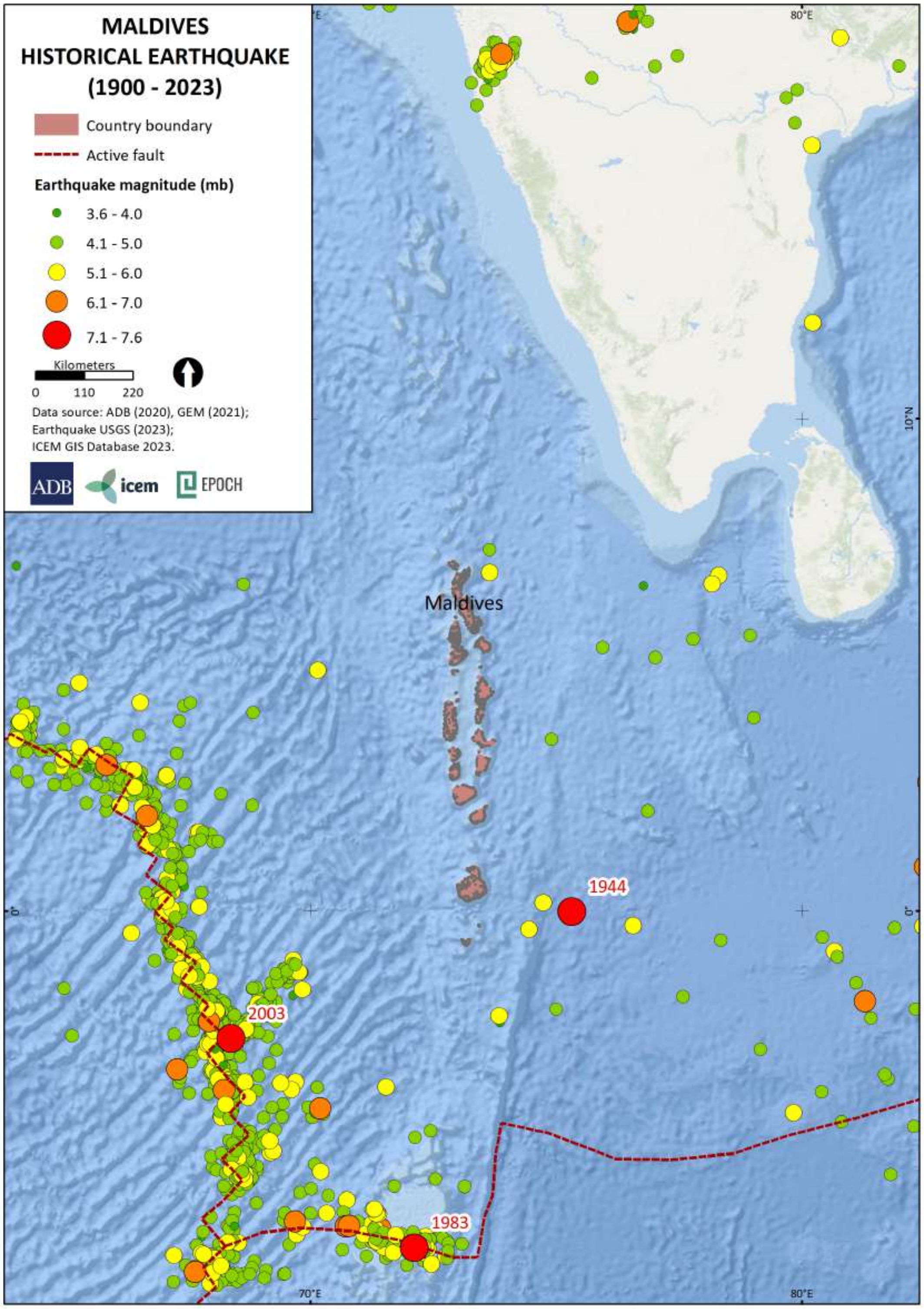


Figure 13: Seismic hazard level in Maldives

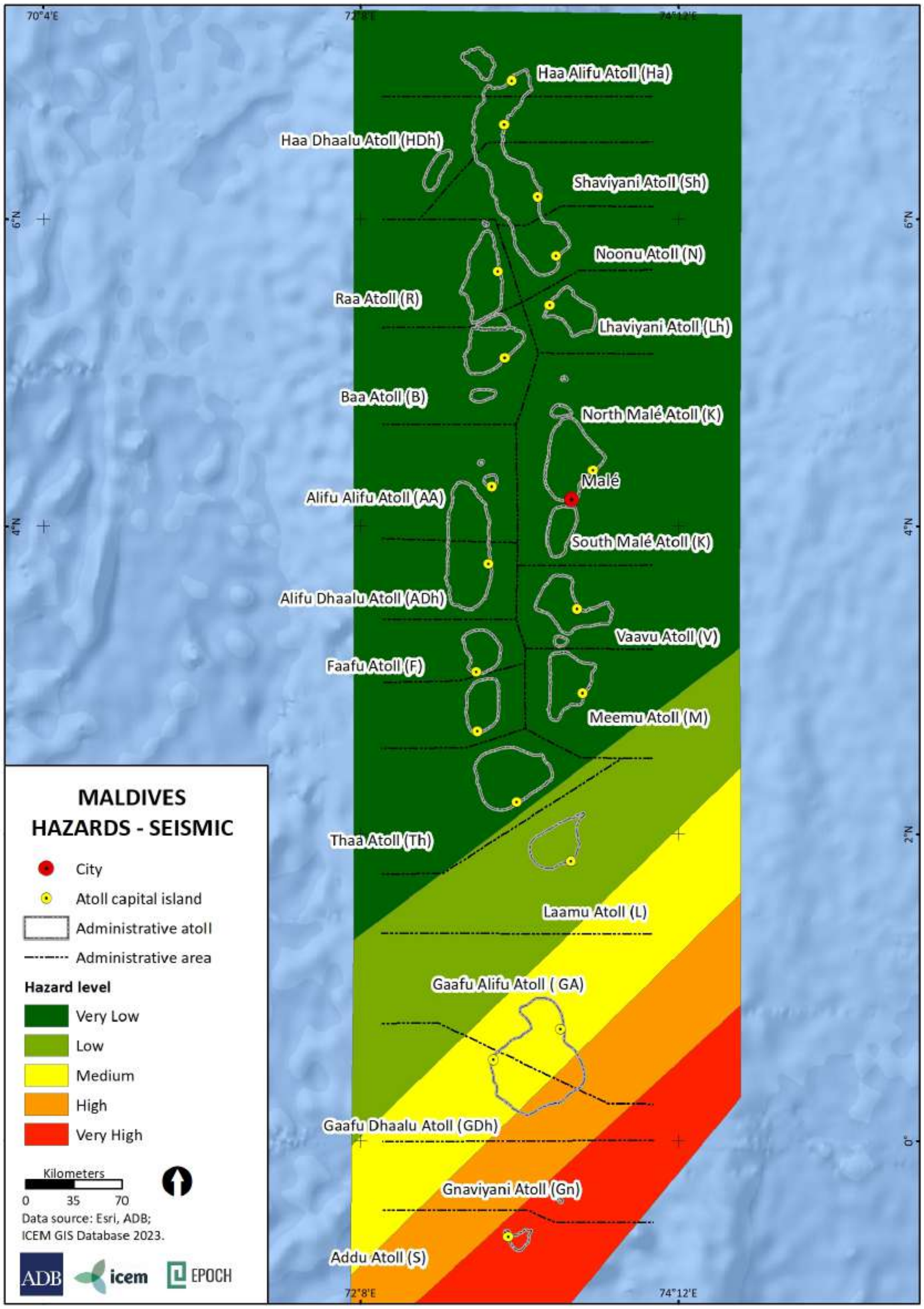
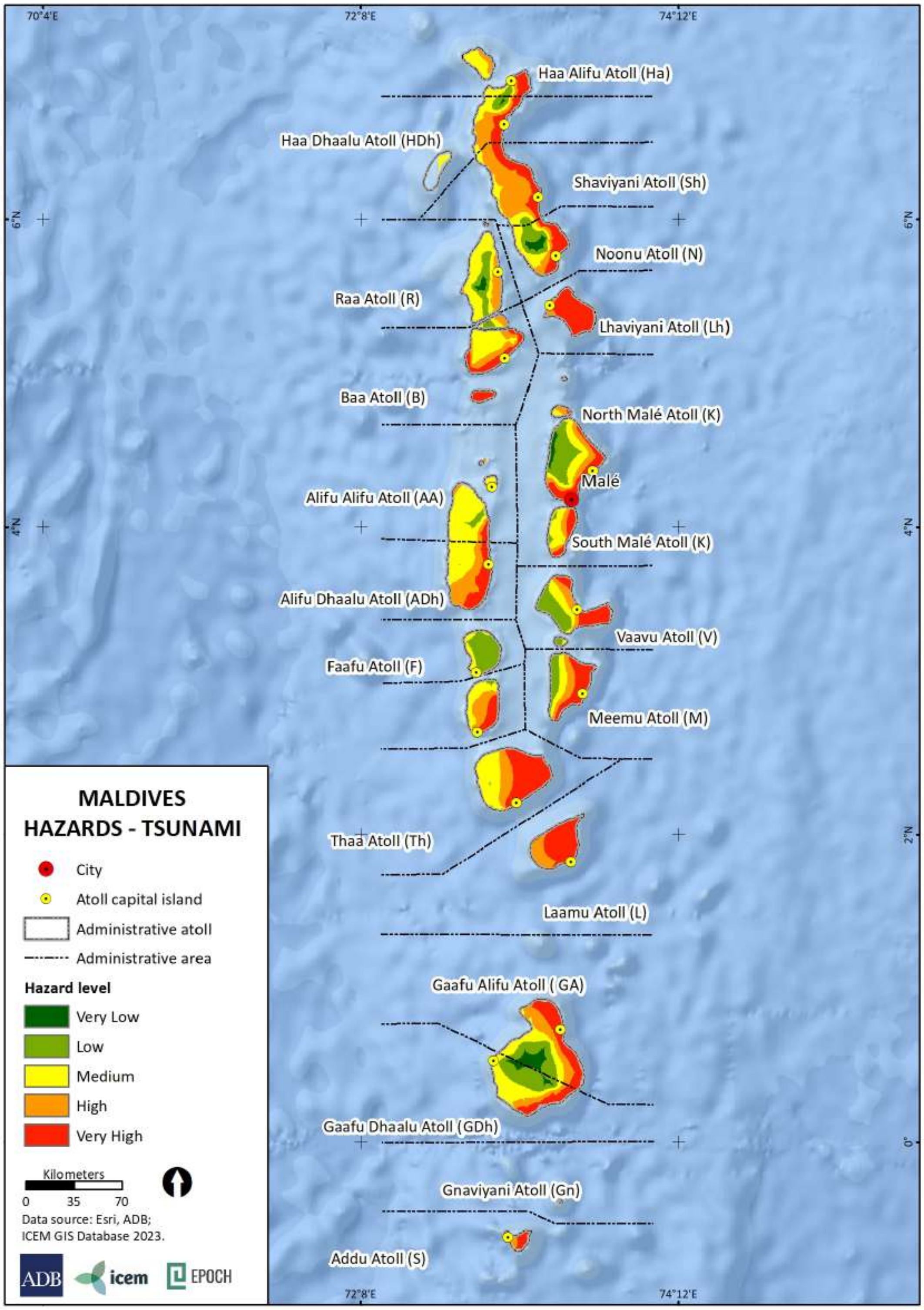


Figure 14: Tsunami hazard level in Maldives



6. Heatwave

37. Average temperatures in Maldives range from 25°C to 32°C. While no specific national definition of heatwave exists, heatwaves generally refer to abnormally hot weather that lasts for two or more days.[46]

38. Extreme heat events and impacts usually occur in March and April, and are mainly anecdotally reported through news items. Heat waves are not included in the hazard list of the common alerting protocol of MMS[47]:

(i) In March 2022 Addu City faced high temperatures for two weeks, leading to reported fish deaths in the mangrove, and melting asphalts across the islands. While recorded temperatures did not exceed 31°C, the perceived temperature (factoring in cloud cover, humidity, wind) was higher.[48]

(ii) In April 2023 the MMS issued heat warnings for five regions of the country where the perceived temperature ranged from 39.3°C in Hulhule to 40.4°C in Kadhdhoo (while actual temperatures did not exceed 32°C).[49]

39. Heat is also affecting the marine environment. In the 120 months from 2010 to 2019, extreme sea surface temperatures were recorded in 111 months, whereas in the 1900s records would only occur a few days each year.[50] In 2007, more than half of the Indian Ocean reached and maintained the average maximum temperature recorded in the first fifty years of the study (1870–1919).[51] Extreme thermal events are increasingly becoming the norm, with marine heatwaves increasing in duration and frequency.[52] High sea surface temperatures can lead to coral bleaching, reducing coastal protection from waves and erosion.

7. Drought

40. No criteria exist for declaring drought events in Maldives, however prolonged dry periods have occurred usually during the El Niño years, between December and April (Figure 15). El Niño often reduces the amount of rainfall in the country, leading to water shortages and periods of consecutive dry days with < 1 mm of precipitation. Northern and central atolls are more exposed to severe drought at present as temperatures are higher and rainfall distributions patterns are more uneven. In the southern region the consecutive dry days average about two weeks, while in the northern and central region it lasts approximately one month.[53]

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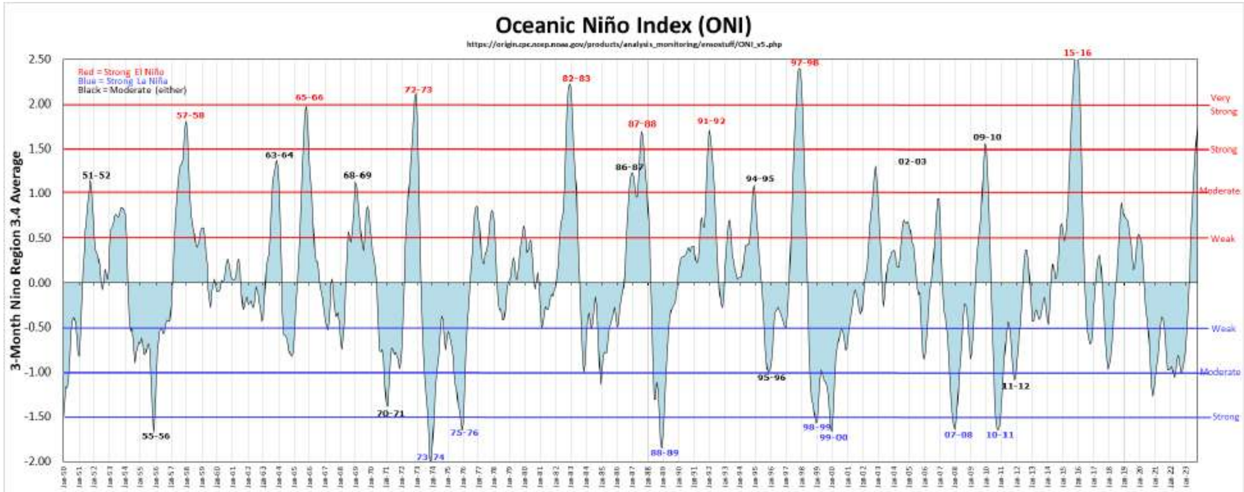
[46] Integrated Research on Disaster Risk. 2014. *Peril Classification and Hazard Glossary*. IRDR Data Publication No. 1. Beijing.
[47] Footnote 24.
[48] M. Shahid. 2022. Addu: Extreme heat wave, fish dying in Hithadhoo Mangrove. *The Edition*. 16 March.
[49] Avas. 2023. Met Office issues warning for high heat in April. 22 April.
[50] K. R. Tanaka and K. S. van Houtan. 2022. The Recent Normalization of Historical Marine Heat Extremes. *PLOS Climate*. 1 (2).
[51] Ibid.
[52] E. C. J. Oliver et al. 2018. Longer and More Frequent Marine Heatwaves over the Past Century. *Nature Communications*. 9.
[53] Footnote 17.

Figure 15: Global historical El Niño and La Nina events



Source: NOAA Oceanic Niño Index: https://ggweather.com/enso/oni.htm (accessed on 6 December 2023).

41. Years with drought events due to rainfall deficits that occurred in Maldives from 1993–2013 are:[54]

(i) North: 2001, 2002, 2005, 2012;
(ii) Central: 1995, 2000, 2001, 2011; and
(iii) South: 1999, 2003.

42. Over the same period, northern and southern regions showed a decreasing trend in consecutive dry days, while the central region showed a slight increasing trend.

43. While drought events are not systematically tracked, data on the number of islands requesting emergency water supply is collected for some years and combined with rainfall patterns inform drought monitoring.[55] Although aside from drought increased consumption due to population growth also factors into a growing demand for water, the data shows an upward trend in the number of islands and quantity of water requested between 2017–2020 (Table 4). Both the quantity of water requested and the number of islands requesting water more than doubled.

Table 4: Number of islands requesting emergency water supply between 2017–2020 and quantity requested

Atoll	Number of islands				Quantity (ton)			
	2017	2018	2019	2020	2017	2018	2019	2020
Haa Alifu	2	7	3	3	44	201	100	44
Haa Dhaalu	2	9	8	8	70	332	527	298
Shaviyani	0	6	8	8		237	478	439
Noonu	3	8	11	7	98	279	583	432
Raa	1	4	7	7	15	81	225	162
Baa	2	6	9	5	40	140	233	176
Lhaviyani	0	-	3	1			233	181

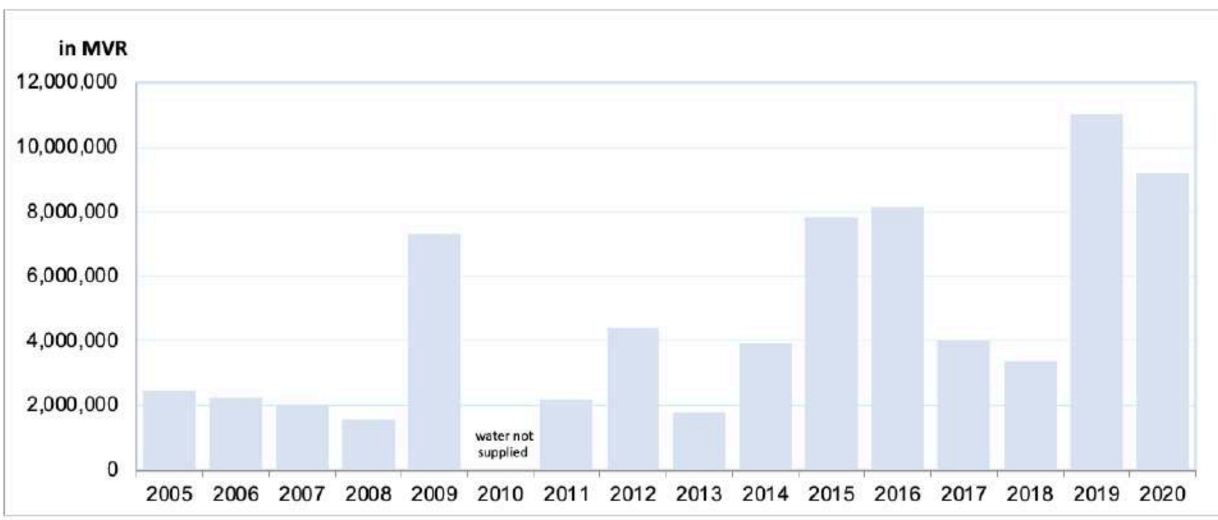
[54] Footnote 17.
[55] Ministry of Environment and Energy – Water and Sanitation Department. Not dated. *Drought Monitoring Mechanism in Maldives*.

Atoll	Number of islands				Quantity (ton)			
	2017	2018	2019	2020	2017	2018	2019	2020
Kaafu	1	2	2	2	10	60	68	67
Alifu Alifu	4	3	6	3	154	67	216	160
Alifu Dhaalu	1	3	3	2	25	63	67	82
Vaavu	1	-	2	1	11	-	110	50
Meemu	2	-	2	4	35	-	75	145
Faafu	0	-	4	1	-	-	217	50
Dhaalu	3	-	4	3	192	-	207	114
Thaa	2	-	7	6	135	-	405	277
Laamu	3	-	2	5	165	-	120	343
Gaafu Alifu	2	-	-	4	83	-	-	153
Gaafu Dhaalu	3	-	1	3	99	-	25	177
Gnaviyani	0	-	-	-	-	-	-	-
Seenu	1	-	-	-	200	-	-	-
Total	**33**	**48**	**82**	**73**	**1,376**	**1,460**	**3,887**	**3,349**

Source: National Bureau of Statistics. 2022. Statistical Yearbook 2021, Table 12.17.

44. Data on government spending on emergency water supply from 2005 to 2020 is shown in Figure 16, including both cost of the water and cost of transportation. The average expense for a ton of water increased from 900 MVR to 2,751 between 2005 and 2020.[56] Public expenditure peaked during El Niño years (2009, 2015–2016, 2019).

Figure 16: Public expenditure on emergency water supply from 2005-2020



Source: National Bureau of Statistics. 2022. Statistical Yearbook 2021, Table 12.15.

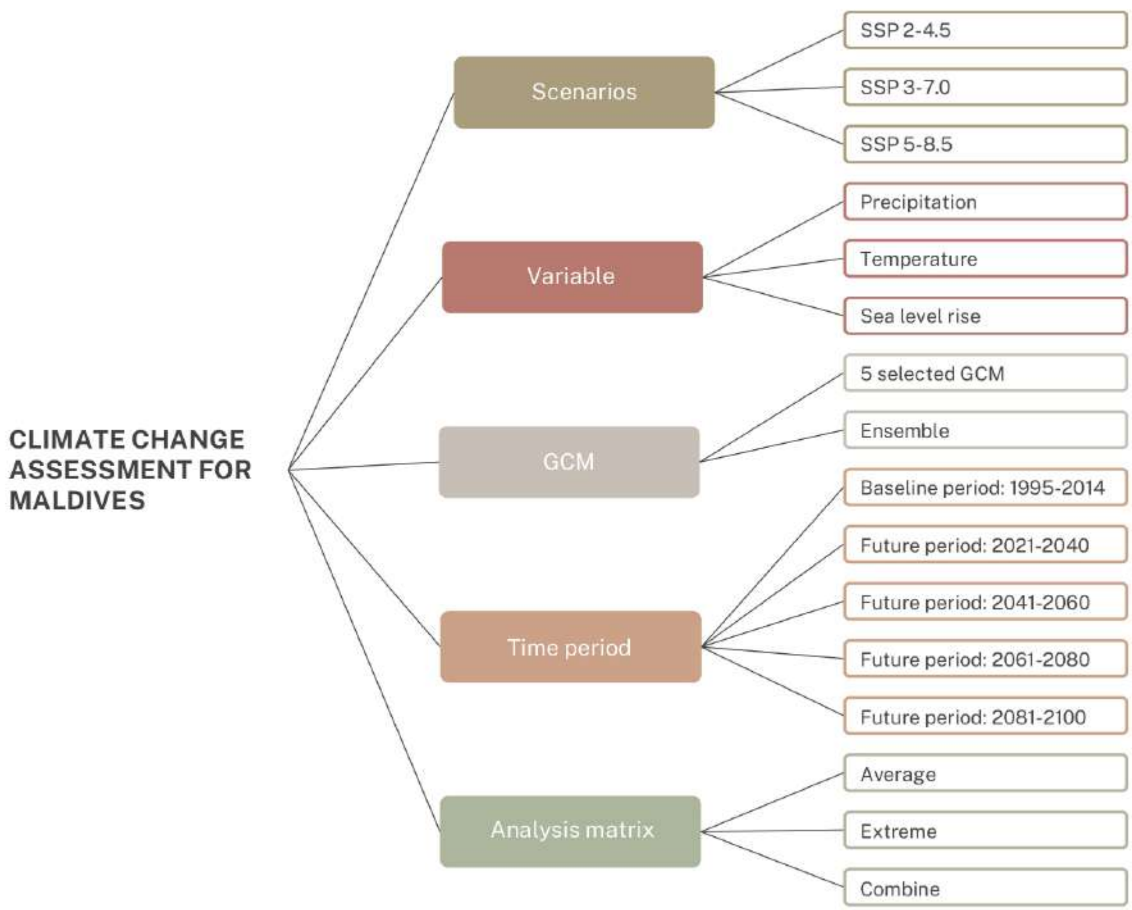
[56] National Bureau of Statistics. 2022. *Statistical Yearbook 2021.* Table 12.15.

III. CLIMATE CHANGE PROJECTIONS

A. Methodology

45. A comprehensive analysis of the potential impacts of climate change on Maldives was performed using various scenarios, variables, time periods, and GCMs from the Coupled Model Intercomparison Project Phase 6 (CMIP6)[57] dataset, as shown in Figure 17. The CMIP6 dataset is a collection of climate change projections based on the results of multiple global climate models (GCMs) from different research institutions worldwide. These models simulate the complex interactions between various components of the climate system, such as the atmosphere, oceans, land and ice, under different greenhouse gas emission scenarios known as Shared Socioeconomic Pathways (SSPs). CMIP6 has improved spatial resolution, regional details, and feedback mechanisms compared to previous datasets. CMIP6 also includes a wider range of experiments and model intercomparison activities to answer important scientific questions and to see how well the models can predict the climate.

Figure 17: Scenarios, variables, time periods and GCMs selected for the climate change diagnostics of Maldives



[57] https://wcrp-cmip.org/ (accessed on 15 October 2023).

1. Selection of baseline and future period

46. The Intergovernmental Panel on Climate Change (IPCC) uses the period 1995-2014 as the baseline period for its Sixth Assessment Report (AR6), while the TRTA's terms of reference proposes the period 1986-2005 as the reference baseline. To ensure the versatility and applicability of the projections for the investment as well as other projects, the bias correction of the future projected climate from GCMs data was performed using the 1995-2014 period as the baseline. Additionally, the changes relative to the 1986-2005 baseline period were also computed as a reference. The future periods selected for the analysis are 2021-2040 (2030s), 2041-2060 (2050s), 2061-2080 (2070s), and 2081-2100 (2090s).

2. Climate variables of interest and analysis method

47. Per the TRTA's terms of reference, the climate variables of importance for the investment project include temperature, annual and seasonal precipitation, extreme rainfall, and sea level changes. These variables have been categorized into three main climate change diagnostics categories: averages, extremes, and combinations:

(i) The *averages* category involves calculations derived from mean values over the assessment periods (either baseline or future), serving as a fundamental metric for assessing general climatic trends;

(ii) The *extremes* category focuses on specific return periods (default being 5-, 10-, 25-, and 40- year periods). This is particularly important for evaluating the project's resilience to extreme weather events.

(iii) The *combination* category employs scatter plots to visualize interactions between precipitation and temperature results across individual model scenarios, supporting the identification of key marker scenarios for focused analysis.

48. Analysis methods have been applied using data derived from SSP scenarios or the most recent and best available datasets to capture both emissions uncertainty and model variance. The ensemble results are presented in term of likelihood, with *very likely* (90-100%) and *likely* (66-100%). This multifaceted approach ensures a comprehensive and robust climate analysis aligned with the project's design life and objectives.

3. Review of historical data

49. Two key data sources have been used as source of historical data and to develop the climate change projections:

(i) Historical observation data: Climate Research Unit (CRU) TS 4.07, monthly reanalysis from 1901 to 2021 https://www.uea.ac.uk/groups-and-centres/climatic-research-unit; and

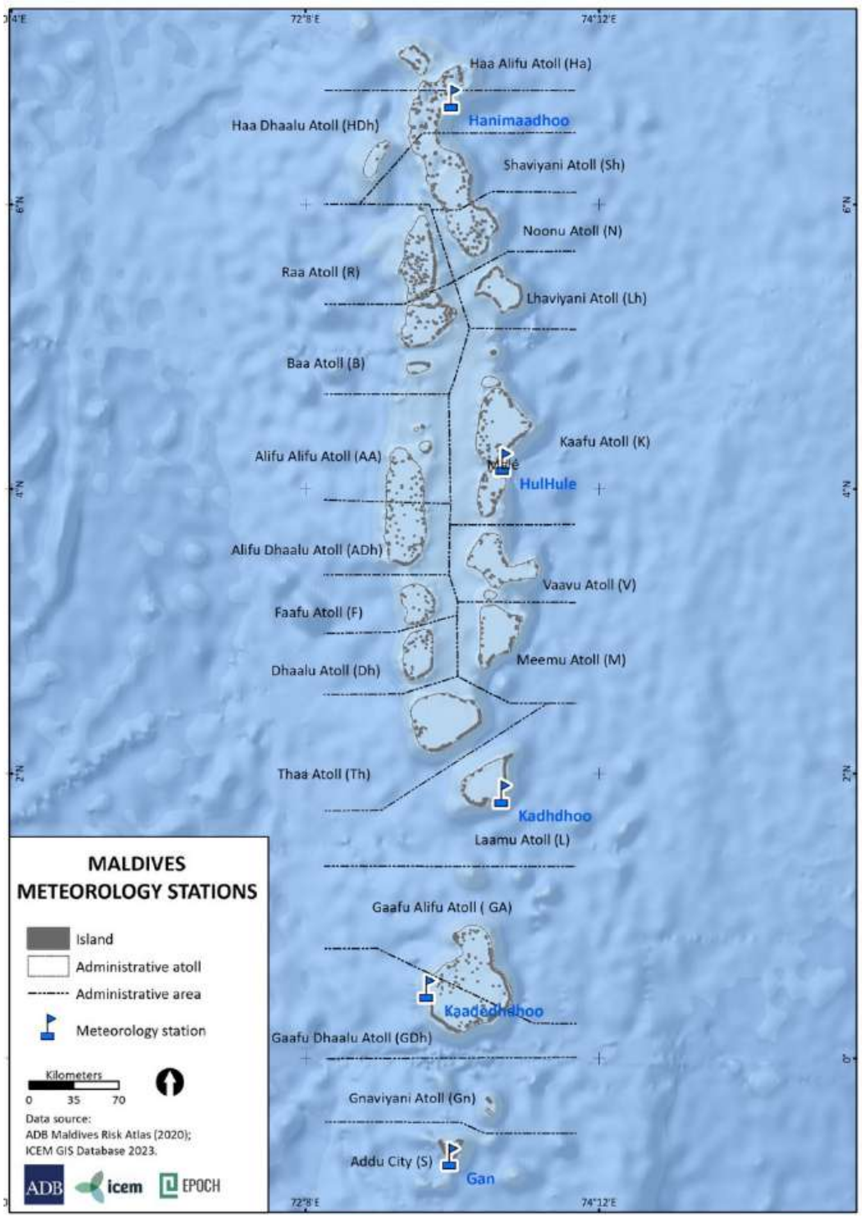
(ii) Maldives Ground Station Observation data, provided by the MMS, for three meteorological stations Hanimaadhoo (north), Gan (south) and Hulhule (central) (see Figure 18 for their location): https://www.meteorology.gov.mv/climate

50. Table 5 provides a summary of average historical precipitation and temperature data for Maldives.

Table 5: Summary of the climate data for the historical period 1995 to 2014

Station	Yearly average pr (mm)	Max daily pr (mm)	Monthly average pr (mm)	Average of maximum temperature Tmax (°C)	Average of mean temperature Tmean (°C)	Average of minimum temperature Tmin (°C)	Source of data
Hanimaadhoo	1,730.30	144.19	144.19	31.09	28.52	25.35	MMS
Hulhule	1,965.46	163.79	163.79	30.87	28.62	26.10	MMS
Gan	2,190.57	182.55	182.55	30.88	28.20	25.04	MMS
Maldives	2,091.62	174.30	174.30	31.01	28.22	25.48	CRU 4.07

Figure 18: Location of Hanimaadhoo, Hulhule and Gan meteorological stations



51. Figure 19 and Figure 20 illustrate the monthly characteristics of historical precipitation and temperature data at the three stations and the country average. Meanwhile, Figure 21 to Figure 24 show the anomalies in precipitation data, accompanied by a comprehensive analysis of historical trends in precipitation, temperature, and tide data for the three stations and the country as a whole.

52. The **key historical climate trends in Maldives**, as derived from this review of observed data collected at three stations and for Maldives, for the period 1995 to 2014, are:

(i) The maximum temperature has increased at all locations, but with different rates. Hanimaadhoo station (north) has the highest increase of +0.66°C over 20 years, followed by Hulhule station (central) with +0.62°C. Gan station (south) has the lowest increase of +0.28°C over 20 years. Maldives' countrywide average also reveals a substantial warming trend, with a +0.66°C increase over the two decades;

(ii) Annual rainfall exhibits a declining pattern at Hanimaadhoo station (north), decreasing at a rate of -3.13 mm per year, resulting in a total decrease of -63.0 mm over the 20-year period. Both Hulhule and Gan stations (central and south) show increasing trends in precipitation, with rates of +2.85 mm per year (+57.0 mm over 20 years) and +2.9 mm per year (+58 mm over 20 years), respectively. Maldives overall has seen an increase of +35.2 mm over 20 years.

(iii) Analysis of tide data indicates an accelerating sea level rise in Maldives, particularly pronounced at Hanimaadhoo station (north), where the average rate is +6.1 mm per year. This exceeds the global average of +3.7 mm/year reported by the IPCC AR6 for the most recent period analyzed; 2006 to 2018. Hulhule (central) and Gan stations (south) also presents a notable increase at +4.8mm and +3.27 mm per year, respectively. Over two decades, this translates to a total rise of +121.1mm, +95.8 mm and +65.4 mm for Hanimaadhoo, Hulhule and Gan stations (north, central and south), respectively.

Figure 19: Monthly precipitation at the three stations and country average, for the historical period 1995 to 2014

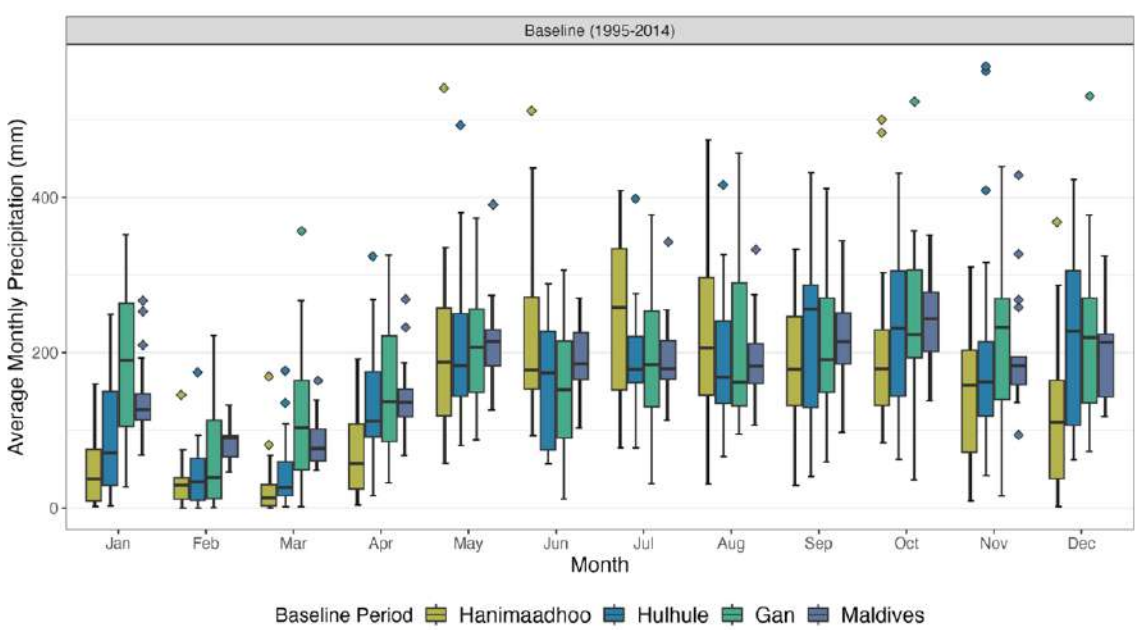


Figure 20: Monthly average maximum temperature at the three stations and country average, for the historical period 1995 to 2014

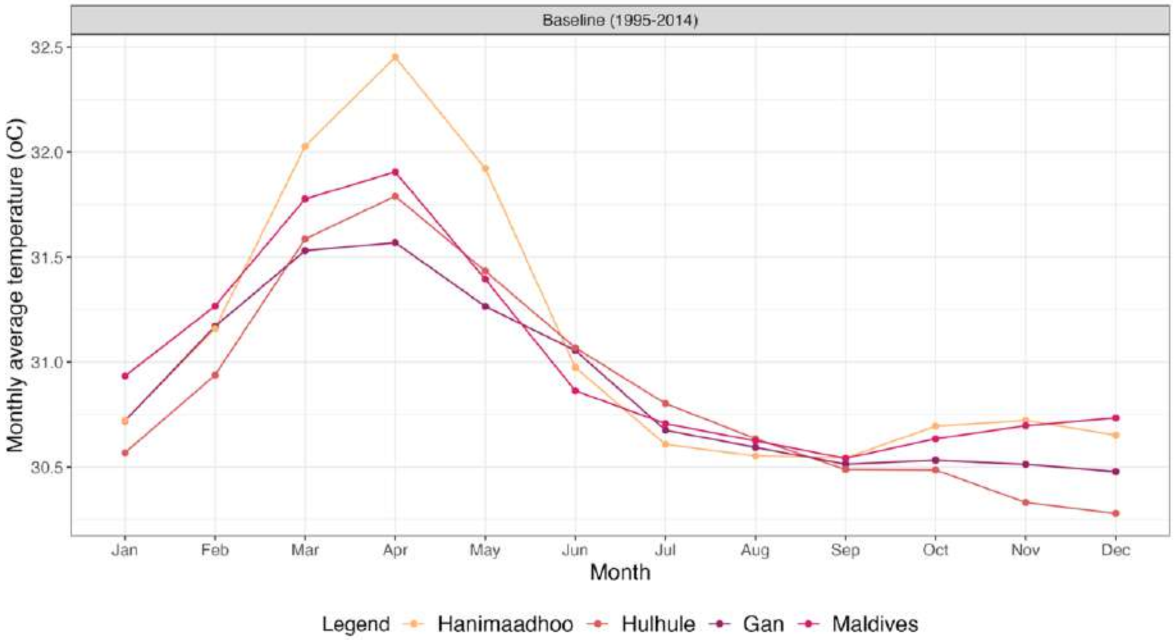


Figure 21: Annual precipitation anomaly in Maldives, for the period 1995 to 2014

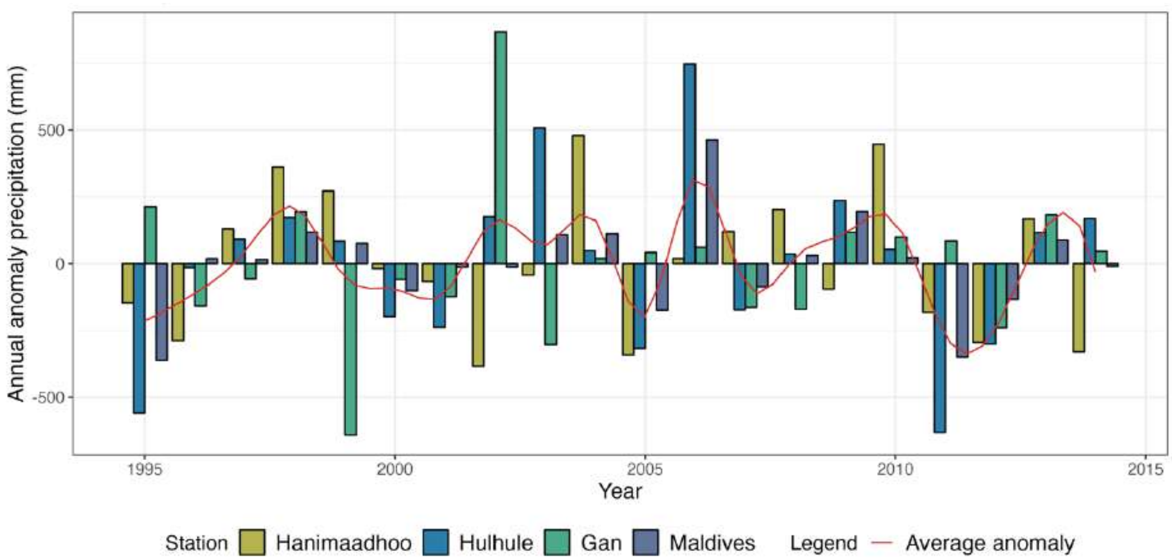


Figure 22: Annual precipitation trend in Maldives, for the period 1995 to 2014

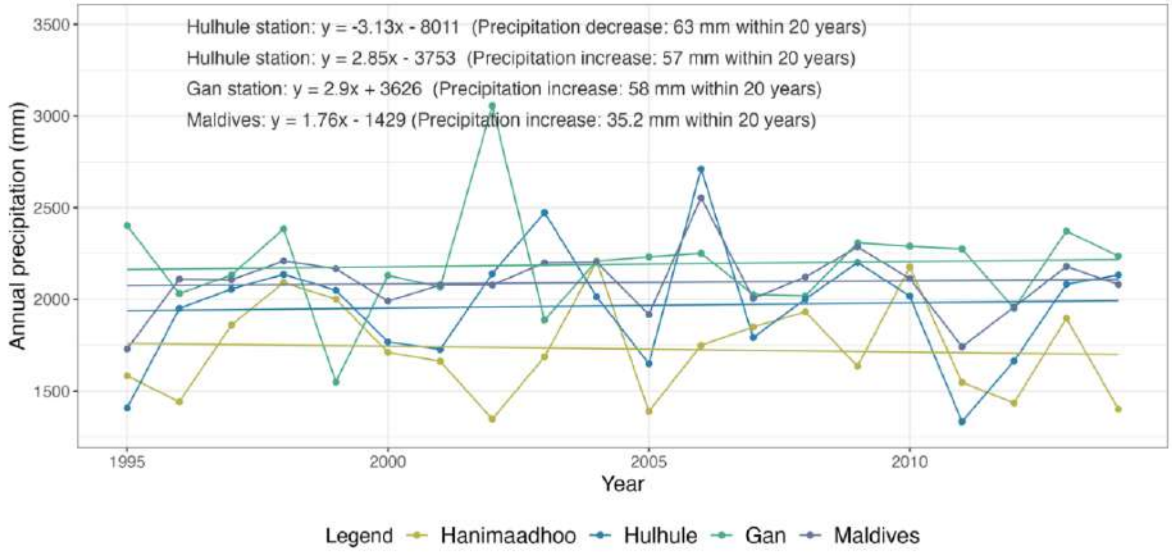


Figure 23: Annual maximum temperature trend in Maldives, for the period 1995 to 2014

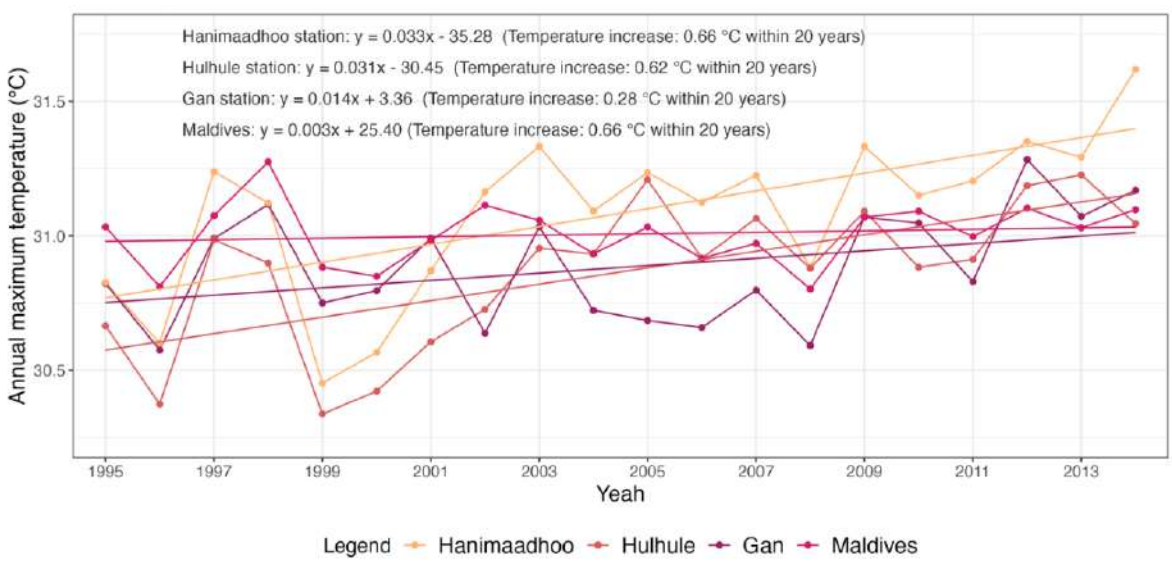
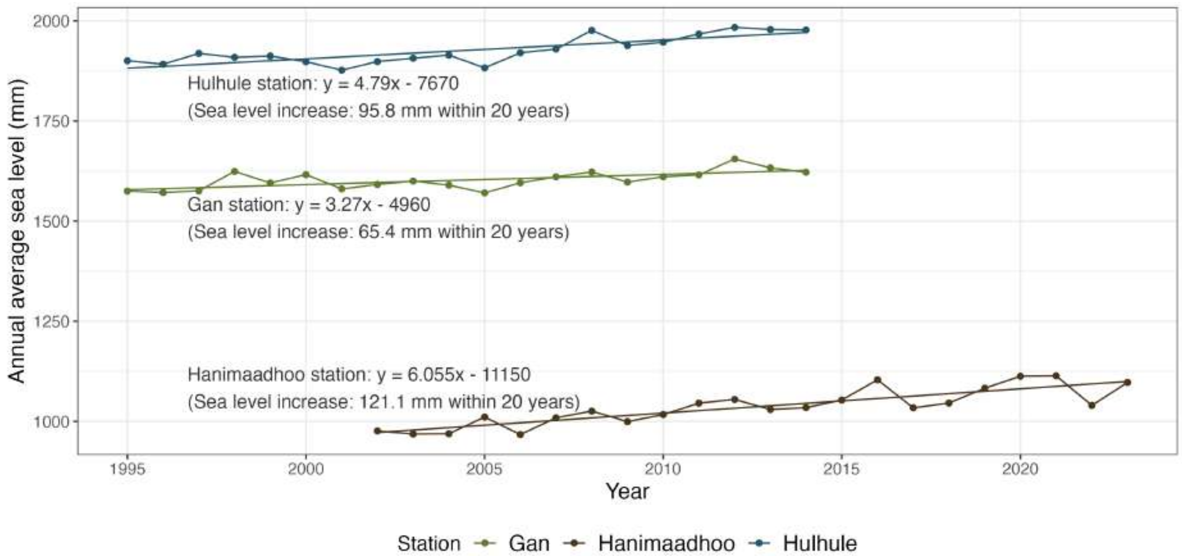


Figure 24: Annual average sea-level trend in Maldives base on tide data, for the period 1995 to 2023



4. GCM data collection

53. CMIP6 model outputs are distributed through various data centers and platforms, with the Earth System Grid Federation (ESGF) serving as the primary hub. The ESGF is a collaborative global network of data nodes that hosts and distributes CMIP6 data. The raw data can be accessed through the following active CMIP6 Collaboration Gateway (CoG) web interfaces:

(i) *USA, Program for Climate Model Diagnostics & Intercomparison/ Lawrence Livermore National Laboratory:* https://aims2.llnl.gov/search;

(ii) *Germany, Deutsche Klimarechenzentrum*: https://esgf-data.dkrz.de/projects/cmip6-dkrz/;

(iii) *UK, Centre for Environmental Data Analysis*: https://esgf-index1.ceda.ac.uk/projects/cmip6-ceda/;

(iv) *France, Institut Pierre-Simon Laplace*: https://esgf-node.ipsl.upmc.fr/projects/cmip6-ipsl/.

54. Additionally, the Royal Netherlands Meteorological Institute (KNMI) also hosts a substantial amount of CMIP6 data and offers efficient search functions which can be accessed and downloaded at: https://climexp.knmi.nl/start.cgi.

55. The two most prominent sources for accessing global downscaled GCM datasets are NEX-GDDP-CMIP6 and WorldClim:

(i) *NEX-GDDP-CMIP6: NASA NEX-GDDP-CMIP6:* This dataset provides downscaled projections from ScenarioMIP model runs. It offers global, high-resolution, bias-corrected climate change projections useful for analyzing processes sensitive to finer-scale climate gradients and local topography. However, this dataset does not cover oceanic cells in the Maldives area; it is limited to land cells;

(ii) *WorldClim:* WorldClim offers downscaled datasets with varying spatial resolutions, ranging from 30 seconds (~1 km) to 10 minutes (~20 km). However, it only provides monthly data, making it unsuitable for analyzing extreme events, such as maximum 5-day rainfall.

56. For this climate change assessment, it was decided to obtain raw GCM outputs from the KNMI portal due to its proven reliability. The portal also provides a wide range of GCM outputs and ensures consistent data quality on a daily scale. Downscaling has been performed using local observed data from Maldives, provided by the MMS.

5. GCM selection

57. The methodology for GCM selection involved an initial screening of GCM outputs available on the KNMI portal. This was followed by a comprehensive evaluation of the model performance, utilizing a predefined set of criteria to ensure accurate representation and reliability in simulating the monsoon patterns, sea surface temperatures, and other key climate features specific for Maldives. In the initial screening step, the following set of criteria was utilized to filter and select GCMs for downloading:

(i) *Geographical coverage:* Models that encompass the geographical area of interest, spanning Maldives with some buffer (latitude: 1°S to 7°N, longitude: 70°E to 78°E);
(ii) *Parameters of interest*: The investment project's focus on flood risk management and agricultural productivity informed the selection of GCMs providing outputs for critical climate variables, such as precipitation and maximum temperature;
(iii) *Data frequency:* GCMs offering daily data were prioritized to capture the intricate temporal dynamics of climate variables;
(iv) *Scenarios*: SSP2-4.5, SSP3-7.0 and SSP5-8.5.

58. **The screening process identified 26 GCMs that meet the specific criteria mentioned above.** Table 6 presents detailed information about the 26 downloaded GCMs utilized for the climate change assessment.

Table 6: Summary of selected global climate models for the climate change assessment

No	GCM Name	Institution	Resolutions
1	ACCESS-CM2	Commonwealth Scientific and Industrial Research Organisation (CSIRO), Australia	Land: 250 km, Ocean: 100 km
2	ACCESS-ESM1-5		
3	AWI-CM-1-1-MR	Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research (AWI), Germany	Land: 100 km, Ocean: 25 km
4	BCC-CSM2-MR	Beijing Climate Center, China	Land: 100 km, Ocean: 50 km
5	CanESM5-CanOE-p2	Canadian Centre for Climate Modelling and Analysis, Environment and Climate Change Canada	Land: 500 km, Ocean: 100 km
6	CanESM5-p1		
7	CanESM5-p2		
8	CMCC-CM2-SR5	Fondazione Centro Euro-Mediterraneo sui Cambiamenti Climatici, Italy	Land: 100 km, Ocean: 100 km
9	CNRM-CM6-1-f2	Centre National de Recherches Meteorologiques (CNRM) and Centre Europeen de Recherche et de Formation Avancee en Calcul Scientifique (CERFACS), Toulouse, France	Land: 250 km, Ocean: 100 km
10	CNRM-CM6-1-HR-f2		
11	CNRM-ESM2-1-f2		
12	EC-Earth3	EC-Earth consortium, Rossby Center, Swedish Meteorological and Hydrological Institute/SMHI, Norrkoping, Sweden	Land: 100 km, Ocean: 100 km
13	EC-Earth3-Veg		
14	GFDL-ESM4	National Oceanic and Atmospheric Administration, Geophysical Fluid Dynamics Laboratory, Princeton, NJ, USA	Land: 100 km, Ocean: 25 km
15	GISS-E2-1-G-p3	Goddard Institute for Space Studies, USA	Land: 250 km,

No	GCM Name	Institution	Resolutions
			Ocean: 100 km
16	HadGEM3-GC31-LL-f3	Met Office Hadley Centre, Exeter, Devon, UK	Land: 250 km, Ocean: 100 km
17	INM-CM4-8	Institute for Numerical Mathematics (INM), Russian Academy of Science, Moscow, Russia	Land: 100 km, Ocean: 50 km,
18	INM-CM5-0		
19	IPSL-CM6A-LR	Institut Pierre Simon Laplace (IPSL), Paris, France	Land: 250 km, Ocean: 100 km
20	MIROC-ES2L-f2	Japan Agency for Marine-Earth Science and Technology (JAMSTEC), Kanagawa, Japan, Atmosphere and Ocean Research Institute (AORI), The University of Tokyo, Chiba, Japan, National Institute for Environmental Studies (NIES), Ibaraki, Japan, and RIKEN Center for Computational Science, Hyogo, Japan	
21	MIROC6		
22	MPI-ESM1-2-HR	Max Planck Institute for Meteorology (MPI-M), Hamburg, Germany	Land: 100 km, Ocean: 50 km,
23	MPI-ESM1-2-LR		
24	MRI-ESM2-0	Meteorological Research Institute (MRI), Tsukuba, Ibaraki, Japan	Land: 100 km, Ocean: 100 km,
25	NESM3	Nanjing University of Information Science and Technology (NUIST), Nanjing, China	Land: 250km Ocean: 100km
26	UKESM1-0-LL-f2	Met Office Hadley Centre, Exeter, UK	Land: 250 km, Ocean: 100 km,

6. Evaluation of the GCMs performance

59. An overview of the dataset from 26 GCMs for SSP5-8.5 (Figure 25 and Figure 26) reveals increasing trends in the long term until 2100 for both precipitation and temperature in the Maldives. 24 out of 26 GCMs shows a positive change in precipitation, and all 26 GCMs predict an increase in temperature. A particular subset of the mid-future period (2041-2060), compared to the baseline period (1995-2014), shows a range of -3.17% to +17.89% for precipitation (Figure 27) and +1°C to +2.1°C for temperature (Figure 28).

60. To avoid potential biases introduced by outliers or extreme predictions, an approach that filters out GCMs whose predictions of change in precipitation (Figure 27) and temperature (Figure 28) fall within the 10th to 90th percentiles is proposed. This percentile range captures the middle 80% of the GCMs (Figure 29). By concentrating on this central range, the robustness of the analysis is enhanced, as it reduces the sensitivity to outlier models that might introduce undue variability. This approach ensures that the results are statistically stable, reliable, and consistent with the majority of the GCMs, offering a more nuanced and representative perspective on future climate scenarios. **Out of the 26 GCMs analyzed, 15 were selected for further analysis** (Table 7).

61. The potential sensitivity of the results to the choice of percentile range is acknowledged and, to address this, a sensitivity analysis is conducted, comparing outcomes obtained from different percentile ranges, such as 5th to 95th, to further validate the robustness of the findings.

Figure 25: Total annual precipitation for Maldives over the period from 1960 to 2100, for each of the 26 selected GCMs

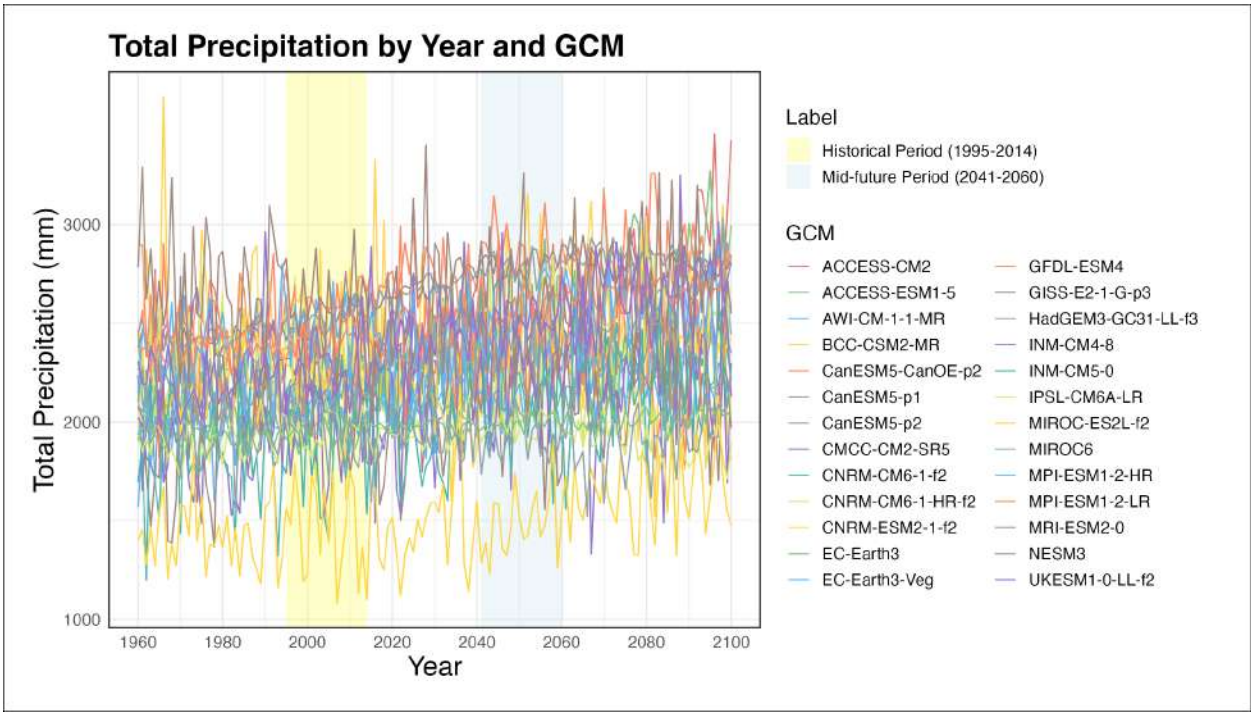


Figure 26: Annual average maximum temperature for Maldives, over the period from 1960 to 2100, for each of the 26 selected GCMs

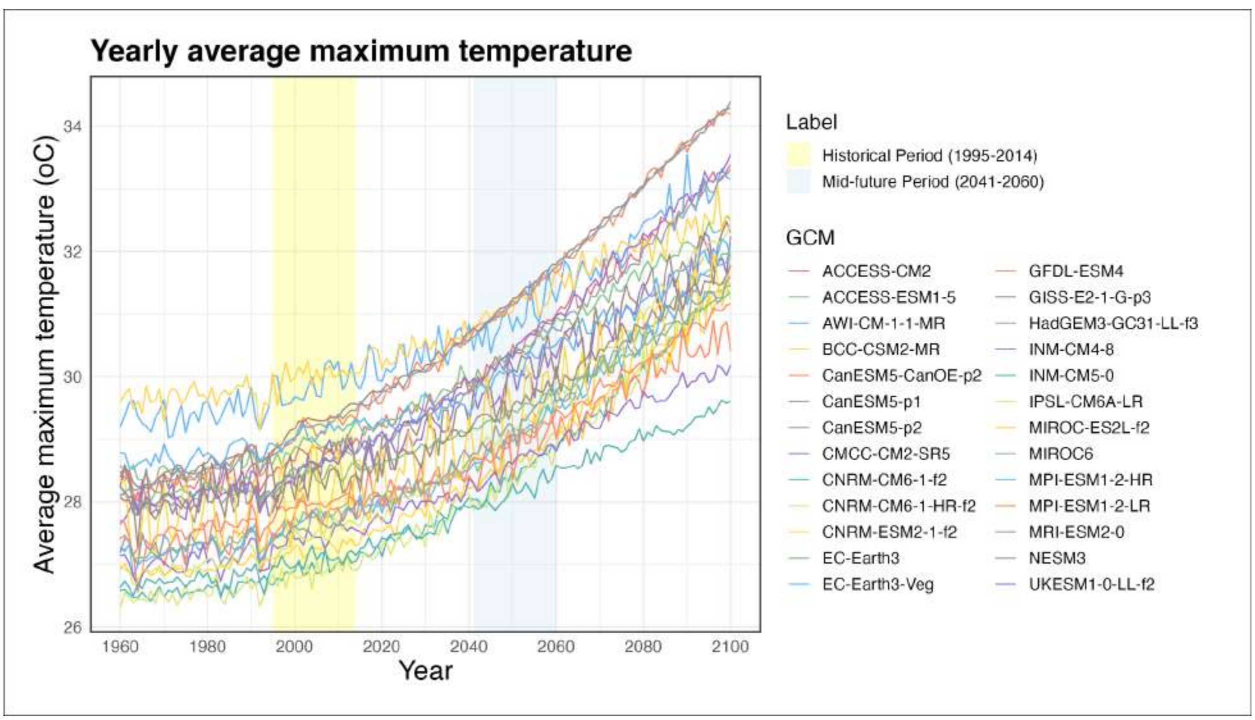


Figure 27: Percentage change in total precipitation for Maldives between the historical (1995-2014) and mid-future period (2041-2060), for each of the 26 selected GCMs

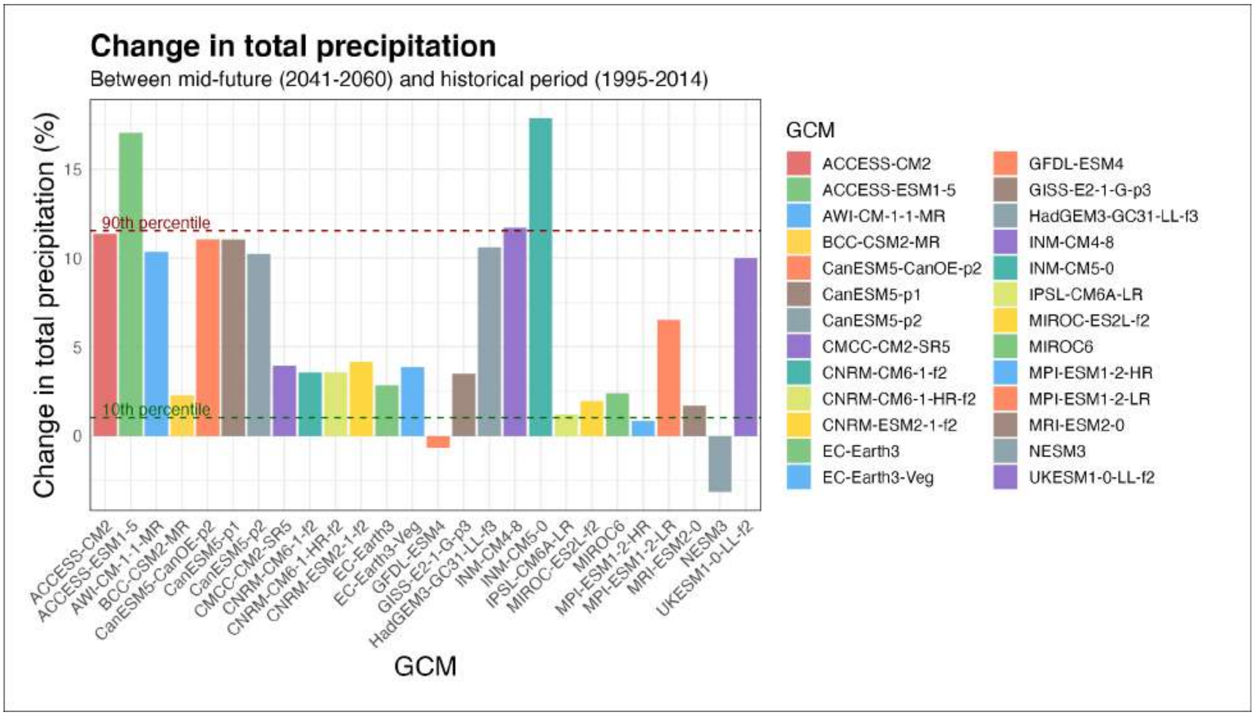


Figure 28: Percentage change in average maximum temperature for Maldives between the historical (1995-2014) and mid-future period (2041-2060), for each of the 26 selected GCMs

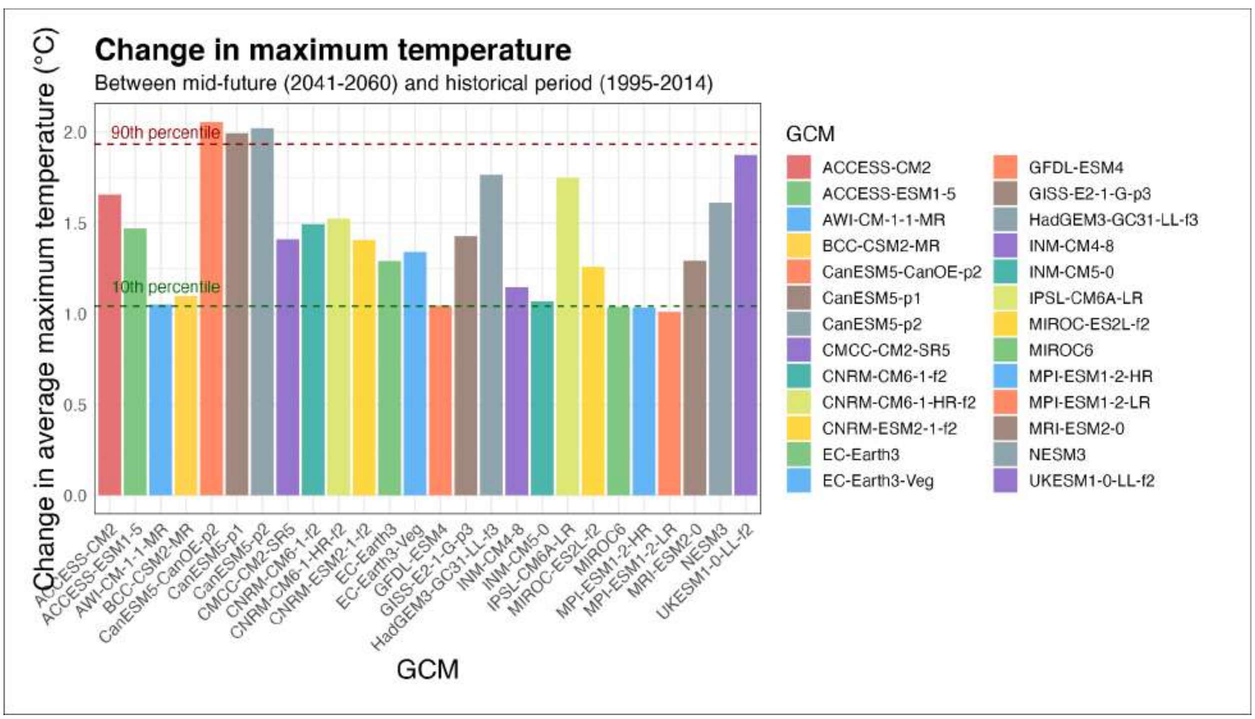


Figure 29: Performance of the 26 selected GCMs

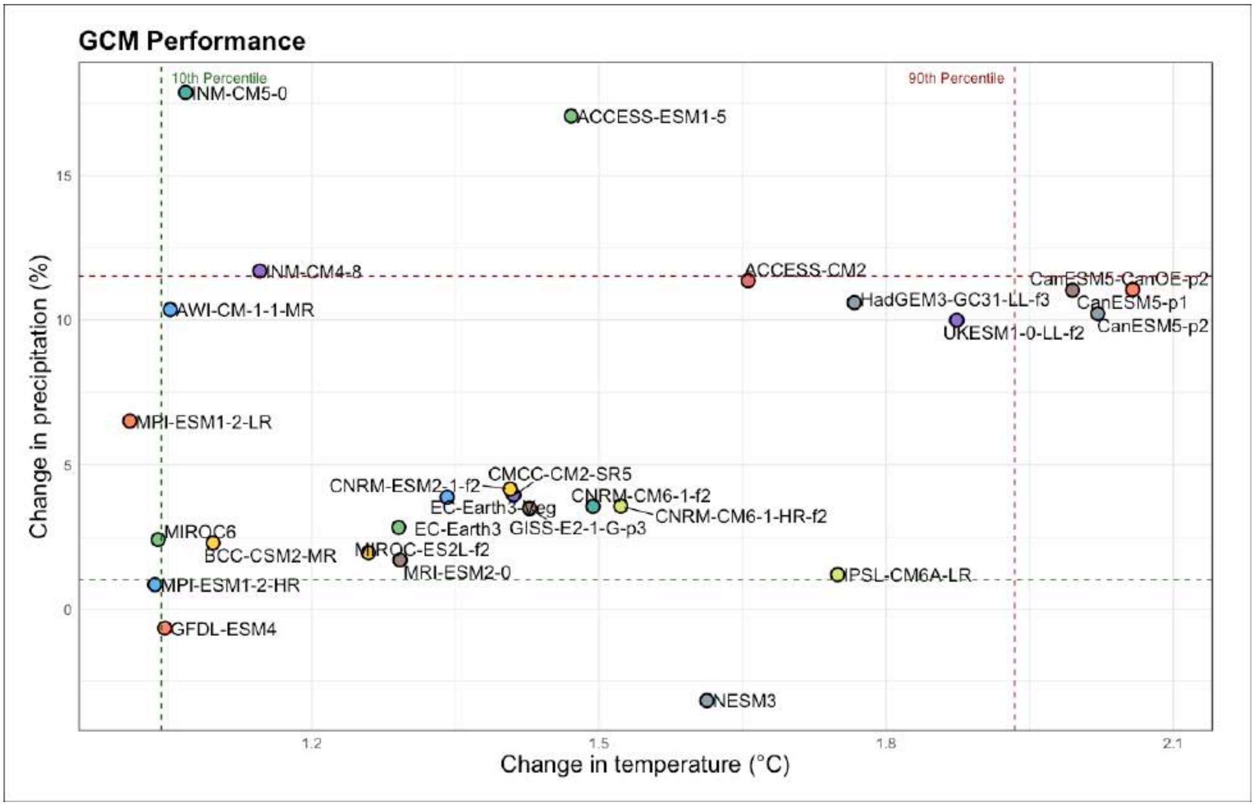


Table 7: Distribution of GCMs in 10th and 90th percentiles

GCM	Change in precipitation (%)	Change in temperature (°C)
10th percentile	**1.04**	**1.02**
ACCESS-CM2	1.66	11.36
AWI-CM-1-1-MR	1.05	10.36
BCC-CSM2-MR	1.10	2.29
CMCC-CM2-SR5	1.41	3.94
CNRM-CM6-1-f2	1.49	3.55
CNRM-CM6-1-HR-f2	1.52	3.56
CNRM-ESM2-1-f2	1.41	4.15
EC-Earth3	1.29	2.83
EC-Earth3-Veg	1.34	3.87
GISS-E2-1-G-p3	1.43	3.48
HadGEM3-GC31-LL-f3	1.77	10.61
IPSL-CM6A-LR	1.75	1.19
MIROC-ES2L-f2	1.26	1.95
MRI-ESM2-0	1.29	1.70
UKESM1-0-LL-f2	1.87	10.00
90th percentile	**1.93**	**11.53**

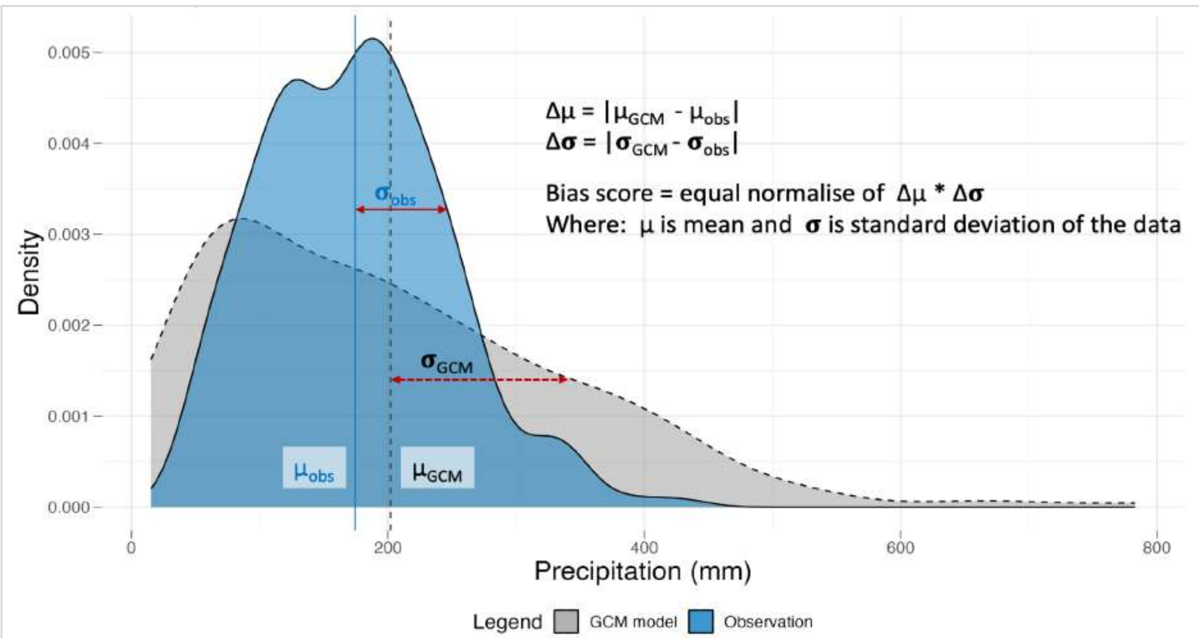
62. Further evaluation of the GCM's performance involves identifying models that demonstrate minimal biases in simulating temperature and precipitation for Maldives. Several bias correction methods are available and ranked based on their ability to adjust mean, variance, coefficient of variation, and standard deviation of climate variables. For instance, bias correction is most effective in adjusting the mean of climate variables, while quantiles mapping corrects

quantiles and also distribution of climate variables. These statistical tools are crucial in estimating discrepancies between observed and simulated data as part of a climate change assessment.

63. Details regarding the downscaling and bias correction are presented in the next section. In this section, the bias correction method with variability has been employed to estimate biases for 15 GCMs in order to select the top five GCMs that exhibit the best performance to conduct the climate change assessment for Maldives.

64. To calculate the biases between the GCM and observed data, the differences in mean and standard deviation are computed for both datasets over a reference period from 1995-2014. Smaller differences in both mean and standard deviation indicate better performance. This suggests fewer biases are necessary for localized projections, as illustrated in Figure 30.

Figure 30: Density plot of precipitation from GCMs versus observation data, for the period 1995 to 2014



Note: Normalization is a process of scaling the values in a dataset to a standard range, in this case between 0 and 1.

65. Subsequently, the bias amount has been converted into a bias score by applying equal normalization and ranking the scores. Smaller scores indicate fewer biases, correlating to better model skill. Table 8 shows the results of bias score for precipitation and temperature. The overall score is calculated by summing the bias score of the two parameters. **The top five models, from different research centers, with the best performance have been selected as follows**: **CNRM-CM6-1-f2, EC-Earth3, IPSL-CM6A-LR, CMCC-CM2-SR5, BCC-CSM2-MR.**

66. The figures in Annex A illustrate the characteristic of observation and GCM data for rainfall and temperature over the period of 1995-2014. The corrected values using the bias correction with variability are also added to visually illustrate the performance of the 15 GCMs.

Table 8: Overall bias score for the 15 selected GCMs

GCM	Average monthly precipitation (mm) observation	STD Average monthly precipitation (mm) - observation	Average monthly precipitation (mm) -GCM model	STD Average monthly precipitation (mm) - GCM model	Normalised bias amount of precipitation	Average monthly temperature (ºC) - observation	STD Average monthly temperature (mm) - observation	Average monthly temperature (ºC) -GCM model	STD Average monthly temperature (ºC)- GCM model	Normalised bias amount of temperature	Product sum bias amount
CNRM-CM6-1-f2	174.3	72.0	184.5	74.5	0.02	31.0	0.50	26.9	0.55	0.25	0.006
CNRM-ESM2-1-f2	174.3	72.0	184.6	68.3	0.03	31.0	0.50	27.2	0.54	0.19	0.006
EC-Earth3	174.3	72.0	167.8	87.5	0.15	31.0	0.50	27.7	0.51	0.05	0.008
EC-Earth3-Veg	174.3	72.0	169.8	88.3	0.16	31.0	0.50	27.7	0.52	0.07	0.011
IPSL-CM6A-LR	174.3	72.0	162.7	52.0	0.16	31.0	0.50	27.5	0.48	0.08	0.013
CMCC-CM2-SR5	174.3	72.0	185.6	67.3	0.05	31.0	0.50	28.5	0.68	0.50	0.023
BCC-CSM2-MR	174.3	72.0	201.9	138.0	1.00	31.0	0.50	30.0	0.52	0.03	0.026
CNRM-CM6-1-HR-f2	174.3	72.0	188.4	79.1	0.08	31.0	0.50	26.9	0.58	0.38	0.030
UKESM1-0-LL-f2	174.3	72.0	189.6	100.7	0.33	31.0	0.50	28.6	0.43	0.19	0.062
HadGEM3-GC31-LL-f3	174.3	72.0	179.9	95.9	0.27	31.0	0.50	28.6	0.41	0.24	0.064
MIROC-ES2L-f2	174.3	72.0	121.7	79.8	0.10	31.0	0.50	28.1	0.80	1.00	0.101
AWI-CM-1-1-MR	174.3	72.0	179.6	106.5	0.41	31.0	0.50	29.9	0.77	0.36	0.148
ACCESS-CM2	174.3	72.0	184.0	108.7	0.49	31.0	0.50	28.8	0.37	0.33	0.159
MRI-ESM2-0	174.3	72.0	216.3	125.8	0.79	31.0	0.50	28.3	0.59	0.26	0.210
GISS-E2-1-G-p3	174.3	72.0	173.0	123.4	0.74	31.0	0.50	28.6	0.68	0.50	0.369

Note: the five selected GCMs are highlighted in yellow

7. Downscaling and bias correction

67. The direct output from GCMs often has relatively coarse spatial resolutions, which might not effectively capture the unique local climate characteristics of a specific area such as atolls or islands in Maldives. Downscaling and bias correction techniques are essential tools to transform large-scale climate information into localized projections.

68. There are two major downscaling techniques: (i) dynamic downscaling and (ii) statistical downscaling. In dynamical downscaling, a higher-resolution climate model is employed. These models are commonly referred to as regional climate models. However, this approach requires high-performance computers or systems capable of simulating the climate model, making it computationally intensive. In contrast, statistical downscaling provides a simpler and more straightforward method for obtaining localized projection.

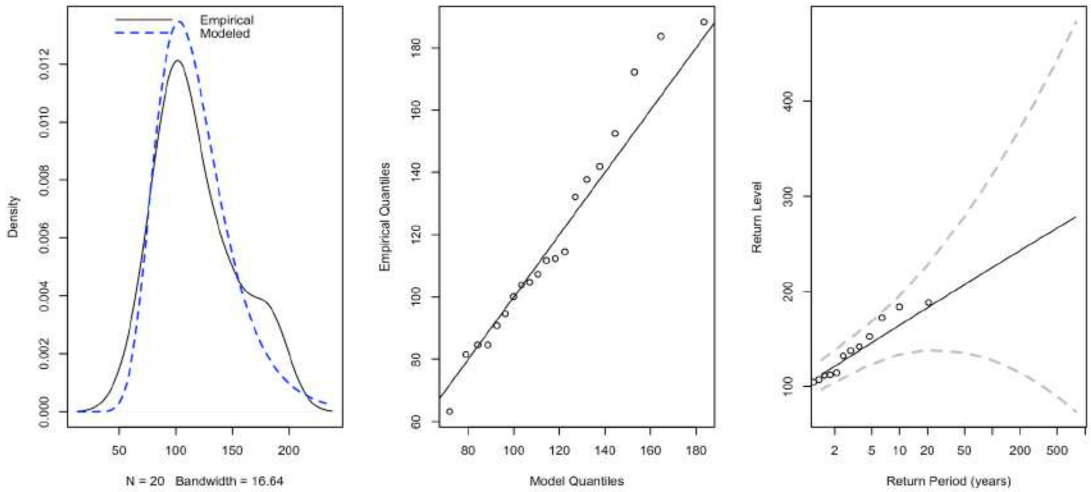
69. Common statistical downscaling methods include:
   (i) *Bias correction:* This approach adjusts the statistical properties of climate model outputs (e.g., mean and variability) to align them with observed data, effectively removing systematic biases;
   (ii) *Change factor of mean:* This involves calculating the difference in mean values between observed and modeled data and applying these changes to the model's outputs;
   (iii) *Quantile mapping:* Quantile mapping adjusts cumulative distribution functions of the climate model's outputs to match those observed data, helping to correct biases and capture the local distribution of variables;
   (iv) *Event-based weather generator*: This simulates local weather events based on the occurrence and characteristics of historical events, providing downscaled climate data in a probabilistic manner.

70. Quantile mapping has been selected for bias correction in this report, as it can adjust both the mean and the variability of the simulated data. It can also maintain the temporal and spatial patterns of the model outputs, which are important for representing the climate system's dynamics and feedbacks. Moreover, quantile mapping can deal with non-linear and non-stationary relationships between the model outputs and the observed data, which often occur in complex and changing climate scenarios.

8. Fitting extreme events distribution to calculate period value for precipitation

71. The chosen method for assessing return period values for precipitation involves utilizing the Generalized Extreme Value (GEV) distribution due to its robust ability to capture extreme values. Renowned for its flexibility in representing a variety of distribution shapes and scales, the GEV method has gained widespread acceptance in hydrology. To calculate return periods (e.g., 5, 10, 20, and 40 years), the GEV distribution is fitted to the dataset of extreme rainfall events. This fitting process involves extracting essential parameters, including location (μ), scale (σ), and shape (ξ). Once these parameters are determined, the GEV quantile function is employed to estimate return levels for specified time frames. This approach proves particularly valuable for evaluating extreme precipitation events, considering both the maximum 1-day and 5-day precipitation, providing a comprehensive understanding of the likelihood of extreme rainfall occurrences over different temporal scales.

Figure 31: Demonstration of fitting historical data of 1-day max precipitation at Gan station with GEV distribution, and use of GEV to estimate Average Return Value for different return period



9. Sea level rise

72. For the assessment of sea level rise for Hulhule and Gan stations, the analysis draws upon information obtained from the NASA Sea Level Projection Tool[58], which facilitates the visualization and download of sea level projection data sourced from the IPCC AR6. Projections of sea level rise across future time period and three SSPs have been obtained directly from the portal.

73. In the sea level projections, likely ranges are assessed based upon the combination of uncertainty in the temperature change associated with an emissions scenarios and uncertainty in the relationships between temperature and drivers of projected sea level change, such as thermal expansion, ocean dynamics, and glacier and ice sheet mass loss. In general, the 5th-95th percentiles are interpreted as *very likely* ranges referring to a probability of at least 90%, and the 17th-83rd percentiles results are interpreted as *likely* ranges referring to a probability of at least 66%.

10. Uncertainty and limitations

74. Uncertainty in climate change projections and analysis arises from various sources, including inherent uncertainties within the physical models themselves. The complexity of the earth's climate system introduces challenges in accurately modeling intricate processes, leading to variability in climate projections. Moreover, the availability of a diverse array of GCMs further contributes to uncertainty, with 134 models offering a wide range of potential outcomes.

75. Recognizing the inherent uncertainties, the selection process for GCMs was carefully conducted, acknowledging the need to account for different model characteristics and their associated uncertainties. To enhance the transparency and clarity of communicating prediction results, the approach aligns with statistical recommendations outlined in the AR6. Likelihood

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[58] NASA Sea Level Projection Tool (accessed on 21 November 2023).

intervals *very likely* 90–100% and *likely* 66–100% are incorporated to convey the level of certainty associated with the predictions.

76. Additionally, for further transparency, graphical representations are employed to depict the range of predictions, facilitating a nuanced understanding of the uncertainty inherent in the model outputs. To provide a quantitative measure of confidence, the analysis incorporates variables of confidence levels derived from the fitting distribution of prediction data. This comprehensive approach allows for a robust exploration and communication of uncertainties within the climate change projection analysis, ensuring that decision-makers and stakeholders are well-informed about the potential range and reliability of the predicted future climate scenarios.

77. One limitation of the observation data is that it is only for three stations (Hanimaadhoo, Hulhule, and Gan), which may not spatially represent the country average for a country that is long and spread out like Maldives. Maldives has about 1,192 islands that cover 871 km from north to south, with each island having its own climatic conditions and topographic features. Therefore, the observation data from the three stations may not capture the spatial variability and heterogeneity of the climate variables across the country.

78. Another limitation of the observation data is that the dataset which is used to calculate the country average is a global dataset from the CRU. The CRU dataset is a gridded dataset that interpolates the station data to a spatial resolution of 0.5 degrees. However, the interpolation method may introduce errors or uncertainties, especially for regions with sparse or uneven station coverage, such as Maldives. Therefore, the CRU dataset may not reflect the realistic and plausible values of the climate variables for Maldives.

B. Climate projections

1. Temperature

79. The following figures and tables show the projected changes in temperature, from the baseline period (1995-2014) into the future (2030s, 2050s, 2070s and 2090s), for three SSPs (2-4.5, 3-7.0 and 5-8.5) and for three meteorological stations and Maldives overall:

(i) Changes in annual maximum temperature: Figure 32 to Figure 39, Table 9 and Table 10;
(ii) Changes in seasonal maximum temperature: Figure 40, Table 12 to Table 15; and
(iii) Changes in monthly maximum temperature: Figure 42 to Figure 46, and Table 16 and Table 17.

80. The **main findings** are as follows:

(i) The average maximum **annual** temperature is projected to increase, under all scenarios and for all stations and the country in general. The increase is more pronounced in the north, but similar in the central and southern parts of the country:
  - For the 2030s, the increases are similar for all three SSPs, ranging from +0.79°C to +0.81°C in Hanimaadhoo (from a baseline of 31.1°C), +0.65°C to +0.68°C in Gan (from a baseline of 30.9°C), +0.59°C to +0.63°C in Hulhule (from a baseline of 30.9°C), and +0.60°C to +0.65°C for the country overall (from a baseline of 31.0°C);
  - For the 2050s, the increases range from +1.10°C to +1.43°C for SSP 2-4.5, from +1.29°C to +1.64°C for SSP 3-7.0, and from +1.51°C to +1.88°C for SSP 5-8.5, with the highest increase in Hanimaadhoo station and the lowest increase in Hulhule station;
  - The highest projected maximum annual temperature is 35.4°C (*very likely* [34.49°C, 36.62°C]) in Hanimaadhoo (SSP 5-8.5, by 2090s, per the ensemble GCM), which is an increase of +4.31°C (*very likely* [+3.41°C, +5.13°C]) from a baseline of 31.1°C;

(ii) **Seasonally**, the projected increases in average maximum temperature are the highest in the wet season (May-November) but lower in the dry season (January-March) for Hanimaadhoo and Gan stations and Maldives overall, for all three SSPs. For Hulhule station, the increases are the highest in the dry season but lower in the wet season, for all three SSPs;

(iii) The highest maximum increase in the wet season is +4.66°C (*very likely* [+3.81°C, +5.46°C]) from a baseline of 30.9°C (Hanimaadhoo, SSP 5-8.5, by 2090s). The highest maximum increase in the dry season is +4.81°C (*very likely* [+3.87°C, +5.5°C]) from a baseline of 31.0°C (Hulhule, SSP 5-8.5, by 2090s);

(iv) In terms of **monthly** increases, the average maximum temperature, for all three SSPs, is the highest in April-May and the lowest in January for Hanimaadhoo and Gan stations and Maldives overall, while the highest in March and the lowest in July for Hulhule station:
  - The highest average maximum temperature in May in Hanimaadhoo is projected to be 36.6°C (*very likely* [35.62°C, 37.32°C]) (SSP 5-8.5, 2090s) – compared to a baseline of 31.9°C;
  - The highest average maximum temperature in May in Gan is projected to be 35.6°C (*very likely* [34.36°C, 36.44°C]) (SSP 5-8.5, 2090s) – compared to a baseline of 31.3°C;

- The highest average maximum temperature in March in Hulhule is projected to be 36.0°C (*very likely* [35.05°C, 36.63°C]) (SSP 5-8.5, 2090s) – compared to a baseline of 31.6°C.

Figure 32: Projected annual average maximum temperature (°C), for three SSPs, at the three stations and country average (baseline period: 1995-2014; future projection: 2021-2100)

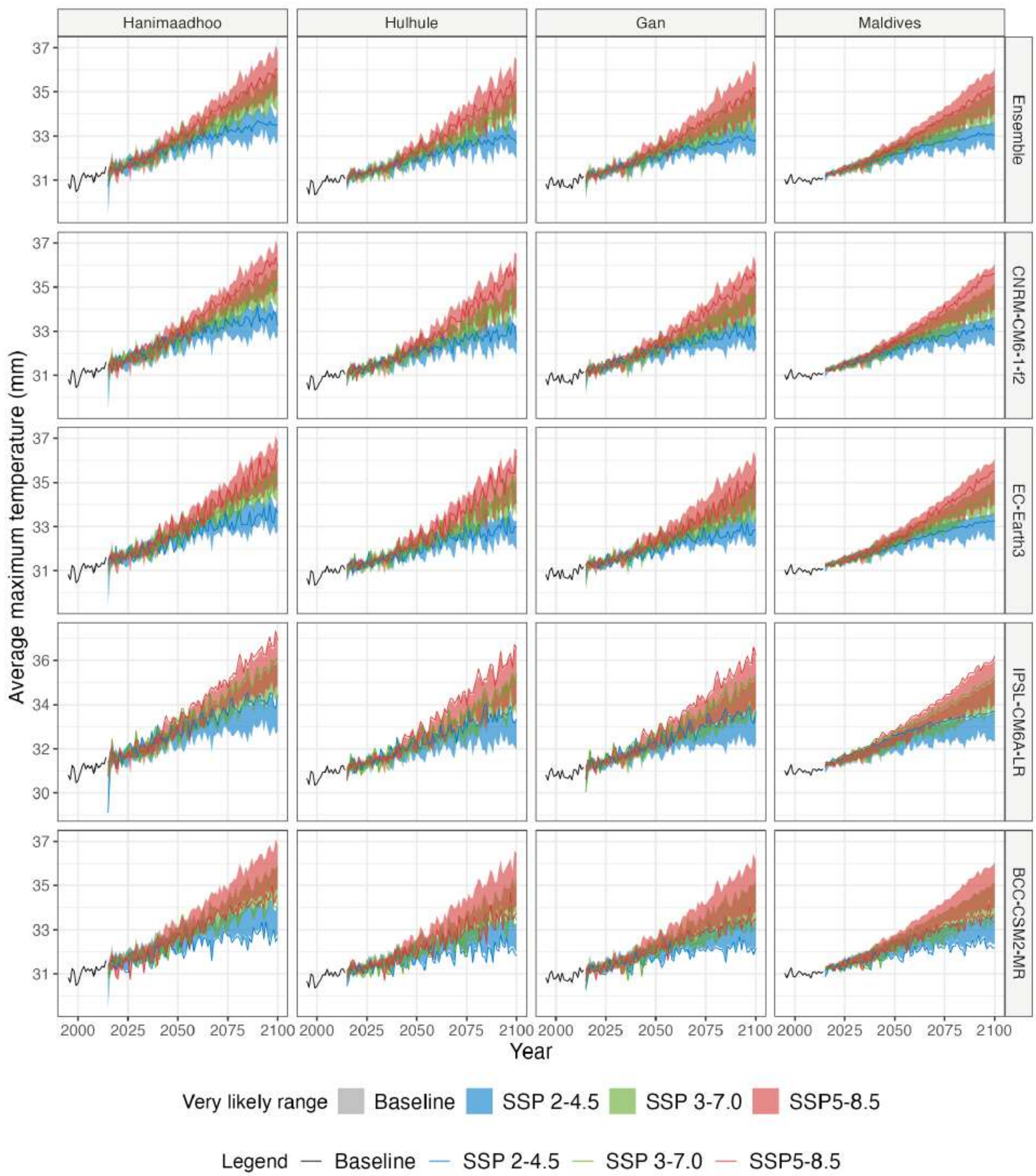

Table 9: Projected annual average maximum temperature (°C), for three SSPs, at the Hanimaadhoo and Hulhule stations (baseline period: 1995-2014; future projection: 2021-2100)

Station	Hanimaadhoo					Hulhule				
Period	Baseline (1995-2014)	2021-2040	2041-2060	2061-2080	2081-2100	Baseline (1994-2015)	2021-2040	2041-2060	2061-2080	2081-2100
					SSP 2-4.5					
Average Tmax (°C)	31.09	31.87	32.51	33.10	33.46	30.87	31.46	31.97	32.49	32.82
Change (°C)	-	0.79	1.43	2.01	2.37	-	0.59	1.10	1.63	1.96
Very likely range (°C)	-	[0.55, 1.01]	[1.09, 1.75]	[1.55, 2.45]	[1.75, 2.96]	-	[0.45, 0.71]	[0.8, 1.37]	[1.2, 2]	[1.38, 2.5]
Likely range (°C)	-	[0.62, 0.96]	[1.18, 1.68]	[1.71, 2.31]	[1.98, 2.76]	-	[0.51, 0.68]	[0.89, 1.31]	[1.37, 1.88]	[1.61, 2.3]
					SSP 3-7.0					
Average Tmax (°C)	31.09	31.87	32.73	33.67	34.61	30.87	31.46	32.16	32.96	33.97
Change (°C)	-	0.79	1.64	2.58	3.53	-	0.59	1.29	2.09	3.10
Very likely range (°C)	-	[0.57, 0.95]	[1.32, 2.02]	[2.12, 3.05]	[2.95, 4.18]	-	[0.4, 0.69]	[1.03, 1.57]	[1.61, 2.47]	[2.51, 3.62]
Likely range (°C)	-	[0.65, 0.93]	[1.4, 1.88]	[2.29, 2.87]	[3.12, 3.93]	-	[0.48, 0.68]	[1.12, 1.46]	[1.8, 2.36]	[2.74, 3.45]
					SSP 5-8.5					
Average Tmax (°C)	31.09	31.89	32.97	34.16	35.40	30.87	31.49	32.38	33.55	34.78
Change (°C)	-	0.81	1.88	3.08	4.31	-	0.63	1.51	2.68	3.91
Very likely range (°C)	-	[0.54, 0.99]	[1.53, 2.24]	[2.53, 3.63]	[3.41, 5.13]	-	[0.51, 0.7]	[1.2, 1.83]	[2.12, 3.21]	[2.81, 4.69]
Likely range (°C)	-	[0.65, 0.96]	[1.65, 2.1]	[2.7, 3.45]	[3.76, 4.88]	-	[0.56, 0.69]	[1.31, 1.71]	[2.34, 3.02]	[3.25, 4.47]

Table 10: Projected annual average maximum temperature (°C), for three SSPs, at Gan station and country average (baseline period: 1995-2014; future projection: 2021-2100)

Station	Gan					Maldives				
Period	Baseline (1995-2014)	2021-2040	2041-2060	2061-2080	2081-2100	Baseline (1994-2015)	2021-2040	2041-2060	2061-2080	2081-2100
SSP 2-4.5										
Average Tmax (°C)	30.88	31.54	32.03	32.51	32.81	31.01	31.62	32.18	32.67	33.00
Change (°C)	-	0.65	1.14	1.62	1.92	-	0.61	1.17	1.66	1.99
Very likely range (°C)	-	[0.48, 0.8]	[0.86, 1.4]	[1.23, 2.02]	[1.37, 2.48]	-	[0.47, 0.8]	[0.86, 1.5]	[1.25, 2.05]	[1.43, 2.44]
Likely range (°C)	-	[0.54, 0.77]	[0.94, 1.35]	[1.36, 1.89]	[1.55, 2.29]	-	[0.5, 0.73]	[0.97, 1.37]	[1.42, 1.9]	[1.65, 2.31]
SSP 3-7.0										
Average Tmax (°C)	30.88	31.54	32.21	32.97	33.81	31.01	31.61	32.34	33.12	34.01
Change (°C)	-	0.65	1.33	2.08	2.93	-	0.60	1.33	2.11	3.00
Very likely range (°C)	-	[0.46, 0.79]	[1.03, 1.65]	[1.6, 2.56]	[2.24, 3.64]	-	[0.42, 0.83]	[1.06, 1.69]	[1.65, 2.59]	[2.38, 3.57]
Likely range (°C)	-	[0.54, 0.76]	[1.12, 1.53]	[1.76, 2.4]	[2.42, 3.43]	-	[0.48, 0.74]	[1.13, 1.55]	[1.83, 2.4]	[2.63, 3.36]
SSP 5-8.5										
Average Tmax (°C)	30.88	31.57	32.40	33.43	34.56	31.01	31.65	32.51	33.59	34.72
Change (°C)	-	0.68	1.52	2.54	3.68	-	0.65	1.51	2.58	3.72
Very likely range (°C)	-	[0.5, 0.82]	[1.19, 1.86]	[1.96, 3.12]	[2.6, 4.59]	-	[0.49, 0.82]	[1.21, 1.84]	[2.06, 3]	[2.69, 4.42]
Likely range (°C)	-	[0.57, 0.79]	[1.3, 1.73]	[2.12, 2.97]	[2.98, 4.38]	-	[0.52, 0.77]	[1.29, 1.72]	[2.27, 2.87]	[3.1, 4.26]

Figure 33: Baseline and projected change in annual average maximum temperature per year (°C), for SSP2-4.5 (baseline period: 1995-2014; future projection: 2021-2100)

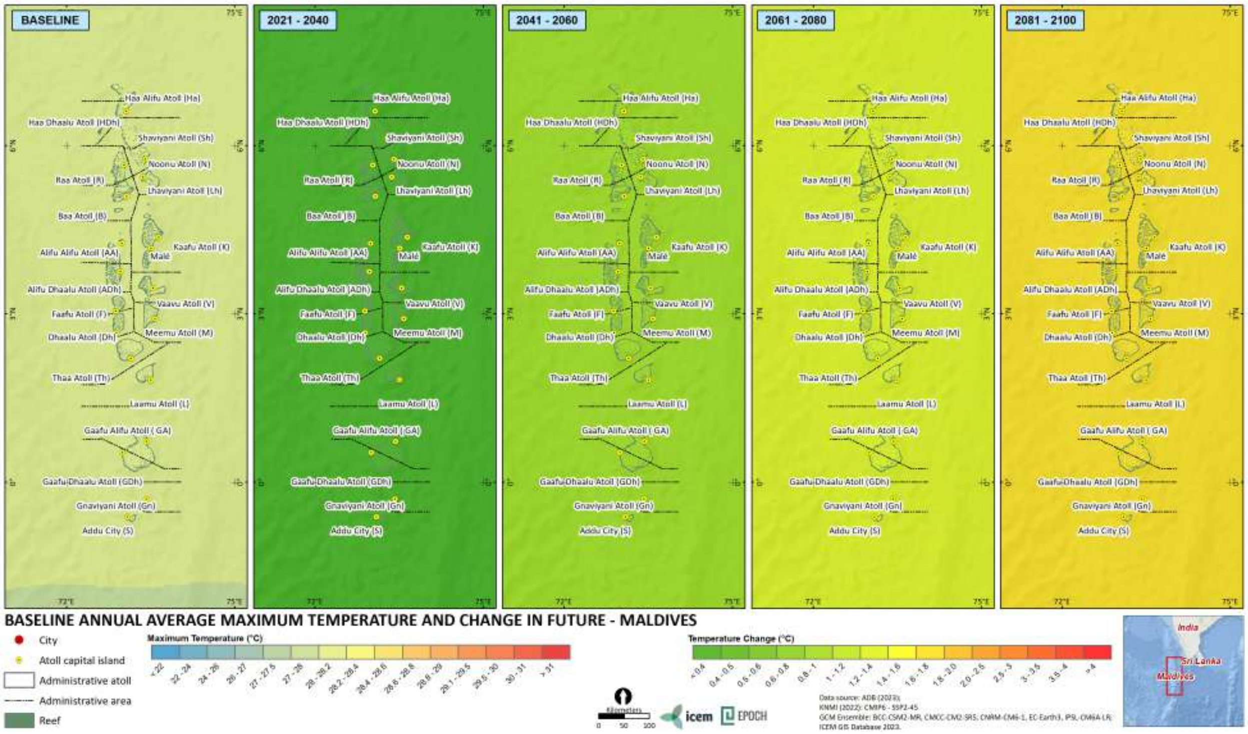

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Figure 34: Baseline and projected change in annual average maximum temperature per year (°C), for SSP3-7.0 (baseline period: 1995-2014; future projection: 2021-2100)

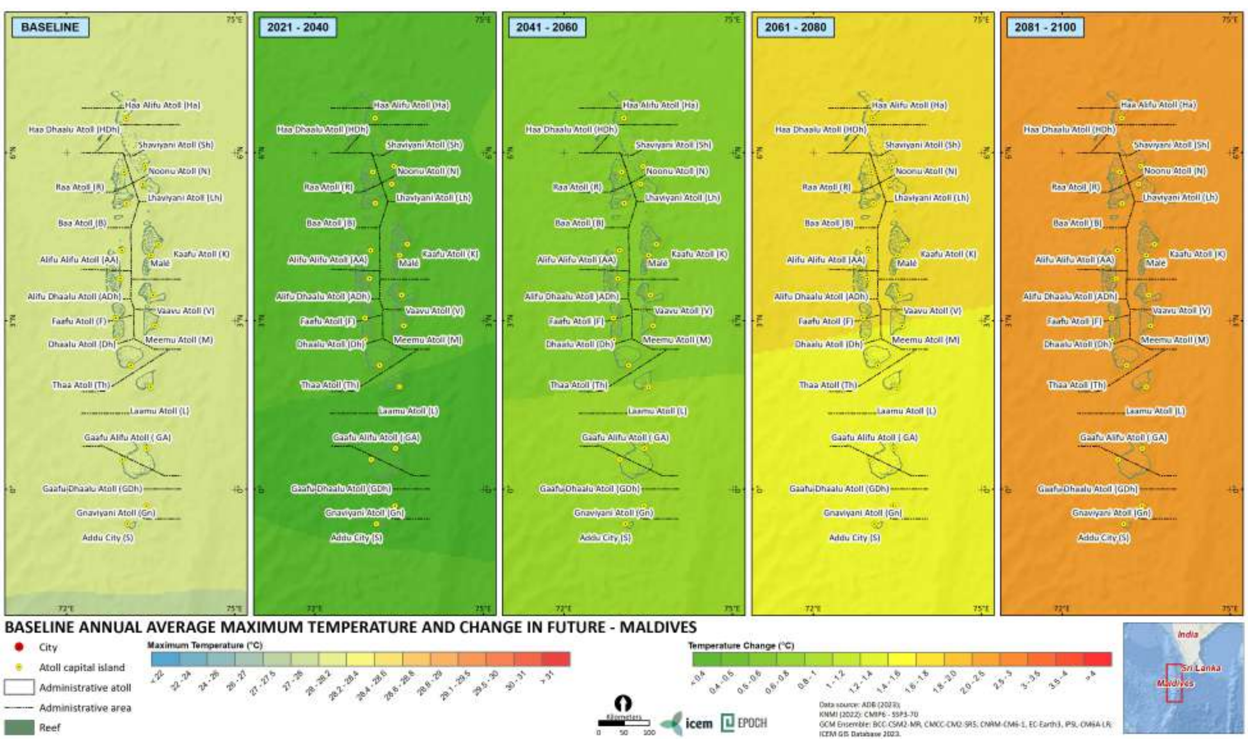


Figure 35: Baseline and projected change in annual average maximum temperature per year (°C), for SSP5-8.5 (baseline period: 1995-2014; future projection: 2021-2100)

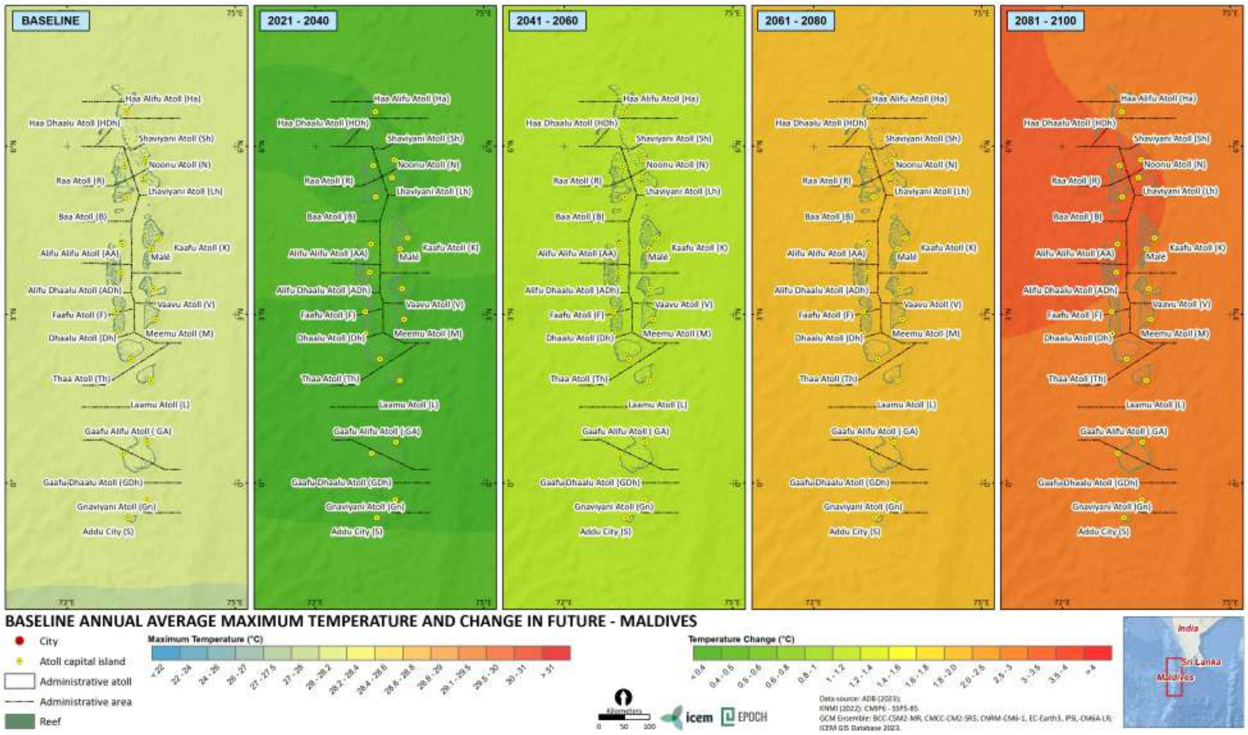


Figure 36: Projected maximum temperature per year (°C), for three SSPs, at Hanimaadhoo station (baseline period: 1995-2014; future projection: 2021-2100)

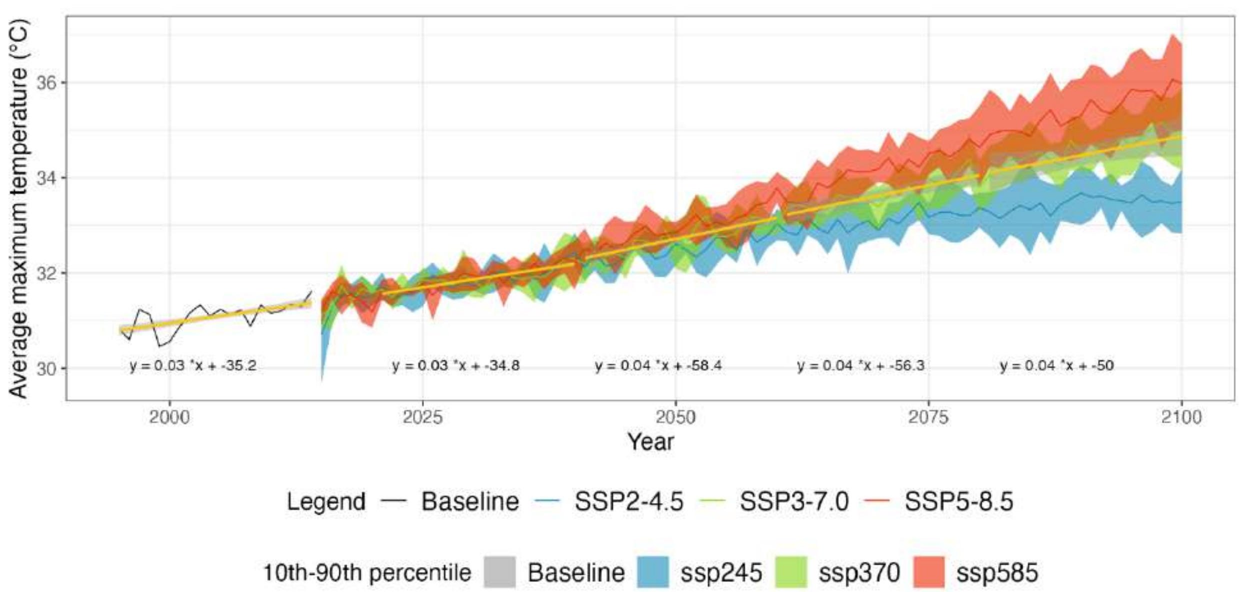


Figure 37: Projected maximum temperature per year (ºC), for three SSPs, at Hulhule station (baseline period: 1995-2014; future projection: 2021-2100)

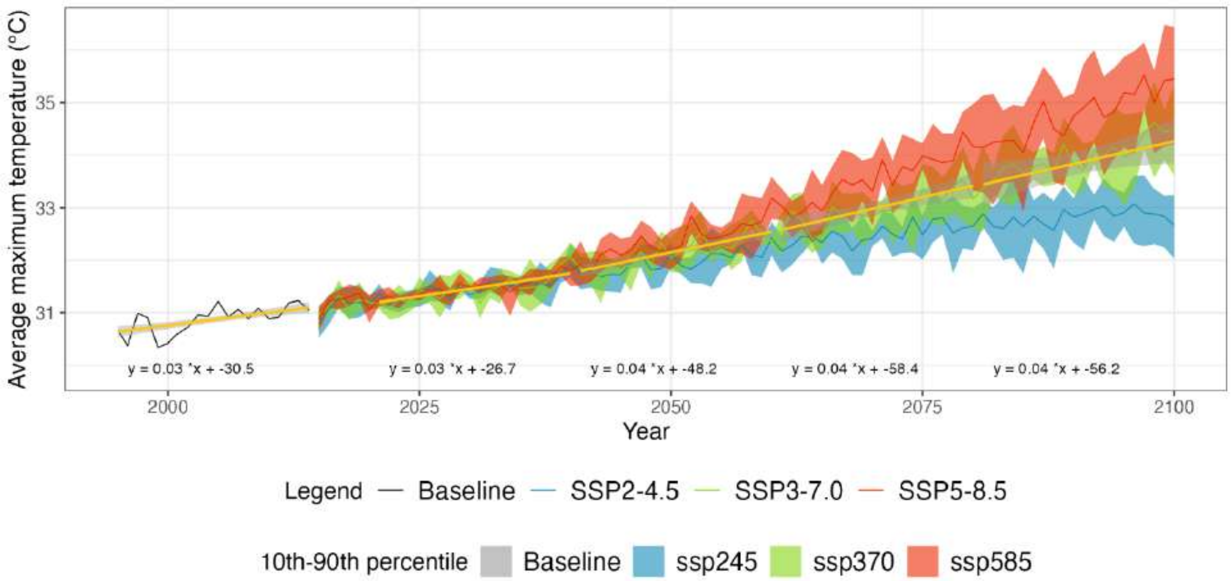


Figure 38: Projected maximum temperature per year (ºC), for three SSPs, at Gan station (baseline period: 1995-2014; future projection: 2021-2100)

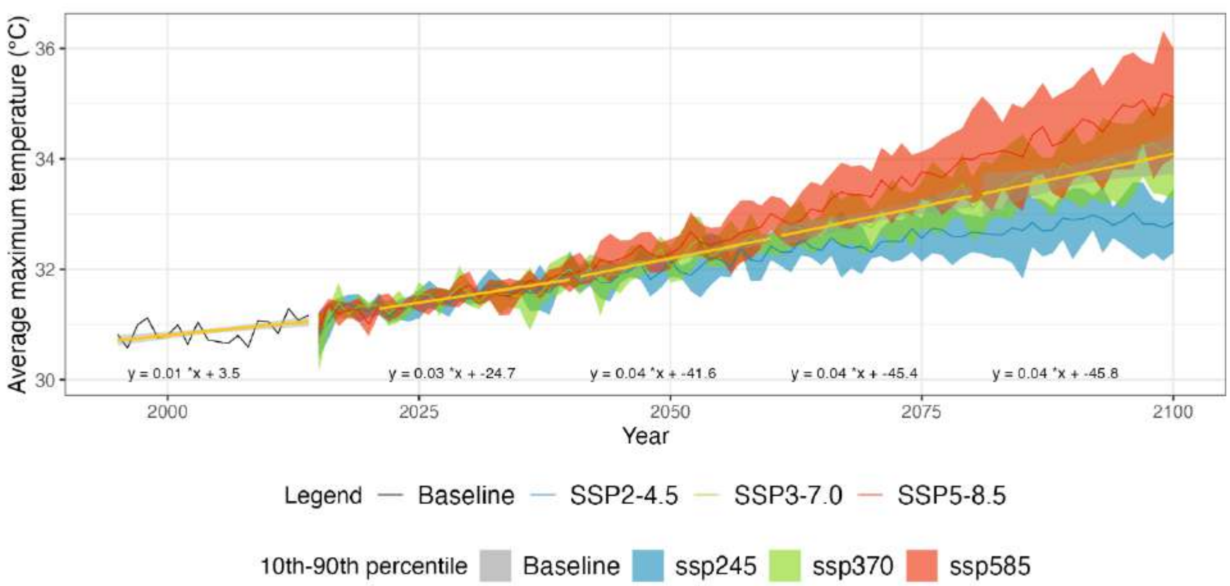


Figure 39: Projected maximum temperature per year (°C), for three SSPs, for Maldives (baseline period: 1995-2014; future projection: 2021-2100)

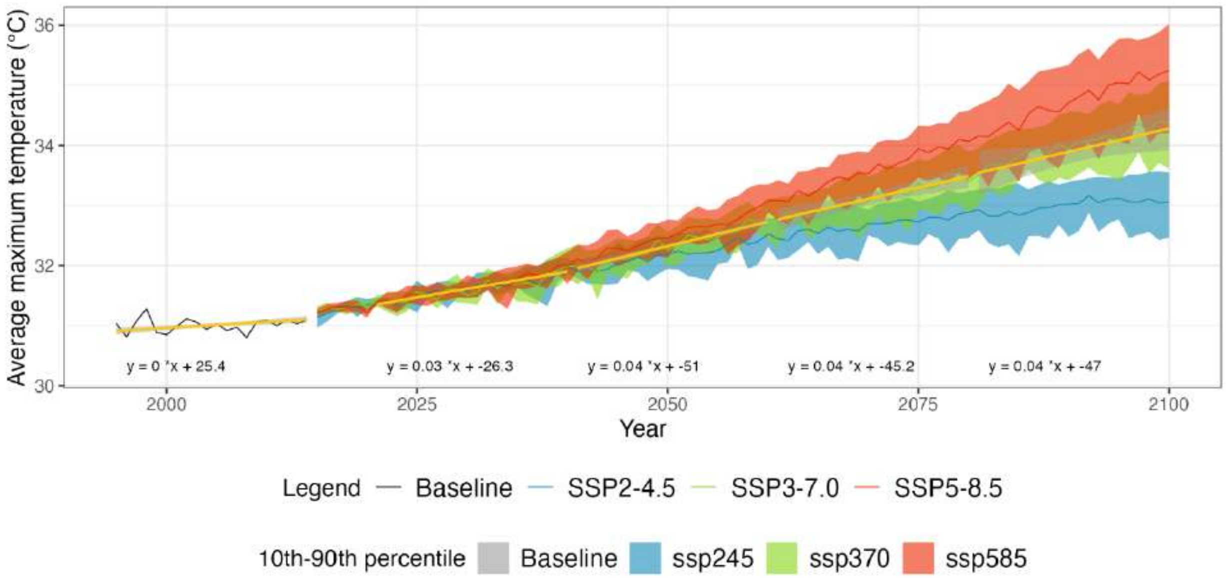


Table 11: Rate of change in temperature per year (°C/year), at the three stations and country average (baseline period: 1995-2014; future projection: 2021-2100)

Location	Baseline 1995-2014 (°C/year)	2021-2040 (°C/year)	2041-2060 (°C/year)	2061-2080 (°C/year)	2081-2100 (°C/year)
Hanimaadhoo	0.03	0.03	0.04	0.04	0.04
Hulhule	0.03	0.03	0.04	0.04	0.04
Gan	0.01	0.03	0.04	0.04	0.04
Maldives	Close to 0	0.03	0.04	0.04	0.04

Figure 40: Change (°C) in average maximum temperature per season, for three SSPs, at the three stations and country average (baseline period: 1995-2014; future projection: 2021-2100)

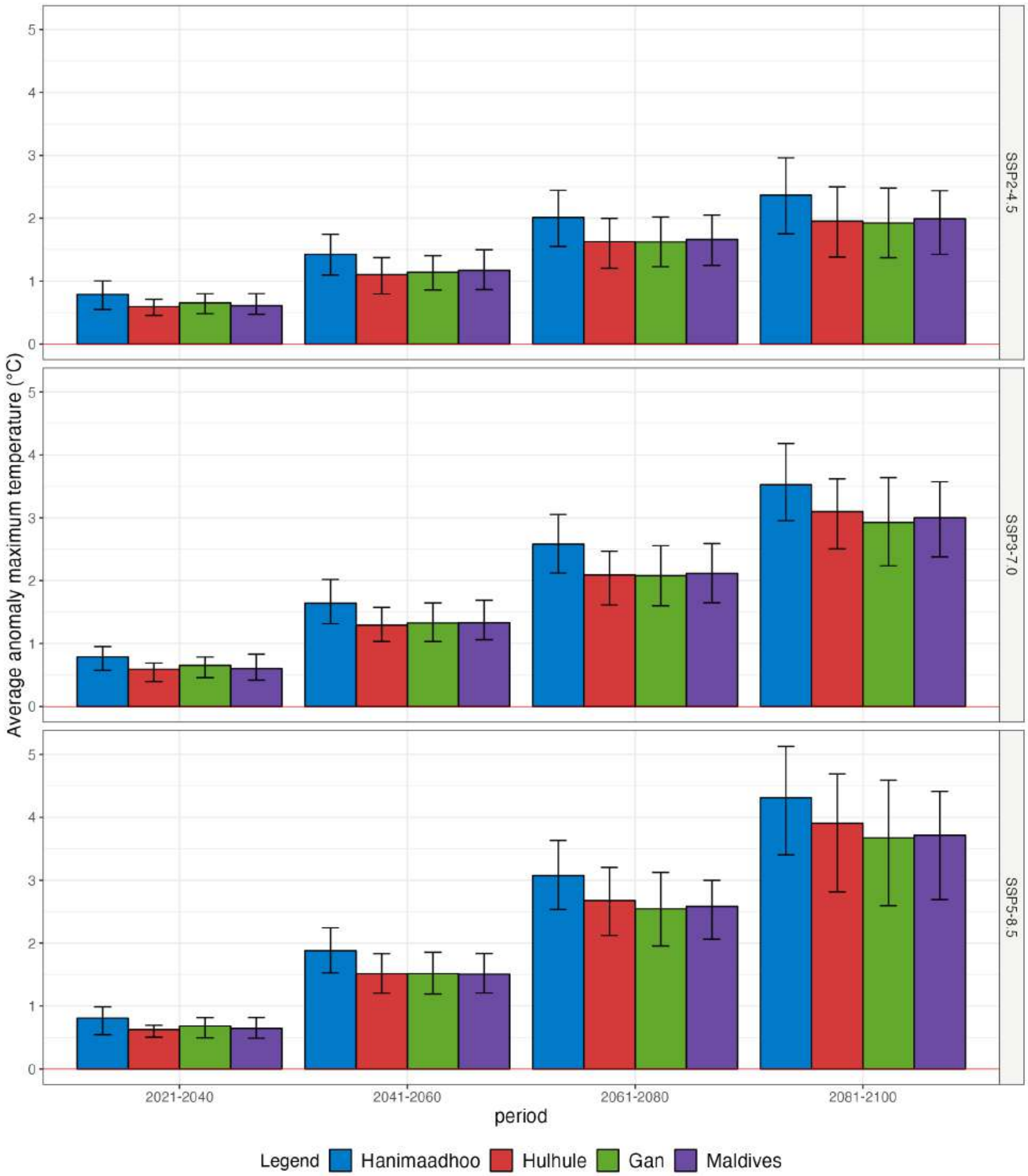


Figure 41: Change (°C) in average maximum temperature per season, for three SSPs, at the three stations and country average (baseline period: 1995-2014; future projection: 2021-2100)

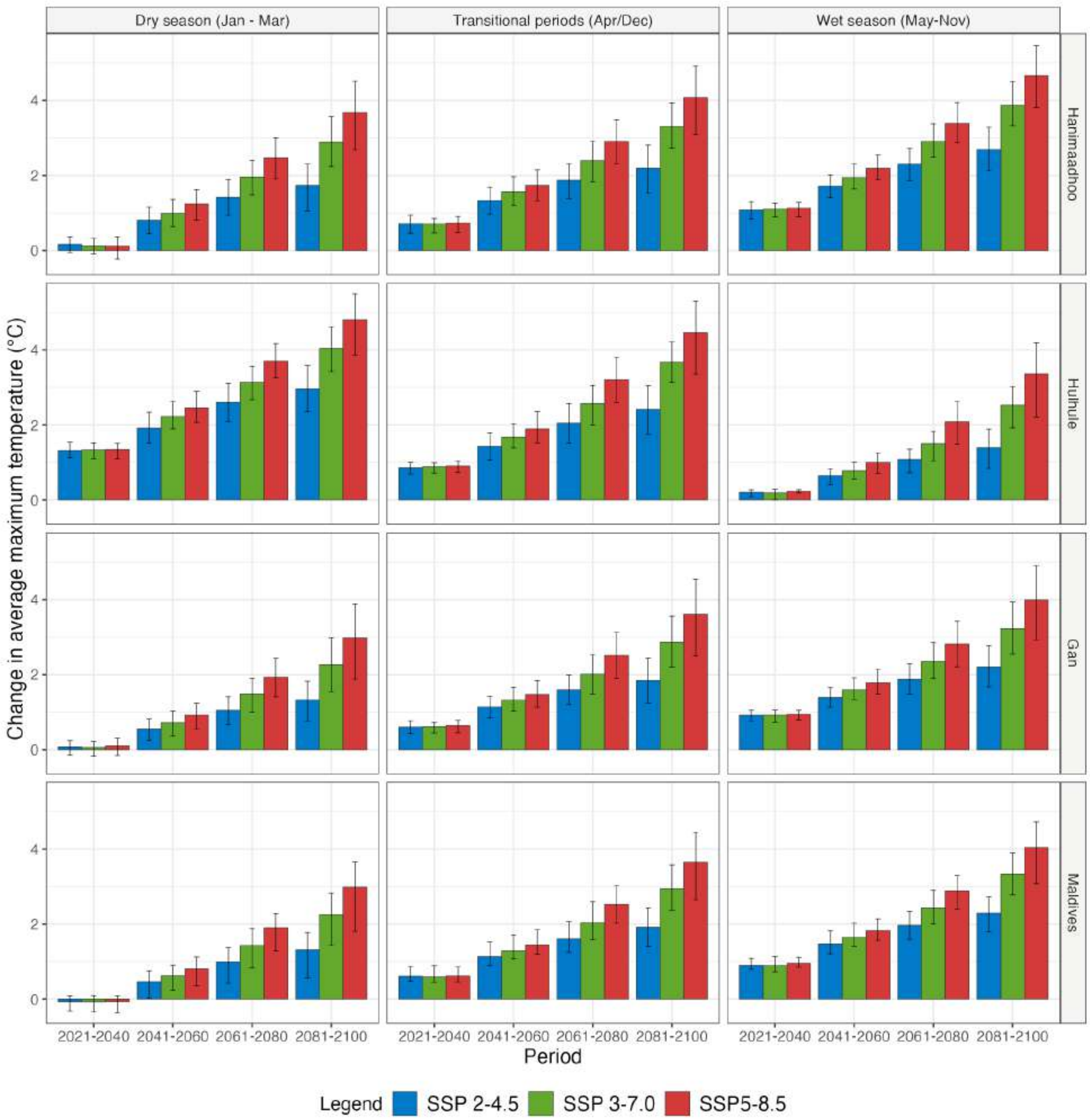


Table 12: Change (°C) in average maximum temperature per season, for three SSPs, at Hanimaadhoo station (baseline period: 1995-2014; future projection: 2021-2100)

Hanimaadhoo (north)	Baseline period (1995-2014)	2021-2040	2041-2060	2061-2080	2081-2100
SSP2.4-5					
Dry season (Jan-Mar)					
Tmax (°C)	31.30	31.47	32.11	32.72	33.04
Change (°C)	-	0.17	0.81	1.42	1.74
Very likely range (°C)	-	[-0.06, 0.36]	[0.44, 1.16]	[0.94, 1.88]	[1.05, 2.3]
Likely range (°C)	-	[0.01, 0.33]	[0.51, 1.11]	[1.11, 1.73]	[1.33, 2.16]
Transitional period (Apr-Dec)					
Tmax (°C)	31.55	32.26	32.89	33.42	33.75
Change (°C)	-	0.71	1.33	1.87	2.19
Very likely range (°C)	-	[0.46, 0.95]	[0.97, 1.68]	[1.38, 2.32]	[1.53, 2.81]
Likely range (°C)	-	[0.54, 0.89]	[1.08, 1.59]	[1.57, 2.17]	[1.79, 2.61]
Wet season (May-Nov)					
Tmax (°C)	30.86	31.94	32.58	33.16	33.55
Change (°C)	-	1.08	1.72	2.30	2.69
Very likely range (°C)	-	[0.83, 1.3]	[1.41, 2.02]	[1.86, 2.72]	[2.12, 3.28]
Likely range (°C)	-	[0.91, 1.24]	[1.49, 1.95]	[2.01, 2.6]	[2.31, 3.07]
SSP3-7.0					
Dry season (Jan-Mar)					
Tmax (°C)	31.30	31.43	32.29	33.26	34.19
Change (°C)	-	0.13	0.99	1.96	2.88
Very likely range (°C)	-	[-0.09, 0.31]	[0.64, 1.37]	[1.48, 2.4]	[2.24, 3.57]
Likely range (°C)	-	[-0.05, 0.31]	[0.73, 1.25]	[1.66, 2.26]	[2.45, 3.32]
Transitional period (Apr-Dec)					
Tmax (°C)	31.55	32.26	33.12	33.95	34.86
Change (°C)	-	0.70	1.57	2.40	3.31
Very likely range (°C)	-	[0.46, 0.85]	[1.21, 1.97]	[1.83, 2.9]	[2.73, 3.94]
Likely range (°C)	-	[0.56, 0.83]	[1.31, 1.83]	[2.05, 2.74]	[2.93, 3.69]
Wet season (May-Nov)					
Tmax (°C)	30.86	31.95	32.80	33.76	34.72
Change (°C)	-	1.09	1.95	2.90	3.86
Very likely range (°C)	-	[0.89, 1.26]	[1.64, 2.31]	[2.48, 3.38]	[3.32, 4.51]
Likely range (°C)	-	[0.97, 1.22]	[1.72, 2.17]	[2.63, 3.19]	[3.46, 4.26]
SSP5-8.5					
Dry season (Jan-Mar)					
Tmax (°C)	31.30	31.42	32.54	33.77	34.98
Change (°C)	-	0.12	1.24	2.47	3.67
Very likely range (°C)	-	[-0.22, 0.36]	[0.8, 1.63]	[1.9, 3.01]	[2.68, 4.52]
Likely range (°C)	-	[-0.09, 0.3]	[0.95, 1.53]	[2.08, 2.85]	[3.08, 4.27]
Transitional period (Apr-Dec)					
Tmax (°C)	31.55	32.29	33.29	34.46	35.62
Change (°C)	-	0.74	1.74	2.91	4.07
Very likely range (°C)	-	[0.47, 0.9]	[1.33, 2.15]	[2.3, 3.48]	[3.08, 4.92]
Likely range (°C)	-	[0.58, 0.9]	[1.46, 2.02]	[2.49, 3.32]	[3.46, 4.69]
Wet season (May-Nov)					
Tmax (°C)	30.86	31.98	33.05	34.25	35.52
Change (°C)	-	1.12	2.19	3.39	4.66
Very likely range (°C)	-	[0.89, 1.28]	[1.89, 2.55]	[2.87, 3.95]	[3.81, 5.46]
Likely range (°C)	-	[0.99, 1.26]	[1.99, 2.4]	[3.02, 3.75]	[4.13, 5.19]

Table 13: Change (°C) in average maximum temperature per season, for three SSPs, at Hulhule station (baseline period: 1995-2014; future projection: 2021-2100)

Hulhule (central)	Baseline period (1995-2014)	2021-2040	2041-2060	2061-2080	2081-2100
		SSP2.4-5			
		Dry season (Jan-Mar)			
Tmax (°C)	31.03	32.35	32.95	33.63	33.99
Change (°C)	-	1.32	1.92	2.60	2.96
Very likely range (°C)	-	[1.12, 1.54]	[1.52, 2.34]	[2.1, 3.12]	[2.36, 3.58]
Likely range (°C)	-	[1.18, 1.46]	[1.61, 2.24]	[2.29, 2.91]	[2.55, 3.36]
		Transitional period (Apr-Dec)			
Tmax (°C)	31.03	31.90	32.47	33.09	33.46
Change (°C)	-	0.87	1.44	2.06	2.42
Very likely range (°C)	-	[0.7, 1]	[1.07, 1.79]	[1.51, 2.57]	[1.75, 3.05]
Likely range (°C)	-	[0.76, 0.97]	[1.2, 1.68]	[1.73, 2.38]	[2, 2.85]
		Wet season (May-Nov)			
Tmax (°C)	30.75	30.96	31.40	31.84	32.14
Change (°C)	-	0.21	0.65	1.09	1.39
Very likely range (°C)	-	[0.09, 0.28]	[0.41, 0.84]	[0.73, 1.35]	[0.85, 1.89]
Likely range (°C)	-	[0.14, 0.27]	[0.5, 0.81]	[0.87, 1.29]	[1.06, 1.72]
		SSP3-7.0			
		Dry season (Jan-Mar)			
Tmax (°C)	31.03	32.37	33.25	34.17	35.08
Change (°C)	-	1.33	2.22	3.14	4.05
Very likely range (°C)	-	[1.11, 1.53]	[1.9, 2.63]	[2.68, 3.56]	[3.43, 4.61]
Likely range (°C)	-	[1.2, 1.47]	[1.99, 2.47]	[2.86, 3.41]	[3.67, 4.42]
		Transitional period (Apr-Dec)			
Tmax (°C)	31.03	31.93	32.72	33.60	34.71
Change (°C)	-	0.89	1.68	2.57	3.68
Very likely range (°C)	-	[0.72, 0.99]	[1.38, 2.04]	[1.99, 3.06]	[3.14, 4.21]
Likely range (°C)	-	[0.79, 0.98]	[1.48, 1.9]	[2.22, 2.91]	[3.33, 4.03]
		Wet season (May-Nov)			
Tmax (°C)	30.75	30.94	31.53	32.26	33.28
Change (°C)	-	0.19	0.78	1.51	2.53
Very likely range (°C)	-	[0, 0.29]	[0.56, 1]	[1.05, 1.84]	[1.92, 3.03]
Likely range (°C)	-	[0.08, 0.28]	[0.63, 0.93]	[1.23, 1.77]	[2.17, 2.87]
		SSP5-8.5			
		Dry season (Jan-Mar)			
Tmax (°C)	31.03	32.38	33.49	34.73	35.84
Change (°C)	-	1.35	2.46	3.70	4.81
Very likely range (°C)	-	[1.1, 1.51]	[2.08, 2.9]	[3.26, 4.17]	[3.87, 5.5]
Likely range (°C)	-	[1.2, 1.5]	[2.18, 2.74]	[3.41, 4]	[4.25, 5.33]
		Transitional period (Apr-Dec)			
Tmax (°C)	31.03	31.94	32.93	34.24	35.50
Change (°C)	-	0.91	1.90	3.20	4.47
Very likely range (°C)	-	[0.74, 1.04]	[1.53, 2.36]	[2.59, 3.81]	[3.36, 5.3]
Likely range (°C)	-	[0.8, 1.02]	[1.63, 2.17]	[2.79, 3.62]	[3.8, 5.07]
		Wet season (May-Nov)			
Tmax (°C)	30.75	30.99	31.75	32.84	34.11
Change (°C)	-	0.24	1.00	2.09	3.36
Very likely range (°C)	-	[0.18, 0.28]	[0.72, 1.25]	[1.49, 2.62]	[2.21, 4.19]
Likely range (°C)	-	[0.2, 0.27]	[0.8, 1.2]	[1.73, 2.43]	[2.67, 3.97]

Table 14: Change (°C) in average maximum temperature per season, for three SSPs, at Gan station (baseline period: 1995-2014; future projection: 2021-2100)

Gan (south)	Baseline period (1995-2014)	2021-2040	2041-2060	2061-2080	2081-2100
SSP2.4-5					
Dry season (Jan-Mar)					
Tmax (°C)	31.14	31.21	31.70	32.19	32.46
Change (°C)	-	0.07	0.56	1.05	1.32
Very likely range (°C)	-	[-0.15, 0.24]	[0.24, 0.82]	[0.67, 1.41]	[0.76, 1.82]
Likely range (°C)	-	[-0.07, 0.22]	[0.31, 0.81]	[0.8, 1.29]	[0.95, 1.7]
Transitional period (Apr-Dec)					
Tmax (°C)	31.02	31.63	32.16	32.62	32.87
Change (°C)	-	0.60	1.14	1.60	1.84
Very likely range (°C)	-	[0.43, 0.77]	[0.85, 1.41]	[1.2, 1.99]	[1.24, 2.44]
Likely range (°C)	-	[0.47, 0.74]	[0.94, 1.33]	[1.33, 1.86]	[1.43, 2.25]
Wet season (May-Nov)					
Tmax (°C)	30.74	31.65	32.13	32.61	32.94
Change (°C)	-	0.92	1.40	1.87	2.20
Very likely range (°C)	-	[0.77, 1.05]	[1.13, 1.65]	[1.48, 2.28]	[1.67, 2.77]
Likely range (°C)	-	[0.82, 1.01]	[1.21, 1.58]	[1.6, 2.15]	[1.84, 2.56]
SSP3-7.0					
Dry season (Jan-Mar)					
Tmax (°C)	31.14	31.20	31.85	32.62	33.40
Change (°C)	-	0.06	0.71	1.48	2.26
Very likely range (°C)	-	[-0.17, 0.22]	[0.37, 1.03]	[1, 1.89]	[1.53, 2.98]
Likely range (°C)	-	[-0.1, 0.22]	[0.48, 0.94]	[1.17, 1.8]	[1.74, 2.79]
Transitional period (Apr-Dec)					
Tmax (°C)	31.02	31.64	32.34	33.04	33.89
Change (°C)	-	0.62	1.32	2.01	2.86
Very likely range (°C)	-	[0.44, 0.72]	[1.02, 1.66]	[1.48, 2.53]	[2.2, 3.57]
Likely range (°C)	-	[0.51, 0.7]	[1.11, 1.53]	[1.64, 2.39]	[2.38, 3.34]
Wet season (May-Nov)					
Tmax (°C)	30.74	31.66	32.33	33.09	33.96
Change (°C)	-	0.92	1.60	2.36	3.23
Very likely range (°C)	-	[0.73, 1.05]	[1.32, 1.91]	[1.89, 2.85]	[2.55, 3.94]
Likely range (°C)	-	[0.8, 1.02]	[1.4, 1.79]	[2.05, 2.66]	[2.73, 3.72]
SSP5-8.5					
Dry season (Jan-Mar)					
Tmax (°C)	31.14	31.24	32.06	33.07	34.12
Change (°C)	-	0.10	0.92	1.93	2.98
Very likely range (°C)	-	[-0.16, 0.3]	[0.55, 1.24]	[1.41, 2.43]	[1.88, 3.88]
Likely range (°C)	-	[-0.05, 0.25]	[0.66, 1.18]	[1.54, 2.33]	[2.27, 3.71]
Transitional period (Apr-Dec)					
Tmax (°C)	31.02	31.67	32.49	33.53	34.63
Change (°C)	-	0.64	1.47	2.51	3.61
Very likely range (°C)	-	[0.45, 0.78]	[1.13, 1.84]	[1.89, 3.12]	[2.49, 4.55]
Likely range (°C)	-	[0.52, 0.77]	[1.21, 1.72]	[2.05, 2.97]	[2.88, 4.35]
Wet season (May-Nov)					
Tmax (°C)	30.74	31.68	32.52	33.55	34.73
Change (°C)	-	0.95	1.79	2.82	3.99
Very likely range (°C)	-	[0.79, 1.05]	[1.48, 2.13]	[2.21, 3.42]	[2.93, 4.91]
Likely range (°C)	-	[0.85, 1.03]	[1.59, 1.99]	[2.39, 3.25]	[3.32, 4.68]

Table 15: Change (°C) in average maximum temperature per season, for three SSPs, in Maldives (baseline period: 1995-2014; future projection: 2021-2100)

Maldives	Baseline period (1995-2014)	2021-2040	2041-2060	2061-2080	2081-2100
SSP2.4-5					
Dry season (Jan-Mar)					
Tmax (°C)	31.33	31.26	31.80	32.32	32.65
Change (°C)	-	-0.07	0.47	0.99	1.32
Very likely range (°C)	-	[-0.31, 0.1]	[0.02, 0.76]	[0.43, 1.38]	[0.57, 1.78]
Likely range (°C)	-	[-0.22, 0.07]	[0.2, 0.7]	[0.65, 1.28]	[0.87, 1.7]
Transitional period (Apr-Dec)					
Tmax (°C)	31.32	31.93	32.46	32.93	33.24
Change (°C)	-	0.61	1.14	1.61	1.92
Very likely range (°C)	-	[0.48, 0.87]	[0.9, 1.52]	[1.24, 2.07]	[1.41, 2.43]
Likely range (°C)	-	[0.49, 0.77]	[0.93, 1.37]	[1.33, 1.89]	[1.61, 2.24]
Wet season (May-Nov)					
Tmax (°C)	30.78	31.68	32.26	32.75	33.08
Change (°C)	-	0.90	1.48	1.97	2.30
Very likely range (°C)	-	[0.8, 1.09]	[1.21, 1.82]	[1.6, 2.34]	[1.8, 2.73]
Likely range (°C)	-	[0.8, 1.02]	[1.29, 1.68]	[1.74, 2.2]	[2, 2.6]
SSP3-7.0					
Dry season (Jan-Mar)					
Tmax (°C)	31.33	31.26	31.95	32.76	33.59
Change (°C)	-	-0.07	0.62	1.43	2.26
Very likely range (°C)	-	[-0.34, 0.1]	[0.23, 0.91]	[0.83, 1.88]	[1.43, 2.82]
Likely range (°C)	-	[-0.23, 0.07]	[0.39, 0.83]	[1.07, 1.75]	[1.76, 2.68]
Transitional period (Apr-Dec)					
Tmax (°C)	31.32	31.91	32.61	33.36	34.27
Change (°C)	-	0.59	1.29	2.04	2.95
Very likely range (°C)	-	[0.45, 0.89]	[1.08, 1.71]	[1.58, 2.6]	[2.37, 3.58]
Likely range (°C)	-	[0.46, 0.77]	[1.08, 1.54]	[1.71, 2.37]	[2.56, 3.33]
Wet season (May-Nov)					
Tmax (°C)	30.78	31.68	32.43	33.21	34.12
Change (°C)	-	0.90	1.65	2.43	3.34
Very likely range (°C)	-	[0.73, 1.14]	[1.41, 2.02]	[2.01, 2.9]	[2.78, 3.9]
Likely range (°C)	-	[0.77, 1.04]	[1.45, 1.87]	[2.14, 2.71]	[2.99, 3.68]
SSP5-8.5					
Dry season (Jan-Mar)					
Tmax (°C)	31.33	31.26	32.13	33.23	34.31
Change (°C)	-	-0.06	0.81	1.91	2.99
Very likely range (°C)	-	[-0.36, 0.09]	[0.36, 1.13]	[1.29, 2.28]	[1.81, 3.66]
Likely range (°C)	-	[-0.24, 0.09]	[0.54, 1.07]	[1.54, 2.2]	[2.28, 3.56]
Transitional period (Apr-Dec)					
Tmax (°C)	31.32	31.94	32.77	33.85	34.98
Change (°C)	-	0.62	1.45	2.53	3.66
Very likely range (°C)	-	[0.47, 0.85]	[1.19, 1.85]	[2.02, 3.03]	[2.66, 4.45]
Likely range (°C)	-	[0.48, 0.76]	[1.2, 1.7]	[2.19, 2.86]	[3.06, 4.26]
Wet season (May-Nov)					
Tmax (°C)	30.78	31.74	32.60	33.67	34.83
Change (°C)	-	0.96	1.82	2.89	4.05
Very likely range (°C)	-	[0.85, 1.12]	[1.57, 2.14]	[2.4, 3.3]	[3.08, 4.73]
Likely range (°C)	-	[0.85, 1.06]	[1.63, 2.01]	[2.6, 3.16]	[3.47, 4.56]

Figure 42: Average maximum temperature per month (°C), at the three stations and country average (baseline period: 1995-2014; future projection: 2021-2100)

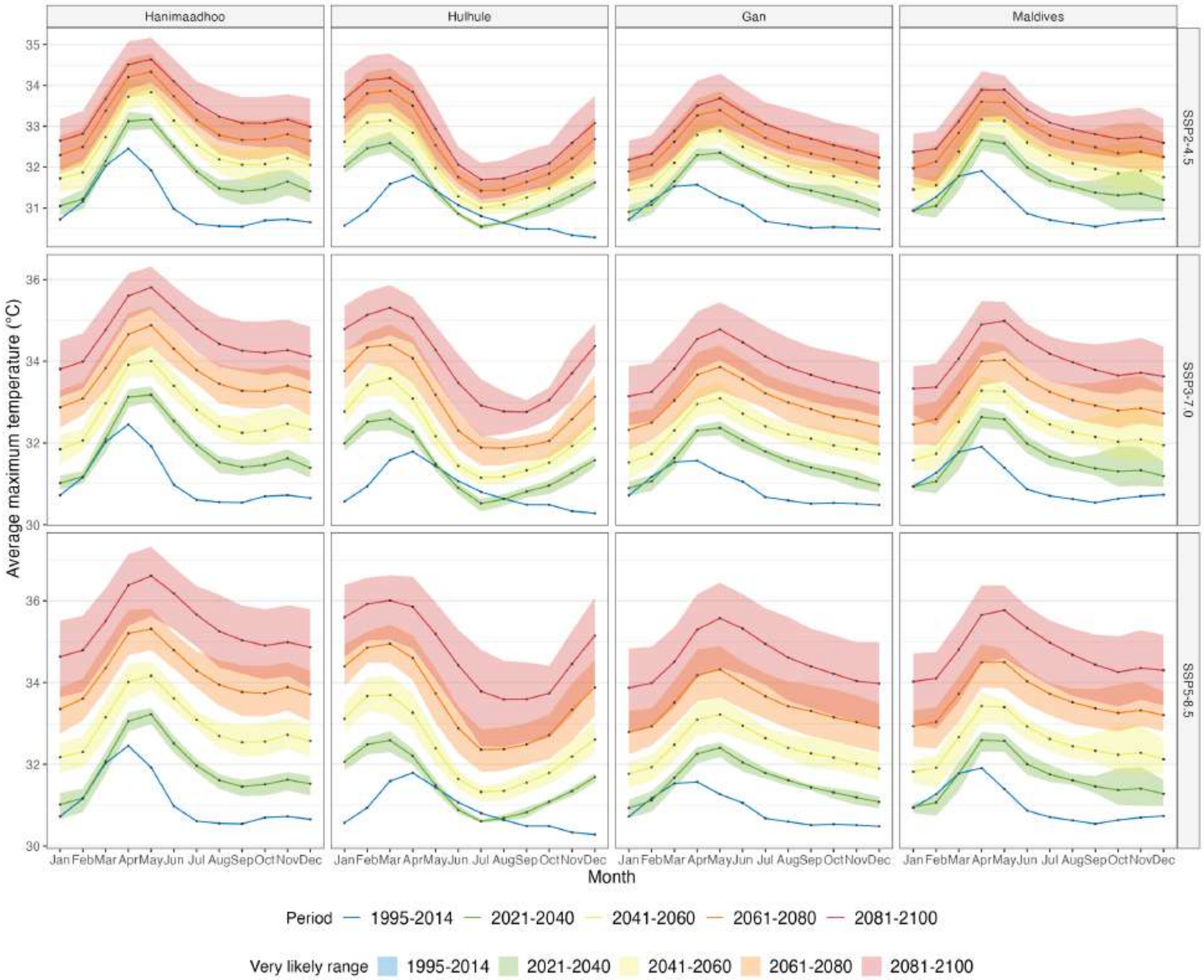


Figure 43: Average maximum temperature per month (°C), for three SSPs, at Hanimaadhoo station (baseline period: 1995-2014; future projection: 2021-2100)

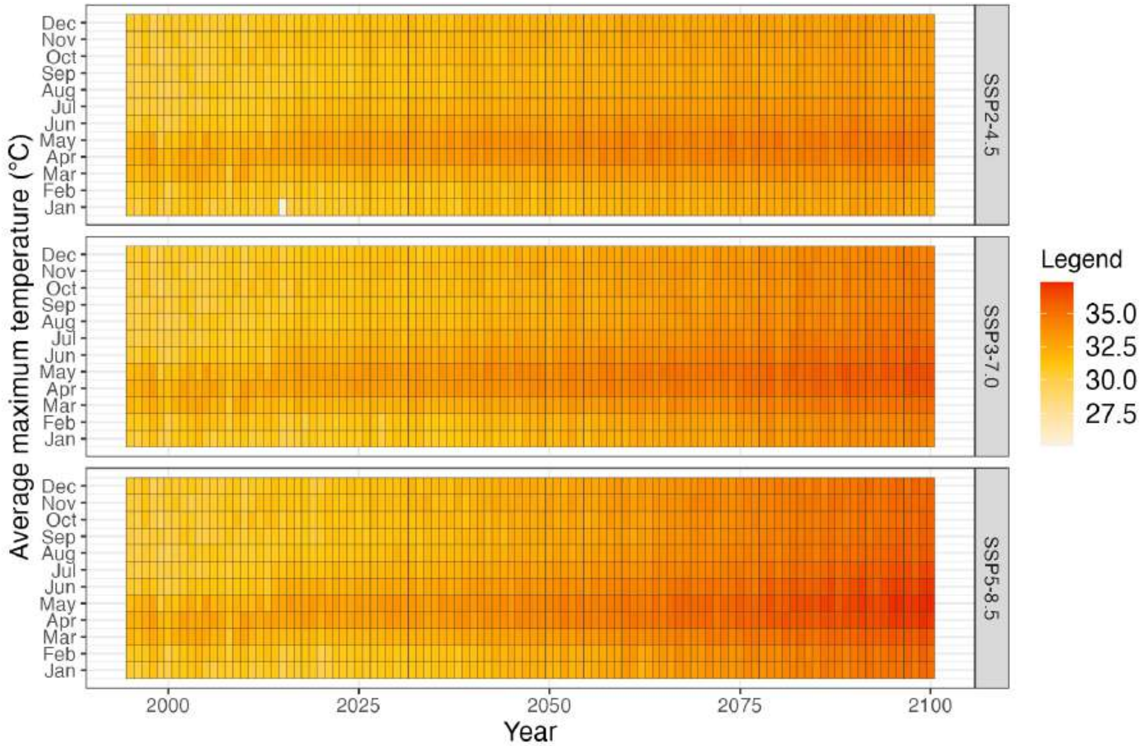


Figure 44: Average maximum temperature per month (°C), for three SSPs, at Hulhule station (baseline period: 1995-2014; future projection: 2021-2100)

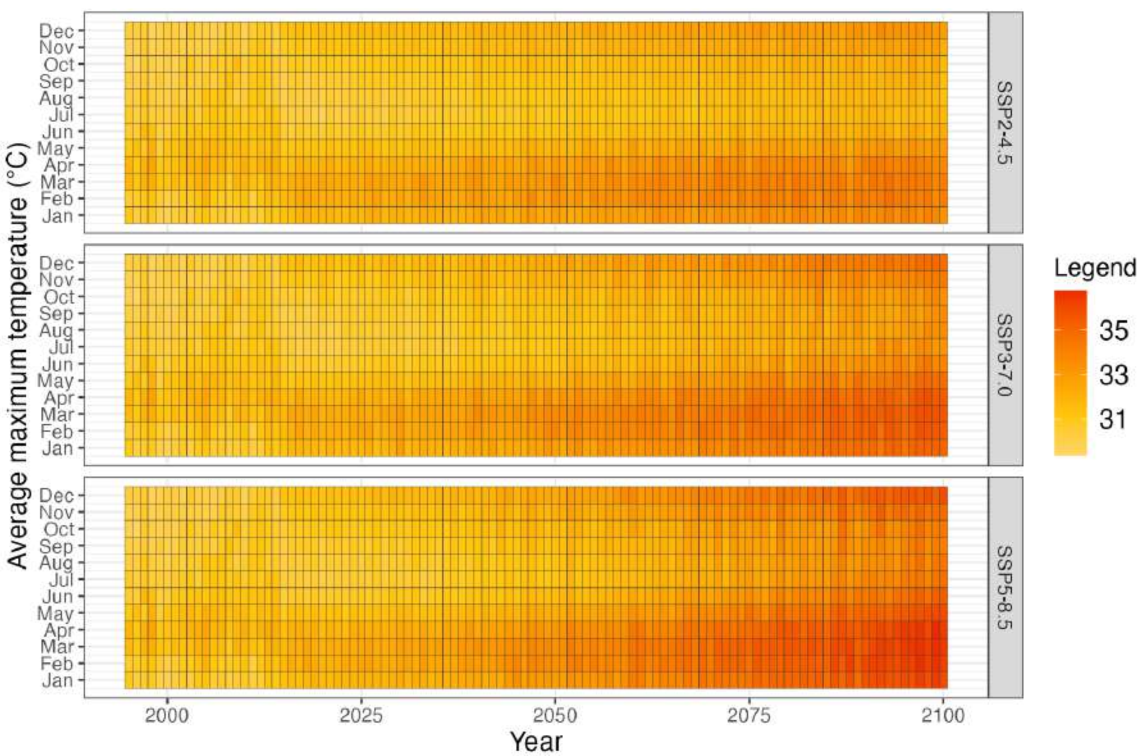


Figure 45: Average maximum temperature per month (°C), for three SSPs, at Gan station (baseline period: 1995-2014; future projection: 2021-2100)

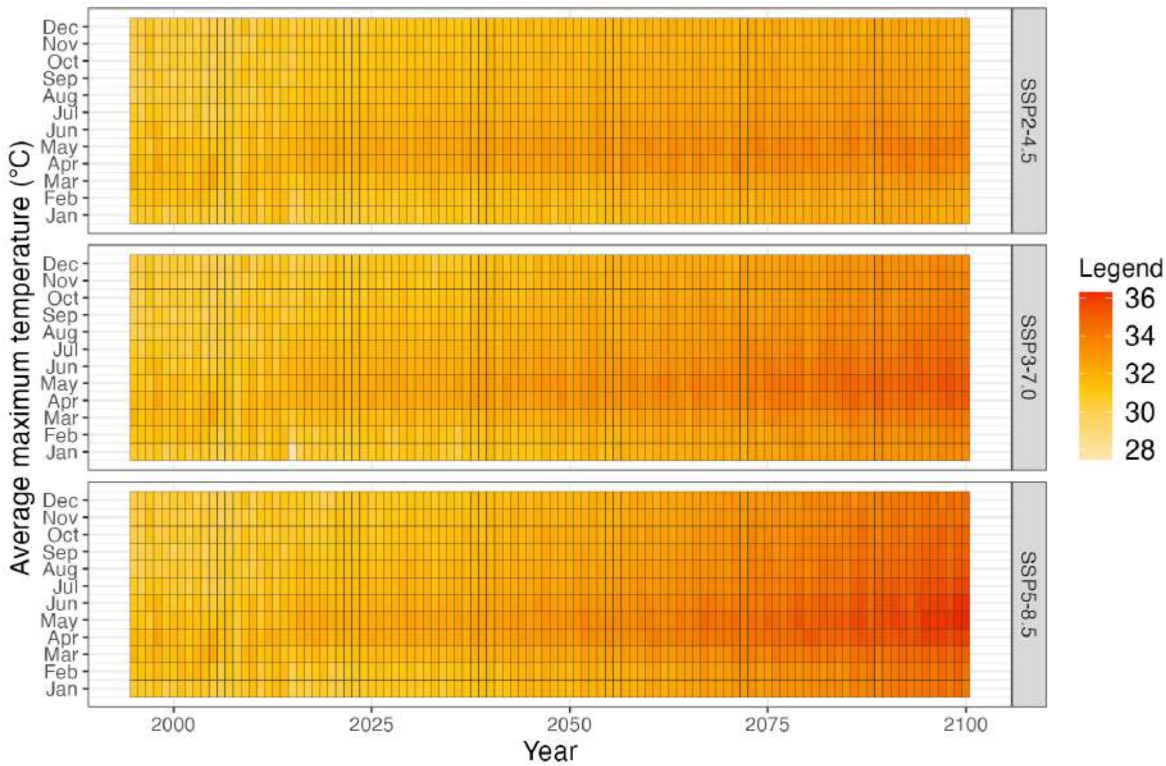


Figure 46: Average maximum temperature per month (°C), for three SSPs, in Maldives (baseline period: 1995-2014; future projection: 2021-2100)

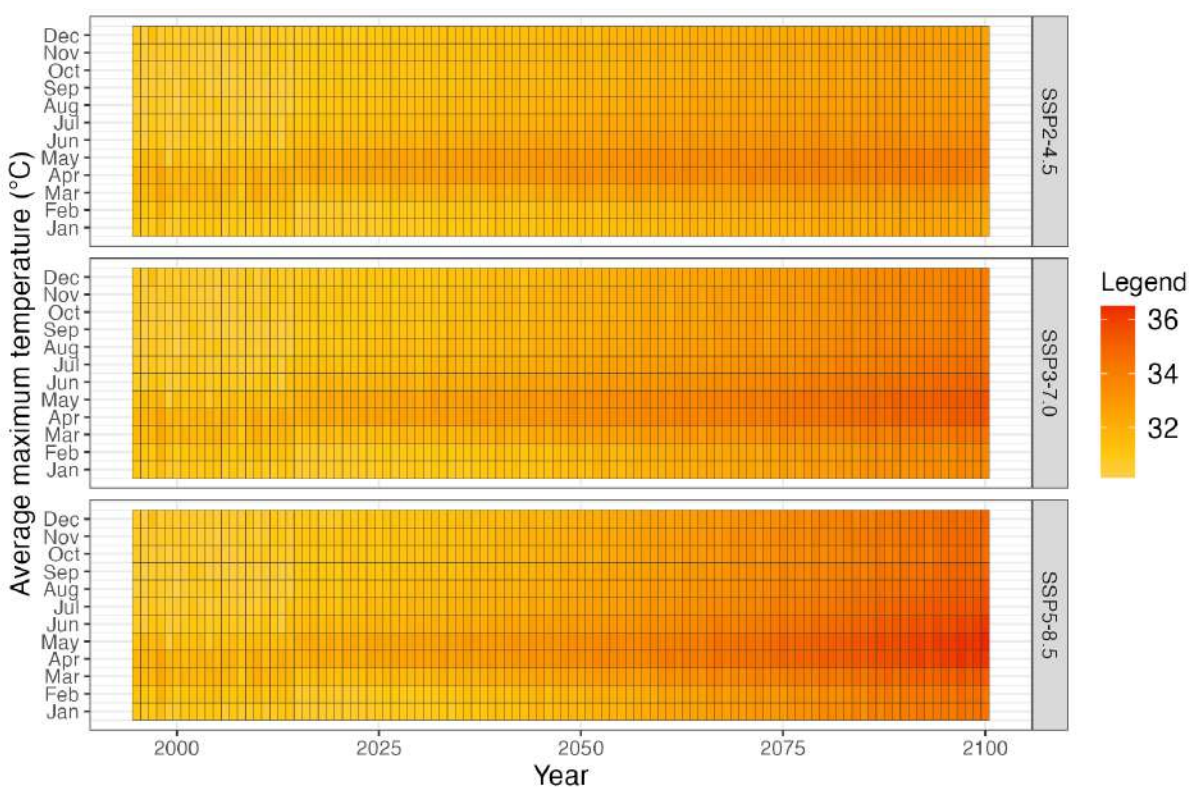


Table 16: Average maximum temperature per month (°C), for three SSPs, in Hanimaadhoo and Hulhule (baseline period: 1995-2014; future projection: 2021-2100)

	Hanimaadhoo					Hulhule				
Period / Average Tmax (°C)	Baseline (1995-2014)	2021-2040	2041-2060	2061-2080	2081-2100	Baseline (1995-2014)	2021-2040	2041-2060	2061-2080	2081-2100
SSP 2-4.5										
January	30.72	31.05	31.72	32.30	32.64	30.57	32.01	32.62	33.23	33.66
February	31.16	31.22	31.87	32.49	32.82	30.94	32.46	33.09	33.80	34.13
March	32.03	32.15	32.73	33.38	33.67	31.59	32.59	33.14	33.87	34.18
April	32.45	33.12	33.72	34.20	34.51	31.79	32.18	32.84	33.50	33.84
May	31.92	33.17	33.83	34.33	34.63	31.43	31.42	31.97	32.54	32.94
June	30.97	32.51	33.14	33.73	34.10	31.07	30.86	31.28	31.76	32.06
July	30.61	31.89	32.53	33.15	33.57	30.80	30.54	31.00	31.42	31.70
August	30.55	31.48	32.19	32.78	33.24	30.64	30.64	31.08	31.44	31.72
September	30.54	31.41	32.06	32.66	33.08	30.49	30.85	31.25	31.64	31.90
October	30.69	31.46	32.07	32.68	33.07	30.49	31.06	31.48	31.84	32.09
November	30.72	31.64	32.22	32.80	33.16	30.33	31.31	31.75	32.21	32.59
December	30.65	31.41	32.05	32.64	32.98	30.28	31.62	32.10	32.68	33.07
SSP 3-7.0										
January	30.72	31.02	31.84	32.87	33.81	30.57	31.99	32.77	33.76	34.79
February	31.16	31.18	32.06	33.08	33.99	30.94	32.52	33.41	34.34	35.13
March	32.03	32.10	32.97	33.83	34.77	31.59	32.59	33.58	34.40	35.31
April	32.45	33.12	33.91	34.66	35.60	31.79	32.27	33.08	34.07	35.05
May	31.92	33.18	34.01	34.88	35.81	31.43	31.48	32.17	33.18	34.28
June	30.97	32.54	33.39	34.30	35.30	31.07	30.90	31.44	32.30	33.47
July	30.61	31.94	32.81	33.78	34.80	30.80	30.52	31.15	31.89	32.92
August	30.55	31.53	32.41	33.44	34.42	30.64	30.62	31.18	31.87	32.77
September	30.54	31.41	32.25	33.28	34.26	30.49	30.81	31.33	31.92	32.76
October	30.69	31.46	32.30	33.27	34.21	30.49	30.96	31.52	32.05	33.05
November	30.72	31.62	32.47	33.40	34.27	30.33	31.26	31.92	32.58	33.71
December	30.65	31.39	32.34	33.24	34.12	30.28	31.58	32.35	33.13	34.37
SSP 5-8.5										
January	30.72	31.02	32.17	33.35	34.63	30.57	32.06	33.11	34.40	35.60
February	31.16	31.17	32.30	33.60	34.79	30.94	32.48	33.67	34.85	35.92
March	32.03	32.08	33.15	34.35	35.51	31.59	32.59	33.69	34.95	36.01
April	32.45	33.05	34.02	35.20	36.38	31.79	32.20	33.26	34.60	35.85
May	31.92	33.22	34.17	35.31	36.61	31.43	31.49	32.39	33.73	35.19

	Hanimaadhoo					Hulhule				
Period / Average Tmax (°C)	Baseline (1995-2014)	2021-2040	2041-2060	2061-2080	2081-2100	Baseline (1995-2014)	2021-2040	2041-2060	2061-2080	2081-2100
June	30.97	32.51	33.61	34.79	36.18	31.07	30.88	31.64	32.88	34.42
July	30.61	31.96	33.09	34.29	35.66	30.80	30.60	31.32	32.36	33.79
August	30.55	31.61	32.69	33.94	35.25	30.64	30.68	31.35	32.37	33.59
September	30.54	31.45	32.54	33.77	35.03	30.49	30.82	31.55	32.49	33.59
October	30.69	31.51	32.55	33.74	34.91	30.49	31.08	31.79	32.72	33.74
November	30.72	31.62	32.72	33.89	34.99	30.33	31.34	32.19	33.33	34.46
December	30.65	31.52	32.57	33.71	34.86	30.28	31.68	32.60	33.88	35.15

Note: The 'very likely' and 'likely' ranges per month, per SSP, per station are available in a separate spreadsheet

Table 17: Average maximum temperature per month (°C), for three SSPs, in Gan and Maldives (baseline period: 1995-2014; future projection: 2021-2100)

	Gan					Maldives				
Period / Average Tmax (°C)	Baseline (1995-2014)	2021-2040	2041-2060	2061-2080	2081-2100	Baseline (1995-2014)	2021-2040	2041-2060	2061-2080	2081-2100
SSP 2-4.5										
January	30.72	30.90	31.44	31.89	32.18	30.93	30.93	31.45	31.97	32.37
February	31.17	31.08	31.55	32.05	32.33	31.27	31.05	31.56	32.13	32.45
March	31.53	31.65	32.10	32.62	32.88	31.78	31.78	32.38	32.84	33.12
April	31.57	32.30	32.79	33.26	33.50	31.91	32.66	33.16	33.60	33.89
May	31.27	32.35	32.89	33.39	33.69	31.40	32.58	33.13	33.58	33.89
June	31.06	32.04	32.49	33.03	33.35	30.86	31.99	32.60	33.08	33.41
July	30.68	31.76	32.23	32.72	33.05	30.71	31.67	32.29	32.78	33.09
August	30.59	31.53	32.03	32.48	32.85	30.63	31.52	32.09	32.61	32.93
September	30.51	31.43	31.87	32.33	32.70	30.54	31.37	31.95	32.48	32.81
October	30.53	31.29	31.78	32.20	32.53	30.64	31.31	31.85	32.34	32.69
November	30.51	31.17	31.63	32.12	32.41	30.70	31.35	31.91	32.37	32.73
December	30.48	30.96	31.53	31.98	32.24	30.73	31.20	31.75	32.25	32.59
SSP 3-7.0										
January	30.72	30.90	31.52	32.32	33.14	30.93	30.93	31.58	32.46	33.33
February	31.17	31.06	31.73	32.50	33.25	31.27	31.06	31.74	32.58	33.37
March	31.53	31.63	32.31	33.04	33.82	31.78	31.77	32.52	33.23	34.06
April	31.57	32.30	32.95	33.67	34.54	31.91	32.63	33.28	34.00	34.90
May	31.27	32.37	33.09	33.86	34.78	31.40	32.58	33.26	34.03	34.99

	Gan					Maldives				
Period / Average Tmax (ºC)	Baseline (1995-2014)	2021-2040	2041-2060	2061-2080	2081-2100	Baseline (1995-2014)	2021-2040	2041-2060	2061-2080	2081-2100
June	31.06	32.06	32.72	33.56	34.46	30.86	31.99	32.76	33.56	34.51
July	30.68	31.79	32.41	33.22	34.12	30.71	31.66	32.45	33.25	34.18
August	30.59	31.56	32.21	32.99	33.85	30.63	31.51	32.26	33.05	33.98
September	30.51	31.40	32.11	32.83	33.67	30.54	31.38	32.15	32.92	33.79
October	30.53	31.27	31.94	32.65	33.49	30.64	31.31	32.03	32.79	33.65
November	30.51	31.13	31.85	32.55	33.37	30.70	31.33	32.09	32.85	33.72
December	30.48	30.98	31.73	32.41	33.23	30.73	31.19	31.95	32.72	33.63
SSP 5-8.5										
January	30.72	30.93	31.77	32.79	33.87	30.93	30.95	31.81	32.93	34.02
February	31.17	31.11	31.93	32.93	33.99	31.27	31.07	31.92	33.04	34.10
March	31.53	31.67	32.48	33.51	34.51	31.78	31.77	32.66	33.72	34.81
April	31.57	32.25	33.09	34.18	35.29	31.91	32.59	33.42	34.49	35.65
May	31.27	32.40	33.22	34.32	35.57	31.40	32.57	33.40	34.50	35.77
June	31.06	32.05	32.94	33.98	35.32	30.86	32.00	32.92	34.03	35.33
July	30.68	31.79	32.64	33.66	34.95	30.71	31.75	32.62	33.72	34.98
August	30.59	31.61	32.40	33.42	34.61	30.63	31.61	32.44	33.52	34.68
September	30.51	31.44	32.26	33.30	34.39	30.54	31.46	32.33	33.37	34.44
October	30.53	31.31	32.16	33.15	34.21	30.64	31.37	32.23	33.26	34.25
November	30.51	31.19	32.02	33.03	34.04	30.70	31.40	32.28	33.32	34.35
December	30.48	31.08	31.89	32.89	33.98	30.73	31.28	32.12	33.20	34.30

Note: The ‘very likely’ and ‘likely’ ranges per month, per SSP, per station are available in a separate spreadsheet

2. Precipitation

81. The following figures and tables show the projected changes in precipitation, from the baseline period (1995-2014) into the future (2030s, 2050s, 2070s and 2090s), for three SSPs (2-4.5, 3-7.0 and 5-8.5) and for three meteorological stations and Maldives overall:

(i) Changes in annual average precipitation: Figure 47 to Figure 56 and Table 18 to Table 20;

(ii) Changes in seasonal average precipitation: Figure 57 and Table 21 to Table 24;

(iii) Changes in monthly average precipitation: Figure 58 to Figure 65, Table 25 to Table 26Table 27.

82. The **main findings** from the multi-model ensemble are as follows:

(i) **Annual** precipitation is projected to increase, under all scenarios, in Hanimaadhoo and Gan stations and Maldives overall, while decreasing in Hulhule station. The increase is most pronounced in Hanimaadhoo:
  - The increase is most pronounced at Hanimaadhoo station, with increases up to +57.9% (*Very likely* [24.86%, 98.33%]) by 2090s under SSP 5-8.5, from a baseline of 1,730.3 mm. The maximum decrease in Hulhule station is -14.7% (*Very likely* [-32.92%, 0.64%]) by 2090s under SSP 5-8.5, from a baseline of 1,965.7 mm;
  - The highest projected annual precipitation for the 2030s is 2,334.0 mm from a baseline of 2,190.6 mm, in Gan, for SSP 2-4.5. For the 2050s it is 2,400.0 mm from a baseline of 2,190.6 mm in Gan, for SSP 5-8.5;
  - The lowest projected annual precipitation for the 2030s is 1,752.7 mm and 1,756.1 mm for the 2050s from a baseline of 2,190.6 mm, in Hulhule station, for SSP 5-8.5.

(ii) There are notable **seasonal** differences. In all scenarios, Hanimaadhoo and Gan are projected to experience an increase in precipitation during the wet season, while a decrease in the dry season. Hulhule is expected to see a very significant increase mostly in the dry season and a small decrease in the wet season:
  - Hanimaadhoo is expected to see decreases of -58.4% to -74.4% during the dry season (from a baseline of 107.6 mm), while increases of +14.7% to +75.4% during the wet season (from a baseline of 1,436.8 mm) (under the different SSPs);
  - Gan is expected to see decreases of -42.3% to -57.1% during the dry season (from a baseline of 376.2 mm), while increases of +20.0% to +32.8% during the wet season (from a baseline of 1,440.2 mm) (under the different SSPs);
  - Hulhule is expected to see increases of +85.9% to +137% during the dry season (from a baseline of 183.2 mm), while decreases of -22.6% to -39.3% during the wet season (from a baseline of 1,421.8 mm) (under the different SSPs).

(iii) In terms of **monthly** differences, for all three SSPs, Hanimaadhoo and Gan will experience the highest increase of average monthly precipitation in September, while Hulhule and the Maldives overall in December:
  - In Hanimaadhoo, the highest projected average precipitation in September is 683.0mm (SSP 5-8.5, 2090s), from a baseline of 188.0 mm;
  - In Gan, the highest projected average precipitation in September is 445.5 mm (SSP 3-7.0, 2050s), from a baseline of 211.1 mm;
  - In Hulhule, the highest projected average precipitation in December is 291.6 mm (SSP 3-7.0, 2050s), from a baseline of 224.3 mm.

Figure 47: Projected annual precipitation (mm), for three SSPs, at the three stations and country average (baseline period: 1995-2014; future projection: 2021-2100)

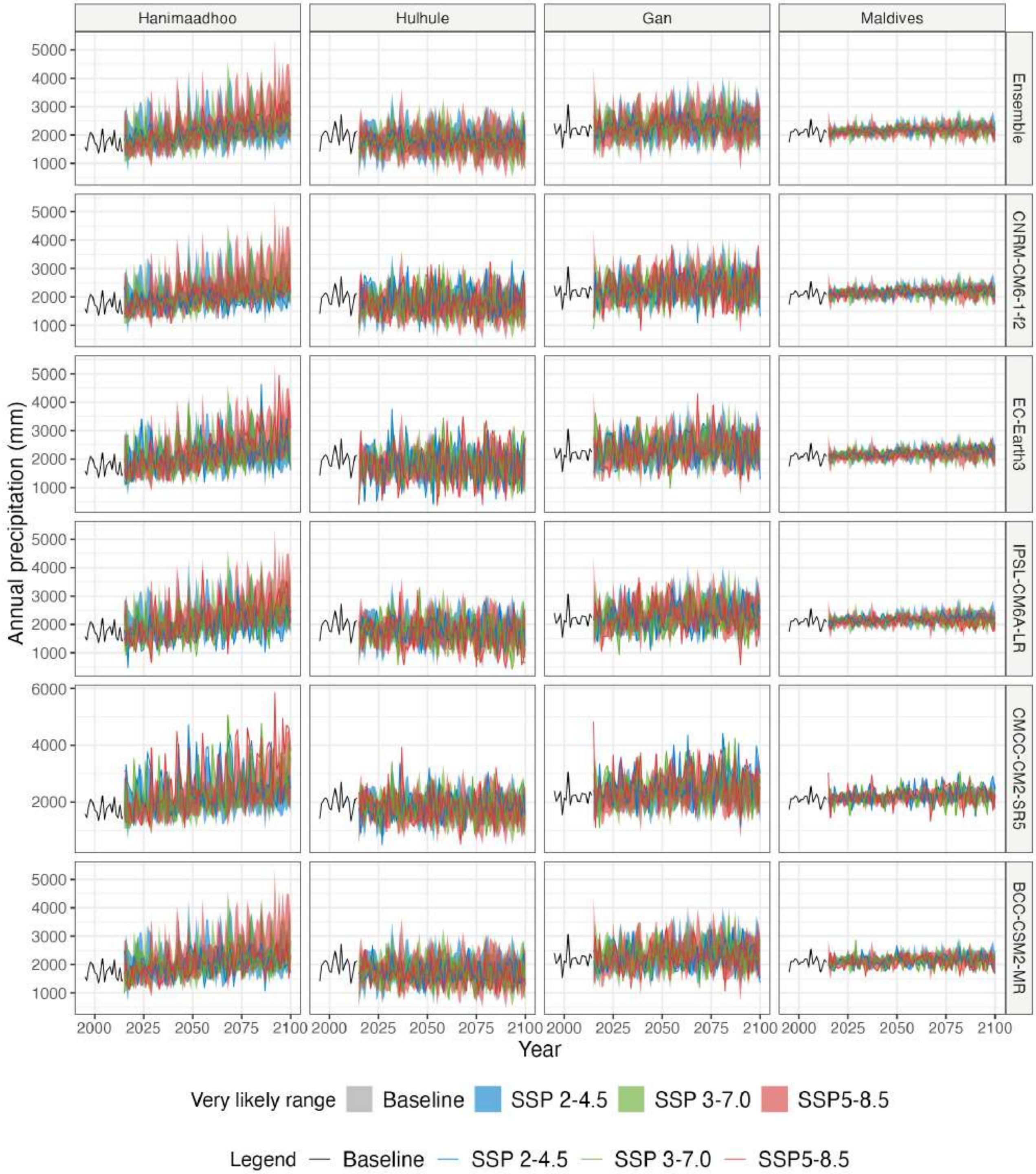


Table 18: Projected annual precipitation (mm), for three SSPs, at Hanimaadhoo and Hulhule stations (baseline period: 1995-2014; future projection: 2021-2100)

Station	Hanimaadhoo					Hulhule				
Period	Baseline (1995-2014)	2021-2040	2041-2060	2061-2080	2081-2100	Baseline (1994-2015)	2021-2040	2041-2060	2061-2080	2081-2100
					SSP 2-4.5					
Annual precipitation (mm)	1,730.30	1,963.02	2,090.37	2,187.79	2,194.91	1,965.46	1,815.61	1,796.29	1,852.29	1,834.10
Change (%)	-	13.45	20.81	26.44	26.85	-	-7.62	-8.61	-5.76	-6.68
Very likely range (%)	-	[-6.04, 39.71]	[3.09, 45.48]	[6.94, 57.68]	[10.48, 48.02]	-	[-11.62, -1.13]	[-13.83, -3.06]	[-11.61, 0.69]	[-12.56, 0.58]
Likely range (%)	-	[-1.12, 31.11]	[7.2, 33.78]	[7.99, 44.29]	[12, 42.82]	-	[-11.33, -4.12]	[-11.99, -5.74]	[-8.81, -2.75]	[-11.31, -1.42]
					SSP 3-7.0					
Annual precipitation (mm)	1,730.30	1,934.02	2,026.65	2,302.91	2,474.94	1,965.46	1,785.23	1,859.57	1,722.88	1,696.86
Change (%)	-	11.77	17.13	33.09	43.04	-	-9.17	-5.39	-12.34	-13.67
Very likely range (%)	-	[-2.29, 21.69]	[2.26, 35.48]	[21.67, 55.34]	[23.57, 73.52]	-	[-13.69, -4.4]	[-11.75, 1.04]	[-21.17, -4.34]	[-28.57, -2.73]
Likely range (%)	-	[-0.2, 20.43]	[4.55, 35.3]	[22.82, 43.48]	[27.49, 60.98]	-	[-12.03, -6.68]	[-9.74, 0.2]	[-18.03, -7.26]	[-24.13, -3.85]
					SSP 5-8.5					
Annual precipitation (mm)	1,730.30	1,826.52	2,164.32	2,412.17	2,731.92	1,965.46	1,752.73	1,756.13	1,726.07	1,677.19
Change (%)	-	5.56	25.08	39.41	57.89	-	-10.82	-10.65	-12.18	-14.67
Very likely range (%)	-	[-2.76, 18.96]	[13.13, 47.69]	[21.03, 66.07]	[24.86, 98.33]	-	[-19.37, 0.14]	[-16.98, -6.18]	[-20.02, -6.12]	[-32.92, 0.64]
Likely range (%)	-	[-1.08, 11.81]	[13.2, 35.63]	[23.7, 56.28]	[25.27, 86.38]	-	[-17.93, -4.49]	[-13.89, -7.57]	[-18.69, -6.89]	[-29.28, -2.76]

Table 19: Projected annual precipitation (mm), for three SSPs, at Gan station and for Maldives (baseline period: 1995-2014; future projection: 2021-2100)

Station	Gan					Maldives				
Period	Baseline (1995-2014)	2021-2040	2041-2060	2061-2080	2081-2100	Baseline (1994-2015)	2021-2040	2041-2060	2061-2080	2081-2100
					SSP 2-4.5					
Annual precipitation (mm)	2,190.57	2,334.00	2,326.39	2,406.69	2,431.59	2,091.62	2,145.14	2,177.14	2,202.39	2,276.95
Change (%)	-	6.55	6.20	9.87	11.00	-	2.56	4.09	5.30	8.86
Very likely range (%)		[-19.37, 0.14]	[-16.98, -6.18]	[-20.02, -6.12]	[-32.92, 0.64]	-	[1.21, 3.93]	[0.05, 6.95]	[0.13, 8.97]	[3.12, 15.3]
Likely range (%)		[-17.93, -4.49]	[-13.89, -7.57]	[-18.69, -6.89]	[-29.28, -2.76]	-	[1.4, 3.63]	[2.2, 6.46]	[2.33, 8.84]	[5.44, 12.66]
					SSP 3-7.0					
Annual precipitation (mm)	2,190.57	2,275.78	2,293.06	2,444.92	2,371.33	2,091.62	2,135.00	2,178.24	2,177.80	2,219.54
Change (%)	-	3.89	4.68	11.61	8.25	-	2.07	4.14	4.12	6.12
Very likely range (%)	-	[-5.84, 16.31]	[-6.66, 17.03]	[5.43, 22.5]	[-6.17, 23.9]	-	[-0.46, 5.89]	[0.12, 7.62]	[-0.15, 8.5]	[-0.2, 12.74]
Likely range (%)	-	[-3.65, 10.11]	[-2.13, 11.08]	[6.16, 17.62]	[0.24, 16.68]	-	[-0.09, 4.78]	[1.15, 6.63]	[0.76, 8.49]	[0.29, 11.29]
					SSP 5-8.5					
Annual precipitation (mm)	2,190.57	2,238.52	2,399.95	2,450.10	2,304.69	2,091.62	2,127.16	2,153.23	2,197.91	2,168.51
Change (%)	-	2.19	9.56	11.85	5.21	-	1.70	2.95	5.08	3.68
Very likely range (%)	-	[-8.3, 17.61]	[-1.6, 18.92]	[1.49, 29.8]	[-5.67, 18.27]	-	[-3.81, 7.02]	[0.75, 5.58]	[0.7, 9.21]	[-3.79, 10.98]
Likely range (%)	-	[-6.32, 10.28]	[4.35, 14.74]	[2.64, 20.23]	[-2.76, 14.41]	-	[-1.13, 4.51]	[1.45, 4.59]	[1.02, 8.74]	[-3.79, 9.11]

Figure 48: Baseline and projected annual precipitation (mm), for SSP2-4.5 (baseline period: 1995-2014; future projection: 2021-2100)

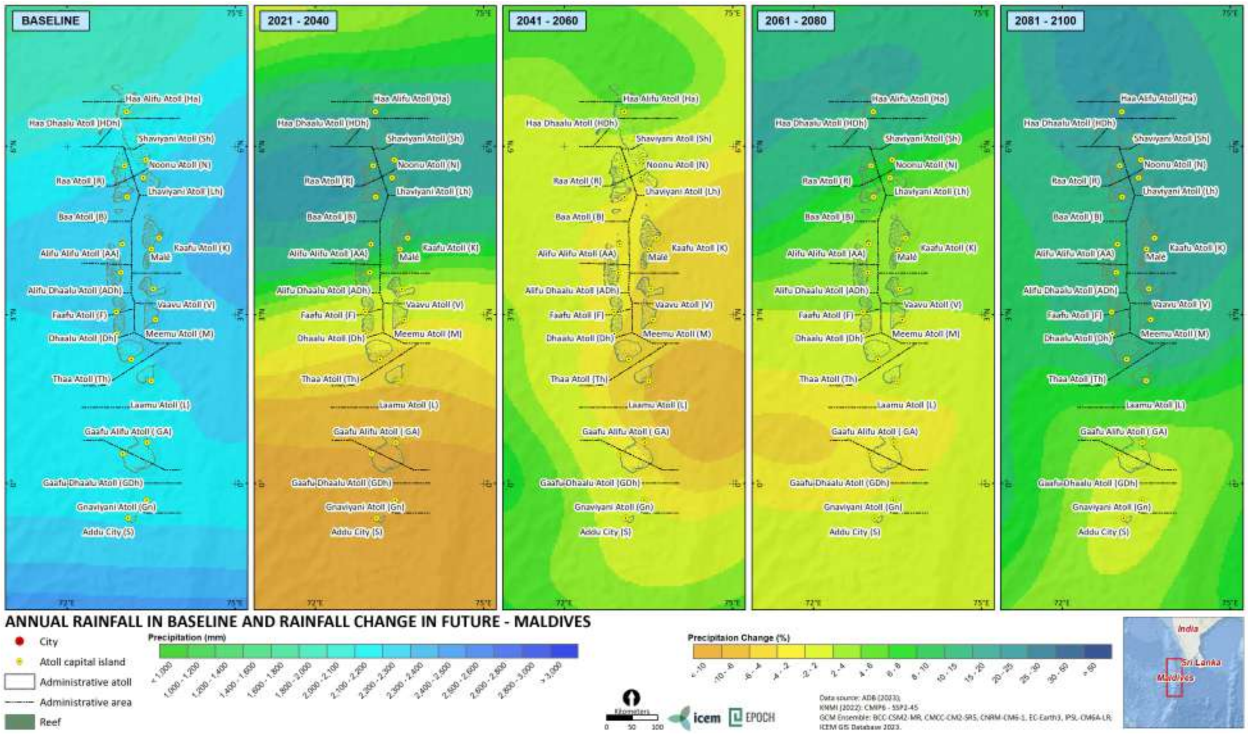


Figure 49: Baseline and projected annual precipitation (mm), for SSP3-7.0 (baseline period: 1995-2014; future projection: 2021-2100)

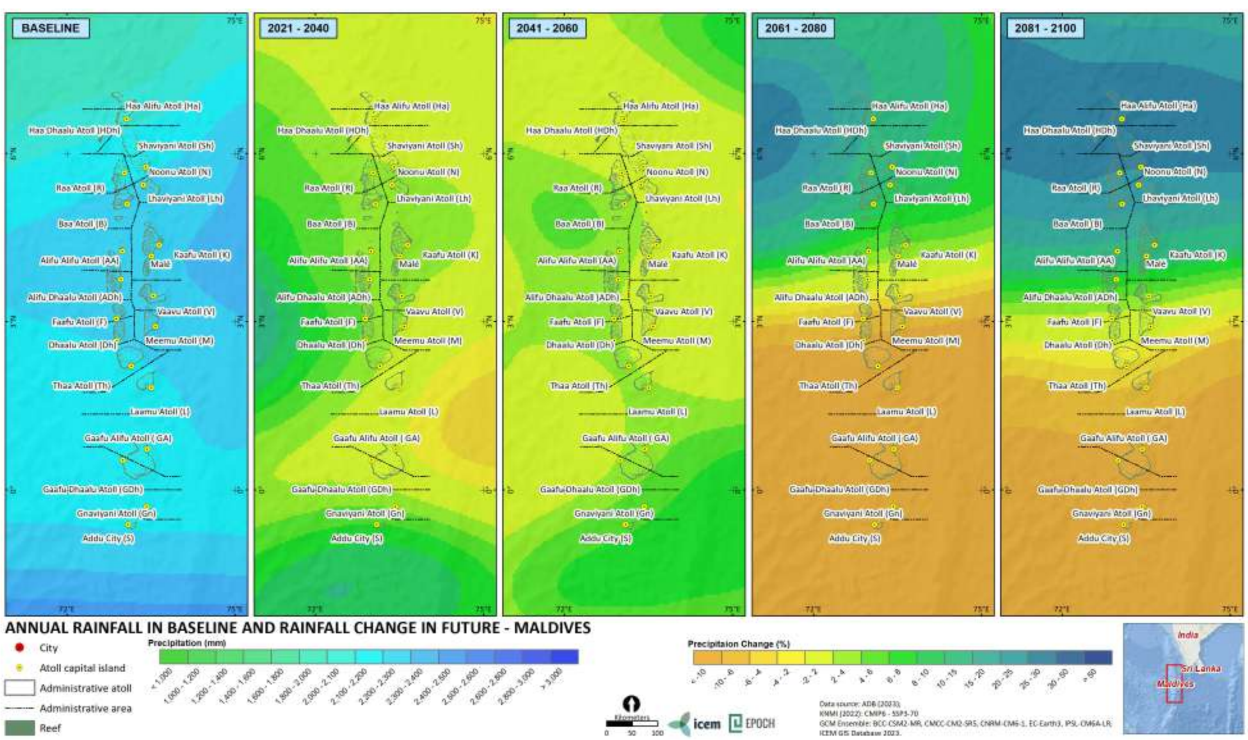


Figure 50: Baseline and projected annual precipitation (mm), for SSP5-8.5 (baseline period: 1995-2014; future projection: 2021-2100)

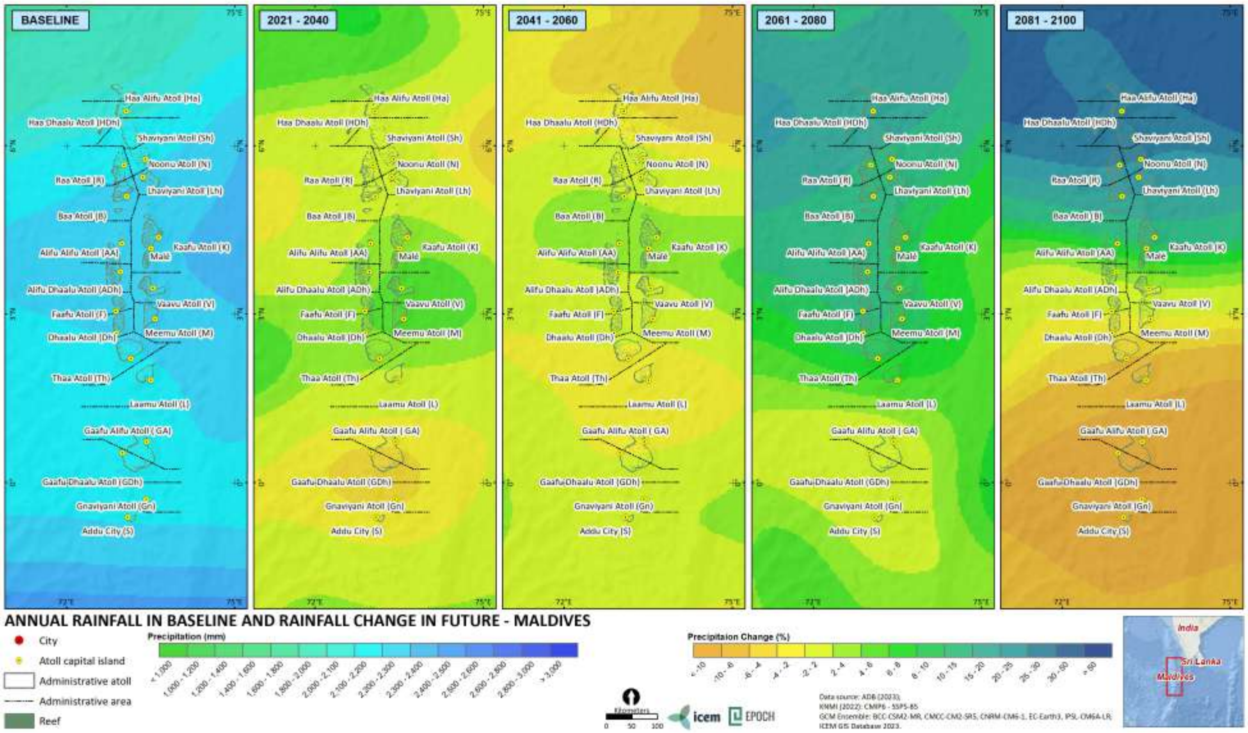


Figure 51: Projected annual precipitation (mm), for three SSPs, at Hanimaadhoo station (baseline period: 1995-2014; future projection: 2021-2100)

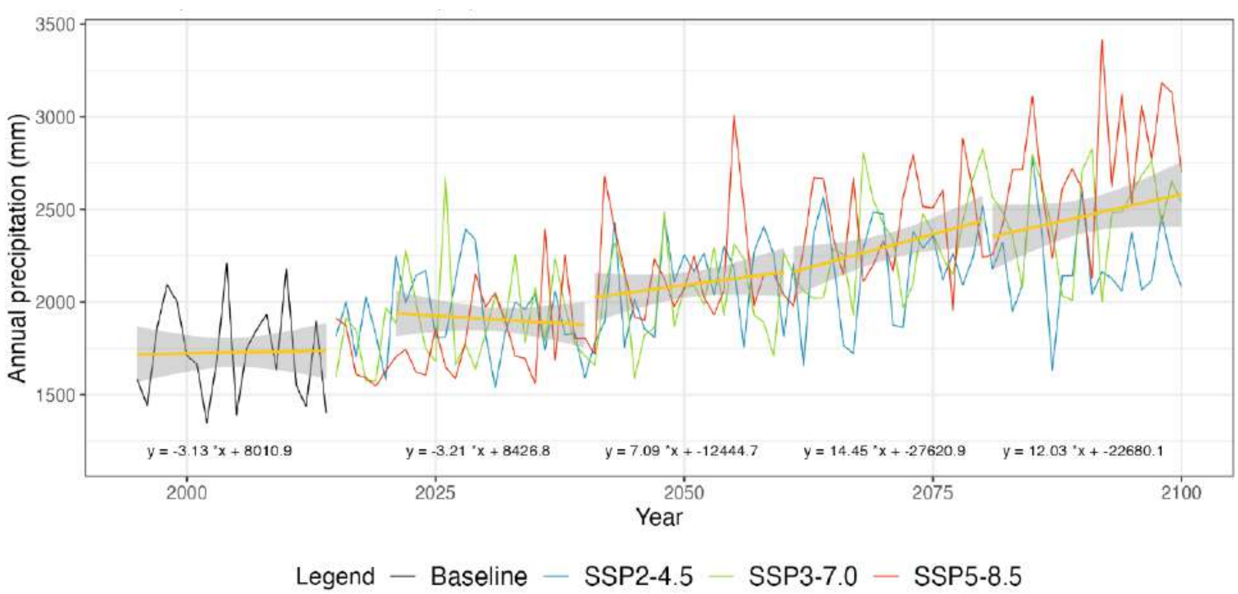


Figure 52: Projected annual precipitation (mm), for three SSPs, at Hulhule station (baseline period: 1995-2014; future projection: 2021-2100)

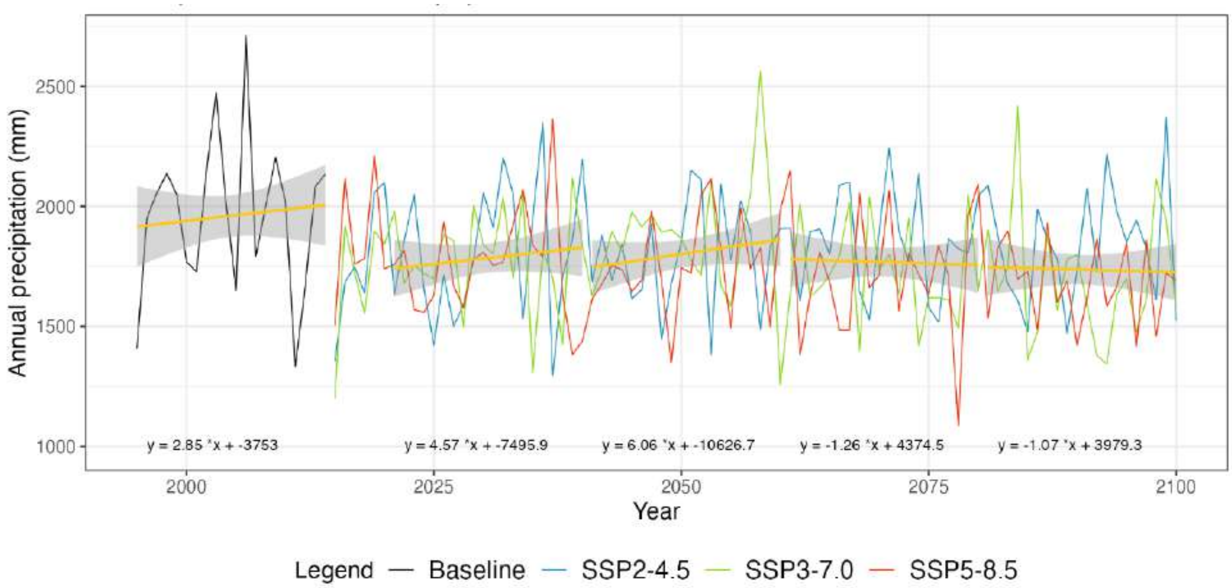


Figure 53: Projected annual precipitation (mm), for three SSPs, at Gan station (baseline period: 1995-2014; future projection: 2021-2100)

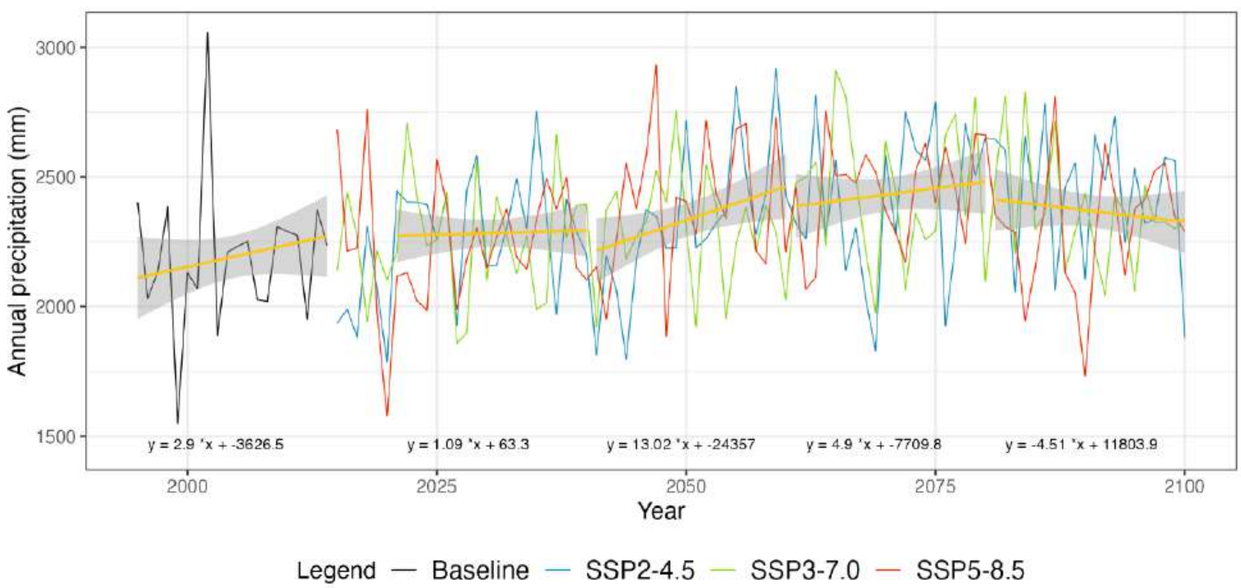


Figure 54: Projected annual precipitation (mm), for three SSPs, for Maldives (baseline period: 1995-2014; future projection: 2021-2100)

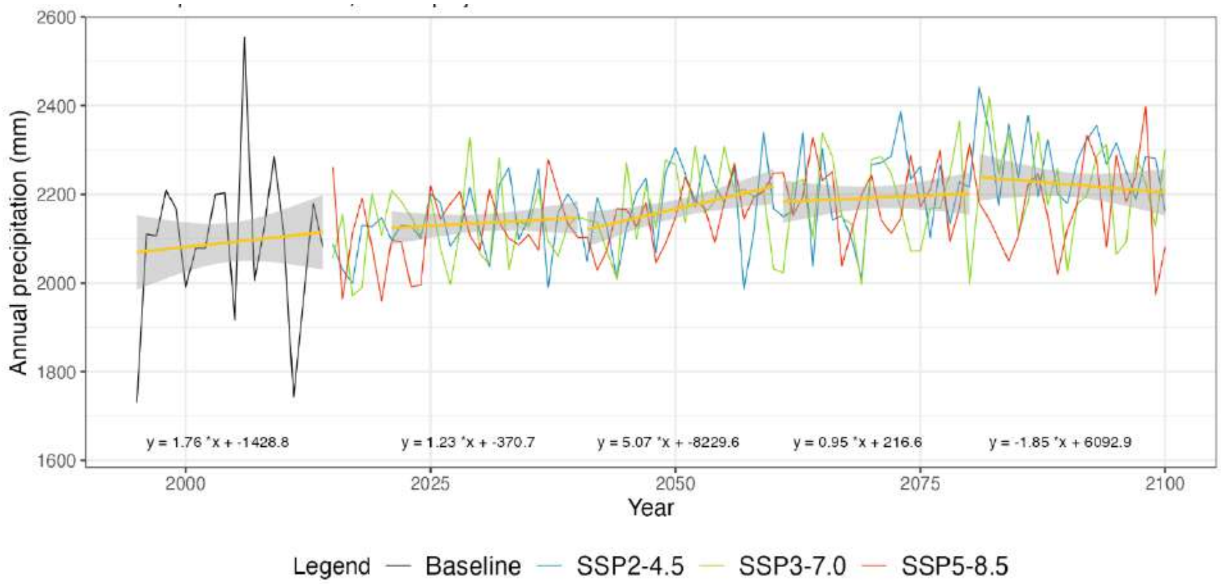


Table 20: Rate of change in precipitation per year (mm/year), at the three stations and country average (baseline period: 1995-2014; future projection: 2021-2100)

Location	Baseline 1995-2014 (mm/year)	2021-2040 (mm/year)	2041-2060 (mm/year)	2061-2080 (mm/year)	2081-2100 (mm/year)
Hanimaadhoo	-3.13	-3.21	7.09	14.45	12.03
Hulhule	2.85	4.57	6.06	-1.26	-1.07
Gan	2.9	1.09	13.02	4.9	-4.51
Maldives	1.76	1.23	5.07	0.95	-1.85

Figure 55: Annual precipitation anomaly (mm), for three SSPs, at the three stations and country average (baseline period: 1995-2014; future projection: 2021-2100)

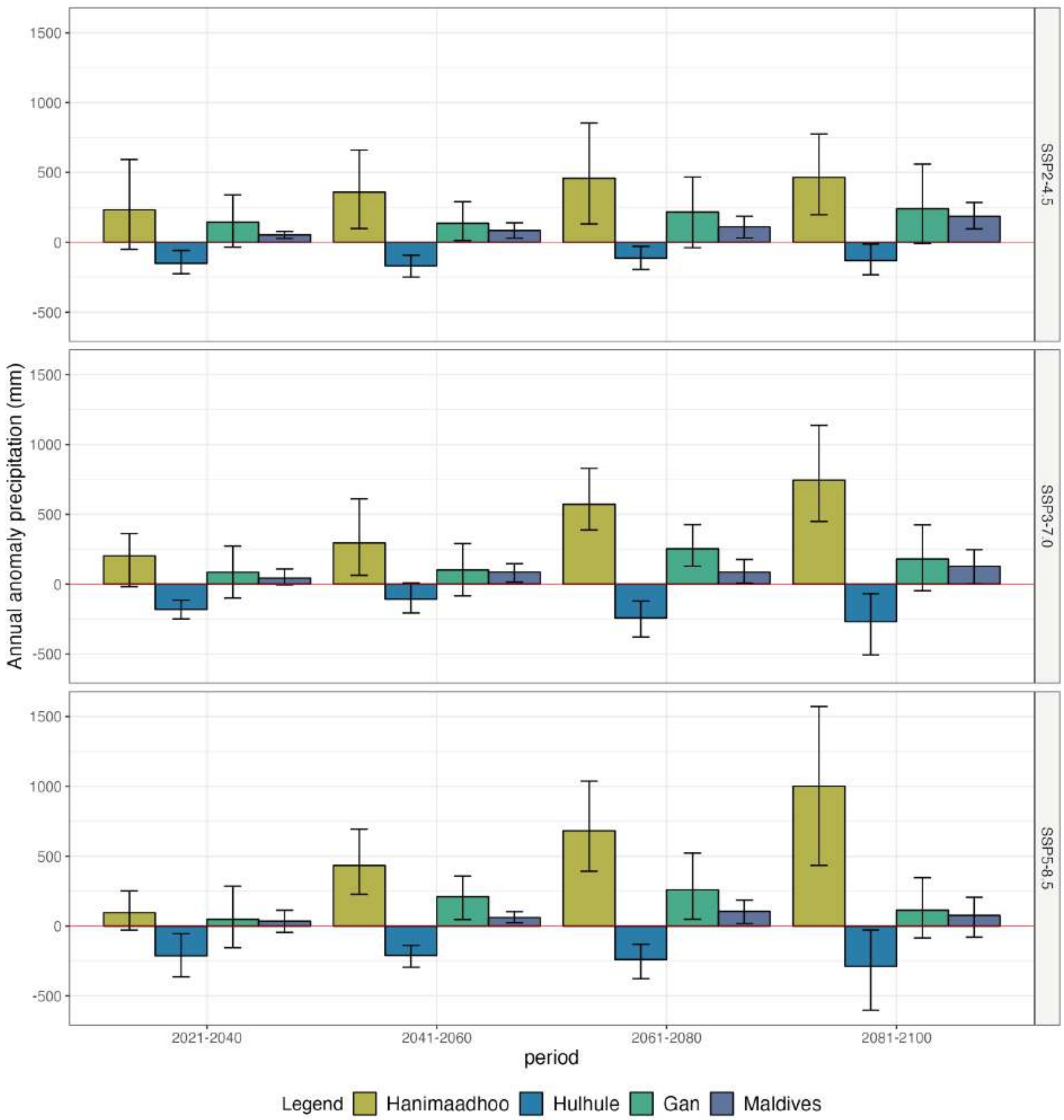


Figure 56: Changes (%) in annual average precipitation, for three SSPs, at the three stations and country average (baseline period: 1995-2014; future projection: 2021-2100)

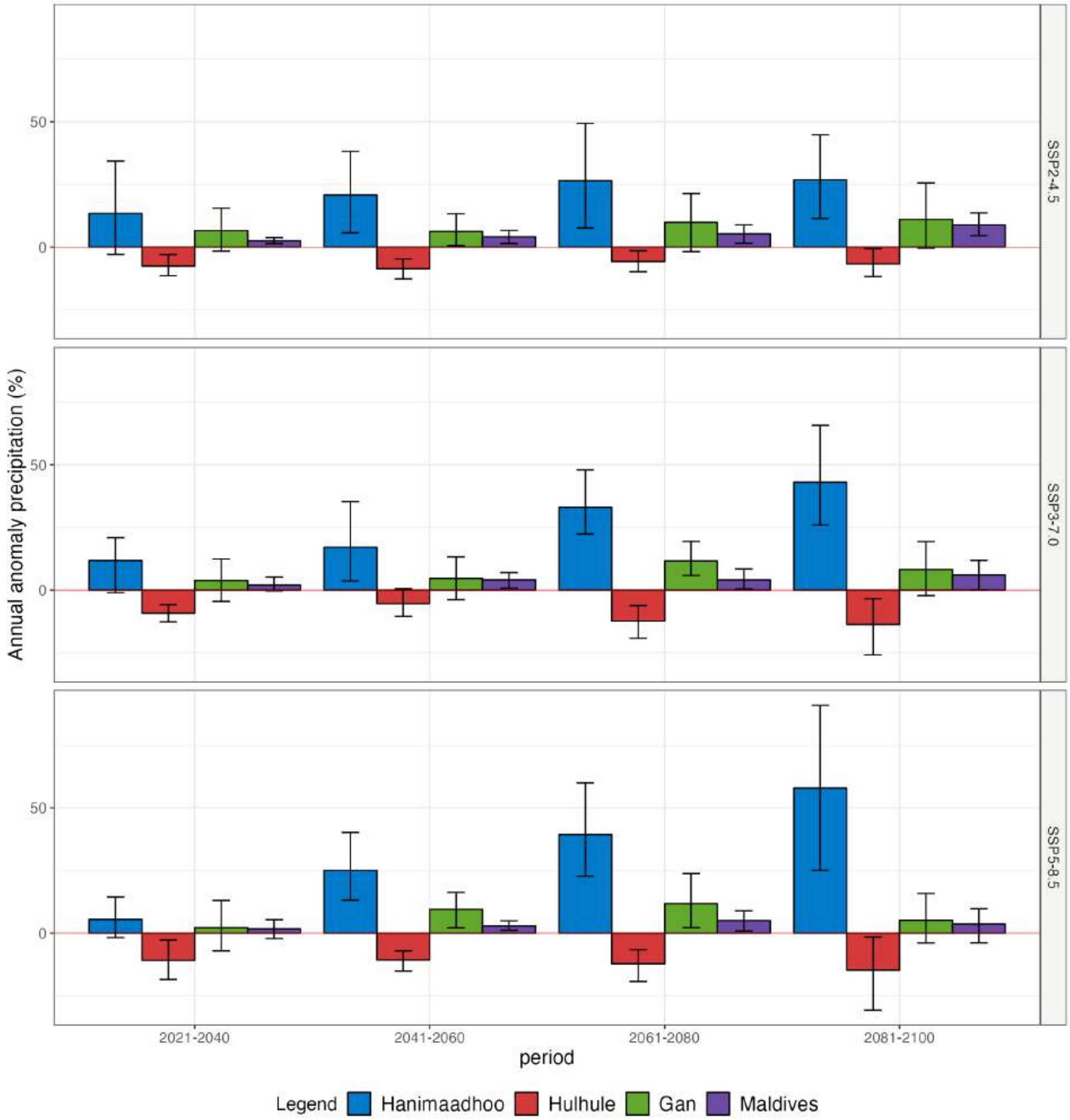


Figure 57: Changes (%) in seasonal average precipitation, for three SSPs, at the three stations and country average (baseline period: 1995-2014; future projection: 2021-2100)

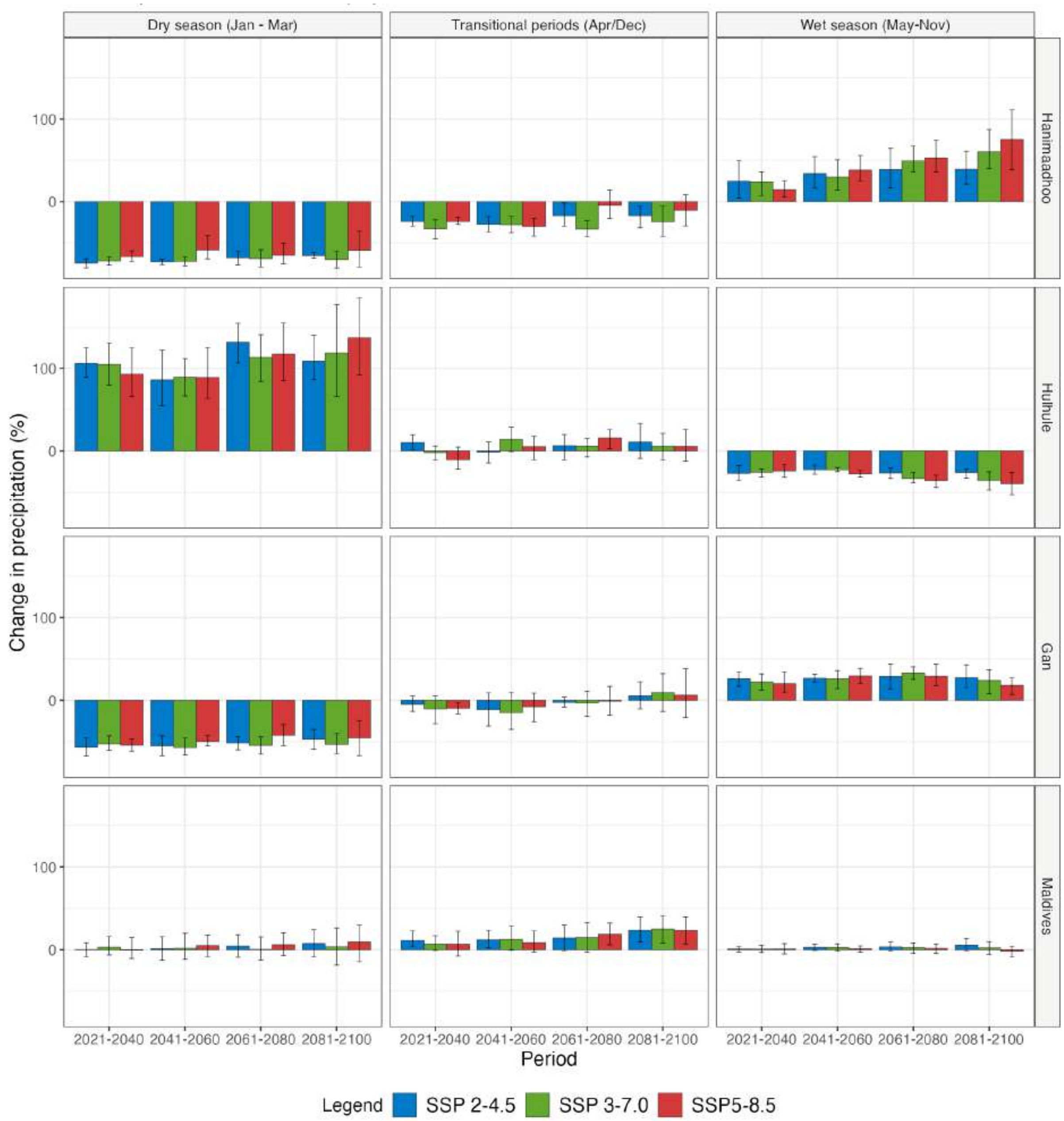


Table 21: Change (%) in seasonal average precipitation, for three SSPs, at Hanimaadhoo station (baseline period: 1995-2014; future projection: 2021-2100)

Hanimaadhoo (north)	Baseline period (1995-2014)	2021-2040	2041-2060	2061-2080	2081-2100
SSP2.4-5					
Dry season (Jan-Mar)					
Seasonal precipitation (mm)	107.55	27.50	29.13	34.37	37.61
Change (%)	-	-74.43	-72.91	-68.04	-65.03
Very likely range (%)	-	[-80.91, -67.91]	[-77.03, -68.78]	[-79.87, -59.39]	[-69, -61.41]
Likely range (%)	-	[-79.8, -69.89]	[-75.29, -70.25]	[-74.46, -60.82]	[-68.43, -62.04]
Transitional period (Apr-Dec)					
Seasonal precipitation (mm)	185.96	141.76	135.19	154.44	154.47
Change (%)	-	-23.77	-27.30	-16.95	-16.93
Very likely range (%)	-	[-31.45, -16.37]	[-38.89, -16.17]	[-33.68, 6.15]	[-35.63, -4.62]
Likely range (%)	-	[-28.37, -18.18]	[-35.38, -19.44]	[-27.36, -6.17]	[-29.43, -6.44]
Wet season (May-Nov)					
Seasonal precipitation (mm)	1,436.80	1,793.76	1,926.04	1,998.98	2,002.83
Change (%)	-	24.84	34.05	39.13	39.40
Very likely range (%)	-	[0.69, 56.43]	[13.88, 62.84]	[15.83, 73.72]	[21.25, 64.26]
Likely range (%)	-	[6.68, 45.92]	[17.81, 49.39]	[17.27, 58.91]	[21.53, 58.94]
SSP3-7.0					
Dry season (Jan-Mar)					
Seasonal precipitation (mm)	107.55	30.52	29.76	33.37	32.24
Change (%)	-	-71.62	-72.32	-68.97	-70.02
Very likely range (%)	-	[-77.64, -65.94]	[-77.45, -65.05]	[-79.71, -54.85]	[-84.04, -57.64]
Likely range (%)	-	[-75.88, -66.4]	[-77.28, -66.85]	[-78.42, -59.79]	[-78.05, -61.18]
Transitional period (Apr-Dec)					
Seasonal precipitation (mm)	185.96	124.90	134.39	124.42	140.82
Change (%)	-	-32.84	-27.73	-33.10	-24.28
Very likely range (%)	-	[-49.54, -17.88]	[-38.26, -15.61]	[-42.81, -19.17]	[-45.37, -0.22]
Likely range (%)	-	[-42.13, -24.27]	[-37.14, -19.27]	[-42.46, -24.7]	[-39.72, -8.97]
Wet season (May-Nov)					
Seasonal precipitation (mm)	1,436.80	1,778.60	1,862.50	2,145.12	2,301.89
Change (%)	-	23.79	29.63	49.30	60.21
Very likely range (%)	-	[6.14, 37.46]	[12.95, 50.91]	[34.09, 75.87]	[39.2, 96.86]
Likely range (%)	-	[8.02, 35.03]	[14.77, 50.73]	[37.33, 61.7]	[40.58, 81.93]

Hanimaadhoo (north)	Baseline period (1995-2014)	2021-2040	2041-2060	2061-2080	2081-2100
SSP5-8.5					
Dry season (Jan-Mar)					
Seasonal precipitation (mm)	107.55	36.27	44.72	38.04	44.37
Change (%)	-	-66.28	-58.42	-64.63	-58.74
Very likely range (%)	-	[-73.54, -56.42]	[-69.89, -32.3]	[-75.09, -46.1]	[-82.73, -25.13]
Likely range (%)	-	[-72.06, -61.14]	[-68.84, -46.23]	[-74.89, -52.5]	[-76.53, -41.91]
Transitional period (Apr-Dec)					
Seasonal precipitation (mm)	185.96	141.61	129.90	178.09	167.20
Change (%)	-	-23.85	-30.15	-4.23	-10.09
Very likely range (%)	-	[-27.97, -17.36]	[-45.45, -20.09]	[-24.51, 21.04]	[-31.67, 9.4]
Likely range (%)	-	[-27.14, -20]	[-39.09, -20.29]	[-17.83, 10.26]	[-27.65, 7.87]
Wet season (May-Nov)					
Seasonal precipitation (mm)	1,436.80	1,648.64	1,989.71	2,196.04	2,520.35
Change (%)	-	14.74	38.48	52.84	75.42
Very likely range (%)	-	[4.93, 31.18]	[24.69, 64.92]	[33.02, 80.62]	[38.14, 120.9]
Likely range (%)	-	[6.46, 22.42]	[25.16, 50.82]	[37.11, 71.21]	[39.43, 105.05]

Table 22: Change (%) in seasonal average precipitation, for three SSPs, at Hulhule station (baseline period: 1995-2014; future projection: 2021-2100)

Hulhule (central)	Baseline period (1995-2014)	2021-2040	2041-2060	2061-2080	2081-2100
SSP2.4-5					
Dry season (Jan-Mar)					
Seasonal precipitation (mm)	183.24	378.10	340.64	424.74	382.67
Change (%)	-	106.35	85.90	131.80	108.84
Very likely range (%)	-	[89.04, 127.57]	[51.44, 124.39]	[97.62, 154.85]	[83.47, 141.1]
Likely range (%)	-	[89.58, 123.97]	[56.65, 120.29]	[112.33, 154.04]	[87.6, 139.07]
Transitional period (Apr-Dec)					
Seasonal precipitation (mm)	360.46	397.82	355.62	382.78	399.78
Change (%)	-	10.36	-1.34	6.19	10.91
Very likely range (%)	-	[1.98, 24.11]	[-15.49, 14.89]	[-14.13, 22.94]	[-9.59, 35.43]
Likely range (%)	-	[2.06, 16.84]	[-13.58, 8.55]	[-8.8, 17.84]	[-8.26, 32.53]
Wet season (May-Nov)					
Seasonal precipitation (mm)	1,421.76	1,039.69	1,100.03	1,044.78	1,051.65
Change (%)	-	-26.87	-22.63	-26.52	-26.03
Very likely range (%)	-	[-37.41, -15.27]	[-28.24, -16.98]	[-34.14, -17.98]	[-36.35, -21.36]
Likely range (%)	-	[-34.62, -19.44]	[-27.65, -17.28]	[-32.52, -21.91]	[-30.85, -22.1]

Hulhule (central)	Baseline period (1995-2014)	2021-2040	2041-2060	2061-2080	2081-2100
SSP3-7.0					
Dry season (Jan-Mar)					
Seasonal precipitation (mm)	183.24	375.10	346.98	391.14	401.00
Change (%)	-	104.71	89.36	113.46	118.85
Very likely range (%)	-	[77.29, 131.12]	[64.34, 113.17]	[77.44, 148.49]	[61.26, 189.63]
Likely range (%)	-	[80.95, 130.64]	[67.8, 110.62]	[88.4, 135.79]	[68.99, 169.52]
Transitional period (Apr-Dec)					
Seasonal precipitation (mm)	360.46	353.83	412.76	381.51	380.59
Change (%)	-	-1.84	14.51	5.84	5.58
Very likely range (%)	-	[-13.16, 6.23]	[-4.95, 30.93]	[-11.41, 15.23]	[-14.59, 22.77]
Likely range (%)	-	[-9.49, 5.75]	[1.87, 27.7]	[-4.69, 15.05]	[-8.33, 20.73]
Wet season (May-Nov)					
Seasonal precipitation (mm)	1,421.76	1,056.31	1,099.83	950.23	915.26
Change (%)	-	-25.70	-22.64	-33.16	-35.62
Very likely range (%)	-	[-32.32, -21.21]	[-25.76, -19.34]	[-38.7, -23.01]	[-53.31, -22.54]
Likely range (%)	-	[-30.88, -21.43]	[-24.65, -20.22]	[-37.86, -28.07]	[-43.88, -26.82]
SSP5-8.5					
Dry season (Jan-Mar)					
Seasonal precipitation (mm)	183.24	353.66	346.31	397.89	434.22
Change (%)	-	93.01	89.00	117.15	136.97
Very likely range (%)	-	[62.59, 135.79]	[62.8, 128.88]	[78.8, 164.06]	[82.72, 189.1]
Likely range (%)	-	[67.83, 118.09]	[64.54, 123.09]	[88.74, 148.98]	[97.05, 183.01]
Transitional period (Apr-Dec)					
Seasonal precipitation (mm)	360.46	322.75	379.27	417.87	380.27
Change (%)	-	-10.46	5.22	15.93	5.50
Very likely range (%)	-	[-22.86, 6.83]	[-13.38, 18.61]	[-0.34, 27.09]	[-17.96, 32.26]
Likely range (%)	-	[-21.15, 3.61]	[-8.67, 16.85]	[4.98, 24.91]	[-9.28, 22.68]
Wet season (May-Nov)					
Seasonal precipitation (mm)	1,421.76	1,076.32	1,030.54	910.31	862.70
Change (%)	-	-24.30	-27.52	-35.97	-39.32
Very likely range (%)	-	[-32.3, -13.58]	[-32.19, -23.44]	[-46.98, -28.64]	[-57.71, -19.23]
Likely range (%)	-	[-31.57, -17.26]	[-31.35, -23.74]	[-42.54, -29.85]	[-49.59, -29.81]

Table 23: Change (%) in seasonal average precipitation, for three SSPs, at Gan station (baseline period: 1995-2014; future projection: 2021-2100)

Gan (south)	Baseline period (1995-2014)	2021-2040	2041-2060	2061-2080	2081-2100
		SSP2.4-5			
		Dry season (Jan-Mar)			
Seasonal precipitation (mm)	376.22	163.28	169.26	182.71	198.25
Change (%)	-	-56.60	-55.01	-51.44	-47.31
Very likely range (%)	-	[-67.8, -44.91]	[-67.79, -40.88]	[-63.37, -42.8]	[-62.92, -31.28]
Likely range (%)	-	[-67.06, -45.43]	[-66.55, -44.26]	[-58.07, -44.23]	[-57.57, -37.72]
		Transitional period (Apr-Dec)			
Seasonal precipitation (mm)	374.11	355.51	331.93	364.72	394.82
Change (%)	-	-4.97	-11.27	-2.51	5.53
Very likely range (%)	-	[-13.58, 5.71]	[-31.93, 13.56]	[-9.91, 7.42]	[-13.88, 30.69]
Likely range (%)	-	[-12.94, 4.93]	[-30.45, 5.96]	[-7.26, 2.12]	[-8.43, 17.62]
		Wet season (May-Nov)			
Seasonal precipitation (mm)	1,440.23	1,815.21	1,825.20	1,859.26	1,838.52
Change (%)	-	26.04	26.73	29.09	27.65
Very likely range (%)	-	[14.12, 34.54]	[20.06, 33.17]	[9.33, 44.37]	[15.37, 50.48]
Likely range (%)	-	[18.84, 33.7]	[22.17, 30.49]	[16.59, 43.27]	[15.46, 38.31]
		SSP3-7.0			
		Dry season (Jan-Mar)			
Seasonal precipitation (mm)	376.22	176.85	161.24	171.21	175.31
Change (%)	-	-52.99	-57.14	-54.49	-53.40
Very likely range (%)	-	[-60.55, -38.68]	[-67.4, -39.85]	[-66.09, -40.13]	[-67.01, -33.73]
Likely range (%)	-	[-60.39, -45.68]	[-65.08, -49.07]	[-64.68, -46.37]	[-62.76, -43.61]
		Transitional period (Apr-Dec)			
Seasonal precipitation (mm)	374.11	334.75	318.46	361.54	409.36
Change (%)	-	-10.52	-14.88	-3.36	9.42
Very likely range (%)	-	[-30.54, 9.23]	[-36.8, 11.51]	[-22.8, 13.13]	[-15.52, 39.39]
Likely range (%)	-	[-27.21, 2.84]	[-34.32, 8.31]	[-17.22, 9.7]	[-11.88, 27.7]
		Wet season (May-Nov)			
Seasonal precipitation (mm)	1,440.23	1,764.19	1,813.36	1,912.17	1,786.66
Change (%)	-	22.49	25.91	32.77	24.05
Very likely range (%)	-	[11.7, 34.02]	[12.77, 36.53]	[24.87, 42.53]	[1.48, 37.66]
Likely range (%)	-	[12.51, 30.47]	[14.87, 35.86]	[25.51, 39.6]	[11.4, 36.68]

Gan (south)	Baseline period (1995-2014)	2021-2040	2041-2060	2061-2080	2081-2100
SSP5-8.5					
Dry season (Jan-Mar)					
Seasonal precipitation (mm)	376.22	171.84	188.64	217.00	204.40
Change (%)	-	-54.33	-49.86	-42.32	-45.67
Very likely range (%)	-	[-63.77, -43.54]	[-55.4, -42.33]	[-59.64, -25.65]	[-68.1, -23.84]
Likely range (%)	-	[-60.02, -49.15]	[-54.81, -43.12]	[-51.74, -31.83]	[-66.2, -24.79]
Transitional period (Apr-Dec)					
Seasonal precipitation (mm)	374.11	337.87	345.59	370.83	397.50
Change (%)	-	-9.69	-7.62	-0.88	6.25
Very likely range (%)	-	[-17.87, -0.74]	[-30.86, 10.4]	[-24.72, 19.8]	[-22.77, 43.12]
Likely range (%)	-	[-15.68, -4.19]	[-22.5, 7.48]	[-14.18, 15.41]	[-19.25, 34.76]
Wet season (May-Nov)					
Seasonal precipitation (mm)	1,440.23	1,728.82	1,865.71	1,862.27	1,702.79
Change (%)	-	20.04	29.54	29.30	18.23
Very likely range (%)	-	[8.55, 40.19]	[16.51, 40.49]	[15.33, 49.01]	[2.74, 28.71]
Likely range (%)	-	[9.78, 30.76]	[22.57, 37.41]	[19.03, 40.6]	[9.76, 26.72]

Table 24: Change (%) in seasonal average precipitation, for three SSPs, for Maldives (baseline period: 1995-2014; future projection: 2021-2100)

Maldives	Baseline period (1995-2014)	2021-2040	2041-2060	2061-2080	2081-2100
SSP2.4-5					
Dry season (Jan-Mar)					
Seasonal precipitation (mm)	307.13	307.87	311.02	321.20	329.86
Change (%)	-	0.24	1.26	4.58	7.40
Very likely range (%)	-	[-9.49, 10.23]	[-13.08, 17.37]	[-10.17, 19.8]	[-10.61, 25.91]
Likely range (%)	-	[-7.84, 7.02]	[-12.59, 14.36]	[-8.79, 17.19]	[-7.97, 23.06]
Transitional period (Apr-Dec)					
Seasonal precipitation (mm)	348.26	387.70	390.23	397.09	430.46
Change (%)	-	11.32	12.05	14.02	23.60
Very likely range (%)	-	[3.02, 24.61]	[-1.11, 24.37]	[-3.57, 31.07]	[5.47, 40.15]
Likely range (%)	-	[3.37, 21.18]	[3.71, 23.08]	[0.47, 29.12]	[10.88, 38.59]
Wet season (May-Nov)					
Seasonal precipitation (mm)	1,436.22	1,449.58	1,475.89	1,484.10	1,516.62
Change (%)	-	0.93	2.76	3.33	5.60
Very likely range (%)	-	[-4.06, 5.04]	[-1.8, 7.98]	[-2.89, 10.62]	[-1.89, 14.33]

Maldives	Baseline period (1995-2014)	2021-2040	2041-2060	2061-2080	2081-2100
Likely range (%)	-	[-2.37, 3.68]	[-0.39, 6.14]	[-1.69, 8.77]	[-0.86, 13.28]
		SSP3-7.0			
		Dry season (Jan-Mar)			
Seasonal precipitation (mm)	307.13	316.01	312.06	308.50	318.26
Change (%)	-	2.89	1.60	0.44	3.62
Very likely range (%)	-	[-6.36, 20.18]	[-12.58, 23.48]	[-13.63, 18.74]	[-19.49, 29.85]
Likely range (%)	-	[-6.23, 13.07]	[-11.13, 17.47]	[-11.7, 13.29]	[-17.99, 23.92]
		Transitional period (Apr-Dec)			
Seasonal precipitation (mm)	348.26	371.56	391.97	398.96	435.24
Change (%)	-	6.69	12.55	14.56	24.98
Very likely range (%)	-	[-1.22, 21.3]	[-3.58, 29.99]	[-7.01, 33.88]	[2.03, 41.45]
Likely range (%)	-	[-0.71, 14.33]	[1.14, 28.56]	[-1.2, 31.3]	[11.44, 40.49]
		Wet season (May-Nov)			
Seasonal precipitation	1,436.22	1,447.43	1,474.21	1,470.35	1,466.04
Change (%)	-	0.78	2.64	2.38	2.08
Very likely range (%)	-	[-5.35, 5.71]	[-2.39, 8.1]	[-4.66, 8.79]	[-6.49, 11.05]
Likely range (%)	-	[-2.64, 5.01]	[-2.13, 6.32]	[-4.42, 7.68]	[-5.09, 8.54]
		SSP5-8.5			
		Dry season (Jan-Mar)			
Seasonal precipitation (mm)	307.13	306.02	322.77	325.62	335.26
Change (%)	-	-0.36	5.09	6.02	9.16
Very likely range (%)	-	[-11.23, 15.68]	[-8.9, 18.16]	[-8.4, 21.6]	[-16.24, 32.23]
Likely range (%)	-	[-10.42, 13.87]	[-7.96, 17.58]	[-6.27, 19.72]	[-13.88, 28.15]
		Transitional period (Apr-Dec)			
Seasonal precipitation (mm)	348.26	371.28	377.35	413.49	430.09
Change (%)	-	6.61	8.35	18.73	23.50
Very likely range (%)	-	[-7.75, 26.56]	[-3.57, 24.07]	[4.22, 34.05]	[0.04, 40.2]
Likely range (%)	-	[-7.44, 19.38]	[-2.84, 21.57]	[6.89, 30.9]	[11.11, 39.17]
		Wet season (May-Nov)			
Seasonal precipitation (mm)	1,436.22	1,449.86	1,453.11	1,458.79	1,403.17
Change (%)	-	0.95	1.18	1.57	-2.30
Very likely range (%)	-	[-5.98, 8.94]	[-3.97, 5.16]	[-4.9, 7.02]	[-10.69, 6.25]
Likely range (%)	-	[-4.69, 6.21]	[-3.21, 4.43]	[-4.52, 6.86]	[-8.16, 2.89]

Figure 58: Projected average monthly precipitation (mm), for three SSPs, at Hanimaadhoo station (baseline period: 1995-2014; future projection: 2021-2100)

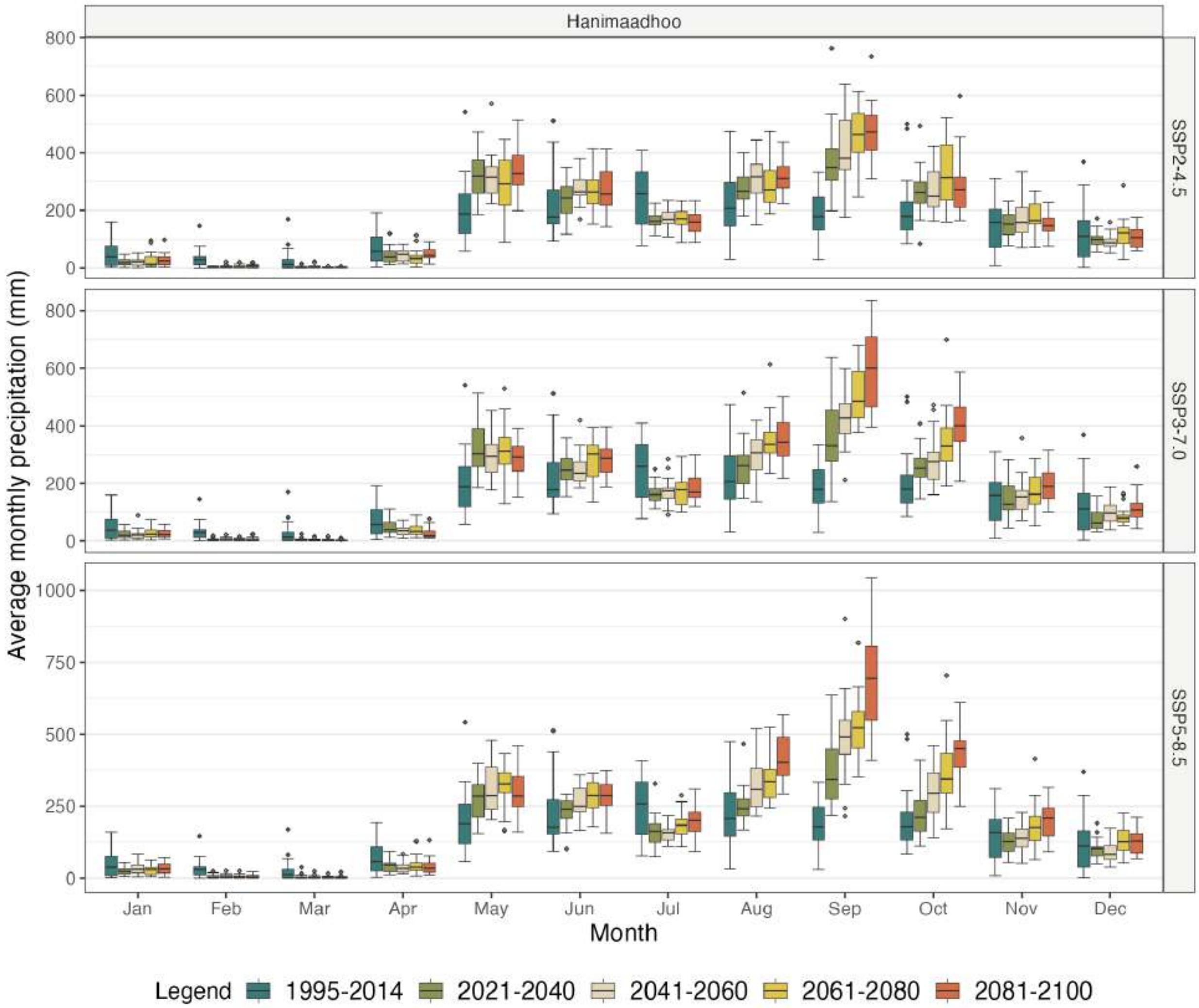


Figure 59: Projected average monthly precipitation (mm), for three SSPs, at Hulhule station (baseline period: 1995-2014; future projection: 2021-2100)

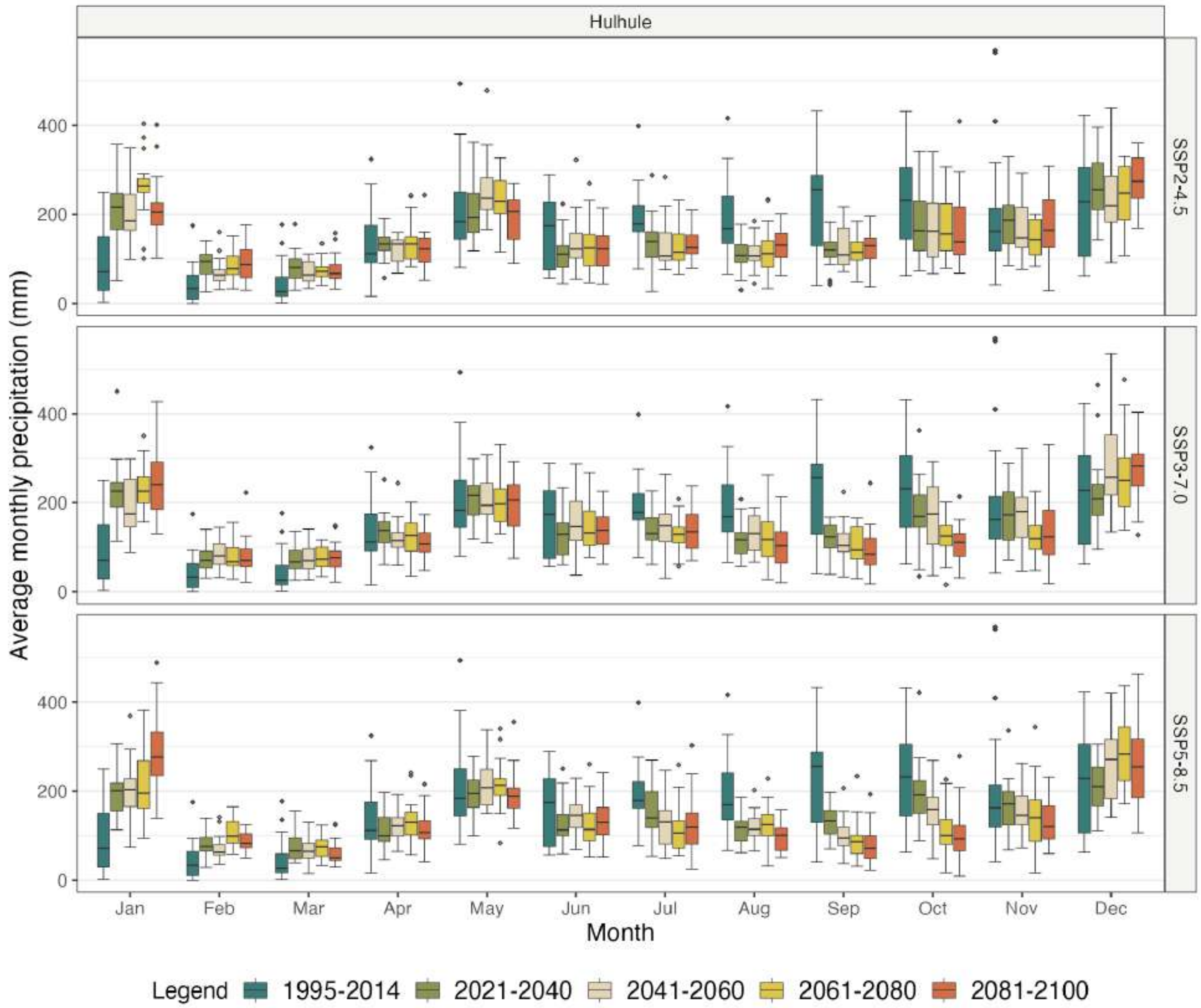


Figure 60: Projected average monthly precipitation (mm), for three SSPs, at Gan station (baseline period: 1995-2014; future projection: 2021-2100)

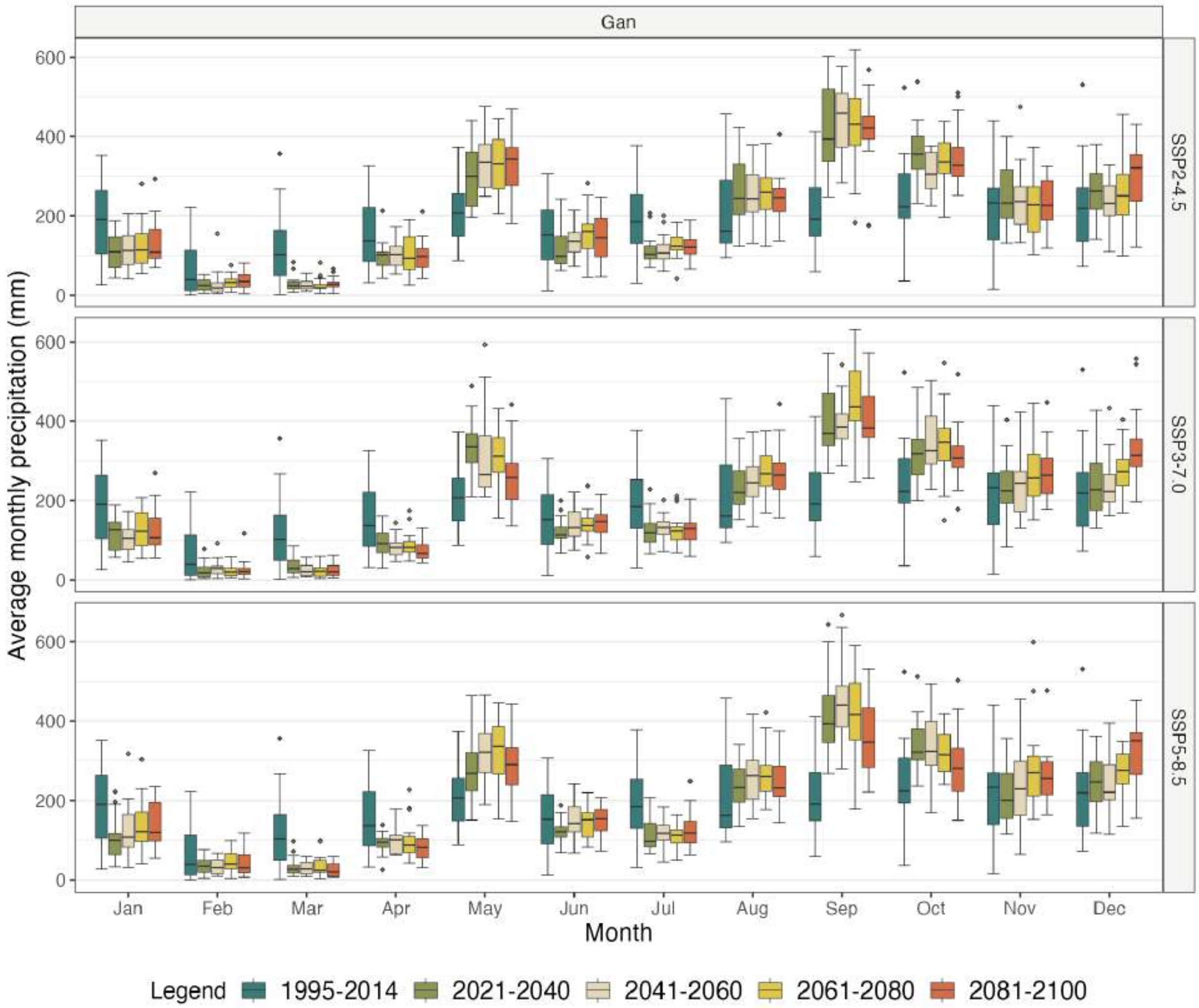


Figure 61: Projected average monthly precipitation (mm), for three SSPs, in Maldives (baseline period: 1995-2014; future projection: 2021-2100)

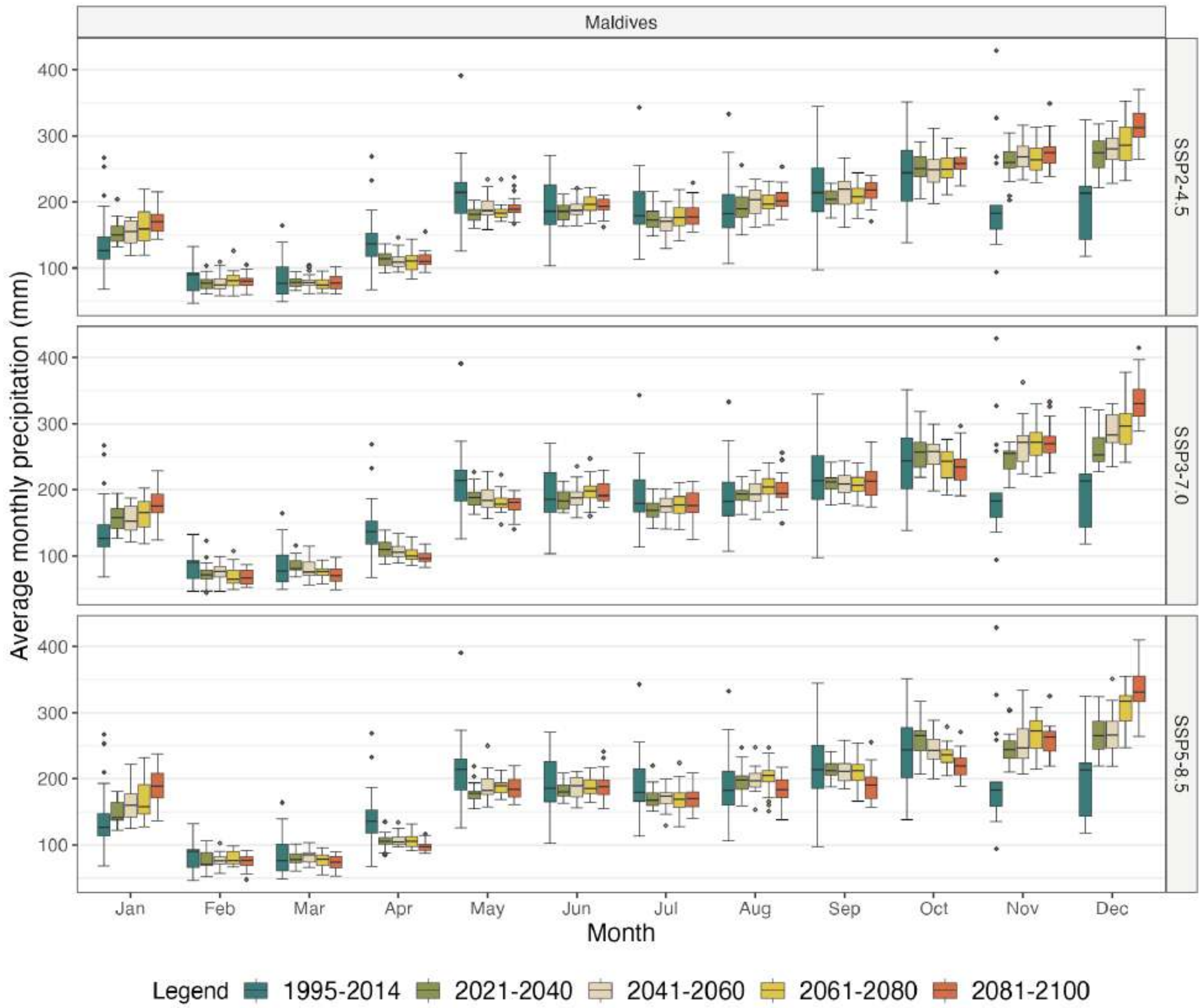


Figure 62: Projected monthly precipitation by year (mm), for three SSPs, at Hanimaadhoo station (baseline period: 1995-2014; future projection: 2021-2100)

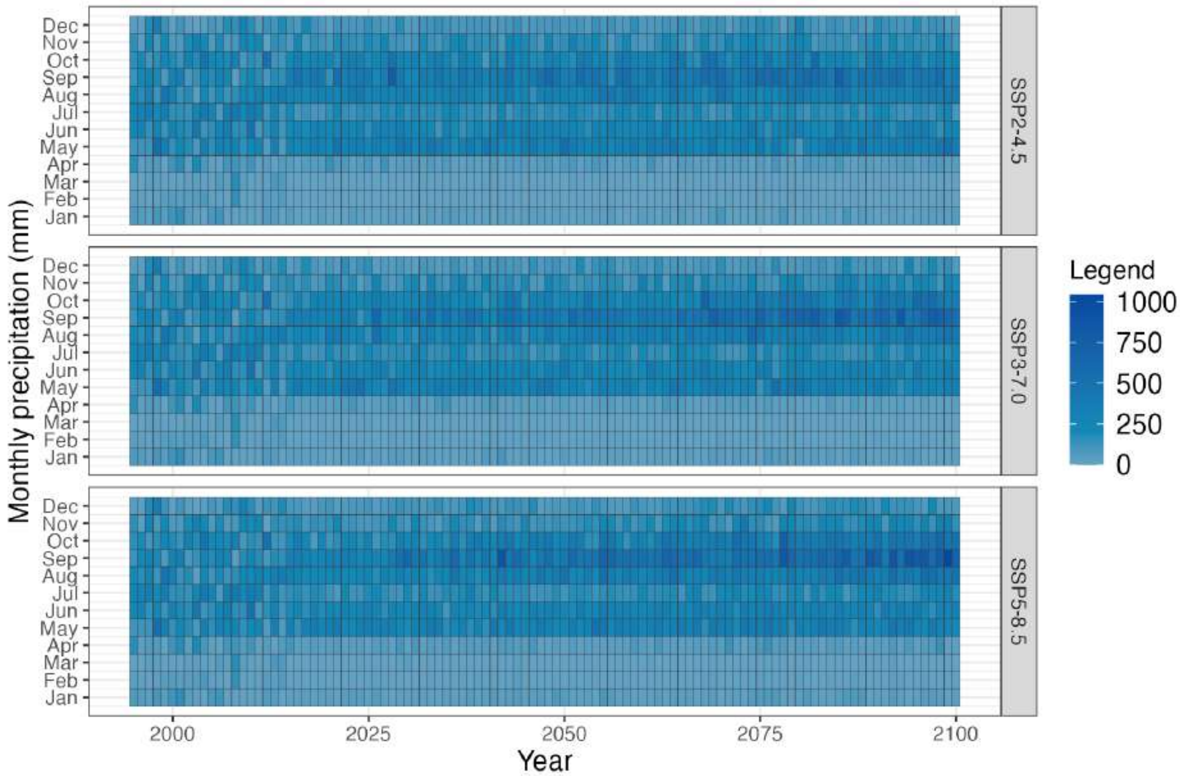


Figure 63: Projected monthly precipitation by year (mm), for three SSPs, at Hulhule station (baseline period: 1995-2014; future projection: 2021-2100)

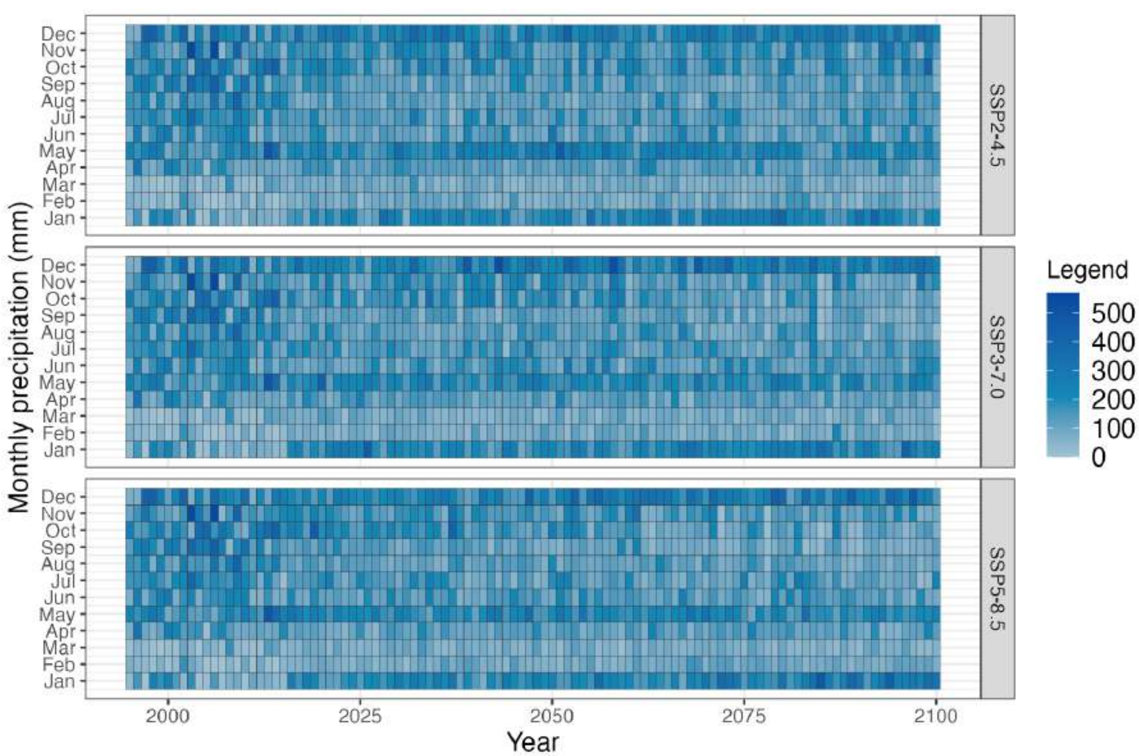


Figure 64: Projected monthly precipitation by year (mm), for three SSPs, at Gan station (baseline period: 1995-2014; future projection: 2021-2100)

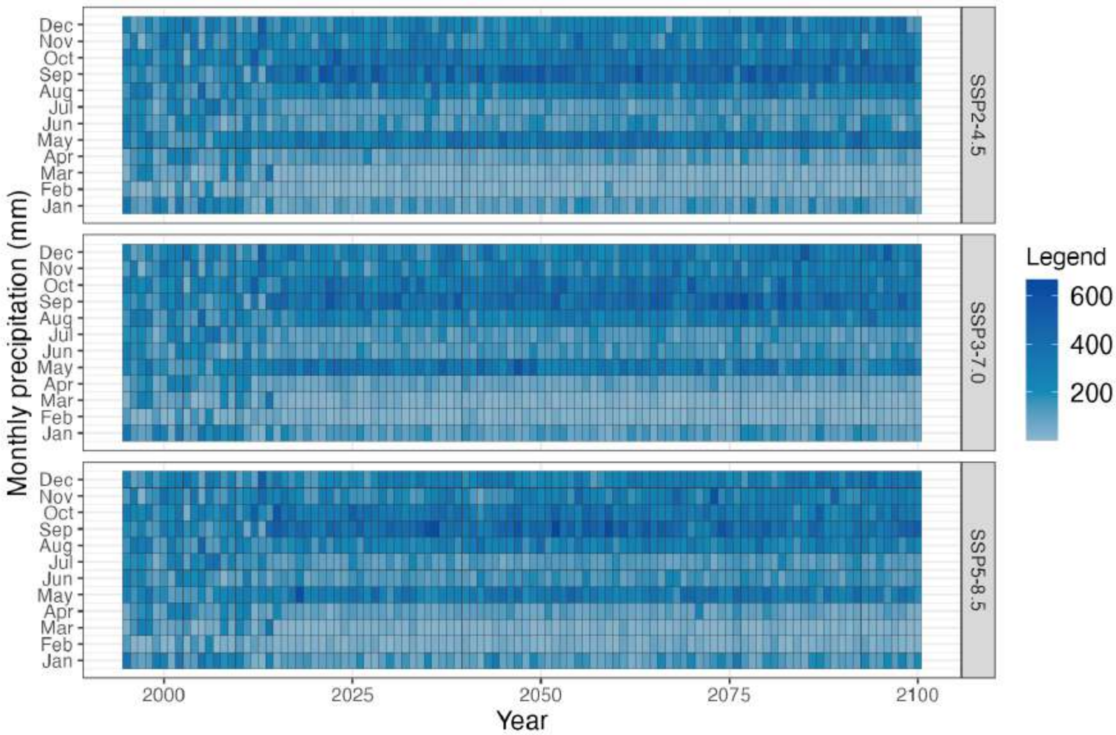


Figure 65: Projected monthly precipitation by year (mm), for three SSPs, at Gan station (baseline period: 1995-2014; future projection: 2021-2100)

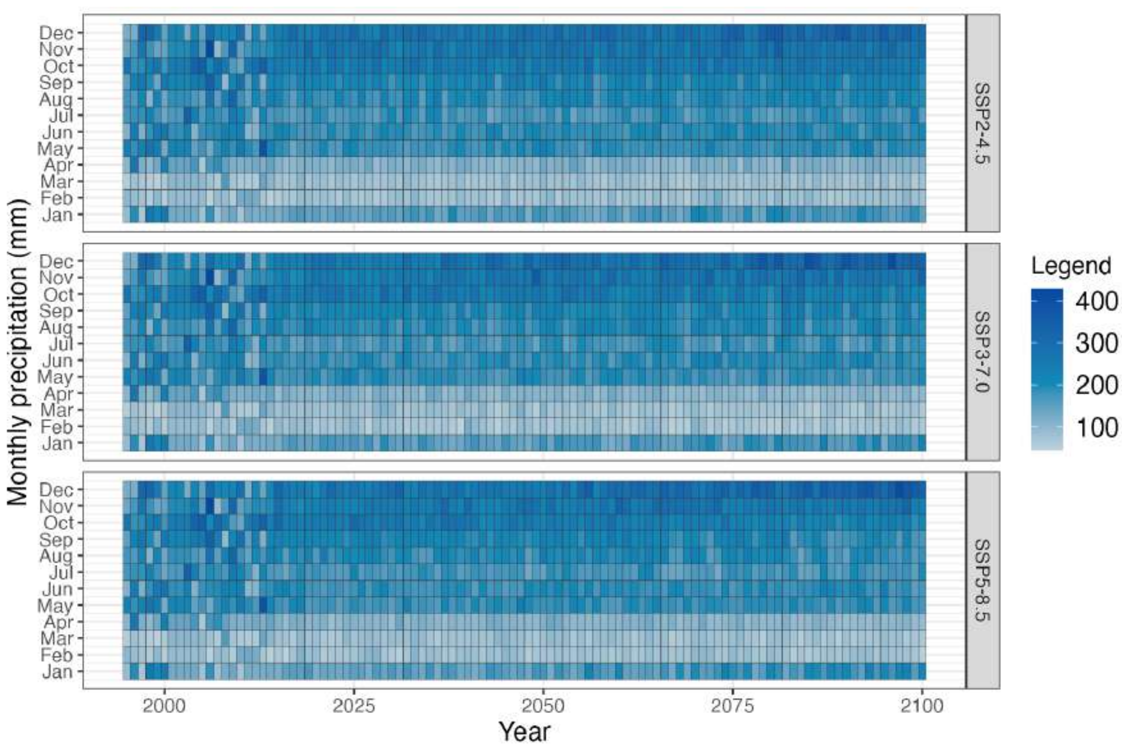


Table 25: Average precipitation per month (mm), for three SSPs, in Hanimaadhoo and Hulhule (baseline period: 1995-2014; future projection: 2021-2100)

	Hanimaadhoo					Hulhule				
Period / Average precipitation	Baseline (1995-2014)	2021-2040	2041-2060	2061-2080	2081-2100	Baseline (1995-2014)	2021-2040	2041-2060	2061-2080	2081-2100
SSP 2-4.5										
January	47.30	21.85	21.11	26.75	28.69	92.31	205.10	200.84	263.12	213.21
February	33.04	2.72	3.92	5.89	7.00	43.34	90.45	69.66	87.15	92.92
March	27.21	2.94	4.10	1.73	1.91	47.59	82.55	70.14	74.46	76.53
April	70.33	42.06	44.19	36.76	47.03	136.14	133.51	120.55	138.14	122.96
May	206.11	325.58	319.63	294.07	339.55	209.54	206.92	260.39	231.89	192.77
June	222.85	234.61	273.71	271.86	268.63	161.92	112.46	135.66	128.90	124.90
July	249.53	166.41	171.45	169.65	160.66	191.33	136.38	131.11	134.60	134.16
August	217.52	279.93	311.10	297.17	321.59	190.87	110.02	111.75	120.20	127.97
September	188.03	369.55	412.39	463.23	473.80	227.16	116.92	129.43	113.54	123.74
October	206.49	265.78	270.82	325.93	289.28	231.02	175.14	167.57	167.21	170.70
November	146.28	151.90	166.95	177.08	149.31	209.93	181.84	164.12	148.42	177.41
December	115.64	99.70	91.00	117.68	107.44	224.33	264.31	235.07	244.64	276.83
SSP 3-7.0										
January	47.30	23.15	21.68	26.72	25.38	92.31	227.36	192.69	235.44	244.30
February	33.04	3.65	5.41	3.84	5.08	43.34	73.42	81.32	77.86	80.48
March	27.21	3.71	2.68	2.81	1.79	47.59	74.32	72.97	77.85	76.23
April	70.33	49.44	34.48	37.52	26.05	136.14	132.23	121.12	119.24	110.13
May	206.11	327.43	291.71	317.77	289.06	209.54	208.84	205.05	203.08	195.91
June	222.85	251.87	250.58	283.45	281.47	161.92	127.58	160.19	147.18	140.53
July	249.53	165.92	170.02	174.71	181.98	191.33	138.76	149.71	127.54	135.68
August	217.52	258.59	294.34	348.57	350.35	190.87	116.73	128.99	122.94	103.73
September	188.03	365.29	421.53	507.46	599.66	227.16	119.16	112.11	103.97	93.36
October	206.49	259.08	282.19	343.10	400.51	231.02	172.90	175.06	121.33	111.05
November	146.28	150.42	152.12	170.06	198.86	209.93	172.35	168.72	124.19	134.99
December	115.64	75.46	99.91	86.90	114.76	224.33	221.59	291.64	262.26	270.47
SSP 5-8.5										
January	47.30	25.33	33.58	28.41	34.63	92.31	198.61	207.46	218.42	285.14
February	33.04	6.12	7.12	6.48	6.87	43.34	80.27	70.60	104.21	86.81
March	27.21	4.81	4.01	3.15	2.87	47.59	74.78	68.25	75.27	62.26
April	70.33	41.29	37.97	47.29	40.94	136.14	111.28	120.53	131.42	116.12
May	206.11	271.61	312.97	318.14	303.38	209.54	195.41	220.46	213.72	195.25

	Hanimaadhoo					Hulhule				
Period / Average precipitation	Baseline (1995-2014)	2021-2040	2041-2060	2061-2080	2081-2100	Baseline (1995-2014)	2021-2040	2041-2060	2061-2080	2081-2100
June	222.85	232.42	264.29	284.35	283.36	161.92	129.68	145.01	122.81	134.41
July	249.53	162.10	153.04	185.08	200.08	191.33	150.19	129.59	114.83	125.62
August	217.52	249.19	327.53	335.33	417.42	190.87	114.88	118.41	122.70	95.62
September	188.03	374.70	491.75	526.54	682.96	227.16	130.19	101.11	88.29	78.74
October	206.49	227.84	298.52	368.17	430.02	231.02	193.26	156.29	109.16	101.44
November	146.28	130.79	141.61	178.42	203.13	209.93	162.72	159.67	138.81	131.62
December	115.64	100.32	91.93	130.80	126.25	224.33	211.47	258.75	286.45	264.15

Note: The ‘very likely’ and ‘likely’ ranges per month, per SSP, per station are available in a separate spreadsheet

Table 26: Average precipitation per month (mm), for three SSPs, in Gan and Maldives (baseline period: 1995-2014; future projection: 2021-2100)

	Gan					Maldives				
Period / Average precipitation	Baseline (1995-2014)	2021-2040	2041-2060	2061-2080	2081-2100	Baseline (1995-2014)	2021-2040	2041-2060	2061-2080	2081-2100
SSP 2-4.5										
January	189.69	109.01	113.58	123.78	131.86	138.12	153.03	154.24	163.66	171.76
February	65.02	26.00	28.47	33.57	37.78	85.58	76.86	77.47	81.64	80.29
March	121.51	28.27	27.21	25.36	28.61	83.44	77.98	79.31	75.91	77.82
April	154.28	99.21	99.10	100.70	100.55	143.31	113.29	112.17	109.72	112.99
May	206.05	302.63	336.07	327.67	325.47	210.28	181.75	191.13	184.80	191.72
June	160.35	121.24	136.59	156.47	143.74	185.79	184.13	190.37	196.51	192.32
July	195.79	113.62	113.36	127.91	123.27	192.34	175.99	166.95	176.89	179.64
August	205.45	259.97	255.49	253.37	251.10	189.89	192.24	199.39	199.76	204.08
September	211.05	415.63	437.34	431.78	413.44	213.57	204.62	213.50	208.27	216.20
October	242.19	357.32	307.01	332.82	347.47	246.58	250.83	246.26	251.45	257.89
November	219.34	244.80	239.34	229.24	234.03	197.77	260.02	268.29	266.42	274.76
December	219.84	256.30	232.83	264.02	294.26	204.95	274.41	278.06	287.37	317.47
SSP 3-7.0										
January	189.69	117.55	105.27	125.62	123.96	138.12	157.46	156.22	164.30	178.95
February	65.02	22.70	30.87	22.32	27.15	85.58	73.49	75.38	69.24	67.79
March	121.51	36.59	25.10	23.27	24.19	83.44	85.06	80.47	74.95	71.52
April	154.28	93.52	82.33	88.37	76.42	143.31	110.34	107.36	103.05	97.91
May	206.05	335.31	315.13	310.40	261.64	210.28	188.93	185.83	181.35	176.49

	Gan					Maldives				
Period / **Average precipitation**	**Baseline (1995-2014)**	**2021-2040**	**2041-2060**	**2061-2080**	**2081-2100**	**Baseline (1995-2014)**	**2021-2040**	**2041-2060**	**2061-2080**	**2081-2100**
June	160.35	120.47	137.66	142.06	143.05	185.79	184.85	189.34	197.42	194.43
July	195.79	122.44	129.85	126.78	123.96	192.34	169.50	173.98	176.13	177.34
August	205.45	235.44	251.07	278.64	267.73	189.89	190.86	194.15	203.53	198.30
September	211.05	398.69	391.81	445.51	404.23	213.57	208.90	207.79	207.18	213.24
October	242.19	321.71	350.82	344.76	313.64	246.58	258.27	254.24	236.97	233.99
November	219.34	230.13	237.03	264.03	272.42	197.77	246.12	268.88	267.76	272.26
December	219.84	241.23	236.13	273.17	332.94	204.95	261.22	284.61	295.91	337.33
SSP 5-8.5										
January	189.69	104.31	125.51	135.32	137.77	138.12	148.24	162.26	167.74	187.14
February	65.02	36.39	33.29	46.42	41.01	85.58	77.69	76.97	80.55	74.92
March	121.51	31.14	29.84	35.27	25.63	83.44	80.08	83.55	77.33	73.20
April	154.28	91.12	100.26	97.87	80.06	143.31	105.24	108.04	107.13	98.19
May	206.05	281.92	319.03	325.67	284.21	210.28	177.76	188.45	187.66	185.53
June	160.35	123.03	150.15	144.11	146.31	185.79	182.64	187.37	187.12	191.06
July	195.79	117.57	117.36	112.69	125.35	192.34	172.37	170.86	168.71	171.10
August	205.45	234.89	266.17	270.13	244.69	189.89	197.25	197.91	202.38	183.86
September	211.05	412.57	442.10	409.63	356.90	213.57	213.31	211.91	209.28	191.55
October	242.19	344.10	338.60	319.28	286.09	246.58	259.75	243.91	235.84	221.05
November	219.34	214.73	232.30	280.75	259.24	197.77	246.79	252.69	267.80	259.01
December	219.84	246.75	245.33	272.96	317.43	204.95	266.03	269.31	306.37	331.89

Note: The ‘very likely’ and ‘likely’ ranges per month, per SSP, per station are available in a separate spreadsheet

3. Combination of precipitation and temperature

83. The combination category uses scatter plots to visualize interactions between precipitation and temperature results across individual model scenarios, supporting the identification of key marker scenarios for focused analysis.

84. Figure 66 to Figure 68 show the scatter plots for combined precipitation change (%) and temperature change (°C) over the projected periods, seasons, and months. The projections cover three stations (Hanimaadhoo, Gan, and Hulhule) and Maldives as a whole.

85. The **main findings** from the scatter plots reveal distinct patterns of climate changes:

(i) On an **annual** basis, Hanimaadhoo, Gan, and Maldives in general tend to experience both higher temperatures and increased precipitation, indicating a possible shift to a warmer and wetter climate. Hanimaadhoo will experience the highest increases for both annual temperature and precipitation. Hulhule tends to exhibit higher temperatures and lower precipitation, suggesting a potential shift to a drier climate;

(ii) The combination of higher temperatures with increased rainfall may indicate a more dynamic water cycle, characterized by greater evaporation and subsequent precipitation. While increased precipitation could potentially benefit agriculture, it also poses a risk to livelihoods and infrastructure in terms of flooding;

(iii) In the future, Hanimaadhoo and Gan may possibly experience drier conditions, particularly in the dry **season**, with a more pronounced trend for the north. Higher temperatures could lead to increased evaporation, and without sufficient rainfall, this may result in drier conditions. Decreased rainfall combined with higher temperatures can contribute to water scarcity, affecting agriculture, water supplies, and ecosystems;

(iv) The dry season in Hulhule may be wetter due to a significant increase in precipitation, while a slight increase in temperature, while the wet season may be drier, due to a significantly increased temperature, but decreased rainfall;

Figure 66: Combined projected annual change in precipitation (%) and temperature (°C)

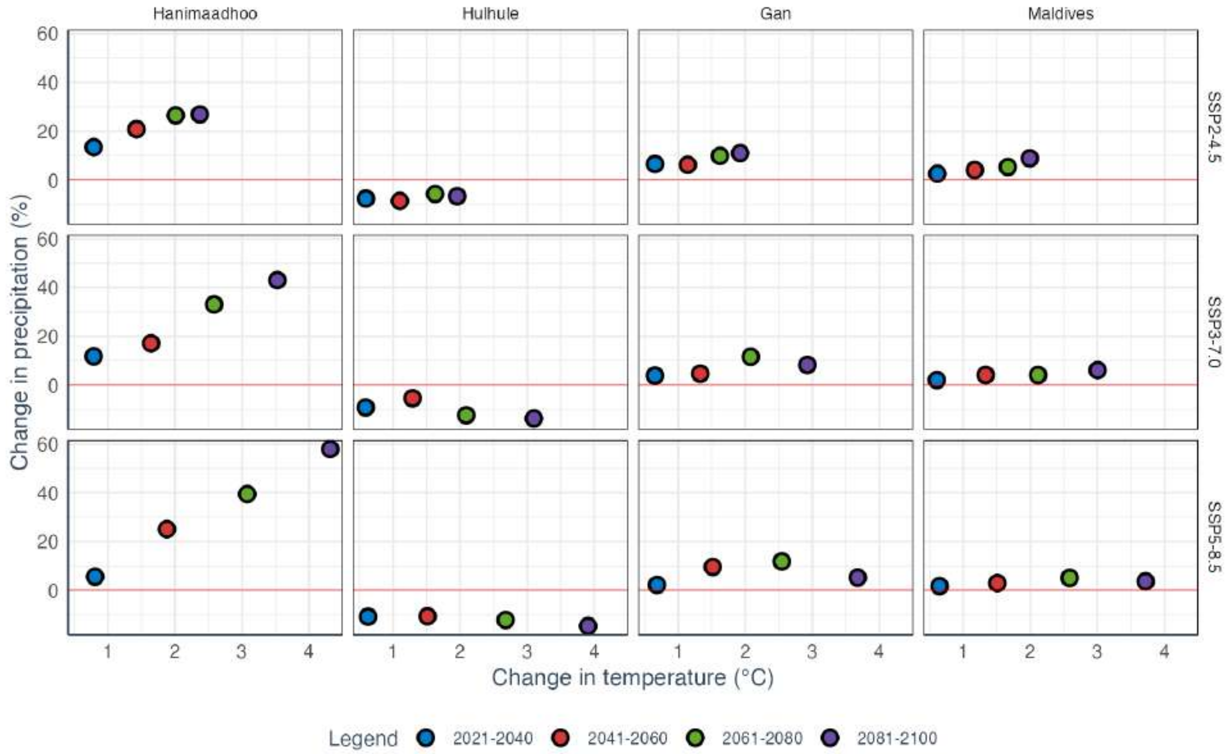


Figure 67: Combined projected seasonal change in precipitation (%) and temperature (°C)

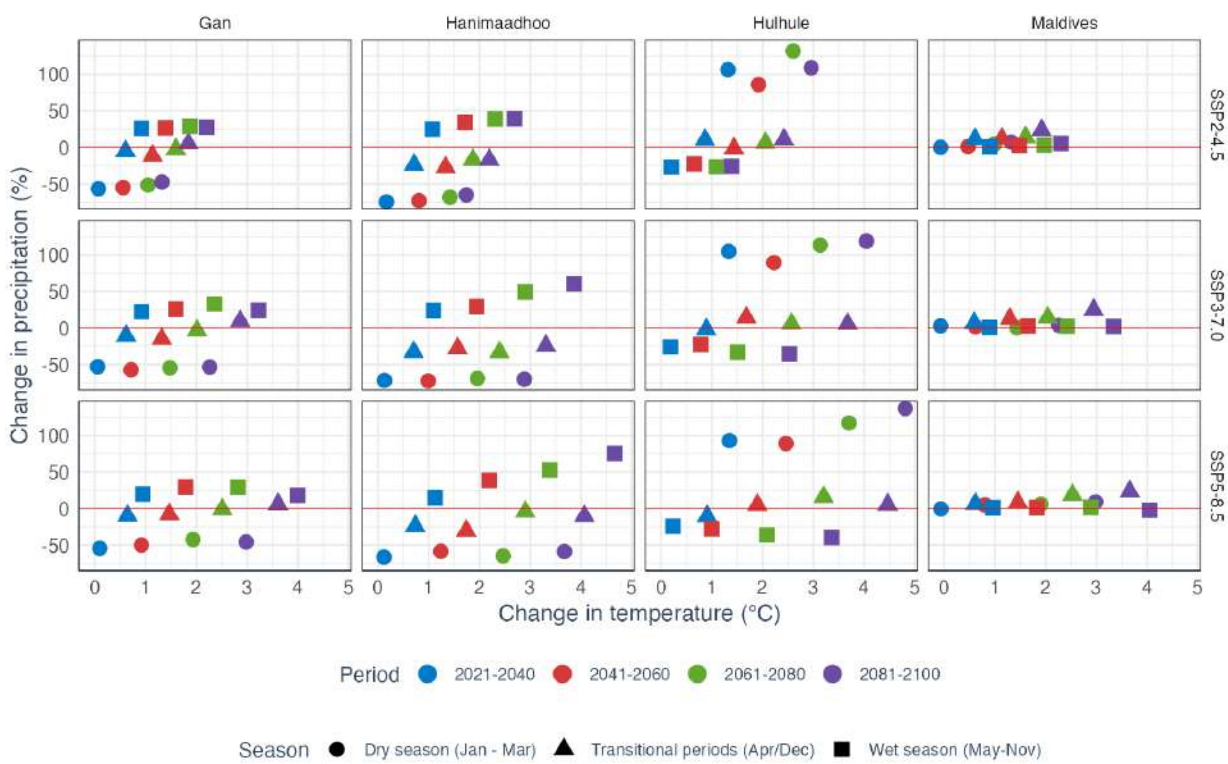
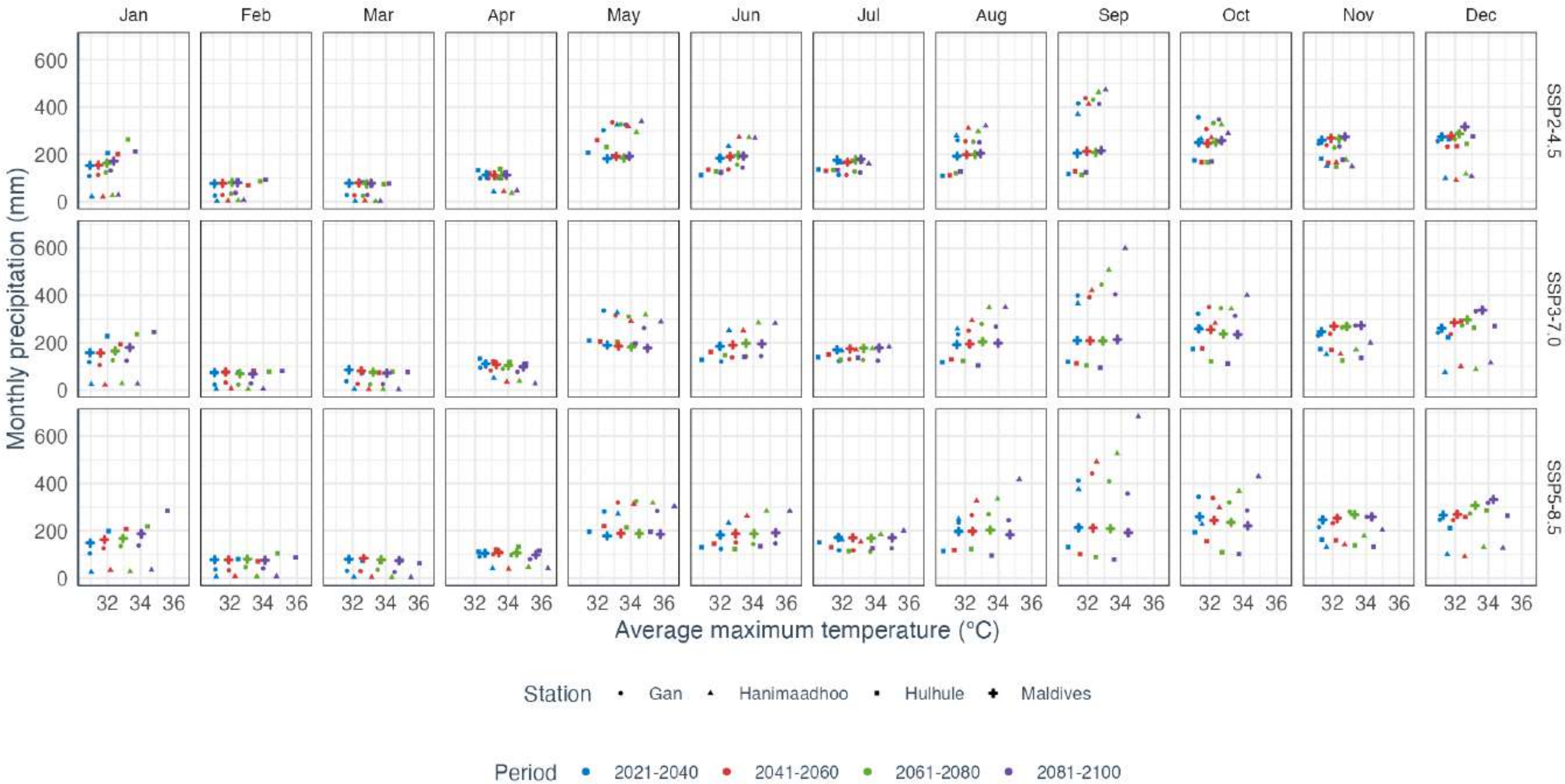


Figure 68: Combined projected monthly change in precipitation (%) and average maximum temperature (°C)



4. Extreme rainfall

86. Extreme rainfall has been estimated through changes in 1-day and 5-day maximum rainfall, at the three stations and in Maldives overall, for three SSPs and different return periods:

(i) Changes in 1-day maximum rainfall: Figure 69 to Figure 71, Figure 75 to Figure 77, and Table 27;

(ii) Changes in 5-day maximum rainfall: Figure 72 to Figure 74, Figure 75 to Figure 77, and Table 32.

87. The **main findings** are:

(i) Changes in 1-day and 5-days maximum rainfall are very variable per station, per scenario and per return period, with no very distinct pattern. However, overall, in most scenarios, increases in maximum rainfall are expected for all three stations:

- Hanimaadhoo will experience changes from +11.2% to +33.0% in 1-day maximum rainfall (of different return periods) from the current baseline of 110.0 mm (5y) to 147.7 mm (40y), and from -4.9% to +29.9% in 5-day maximum rainfall (of different return periods) from the current baseline of 295.4 mm (5y) to 467.6 mm (40y);
- Hulhule will experience changes from -1.4% to +23.4% in 1-day maximum rainfall (of different return periods) from the current baseline of 118.4 mm (5y) to 155.9 mm (40y), and from -4.5% to +32.0% in 5-day maximum rainfall (of different return periods) from the current baseline of 269.6 mm (5y) to 355.3 mm (40y);
- Gan will experience changes from +5.2% to +44.4% in 1-day maximum rainfall (of different return periods) from the current baseline of 135.5 mm (5y) to 190.3 mm (40y), and from -10.8% to +31.4% in 5-day maximum rainfall (of different return periods) from the current baseline of 327.3 mm (5y) to 535.5 mm (40y).

Figure 69: Projected change (%) in 1-day maximum rainfall, for different return periods for SSP2-4.5

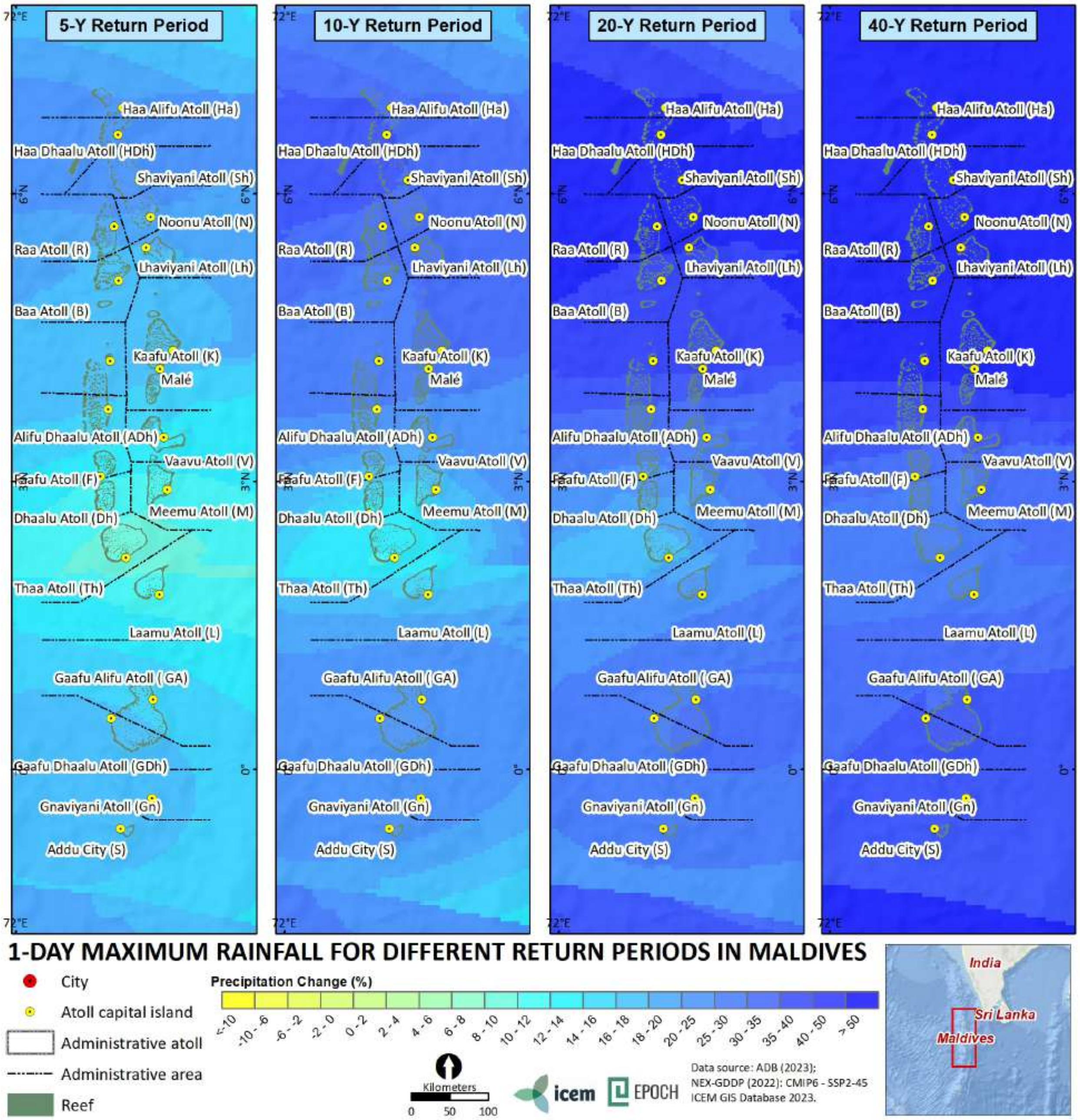


Figure 70: Projected change (%) in 1-day maximum rainfall, for different return periods for SSP3-7.0

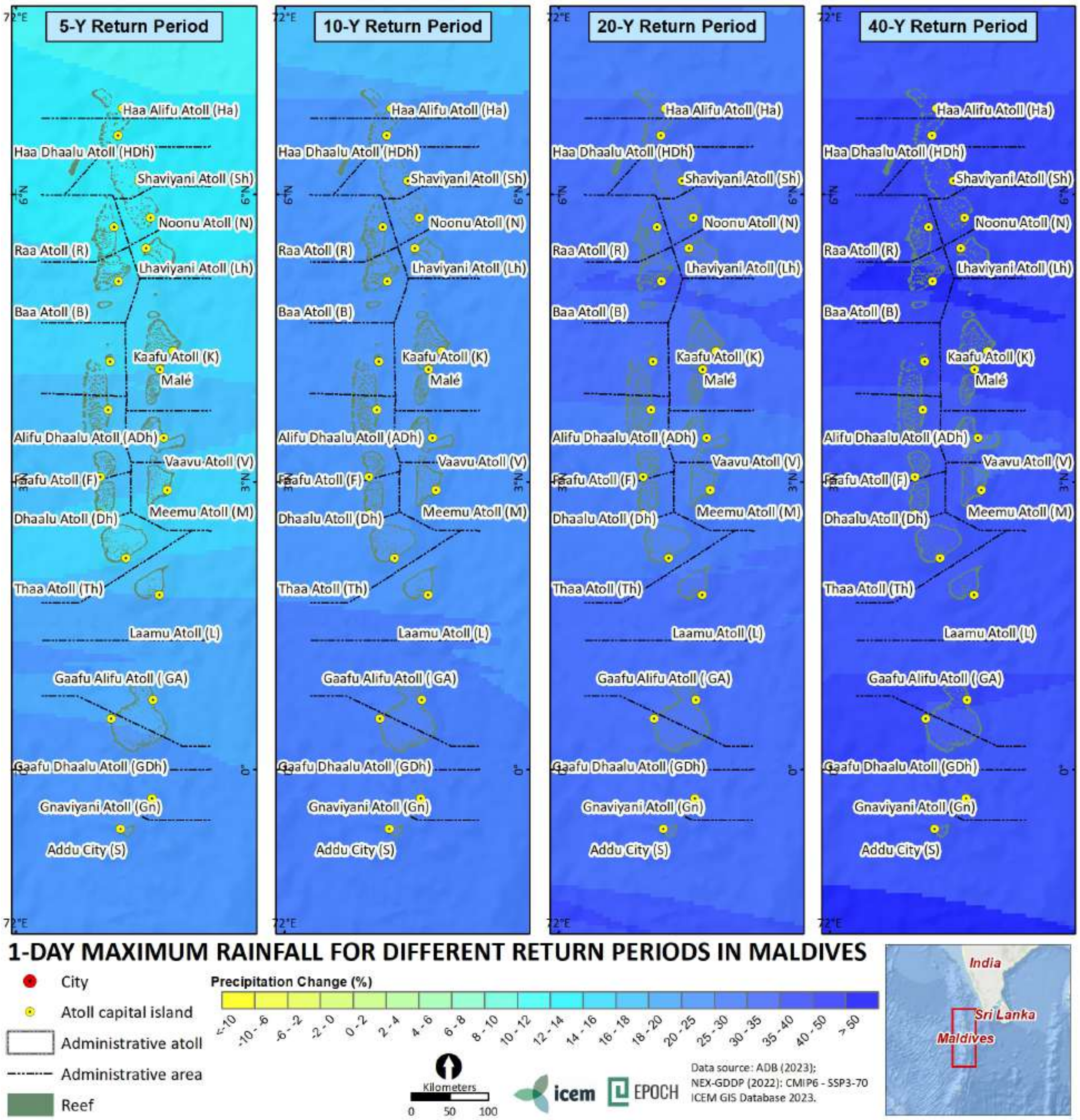


Figure 71: Projected change (%) in 1-day maximum rainfall, for different return periods for SSP5-8.5

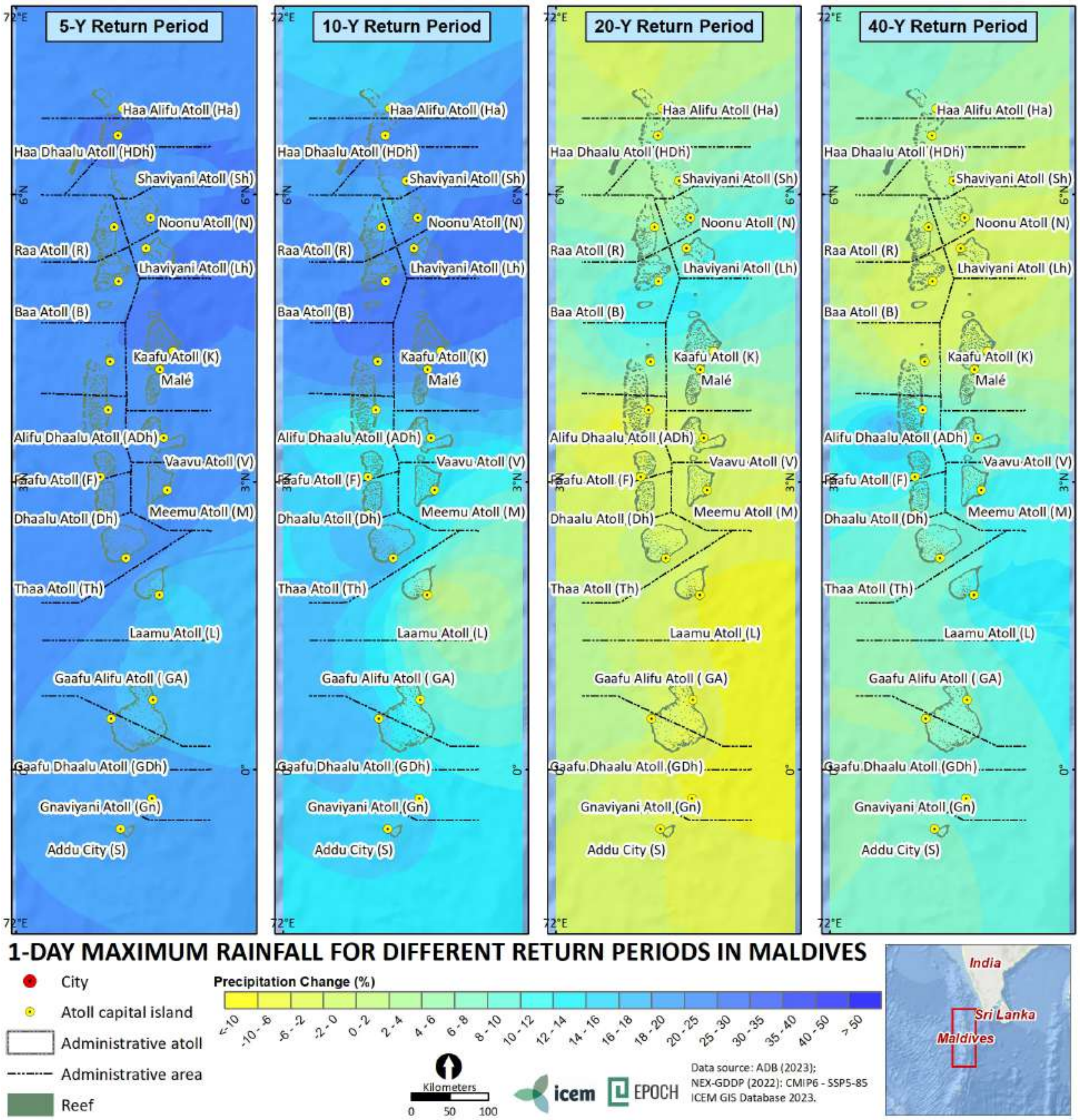


Figure 72: Projected change (%) in 5-day maximum rainfall, for different return periods, for SSP2-4.5

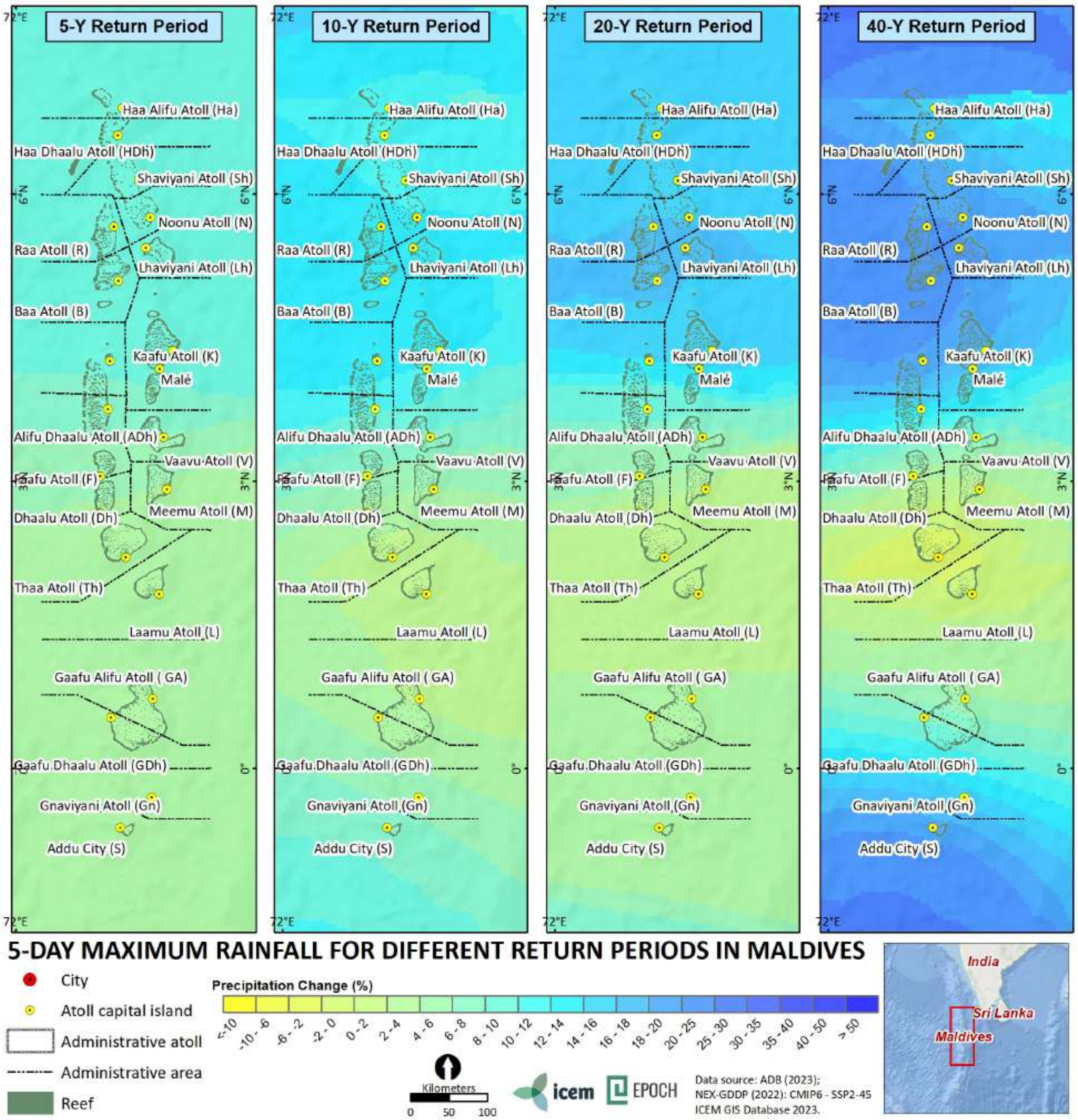


Figure 73: Projected change (%) in 5-day maximum rainfall, for different return periods, for SSP3-7.0

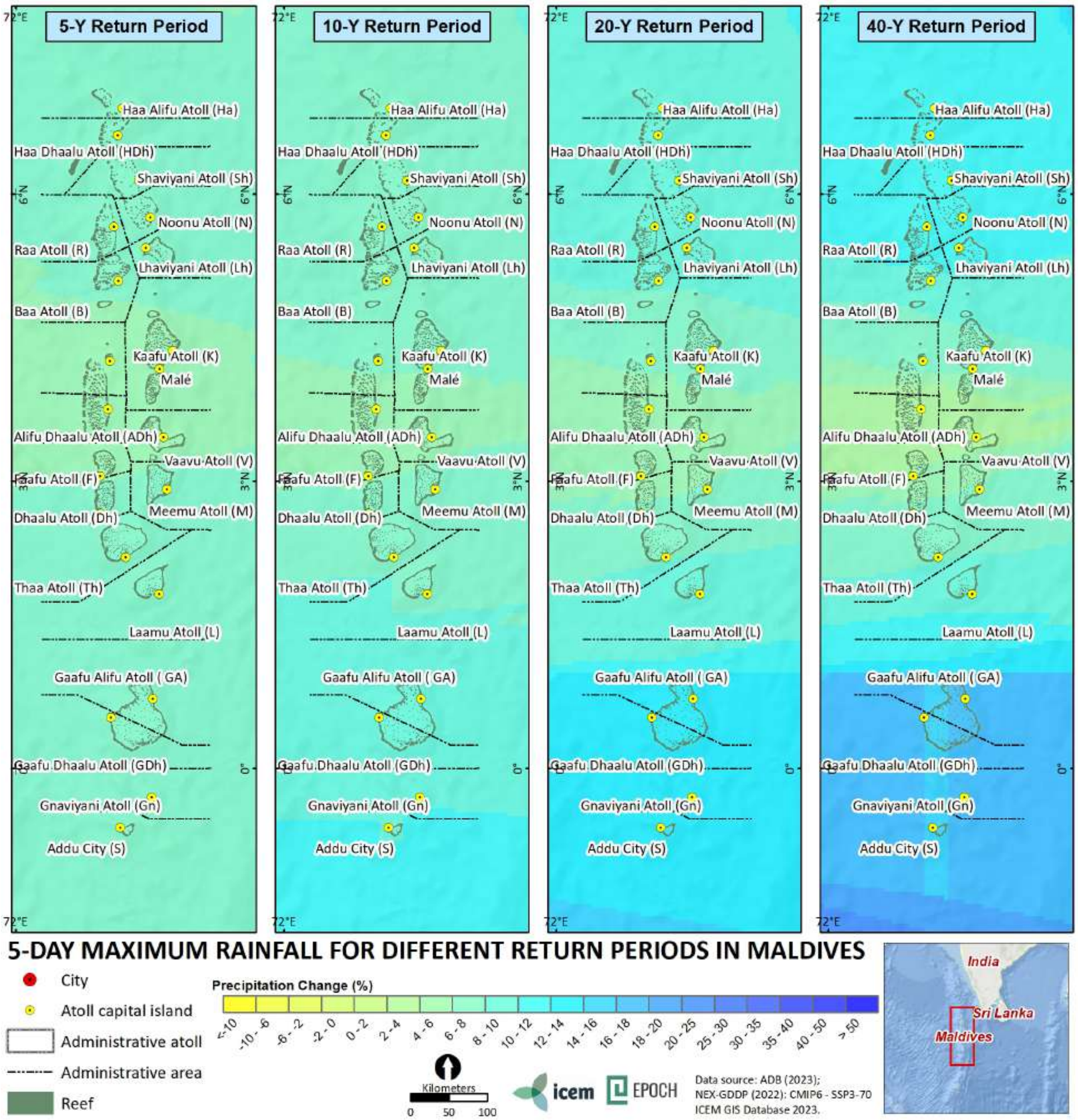


Figure 74: Projected change (%) in 5-day maximum rainfall, for different return periods, for SSP5-8.5

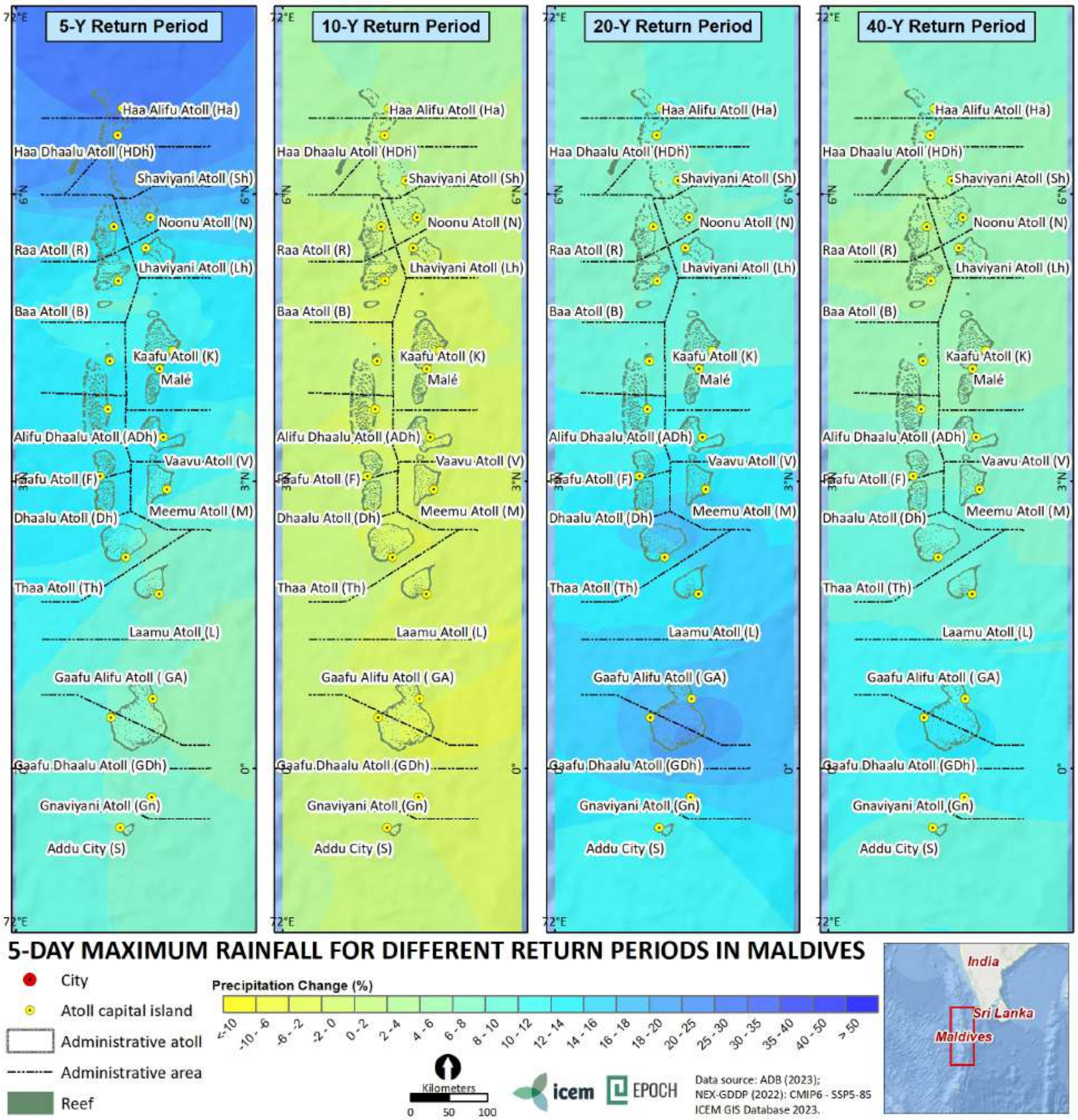
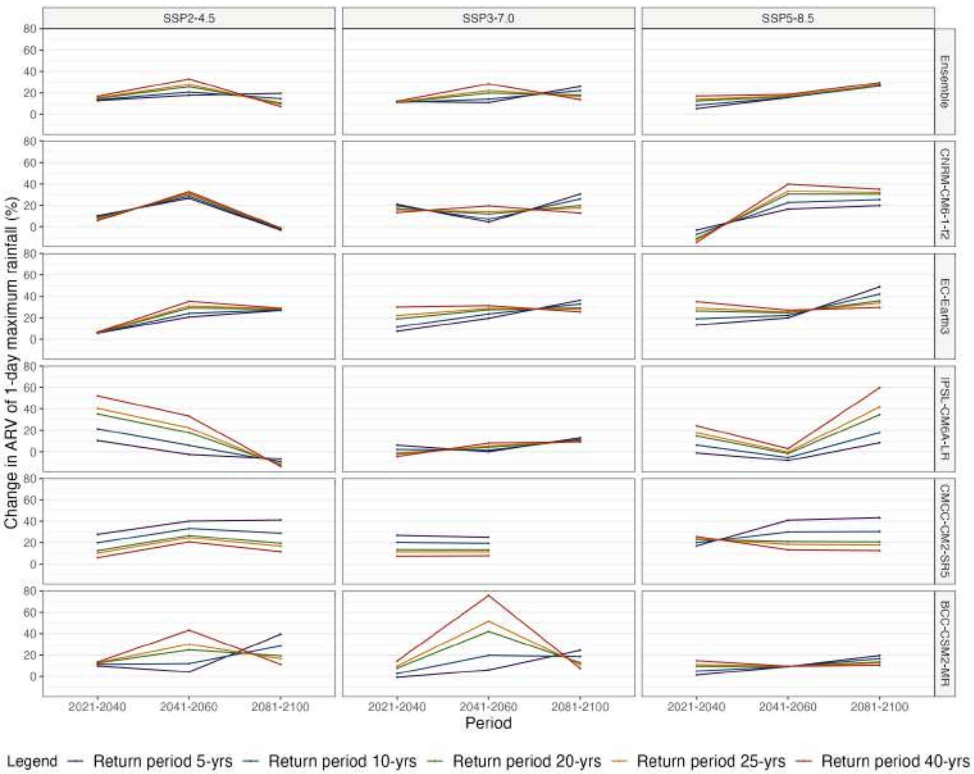


Figure 75: Change (%) in average return value of 1-day (left) and 5-day (right) maximum rainfall in Hanimaadhoo, for different return periods



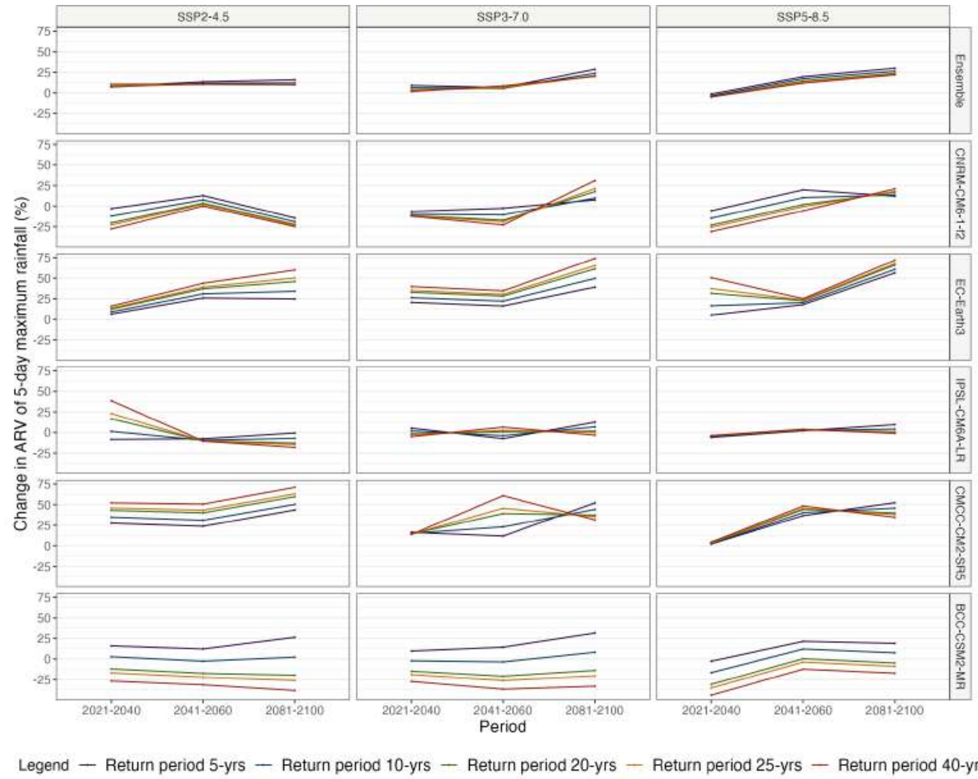


Figure 76: Change (%) in average return value of 1-day (left) and 5-day (right) maximum rainfall in Hulhule, for different return periods

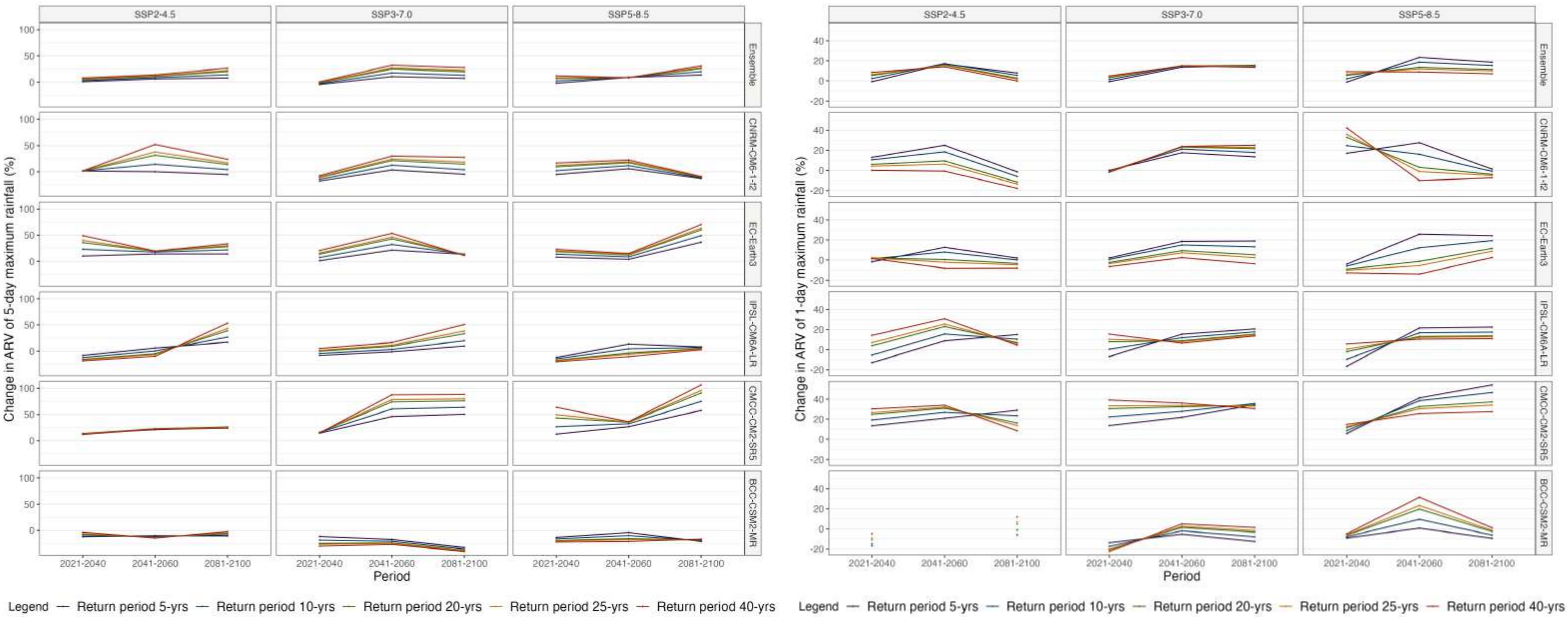


Figure 77: Change (%) in average return value of 1-day (left) and 5-day (right) maximum rainfall in Gan, for different return periods

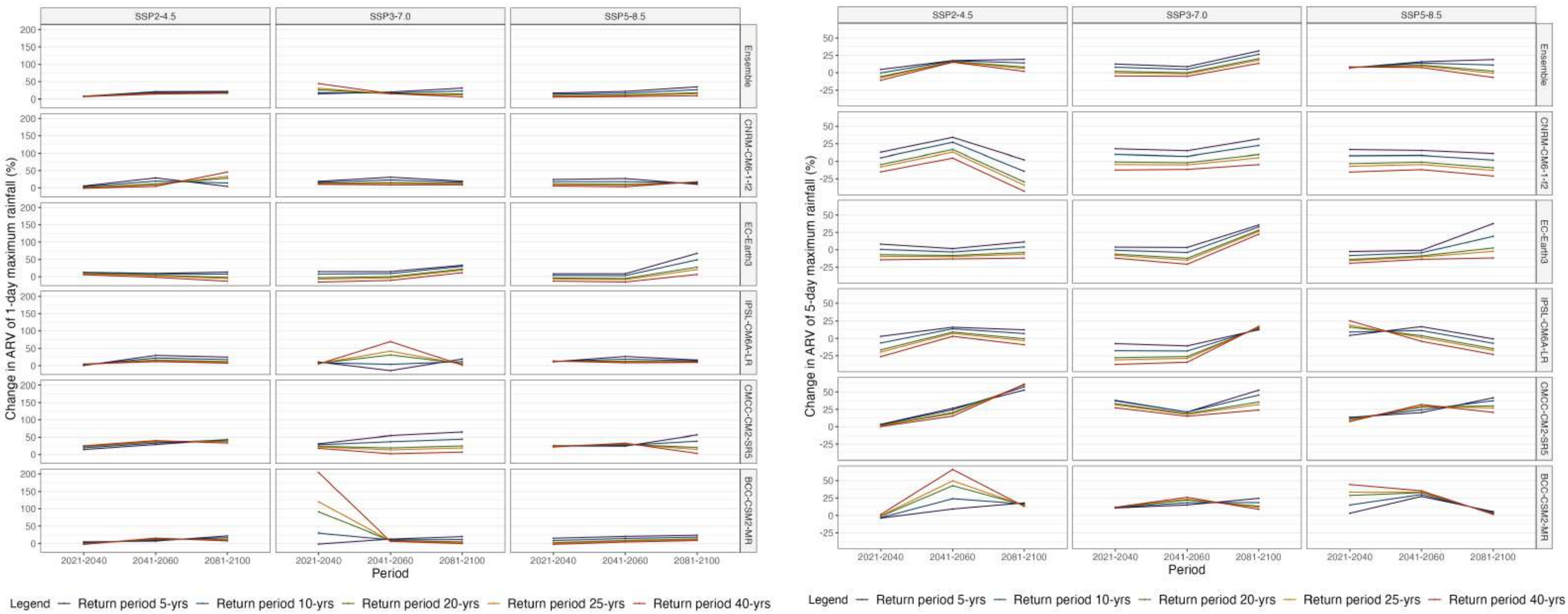


Table 27: Change (%) in average return value of 1-day maximum rainfall

		Change compared to baseline (%)				
		Return period				
Hanimaadhoo station	**Period**	**5-yrs**	**10-yrs**	**20-yrs**	**25-yrs**	**40-yrs**
	Baseline (1995-2014)	109.89	123.56	136.04	139.88	147.73
SSP2.4-5	2021-2040	12.83	13.58	14.85	15.40	16.80
	2041-2060	17.81	20.73	25.74	27.82	32.99
	2081-2100	19.52	14.65	10.65	9.51	7.33
SSP3.7-0	2021-2040	12.10	11.19	11.18	11.38	12.17
	2041-2060	11.05	14.17	19.78	22.19	28.41
	2081-2100	25.96	22.11	17.96	16.60	13.78
SSP5.8-5	2021-2040	5.45	8.62	12.51	13.90	17.05
	2041-2060	15.69	15.79	16.75	17.23	18.52
	2081-2100	27.94	26.47	26.93	27.51	29.51
Hulhule station	**Period**	**5-yrs**	**10-yrs**	**20-yrs**	**25-yrs**	**40-yrs**
	Baseline (1995-2014)	118.43	134.30	150.51	155.94	167.82
SSP2.4-5	2021-2040	-0.97	2.19	5.21	6.18	8.27
	2041-2060	16.81	17.18	15.99	15.40	13.97
	2081-2100	7.67	5.31	2.55	1.64	-0.24
SSP3.7-0	2021-2040	-0.97	1.10	2.99	3.57	4.76
	2041-2060	13.61	14.80	15.05	15.00	14.74
	2081-2100	15.00	15.29	14.58	14.23	13.37
SSP5.8-5	2021-2040	-1.38	1.95	5.39	6.53	9.00
	2041-2060	23.39	18.60	13.43	11.84	8.72
	2081-2100	18.56	15.26	11.18	9.82	6.94
Gan station	**Period**	**5-yrs**	**10-yrs**	**20-yrs**	**25-yrs**	**40-yrs**
	Baseline (1995-2014)	135.48	153.02	170.88	176.90	190.25
SSP2.4-5	2021-2040	7.54	7.79	7.39	7.13	6.44
	2041-2060	20.90	18.68	16.37	15.64	14.11
	2081-2100	21.56	19.82	17.83	17.24	16.18
SSP3.7-0	2021-2040	14.75	18.12	26.32	30.73	44.36
	2041-2060	19.70	16.67	14.78	14.63	15.29
	2081-2100	31.26	22.82	14.19	11.45	5.81
SSP5.8-5	2021-2040	16.88	13.60	9.55	8.17	5.17
	2041-2060	21.47	16.30	11.31	9.79	6.74
	2081-2100	34.95	26.64	17.69	14.86	9.12

Table 28: Change (%) in average return value of 5-day maximum rainfall

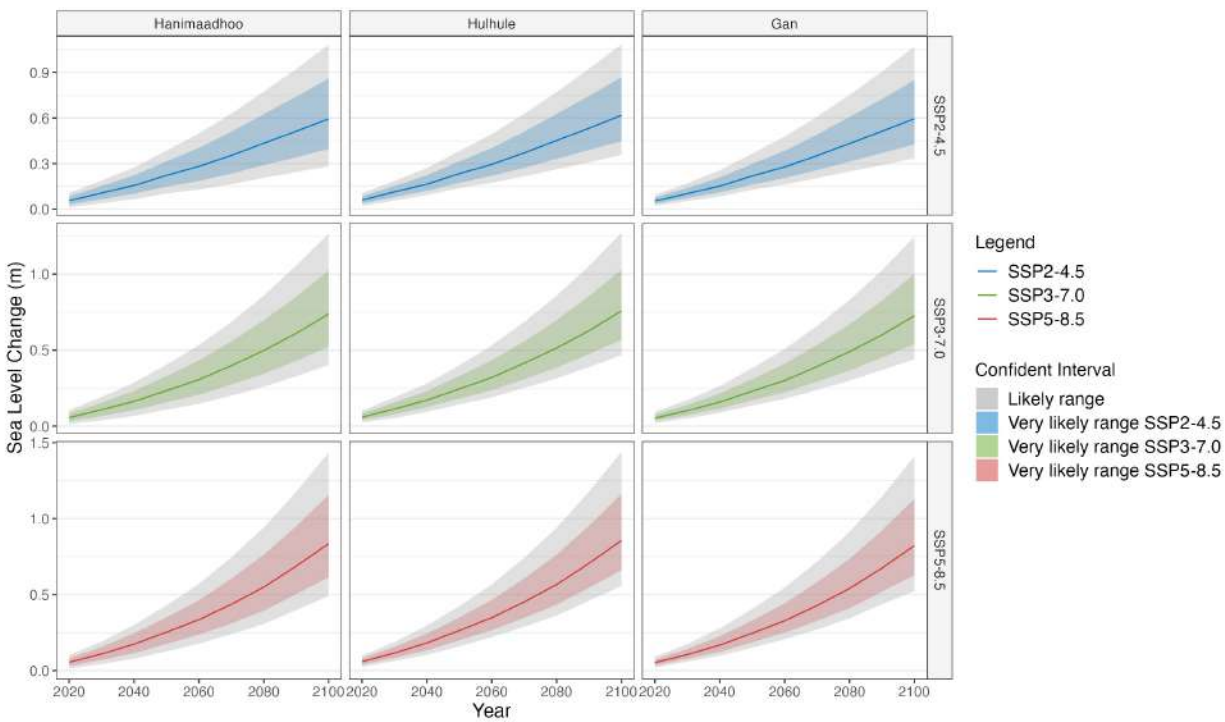
		Change compared to baseline (%)				
		Return period				
Hanimaadhoo station	**Period**	**5-yrs**	**10-yrs**	**20-yrs**	**25-yrs**	**40-yrs**
	Baseline (1995-2014)	295.41	348.16	404.25	423.66	467.56
SSP2.4-5	2021-2040	7.71	7.20	7.99	8.59	10.48
	2041-2060	13.44	11.52	10.60	10.49	10.55
	2081-2100	15.93	12.15	10.16	9.90	9.95
SSP3.7-0	2021-2040	9.10	6.30	3.86	3.16	1.79
	2041-2060	6.47	5.46	6.08	6.65	8.49
	2081-2100	28.53	23.71	20.80	20.31	20.02
SSP5.8-5	2021-2040	-1.38	-3.49	-4.70	-4.86	-4.77
	2041-2060	19.59	17.10	14.47	13.63	11.88
	2081-2100	29.88	26.34	23.73	23.05	21.87
Hulhule station	**Period**	**5-yrs**	**10-yrs**	**20-yrs**	**25-yrs**	**40-yrs**
	Baseline (1995-2014)	269.61	300.35	328.56	337.30	355.32
SSP2.4-5	2021-2040	0.87	2.98	5.35	6.17	8.00
	2041-2060	6.16	8.70	11.13	11.95	13.79
	2081-2100	7.81	13.99	20.08	22.07	26.34
SSP3.7-0	2021-2040	-4.50	-2.90	-1.25	-0.69	0.54
	2041-2060	10.45	17.54	24.69	27.03	32.03
	2081-2100	7.21	13.02	19.68	22.04	27.39
SSP5.8-5	2021-2040	-2.10	2.27	6.92	8.52	12.09
	2041-2060	9.09	9.43	9.07	8.87	8.34
	2081-2100	13.57	19.85	25.46	27.17	30.69
Gan station	**Period**	**5-yrs**	**10-yrs**	**20-yrs**	**25-yrs**	**40-yrs**
	Baseline (1995-2014)	327.29	387.66	455.94	480.16	535.47
SSP2.4-5	2021-2040	4.75	-0.25	-5.54	-7.25	-10.83
	2041-2060	17.55	17.20	16.15	15.79	15.15
	2081-2100	19.27	14.13	8.18	6.21	2.05
SSP3.7-0	2021-2040	12.54	7.96	2.00	-0.08	-4.58
	2041-2060	8.75	4.87	0.08	-1.56	-5.10
	2081-2100	31.39	26.57	20.33	18.18	13.57
SSP5.8-5	2021-2040	7.00	7.23	7.59	7.80	8.47
	2041-2060	15.82	13.92	10.98	9.90	7.50
	2081-2100	18.96	11.12	2.26	-0.65	-6.75

5. Sea level rise

88. Sea level projections for three SSP scenarios, relative to a baseline of 1995-2014, in meters are shown in Figure 78. Table 29 to Table 31 show individual contributions for the selected year for the two stations[59], with median values shown as '[*likely ranges*]'. Average rates for total sea-level change are shown in mm yr-1.

89. The main findings on sea level rise are:
   (i) Sea levels are projected to increase at all stations, with a slightly higher sea level increase at Hulhule and Hanimaadhoo than in Gan, for all three SSPs. The rate per year is the highest for Hulhule, in the 2050s as well as 2090s;
   (ii) 2030 will see an average sea level rise of 0.10m to 0.12m, 2050 a rise of 0.20m to 0.26m and 2080 a rise of 0.43m to 0.57m.

Figure 78: Projected sea level rise (m) under different SSP scenarios, for Hulhule and Gan stations



59 There was no tidal data provided for Hanimaadhoo station.

Table 29: Summary of projected total sea level rise (m) and rates (mm/year) for selected time periods and three SSPs at Hulhule station

Year and rate	SSP 2-4.5	SSP 3-7.0	SSP 5-8.5
Total (2030) (m)	0.11 [0.08–0.15]	0.11 [0.08–0.15]	0.12 [0.08–0.16]
Total (2050) (m)	0.23 [0.17–0.31]	0.24 [0.18–0.33]	0.26 [0.20–0.35]
Total (2080) (m)	0.45 [0.33-0.63]	0.51 [0.39-0.70]	0.57 [0.43-0.76]
Total (2100) (m)	0.62 [0.45–0.87]	0.76 [0.57–1.03]	0.86 [0.66–1.16]
Rate (2040-2060) (mm/year)	6.2 [4.3–9.0]	7.0 [4.8–9.8]	7.9 [5.6–11.0]
Rate (2080-2100) (mm/year)	8.3 [5.4–12.6]	11.4 [7.8–16.4]	13.7 [9.4–20.3]

Table 30: Summary of projected total sea level rise (m) and rates (mm/year) for selected time periods and three SSPs at Gan station

Year and rate	SSP2-4.5	SSP3-7.0	SSP5-8.5
Total (2030) (m)	0.10 [0.07–0.13]	0.10 [0.07–0.14]	0.10 [0.07–0.14]
Total (2050) (m)	0.20 [0.14–0.28]	0.22 [0.16–0.30]	0.23 [0.17–0.31]
Total (2080) (m)	0.43 [0.31-0.61]	0.49 [0.37-0.67]	0.54 [0.41-0.74]
Total (2100) (m)	0.47 [0.31–0.70]	0.59 [0.43–0.85]	0.73 [0.54–1.00]
Rate (2040-2060) (mm/year)	5.2 [3.4–7.8]	6.1 [4.1–8.8]	6.8 [4.6–9.4]
Rate (2080-2100) (mm/year)	6.0 [3.0–9.8]	8.3 [5.2–12.7]	11.1 [7.4–16.2]

Table 31: Summary of projected total sea level rise (m) and rates (mm/year) for selected time periods and three SSPs at Hanimaadhoo station

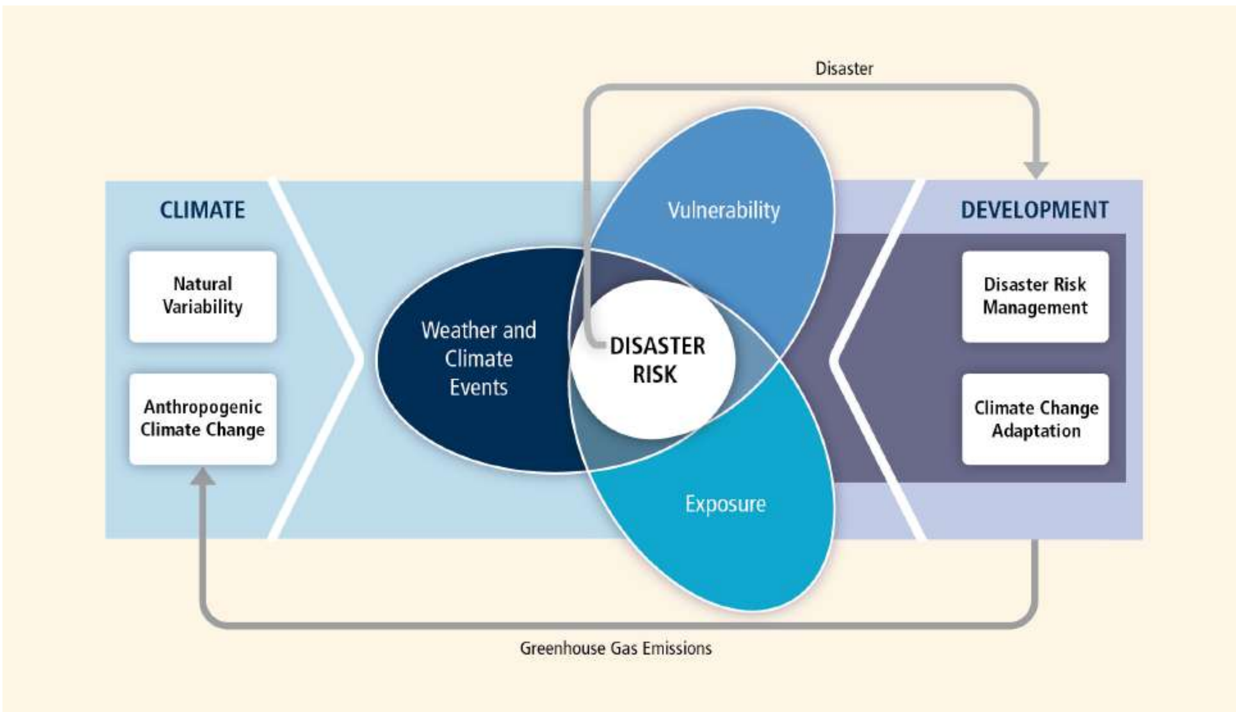
Year and rate	SSP2-4.5	SSP3-7.0	SSP5-8.5
Total (2030) (m)	0.11 [0.07–0.15]	0.11 [0.07–0.16]	0.11 [0.07–0.16]
Total (2050) (m)	0.22 [0.15–0.31]	0.23 [0.16–0.33]	0.25 [0.18–0.35]
Total (2080) (m)	0.43 [0.29-0.63]	0.50 [0.35-0.70]	0.55 [0.39-0.76]
Total (2100) (m)	0.59 [0.40–0.86]	0.74 [0.52–1.02]	0.84 [0.61–1.16]
Rate (2040-2060) (mm/year)	6.0 [2.0–10.0]	6.0 [2.0–10.0]	7.0 [3.0–11.0]
Rate (2080-2100) (mm/year)	8.0 [3.0–13.0]	10.0 [6.0–16.0]	13.0 [8.0–20.0]

IV. COUNTRY-LEVEL CLIMATE RISK ASSESSMENT

A. Methodology

90. IPCC's risk framework[60] (Figure 79) has been used as the main interpretative framework for the climate risk assessment, with risk determined by the dynamic interactions between climate-related hazards with the exposure and vulnerability of the affected elements or systems (people, infrastructure, ecological etc.). Adaptation is defined, in human systems, as 'the process of adjustment to actual or expected climate and its effects in order to moderate harm or exploit beneficial opportunities'. In natural systems, adaptation is 'the process of adjustment to actual climate and its effects; human intervention may facilitate this'.[61]

Figure 79: Risk framework applied for the climate change analysis



[60] IPCC, 2021: *Climate Change 2021: The Physical Science Basis.* Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson-Delmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, In press.

[61] The concept of 'resilience', while commonly used, has been avoided in this risk assessment as it is hard to measure, multi-interpretable and overlapping with vulnerability, disaster risk reduction and climate change adaptation. IPCC describes it as 'the capacity of interconnected social, economic and ecological systems to cope with a hazardous event, trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity and structure. Resilience is a positive attribute when it maintains capacity for adaptation, learning and/or transformation' (IPCC, 2021, Ibid.). When applied at the community level, a 'resilient community' can be defined as 'a social entity that is able to absorb and recover from shocks (*absorption capacity*), to adapt to and manage change (*adaptive capacity*) and to transform itself in a way that its social cohesion is maintained and the basic needs of its members are met without compromising their long-term prospects (*transformative capacity*)'. Swiss NGO DRR Platform. 2017. E-Learning Course "*Disaster Risk Reduction and Climate Change Adaptation*". https://drrplatform.org/tools/e-learning-course-disaster-risk-reduction-and-climate-change-adaptation/ (accessed on 21 August 2023).

91. The geographical unit of analysis or ‘system/element at risk’ for the national-level exposure and vulnerability assessment is the inhabited islands in Maldives. Maldives has over 1,192 islands, but only 189 are inhabited.

92. The national-level risk assessment has been performed as follows:

(i) *Geospatial representation of systems or elements at risk:* The target system or element at risk (i.e., islands) has been represented in a GIS environment through a process called georeferencing. Georeferencing of the inhabited islands has been done using 2023 polygons data from the Maldives Land and Survey Authority;[62]

(ii) *Hazard zoning*: Hazard zoning has been done primarily based on the classification of hazard susceptibility, indicating where hazard events are prone to occur. The zoning has been done at country level for the following hazards: pluvial floods, *udha*, storm surge, wind storm, and coastal erosion – selected as most relevant for the investment project and based on data availability (especially at island level). Climate change was considered as part of pluvial floods by integrating the increase of 1-day maximum rainfall for 10-year return period in 2050. Existing zoning maps from ADB were used.[63] For each of the hazards five classes were created to indicate very-high to very-low susceptibility levels and ensure consistent classes among all hazards (Table 33);

(iii) *Exposure mapping and analysis:* Exposure refers to the number or proportion of elements at risk that are located in a hazard prone area. This has been done by overlaying the georeferenced island with the reclassified hazard zoning maps, assigning one very-high to very-low exposure value per island (Table 33). The exposure values per each hazard for each island were also combined in a multi-hazard exposure score, by summing up the exposure values for each hazard, applying equal weights. Exposure maps have been prepared for each hazard and multi-hazard;

(iv) *Vulnerability analysis:* Vulnerability refers to the conditions determined by physical, social, economic and environmental factors or processes which increase the susceptibility of an individual, a community, assets or systems to the impacts of hazards and climate change.[64] To assess the vulnerability of the inhabited islands in Maldives, three indices have been developed, for physical, socio-economic and environmental vulnerability, with each of them combining a number of parameters as shown in Table 32.

The data and values for each of the vulnerability parameters have been classified into five one very-high to very-low classes, as shown in Table 33. All the composite exposure and vulnerability scores were reclassified into five classes (very low to very high) using a quintile analysis.

(v) *Risk analysis:* The values for multi-hazard exposure and vulnerability have been combined applying the risk matrix in Figure 81.

(vi) *Hotspot identification:* To support the prioritization of locations for the investment project, hotspots have been identified. Multi-hazard exposure and vulnerability

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[62] Maldives Land and Survey Authority. 2023. National Map of Maldives (accessed on 10 November 2023).

[63] Asian Development Bank, Ministry of Environment. 2020. *Multihazard Risk Atlas of Maldives.* Manila, Philippines.

[64] United Nations, General Assembly. 1 December 2016. *Report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction*. A/71/644.

hotspots are defined as the islands with high to very high values for the respective dimensions of exposure and vulnerability, and combined.

Table 32: Selected parameters and data sources for the national-level risk assessment

Risk assessment	Parameter	Data source
Exposure		
Pluvial flood	Rain-induced flood susceptibility	Multihazard Risk Atlas of Maldives. Ministry of Environment and ADB, 2020.[65]
Udha	Udha vulnerability	
Storm surge	Surge hazard	
Wind storm	Cyclonic wind hazard through probable maximum wind speed (knots)	
Coastal erosion	Coastal erosion severity	
Extreme rainfall	Increase of 1-day maximum rainfall for 10-year return period in 2050	Computed by ICEM from historical rainfall data provided by MMS.
Vulnerability		
Land area	Percentage of built-up area out of the total land area	ESRI Sentinel-2 Land Cover Explorer.
Critical facilities	Number and type of schools	Multihazard Risk Atlas of Maldives. Ministry of Environment and ADB, 2020.
	Number and type of health facilities	
	Number of harbors and ports	
	Number of airports	Updated until 2023 by ICEM from available online resources.
Power stations	Total installed capacity (kW)	Island Electricity Databook 2019, Ministry of Environment and Energy Ministry of Climate Change, Environment and Energy 2019
Population	Number of people per island	Maldives Population and Housing Census 2022, Maldives National Bureau of Statistic, 2023.
Poverty	Multi-dimensional poverty (MPI) index	Multidimensional Poverty Index, Maldives Bureau of Statistics, 2020.
Female employment	Female-employment-to-population ration	Maldives Population and Housing Census 2022, Maldives National Bureau of Statistic, 2023.
Dependency	Dependency ratio	
Remoteness	Distance (in km) of the island to the capital city	
Income	Monthly per capita income (in MVR)	HIES 2019 – Expenditure, Maldives Bureau of Statistics
Natural area	Percentage of natural area (trees, crops, flooded vegetation, rangeland and on-land water body) out of the total island land area	ESRI Sentinel-2 Land Cover Explorer.
Reef area	Ratio of reef area within 500m of the island, in proportion to the total island area	National Map of Maldives, Maldives Land and Survey Authority, 2023.
Reef health	Level of coral reef health, based on the thermal stress regime	Maldives Bleaching Risk Assessment Tool, Ministry of Environment and Energy.[66]

[65] Developed as part of the ADB-funded *Establishing a National Geospatial Database for Mainstreaming Climate Change Adaptation into Development Activities and Policies in Maldives*, as part of the regional technical assistance *Action on Climate Change in South Asia (2013-2018).*
[66] Tool developed by the Marine Spatial Ecology Lab, University of Queensland, Australia, as part of the World Bank-funded *Wetlands Conservation and Coral Reef Monitoring for Adaptation to Climate Change Project for Maldives*.

Table 33: Classification system for parameters for very low to very high vulnerability

Risk assessment	Parameter	Classification				
		Very low	Low	Medium	High	Very High
Pluvial flood	Rain-induced flood susceptibility	-	low	medium	high	-
Extreme rainfall	Increase of 1-day maximum rainfall for 10-year return period in 2050	≤ 13.44	13.45-15.95	15.95-19.66	19.67-22.11	>22.11
Pluvial flood with climate change	Applying a risk matrix (see Figure 80)	-	-	-	-	-
Udha	Udha vulnerability	≤ 0.100	0.101-0.2	0.201-0.5	0.501-1.0	> 1.0
Storm surge	Surge hazard	1	2	3	4	5
Wind storm	Cyclonic wind hazard through probable maximum wind speed (knots)	1	2	3	4	5
Coastal erosion	Coastal erosion severity	1	2	3	4	5
Multi-hazard exposure	Sum of 5 hazard sub-parameters, with equal weights	≤ 9	9-11	12-13	14-15	> 15
Land area	% built-up area out of the total land area	≤ 10%	11-20%	21-40%	41-80%	> 80%
Critical facilities – health and education[67]	Number and type of schools Number and type of health facilities	≤ 3	3-5	6-7	8-9	> 9
Critical facilities - transport[68]	Number of harbors and ports Number of airports	0	1	2	3-4	> 4
Power station	Total installed capacity (kW)	≤ 250	251 - 500	501 – 1,000	1,001 – 5,000	> 5,000
Physical vulnerability	Sum of 4 sub-parameters, with equal weights	≤ 10	11	12	13	> 13
Population	Number of people per island	≤ 500	501-1,000	1,001 – 2,500	2,501 – 10,000	> 10,000
Poverty	Multi-dimensional poverty index	≤ 0.185	0.186-0.198	0.199-0.2	0.201-0.231	>0.231
Female employment	Female-employment-to-population ration	> 80%	61-80%	41-60%	31-40%	≤ 30%
Dependency	Dependency ratio	≤ 30%	31-40%	41-60%	61-80%	> 80%
Remoteness	Distance (in km) of the island to the capital city	≤ 50 km	51-100 km	101-200 km	201-400 km	> 400 km
Income	Monthly per capita income (in MVR)	≤ 3,500	3,501 – 4,000	4,001 – 4,500	4,501 – 5,000	>5,000

[67] For education facilities: a score '1' is assigned to the island if it has only 1 preschool, a score '2' if it has more than 1 pre-school, a score '3' if it also has more than one 'other schools'. For health facilities: a score '3' is assigned to the island if it has a Level-1 health facility only, a score '5' if it has a Level-2 health facility, and a score '6' if it has a Level-3 health facility. The total score for the 'critical facilities – health and education' parameter is the sum of the score for each. For islands with none of these facilities, the score is '0'.

[68] Score '1' means 1 to 4 harbors on the island (and no port or airport), score '2' means more than 4 harbors on the island (and no port or airport), score '3' means more than 4 harbors and a port on the island (but no airport), score '4' means more than 4 harbors, a port and an airport on the island. For islands with none of these facilities, the score is '0'.

Risk assessment	Parameter	Classification				
		Very low	Low	Medium	High	Very High
Social vulnerability	Sum of 6 sub-parameters, with MPI weighted by 2, while others 1	≤ 19	20-21	22-23	24-27	> 27
Natural area	% natural area out of the total island land area	≤ 10%	11-20%	21-40%	41-80%	> 80%
Reef area	Ratio of reef area within 500m of the island, in proportion to the total island area	≤ 1.056	1.057-1.684	1.685-2.963	2.964-5.003	> 5.003
Reef health	Level of coral reef health, based on the thermal stress regime	None	C (low acute, low chronic)	D (high acute, low chronic)	A (low acute, high chronic)	B (high acute, high chronic)
Environmental vulnerability	Sum of 3 sub-parameters, with equal weights	≤ 6	7-8	9	10	> 10
Multi-dimensional vulnerability	Sum of 3 dimensions, with equal weights	≤ 6	7-8	9	10-11	> 11
Exposure and vulnerability	Applying a risk matrix (see Figure 81)	-	-	-	-	-

Figure 80: Matrix for composing exposure to pluvial flood hazard with climate change

		1day maximum rainfall change for 10 year return period				
		Very Low	Low	Medium	High	Very High
Rainfall induce flood	Very High	Medium	Medium	High	Very High	Very High
	Medium	Low	Medium	Medium	High	Very High
	Very Low	Very Low	Low	Low	Medium	High

Figure 81: Matrix for developing multi-hazard exposure and vulnerability scores and maps

		Vulnerability score				
		Very Low	Low	Medium	High	Very High
Exposure to hazard score	Very High	Medium	Medium	High	Very High	Very High
	High	Low	Medium	Medium	High	Very High
	Medium	Low	Medium	Medium	High	Very High
	Low	Low	Low	Medium	Medium	High
	Very Low	Very Low	Low	Low	Medium	High

93. There are several limitations for this risk assessment. Risk assessment is a process that does not result in a fixed final answer, but rather is a starting point and tool which delivers results to support decision-making. A risk assessment necessitates further detailed quantitative and qualitative analysis, particularly when performed over a short time and as more data becomes available. It also has a number of built-in limitations. The risk assessment carried out for this project is based on available data. However, for more comprehensive assessments of hotspot islands, additional data collection and integration of more parameters are required. In addition to natural hazards and climate change, other biophysical pressures such as changing land use, infrastructure development, environmental degradation and anthropogenic influences should also be considered with additional study and integrated into a comprehensive qualitative assessment. The risk assessment is largely a desk-based analysis, with limited and therefore incomplete field verification due to scale of the assessment. As a result, there is always a certain level of subjectivity or bias in the interpretation of data, but this has been mitigated through expert judgement and verification among local experts.

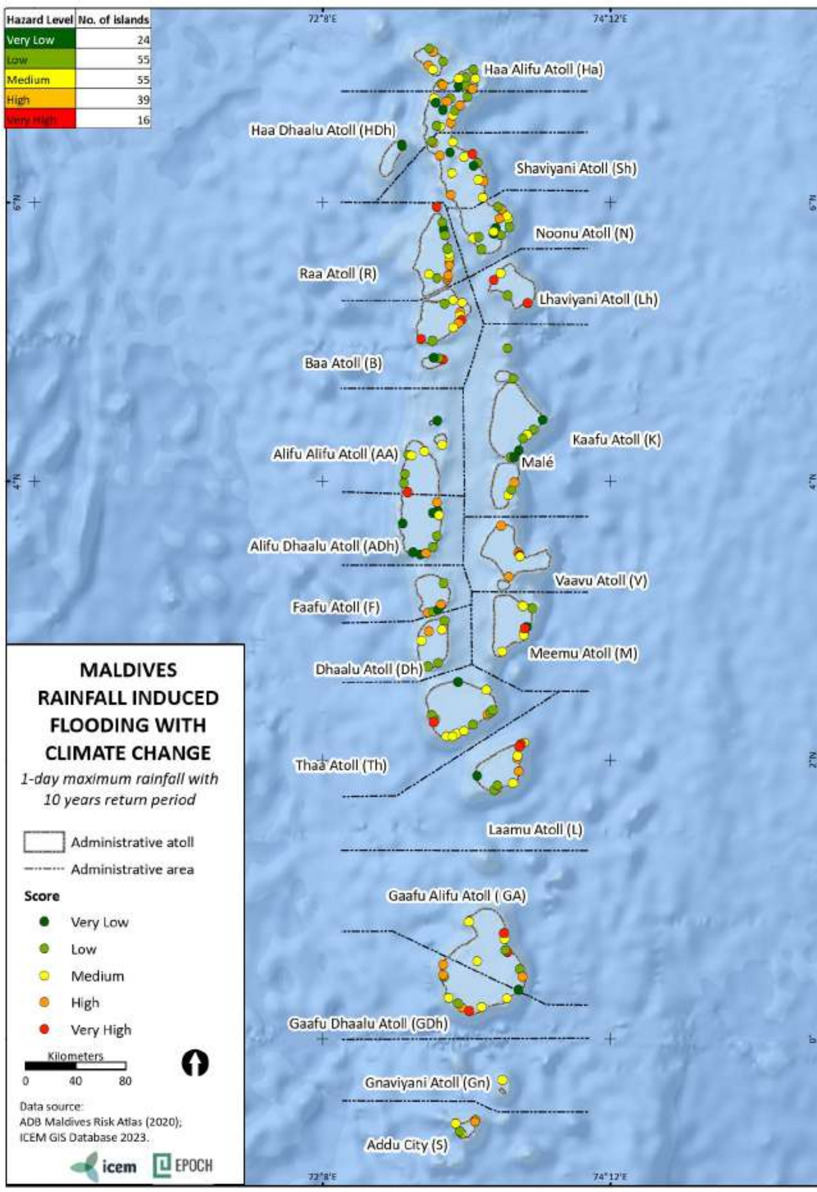
B. Risk assessment results

94. The results are presented through a series of key data statements, maps and graphs, for exposure and vulnerability. The maps integrate summary and detailed tables on the list of islands considered very-lowly to very-highly exposed or vulnerable. Hotspots have been identified for multi-hazard exposure, multi-dimensional vulnerability and combined exposure and vulnerability.

1. Exposure to pluvial floods

95. 55 out of the 189 islands (29.1%) can be considered as highly to very highly exposed to pluvial flood (including potential extreme pluvial flood events due to climate change), with 16 very highly exposed. The 55 islands are dispersed across all regions of the country (Figure 82). 79 islands (41.8%) are lowly to very lowly exposed.

Figure 82: Islands' exposure to pluvial floods, with climate change

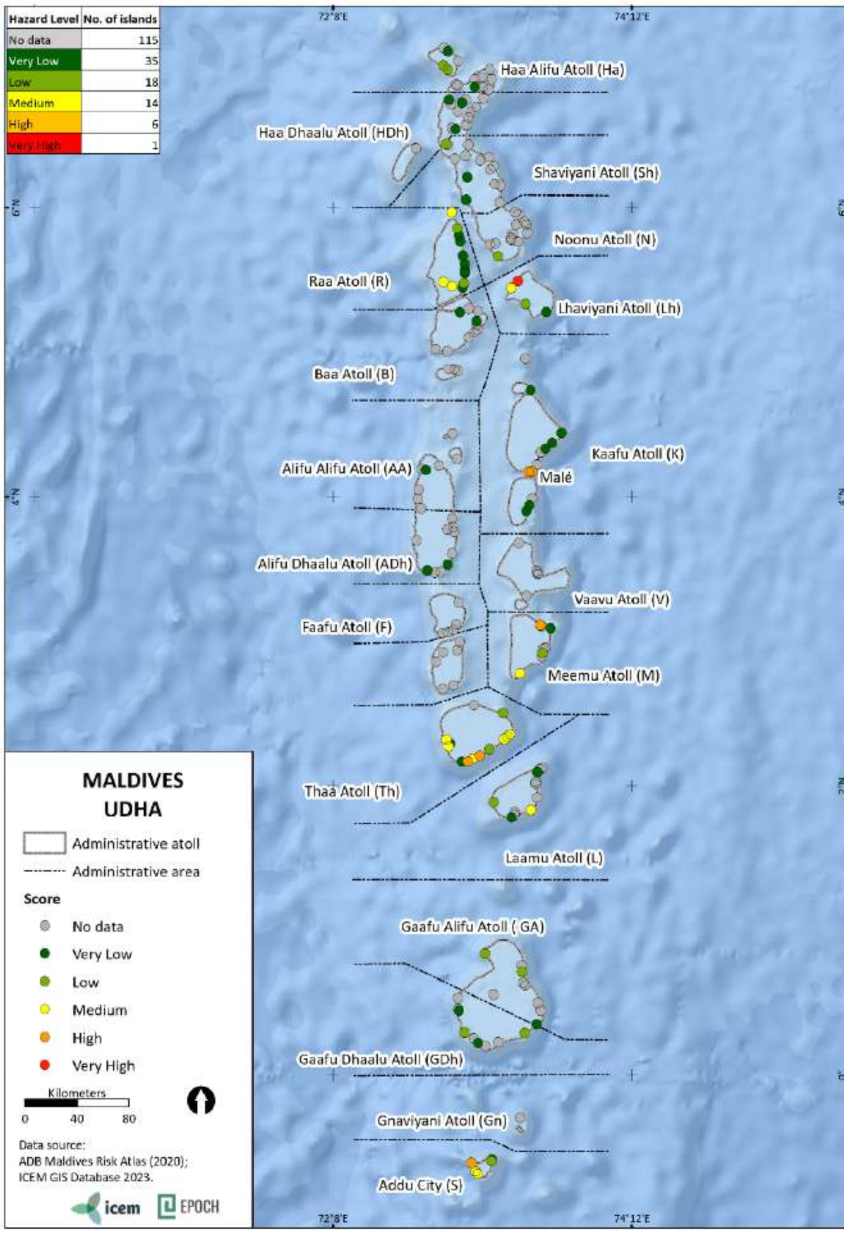


No	Islands	Sc	No	Islands	Sc	No	Islands	Sc
1	Hulhumale'	1	64	Holhudhoo	2	127	Rin'budhoo	4
2	Male'	1	65	Kedhikolhudhoo	4	128	Bileiydhoo	4
3	Villimale	2	66	Kudafari	4	129	Dharan'boodhoo	2
4	Baarah	4	67	Landhoo	3	130	Feeali	2
5	Dhidhdhoo (HA)	3	68	Lhohi	1	131	Magoodhoo (F)	1
6	Filladhoo	3	69	Maafaru	2	132	Nilandhoo (F)	4
7	Hoarafushi	4	70	Maalhendhoo	3	133	Dhan'bidhoo	5
8	Ihavandhoo	3	71	Magoodhoo (N)	1	134	Fonadhoo	3
9	Kelaa	2	72	Manadhoo	2	135	Gan	4
10	Maarandhoo	2	73	Miladhoo	3	136	Hithadhoo (L)	4
11	Mulhadhoo	2	74	Velidhoo	2	137	Isdhoo	3
12	Muraidhoo	2	75	Agolhitheemu	3	138	Kalaidhoo	5
13	Thakandhoo	4	76	Alifushi	5	139	Kunahandhoo	2
14	Thurakunu	2	77	Dhuvaafaru	3	140	Maabaidhoo	3
15	Uligamu	4	78	Fainu	4	141	Maamendhoo (L)	2
16	Utheemu	1	79	Hulhudhuffaaru	2	142	Maavah	1
17	Vashafaru	2	80	Iguraidhoo	4	143	Mundoo	4
18	Finey	2	81	Innamaadhoo	4	144	Dhiggaru	3
19	Hanimaadhoo	2	82	Kinolhas	4	145	Kolhufushi	3
20	Hirimaradhoo	4	83	Maakurathu	3	146	Maduvvari (M)	3
21	Kulhudhuffushi	3	84	Maduvvari (R)	3	147	Mulah	5
22	Kumundhoo	4	85	Meedhoo (R)	2	148	Muli	4
23	Kurin'bee	1	86	Rasgetheemu	1	149	Naalaafushi	3
24	Makunudhoo	1	87	Rasmaadhoo	2	150	Raiymandhoo	2
25	Naivaadhoo	3	88	Ungufaaru	2	151	Veyvah	1
26	Nellaidhoo	1	89	Vaadhoo (R)	2	152	Buruni	1
27	Neykurendhoo	3	90	Bodufolhudhoo	3	153	Dhiyamigili	2
28	Nolhivaramu	2	91	Feridhoo	2	154	Gaadhiffushi	2
29	Nolhivaranfaru	4	92	Himandhoo	5	155	Guraidhoo (Th)	4
30	Vaikaradhoo	2	93	Maalhos (AA)	2	156	Hirilandhoo	5
31	Bilehffahi	4	94	Mathiveri	2	157	Kan'doodhoo	2
32	Feevah	5	95	Rasdhoo	3	158	Kin'bidhoo	3
33	Feydhoo (Sh)	1	96	Thoddoo	1	159	Madifushi	2
34	Foakaidhoo	3	97	Ukulhas	3	160	Omadhoo (Th)	3
35	Funadhoo	4	98	Dhan'gethi	2	161	Thimarafushi	3
36	Goidhoo (Sh)	4	99	Dhidhdhoo (ADh)	4	162	Vandhoo	2
37	Kan'ditheemu	2	100	Dhigurah	2	163	Veymandoo	3
38	Komandoo	4	101	Fenfushi	1	164	Vilufushi	3
39	Lhaimagu	3	102	Hangnameedhoo	4	165	Dhaandhoo	5
40	Maaugoodhoo	3	103	Kun'burudhoo	1	166	Dhevvadhoo	3
41	Maroshi	3	104	Maamigili	1	167	Gemanafushi	4
42	Milandhoo	2	105	Mahibadhoo	3	168	Kanduhulhudhoo	1
43	Narudhoo	1	106	Mandhoo	1	169	Kondey	2
44	Noomaraa	3	107	Omadhoo (ADh)	1	170	Kolamaafushi	3
45	Dharavandhoo	5	108	Dhiffushi	1	171	Maamendhoo (GA)	3
46	Dhonfanu	3	109	Gaafuru	2	172	Nilandhoo (GA)	2
47	Eydhafushi	3	110	Gulhi	4	173	Vilin'gili	5
48	Fehendhoo	2	111	Guraidhoo (K)	3	174	Faresmaathodaa	5
49	Fulhadhoo	1	112	Himmafushi	2	175	Fiyoari	4
50	Goidhoo (B)	5	113	Huraa	3	176	Gadhdhoo	3
51	Hithaadhoo	2	114	Kaashidhoo	2	177	Hoan'dehdhoo	2
52	Kamadhoo	3	115	Maafushi	2	178	Madeveli	4
53	Kendhoo	2	116	Thulusdhoo	2	179	Nadallaa	3
54	Kihaadhoo	4	117	Felidhoo	5	180	Rathafandhoo	2
55	Kudarikilu	3	118	Fulidhoo	4	181	Thinadhoo (GDh)	4
56	Maalhos (B)	4	119	Keyodhoo	3	182	Vaadhoo (GDh)	3
57	Thulhaadhoo	5	120	Rakeedhoo	4	183	Fuvahmulah	3
58	Hinnavaru	3	121	Thinadhoo (V)	4	184	Feydhoo (S)	3
59	Kurendhoo	2	122	Ban'didhoo	3	185	Hithadhoo (S)	3
60	Naifaru	5	123	Hulhudheli	3	186	Hulhudhoo	4
61	Olhuvelifushi	5	124	Kudahuvadhoo	2	187	Maradhoo	2
62	Fodhdhoo	3	125	Maaen'boodhoo	2	188	Maradhoofeydhoo	3
63	Hebadhoo	2	126	Meedhoo (Dh)	2	189	Meedho	4

2. Exposure to *udha*

96. 7 out of 74 islands (with data available on udha-waves) (9.5%) can be considered as highly to very highly exposed to udha-waves, with 1 island very highly exposed: Hinnavaru island, Lhaviyani atoll, in the north-central region. The 7 islands are mostly located in the south and central parts of the country (Figure 83). 53 of the 74 islands (71.6%) are lowly to very lowly exposed.

Figure 83: Islands' exposure to udha

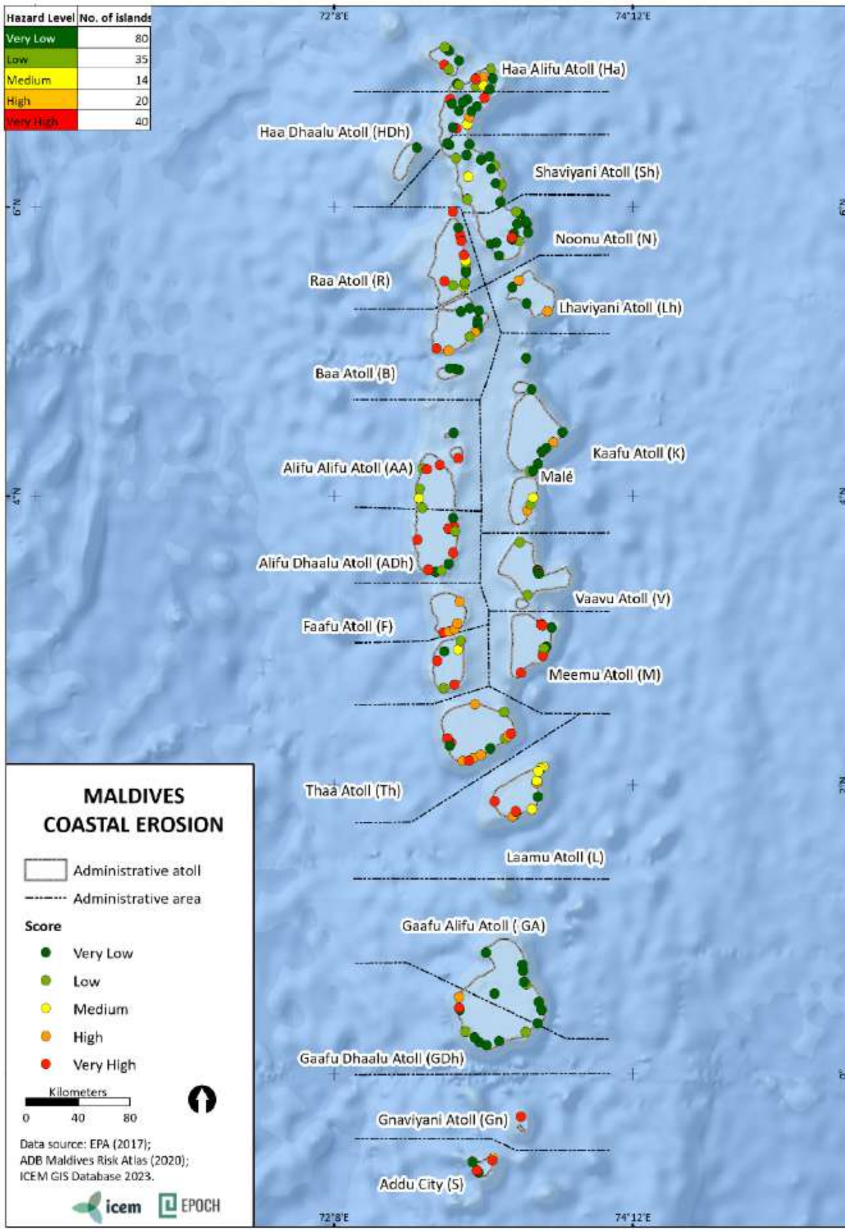


No	Islands	Sc	No	Islands	Sc	No	Islands	Sc
1	Hulhumale'	0	64	Holhudhoo	0	127	Rin'budhoo	0
2	Male'	4	65	Kedhikolhudhoo	0	128	Bileiydhoo	0
3	Villimale	4	66	Kudafari	0	129	Dharan'boodhoo	0
4	Baarah	0	67	Landhoo	0	130	Feeali	0
5	Dhidhdhoo (HA)	0	68	Lhohi	0	131	Magoodhoo (F)	0
6	Filladhoo	0	69	Maafaru	0	132	Nilandhoo (F)	0
7	Hoarafushi	2	70	Maalhendhoo	0	133	Dhan'bidhoo	1
8	Ihavandhoo	2	71	Magoodhoo (N)	0	134	Fonadhoo	3
9	Kelaa	0	72	Manadhoo	0	135	Gan	0
10	Maarandhoo	0	73	Miladhoo	0	136	Hithadhoo (L)	0
11	Mulhadhoo	0	74	Velidhoo	2	137	Isdhoo	0
12	Muraidhoo	0	75	Agolhitheemu	0	138	Kalaidhoo	0
13	Thakandhoo	0	76	Alifushi	3	139	Kunahandhoo	1
14	Thurakunu	0	77	Dhuvaafaru	0	140	Maabaidhoo	0
15	Uligamu	1	78	Fainu	0	141	Maamendhoo (L)	0
16	Utheemu	1	79	Hulhudhuffaaru	1	142	Maavah	2
17	Vashafaru	0	80	Iguraidhoo	2	143	Mundoo	0
18	Finey	0	81	Innamaadhoo	1	144	Dhiggaru	4
19	Hanimaadhoo	0	82	Kinolhas	1	145	Kolhufushi	3
20	Hirimaradhoo	1	83	Maakurathu	1	146	Maduvvari (M)	2
21	Kulhudhuffushi	0	84	Maduvvari (R)	3	147	Mulah	0
22	Kumundhoo	0	85	Meedhoo (R)	3	148	Muli	2
23	Kurin'bee	0	86	Rasgetheemu	1	149	Naalaafushi	0
24	Makunudhoo	0	87	Rasmaadhoo	1	150	Raiymandhoo	1
25	Naivaadhoo	1	88	Ungufaaru	1	151	Veyvah	0
26	Nellaidhoo	0	89	Vaadhoo (R)	2	152	Buruni	0
27	Neykurendhoo	1	90	Bodufolhudhoo	1	153	Dhiyamigili	3
28	Nolhivaramu	0	91	Feridhoo	0	154	Gaadhiffushi	2
29	Nolhivaranfaru	0	92	Himandhoo	0	155	Guraidhoo (Th)	3
30	Vaikaradhoo	0	93	Maalhos (AA)	0	156	Hirilandhoo	3
31	Bilehffahi	0	94	Mathiveri	0	157	Kan'doodhoo	3
32	Feevah	0	95	Rasdhoo	0	158	Kin'bidhoo	4
33	Feydhoo (Sh)	0	96	Thoddoo	0	159	Madifushi	3
34	Foakaidhoo	0	97	Ukulhas	0	160	Omadhoo (Th)	1
35	Funadhoo	0	98	Dhan'gethi	0	161	Thimarafushi	4
36	Goidhoo (Sh)	0	99	Dhidhdhoo (ADh)	0	162	Vandhoo	1
37	Kan'ditheemu	2	100	Dhigurah	1	163	Veymandoo	3
38	Komandoo	1	101	Fenfushi	1	164	Vilufushi	2
39	Lhaimagu	0	102	Hangnameedhoo	0	165	Dhaandhoo	0
40	Maaugoodhoo	0	103	Kun'burudhoo	0	166	Dhewadhoo	0
41	Maroshi	1	104	Maamigili	0	167	Gemanafushi	0
42	Milandhoo	0	105	Mahibadhoo	0	168	Kanduhulhudhoo	1
43	Narudhoo	0	106	Mandhoo	0	169	Kondey	0
44	Noomaraa	0	107	Omadhoo (ADh)	0	170	Kolamaafushi	2
45	Dharavandhoo	0	108	Dhiffushi	1	171	Maamendhoo (GA)	2
46	Dhonfanu	0	109	Gaafuru	1	172	Nilandhoo (GA)	0
47	Eydhafushi	0	110	Gulhi	0	173	Viiin'gili	0
48	Fehendhoo	0	111	Guraidhoo (K)	1	174	Faresmaathodaa	0
49	Fulhadhoo	0	112	Himmafushi	0	175	Fiyoari	1
50	Goidhoo (B)	0	113	Huraa	1	176	Gadhdhoo	2
51	Hithaadhoo	0	114	Kaashidhoo	0	177	Hoan'dehdhoo	1
52	Kamadhoo	0	115	Maafushi	1	178	Madeveli	0
53	Kendhoo	1	116	Thulusdhoo	1	179	Nadallaa	2
54	Kihaadhoo	1	117	Felidhoo	0	180	Rathafandhoo	0
55	Kudarikilu	0	118	Fulidhoo	0	181	Thinadhoo (GDh)	0
56	Maalhos (B)	0	119	Keyodhoo	0	182	Vaadhoo (GDh)	0
57	Thulhaadhoo	0	120	Rakeedhoo	0	183	Fuvahmulah	0
58	Hinnavaru	5	121	Thinadhoo (V)	0	184	Feydhoo (S)	3
59	Kurendhoo	2	122	Ban'didhoo	0	185	Hithadhoo (S)	4
60	Naifaru	3	123	Hulhudheli	0	186	Hulhudhoo	2
61	Olhuvelifushi	1	124	Kudahuvadhoo	0	187	Maradhoo	3
62	Fodhdhoo	0	125	Maaen'boodhoo	0	188	Maradhoofeydhoo	2
63	Hebadhoo	0	126	Meedhoo (Dh)	0	189	Meedho	1

3. Exposure to coastal erosion

97. 60 out of the 189 islands (31.7%) can be considered as highly to very highly exposed to coastal erosion, with 40 very highly exposed. The 60 islands are dispersed across all regions of the country, but are primarily located in the western half of the country (Figure 84). 115 islands (60.8%) are lowly to very lowly exposed.

Figure 84: Islands' exposure to coastal erosion

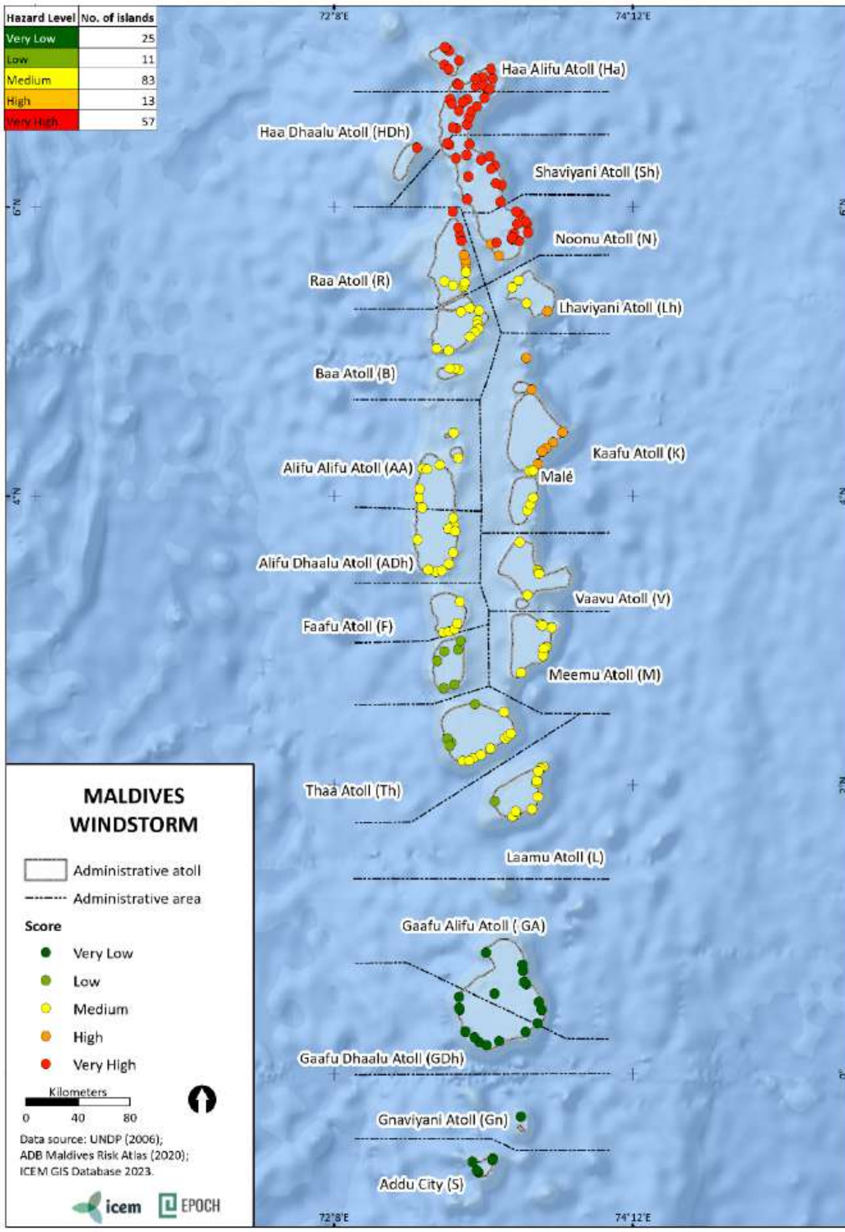


No	Islands	Sc	No	Islands	Sc	No	Islands	Sc
1	Hulhumale'	1	64	Holhudhoo	1	127	Rin'budhoo	1
2	Male'	1	65	Kedhikolhudhoo	1	128	Bileydhoo	4
3	Villimale	2	66	Kudafari	1	129	Dharan'boodhoo	4
4	Baarah	1	67	Landhoo	1	130	Feeali	4
5	Dhidhdhoo (HA)	5	68	Lhohi	1	131	Magoodhoo (F)	4
6	Filladhoo	1	69	Maafaru	1	132	Nilandhoo (F)	5
7	Hoarafushi	5	70	Maalhendhoo	1	133	Dhan'bidhoo	3
8	Ihavandhoo	2	71	Magoodhoo (N)	1	134	Fonadhoo	3
9	Kelaa	2	72	Manadhoo	2	135	Gan	1
10	Maarandhoo	1	73	Miladhoo	5	136	Hithadhoo (L)	2
11	Mulhadhoo	1	74	Velidhoo	1	137	Isdhoo	3
12	Muraidhoo	3	75	Agolhitheemu	1	138	Kalaidhoo	3
13	Thakandhoo	2	76	Alifushi	5	139	Kunahandhoo	4
14	Thurakunu	2	77	Dhuvaafaru	3	140	Maabaidhoo	3
15	Uligamu	1	78	Fainu	2	141	Maamendhoo (L)	5
16	Utheemu	2	79	Hulhudhuffaaru	5	142	Maavah	5
17	Vashafaru	4	80	Iguraidhoo	2	143	Mundoo	4
18	Finey	1	81	Innamaadhoo	1	144	Dhiggaru	5
19	Hanimaadhoo	5	82	Kinolhas	3	145	Kolhufushi	5
20	Hirimaradhoo	1	83	Maakurathu	2	146	Maduvvari (M)	5
21	Kulhudhuffushi	4	84	Maduvvari (R)	5	147	Mulah	2
22	Kumundhoo	3	85	Meedhoo (R)	2	148	Muli	2
23	Kurin'bee	1	86	Rasgetheemu	5	149	Naalaafushi	5
24	Makunudhoo	1	87	Rasmaadhoo	5	150	Raiymandhoo	1
25	Naivaadhoo	5	88	Ungulaaru	5	151	Veyvah	1
26	Nellaidhoo	1	89	Vaadhoo (R)	1	152	Buruni	4
27	Neykurendhoo	5	90	Bodufolhudhoo	5	153	Dhiyamigili	4
28	Nolhivaramu	1	91	Feridhoo	2	154	Gaadhiffushi	1
29	Nolhivaranfaru	1	92	Himandhoo	2	155	Guraidhoo (Th)	2
30	Vaikaradhoo	1	93	Maalhos (AA)	3	156	Hirilandhoo	1
31	Bilehffahi	2	94	Mathiveri	2	157	Kan'doodhoo	5
32	Feevah	1	95	Rasdhoo	5	158	Kin'bidhoo	5
33	Feydhoo (Sh)	1	96	Thoddoo	1	159	Madifushi	5
34	Foakaidhoo	1	97	Ukulhas	5	160	Omadhoo (Th)	4
35	Funadhoo	2	98	Dhan'gethi	5	161	Thimarafushi	4
36	Goidhoo (Sh)	1	99	Dhidhdhoo (ADh)	2	162	Vandhoo	5
37	Kan'ditheemu	1	100	Dhigurah	1	163	Veymandoo	4
38	Komandoo	2	101	Fenfushi	5	164	Vilufushi	2
39	Lhaimagu	1	102	Hangnameedhoo	1	165	Dhaandhoo	2
40	Maaugoodhoo	1	103	Kun'burudhoo	5	166	Dhevvadhoo	1
41	Maroshi	3	104	Maamigili	1	167	Gemanafushi	1
42	Milandhoo	2	105	Mahibadhoo	2	168	Kanduhulhudhoo	1
43	Narudhoo	1	106	Mandhoo	5	169	Kondey	1
44	Noomaraa	1	107	Omadhoo (ADh)	5	170	Kolamaafushi	1
45	Dharavandhoo	1	108	Dhiffushi	1	171	Maamendhoo (GA)	1
46	Dhonfanu	1	109	Gaafuru	1	172	Nilandhoo (GA)	1
47	Eydhafushi	2	110	Gulhi	3	173	Vilin'gili	1
48	Fehendhoo	1	111	Guraidhoo (K)	4	174	Faresmaathodaa	1
49	Fulhadhoo	1	112	Himmafushi	1	175	Fiyoari	1
50	Goidhoo (B)	1	113	Huraa	1	176	Gadhdhoo	2
51	Hithaadhoo	4	114	Kaashidhoo	1	177	Hoan'dehdhoo	1
52	Kamadhoo	1	115	Maafushi	2	178	Madeveli	5
53	Kendhoo	1	116	Thulusdhoo	4	179	Nadallaa	2
54	Kihaadhoo	1	117	Felidhoo	5	180	Rathafandhoo	1
55	Kudarikilu	1	118	Fulidhoo	2	181	Thinadhoo (GDh)	4
56	Maalhos (B)	4	119	Keyodhoo	1	182	Vaadhoo (GDh)	1
57	Thulhaadhoo	5	120	Rakeedhoo	2	183	Fuvahmulah	5
58	Hinnavaru	4	121	Thinadhoo (V)	1	184	Feydhoo (S)	1
59	Kurendhoo	1	122	Ban'didhoo	3	185	Hithadhoo (S)	1
60	Naifaru	1	123	Hulhudheli	5	186	Hulhudhoo	5
61	Olhuvelifushi	4	124	Kudahuvadhoo	2	187	Maradhoo	5
62	Fodhdhoo	1	125	Maaen'boodhoo	5	188	Maradhoofeydhoo	5
63	Hebadhoo	2	126	Meedhoo (Dh)	2	189	Meedho	3

4. Exposure to wind storm

98. 70 out of the 189 islands (37.0%) can be considered as highly to very highly exposed to wind storm, with 57 very highly exposed. The 70 islands are located in the north and north-central regions of the country (Figure 85). 36 islands (19.0%) are lowly to very lowly exposed, mostly located in the southern region.

Figure 85: Islands' exposure to wind storm

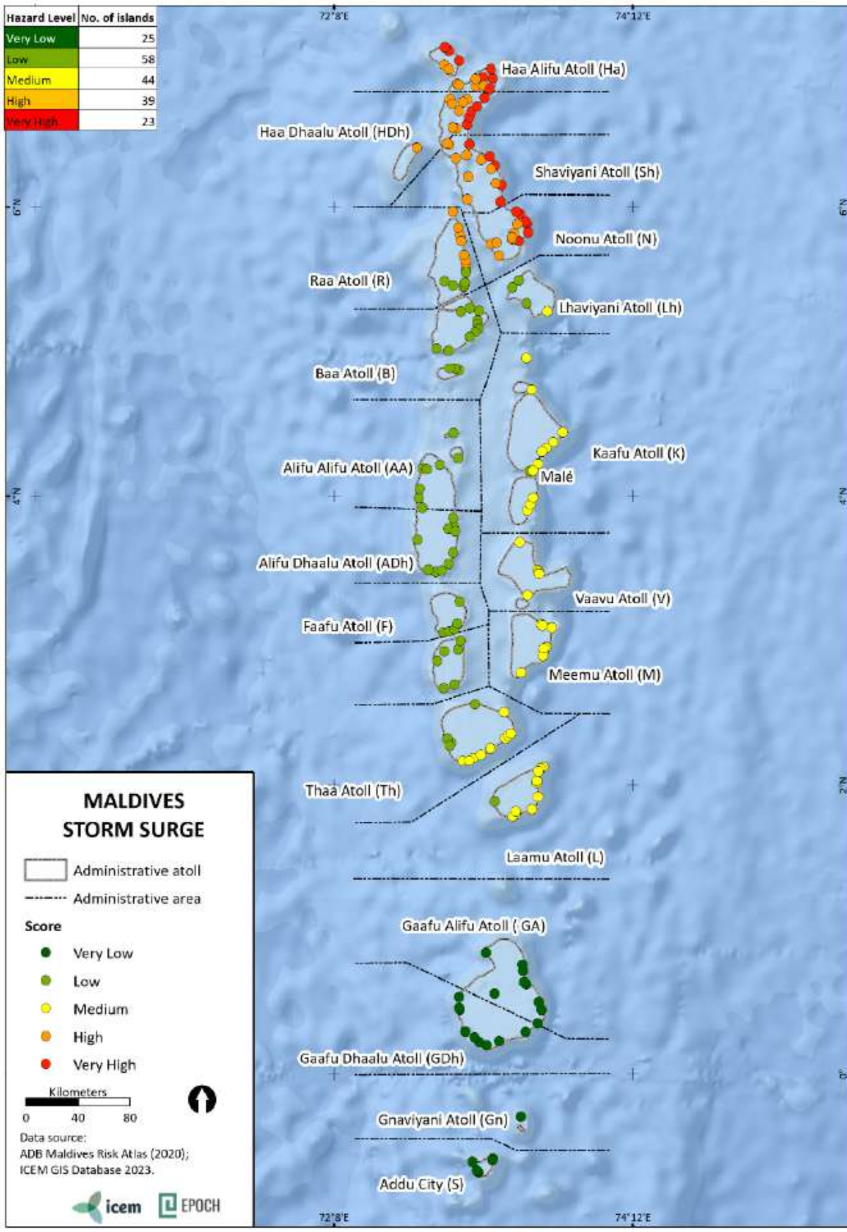


No	Islands	Sc	No	Islands	Sc	No	Islands	Sc
1	Hulhumale'	4	64	Holhudhoo	5	127	Rin'budhoo	2
2	Male'	3	65	Kedhikolhudhoo	5	128	Bileiydhoo	3
3	Villimale	3	66	Kudafari	5	129	Dharan'boodhoo	3
4	Baarah	5	67	Landhoo	5	130	Feeali	3
5	Dhidhdhoo (HA)	5	68	Lhohi	5	131	Magoodhoo (F)	3
6	Filladhoo	5	69	Maafaru	5	132	Nilandhoo (F)	3
7	Hoarafushi	5	70	Maalhendhoo	5	133	Dhan'bidhoo	3
8	Ihavandhoo	5	71	Magoodhoo (N)	5	134	Fonadhoo	3
9	Kelaa	5	72	Manadhoo	5	135	Gan	3
10	Maarandhoo	5	73	Miladhoo	5	136	Hithadhoo (L)	3
11	Mulhadhoo	5	74	Velidhoo	4	137	Isdhoo	3
12	Muraidhoo	5	75	Agolhitheemu	5	138	Kalaidhoo	3
13	Thakandhoo	5	76	Alifushi	5	139	Kunahandhoo	3
14	Thurakunu	5	77	Dhuvaafaru	4	140	Maabaidhoo	3
15	Uligamu	5	78	Fainu	3	141	Maamendhoo (L)	3
16	Utheemu	5	79	Hulhudhuffaaru	5	142	Maavah	2
17	Vashafaru	5	80	Iguraidhoo	3	143	Mundoo	3
18	Finey	5	81	Innamaadhoo	3	144	Dhiggaru	3
19	Hanimaadhoo	5	82	Kinolhas	3	145	Kolhufushi	3
20	Hirimaradhoo	5	83	Maakurathu	4	146	Maduvvari (M)	3
21	Kulhudhuffushi	5	84	Maduvvari (R)	3	147	Mulah	3
22	Kumundhoo	5	85	Meedhoo (R)	3	148	Muli	3
23	Kurin'bee	5	86	Rasgetheemu	5	149	Naalaafushi	3
24	Makunudhoo	5	87	Rasmaadhoo	3	150	Ralymandhoo	3
25	Naivaadhoo	5	88	Ungufaaru	4	151	Veyvah	3
26	Nellaidhoo	5	89	Vaadhoo (R)	5	152	Buruni	2
27	Neykurendhoo	5	90	Bodufolhudhoo	3	153	Dhiyamigili	3
28	Nolhivaramu	5	91	Feridhoo	3	154	Gaadhiffushi	3
29	Nolhivaranfaru	5	92	Himandhoo	3	155	Guraidhoo (Th)	3
30	Vaikaradhoo	5	93	Maalhos (AA)	3	156	Hirilandhoo	2
31	Bilehffahi	5	94	Mathiveri	3	157	Kan'doodhoo	2
32	Feevah	5	95	Rasdhoo	3	158	Kin'bidhoo	3
33	Feydhoo (Sh)	5	96	Thoddoo	3	159	Madifushi	3
34	Foakaidhoo	5	97	Ukulhas	3	160	Omadhoo (Th)	3
35	Funadhoo	5	98	Dhan'gethi	3	161	Thimarafushi	3
36	Goidhoo (Sh)	5	99	Dhidhdhoo (ADh)	3	162	Vandhoo	2
37	Kan'ditheemu	5	100	Dhigurah	3	163	Veymandoo	3
38	Komandoo	5	101	Fenfushi	3	164	Vilufushi	3
39	Lhaimagu	5	102	Hangnameedhoo	3	165	Dhaandhoo	1
40	Maaugoodhoo	5	103	Kun'burudhoo	3	166	Dhevvadhoo	1
41	Maroshi	5	104	Maamigili	3	167	Gemanafushi	1
42	Milandhoo	5	105	Mahibadhoo	3	168	Kanduhulhudhoo	1
43	Narudhoo	5	106	Mandhoo	3	169	Kondey	1
44	Noomaraa	5	107	Omadhoo (ADh)	3	170	Kolamaafushi	1
45	Dharavandhoo	3	108	Dhiffushi	4	171	Maamendhoo (GA)	1
46	Dhonfanu	3	109	Gaafuru	4	172	Nilandhoo (GA)	1
47	Eydhafushi	3	110	Gulhi	3	173	Vilin'gili	1
48	Fehendhoo	3	111	Guraidhoo (K)	3	174	Faresmaathodaa	1
49	Fulhadhoo	3	112	Himmafushi	4	175	Fiyoari	1
50	Goidhoo (B)	3	113	Huraa	4	176	Gadhdhoo	1
51	Hithaadhoo	3	114	Kaashidhoo	4	177	Hoan'dehdhoo	1
52	Kamadhoo	3	115	Maafushi	3	178	Madeveli	1
53	Kendhoo	3	116	Thulusdhoo	4	179	Nadallaa	1
54	Kihaadhoo	3	117	Felidhoo	3	180	Rathafandhoo	1
55	Kudarikilu	3	118	Fulidhoo	3	181	Thinadhoo (GDh)	1
56	Maalhos (B)	3	119	Keyodhoo	3	182	Vaadhoo (GDh)	1
57	Thulhaadhoo	3	120	Rakeedhoo	3	183	Fuvahmulah	1
58	Hinnavaru	3	121	Thinadhoo (V)	3	184	Feydhoo (S)	1
59	Kurendhoo	3	122	Ban'didhoo	2	185	Hithadhoo (S)	1
60	Naifaru	3	123	Hulhudheli	2	186	Hulhudhoo	1
61	Olhuvelifushi	4	124	Kudahuvadhoo	2	187	Maradhoo	1
62	Fodhdhoo	4	125	Maaen'boodhoo	2	188	Maradhoofeydhoo	1
63	Hebadhoo	5	126	Meedhoo (Dh)	2	189	Meedho	1

5. Exposure to storm surge

99. 62 out of the 189 islands (32.8%) can be considered as highly to very highly exposed to storm surge, with 23 very highly exposed. The 62 islands are located in the north and north-central regions of the country (Figure 86). 83 islands (43.9%) are lowly to very lowly exposed, mostly located in the southern region and the western half of the country.

Figure 86: Islands' exposure to storm surge

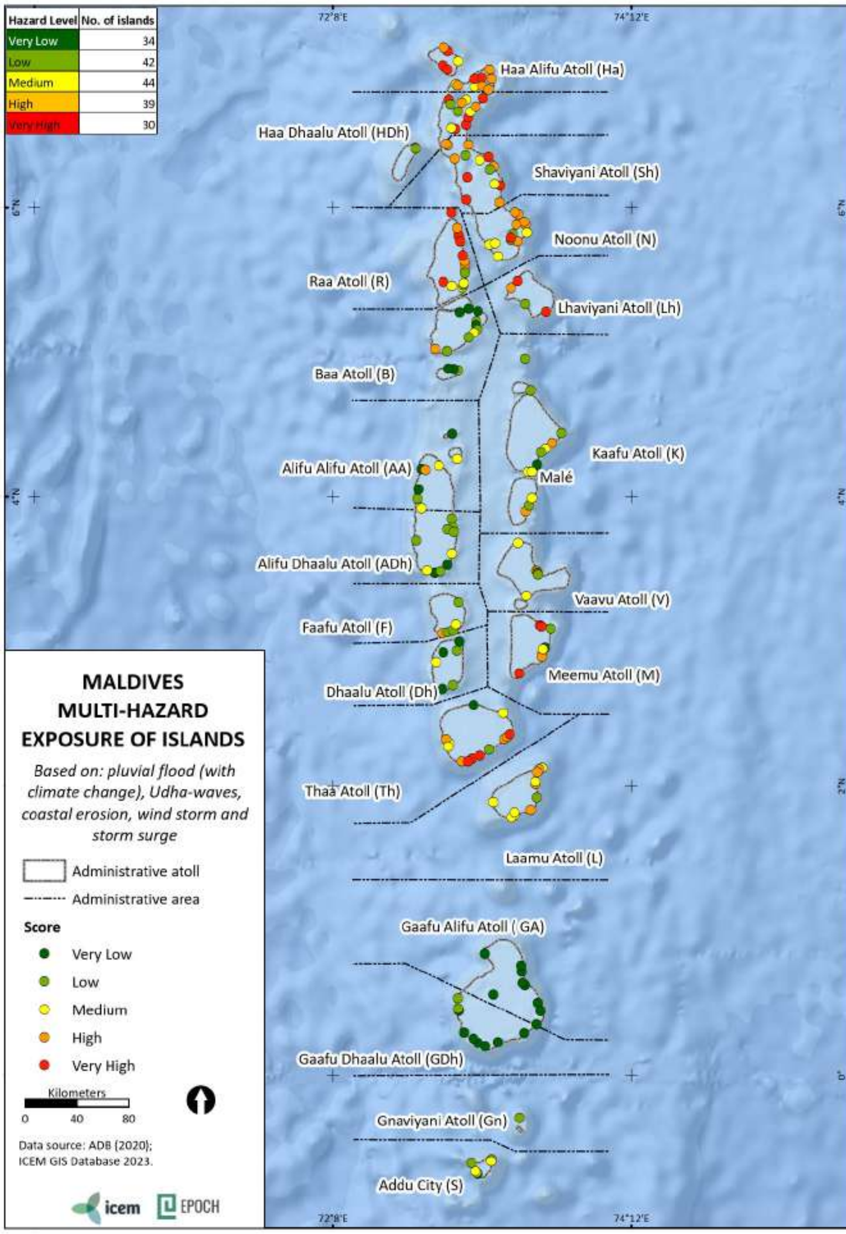


No	Islands	Sc	No	Islands	Sc	No	Islands	Sc
1	Hulhumale'	3	64	Holhudhoo	4	127	Rin'budhoo	2
2	Male'	3	65	Kedhikolhudhoo	5	128	Bileiydhoo	2
3	Villimale	2	66	Kudafari	4	129	Dharan'boodhoo	2
4	Baarah	5	67	Landhoo	5	130	Feeali	2
5	Dhidhdhoo (HA)	4	68	Lhohi	4	131	Magoodhoo (F)	2
6	Filladhoo	5	69	Maafaru	5	132	Nilandhoo (F)	2
7	Hoarafushi	4	70	Maalhendhoo	5	133	Dhan'bidhoo	3
8	Ihavandhoo	4	71	Magoodhoo (N)	4	134	Fonadhoo	3
9	Kelaa	5	72	Manadhoo	5	135	Gan	3
10	Maarandhoo	4	73	Miladhoo	4	136	Hithadhoo (L)	3
11	Mulhadhoo	5	74	Velidhoo	4	137	Isdhoo	3
12	Muraidhoo	4	75	Agolhitheemu	4	138	Kalaidhoo	3
13	Thakandhoo	4	76	Alifushi	4	139	Kunahandhoo	3
14	Thurakunu	5	77	Dhuvaafaru	4	140	Maabaidhoo	3
15	Uligamu	5	78	Fainu	2	141	Maamendhoo (L)	3
16	Utheemu	4	79	Hulhudhuffaaru	4	142	Maavah	2
17	Vashafaru	5	80	Iguraidhoo	2	143	Mundoo	3
18	Finey	4	81	Innamaadhoo	2	144	Dhiggaru	3
19	Hanimaadhoo	5	82	Kinolhas	2	145	Kolhufushi	3
20	Hirimaradhoo	4	83	Maakurathu	4	146	Maduvvari (M)	3
21	Kulhudhuffushi	5	84	Maduvvari (R)	2	147	Mulah	3
22	Kumundhoo	5	85	Meedhoo (R)	2	148	Muli	3
23	Kurin'bee	4	86	Rasgetheemu	4	149	Naalaafushi	3
24	Makunudhoo	4	87	Rasmaadhoo	2	150	Raiymandhoo	3
25	Naivaadhoo	4	88	Ungufaaru	4	151	Veyvah	3
26	Nellaidhoo	4	89	Vaadhoo (R)	4	152	Buruni	2
27	Neykurendhoo	4	90	Bodufolhudhoo	2	153	Dhiyamigili	3
28	Nolhivaramu	5	91	Feridhoo	2	154	Gaadhiffushi	3
29	Nolhivaranfaru	5	92	Himandhoo	2	155	Guraidhoo (Th)	3
30	Vaikaradhoo	4	93	Maalhos (AA)	2	156	Hirilandhoo	2
31	Bilehffahi	4	94	Mathiveri	2	157	Kan'doodhoo	2
32	Feevah	5	95	Rasdhoo	2	158	Kin'bidhoo	3
33	Feydhoo (Sh)	4	96	Thoddoo	2	159	Madifushi	3
34	Foakaidhoo	4	97	Ukulhas	2	160	Omadhoo (Th)	3
35	Funadhoo	5	98	Dhan'gethi	2	161	Thimarafushi	3
36	Goidhoo (Sh)	4	99	Dhidhdhoo (ADh)	2	162	Vandhoo	2
37	Kan'ditheemu	4	100	Dhigurah	2	163	Veymandoo	3
38	Komandoo	4	101	Fenfushi	2	164	Vilufushi	3
39	Lhaimagu	4	102	Hangnameedhoo	2	165	Dhaandhoo	1
40	Maaugoodhoo	5	103	Kun'burudhoo	2	166	Dhevvadhoo	1
41	Maroshi	4	104	Maamigili	2	167	Gemanafushi	1
42	Milandhoo	5	105	Mahibadhoo	2	168	Kanduhulhudhoo	1
43	Narudhoo	4	106	Mandhoo	2	169	Kondey	1
44	Noomaraa	5	107	Omadhoo (ADh)	2	170	Kolamaafushi	1
45	Dharavandhoo	2	108	Dhiffushi	3	171	Maamendhoo (GA)	1
46	Dhonfanu	2	109	Gaafuru	3	172	Nilandhoo (GA)	1
47	Eydhafushi	2	110	Gulhi	3	173	Vilin'gili	1
48	Fehendhoo	2	111	Guraidhoo (K)	3	174	Faresmaathodaa	1
49	Fulhadhoo	2	112	Himmafushi	3	175	Fiyoari	1
50	Goidhoo (B)	2	113	Huraa	3	176	Gadhdhoo	1
51	Hithaadhoo	2	114	Kaashidhoo	3	177	Hoan'dehdhoo	1
52	Kamadhoo	2	115	Maafushi	3	178	Madeveli	1
53	Kendhoo	2	116	Thulusdhoo	3	179	Nadallaa	1
54	Kihaadhoo	2	117	Felidhoo	3	180	Rathafandhoo	1
55	Kudarikilu	2	118	Fulidhoo	3	181	Thinadhoo (GDh)	1
56	Maalhos (B)	2	119	Keyodhoo	3	182	Vaadhoo (GDh)	1
57	Thulhaadhoo	2	120	Rakeedhoo	3	183	Fuvahmulah	1
58	Hinnavaru	2	121	Thinadhoo (V)	3	184	Feydhoo (S)	1
59	Kurendhoo	2	122	Ban'didhoo	2	185	Hithadhoo (S)	1
60	Naifaru	2	123	Hulhudheli	2	186	Hulhudhoo	1
61	Olhuvelifushi	3	124	Kudahuvadhoo	2	187	Maradhoo	1
62	Fodhdhoo	4	125	Maaen'boodhoo	2	188	Maradhoofeydhoo	1
63	Hebadhoo	5	126	Meedhoo (Dh)	2	189	Meedho	1

6. Multi-hazard exposure

100. In terms of exposure to all five hazards combined, 69 out of the 189 islands (36.5%) are highly to very highly exposed and can thus be considered as *exposure hotspots*. 28 of these islands are located in the north region, 19 in the north-central region, 18 in the south-central region, and 4 in the central region (Figure 87). There are no multi-hazard exposure hotspots in the south region. 76 islands have low to very low exposure.

Figure 87: Islands' multi-hazard exposure

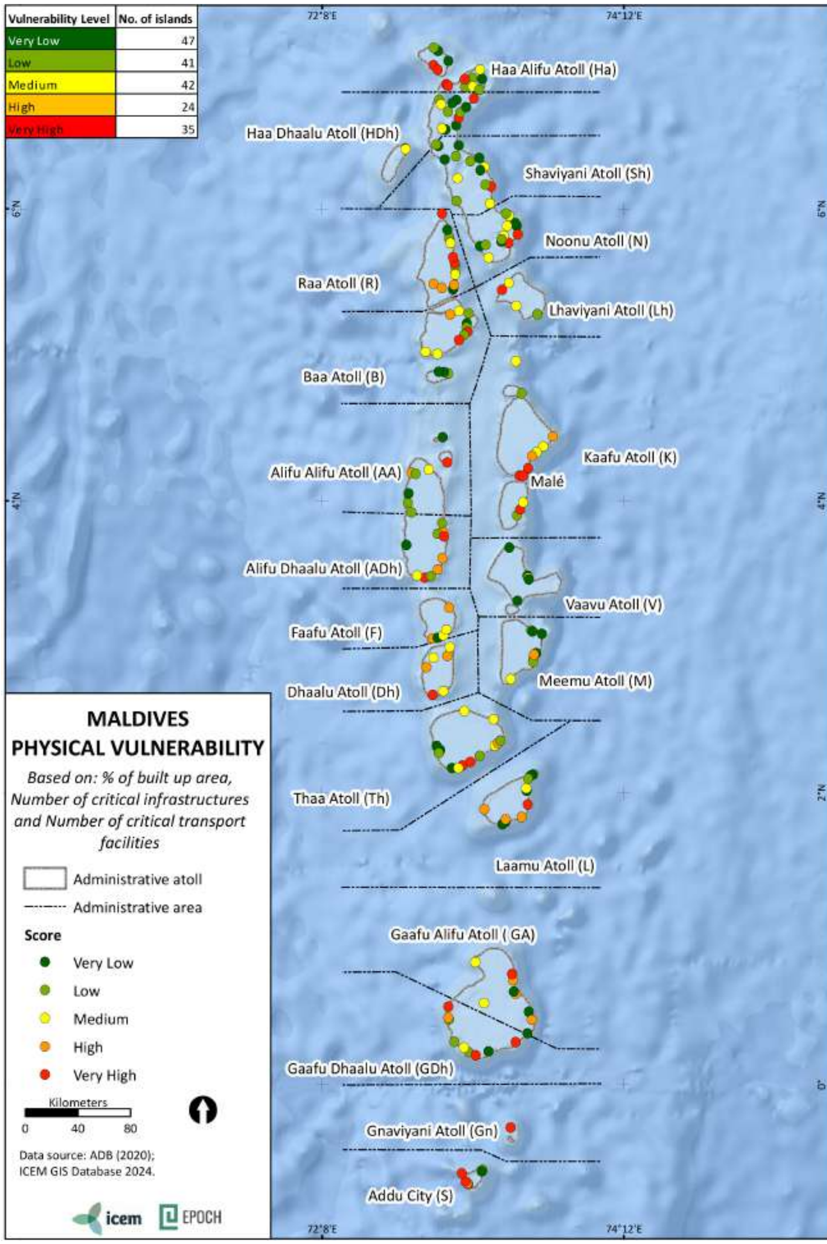


No	Islands	Sc	No	Islands	Sc	No	Islands	Sc
1	Hulhumale'	1	64	Holhudhoo	3	127	Rin'budhoo	1
2	Male'	3	65	Kedhikolhudhoo	4	128	Bileiydhoo	3
3	Villimale	3	66	Kudafari	4	129	Dharan'boodhoo	2
4	Baarah	4	67	Landhoo	4	130	Feeali	2
5	Dhidhdhoo (HA)	5	68	Lhohi	2	131	Magoodhoo (F)	2
6	Filladhoo	4	69	Maafaru	3	132	Nilandhoo (F)	4
7	Hoarafushi	5	70	Maalhendhoo	4	133	Dhan'bidhoo	4
8	Ihavandhoo	5	71	Magoodhoo (N)	2	134	Fonadhoo	4
9	Kelaa	4	72	Manadhoo	4	135	Gan	2
10	Maarandhoo	3	73	Miladhoo	5	136	Hithadhoo (L)	3
11	Mulhadhoo	3	74	Velidhoo	3	137	Isdhoo	3
12	Muraidhoo	4	75	Agolhitheemu	3	138	Kalaidhoo	4
13	Thakandhoo	4	76	Alifushi	5	139	Kunahandhoo	3
14	Thurakunu	4	77	Dhuvaafaru	4	140	Maabaidhoo	3
15	Uligamu	5	78	Fainu	2	141	Maamendhoo (L)	3
16	Utheemu	3	79	Hulhudhuffaaru	5	142	Maavah	3
17	Vashafaru	5	80	Iguraidhoo	3	143	Mundoo	4
18	Finey	3	81	Innamaadhoo	2	144	Dhiggaru	5
19	Hanimaadhoo	5	82	Kinolhas	3	145	Kolhufushi	5
20	Hirimaradhoo	4	83	Maakurathu	4	146	Maduvvari (M)	5
21	Kulhudhuffushi	5	84	Maduvvari (R)	5	147	Mulah	3
22	Kumundhoo	5	85	Meedhoo (R)	3	148	Muli	4
23	Kurin'bee	2	86	Rasgetheemu	5	149	Naalaafushi	4
24	Makunudhoo	2	87	Rasmaadhoo	3	150	Raiymandhoo	2
25	Naivaadhoo	5	88	Ungufaaru	5	151	Veyvah	1
26	Nellaidhoo	2	89	Vaadhoo (R)	4	152	Buruni	1
27	Neykurendhoo	5	90	Bodufolhudhoo	4	153	Dhiyamigili	4
28	Nolhivaramu	3	91	Feridhoo	1	154	Gaadhiffushi	2
29	Nolhivaranfaru	4	92	Himandhoo	3	155	Guraidhoo (Th)	4
30	Vaikaradhoo	3	93	Maalhos (AA)	2	156	Hirilandhoo	3
31	Bilehffahi	4	94	Mathiveri	1	157	Kan'doodhoo	4
32	Feevah	5	95	Rasdhoo	3	158	Kin'bidhoo	5
33	Feydhoo (Sh)	2	96	Thoddoo	1	159	Madifushi	5
34	Foakaidhoo	3	97	Ukulhas	3	160	Omadhoo (Th)	4
35	Funadhoo	5	98	Dhan'gethi	3	161	Thimarafushi	5
36	Goidhoo (Sh)	4	99	Dhidhdhoo (ADh)	2	162	Vandhoo	3
37	Kan'ditheemu	4	100	Dhigurah	1	163	Veymandoo	5
38	Komandoo	5	101	Fenfushi	3	164	Vilufushi	3
39	Lhaimagu	3	102	Hangnameedhoo	2	165	Dhaandhoo	1
40	Maaugoodhoo	4	103	Kun'burudhoo	2	166	Dhevvadhoo	1
41	Maroshi	5	104	Maamigili	1	167	Gemanafushi	1
42	Milandhoo	4	105	Mahibadhoo	2	168	Kanduhulhudhoo	1
43	Narudhoo	2	106	Mandhoo	2	169	Kondey	1
44	Noomaraa	4	107	Omadhoo (ADh)	2	170	Kolamaafushi	1
45	Dharavandhoo	2	108	Dhiffushi	2	171	Maamendhoo (GA)	1
46	Dhonfanu	1	109	Gaafuru	2	172	Nilandhoo (GA)	1
47	Eydhafushi	2	110	Gulhi	3	173	Vilin'gili	1
48	Fehendhoo	1	111	Guraidhoo (K)	4	174	Faresmaathodaa	1
49	Fulhadhoo	1	112	Himmafushi	2	175	Fiyoari	1
50	Goidhoo (B)	2	113	Huraa	3	176	Gadhdhoo	1
51	Hithaadhoo	2	114	Kaashidhoo	2	177	Hoan'dehdhoo	1
52	Kamadhoo	1	115	Maafushi	2	178	Madeveli	2
53	Kendhoo	1	116	Thulusdhoo	4	179	Nadallaa	1
54	Kihaadhoo	2	117	Felidhoo	5	180	Rathafandhoo	1
55	Kudarikilu	1	118	Fulidhoo	3	181	Thinadhoo (GDh)	2
56	Maalhos (B)	3	119	Keyodhoo	2	182	Vaadhoo (GDh)	1
57	Thulhaadhoo	4	120	Rakeedhoo	3	183	Fuvahmulah	2
58	Hinnavaru	5	121	Thinadhoo (V)	2	184	Feydhoo (S)	1
59	Kurendhoo	2	122	Ban'didhoo	2	185	Hithadhoo (S)	2
60	Naifaru	4	123	Hulhudheli	3	186	Hulhudhoo	3
61	Olhuvelifushi	5	124	Kudahuvadhoo	1	187	Maradhoo	3
62	Fodhdhoo	3	125	Maaen'boodhoo	2	188	Maradhoofeydhoo	3
63	Hebadhoo	4	126	Meedhoo (Dh)	1	189	Meedho	2

7. Physical vulnerability

101. 59 out of the 189 islands (31.2%) can be considered as highly to very highly physically vulnerable to hazards and climate change (based on the selected parameters), with 35 very highly vulnerable. The 59 islands are dispersed across the country (Figure 88). 88 islands (46.6%) are lowly to very lowly physically vulnerable.

Figure 88: Islands' physical vulnerability to hazards and climate change



No	Islands	Sc	No	Islands	Sc	No	Islands	Sc
1	Hulhumale'	5	64	Holhudhoo	2	127	Rin'budhoo	3
2	Male'	5	65	Kedhikolhudhoo	3	128	Bileiydhoo	3
3	Villimale	5	66	Kudafari	3	129	Dharan'boodhoo	1
4	Baarah	2	67	Landhoo	1	130	Feeali	4
5	Dhidhdhoo (HA)	5	68	Lhohi	3	131	Magoodhoo (F)	3
6	Filladhoo	1	69	Maafaru	5	132	Nilandhoo (F)	4
7	Hoarafushi	5	70	Maalhendhoo	1	133	Dhan'bidhoo	2
8	Ihavandhoo	5	71	Magoodhoo (N)	1	134	Fonadhoo	4
9	Kelaa	3	72	Manadhoo	5	135	Gan	5
10	Maarandhoo	5	73	Miladhoo	2	136	Hithadhoo (L)	1
11	Mulhadhoo	1	74	Velidhoo	3	137	Isdhoo	1
12	Muraidhoo	3	75	Agolhitheemu	2	138	Kalaidhoo	1
13	Thakandhoo	5	76	Alifushi	5	139	Kunahandhoo	1
14	Thurakunu	2	77	Dhuvaafaru	5	140	Maabaidhoo	3
15	Uligamu	1	78	Fainu	1	141	Maamendhoo (L)	4
16	Utheemu	2	79	Hulhudhuffaaru	3	142	Maavah	4
17	Vashafaru	2	80	Iguraidhoo	4	143	Mundoo	1
18	Finey	1	81	Innamaadhoo	3	144	Dhiggaru	2
19	Hanimaadhoo	5	82	Kinolhas	1	145	Kolhufushi	3
20	Hirimaradhoo	1	83	Maakurathu	2	146	Maduvvari (M)	1
21	Kulhudhuffushi	5	84	Maduvvari (R)	4	147	Mulah	4
22	Kumundhoo	1	85	Meedhoo (R)	4	148	Muli	4
23	Kurin'bee	2	86	Rasgetheemu	2	149	Naalaafushi	2
24	Makunudhoo	3	87	Rasmaadhoo	3	150	Raiymandhoo	1
25	Naivaadhoo	2	88	Ungufaaru	5	151	Veyvah	1
26	Nellaidhoo	3	89	Vaadhoo (R)	1	152	Buruni	3
27	Neykurendhoo	1	90	Bodufolhudhoo	2	153	Dhiyamigili	4
28	Nolhivaramu	2	91	Feridhoo	1	154	Gaadhiffushi	2
29	Nolhivaranfaru	1	92	Himandhoo	2	155	Guraidhoo (Th)	3
30	Vaikaradhoo	3	93	Maalhos (AA)	2	156	Hirilandhoo	2
31	Bilehffahi	1	94	Mathiveri	4	157	Kan'doodhoo	1
32	Feevah	1	95	Rasdhoo	5	158	Kin'bidhoo	3
33	Feydhoo (Sh)	2	96	Thoddoo	1	159	Madifushi	2
34	Foakaidhoo	2	97	Ukulhas	3	160	Omadhoo (Th)	1
35	Funadhoo	5	98	Dhan'gethi	4	161	Thimarafushi	5
36	Goidhoo (Sh)	1	99	Dhidhdhoo (ADh)	2	162	Vandhoo	1
37	Kan'ditheemu	2	100	Dhigurah	4	163	Veymandoo	5
38	Komandoo	2	101	Fenfushi	3	164	Vilufushi	3
39	Lhaimagu	2	102	Hangnameedhoo	2	165	Dhaandhoo	4
40	Maaugoodhoo	3	103	Kun'burudhoo	2	166	Dhevvadhoo	3
41	Maroshi	3	104	Maamigili	5	167	Gemanafushi	4
42	Milandhoo	3	105	Mahibadhoo	5	168	Kanduhulhudhoo	1
43	Narudhoo	1	106	Mandhoo	1	169	Kondey	1
44	Noomaraa	1	107	Omadhoo (ADh)	4	170	Kolamaafushi	3
45	Dharavandhoo	5	108	Dhiffushi	4	171	Maamendhoo (GA)	4
46	Dhonfanu	2	109	Gaafuru	2	172	Nilandhoo (GA)	1
47	Eydhafushi	5	110	Gulhi	3	173	Vilin'gili	5
48	Fehendhoo	1	111	Guraidhoo (K)	2	174	Faresmaathodaa	5
49	Fulhadhoo	1	112	Himmafushi	4	175	Fiyoari	2
50	Goidhoo (B)	2	113	Huraa	3	176	Gadhdhoo	5
51	Hithaadhoo	3	114	Kaashidhoo	3	177	Hoan'dehdhoo	2
52	Kamadhoo	2	115	Maafushi	5	178	Madeveli	4
53	Kendhoo	4	116	Thulusdhoo	3	179	Nadallaa	2
54	Kihaadhoo	1	117	Felidhoo	3	180	Rathafandhoo	3
55	Kudarikilu	3	118	Fulidhoo	1	181	Thinadhoo (GDh)	5
56	Maalhos (B)	2	119	Keyodhoo	1	182	Vaadhoo (GDh)	1
57	Thulhaadhoo	3	120	Rakeedhoo	1	183	Fuvahmulah	5
58	Hinnavaru	3	121	Thinadhoo (V)	1	184	Feydhoo (S)	5
59	Kurendhoo	3	122	Ban'didhoo	4	185	Hithadhoo (S)	5
60	Naifaru	5	123	Hulhudheli	4	186	Hulhudhoo	1
61	Olhuvelifushi	2	124	Kudahuvadhoo	5	187	Maradhoo	5
62	Fodhdhoo	1	125	Maaen'boodhoo	3	188	Maradhoofeydhoo	3
63	Hebadhoo	2	126	Meedhoo (Dh)	3	189	Meedho	2

102. Specifically, for each parameter on physical vulnerability:

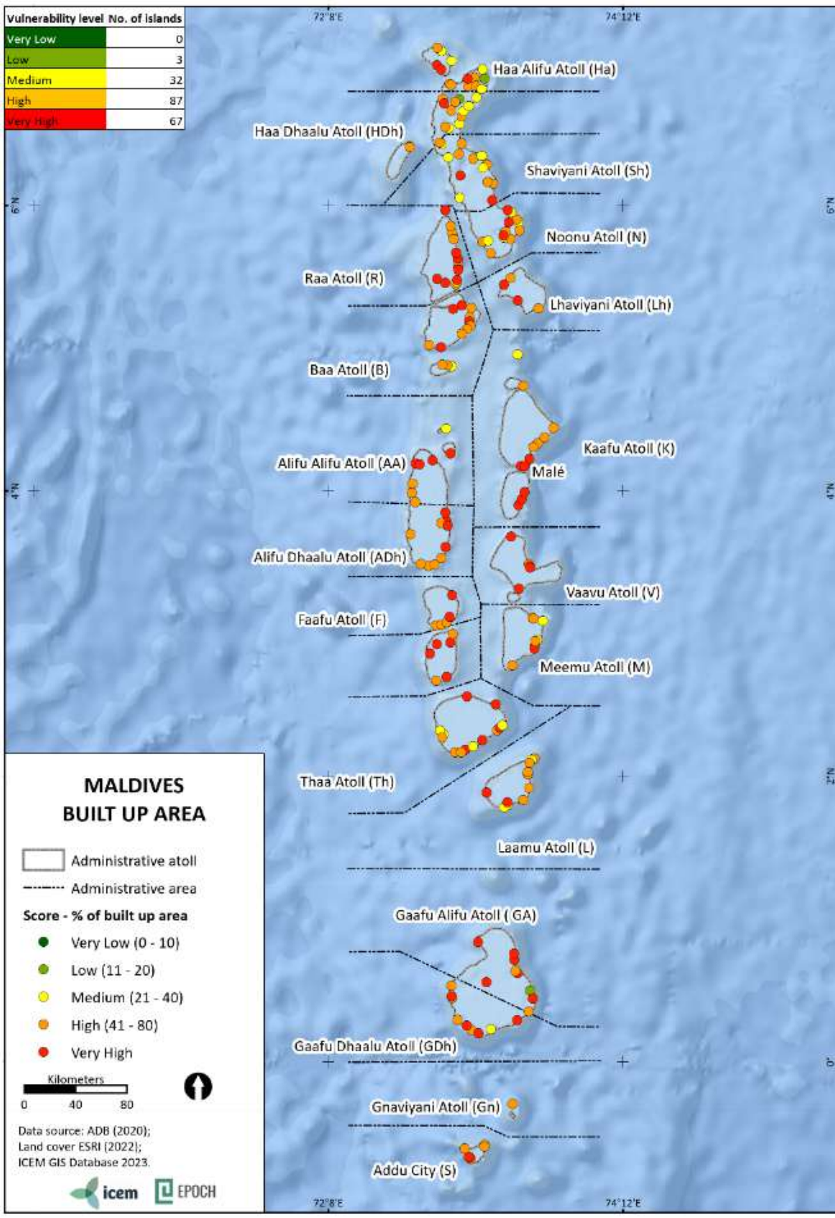
(i) 154 out of 189 islands (81.5%) are highly to very highly physically vulnerable due to a high percentage (40% or more) of built-up land area in proportion to the total island land area, as of 2022 (Figure 89). Only 3 islands have 20% or less of their total land area built-up;

(ii) 20 out of 189 islands (10.6%) are highly to very highly physically vulnerable due to a high number of critical health and education facilities on the island (Figure 90). The 5 islands with the highest number of these critical facilities – and therefore most physically vulnerable – are: Malé and Hulhumale, Gan (Laamu atoll, south-central region), Thinadhoo (Gaafu Dhaalu atoll, south region) and Hithadhoo (Addu City atoll, south region);

(iii) 17 out of 189 islands (9.0%), mostly regional hubs and the capital, are highly to very highly physically vulnerable due to a higher number of critical transport infrastructure on the island (Figure 91).

(iv) 46 out of 189 islands (24.3%) are highly to very highly physically vulnerable due to high-capacity power stations present on the island (Figure 92).

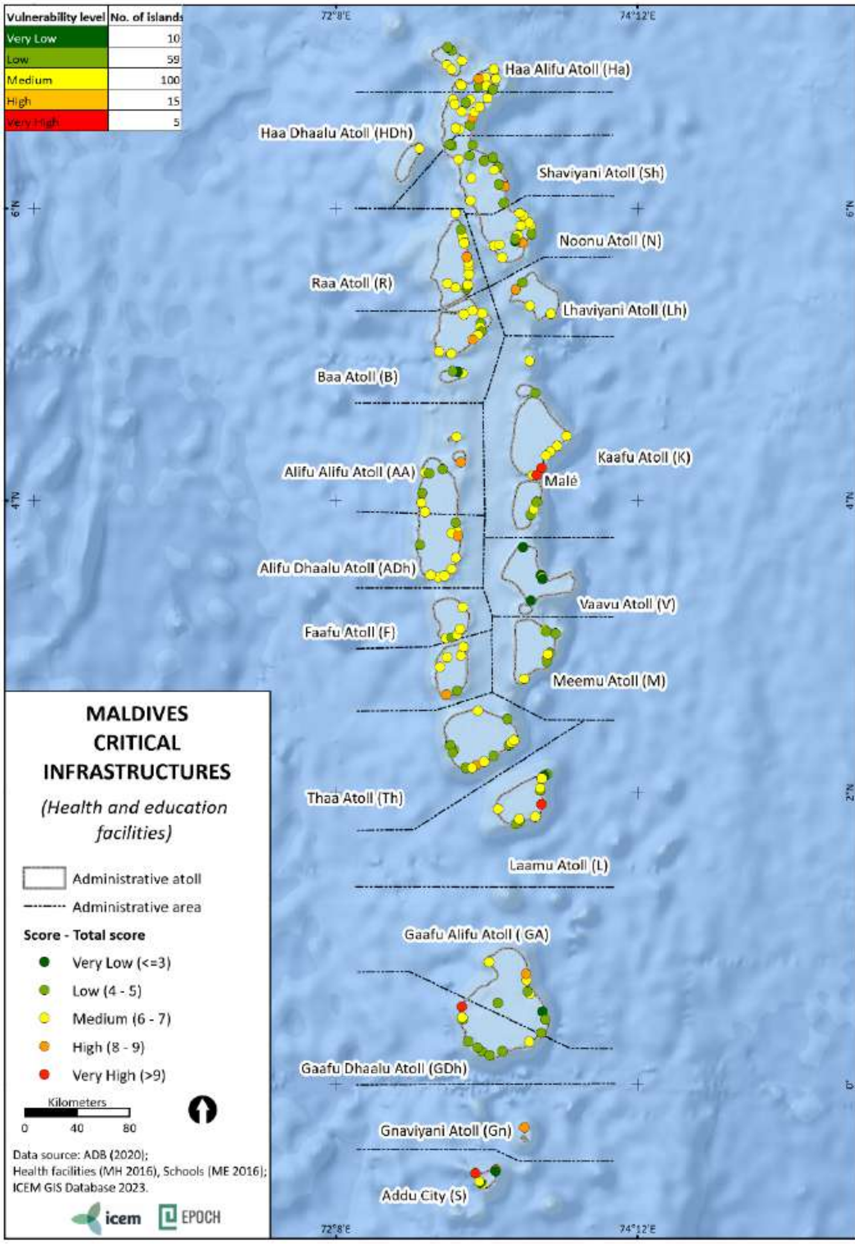
Figure 89: Islands' physical vulnerability: percentage of built-up area



No	Islands	Sc	No	Islands	Sc	No	Islands	Sc
1	Hulhumale'	5	64	Holhudhoo	3	127	Rin'budhoo	5
2	Male'	5	65	Kedhikolhudhoo	3	128	Bileiydhoo	5
3	Villimale	5	66	Kudafari	5	129	Dharan'boodhoo	4
4	Baarah	3	67	Landhoo	3	130	Feeali	5
5	Dhidhdhoo (HA)	5	68	Lhohi	4	131	Magoodhoo (F)	4
6	Filladhoo	2	69	Maafaru	4	132	Nilandhoo (F)	4
7	Hoarafushi	5	70	Maalhendhoo	4	133	Dhan'bidhoo	4
8	Ihavandhoo	5	71	Magoodhoo (N)	3	134	Fonadhoo	4
9	Kelaa	3	72	Manadhoo	4	135	Gan	4
10	Maarandhoo	4	73	Miladhoo	5	136	Hithadhoo (L)	3
11	Mulhadhoo	3	74	Velidhoo	4	137	Isdhoo	4
12	Muraidhoo	4	75	Agolhitheemu	4	138	Kalaidhoo	3
13	Thakandhoo	4	76	Alifushi	5	139	Kunahandhoo	3
14	Thurakunu	4	77	Dhuvaafaru	5	140	Maabaidhoo	4
15	Uligamu	3	78	Fainu	3	141	Maamendhoo (L)	5
16	Utheemu	4	79	Hulhudhuffaaru	4	142	Maavah	5
17	Vashafaru	4	80	Iguraidhoo	5	143	Mundoo	4
18	Finey	2	81	Innamaadhoo	5	144	Dhiggaru	4
19	Hanimaadhoo	3	82	Kinolhas	4	145	Kolhufushi	4
20	Hirimaradhoo	4	83	Maakurathu	4	146	Maduvvari (M)	4
21	Kulhudhuffushi	4	84	Maduvvari (R)	5	147	Mulah	4
22	Kumundhoo	3	85	Meedhoo (R)	5	148	Muli	4
23	Kurin'bee	4	86	Rasgetheemu	4	149	Naalaafushi	5
24	Makunudhoo	4	87	Rasmaadhoo	5	150	Raiymandhoo	3
25	Naivaadhoo	4	88	Ungufaaru	5	151	Veyvah	3
26	Nellaidhoo	5	89	Vaadhoo (R)	4	152	Buruni	5
27	Neykurendhoo	3	90	Bodufolhudhoo	5	153	Dhiyamigili	5
28	Nolhivaramu	3	91	Feridhoo	4	154	Gaadhiffushi	5
29	Nolhivaranfaru	3	92	Himandhoo	4	155	Guraidhoo (Th)	4
30	Vaikaradhoo	4	93	Maalhos (AA)	4	156	Hirilandhoo	4
31	Bilehffahi	3	94	Mathiveri	5	157	Kan'doodhoo	3
32	Feevah	3	95	Rasdhoo	5	158	Kin'bidhoo	4
33	Feydhoo (Sh)	4	96	Thoddoo	3	159	Madifushi	3
34	Foakaidhoo	4	97	Ukulhas	5	160	Omadhoo (Th)	4
35	Funadhoo	4	98	Dhan'gethi	5	161	Thimarafushi	3
36	Goidhoo (Sh)	3	99	Dhidhdhoo (ADh)	4	162	Vandhoo	3
37	Kan'ditheemu	4	100	Dhigurah	4	163	Veymandoo	5
38	Komandoo	3	101	Fenfushi	4	164	Vilufushi	5
39	Lhaimagu	4	102	Hangnameedhoo	5	165	Dhaandhoo	5
40	Maaugoodhoo	5	103	Kun'burudhoo	4	166	Dhevvadhoo	5
41	Maroshi	5	104	Maamigili	4	167	Gemanafushi	5
42	Milandhoo	4	105	Mahibadhoo	5	168	Kanduhulhudhoo	4
43	Narudhoo	3	106	Mandhoo	4	169	Kondey	2
44	Noomaraa	4	107	Omadhoo (ADh)	5	170	Kolamaafushi	5
45	Dharavandhoo	4	108	Dhiffushi	4	171	Maamendhoo (GA)	5
46	Dhonfanu	5	109	Gaafuru	4	172	Nilandhoo (GA)	4
47	Eydhafushi	4	110	Gulhi	5	173	Vilin'gili	5
48	Fehendhoo	4	111	Guraidhoo (K)	5	174	Faresmaathodaa	5
49	Fulhadhoo	4	112	Himmafushi	4	175	Fiyoari	4
50	Goidhoo (B)	3	113	Huraa	4	176	Gadhdhoo	5
51	Hithaadhoo	5	114	Kaashidhoo	3	177	Hoan'dehdhoo	4
52	Kamadhoo	4	115	Maafushi	5	178	Madeveli	5
53	Kendhoo	5	116	Thulusdhoo	4	179	Nadallaa	4
54	Kihaadhoo	4	117	Felidhoo	5	180	Rathafandhoo	5
55	Kudarikilu	5	118	Fulidhoo	5	181	Thinadhoo (GDh)	4
56	Maalhos (B)	4	119	Keyodhoo	5	182	Vaadhoo (GDh)	3
57	Thulhaadhoo	4	120	Rakeedhoo	5	183	Fuvahmulah	4
58	Hinnavaru	4	121	Thinadhoo (V)	4	184	Feydhoo (S)	4
59	Kurendhoo	5	122	Ban'didhoo	5	185	Hithadhoo (S)	4
60	Naifaru	5	123	Hulhudheli	5	186	Hulhudhoo	4
61	Olhuvelifushi	4	124	Kudahuvadhoo	4	187	Maradhoo	5
62	Fodhdhoo	4	125	Maaen'boodhoo	5	188	Maradhoofeydhoo	5
63	Hebadhoo	5	126	Meedhoo (Dh)	4	189	Meedho	4

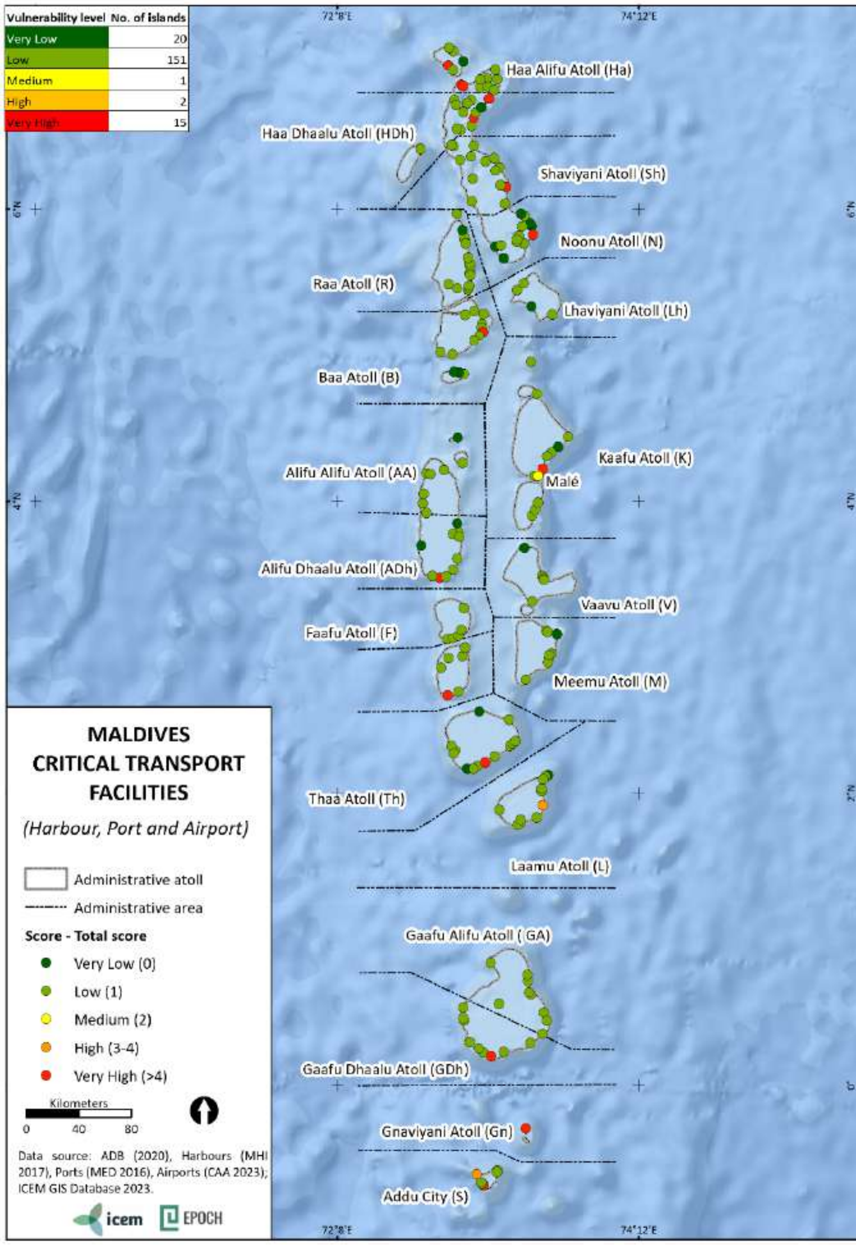
Figure 90: Islands' physical vulnerability: number of health and education facilities

Vulnerability level	No. of islands
Very Low	10
Low	59
Medium	100
High	15
Very High	5



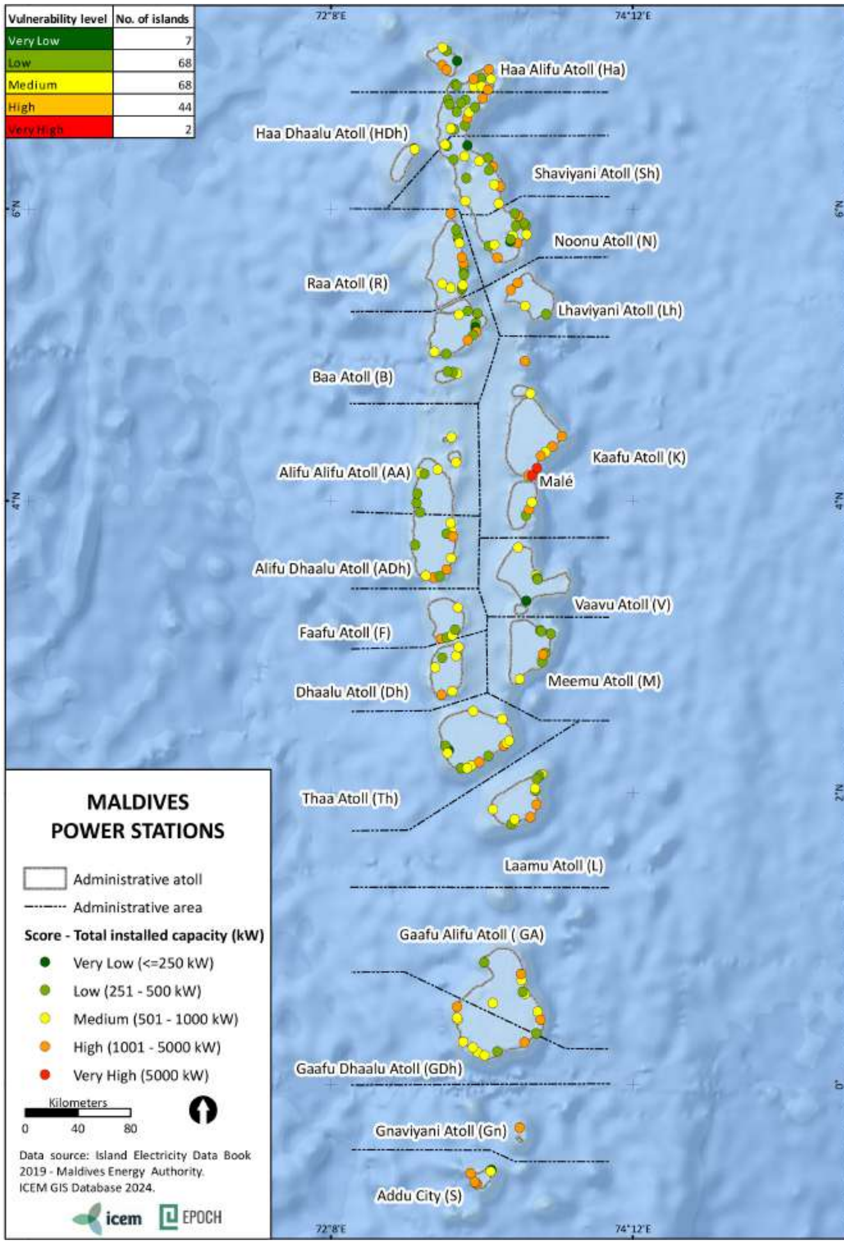
No	Islands	Sc	No	Islands	Sc	No	Islands	Sc
1	Hulhumale'	5	64	Holhudhoo	3	127	Rin'budhoo	3
2	Male'	5	65	Kedhikolhudhoo	3	128	Bileiydhoo	3
3	Villimale	3	66	Kudafari	3	129	Dharan'boodhoo	2
4	Baarah	2	67	Landhoo	3	130	Feeali	3
5	Dhidhdhoo (HA)	4	68	Lhohi	3	131	Magoodhoo (F)	3
6	Filladhoo	3	69	Maafaru	2	132	Nilandhoo (F)	3
7	Hoarafushi	3	70	Maalhendhoo	3	133	Dhan'bidhoo	3
8	Ihavandhoo	3	71	Magoodhoo (N)	1	134	Fonadhoo	3
9	Kelaa	3	72	Manadhoo	4	135	Gan	5
10	Maarandhoo	3	73	Miladhoo	2	136	Hithadhoo (L)	2
11	Mulhadhoo	3	74	Velidhoo	3	137	Isdhoo	2
12	Muraidhoo	3	75	Agolhitheemu	3	138	Kalaidhoo	1
13	Thakandhoo	3	76	Alifushi	3	139	Kunahandhoo	2
14	Thurakunu	2	77	Dhuvaafaru	3	140	Maabaidhoo	3
15	Uligamu	2	78	Fainu	2	141	Maamendhoo (L)	3
16	Utheemu	2	79	Hulhudhuffaaru	3	142	Maavah	3
17	Vashafaru	3	80	Iguraidhoo	3	143	Mundoo	2
18	Finey	3	81	Innamaadhoo	3	144	Dhiggaru	3
19	Hanimaadhoo	3	82	Kinolhas	2	145	Kolhufushi	3
20	Hirimaradhoo	2	83	Maakurathu	3	146	Maduwari (M)	2
21	Kulhudhuffushi	4	84	Maduvvari (R)	3	147	Mulah	3
22	Kumundhoo	2	85	Meedhoo (R)	3	148	Muli	4
23	Kurin'bee	3	86	Rasgetheemu	3	149	Naalaafushi	2
24	Makunudhoo	3	87	Rasmaadhoo	3	150	Ralymandhoo	2
25	Naivaadhoo	3	88	Ungufaaru	4	151	Veyvah	2
26	Nellaidhoo	3	89	Vaadhoo (R)	2	152	Buruni	3
27	Neykurendhoo	3	90	Bodufolhudhoo	2	153	Dhiyamigili	3
28	Nolhivaramu	3	91	Feridhoo	2	154	Gaadhiffushi	2
29	Nolhivaranfaru	3	92	Himandhoo	3	155	Guraidhoo (Th)	2
30	Vaikaradhoo	3	93	Maalhos (AA)	3	156	Hirilandhoo	2
31	Bilehffahi	3	94	Mathiveri	3	157	Kan'doodhoo	2
32	Feevah	2	95	Rasdhoo	4	158	Kin'bidhoo	3
33	Feydhoo (Sh)	2	96	Thoddoo	3	159	Madifushi	3
34	Foakaidhoo	2	97	Ukulhas	2	160	Omadhoo (Th)	2
35	Funadhoo	4	98	Dhan'gethi	3	161	Thimarafushi	3
36	Goidhoo (Sh)	2	99	Dhidhdhoo (ADh)	3	162	Vandhoo	2
37	Kan'ditheemu	2	100	Dhigurah	3	163	Veymandoo	4
38	Komandoo	3	101	Fenfushi	3	164	Vilufushi	2
39	Lhaimagu	2	102	Hangnameedhoo	2	165	Dhaandhoo	3
40	Maaugoodhoo	2	103	Kun'burudhoo	3	166	Dhevvadhoo	2
41	Maroshi	3	104	Maamigili	3	167	Gemanafushi	2
42	Milandhoo	2	105	Mahibadhoo	4	168	Kanduhulhudhoo	2
43	Narudhoo	3	106	Mandhoo	2	169	Kondey	1
44	Noomaraa	2	107	Omadhoo (ADh)	3	170	Kolamaafushi	3
45	Dharavandhoo	2	108	Dhiffushi	3	171	Maamendhoo (GA)	3
46	Dhonfanu	3	109	Gaafuru	2	172	Nilandhoo (GA)	2
47	Eydhafushi	4	110	Gulhi	2	173	Vilin'gili	4
48	Fehendhoo	1	111	Guraidhoo (K)	2	174	Faresmaathodaa	2
49	Fulhadhoo	2	112	Himmafushi	3	175	Fiyoari	2
50	Goidhoo (B)	3	113	Huraa	3	176	Gadhdhoo	3
51	Hithaadhoo	3	114	Kaashidhoo	3	177	Hoan'dehdhoo	2
52	Kamadhoo	3	115	Maafushi	3	178	Madeveli	3
53	Kendhoo	3	116	Thulusdhoo	3	179	Nadallaa	2
54	Kihaadhoo	2	117	Felidhoo	3	180	Rathafandhoo	2
55	Kudarikilu	3	118	Fulidhoo	1	181	Thinadhoo (GDh)	5
56	Maalhos (B)	3	119	Keyodhoo	1	182	Vaadhoo (GDh)	2
57	Thulhaadhoo	3	120	Rakeedhoo	1	183	Fuvahmulah	4
58	Hinnavaru	2	121	Thinadhoo (V)	1	184	Feydhoo (S)	3
59	Kurendhoo	3	122	Ban'didhoo	3	185	Hithadhoo (S)	5
60	Naifaru	4	123	Hulhudheli	3	186	Hulhudhoo	1
61	Olhuvelifushi	3	124	Kudahuvadhoo	4	187	Maradhoo	3
62	Fodhdhoo	3	125	Maaen'boodhoo	2	188	Maradhoofeydhoo	1
63	Hebadhoo	3	126	Meedhoo (Dh)	3	189	Meedho	4

Figure 91: Islands' physical vulnerability: number of transport facilities



No	Islands	Sc	No	Islands	Sc	No	Islands	Sc
1	Hulhumale'	5	64	Holhudhoo	2	127	Rin'budhoo	2
2	Male'	3	65	Kedhikolhudhoo	2	128	Bileiydhoo	2
3	Villimale	2	66	Kudafari	2	129	Dharan'boodhoo	2
4	Baarah	2	67	Landhoo	1	130	Feeali	2
5	Dhidhdhoo (HA)	2	68	Lhohi	2	131	Magoodhoo (F)	2
6	Filladhoo	2	69	Maafaru	5	132	Nilandhoo (F)	2
7	Hoarafushi	5	70	Maalhendhoo	1	133	Dhan'bidhoo	2
8	Ihavandhoo	2	71	Magoodhoo (N)	2	134	Fonadhoo	2
9	Kelaa	2	72	Manadhoo	2	135	Gan	4
10	Maarandhoo	5	73	Miladhoo	2	136	Hithadhoo (L)	2
11	Mulhadhoo	1	74	Velidhoo	1	137	Isdhoo	1
12	Muraidhoo	2	75	Agolhitheemu	2	138	Kalaidhoo	2
13	Thakandhoo	5	76	Alifushi	2	139	Kunahandhoo	2
14	Thurakunu	2	77	Dhuvaafaru	2	140	Maabaidhoo	2
15	Uligamu	2	78	Fainu	2	141	Maamendhoo (L)	2
16	Utheemu	2	79	Hulhudhuffaaru	2	142	Maavah	2
17	Vashafaru	2	80	Iguraidhoo	2	143	Mundoo	2
18	Finey	2	81	Innamaadhoo	2	144	Dhiggaru	2
19	Hanimaadhoo	5	82	Kinolhas	2	145	Kolhufushi	2
20	Hirimaradhoo	2	83	Maakurathu	2	146	Maduvvari (M)	2
21	Kulhudhuffushi	5	84	Maduvvari (R)	2	147	Mulah	2
22	Kumundhoo	2	85	Meedhoo (R)	2	148	Muli	2
23	Kurin'bee	2	86	Rasgetheemu	2	149	Naalaafushi	2
24	Makunudhoo	2	87	Rasmaadhoo	2	150	Raiymandhoo	1
25	Naivaadhoo	2	88	Ungufaaru	2	151	Veyvah	2
26	Nellaidhoo	2	89	Vaadhoo (R)	1	152	Buruni	1
27	Neykurendhoo	2	90	Bodufolhudhoo	2	153	Dhiyamigili	2
28	Nolhivaramu	2	91	Feridhoo	2	154	Gaadhiffushi	2
29	Nolhivaranfaru	1	92	Himandhoo	2	155	Guraidhoo (Th)	2
30	Vaikaradhoo	2	93	Maalhos (AA)	2	156	Hirilandhoo	2
31	Bilehffahi	2	94	Mathiveri	2	157	Kan'doodhoo	2
32	Feevah	2	95	Rasdhoo	2	158	Kin'bidhoo	2
33	Feydhoo (Sh)	2	96	Thoddoo	1	159	Madifushi	2
34	Foakaidhoo	2	97	Ukulhas	2	160	Omadhoo (Th)	1
35	Funadhoo	5	98	Dhan'gethi	2	161	Thimarafushi	5
36	Goidhoo (Sh)	2	99	Dhidhdhoo (ADh)	2	162	Vandhoo	2
37	Kan'ditheemu	2	100	Dhigurah	2	163	Veymandoo	2
38	Komandoo	2	101	Fenfushi	2	164	Vilufushi	2
39	Lhaimagu	2	102	Hangnameedhoo	1	165	Dhaandhoo	2
40	Maaugoodhoo	2	103	Kun'burudhoo	2	166	Dhevvadhoo	2
41	Maroshi	2	104	Maamigili	5	167	Gemanafushi	2
42	Milandhoo	2	105	Mahibadhoo	2	168	Kanduhulhudhoo	2
43	Narudhoo	2	106	Mandhoo	1	169	Kondey	2
44	Noomaraa	2	107	Omadhoo (ADh)	2	170	Kolamaafushi	2
45	Dharavandhoo	5	108	Dhiffushi	2	171	Maamendhoo (GA)	2
46	Dhonfanu	2	109	Gaafuru	2	172	Nilandhoo (GA)	2
47	Eydhafushi	2	110	Gulhi	2	173	Vilin'gili	2
48	Fehendhoo	1	111	Guraidhoo (K)	2	174	Faresmaathodaa	5
49	Fulhadhoo	1	112	Himmafushi	2	175	Fiyoari	2
50	Goidhoo (B)	2	113	Huraa	2	176	Gadhdhoo	2
51	Hithaadhoo	2	114	Kaashidhoo	2	177	Hoan'dehdhoo	2
52	Kamadhoo	2	115	Maafushi	2	178	Madeveli	2
53	Kendhoo	2	116	Thulusdhoo	1	179	Nadallaa	2
54	Kihaadhoo	2	117	Felidhoo	2	180	Rathafandhoo	2
55	Kudarikilu	2	118	Fulidhoo	1	181	Thinadhoo (GDh)	2
56	Maalhos (B)	2	119	Keyodhoo	2	182	Vaadhoo (GDh)	2
57	Thulhaadhoo	2	120	Rakeedhoo	2	183	Fuvahmulah	5
58	Hinnavaru	2	121	Thinadhoo (V)	2	184	Feydhoo (S)	5
59	Kurendhoo	1	122	Ban'didhoo	2	185	Hithadhoo (S)	4
60	Naifaru	2	123	Hulhudheli	2	186	Hulhudhoo	2
61	Olhuvelifushi	2	124	Kudahuvadhoo	5	187	Maradhoo	2
62	Fodhdhoo	1	125	Maaen'boodhoo	2	188	Maradhoofeydhoo	2
63	Hebadhoo	1	126	Meedhoo (Dh)	2	189	Meedho	2

Figure 92: Islands' physical vulnerability: capacity of power stations

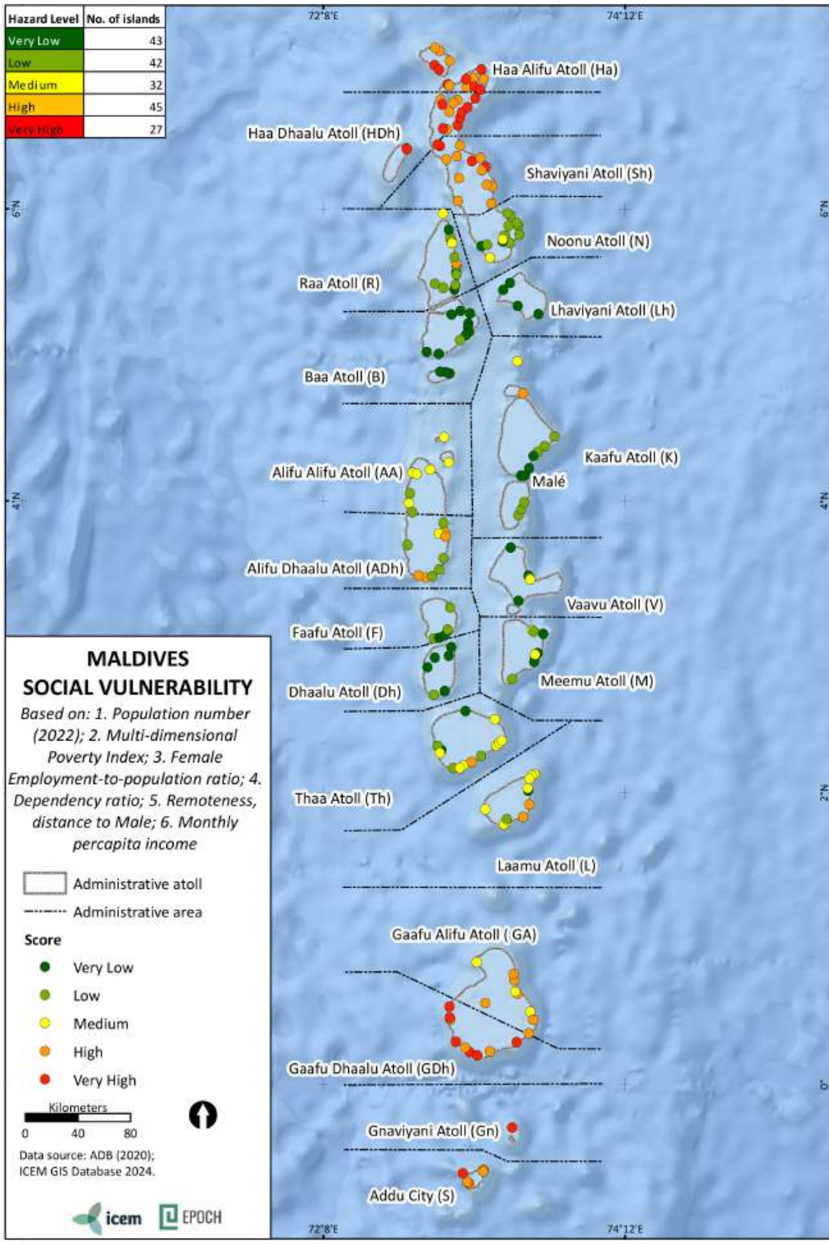


No	Islands	Sc	No	Islands	Sc	No	Islands	Sc
1	Hulhumale'	5	64	Holhudhoo	3	127	Rin'budhoo	2
2	Male'	5	65	Kedhikolhudhoo	4	128	Bileiydhoo	2
3	Villimale	4	66	Kudafari	2	129	Dharan'boodhoo	2
4	Baarah	4	67	Landhoo	2	130	Feeali	3
5	Dhidhdhoo (HA)	4	68	Lhohi	3	131	Magoodhoo (F)	3
6	Filladhoo	3	69	Maafaru	3	132	Nilandhoo (F)	4
7	Hoarafushi	4	70	Maalhendhoo	2	133	Dhan'bidhoo	2
8	Ihavandhoo	4	71	Magoodhoo (N)	1	134	Fonadhoo	4
9	Kelaa	4	72	Manadhoo	4	135	Gan	4
10	Maarandhoo	2	73	Miladhoo	2	136	Hithadhoo (L)	3
11	Mulhadhoo	1	74	Velidhoo	4	137	Isdhoo	3
12	Muraidhoo	3	75	Agolhitheemu	2	138	Kalaidhoo	2
13	Thakandhoo	2	76	Alifushi	4	139	Kunahandhoo	2
14	Thurakunu	3	77	Dhuvaafaru	4	140	Maabaidhoo	3
15	Uligamu	2	78	Fainu	2	141	Maamendhoo (L)	3
16	Utheemu	3	79	Hulhudhuffaaru	3	142	Maavah	3
17	Vashafaru	2	80	Iguraidhoo	3	143	Mundoo	2
18	Finey	2	81	Innamaadhoo	2	144	Dhiggaru	2
19	Hanimaadhoo	4	82	Kinolhas	2	145	Kolhufushi	3
20	Hirimaradhoo	2	83	Maakurathu	2	146	Maduvvari (M)	2
21	Kulhudhuffushi	4	84	Maduvvari (R)	3	147	Mulah	4
22	Kumundhoo	2	85	Meedhoo (R)	3	148	Muli	3
23	Kurin'bee	2	86	Rasgetheemu	2	149	Naalaafushi	2
24	Makunudhoo	3	87	Rasmaadhoo	2	150	Raiymandhoo	2
25	Naivaadhoo	2	88	Ungufaaru	4	151	Veyvah	2
26	Nellaidhoo	2	89	Vaadhoo (R)	2	152	Buruni	3
27	Neykurendhoo	2	90	Bodufolhudhoo	2	153	Dhiyamigili	3
28	Nolhivaramu	3	91	Feridhoo	2	154	Gaadhiffushi	2
29	Nolhivaranfaru	2	92	Himandhoo	2	155	Guraidhoo (Th)	4
30	Vaikaradhoo	3	93	Maalhos (AA)	2	156	Hirilandhoo	3
31	Bilehffahi	2	94	Mathiveri	3	157	Kan'doodhoo	2
32	Feevah	2	95	Rasdhoo	3	158	Kin'bidhoo	3
33	Feydhoo (Sh)	3	96	Thoddoo	3	159	Madifushi	3
34	Foakaidhoo	3	97	Ukulhas	3	160	Omadhoo (Th)	2
35	Funadhoo	4	98	Dhan'gethi	3	161	Thimarafushi	4
36	Goidhoo (Sh)	2	99	Dhidhdhoo (ADh)	2	162	Vandhoo	1
37	Kan'ditheemu	3	100	Dhigurah	4	163	Veymandoo	3
38	Komandoo	3	101	Fenfushi	3	164	Vilufushi	3
39	Lhaimagu	3	102	Hangnameedhoo	3	165	Dhaandhoo	3
40	Maaugoodhoo	3	103	Kun'burudhoo	2	166	Dhevvadhoo	3
41	Maroshi	2	104	Maamigili	4	167	Gemanafushi	4
42	Milandhoo	4	105	Mahibadhoo	4	168	Kanduhulhudhoo	2
43	Narudhoo	2	106	Mandhoo	2	169	Kondey	3
44	Noomaraa	1	107	Omadhoo (ADh)	3	170	Kolamaafushi	2
45	Dharavandhoo	4	108	Dhiffushi	4	171	Maamendhoo (GA)	3
46	Dhonfanu	1	109	Gaafuru	3	172	Nilandhoo (GA)	2
47	Eydhafushi	4	110	Gulhi	3	173	Vilin'gili	4
48	Fehendhoo	2	111	Guraidhoo (K)	2	174	Faresmaathodaa	3
49	Fulhadhoo	2	112	Himmafushi	4	175	Fiyoari	3
50	Goidhoo (B)	3	113	Huraa	3	176	Gadhdhoo	4
51	Hithaadhoo	2	114	Kaashidhoo	4	177	Hoan'dehdhoo	3
52	Kamadhoo	2	115	Maafushi	4	178	Madeveli	3
53	Kendhoo	3	116	Thulusdhoo	4	179	Nadallaa	3
54	Kihaadhoo	2	117	Felidhoo	2	180	Rathafandhoo	3
55	Kudarikilu	2	118	Fulidhoo	3	181	Thinadhoo (GDh)	4
56	Maalhos (B)	2	119	Keyodhoo	2	182	Vaadhoo (GDh)	2
57	Thulhaadhoo	3	120	Rakeedhoo	1	183	Fuvahmulah	4
58	Hinnavaru	4	121	Thinadhoo (V)	3	184	Feydhoo (S)	4
59	Kurendhoo	3	122	Ban'didhoo	3	185	Hithadhoo (S)	4
60	Naifaru	4	123	Hulhudheli	3	186	Hulhudhoo	3
61	Olhuvelifushi	2	124	Kudahuvadhoo	4	187	Maradhoo	4
62	Fodhdhoo	2	125	Maaen'boodhoo	3	188	Maradhoofeydhoo	4
63	Hebadhoo	2	126	Meedhoo (Dh)	3	189	Meedho	1

8. Social vulnerability

103. 72 out of the 189 islands (38.1%) can be considered as highly to very highly socially vulnerable to hazards and climate change (based on the selected parameters), with 27 very highly vulnerable. The 72 islands are mainly located in the farthest north and farthest south of the country, with some in the western-central part of the country as well (Figure 93). 85 islands (45.0%), mostly located in the capital and north-central and south-central regions, are lowly to very lowly socially vulnerable.

Figure 93: Islands' social vulnerability to hazards and climate change



No	Islands	Sc	No	Islands	Sc	No	Islands	Sc
1	Hulhumale'	1	64	Holhudhoo	2	127	Rin'budhoo	1
2	Male'	1	65	Kedhikolhudho	2	128	Bileiydhoo	2
3	Villimale	1	66	Kudafari	2	129	Dharan'boodhoo	1
4	Baarah	5	67	Landhoo	2	130	Feeali	2
5	Dhidhdhoo (HA)	5	68	Lhohi	2	131	Magoodhoo (F)	1
6	Filladhoo	4	69	Maafaru	2	132	Nilandhoo (F)	2
7	Hoarafushi	5	70	Maalhendhoo	2	133	Dhan'bidhoo	3
8	Ihavandhoo	5	71	Magoodhoo (N)	1	134	Fonadhoo	4
9	Kelaa	5	72	Manadhoo	2	135	Gan	4
10	Maarandhoo	5	73	Miladhoo	3	136	Hithadhoo (L)	3
11	Mulhadhoo	4	74	Velidhoo	3	137	Isdhoo	3
12	Muraidhoo	5	75	Agolhitheemu	1	138	Kalaidhoo	3
13	Thakandhoo	4	76	Alifushi	3	139	Kunahandhoo	3
14	Thurakunu	4	77	Dhuvaafaru	4	140	Maabaidhoo	3
15	Uligamu	4	78	Fainu	1	141	Maamendhoo (L)	2
16	Utheemu	4	79	Hulhudhuffaaru	3	142	Maavah	3
17	Vashafaru	4	80	Iguraidhoo	2	143	Mundoo	1
18	Finey	4	81	Innamaadhoo	2	144	Dhiggaru	3
19	Hanimaadhoo	5	82	Kinolhas	1	145	Kolhufushi	2
20	Hirimaradhoo	4	83	Maakurathu	2	146	Maduvvari (M)	2
21	Kulhudhuffushi	5	84	Maduvvari (R)	2	147	Mulah	3
22	Kumundhoo	5	85	Meedhoo (R)	2	148	Muli	2
23	Kurin'bee	4	86	Rasgetheemu	2	149	Naalaafushi	1
24	Makunudhoo	5	87	Rasmaadhoo	1	150	Raiymandhoo	1
25	Naivaadhoo	4	88	Ungufaaru	2	151	Veyvah	1
26	Nellaidhoo	5	89	Vaadhoo (R)	1	152	Buruni	1
27	Neykurendhoo	4	90	Bodufolhudhoo	3	153	Dhiyamigili	3
28	Nolhivaramu	5	91	Feridhoo	2	154	Gaadhiffushi	2
29	Nolhivaranfaru	5	92	Himandhoo	2	155	Guraidhoo (Th)	3
30	Vaikaradhoo	5	93	Maalhos (AA)	3	156	Hirilandhoo	3
31	Bilehffahi	4	94	Mathiveri	3	157	Kan'doodhoo	2
32	Feevah	4	95	Rasdhoo	3	158	Kin'bidhoo	3
33	Feydhoo (Sh)	4	96	Thoddoo	3	159	Madifushi	3
34	Foakaidhoo	5	97	Ukulhas	3	160	Omadhoo (Th)	2
35	Funadhoo	4	98	Dhan'gethi	2	161	Thimarafushi	4
36	Goidhoo (Sh)	5	99	Dhidhdhoo (AD	2	162	Vandhoo	1
37	Kan'ditheemu	5	100	Dhigurah	2	163	Veymandoo	3
38	Komandoo	4	101	Fenfushi	4	164	Vilufushi	3
39	Lhaimagu	4	102	Hangnameedh	2	165	Dhaandhoo	4
40	Maaugoodhoo	4	103	Kun'burudhoo	3	166	Dhevvadhoo	4
41	Maroshi	4	104	Maamigili	4	167	Gemanafushi	4
42	Milandhoo	5	105	Mahibadhoo	4	168	Kanduhulhudhoo	4
43	Narudhoo	4	106	Mandhoo	2	169	Kondey	3
44	Noomaraa	4	107	Omadhoo (ADh	4	170	Kolamaafushi	3
45	Dharavandhoo	1	108	Dhiffushi	2	171	Maamendhoo (GA)	4
46	Dhonfanu	1	109	Gaafuru	4	172	Nilandhoo (GA)	3
47	Eydhafushi	2	110	Gulhi	2	173	Vilin'gili	4
48	Fehendhoo	1	111	Guraidhoo (K)	2	174	Faresmaathodaa	5
49	Fulhadhoo	1	112	Himmafushi	1	175	Fiyoari	5
50	Goidhoo (B)	1	113	Huraa	2	176	Gadhdhoo	5
51	Hithaadhoo	1	114	Kaashidhoo	3	177	Hoan'dehdhoo	4
52	Kamadhoo	1	115	Maafushi	2	178	Madeveli	5
53	Kendhoo	1	116	Thulusdhoo	2	179	Nadallaa	5
54	Kihaadhoo	1	117	Felidhoo	2	180	Rathafandhoo	4
55	Kudarikilu	1	118	Fulidhoo	1	181	Thinadhoo (GDh)	5
56	Maalhos (B)	1	119	Keyodhoo	3	182	Vaadhoo (GDh)	4
57	Thulhaadhoo	1	120	Rakeedhoo	1	183	Fuvahmulah	5
58	Hinnavaru	1	121	Thinadhoo (V)	1	184	Feydhoo (S)	4
59	Kurendhoo	1	122	Ban'didhoo	1	185	Hithadhoo (S)	5
60	Naifaru	1	123	Hulhudheli	1	186	Hulhudhoo	4
61	Olhuvelifushi	1	124	Kudahuvadhoo	2	187	Maradhoo	4
62	Fodhdhoo	1	125	Maaen'boodho	1	188	Maradhoofeydhoo	4
63	Hebadhoo	2	126	Meedhoo (Dh)	1	189	Meedho	4

104. Specifically, for each parameter on social vulnerability:

(i) 23 out of 189 islands (12.2%) are highly to very highly socially vulnerable due to a high population (of more than 2,500 people) (Figure 94). The four most populated and socially vulnerable islands are: Malé and Hulhumale, Hithadhoo (Addu City atoll, south region) and Kulhudhuffushi (Haa Dhaalu atoll, north region), who are all perceived as hub in their respective regions. 112 islands (59.3%) have a population of 1,000 or less and are therefore considered lowly to very lowly socially vulnerable;

(ii) 98 out of 189 islands (51.9%) are highly to very highly socially vulnerable due to higher levels of multi-dimensional poverty[69] of the island's population (Figure 95). 73 of the 98 islands have population with very high levels of multi-dimensional poverty and are located in Haa Alifu, Haa Dhaalu and Shaviyani atolls (north region) and Alifu Alifu, Alifu Dhaalu, Kaafu and Vaavu atolls (central region). Overall, multi-dimensional poverty is higher in atolls than in Malé and the highest absolute number of poor live in the north and south region. Malé provides better social services and easier access to health and educational facilities, reducing social vulnerability;

(iii) 45 out of 189 islands (23.8%) are highly to very highly socially vulnerable due to low to very low female employment-to-population levels (40% or lower) (Figure 96). 6 islands have very low female employment-to-population levels (less than 30%): Uligamu (Haa Alifu atoll, north region), Kumundhoo (Haa Dhaalu atoll, north region), Foakaidhoo (Shaviyani atoll, north region), Dhuvaafaru (Raa atoll, north-central region), Omadhoo (Alifa Dhaalu atoll, central region), and Nadallaa (Gaafu Dhaalu atoll, south region);

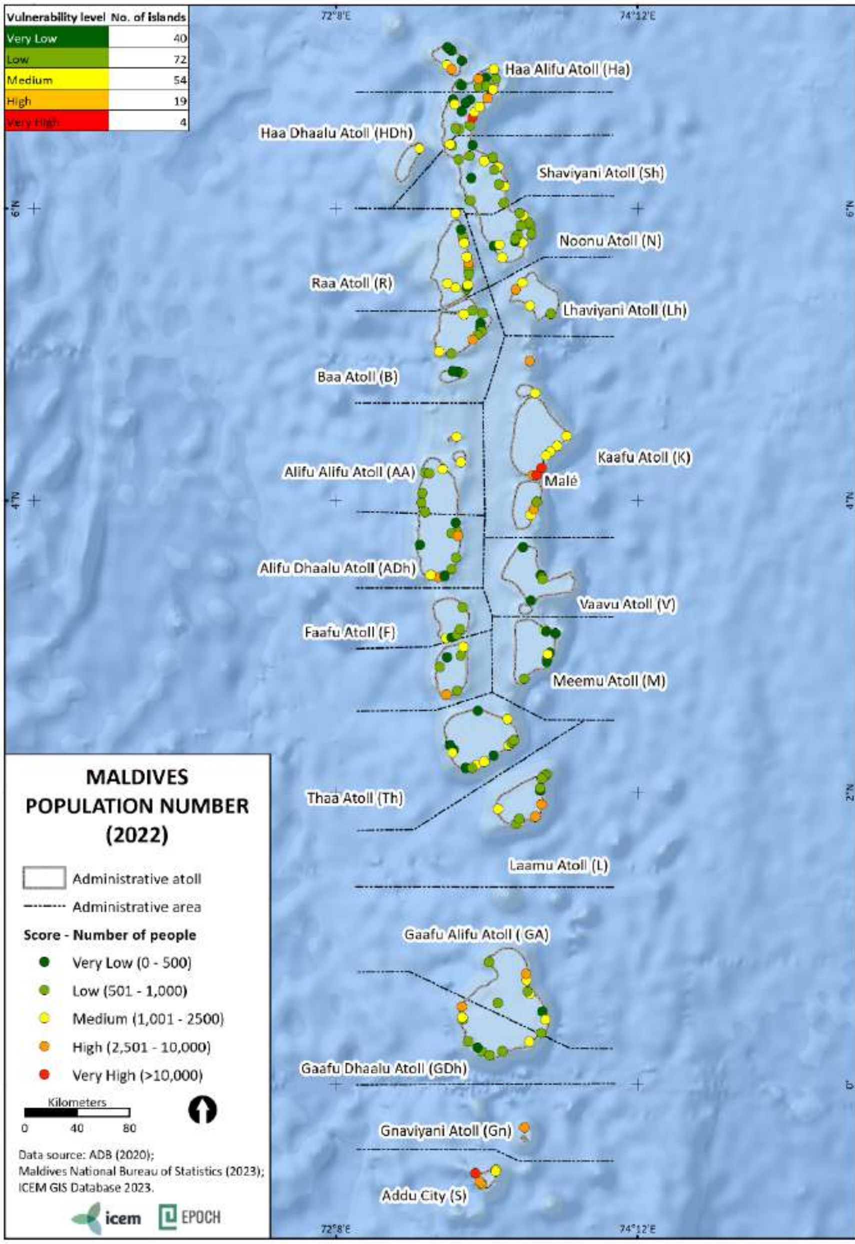
(iv) 104 out of 189 islands (55.0%) are highly to very highly socially vulnerable due to a high to very high dependency ratio (Figure 97). 4 islands have a very high dependency ratio: Maarandhoo and Muraidhoo (Haa Alifu atoll, north region), Maalhos (AlifuAlifu atoll, central region) and Fiyoari (Gaafu Dhaalu atoll, south region). The islands with the lowest dependency ratio (and therefore lower social vulnerability) are located in or near Malé;

(v) 90 out of 189 islands (47.6%) are highly to very highly socially vulnerable due to their level of remoteness (located more than 200 km from the country's capital) (Figure 98). The islands farthest south in Addu City atoll are the most remote;

(vi) 87 out of 189 islands (46.0%) are highly to very highly socially vulnerable due to a lower per capita monthly income (Figure 99). People with the lowest incomes live in Haa Dhaalu (north region), Noonu (north-central region), and Gaafu Dhaalu atolls (south region).

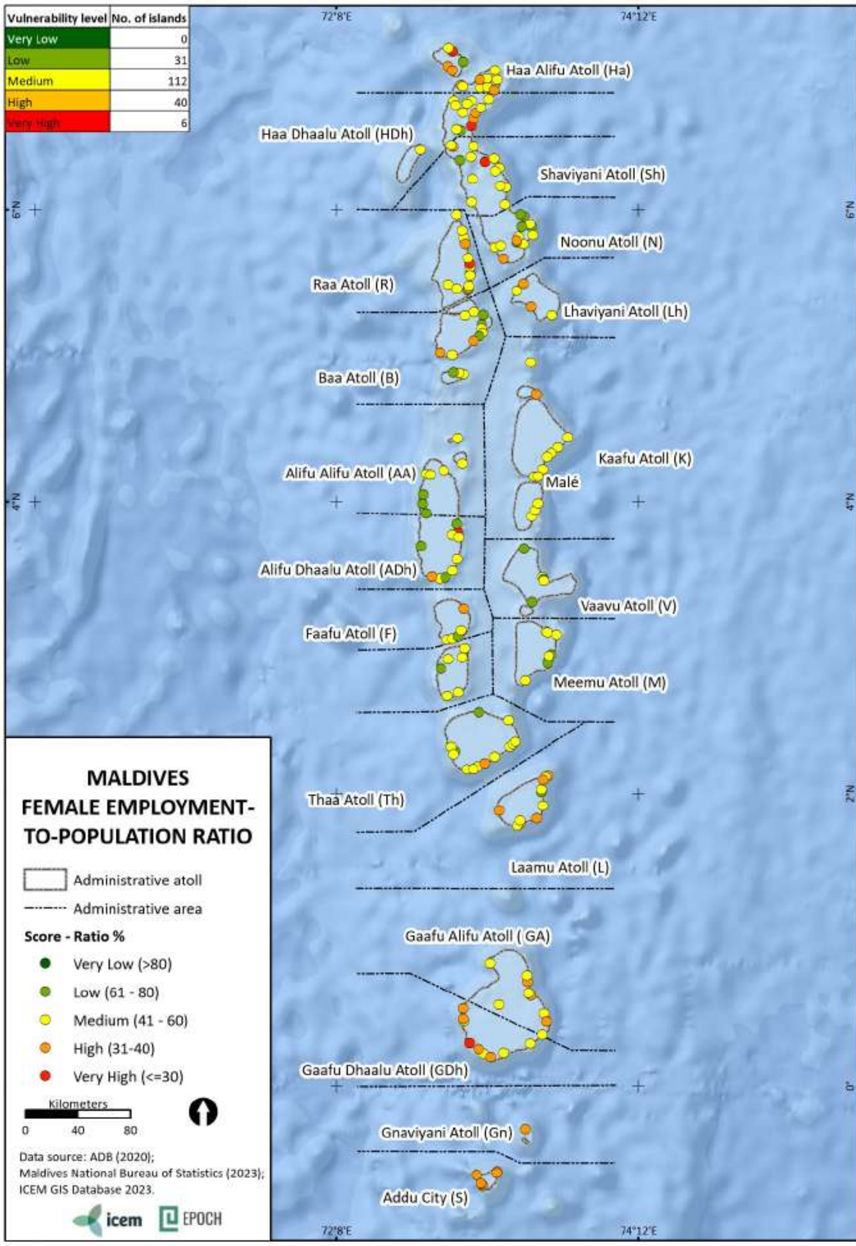
[69] Maldives' multi-dimensional poverty has 8 indicators along 3 dimensions: (i) health (underweight rates, obesity levels and access to health care); (ii) education and information (years of schooling and access to internet); and (iii) living standard (safe drinking water, access to toilet/sewerage and levels of overcrowding). Maldives Bureau of Statistics, 2020. *Multidimensional Poverty Index.* Malé, Maldives.

Figure 94: Islands' social vulnerability: number of people



No	Islands	Sc	No	Islands	Sc	No	Islands	Sc
1	Hulhumale'	5	64	Holhudhoo	3	127	Rin'budhoo	1
2	Male'	5	65	Kedhikolhudhoo	3	128	Bileiydhoo	2
3	Villimale	4	66	Kudafari	2	129	Dharan'boodhoo	1
4	Baarah	3	67	Landhoo	2	130	Feeali	2
5	Dhidhdhoo (HA)	4	68	Lhohi	2	131	Magoodhoo (F)	2
6	Filladhoo	2	69	Maafaru	2	132	Nilandhoo (F)	3
7	Hoarafushi	3	70	Maalhendhoo	2	133	Dhan'bidhoo	2
8	Ihavandhoo	4	71	Magoodhoo (N)	1	134	Fonadhoo	4
9	Kelaa	3	72	Manadhoo	3	135	Gan	4
10	Maarandhoo	2	73	Miladhoo	2	136	Hithadhoo (L)	3
11	Mulhadhoo	1	74	Velidhoo	3	137	Isdhoo	2
12	Muraidhoo	2	75	Agolhitheemu	1	138	Kalaidhoo	2
13	Thakandhoo	1	76	Alifushi	3	139	Kunahandhoo	2
14	Thurakunu	1	77	Dhuvaafaru	4	140	Maabaidhoo	2
15	Uligamu	1	78	Fainu	1	141	Maamendhoo (L)	2
16	Utheemu	2	79	Hulhudhuffaaru	3	142	Maavah	3
17	Vashafaru	1	80	Iguraidhoo	3	143	Mundoo	1
18	Finey	1	81	Innamaadhoo	2	144	Dhiggaru	3
19	Hanimaadhoo	4	82	Kinolhas	2	145	Kolhufushi	2
20	Hirimaradhoo	1	83	Maakurathu	2	146	Maduwari (M)	1
21	Kulhudhuffushi	5	84	Maduvvari (R)	3	147	Mulah	3
22	Kumundhoo	2	85	Meedhoo (R)	3	148	Muli	2
23	Kurin'bee	1	86	Rasgetheemu	2	149	Naalaafushi	1
24	Makunudhoo	3	87	Rasmaadhoo	2	150	Ralymandhoo	1
25	Naivaadhoo	1	88	Ungufaaru	3	151	Veyvah	1
26	Nellaidhoo	3	89	Vaadhoo (R)	1	152	Buruni	1
27	Neykurendhoo	2	90	Bodufolhudhoo	2	153	Dhiyamigili	2
28	Nolhivaramu	3	91	Feridhoo	2	154	Gaadhiffushi	1
29	Nolhivaranfaru	3	92	Himandhoo	2	155	Guraidhoo (Th)	3
30	Vaikaradhoo	2	93	Maalhos (AA)	2	156	Hirilandhoo	3
31	Bilehffahi	2	94	Mathiveri	2	157	Kan'doodhoo	1
32	Feevah	2	95	Rasdhoo	3	158	Kin'bidhoo	2
33	Feydhoo (Sh)	2	96	Thoddoo	3	159	Madifushi	2
34	Foakaidhoo	3	97	Ukulhas	3	160	Omadhoo (Th)	1
35	Funadhoo	3	98	Dhan'gethi	2	161	Thimarafushi	3
36	Goidhoo (Sh)	2	99	Dhidhdhoo (ADh)	1	162	Vandhoo	1
37	Kan'ditheemu	3	100	Dhigurah	2	163	Veymandoo	3
38	Komandoo	2	101	Fenfushi	3	164	Vilufushi	3
39	Lhaimagu	2	102	Hangnameedhoo	1	165	Dhaandhoo	3
40	Maaugoodhoo	2	103	Kun'burudhoo	2	166	Dhevvadhoo	2
41	Maroshi	1	104	Maamigili	4	167	Gemanafushi	3
42	Milandhoo	3	105	Mahibadhoo	4	168	Kanduhulhudhoo	2
43	Narudhoo	2	106	Mandhoo	1	169	Kondey	1
44	Noomaraa	1	107	Omadhoo (ADh)	2	170	Kolamaafushi	2
45	Dharavandhoo	2	108	Dhiffushi	3	171	Maamendhoo (GA)	3
46	Dhonfanu	1	109	Gaafuru	3	172	Nilandhoo (GA)	2
47	Eydhafushi	4	110	Gulhi	2	173	Vilin'gili	4
48	Fehendhoo	1	111	Guraidhoo (K)	3	174	Faresmaathodaa	2
49	Fulhadhoo	1	112	Himmafushi	3	175	Fiyoari	2
50	Goidhoo (B)	2	113	Huraa	3	176	Gadhdhoo	3
51	Hithaadhoo	2	114	Kaashidhoo	4	177	Hoan'dehdhoo	2
52	Kamadhoo	2	115	Maafushi	4	178	Madeveli	3
53	Kendhoo	3	116	Thulusdhoo	3	179	Nadallaa	2
54	Kihaadhoo	1	117	Felidhoo	2	180	Rathafandhoo	1
55	Kudarikilu	2	118	Fulidhoo	1	181	Thinadhoo (GDh)	4
56	Maalhos (B)	2	119	Keyodhoo	2	182	Vaadhoo (GDh)	2
57	Thulhaadhoo	3	120	Rakeedhoo	1	183	Fuvahmulah	4
58	Hinnavaru	3	121	Thinadhoo (V)	1	184	Feydhoo (S)	4
59	Kurendhoo	3	122	Ban'didhoo	2	185	Hithadhoo (S)	5
60	Naifaru	4	123	Hulhudheli	2	186	Hulhudhoo	3
61	Olhuvelifushi	2	124	Kudahuvadhoo	4	187	Maradhoo	4
62	Fodhdhoo	1	125	Maaen'boodhoo	2	188	Maradhoofeydhoo	3
63	Hebadhoo	2	126	Meedhoo (Dh)	3	189	Meedho	3

Figure 95: Islands' social vulnerability: multi-dimensional poverty



No	Islands	Sc	No	Islands	Sc	No	Islands	Sc
1	Hulhumale'	3	64	Holhudhoo	3	127	Rin'budhoo	3
2	Male'	3	65	Kedhikolhudhoo	2	128	Bileiydhoo	3
3	Villimale	3	66	Kudafari	2	129	Dharan'boodhoo	3
4	Baarah	4	67	Landhoo	2	130	Feeali	4
5	Dhidhdhoo (HA)	4	68	Lhohi	3	131	Magoodhoo (F)	2
6	Filladhoo	3	69	Maafaru	3	132	Nilandhoo (F)	3
7	Hoarafushi	4	70	Maalhendhoo	3	133	Dhan'bidhoo	4
8	Ihavandhoo	4	71	Magoodhoo (N)	2	134	Fonadhoo	4
9	Kelaa	3	72	Manadhoo	3	135	Gan	3
10	Maarandhoo	4	73	Miladhoo	4	136	Hithadhoo (L)	4
11	Mulhadhoo	2	74	Velidhoo	4	137	Isdhoo	4
12	Muraidhoo	3	75	Agolhitheemu	3	138	Kalaidhoo	3
13	Thakandhoo	3	76	Alifushi	3	139	Kunahandhoo	3
14	Thurakunu	3	77	Dhuvaafaru	5	140	Maabaidhoo	3
15	Uligamu	5	78	Fainu	4	141	Maamendhoo (L)	3
16	Utheemu	3	79	Hulhudhuffaaru	4	142	Maavah	4
17	Vashafaru	3	80	Iguraidhoo	3	143	Mundoo	2
18	Finey	3	81	Innamaadhoo	3	144	Dhiggaru	3
19	Hanimaadhoo	3	82	Kinolhas	2	145	Kolhufushi	3
20	Hirimaradhoo	3	83	Maakurathu	3	146	Maduvvari (M)	3
21	Kulhudhuffushi	4	84	Maduvvari (R)	3	147	Mulah	3
22	Kumundhoo	5	85	Meedhoo (R)	3	148	Muli	2
23	Kurin'bee	3	86	Rasgetheemu	3	149	Naalaafushi	2
24	Makunudhoo	3	87	Rasmaadhoo	2	150	Raiymandhoo	3
25	Naivaadhoo	3	88	Ungufaaru	3	151	Veyvah	2
26	Nellaidhoo	3	89	Vaadhoo (R)	3	152	Buruni	2
27	Neykurendhoo	2	90	Bodufolhudhoo	3	153	Dhiyamigili	3
28	Nolhivaramu	4	91	Feridhoo	2	154	Gaadhiffushi	3
29	Nolhivaranfaru	3	92	Himandhoo	2	155	Guraidhoo (Th)	3
30	Vaikaradhoo	3	93	Maalhos (AA)	2	156	Hirilandhoo	3
31	Bilehffahi	2	94	Mathiveri	3	157	Kan'doodhoo	3
32	Feevah	3	95	Rasdhoo	3	158	Kin'bidhoo	3
33	Feydhoo (Sh)	3	96	Thoddoo	3	159	Madifushi	3
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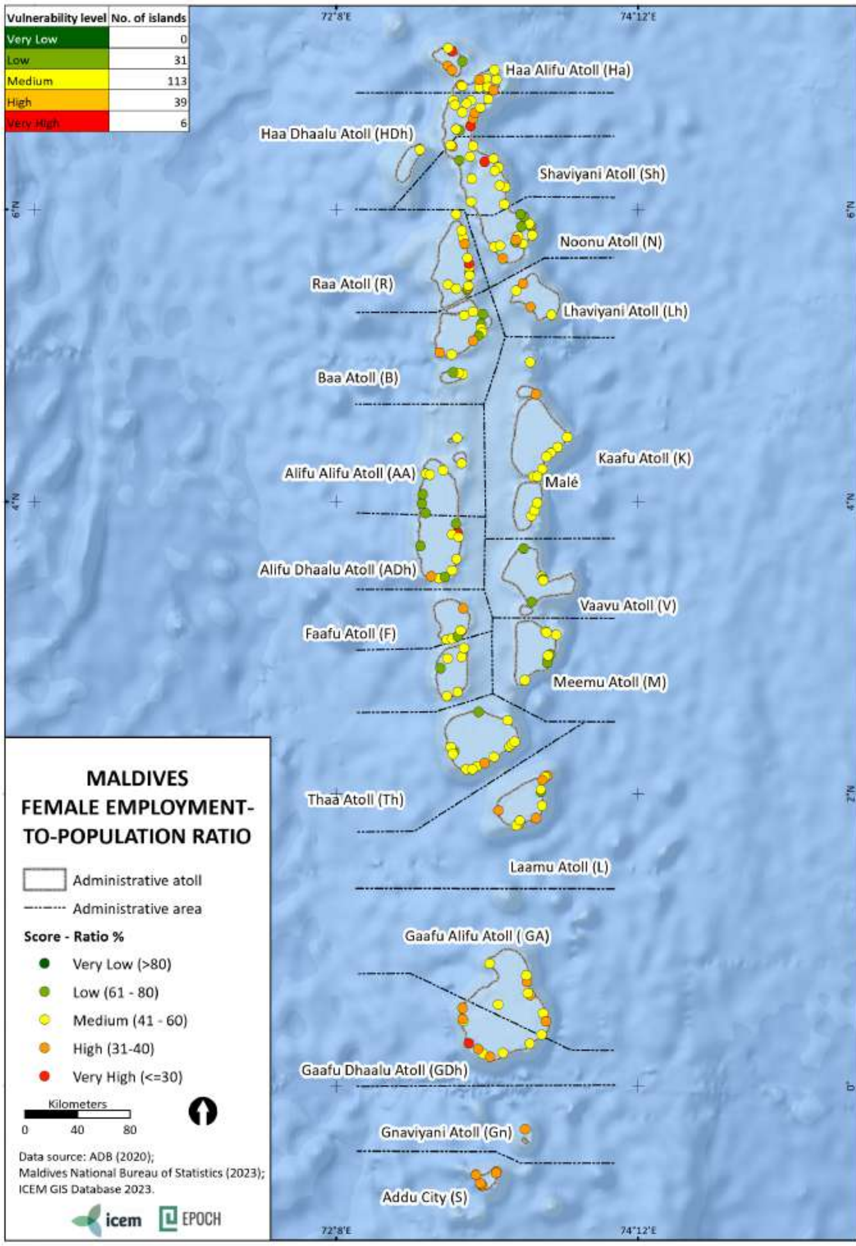
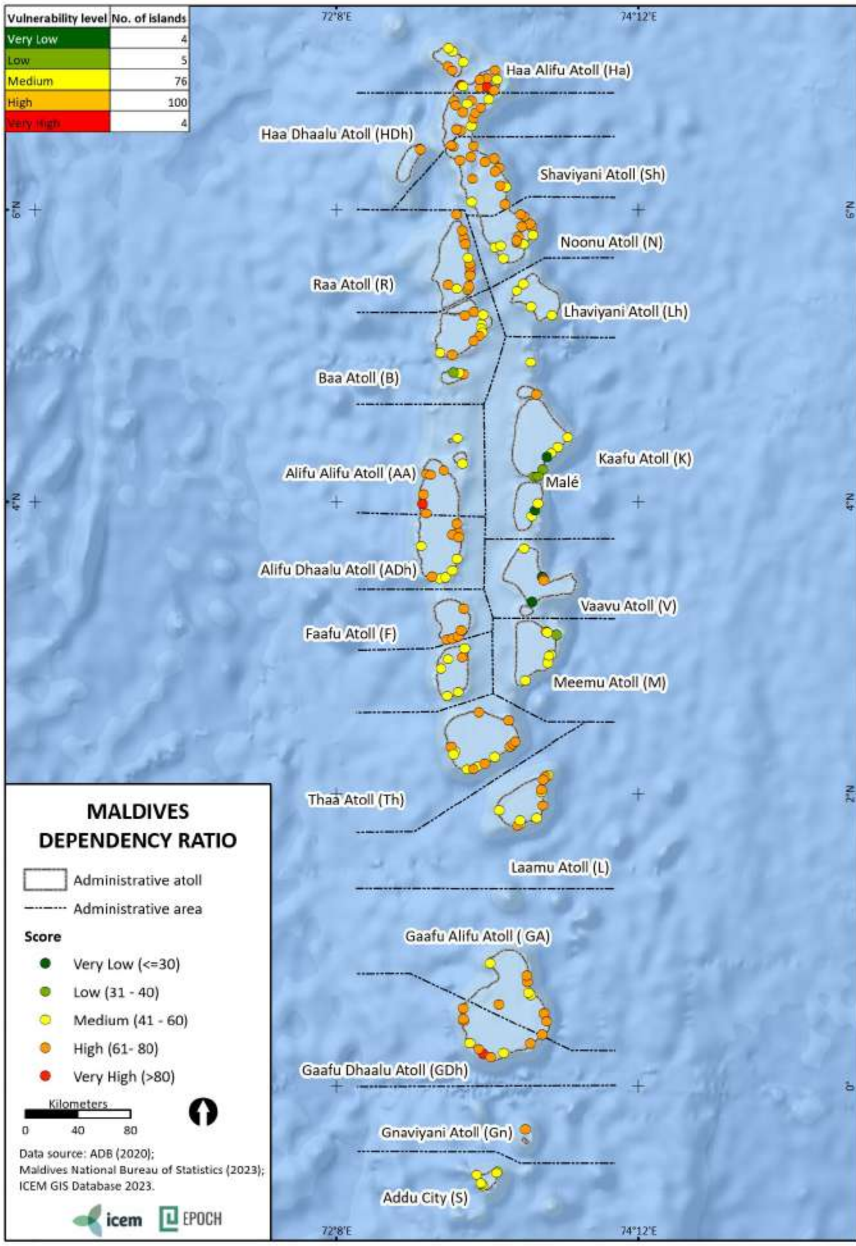
41	Maroshi	3	104	Maamigili	3	167	Gemanafushi	4
42	Milandhoo	3	105	Mahibadhoo	3	168	Kanduhulhudhoo	3
43	Narudhoo	3	106	Mandhoo	2	169	Kondey	3
44	Noomaraa	3	107	Omadhoo (ADh)	5	170	Kolamaafushi	3
45	Dharavandhoo	3	108	Dhiffushi	3	171	Maamendhoo (GA)	4
46	Dhonfanu	3	109	Gaafuru	4	172	Nilandhoo (GA)	3
47	Eydhafushi	4	110	Gulhi	3	173	Vilin'gili	3
48	Fehendhoo	3	111	Guraidhoo (K)	3	174	Faresmaathodaa	4
49	Fulhadhoo	2	112	Himmafushi	3	175	Fiyoari	3
50	Goidhoo (B)	3	113	Huraa	3	176	Gadhdhoo	3
51	Hithaadhoo	3	114	Kaashidhoo	3	177	Hoan'dehdhoo	3
52	Kamadhoo	2	115	Maafushi	3	178	Madeveli	4
53	Kendhoo	3	116	Thulusdhoo	3	179	Nadallaa	5
54	Kihaadhoo	2	117	Felidhoo	2	180	Rathafandhoo	4
55	Kudarikilu	3	118	Fulidhoo	2	181	Thinadhoo (GDh)	4
56	Maalhos (B)	2	119	Keyodhoo	3	182	Vaadhoo (GDh)	3
57	Thulhaadhoo	4	120	Rakeedhoo	2	183	Fuvahmulah	4
58	Hinnavaru	4	121	Thinadhoo (V)	3	184	Feydhoo (S)	4
59	Kurendhoo	4	122	Ban'didhoo	3	185	Hithadhoo (S)	4
60	Naifaru	3	123	Hulhudheli	2	186	Hulhudhoo	4
61	Olhuvelifushi	3	124	Kudahuvadhoo	3	187	Maradhoo	4
62	Fodhdhoo	3	125	Maaen'boodhoo	3	188	Maradhoofeydhoo	4
63	Hebadhoo	2	126	Meedhoo (Dh)	3	189	Meedho	4

Figure 96: Islands' social vulnerability: female employment-to-population ratio



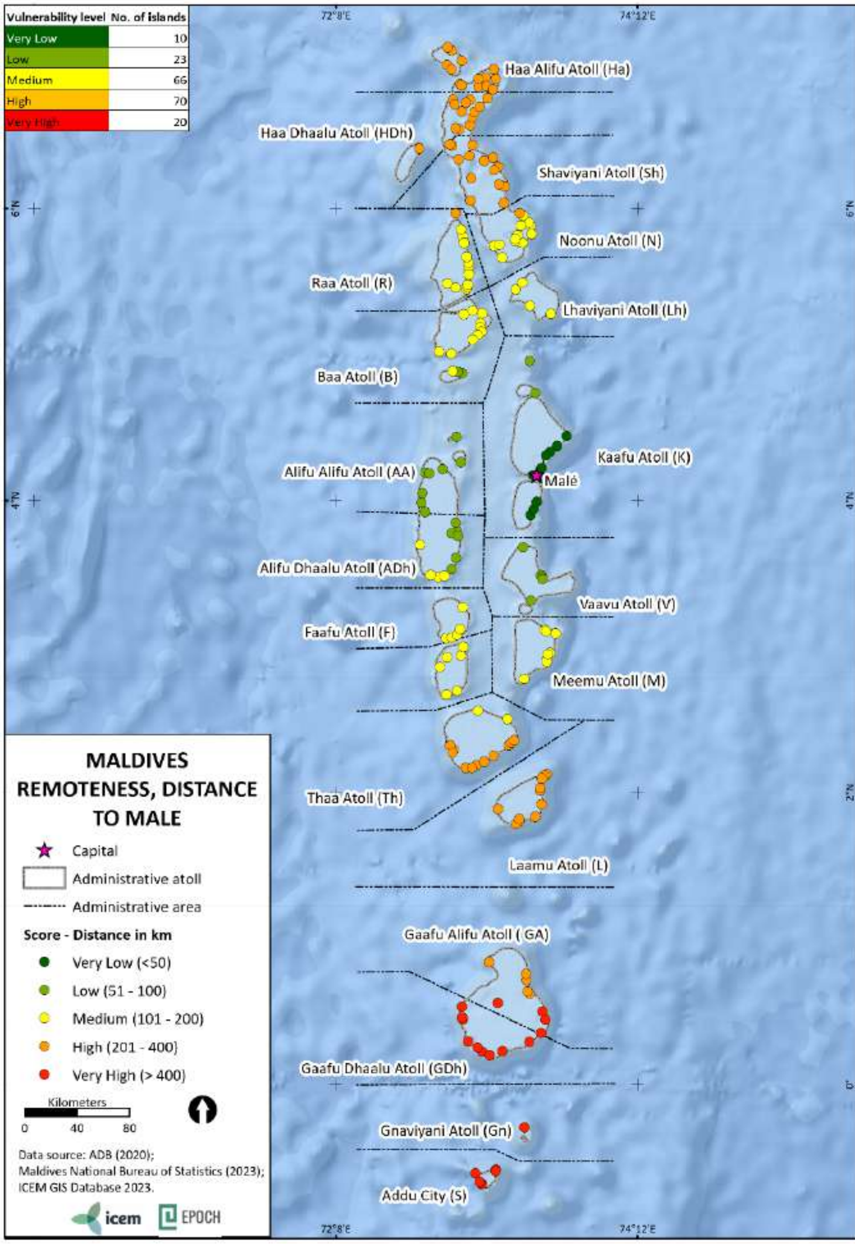
No	Islands	Sc	No	Islands	Sc	No	Islands	Sc
1	Hulhumale'	3	64	Holhudhoo	3	127	Rin'budhoo	3
2	Male'	3	65	Kedhikolhudhoo	2	128	Bileiydhoo	3
3	Villimale	3	66	Kudafari	2	129	Dharan'boodhoo	3
4	Baarah	4	67	Landhoo	2	130	Feeali	4
5	Dhidhdhoo (HA)	4	68	Lhohi	3	131	Magoodhoo (F)	2
6	Filladhoo	3	69	Maafaru	3	132	Nilandhoo (F)	3
7	Hoarafushi	4	70	Maalhendhoo	3	133	Dhan'bidhoo	4
8	Ihavandhoo	4	71	Magoodhoo (N)	2	134	Fonadhoo	4
9	Kelaa	3	72	Manadhoo	3	135	Gan	3
10	Maarandhoo	4	73	Miladhoo	4	136	Hithadhoo (L)	4
11	Mulhadhoo	2	74	Velidhoo	4	137	Isdhoo	4
12	Muraidhoo	3	75	Agolhitheemu	3	138	Kalaidhoo	3
13	Thakandhoo	3	76	Alifushi	3	139	Kunahandhoo	3
14	Thurakunu	3	77	Dhuvaafaru	5	140	Maabaidhoo	3
15	Uligamu	5	78	Fainu	4	141	Maamendhoo (L)	3
16	Utheemu	3	79	Hulhudhuffaaru	4	142	Maavah	4
17	Vashafaru	3	80	Iguraidhoo	3	143	Mundoo	2
18	Finey	3	81	Innamaadhoo	3	144	Dhiggaru	3
19	Hanimaadhoo	3	82	Kinolhas	2	145	Kolhufushi	3
20	Hirimaradhoo	3	83	Maakurathu	3	146	Maduvvari (M)	3
21	Kulhudhuffushi	4	84	Maduvvari (R)	3	147	Mulah	3
22	Kumundhoo	5	85	Meedhoo (R)	3	148	Muli	2
23	Kurin'bee	3	86	Rasgetheemu	3	149	Naalaafushi	2
24	Makunudhoo	3	87	Rasmaadhoo	2	150	Raiymandhoo	3
25	Naivaadhoo	3	88	Ungufaaru	3	151	Veyvah	2
26	Nellaidhoo	3	89	Vaadhoo (R)	3	152	Buruni	2
27	Neykurendhoo	2	90	Bodufolhudhoo	3	153	Dhiyamigili	3
28	Nolhivaramu	4	91	Feridhoo	2	154	Gaadhiffushi	3
29	Nolhivaranfaru	3	92	Himandhoo	2	155	Guraidhoo (Th)	3
30	Vaikaradhoo	3	93	Maalhos (AA)	2	156	Hirilandhoo	3
31	Bilehffahi	2	94	Mathiveri	3	157	Kan'doodhoo	3
32	Feevah	3	95	Rasdhoo	3	158	Kin'bidhoo	3
33	Feydhoo (Sh)	3	96	Thoddoo	3	159	Madifushi	3
34	Foakaidhoo	5	97	Ukulhas	3	160	Omadhoo (Th)	3
35	Funadhoo	3	98	Dhan'gethi	3	161	Thimarafushi	4
36	Goidhoo (Sh)	4	99	Dhidhdhoo (ADh)	2	162	Vandhoo	2
37	Kan'ditheemu	3	100	Dhigurah	3	163	Veymandoo	3
38	Komandoo	3	101	Fenfushi	4	164	Vilufushi	3
39	Lhaimagu	3	102	Hangnameedhoo	2	165	Dhaandhoo	4
40	Maaugoodhoo	3	103	Kun'burudhoo	3	166	Dhevvadhoo	3
41	Maroshi	3	104	Maamigili	3	167	Gemanafushi	4
42	Milandhoo	3	105	Mahibadhoo	3	168	Kanduhulhudhoo	3
43	Narudhoo	3	106	Mandhoo	2	169	Kondey	3
44	Noomaraa	3	107	Omadhoo (ADh)	5	170	Kolamaafushi	3
45	Dharavandhoo	3	108	Dhiffushi	3	171	Maamendhoo (GA)	4
46	Dhonfanu	3	109	Gaafuru	4	172	Nilandhoo (GA)	3
47	Eydhafushi	4	110	Gulhi	3	173	Vilin'gili	3
48	Fehendhoo	3	111	Guraidhoo (K)	3	174	Faresmaathodaa	4
49	Fulhadhoo	2	112	Himmafushi	3	175	Fiyoari	3
50	Goidhoo (B)	3	113	Huraa	3	176	Gadhdhoo	3
51	Hithaadhoo	3	114	Kaashidhoo	3	177	Hoan'dehdhoo	3
52	Kamadhoo	2	115	Maafushi	3	178	Madeveli	4
53	Kendhoo	3	116	Thulusdhoo	3	179	Nadallaa	5
54	Kihaadhoo	2	117	Felidhoo	2	180	Rathafandhoo	4
55	Kudarikilu	3	118	Fulidhoo	2	181	Thinadhoo (GDh)	4
56	Maalhos (B)	2	119	Keyodhoo	3	182	Vaadhoo (GDh)	3
57	Thulhaadhoo	4	120	Rakeedhoo	2	183	Fuvahmulah	4
58	Hinnavaru	4	121	Thinadhoo (V)	3	184	Feydhoo (S)	4
59	Kurendhoo	4	122	Ban'didhoo	3	185	Hithadhoo (S)	4
60	Naifaru	3	123	Hulhudheli	2	186	Hulhudhoo	4
61	Olhuvelifushi	3	124	Kudahuvadhoo	3	187	Maradhoo	4
62	Fodhdhoo	3	125	Maaen'boodhoo	3	188	Maradhoofeydhoo	4
63	Hebadhoo	2	126	Meedhoo (Dh)	3	189	Meedho	4

Figure 97: Islands' social vulnerability: dependency ratio



No	Islands	Sc	No	Islands	Sc	No	Islands	Sc
1	Hulhumale'	2	64	Holhudhoo	3	127	Rin'budhoo	3
2	Male'	2	65	Kedhikolhudhoo	4	128	Bileiydhoo	4
3	Villimale	2	66	Kudafari	4	129	Dharan'boodhoo	4
4	Baarah	4	67	Landhoo	4	130	Feeali	4
5	Dhidhdhoo (HA)	4	68	Lhohi	4	131	Magoodhoo (F)	4
6	Filladhoo	3	69	Maafaru	3	132	Nilandhoo (F)	4
7	Hoarafushi	4	70	Maalhendhoo	4	133	Dhan'bidhoo	4
8	Ihavandhoo	4	71	Magoodhoo (N)	4	134	Fonadhoo	3
9	Kelaa	4	72	Manadhoo	3	135	Gan	4
10	Maarandhoo	5	73	Miladhoo	4	136	Hithadhoo (L)	3
11	Mulhadhoo	3	74	Velidhoo	3	137	Isdhoo	3
12	Muraidhoo	5	75	Agolhitheemu	3	138	Kalaidhoo	4
13	Thakandhoo	3	76	Alifushi	4	139	Kunahandhoo	4
14	Thurakunu	3	77	Dhuvaafaru	4	140	Maabaidhoo	4
15	Uligamu	3	78	Fainu	3	141	Maamendhoo (L)	3
16	Utheemu	4	79	Hulhudhuffaaru	4	142	Maavah	3
17	Vashafaru	4	80	Iguraidhoo	4	143	Mundoo	3
18	Finey	4	81	Innamaadhoo	4	144	Dhiggaru	4
19	Hanimaadhoo	3	82	Kinolhas	4	145	Kolhufushi	3
20	Hirimaradhoo	3	83	Maakurathu	4	146	Maduvvari (M)	3
21	Kulhudhuffushi	4	84	Maduvvari (R)	4	147	Mulah	3
22	Kumundhoo	3	85	Meedhoo (R)	3	148	Muli	3
23	Kurin'bee	4	86	Rasgetheemu	4	149	Naalaafushi	3
24	Makunudhoo	4	87	Rasmaadhoo	4	150	Raiymandhoo	2
25	Naivaadhoo	4	88	Ungufaaru	3	151	Veyvah	3
26	Nellaidhoo	4	89	Vaadhoo (R)	4	152	Buruni	4
27	Neykurendhoo	4	90	Bodufolhudhoo	4	153	Dhiyamigili	4
28	Nolhivaramu	4	91	Feridhoo	4	154	Gaadhiffushi	3
29	Nolhivaranfaru	4	92	Himandhoo	4	155	Guraidhoo (Th)	4
30	Vaikaradhoo	4	93	Maalhos (AA)	5	156	Hirilandhoo	3
31	Bilehffahi	4	94	Mathiveri	4	157	Kan'doodhoo	4
32	Feevah	4	95	Rasdhoo	3	158	Kin'bidhoo	4
33	Feydhoo (Sh)	4	96	Thoddoo	3	159	Madifushi	4
34	Foakaidhoo	4	97	Ukulhas	4	160	Omadhoo (Th)	3
35	Funadhoo	3	98	Dhan'gethi	3	161	Thimarafushi	4
36	Goidhoo (Sh)	4	99	Dhidhdhoo (ADh)	3	162	Vandhoo	3
37	Kan'ditheemu	4	100	Dhigurah	3	163	Veymandoo	3
38	Komandoo	3	101	Fenfushi	4	164	Vilufushi	4
39	Lhaimagu	4	102	Hangnameedhoo	4	165	Dhaandhoo	3
40	Maaugoodhoo	4	103	Kun'burudhoo	4	166	Dhevvadhoo	4
41	Maroshi	4	104	Maamigili	3	167	Gemanafushi	4
42	Milandhoo	4	105	Mahibadhoo	4	168	Kanduhulhudhoo	4
43	Narudhoo	4	106	Mandhoo	3	169	Kondey	4
44	Noomaraa	4	107	Omadhoo (ADh)	4	170	Kolamaafushi	3
45	Dharavandhoo	3	108	Dhiffushi	3	171	Maamendhoo (GA)	4
46	Dhonfanu	3	109	Gaafuru	4	172	Nilandhoo (GA)	3
47	Eydhafushi	4	110	Gulhi	3	173	Vilin'gili	4
48	Fehendhoo	3	111	Guraidhoo (K)	3	174	Faresmaathodaa	4
49	Fulhadhoo	2	112	Himmafushi	1	175	Fiyoari	5
50	Goidhoo (B)	4	113	Huraa	3	176	Gadhdhoo	4
51	Hithaadhoo	4	114	Kaashidhoo	3	177	Hoan'dehdhoo	4
52	Kamadhoo	3	115	Maafushi	1	178	Madeveli	4
53	Kendhoo	4	116	Thulusdhoo	3	179	Nadallaa	3
54	Kihaadhoo	3	117	Felidhoo	4	180	Rathafandhoo	4
55	Kudarikilu	4	118	Fulidhoo	3	181	Thinadhoo (GDh)	4
56	Maalhos (B)	4	119	Keyodhoo	4	182	Vaadhoo (GDh)	3
57	Thulhaadhoo	3	120	Rakeedhoo	1	183	Fuvahmulah	4
58	Hinnavaru	3	121	Thinadhoo (V)	1	184	Feydhoo (S)	3
59	Kurendhoo	3	122	Ban'didhoo	4	185	Hithadhoo (S)	3
60	Naifaru	3	123	Hulhudheli	3	186	Hulhudhoo	3
61	Olhuvelifushi	3	124	Kudahuvadhoo	3	187	Maradhoo	3
62	Fodhdhoo	3	125	Maaen'boodhoo	3	188	Maradhoofeydhoo	3
63	Hebadhoo	4	126	Meedhoo (Dh)	3	189	Meedho	3

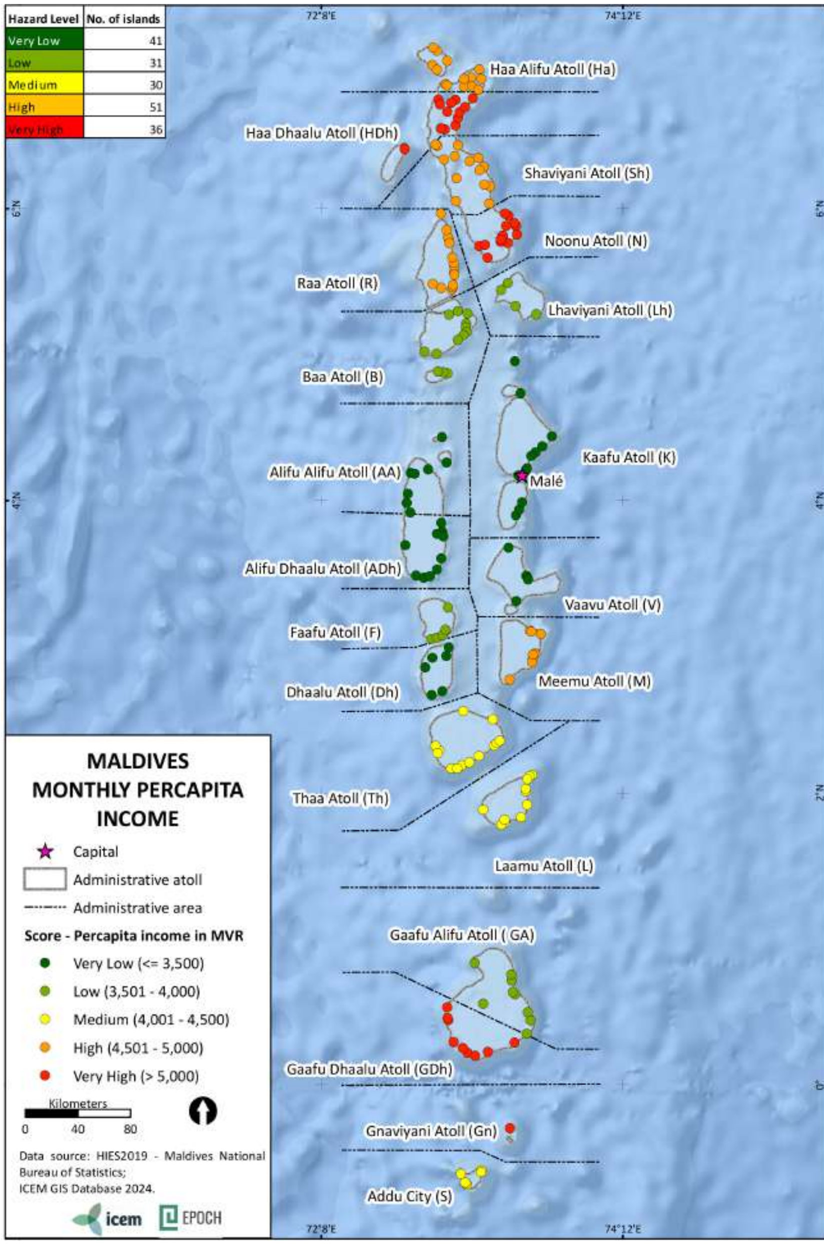
Figure 98: Islands' social vulnerability: remoteness



Vulnerability level	No. of Islands
Very Low	10
Low	23
Medium	66
High	70
Very High	20

No	Islands	Sc	No	Islands	Sc	No	Islands	Sc
1	Hulhumale'	1	64	Holhudhoo	3	127	Rin'budhoo	3
2	Male'	1	65	Kedhikolhudhoo	3	128	Bileiydhoo	3
3	Villimale	1	66	Kudafari	3	129	Dharan'boodhoo	3
4	Baarah	4	67	Landhoo	3	130	Feeali	3
5	Dhidhdhoo (HA)	4	68	Lhohi	3	131	Magoodhoo (F)	3
6	Filladhoo	4	69	Maafaru	3	132	Nilandhoo (F)	3
7	Hoarafushi	4	70	Maalhendhoo	3	133	Dhan'bidhoo	4
8	Ihavandhoo	4	71	Magoodhoo (N)	3	134	Fonadhoo	4
9	Kelaa	4	72	Manadhoo	3	135	Gan	4
10	Maarandhoo	4	73	Miladhoo	3	136	Hithadhoo (L)	4
11	Mulhadhoo	4	74	Velidhoo	3	137	Isdhoo	4
12	Muraidhoo	4	75	Agolhitheemu	3	138	Kalaidhoo	4
13	Thakandhoo	4	76	Alifushi	4	139	Kunahandhoo	4
14	Thurakunu	4	77	Dhuvaafaru	3	140	Maabaidhoo	4
15	Uligamu	4	78	Fainu	3	141	Maamendhoo (L)	4
16	Utheemu	4	79	Hulhudhuffaaru	3	142	Maavah	4
17	Vashafaru	4	80	Iguraidhoo	3	143	Mundoo	4
18	Finey	4	81	Innamaadhoo	3	144	Dhiggaru	3
19	Hanimaadhoo	4	82	Kinolhas	3	145	Kolhufushi	3
20	Hirimaradhoo	4	83	Maakurathu	3	146	Maduvvari (M)	3
21	Kulhudhuffushi	4	84	Maduvvari (R)	3	147	Mulah	3
22	Kumundhoo	4	85	Meedhoo (R)	3	148	Muli	3
23	Kurin'bee	4	86	Rasgetheemu	3	149	Naalaafushi	3
24	Makunudhoo	4	87	Rasmaadhoo	3	150	Ralymandhoo	3
25	Naivaadhoo	4	88	Ungufaaru	3	151	Veyvah	3
26	Nellaidhoo	4	89	Vaadhoo (R)	3	152	Buruni	3
27	Neykurendhoo	4	90	Bodufolhudhoo	2	153	Dhiyamigili	4
28	Nolhivaramu	4	91	Feridhoo	2	154	Gaadhiffushi	4
29	Nolhivaranfaru	4	92	Himandhoo	2	155	Guraidhoo (Th)	4
30	Vaikaradhoo	4	93	Maalhos (AA)	2	156	Hirilandhoo	4
31	Bilehffahi	4	94	Mathiveri	2	157	Kan'doodhoo	4
32	Feevah	4	95	Rasdhoo	2	158	Kin'bidhoo	4
33	Feydhoo (Sh)	4	96	Thoddoo	2	159	Madifushi	4
34	Foakaidhoo	4	97	Ukulhas	2	160	Omadhoo (Th)	4
35	Funadhoo	4	98	Dhan'gethi	2	161	Thimarafushi	4
36	Goidhoo (Sh)	4	99	Dhidhdhoo (ADh)	3	162	Vandhoo	4
37	Kan'ditheemu	4	100	Dhigurah	2	163	Veymandoo	4
38	Komandoo	4	101	Fenfushi	3	164	Vilufushi	3
39	Lhaimagu	4	102	Hangnameedhoo	2	165	Dhaandhoo	4
40	Maaugoodhoo	4	103	Kun'burudhoo	2	166	Dhevvadhoo	5
41	Maroshi	4	104	Maamigili	3	167	Gemanafushi	5
42	Milandhoo	4	105	Mahibadhoo	2	168	Kanduhulhudhoo	5
43	Narudhoo	4	106	Mandhoo	3	169	Kondey	5
44	Noomaraa	4	107	Omadhoo (ADh)	2	170	Kolamaafushi	4
45	Dharavandhoo	3	108	Dhiffushi	1	171	Maamendhoo (GA)	4
46	Dhonfanu	3	109	Gaafuru	2	172	Nilandhoo (GA)	4
47	Eydhafushi	3	110	Gulhi	1	173	Vilin'gili	4
48	Fehendhoo	2	111	Guraidhoo (K)	1	174	Faresmaathodaa	5
49	Fulhadhoo	3	112	Himmafushi	1	175	Fiyoari	5
50	Goidhoo (B)	2	113	Huraa	1	176	Gadhdhoo	5
51	Hithaadhoo	3	114	Kaashidhoo	2	177	Hoan'dehdhoo	5
52	Kamadhoo	3	115	Maafushi	1	178	Madeveli	5
53	Kendhoo	3	116	Thulusdhoo	1	179	Nadallaa	5
54	Kihaadhoo	3	117	Felidhoo	2	180	Rathafandhoo	5
55	Kudarikilu	3	118	Fulidhoo	2	181	Thinadhoo (GDh)	5
56	Maalhos (B)	3	119	Keyodhoo	2	182	Vaadhoo (GDh)	5
57	Thulhaadhoo	3	120	Rakeedhoo	2	183	Fuvahmulah	5
58	Hinnavaru	3	121	Thinadhoo (V)	2	184	Feydhoo (S)	5
59	Kurendhoo	3	122	Ban'didhoo	3	185	Hithadhoo (S)	5
60	Naifaru	3	123	Hulhudheli	3	186	Hulhudhoo	5
61	Olhuvelifushi	3	124	Kudahuvadhoo	3	187	Maradhoo	5
62	Fodhdhoo	3	125	Maaen'boodhoo	3	188	Maradhoofeydhoo	5
63	Hebadhoo	4	126	Meedhoo (Dh)	3	189	Meedho	5

Figure 99: Islands' social vulnerability: monthly per capita income

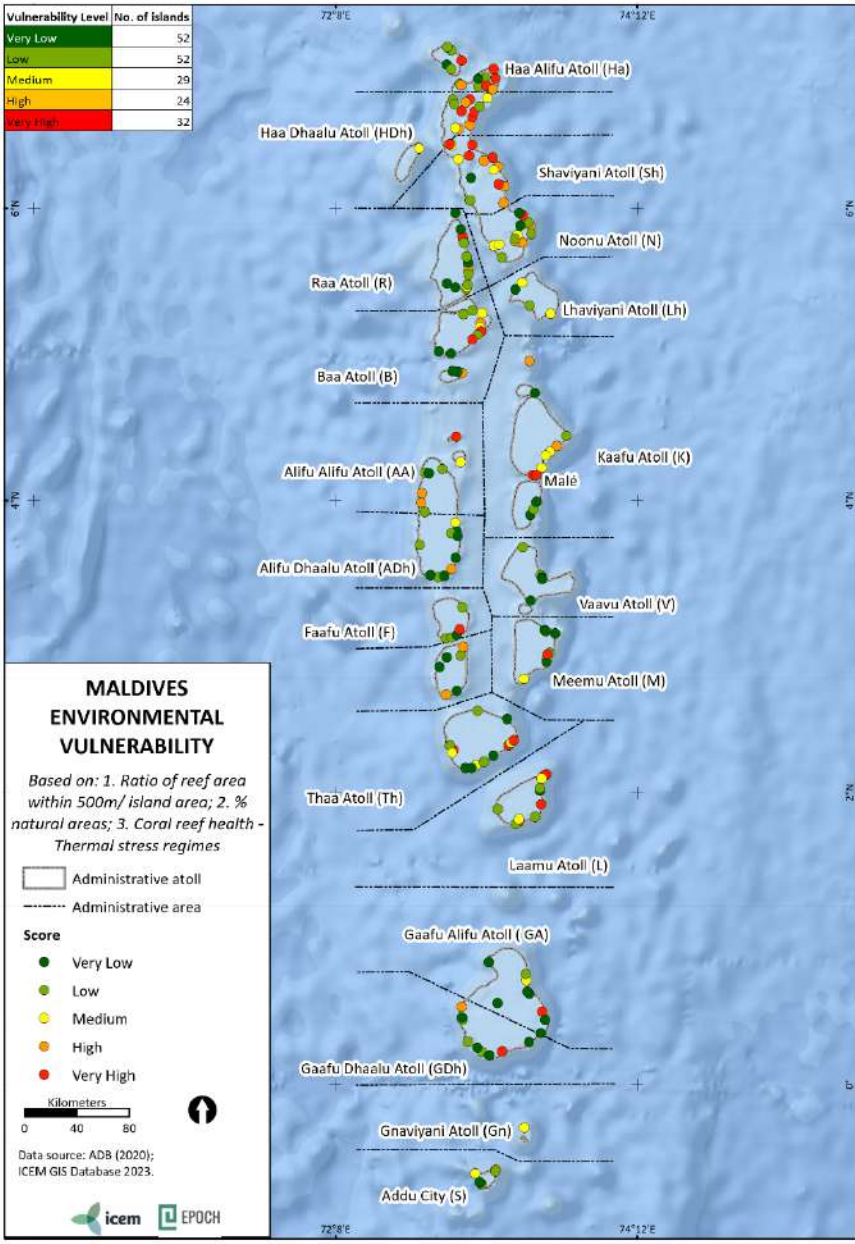


No	Islands	Sc	No	Islands	Sc	No	Islands	Sc
1	Hulhumale'	1	64	Holhudhoo	5	127	Rin'budhoo	1
2	Male'	1	65	Kedhikolhudho	5	128	Bileiydhoo	2
3	Villimale	1	66	Kudafari	5	129	Dharan'boodhoo	2
4	Baarah	4	67	Landhoo	5	130	Feeali	2
5	Dhidhdhoo (HA)	4	68	Lhohi	5	131	Magoodhoo (F)	2
6	Filladhoo	4	69	Maafaru	5	132	Nilandhoo (F)	2
7	Hoarafushi	4	70	Maalhendhoo	5	133	Dhan'bidhoo	3
8	Ihavandhoo	4	71	Magoodhoo (N)	5	134	Fonadhoo	3
9	Kelaa	4	72	Manadhoo	5	135	Gan	3
10	Maarandhoo	4	73	Miladhoo	5	136	Hithadhoo (L)	3
11	Mulhadhoo	4	74	Velidhoo	5	137	Isdhoo	3
12	Muraidhoo	4	75	Agolhitheemu	4	138	Kalaidhoo	3
13	Thakandhoo	4	76	Alifushi	4	139	Kunahandhoo	3
14	Thurakunu	4	77	Dhuvaafaru	4	140	Maabaidhoo	3
15	Uligamu	4	78	Fainu	4	141	Maamendhoo (L)	3
16	Utheemu	4	79	Hulhudhuffaar	4	142	Maavah	3
17	Vashafaru	4	80	Iguraidhoo	4	143	Mundoo	3
18	Finey	5	81	Innamaadhoo	4	144	Dhiggaru	4
19	Hanimaadhoo	5	82	Kinolhas	4	145	Kolhufushi	4
20	Hirimaradhoo	5	83	Maakurathu	4	146	Maduwari (M)	4
21	Kulhudhuffushi	5	84	Maduvvari (R)	4	147	Mulah	4
22	Kumundhoo	5	85	Meedhoo (R)	4	148	Muli	4
23	Kurin'bee	5	86	Rasgetheemu	4	149	Naalaafushi	4
24	Makunudhoo	5	87	Rasmaadhoo	4	150	Raiymandhoo	4
25	Naivaadhoo	5	88	Ungufaaru	4	151	Veyvah	4
26	Nellaidhoo	5	89	Vaadhoo (R)	4	152	Buruni	3
27	Neykurendhoo	5	90	Bodufolhudhoo	1	153	Dhiyamigili	3
28	Nolhivaramu	5	91	Feridhoo	1	154	Gaadhiffushi	3
29	Nolhivaranfaru	5	92	Himandhoo	1	155	Guraidhoo (Th)	3
30	Vaikaradhoo	5	93	Maalhos (AA)	1	156	Hirilandhoo	3
31	Bilehffahi	4	94	Mathiveri	1	157	Kan'doodhoo	3
32	Feevah	4	95	Rasdhoo	1	158	Kin'bidhoo	3
33	Feydhoo (Sh)	4	96	Thoddoo	1	159	Madifushi	3
34	Foakaidhoo	4	97	Ukulhas	1	160	Omadhoo (Th)	3
35	Funadhoo	4	98	Dhan'gethi	1	161	Thimarafushi	3
36	Goidhoo (Sh)	4	99	Dhidhdhoo (AD	1	162	Vandhoo	3
37	Kan'ditheemu	4	100	Dhigurah	1	163	Veymandoo	3
38	Komandoo	4	101	Fenfushi	1	164	Vilufushi	3
39	Lhaimagu	4	102	Hangnameedh	1	165	Dhaandhoo	2
40	Maaugoodhoo	4	103	Kun'burudhoo	1	166	Dhevvadhoo	2
41	Maroshi	4	104	Maamigili	1	167	Gemanafushi	2
42	Milandhoo	4	105	Mahibadhoo	1	168	Kanduhulhudhoo	2
43	Narudhoo	4	106	Mandhoo	1	169	Kondey	2
44	Noomaraa	4	107	Omadhoo (ADh	1	170	Kolamaafushi	2
45	Dharavandhoo	2	108	Dhiffushi	1	171	Maamendhoo (GA)	2
46	Dhonfanu	2	109	Gaafuru	1	172	Nilandhoo (GA)	2
47	Eydhafushi	2	110	Gulhi	1	173	Vilin'gili	2
48	Fehendhoo	2	111	Guraidhoo (K)	1	174	Faresmaathodaa	5
49	Fulhadhoo	2	112	Himmafushi	1	175	Fiyoari	5
50	Goidhoo (B)	2	113	Huraa	1	176	Gadhdhoo	5
51	Hithaadhoo	2	114	Kaashidhoo	1	177	Hoan'dehdhoo	5
52	Kamadhoo	2	115	Maafushi	1	178	Madeveli	5
53	Kendhoo	2	116	Thulusdhoo	1	179	Nadallaa	5
54	Kihaadhoo	2	117	Felidhoo	1	180	Rathafandhoo	5
55	Kudarikilu	2	118	Fulidhoo	1	181	Thinadhoo (GDh)	5
56	Maalhos (B)	2	119	Keyodhoo	1	182	Vaadhoo (GDh)	5
57	Thulhaadhoo	2	120	Rakeedhoo	1	183	Fuvahmulah	5
58	Hinnavaru	2	121	Thinadhoo (V)	1	184	Feydhoo (S)	3
59	Kurendhoo	2	122	Ban'didhoo	1	185	Hithadhoo (S)	3
60	Naifaru	2	123	Hulhudheli	1	186	Hulhudhoo	3
61	Olhuvelifushi	2	124	Kudahuvadhoo	1	187	Maradhoo	3
62	Fodhdhoo	5	125	Maaen'boodho	1	188	Maradhoofeydhoo	3
63	Hebadhoo	5	126	Meedhoo (Dh)	1	189	Meedho	3

9. Environmental vulnerability

105. 56 out of the 189 islands (29.6%) can be considered as highly to very highly environmentally vulnerable to hazards and climate change (based on the selected parameters), with 32 very highly vulnerable. The 56 islands are mostly located in the farthest northern parts of the country (Figure 100). 104 islands (55.0%), spread across the country, are lowly to very lowly environmentally vulnerable.

Figure 100: Islands' environmental vulnerability to hazards and climate change



No	Islands	Sc	No	Islands	Sc	No	Islands	Sc
1	Hulhumale'	3	64	Holhudhoo	3	127	Rin'budhoo	1
2	Male'	5	65	Kedhikolhudhoo	5	128	Bileiydhoo	5
3	Villimale	5	66	Kudafari	1	129	Dharan'boodhoo	2
4	Baarah	4	67	Landhoo	4	130	Feeali	2
5	Dhidhdhoo (HA)	1	68	Lhohi	3	131	Magoodhoo (F)	1
6	Filladhoo	5	69	Maafaru	2	132	Nilandhoo (F)	2
7	Hoarafushi	1	70	Maalhendhoo	2	133	Dhan'bidhoo	3
8	Ihavandhoo	2	71	Magoodhoo (N)	4	134	Fonadhoo	2
9	Kelaa	5	72	Manadhoo	4	135	Gan	5
10	Maarandhoo	2	73	Miladhoo	2	136	Hithadhoo (L)	5
11	Mulhadhoo	5	74	Velidhoo	2	137	Isdhoo	5
12	Muraidhoo	5	75	Agolhitheemu	5	138	Kalaidhoo	5
13	Thakandhoo	4	76	Alifushi	1	139	Kunahandhoo	2
14	Thurakunu	2	77	Dhuvaafaru	1	140	Maabaidhoo	2
15	Uligamu	2	78	Fainu	3	141	Maamendhoo (L)	3
16	Utheemu	2	79	Hulhudhuffaaru	2	142	Maavah	2
17	Vashafaru	2	80	Iguraidhoo	2	143	Mundoo	1
18	Finey	5	81	Innamaadhoo	2	144	Dhiggaru	1
19	Hanimaadhoo	3	82	Kinolhas	2	145	Kolhufushi	3
20	Hirimaradhoo	4	83	Maakurathu	4	146	Maduvvari (M)	1
21	Kulhudhuffushi	5	84	Maduvvari (R)	1	147	Mulah	5
22	Kumundhoo	4	85	Meedhoo (R)	1	148	Muli	3
23	Kurin'bee	5	86	Rasgetheemu	5	149	Naalaafushi	1
24	Makunudhoo	3	87	Rasmaadhoo	2	150	Raiymandhoo	1
25	Naivaadhoo	2	88	Ungufaaru	2	151	Veyvah	2
26	Nellaidhoo	2	89	Vaadhoo (R)	1	152	Buruni	2
27	Neykurendhoo	4	90	Bodufolhudhoo	1	153	Dhiyamigili	3
28	Nolhivaramu	5	91	Feridhoo	4	154	Gaadhiffushi	1
29	Nolhivaranfaru	2	92	Himandhoo	2	155	Guraidhoo (Th)	5
30	Vaikaradhoo	3	93	Maalhos (AA)	4	156	Hirilandhoo	3
31	Bilehffahi	3	94	Mathiveri	2	157	Kan'doodhoo	2
32	Feevah	5	95	Rasdhoo	3	158	Kin'bidhoo	1
33	Feydhoo (Sh)	5	96	Thoddoo	5	159	Madifushi	5
34	Foakaidhoo	4	97	Ukulhas	2	160	Omadhoo (Th)	1
35	Funadhoo	4	98	Dhan'gethi	1	161	Thimarafushi	2
36	Goidhoo (Sh)	3	99	Dhidhdhoo (ADh)	1	162	Vandhoo	5
37	Kan'ditheemu	5	100	Dhigurah	4	163	Veymandoo	3
38	Komandoo	2	101	Fenfushi	1	164	Vilufushi	1
39	Lhaimagu	5	102	Hangnameedhoo	3	165	Dhaandhoo	1
40	Maaugoodhoo	4	103	Kun'burudhoo	2	166	Dhevvadhoo	1
41	Maroshi	1	104	Maamigili	2	167	Gemanafushi	1
42	Milandhoo	4	105	Mahibadhoo	1	168	Kanduhulhudhoo	1
43	Narudhoo	3	106	Mandhoo	2	169	Kondey	5
44	Noomaraa	5	107	Omadhoo (ADh)	1	170	Kolamaafushi	1
45	Dharavandhoo	5	108	Dhiffushi	2	171	Maamendhoo (GA)	3
46	Dhonfanu	3	109	Gaafuru	1	172	Nilandhoo (GA)	1
47	Eydhafushi	5	110	Gulhi	1	173	Vilin'gili	2
48	Fehendhoo	1	111	Guraidhoo (K)	1	174	Faresmaathodaa	1
49	Fulhadhoo	1	112	Himmafushi	3	175	Fiyoari	2
50	Goidhoo (B)	4	113	Huraa	3	176	Gadhdhoo	1
51	Hithaadhoo	1	114	Kaashidhoo	4	177	Hoan'dehdhoo	2
52	Kamadhoo	3	115	Maafushi	2	178	Madeveli	1
53	Kendhoo	2	116	Thulusdhoo	4	179	Nadallaa	2
54	Kihaadhoo	4	117	Felidhoo	1	180	Rathafandhoo	1
55	Kudarikilu	2	118	Fulidhoo	2	181	Thinadhoo (GDh)	4
56	Maalhos (B)	2	119	Keyodhoo	1	182	Vaadhoo (GDh)	5
57	Thulhaadhoo	1	120	Rakeedhoo	1	183	Fuvahmulah	3
58	Hinnavaru	3	121	Thinadhoo (V)	2	184	Feydhoo (S)	2
59	Kurendhoo	2	122	Ban'didhoo	2	185	Hithadhoo (S)	3
60	Naifaru	1	123	Hulhudheli	1	186	Hulhudhoo	2
61	Olhuvelifushi	3	124	Kudahuvadhoo	4	187	Maradhoo	1
62	Fodhdhoo	3	125	Maaen'boodhoo	1	188	Maradhoofeydhoo	1
63	Hebadhoo	1	126	Meedhoo (Dh)	4	189	Meedho	4

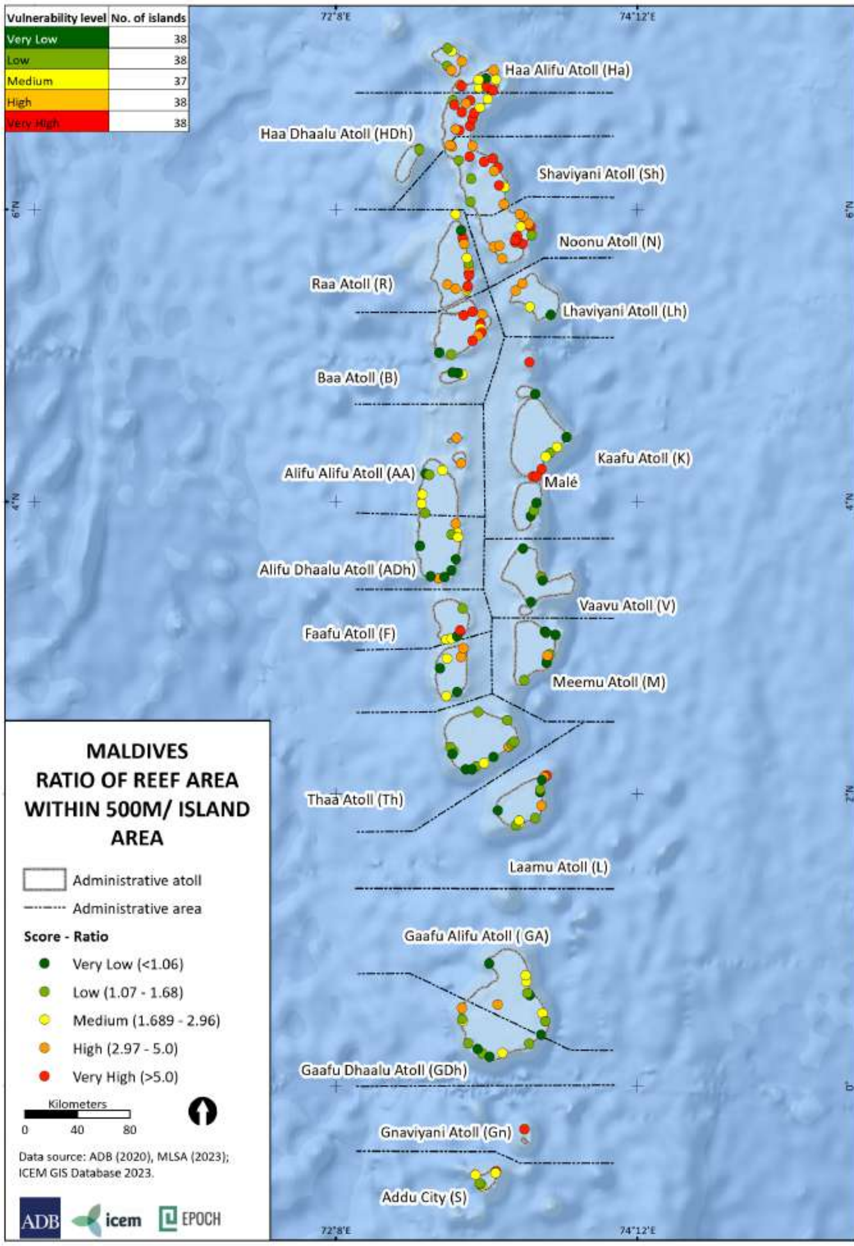
106. Specifically, for each parameter on environmental vulnerability:

(i) 76 out of 189 islands (40.2%) are highly to very highly environmentally vulnerable due to a lower reef-to-island area ratio, i.e., islands which have a smaller reef area to protect the island from impacts from hazards or climate change. The majority of these islands are located in the northern regions of the country (Figure 101);

(ii) 77 out of 189 islands (40.7%) are highly to very highly environmentally vulnerable due to the island having more natural land proportional to the total island area (more than 40% of the land area) (Figure 102). 3 islands are very highly environmentally vulnerable, with 80% or more of the island being natural land: Filladhoo (Haa Alifu atoll, north region), Finey (Haa Dhaalu atoll, north region) and Kondey (Gaafu Alifu atoll, south region);

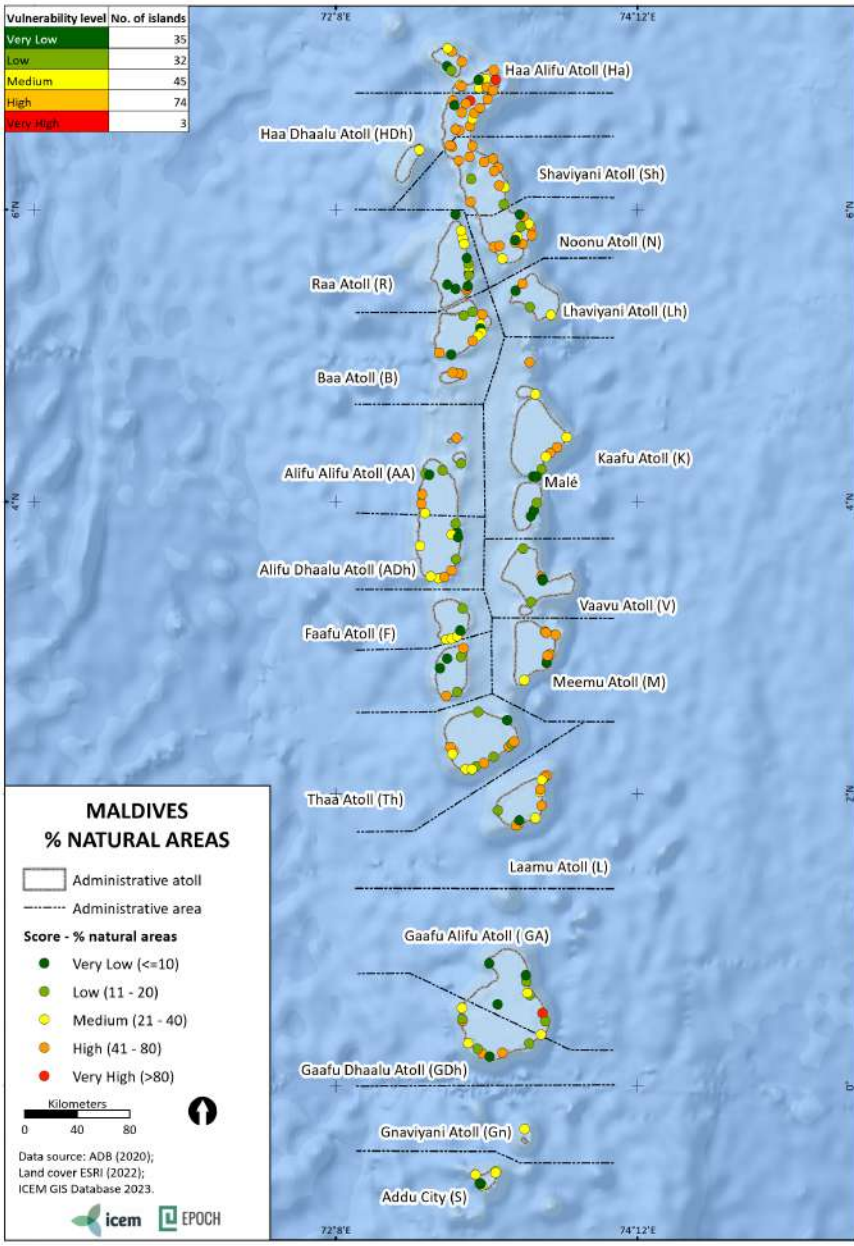
(iii) 42 out of 189 islands (22.2%) are highly to very highly environmentally vulnerable due to low to very low coral reef health (with acute to highly chronic health levels). The 42 islands are dispersed across the country, with 29 islands located in the central and southern regions of the country (Figure 103). 95 islands (50.3%) have a very good level of coral reef health.

Figure 101: Islands’ environmental vulnerability: reef area



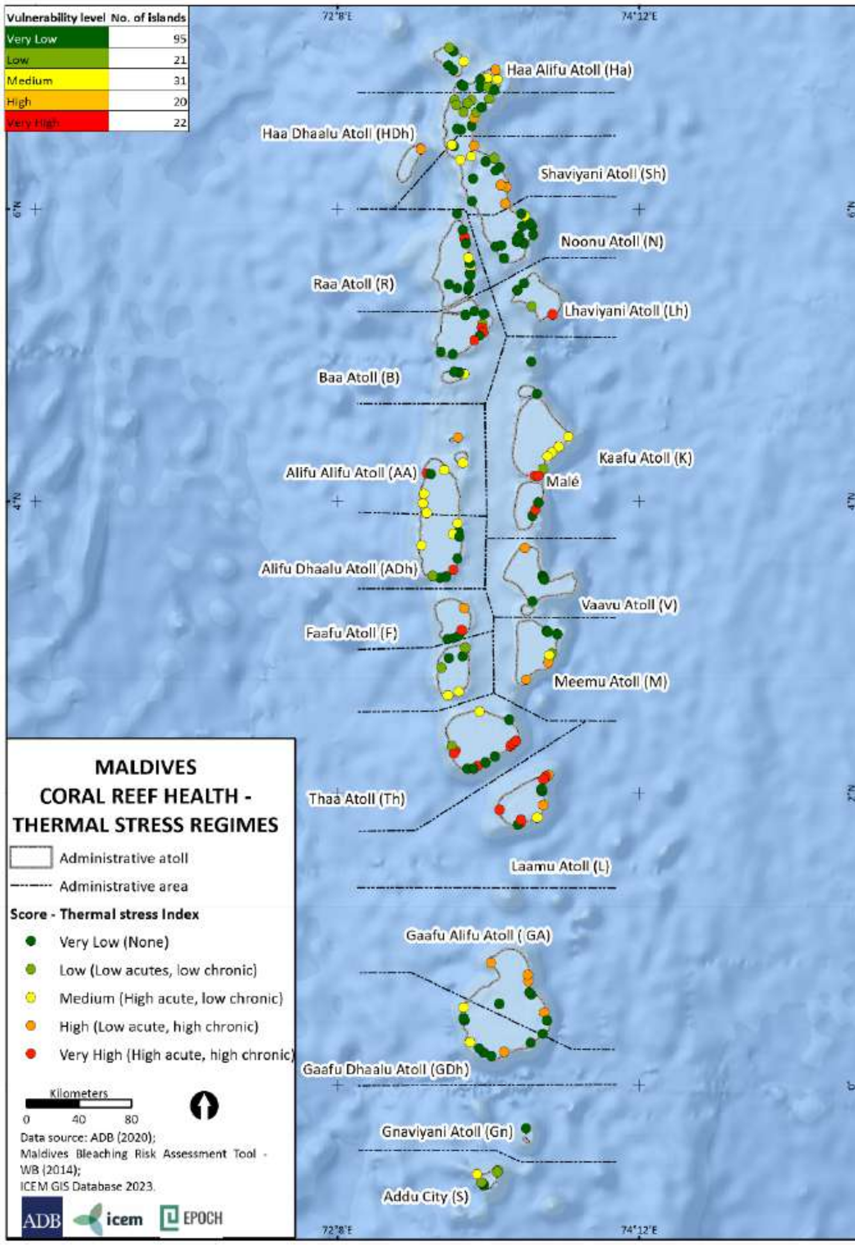
No	Islands	Sc	No	Islands	Sc	No	Islands	Sc
1	Hulhumale'	5	64	Holhudhoo	4	127	Rin'budhoo	3
2	Male'	5	65	Kedhikolhudhoo	4	128	Bileiydhoo	5
3	Villimale	5	66	Kudafari	3	129	Dharan'boodhoo	3
4	Baarah	5	67	Landhoo	5	130	Feeali	2
5	Dhidhdhoo (HA)	3	68	Lhohi	5	131	Magoodhoo (F)	1
6	Filladhoo	3	69	Maafaru	2	132	Nilandhoo (F)	3
7	Hoarafushi	2	70	Maalhendhoo	4	133	Dhan'bidhoo	1
8	Ihavandhoo	4	71	Magoodhoo (N)	5	134	Fonadhoo	2
9	Kelaa	4	72	Manadhoo	5	135	Gan	4
10	Maarandhoo	4	73	Miladhoo	5	136	Hithadhoo (L)	3
11	Mulhadhoo	4	74	Velidhoo	4	137	Isdhoo	5
12	Muraidhoo	5	75	Agolhitheemu	5	138	Kalaidhoo	4
13	Thakandhoo	5	76	Alifushi	3	139	Kunahandhoo	2
14	Thurakunu	2	77	Dhuvaafaru	2	140	Maabaidhoo	2
15	Uligamu	3	78	Fainu	4	141	Maamendhoo (L)	3
16	Utheemu	3	79	Hulhudhuffaaru	4	142	Maavah	1
17	Vashafaru	1	80	Iguraidhoo	5	143	Mundoo	1
18	Finey	5	81	Innamaadhoo	5	144	Dhiggaru	1
19	Hanimaadhoo	3	82	Kinolhas	3	145	Kolhufushi	2
20	Hirimaradhoo	4	83	Maakurathu	4	146	Maduvvari (M)	1
21	Kulhudhuffushi	5	84	Maduvvari (R)	4	147	Mulah	4
22	Kumundhoo	5	85	Meedhoo (R)	4	148	Muli	2
23	Kurin'bee	5	86	Rasgetheemu	5	149	Naalaafushi	1
24	Makunudhoo	2	87	Rasmaadhoo	5	150	Raiymandhoo	1
25	Naivaadhoo	2	88	Ungufaaru	3	151	Veyvah	2
26	Nellaidhoo	5	89	Vaadhoo (R)	1	152	Buruni	2
27	Neykurendhoo	5	90	Bodufolhudhoo	2	153	Dhiyamigili	2
28	Nolhivaramu	5	91	Feridhoo	3	154	Gaadhiffushi	1
29	Nolhivaranfaru	3	92	Himandhoo	2	155	Guraidhoo (Th)	4
30	Vaikaradhoo	4	93	Maalhos (AA)	3	156	Hirilandhoo	1
31	Bilehffahi	2	94	Mathiveri	1	157	Kan'doodhoo	2
32	Feevah	5	95	Rasdhoo	4	158	Kin'bidhoo	1
33	Feydhoo (Sh)	5	96	Thoddoo	4	159	Madifushi	2
34	Foakaidhoo	5	97	Ukulhas	3	160	Omadhoo (Th)	1
35	Funadhoo	3	98	Dhan'gethi	1	161	Thimarafushi	3
36	Goidhoo (Sh)	4	99	Dhidhdhoo (ADh)	1	162	Vandhoo	2
37	Kan'ditheemu	4	100	Dhigurah	1	163	Veymandoo	2
38	Komandoo	2	101	Fenfushi	1	164	Vilufushi	2
39	Lhaimagu	5	102	Hangnameedhoo	4	165	Dhaandhoo	1
40	Maaugoodhoo	4	103	Kun'burudhoo	2	166	Dhevvadhoo	4
41	Maroshi	2	104	Maamigili	4	167	Gemanafushi	2
42	Milandhoo	5	105	Mahibadhoo	3	168	Kanduhulhudhoo	1
43	Narudhoo	4	106	Mandhoo	1	169	Kondey	3
44	Noomaraa	4	107	Omadhoo (ADh)	3	170	Kolamaafushi	1
45	Dharavandhoo	5	108	Dhiffushi	1	171	Maamendhoo (GA)	3
46	Dhonfanu	3	109	Gaafuru	1	172	Nilandhoo (GA)	2
47	Eydhafushi	5	110	Gulhi	1	173	Vilin'gili	3
48	Fehendhoo	1	111	Guraidhoo (K)	1	174	Faresmaathodaa	1
49	Fulhadhoo	1	112	Himmafushi	3	175	Fiyoari	2
50	Goidhoo (B)	3	113	Huraa	2	176	Gadhdhoo	2
51	Hithaadhoo	2	114	Kaashidhoo	5	177	Hoan'dehdhoo	3
52	Kamadhoo	4	115	Maafushi	2	178	Madeveli	2
53	Kendhoo	5	116	Thulusdhoo	3	179	Nadallaa	2
54	Kihaadhoo	5	117	Felidhoo	3	180	Rathafandhoo	1
55	Kudarikilu	5	118	Fulidhoo	1	181	Thinadhoo (GDh)	4
56	Maalhos (B)	4	119	Keyodhoo	1	182	Vaadhoo (GDh)	3
57	Thulhaadhoo	1	120	Rakeedhoo	1	183	Fuvahmulah	5
58	Hinnavaru	4	121	Thinadhoo (V)	2	184	Feydhoo (S)	3
59	Kurendhoo	3	122	Ban'didhoo	4	185	Hithadhoo (S)	3
60	Naifaru	4	123	Hulhudheli	1	186	Hulhudhoo	3
61	Olhuvelifushi	1	124	Kudahuvadhoo	3	187	Maradhoo	2
62	Fodhdhoo	4	125	Maaen'boodhoo	1	188	Maradhoofeydhoo	2
63	Hebadhoo	4	126	Meedhoo (Dh)	4	189	Meedho	5

Figure 102: Islands' environmental vulnerability: proportion of natural area



No	Islands	Sc	No	Islands	Sc	No	Islands	Sc
1	Hulhumale'	2	64	Holhudhoo	4	127	Rin'budhoo	1
2	Male'	1	65	Kedhikolhudhoo	4	128	Bileiydhoo	1
3	Villimale	1	66	Kudafari	2	129	Dharan'boodhoo	3
4	Baarah	4	67	Landhoo	4	130	Feeali	2
5	Dhidhdhoo (HA)	1	68	Lhohi	3	131	Magoodhoo (F)	3
6	Filladhoo	5	69	Maafaru	4	132	Nilandhoo (F)	3
7	Hoarafushi	1	70	Maalhendhoo	3	133	Dhan'bidhoo	3
8	Ihavandhoo	2	71	Magoodhoo (N)	4	134	Fonadhoo	3
9	Kelaa	4	72	Manadhoo	4	135	Gan	4
10	Maarandhoo	3	73	Miladhoo	1	136	Hithadhoo (L)	4
11	Mulhadhoo	4	74	Velidhoo	3	137	Isdhoo	4
12	Muraidhoo	4	75	Agolhitheemu	4	138	Kalaidhoo	4
13	Thakandhoo	4	76	Alifushi	1	139	Kunahandhoo	4
14	Thurakunu	3	77	Dhuvaafaru	2	140	Maabaidhoo	4
15	Uligamu	4	78	Fainu	4	141	Maamendhoo (L)	1
16	Utheemu	3	79	Hulhudhuffaaru	3	142	Maavah	2
17	Vashafaru	3	80	Iguraidhoo	1	143	Mundoo	3
18	Finey	5	81	Innamaadhoo	2	144	Dhiggaru	4
19	Hanimaadhoo	4	82	Kinolhas	4	145	Kolhufushi	3
20	Hirimaradhoo	4	83	Maakurathu	3	146	Maduvvari (M)	4
21	Kulhudhuffushi	3	84	Maduvvari (R)	1	147	Mulah	4
22	Kumundhoo	4	85	Meedhoo (R)	1	148	Muli	4
23	Kurin'bee	4	86	Rasgetheemu	3	149	Naalaafushi	1
24	Makunudhoo	3	87	Rasmaadhoo	1	150	Raiymandhoo	4
25	Naivaadhoo	4	88	Ungufaaru	1	151	Veyvah	4
26	Nellaidhoo	1	89	Vaadhoo (R)	3	152	Buruni	2
27	Neykurendhoo	4	90	Bodufolhudhoo	1	153	Dhiyamigili	2
28	Nolhivaramu	4	91	Feridhoo	4	154	Gaadhiffushi	2
29	Nolhivaranfaru	4	92	Himandhoo	3	155	Guraidhoo (Th)	4
30	Vaikaradhoo	4	93	Maalhos (AA)	4	156	Hirilandhoo	3
31	Bilehffahi	4	94	Mathiveri	2	157	Kan'doodhoo	4
32	Feevah	4	95	Rasdhoo	2	158	Kin'bidhoo	3
33	Feydhoo (Sh)	4	96	Thoddoo	4	159	Madifushi	4
34	Foakaidhoo	4	97	Ukulhas	2	160	Omadhoo (Th)	3
35	Funadhoo	3	98	Dhan'gethi	2	161	Thimarafushi	4
36	Goidhoo (Sh)	4	99	Dhidhdhoo (ADh)	4	162	Vandhoo	4
37	Kan'ditheemu	4	100	Dhigurah	4	163	Veymandoo	2
38	Komandoo	4	101	Fenfushi	3	164	Vilufushi	1
39	Lhaimagu	4	102	Hangnameedhoo	2	165	Dhaandhoo	2
40	Maaugoodhoo	2	103	Kun'burudhoo	3	166	Dhevvadhoo	1
41	Maroshi	2	104	Maamigili	3	167	Gemanafushi	2
42	Milandhoo	4	105	Mahibadhoo	1	168	Kanduhulhudhoo	3
43	Narudhoo	4	106	Mandhoo	3	169	Kondey	5
44	Noomaraa	4	107	Omadhoo (ADh)	1	170	Kolamaafushi	1
45	Dharavandhoo	3	108	Dhiffushi	3	171	Maamendhoo (GA)	2
46	Dhonfanu	1	109	Gaafuru	3	172	Nilandhoo (GA)	3
47	Eydhafushi	4	110	Gulhi	2	173	Vilin'gili	1
48	Fehendhoo	4	111	Guraidhoo (K)	1	174	Faresmaathodaa	1
49	Fulhadhoo	4	112	Himmafushi	3	175	Fiyoari	4
50	Goidhoo (B)	4	113	Huraa	4	176	Gadhdhoo	2
51	Hithaadhoo	1	114	Kaashidhoo	4	177	Hoan'dehdhoo	4
52	Kamadhoo	4	115	Maafushi	1	178	Madeveli	2
53	Kendhoo	2	116	Thulusdhoo	4	179	Nadallaa	3
54	Kihaadhoo	3	117	Felidhoo	1	180	Rathafandhoo	2
55	Kudarikilu	2	118	Fulidhoo	2	181	Thinadhoo (GDh)	3
56	Maalhos (B)	3	119	Keyodhoo	1	182	Vaadhoo (GDh)	4
57	Thulhaadhoo	4	120	Rakeedhoo	2	183	Fuvahmulah	3
58	Hinnavaru	4	121	Thinadhoo (V)	4	184	Feydhoo (S)	3
59	Kurendhoo	2	122	Ban'didhoo	2	185	Hithadhoo (S)	3
60	Naifaru	1	123	Hulhudheli	1	186	Hulhudhoo	3
61	Olhuvelifushi	3	124	Kudahuvadhoo	4	187	Maradhoo	1
62	Fodhdhoo	4	125	Maaen'boodhoo	2	188	Maradhoofeydhoo	1
63	Hebadhoo	1	126	Meedhoo (Dh)	4	189	Meedho	3

Figure 103: Islands' environmental vulnerability: coral reef health



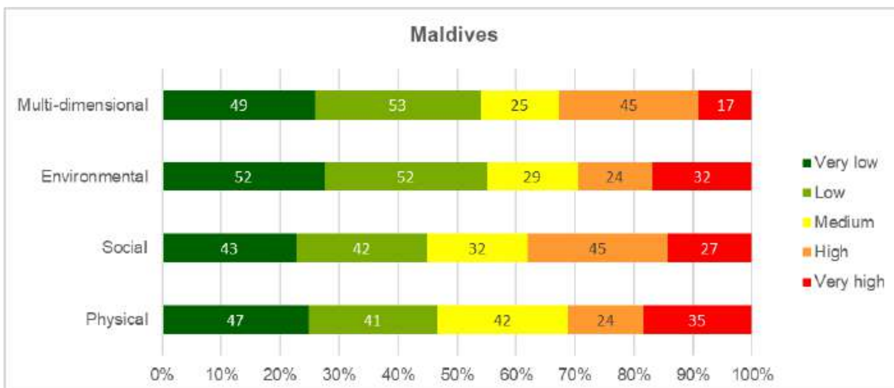
No	Islands	Sc	No	Islands	Sc	No	Islands	Sc
1	Hulhumale'	2	64	Holhudhoo	1	127	Rin'budhoo	1
2	Male'	5	65	Kedhikolhudhoo	3	128	Bileiydhoo	5
3	Villimale	5	66	Kudafari	1	129	Dharan'boodhoo	1
4	Baarah	1	67	Landhoo	1	130	Feeali	4
5	Dhidhdhoo (HA)	1	68	Lhohi	1	131	Magoodhoo (F)	1
6	Filladhoo	3	69	Maafaru	1	132	Nilandhoo (F)	1
7	Hoarafushi	1	70	Maalhendhoo	1	133	Dhan'bidhoo	5
8	Ihavandhoo	1	71	Magoodhoo (N)	1	134	Fonadhoo	3
9	Kelaa	4	72	Manadhoo	1	135	Gan	4
10	Maarandhoo	1	73	Miladhoo	1	136	Hithadhoo (L)	5
11	Mulhadhoo	3	74	Velidhoo	1	137	Isdhoo	4
12	Muraidhoo	2	75	Agolhitheemu	4	138	Kalaidhoo	5
13	Thakandhoo	1	76	Alifushi	1	139	Kunahandhoo	1
14	Thurakunu	2	77	Dhuvaafaru	1	140	Maabaidhoo	1
15	Uligamu	1	78	Fainu	1	141	Maamendhoo (L)	5
16	Utheemu	1	79	Hulhudhuffaaru	1	142	Maavah	5
17	Vashafaru	3	80	Iguraidhoo	1	143	Mundoo	1
18	Finey	2	81	Innamaadhoo	1	144	Dhiggaru	1
19	Hanimaadhoo	2	82	Kinolhas	1	145	Kolhufushi	4
20	Hirimaradhoo	2	83	Maakurathu	3	146	Maduvvari (M)	1
21	Kulhudhuffushi	4	84	Maduvvari (R)	1	147	Mulah	3
22	Kumundhoo	1	85	Meedhoo (R)	1	148	Muli	3
23	Kurin'bee	2	86	Rasgetheemu	5	149	Naalaafushi	4
24	Makunudhoo	4	87	Rasmaadhoo	1	150	Raiymandhoo	1
25	Naivaadhoo	2	88	Ungufaaru	3	151	Veyvah	2
26	Nellaidhoo	2	89	Vaadhoo (R)	1	152	Buruni	3
27	Neykurendhoo	1	90	Bodufolhudhoo	1	153	Dhiyamigili	5
28	Nolhivaramu	2	91	Feridhoo	3	154	Gaadhiffushi	1
29	Nolhivaranfaru	1	92	Himandhoo	3	155	Guraidhoo (Th)	5
30	Vaikaradhoo	1	93	Maalhos (AA)	3	156	Hirilandhoo	5
31	Bilehffahi	3	94	Mathiveri	5	157	Kan'doodhoo	2
32	Feevah	2	95	Rasdhoo	3	158	Kin'bidhoo	1
33	Feydhoo (Sh)	3	96	Thoddoo	4	159	Madifushi	5
34	Foakaidhoo	1	97	Ukulhas	3	160	Omadhoo (Th)	1
35	Funadhoo	4	98	Dhan'gethi	1	161	Thimarafushi	1
36	Goidhoo (Sh)	1	99	Dhidhdhoo (ADh)	1	162	Vandhoo	5
37	Kan'ditheemu	3	100	Dhigurah	5	163	Veymandoo	5
38	Komandoo	1	101	Fenfushi	2	164	Vilufushi	1
39	Lhaimagu	4	102	Hangnameedhoo	3	165	Dhaandhoo	1
40	Maaugoodhoo	4	103	Kun'burudhoo	3	166	Dhevvadhoo	1
41	Maroshi	1	104	Maamigili	1	167	Gemanafushi	1
42	Milandhoo	1	105	Mahibadhoo	1	168	Kanduhulhudhoo	1
43	Narudhoo	1	106	Mandhoo	3	169	Kondey	4
44	Noomaraa	4	107	Omadhoo (ADh)	1	170	Kolamaafushi	4
45	Dharavandhoo	5	108	Dhiffushi	3	171	Maamendhoo (GA)	4
46	Dhonfanu	5	109	Gaafuru	1	172	Nilandhoo (GA)	1
47	Eydhafushi	5	110	Gulhi	1	173	Vilin'gili	4
48	Fehendhoo	1	111	Guraidhoo (K)	1	174	Faresmaathodaa	1
49	Fulhadhoo	1	112	Himmafushi	3	175	Fiyoari	1
50	Goidhoo (B)	3	113	Huraa	3	176	Gadhdhoo	1
51	Hithaadhoo	1	114	Kaashidhoo	1	177	Hoan'dehdhoo	1
52	Kamadhoo	1	115	Maafushi	5	178	Madeveli	1
53	Kendhoo	1	116	Thulusdhoo	3	179	Nadallaa	3
54	Kihaadhoo	2	117	Felidhoo	1	180	Rathafandhoo	1
55	Kudarikilu	1	118	Fulidhoo	4	181	Thinadhoo (GDh)	3
56	Maalhos (B)	1	119	Keyodhoo	1	182	Vaadhoo (GDh)	4
57	Thulhaadhoo	1	120	Rakeedhoo	1	183	Fuvahmulah	1
58	Hinnavaru	1	121	Thinadhoo (V)	1	184	Feydhoo (S)	1
59	Kurendhoo	2	122	Ban'didhoo	1	185	Hithadhoo (S)	3
60	Naifaru	1	123	Hulhudheli	2	186	Hulhudhoo	2
61	Olhuvelifushi	5	124	Kudahuvadhoo	3	187	Maradhoo	2
62	Fodhdhoo	1	125	Maaen'boodhoo	3	188	Maradhoofeydhoo	1
63	Hebadhoo	1	126	Meedhoo (Dh)	2	189	Meedho	2

10. Multi-dimensional vulnerability

107. 62 out of the 189 islands (32.8%) can be considered as highly to very highly vulnerable, when combining levels of physical, social and environmental vulnerability (Figure 104). They can be considered as *vulnerability hotspots*. 28 of the 62 islands are located in the north region, 12 in the south region, 10 in the south-central region, 5 in the north-central region, 5 in the central region, and 2 in Malé (Figure 110). 102 islands (54.0%) are lowly to very lowly vulnerable and dispersed across the country.

108. The total number of highly to very highly vulnerable islands per each dimension are:
(i) Physical vulnerability: 59 islands (31.2%), with 35 islands very highly vulnerable;
(ii) Social vulnerability: 72 islands (38.1%), with 27 islands very highly vulnerable; and
(iii) Environmental vulnerability: 56 islands (29.6%), with 32 islands very highly vulnerable.

Figure 104: Islands' vulnerability scores, per dimension and combined: Maldives



109. Regionally (

110. Figure 105 to Figure 109):

(i) The north region's high vulnerability is mainly due to very high social vulnerability and high environmental vulnerability;

(ii) The north-central region's overall vulnerability is low to very low, having low to very low social vulnerability and low environmental vulnerability;

(iii) The central region's overall vulnerability is low, with this vulnerability mainly influenced by a medium physical vulnerability;

(iv) The south-central region's vulnerability is low, mainly due to a low social vulnerability, and medium environmental and physical vulnerability;

(v) The south region's vulnerability is medium to high, due to a low environmental vulnerability, combined with a high social vulnerability and medium physical vulnerability;

(vi) 2 out of the 3 islands in Malé – Malé and Villimale – have a high overall vulnerability level, mainly due to a very high environmental vulnerability and very high physical vulnerability. Hulhumalé's overall vulnerability is medium, due to a very high physical vulnerability, but medium environmental vulnerability. The social vulnerability levels of all the three islands are very low.

Figure 105: Islands' vulnerability scores, per dimension and combined: north region

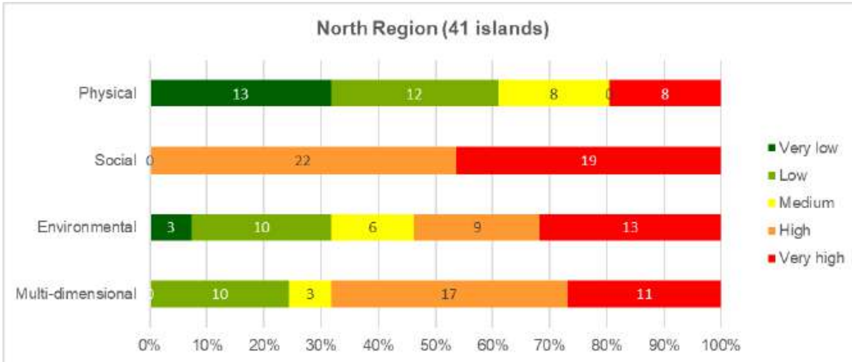


Figure 106: Islands' vulnerability scores, per dimension and combined: north-central region

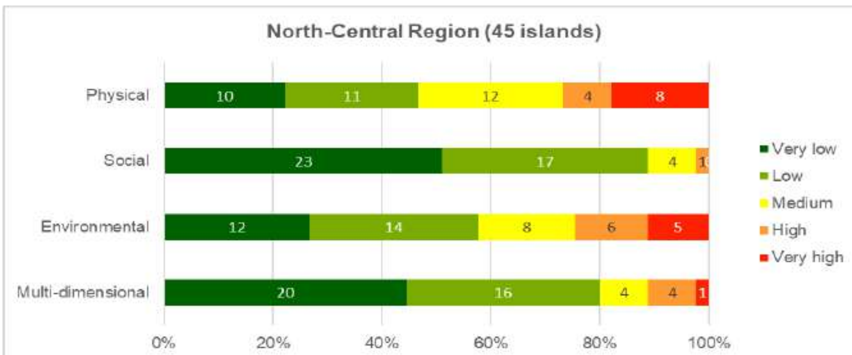


Figure 107: Islands' vulnerability scores, per dimension and combined: central region

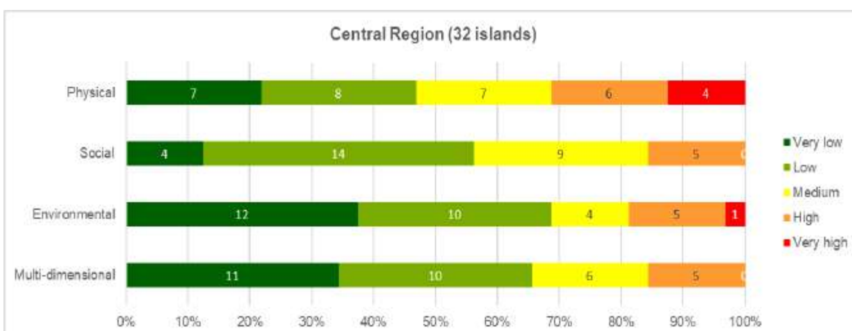


Figure 108: Islands' vulnerability scores, per dimension and combined: south-central region

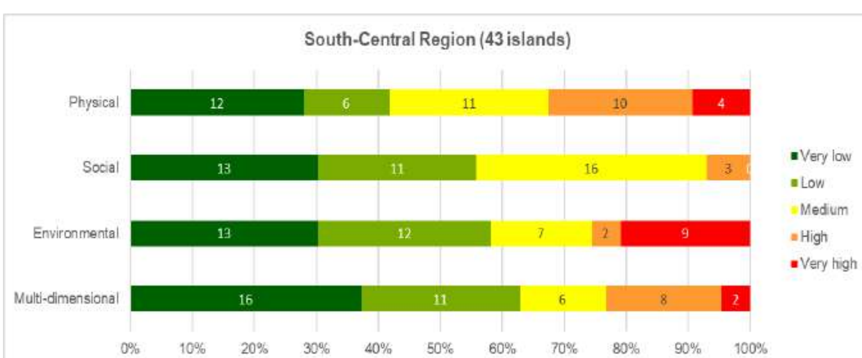


Figure 109: Islands' vulnerability scores, per dimension and combined: south region

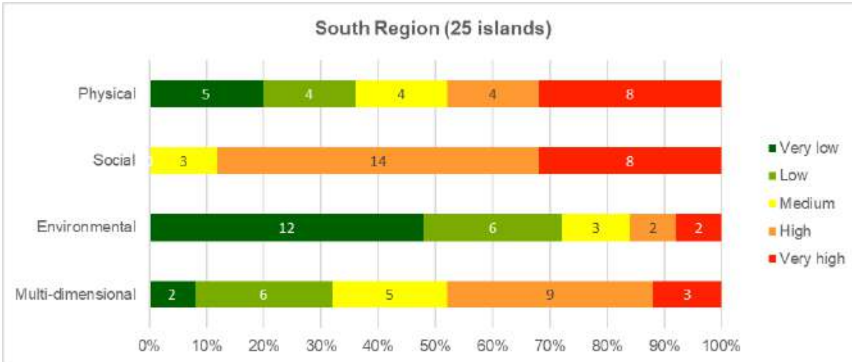
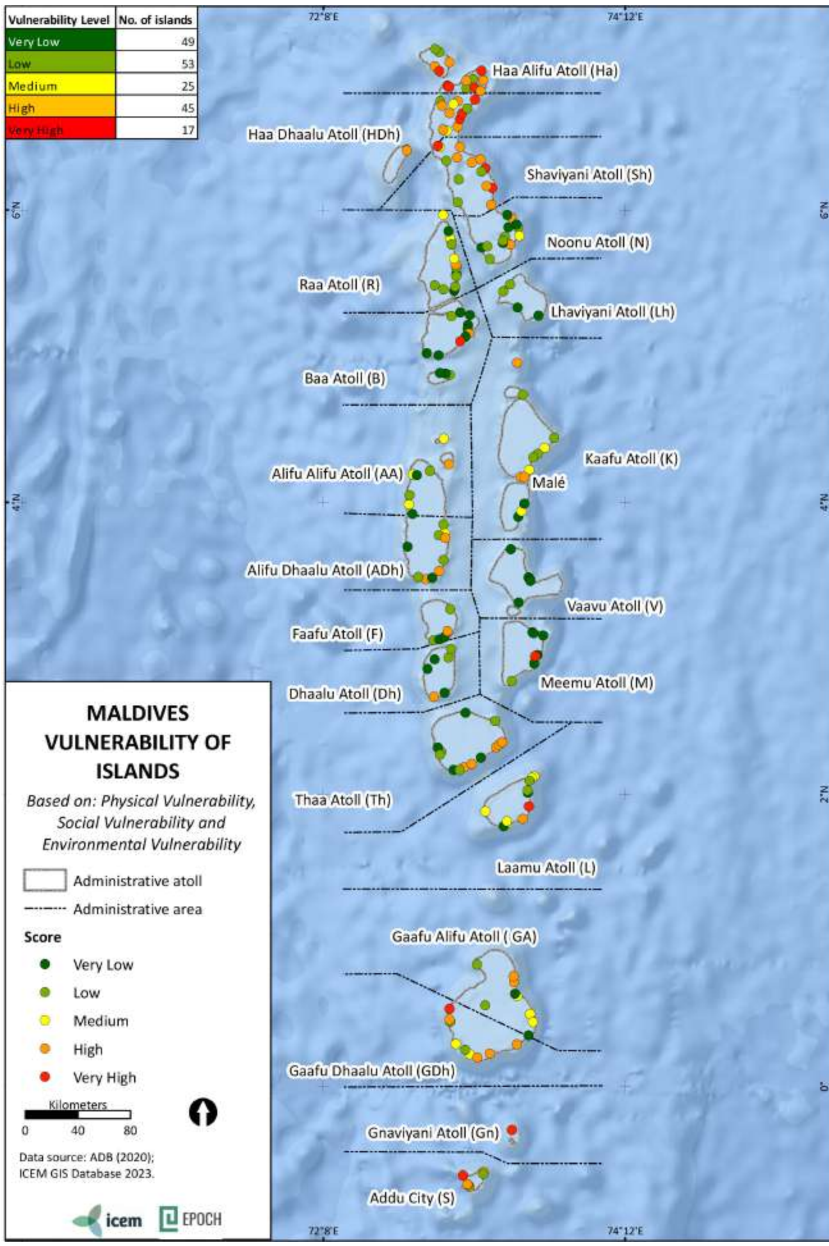


Figure 110: Islands' multi-dimensional vulnerability

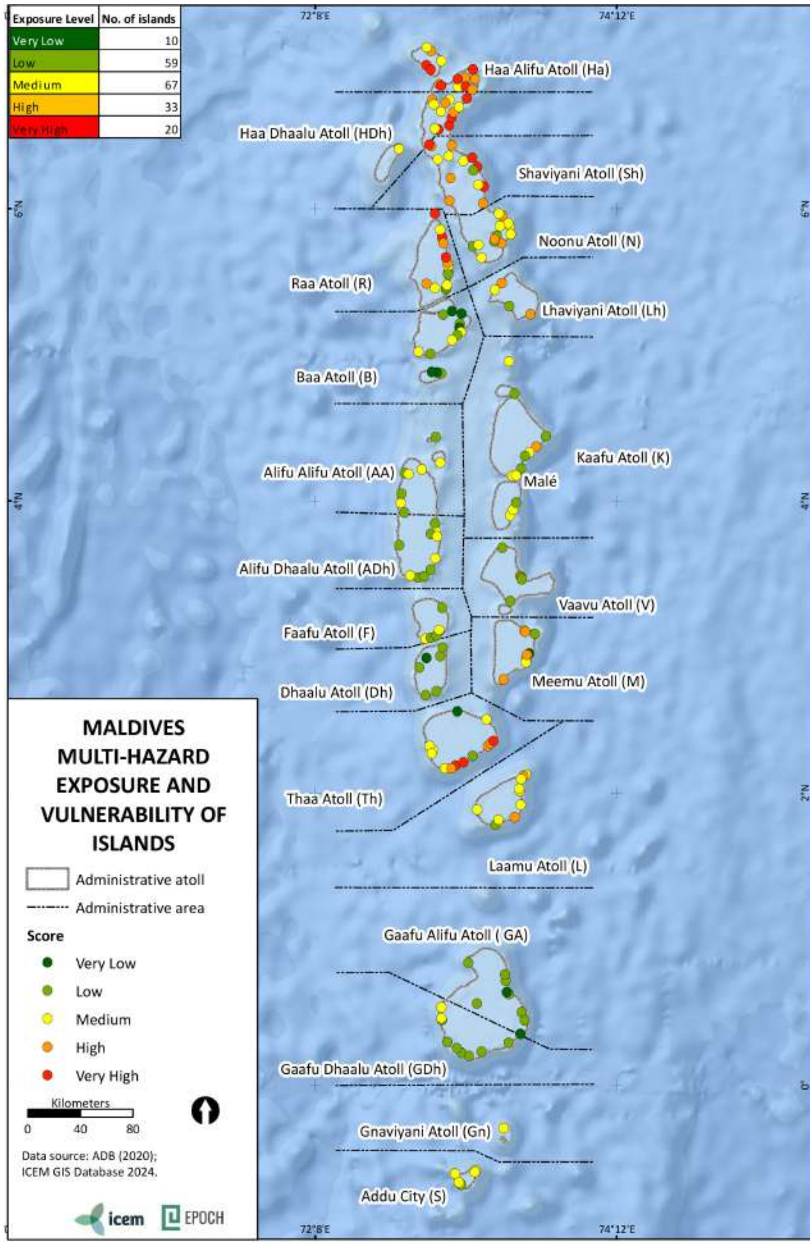


No	Islands	Sc	No	Islands	Sc	No	Islands	Sc
1	Hulhumale'	3	64	Holhudhoo	2	127	Rin'budhoo	1
2	Male'	4	65	Kedhikolhudho	4	128	Bileiydhoo	4
3	Villimale	4	66	Kudafari	1	129	Dharan'boodhoo	1
4	Baarah	4	67	Landhoo	2	130	Feeali	2
5	Dhidhdhoo (HA)	4	68	Lhohi	2	131	Magoodhoo (F)	1
6	Filladhoo	4	69	Maafaru	3	132	Nilandhoo (F)	2
7	Hoarafushi	4	70	Maalhendhoo	1	133	Dhan'bidhoo	2
8	Ihavandhoo	5	71	Magoodhoo (N)	1	134	Fonadhoo	4
9	Kelaa	5	72	Manadhoo	4	135	Gan	5
10	Maarandhoo	5	73	Miladhoo	2	136	Hithadhoo (L)	3
11	Mulhadhoo	4	74	Velidhoo	2	137	Isdhoo	3
12	Muraidhoo	5	75	Agolhitheemu	2	138	Kalaidhoo	3
13	Thakandhoo	5	76	Alifushi	3	139	Kunahandhoo	1
14	Thurakunu	2	77	Dhuvaafaru	4	140	Maabaidhoo	2
15	Uligamu	2	78	Fainu	1	141	Maamendhoo (L)	3
16	Utheemu	2	79	Hulhudhuffaaru	2	142	Maavah	3
17	Vashafaru	2	80	Iguraidhoo	2	143	Mundoo	1
18	Finey	4	81	Innamaadhoo	2	144	Dhiggaru	1
19	Hanimaadhoo	5	82	Kinolhas	1	145	Kolhufushi	2
20	Hirimaradhoo	3	83	Maakurathu	2	146	Maduvvari (M)	1
21	Kulhudhuffushi	5	84	Maduvvari (R)	2	147	Mulah	5
22	Kumundhoo	4	85	Meedhoo (R)	2	148	Muli	3
23	Kurin'bee	4	86	Rasgetheemu	3	149	Naalaafushi	1
24	Makunudhoo	4	87	Rasmaadhoo	1	150	Raiymandhoo	1
25	Naivaadhoo	2	88	Ungufaaru	3	151	Veyvah	1
26	Nellaidhoo	4	89	Vaadhoo (R)	1	152	Buruni	1
27	Neykurendhoo	3	90	Bodufolhudhoo	1	153	Dhiyamigili	4
28	Nolhivaramu	5	91	Feridhoo	2	154	Gaadhiffushi	1
29	Nolhivaranfaru	2	92	Himandhoo	1	155	Guraidhoo (Th)	4
30	Vaikaradhoo	4	93	Maalhos (AA)	3	156	Hirilandhoo	2
31	Bilehffahi	2	94	Mathiveri	3	157	Kan'doodhoo	1
32	Feevah	4	95	Rasdhoo	4	158	Kin'bidhoo	2
33	Feydhoo (Sh)	4	96	Thoddoo	3	159	Madifushi	4
34	Foakaidhoo	4	97	Ukulhas	2	160	Omadhoo (Th)	1
35	Funadhoo	5	98	Dhan'gethi	2	161	Thimarafushi	4
36	Goidhoo (Sh)	3	99	Dhidhdhoo (AD	1	162	Vandhoo	2
37	Kan'ditheemu	5	100	Dhigurah	4	163	Veymandoo	4
38	Komandoo	2	101	Fenfushi	2	164	Vilufushi	2
39	Lhaimagu	4	102	Hangnameedh	2	165	Dhaandhoo	3
40	Maaugoodhoo	4	103	Kun'burudhoo	2	166	Dhevvadhoo	2
41	Maroshi	2	104	Maamigili	4	167	Gemanafushi	3
42	Milandhoo	5	105	Mahibadhoo	4	168	Kanduhulhudhoo	1
43	Narudhoo	2	106	Mandhoo	1	169	Kondey	3
44	Noomaraa	4	107	Omadhoo (ADh	3	170	Kolamaafushi	2
45	Dharavandhoo	4	108	Dhiffushi	2	171	Maamendhoo (GA)	4
46	Dhonfanu	1	109	Gaafuru	2	172	Nilandhoo (GA)	1
47	Eydhafushi	5	110	Gulhi	1	173	Vilin'gili	4
48	Fehendhoo	1	111	Guraidhoo (K)	1	174	Faresmaathodaa	4
49	Fulhadhoo	1	112	Himmafushi	2	175	Fiyoari	3
50	Goidhoo (B)	2	113	Huraa	2	176	Gadhdhoo	4
51	Hithaadhoo	1	114	Kaashidhoo	4	177	Hoan'dehdhoo	2
52	Kamadhoo	1	115	Maafushi	3	178	Madeveli	4
53	Kendhoo	2	116	Thulusdhoo	3	179	Nadallaa	3
54	Kihaadhoo	1	117	Felidhoo	1	180	Rathafandhoo	2
55	Kudarikilu	1	118	Fulidhoo	1	181	Thinadhoo (GDh)	5
56	Maalhos (B)	1	119	Keyodhoo	1	182	Vaadhoo (GDh)	4
57	Thulhaadhoo	1	120	Rakeedhoo	1	183	Fuvahmulah	5
58	Hinnavaru	2	121	Thinadhoo (V)	1	184	Feydhoo (S)	4
59	Kurendhoo	1	122	Ban'didhoo	2	185	Hithadhoo (S)	5
60	Naifaru	2	123	Hulhudheli	1	186	Hulhudhoo	2
61	Olhuvelifushi	1	124	Kudahuvadhoo	4	187	Maradhoo	4
62	Fodhdhoo	1	125	Maaen'boodho	1	188	Maradhoofeydhoo	2
63	Hebadhoo	1	126	Meedhoo (Dh)	2	189	Meedho	4

11. Multi-hazard exposure and vulnerability

111. 53 out of the 189 islands (28.0%) are at high to very high risk of hazards and climate change (combining exposure and vulnerability) and can therefore be considered as *multi-hazard exposure and vulnerability hotspots*. 27 of these islands are located in the north region, 13 in the south-central region, 11 in the north-central region and 2 in the central region (Figure 111). There are no multi-hazard exposure and vulnerability hotspots in the south region.

Figure 111: Islands' multi-hazard exposure and vulnerability



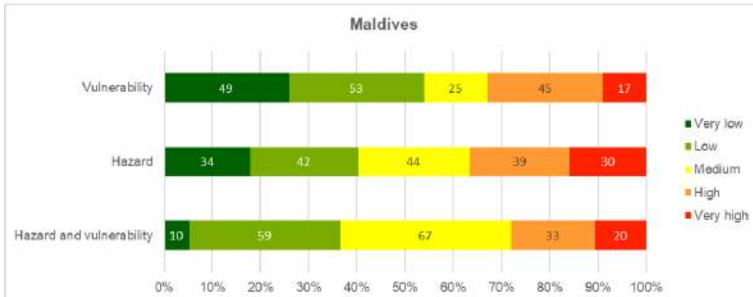
No	Islands	Sc	No	Islands	Sc	No	Islands	Sc
1	Hulhumale'	2	64	Holhudhoo	3	127	Rin'budhoo	1
2	Male'	3	65	Kedhikolhudhoo	4	128	Bileiydhoo	3
3	Villimale	3	66	Kudafari	3	129	Dharan'boodhoo	2
4	Baarah	4	67	Landhoo	3	130	Feeali	2
5	Dhidhdhoo (HA)	5	68	Lhohi	2	131	Magoodhoo (F)	2
6	Filladhoo	4	69	Maafaru	3	132	Nilandhoo (F)	3
7	Hoarafushi	5	70	Maalhendhoo	3	133	Dhan'bidhoo	3
8	Ihavandhoo	5	71	Magoodhoo (N)	2	134	Fonadhoo	4
9	Kelaa	5	72	Manadhoo	4	135	Gan	3
10	Maarandhoo	4	73	Miladhoo	4	136	Hithadhoo (L)	3
11	Mulhadhoo	3	74	Velidhoo	3	137	Isdhoo	3
12	Muraidhoo	5	75	Agolhitheemu	3	138	Kalaidhoo	4
13	Thakandhoo	5	76	Alifushi	5	139	Kunahandhoo	2
14	Thurakunu	3	77	Dhuvaafaru	4	140	Maabaidhoo	3
15	Uligamu	4	78	Fainu	2	141	Maamendhoo (L)	3
16	Utheemu	3	79	Hulhudhuffaaru	4	142	Maavah	3
17	Vashafaru	4	80	Iguraidhoo	3	143	Mundoo	3
18	Finey	3	81	Innamaadhoo	2	144	Dhiggaru	4
19	Hanimaadhoo	5	82	Kinolhas	2	145	Kolhufushi	4
20	Hirimaradhoo	4	83	Maakurathu	3	146	Maduvvari (M)	4
21	Kulhudhuffushi	5	84	Maduvvari (R)	4	147	Mulah	4
22	Kumundhoo	5	85	Meedhoo (R)	3	148	Muli	4
23	Kurin'bee	3	86	Rasgetheemu	5	149	Naalaafushi	3
24	Makunudhoo	3	87	Rasmaadhoo	2	150	Raiymandhoo	2
25	Naivaadhoo	4	88	Ungufaaru	5	151	Veyvah	1
26	Nellaidhoo	3	89	Vaadhoo (R)	3	152	Buruni	1
27	Neykurendhoo	5	90	Bodufolhudhoo	3	153	Dhiyamigili	4
28	Nolhivaramu	4	91	Feridhoo	2	154	Gaadhiffushi	2
29	Nolhivaranfaru	3	92	Himandhoo	2	155	Guraidhoo (Th)	4
30	Vaikaradhoo	3	93	Maalhos (AA)	3	156	Hirilandhoo	3
31	Bilehffahi	3	94	Mathiveri	2	157	Kan'doodhoo	3
32	Feevah	5	95	Rasdhoo	3	158	Kin'bidhoo	4
33	Feydhoo (Sh)	3	96	Thoddoo	2	159	Madifushi	5
34	Foakaidhoo	3	97	Ukulhas	3	160	Omadhoo (Th)	3
35	Funadhoo	5	98	Dhan'gethi	3	161	Thimarafushi	5
36	Goidhoo (Sh)	4	99	Dhidhdhoo (ADh)	2	162	Vandhoo	3
37	Kan'ditheemu	5	100	Dhigurah	2	163	Veymandoo	5
38	Komandoo	4	101	Fenfushi	3	164	Vilufushi	3
39	Lhaimagu	3	102	Hangnameedhoo	2	165	Dhaandhoo	2
40	Maaugoodhoo	4	103	Kun'burudhoo	2	166	Dhevvadhoo	2
41	Maroshi	4	104	Maamigili	2	167	Gemanafushi	2
42	Milandhoo	5	105	Mahibadhoo	3	168	Kanduhulhudhoo	1
43	Narudhoo	2	106	Mandhoo	2	169	Kondey	2
44	Noomaraa	4	107	Omadhoo (ADh)	3	170	Kolamaafushi	2
45	Dharavandhoo	3	108	Dhiffushi	2	171	Maamendhoo (GA)	2
46	Dhonfanu	1	109	Gaafuru	2	172	Nilandhoo (GA)	1
47	Eydhafushi	3	110	Gulhi	2	173	Vilin'gili	2
48	Fehendhoo	1	111	Guraidhoo (K)	3	174	Faresmaathodaa	2
49	Fulhadhoo	1	112	Himmafushi	2	175	Fiyoari	2
50	Goidhoo (B)	2	113	Huraa	3	176	Gadhdhoo	2
51	Hithaadhoo	2	114	Kaashidhoo	3	177	Hoan'dehdhoo	2
52	Kamadhoo	1	115	Maafushi	3	178	Madeveli	3
53	Kendhoo	2	116	Thulusdhoo	4	179	Nadallaa	2
54	Kihaadhoo	2	117	Felidhoo	4	180	Rathafandhoo	2
55	Kudarikilu	1	118	Fulidhoo	2	181	Thinadhoo (GDh)	3
56	Maalhos (B)	2	119	Keyodhoo	2	182	Vaadhoo (GDh)	2
57	Thulhaadhoo	3	120	Rakeedhoo	2	183	Fuvahmulah	3
58	Hinnavaru	4	121	Thinadhoo (V)	2	184	Feydhoo (S)	2
59	Kurendhoo	2	122	Ban'didhoo	2	185	Hithadhoo (S)	3
60	Naifaru	3	123	Hulhudheli	2	186	Hulhudhoo	3
61	Olhuvelifushi	4	124	Kudahuvadhoo	2	187	Maradhoo	3
62	Fodhdhoo	2	125	Maaen'boodhoo	2	188	Maradhoofeydhoo	3
63	Hebadhoo	3	126	Meedhoo (Dh)	2	189	Meedho	3

112. The total number of highly to very highly exposed or vulnerable islands per each aspect is (Figure 112):

(i) 69 islands (36.5%) are exposure hotspots, meaning they are highly to very highly exposed to the five hazards combined; and

(ii) 62 islands (32.8%) are vulnerability hotspots, meaning they are highly to very highly vulnerable for physical, social and environmental vulnerability combined.

Figure 112: Islands' hazard and vulnerability scores, per aspect and combined: Maldives



113. Regionally (Figure 113 to Figure 117):

(i) The north region has both a high to very high exposure and vulnerability, resulting in the highest number of hotspots of all regions;

(ii) The north-central region has an overall medium to high exposure but low to very low vulnerability, resulting into a medium to low exposure and vulnerability combined;

(iii) The central region has a medium to low exposure and vulnerability separately as well as combined;

(iv) The south-central region has a medium to high exposure but low vulnerability, resulting into a medium exposure and vulnerability combined;

(v) The south region has a very low exposure and medium to high vulnerability, resulting in the region having no hotspots for exposure and vulnerability combined;

(vi) 2 of the 3 islands in Malé – Villimale and Malé – have a medium exposure and vulnerability combined, due to a medium exposure and high vulnerability. Hulhumale has a very low exposure and medium vulnerability, resulting in medium exposure and vulnerability combined.

Figure 113: Islands' hazard and vulnerability scores, per aspect and combined: north region

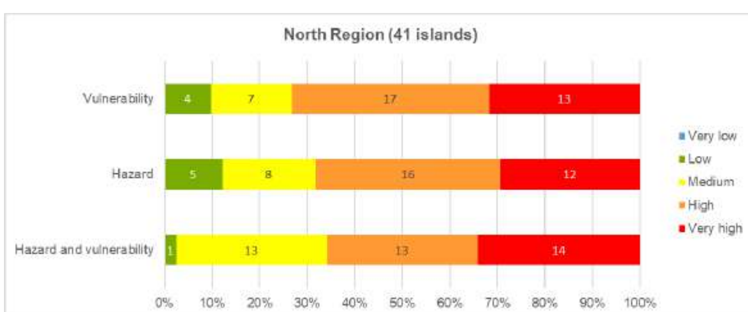


Figure 114: Islands' hazard and vulnerability scores, per aspect and combined: north-central region

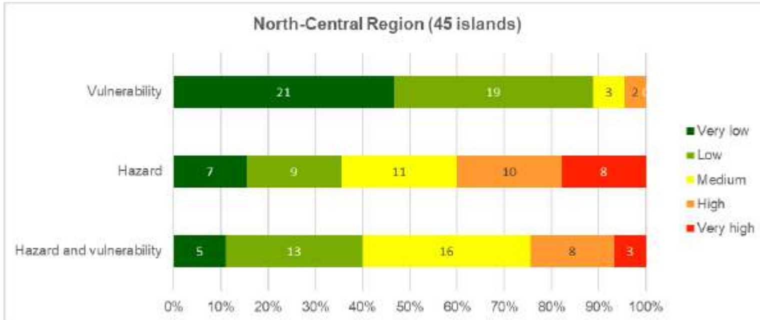


Figure 115: Islands' hazard and vulnerability scores, per aspect and combined: central region

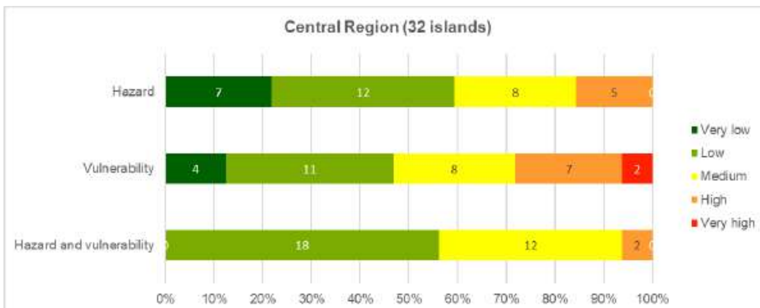


Figure 116: Islands' hazard and vulnerability scores, per aspect and combined: south-central region

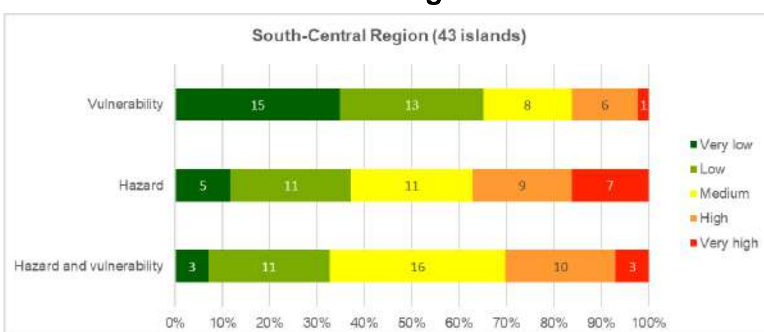
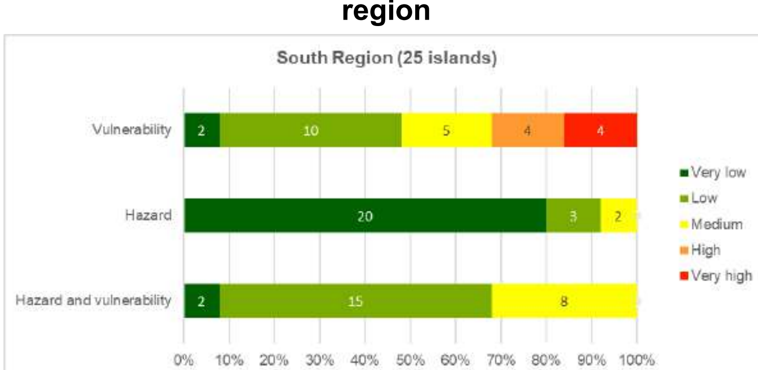


Figure 117: Islands' hazard and vulnerability scores, per aspect and combined: south region



ANNEX A: Bias correction results as part of the evaluation of the GCM performance

Figure 118: Monthly average maximum precipitation from global climate models versus historical data

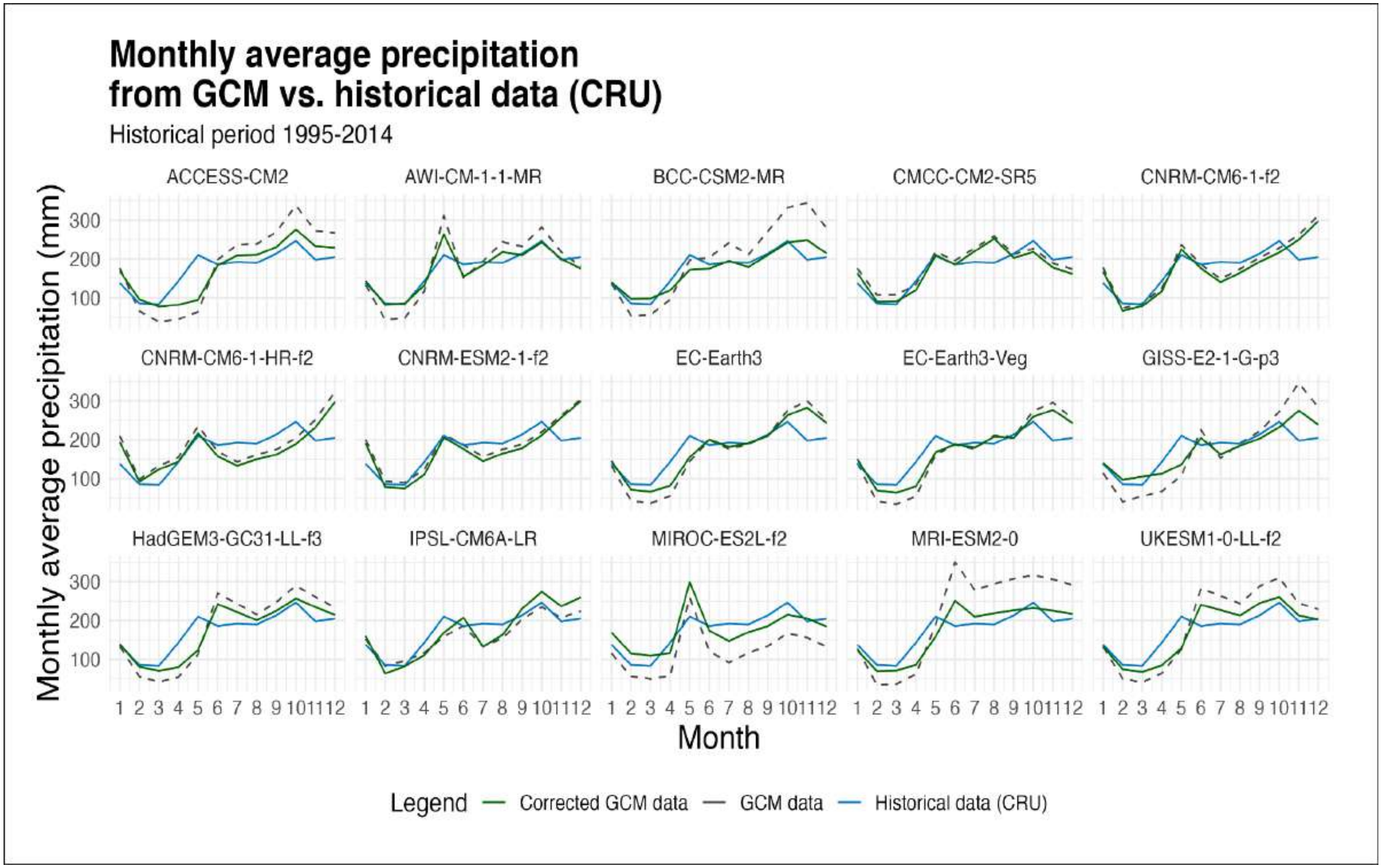


Figure 119: Monthly average maximum temperature from global climate models versus historical data

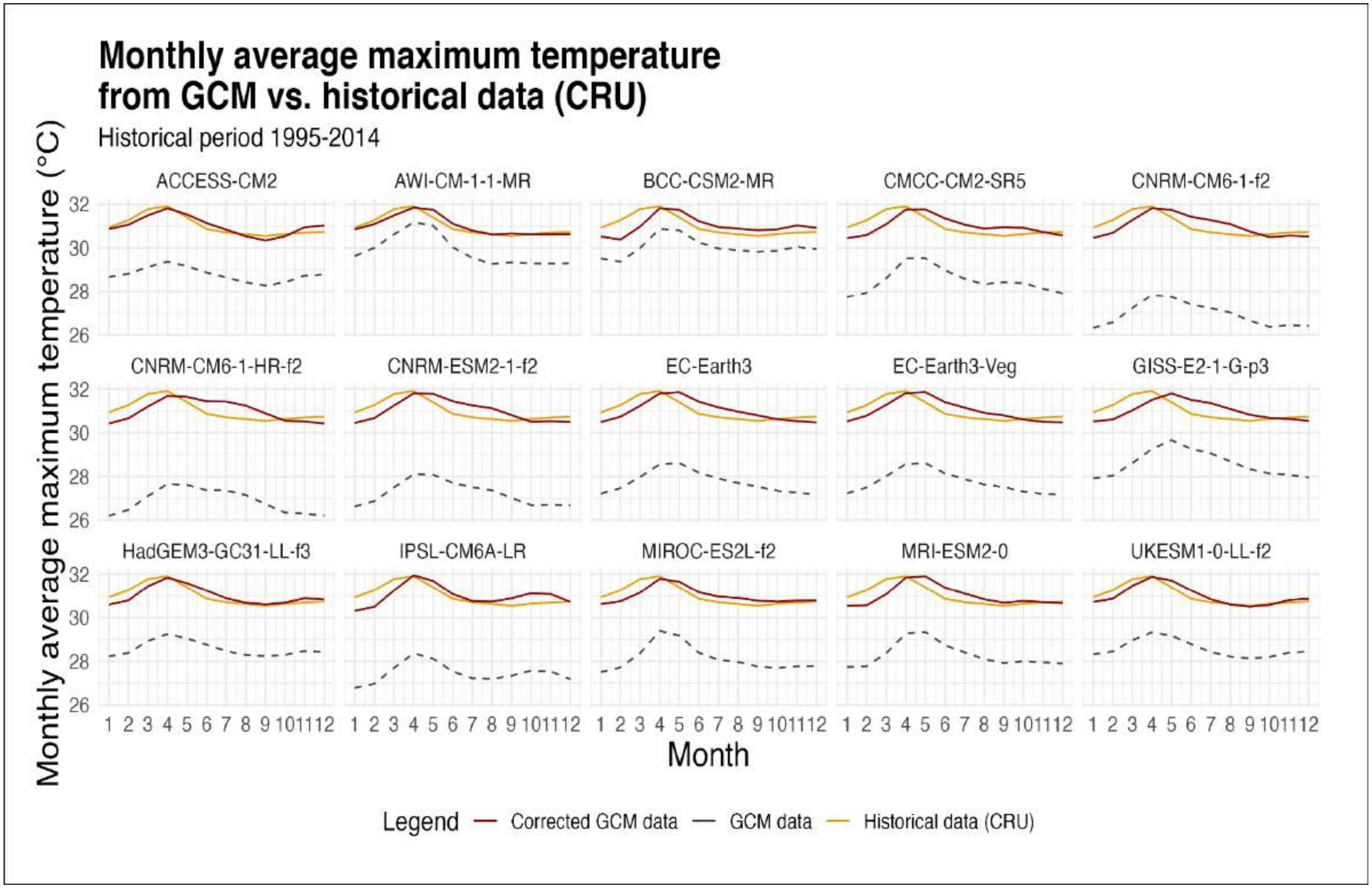


Figure 120: Density plot of monthly average precipitation from global climate models versus historical data

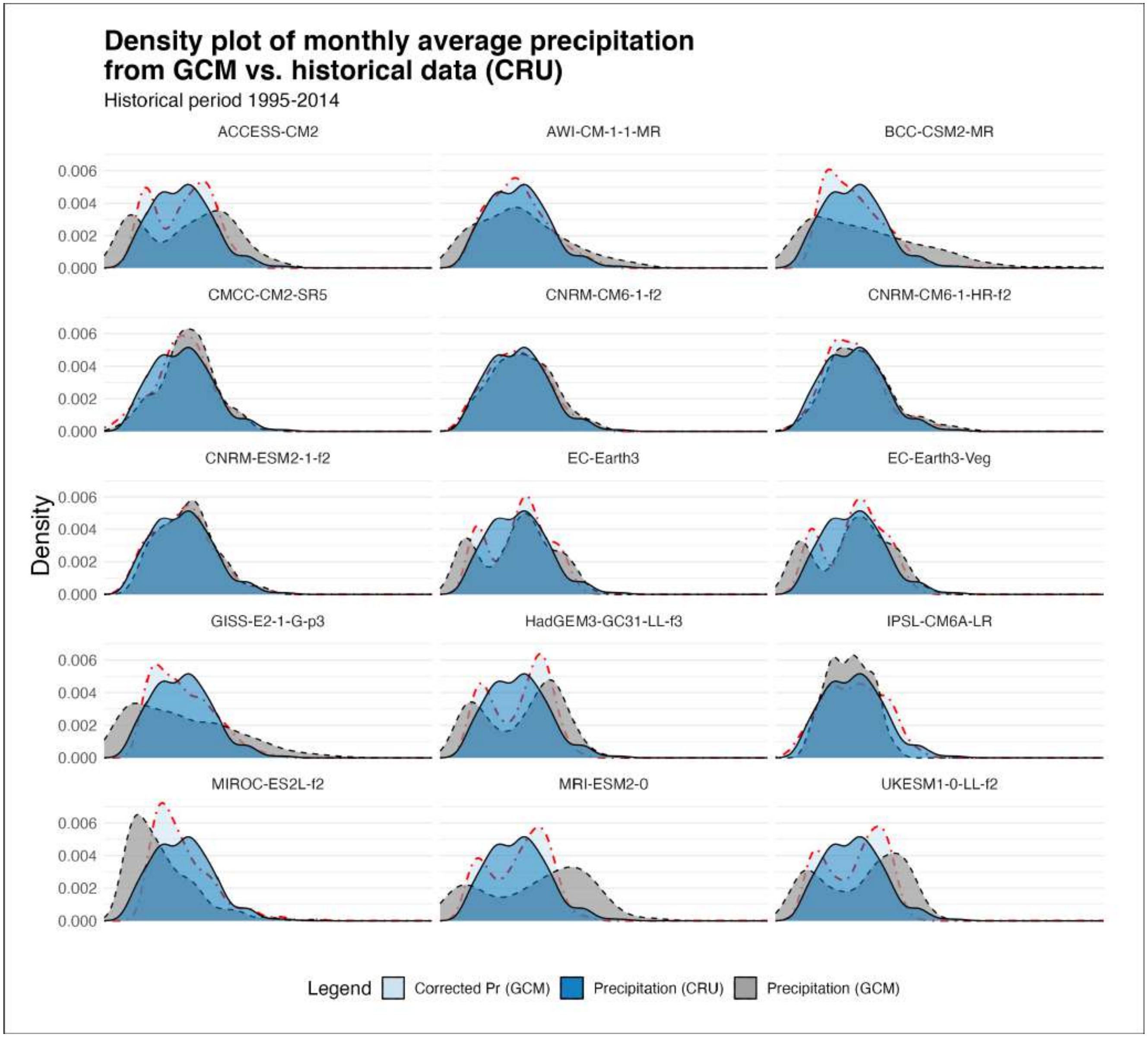
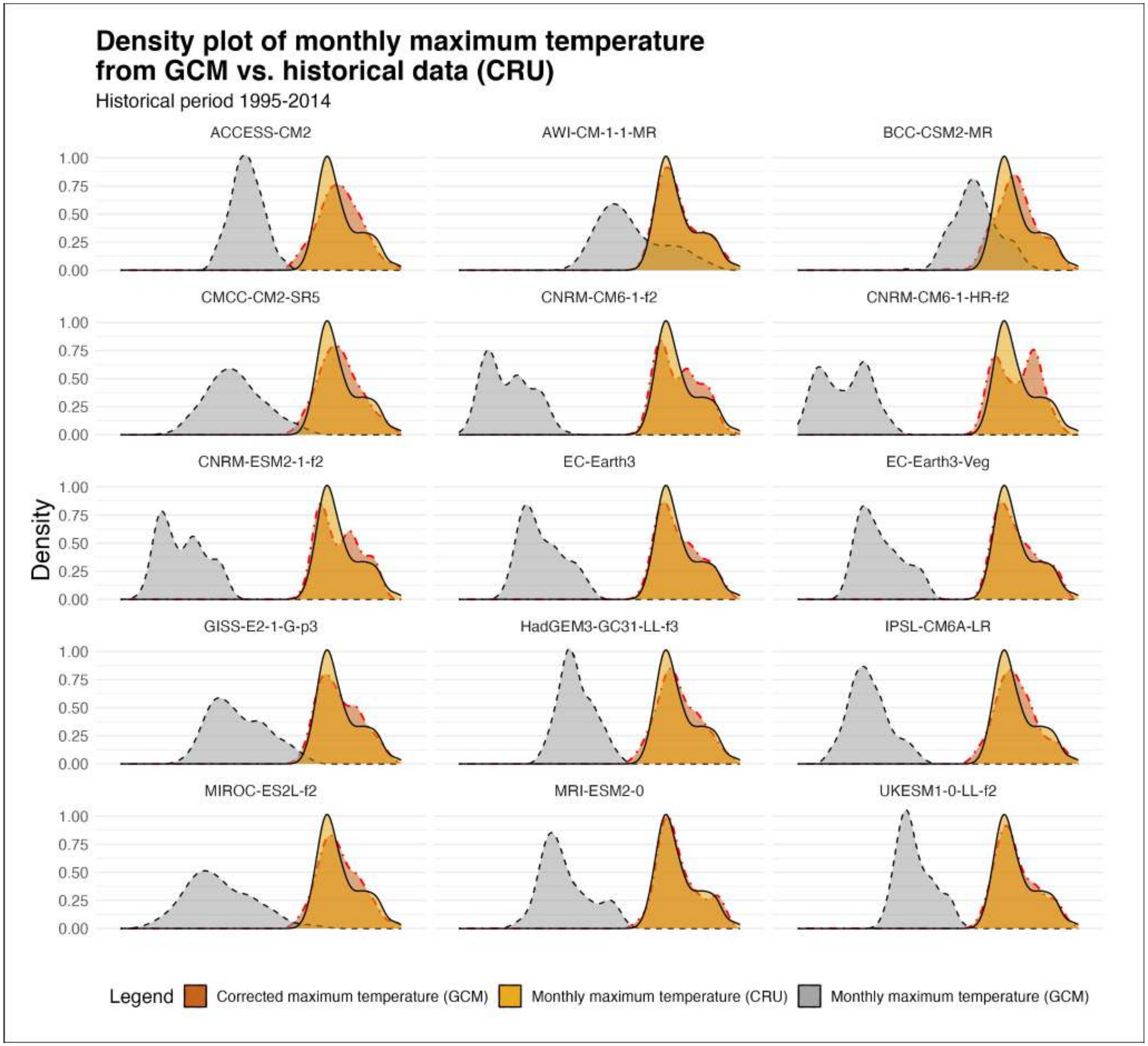


Figure 121: Density plot of monthly maximum temperature from global climate models versus historical data



ANNEX B: Projected annual precipitation and temperature per island

Table 34: Annual precipitation change (%) and annual average maximum temperature change (°C) per island, for three SSPs, for the 2030s (2021-2040) and 2050s (2041-2060)

Atoll	Island	Annual precipitation change (%)						Annual average maximum temperature change (°C)					
		2030s			2050s			2030s			2050s		
		SSP 2-4.5	SSP 3-7.0	SSP 5-8.5	SSP 2-4.5	SSP 3-7.0	SSP 5-8.5	SSP 2-4.5	SSP 3-7.0	SSP 5-8.5	SSP 2-4.5	SSP 3-7.0	SSP 5-8.5
Alifu Alifu	Maalhos	8.75	3.71	2.32	-2.97	3.05	2.53	0.33	0.45	0.40	0.85	0.78	1.09
Alifu Alifu	Mathiveri	11.09	3.61	2.02	-2.96	3.30	2.92	0.33	0.45	0.40	0.85	0.78	1.08
Alifu Alifu	Rasdhoo	11.10	3.29	2.55	-3.39	2.87	2.99	0.33	0.45	0.40	0.85	0.78	1.08
Alifu Alifu	Feridhoo	9.49	3.67	2.22	-2.97	3.13	2.67	0.33	0.45	0.40	0.85	0.78	1.09
Alifu Alifu	Bodufolhudhoo	10.92	3.57	2.12	-3.02	3.24	2.91	0.33	0.45	0.40	0.85	0.78	1.08
Alifu Alifu	Thoddoo	13.18	3.36	2.15	-3.22	3.13	3.06	0.33	0.46	0.40	0.85	0.78	1.08
Alifu Alifu	Himendhoo	7.92	3.70	2.51	-3.03	2.92	2.39	0.33	0.44	0.40	0.85	0.78	1.09
Alifu Alifu	Ukulhas	10.97	3.44	2.32	-3.18	3.10	2.96	0.33	0.45	0.40	0.85	0.78	1.08
Alifu Dhaalu	Omadhoo	5.90	3.38	3.31	-3.46	2.37	2.12	0.32	0.44	0.40	0.85	0.78	1.08
Alifu Dhaalu	Maamin'gili	3.08	3.81	3.47	-3.22	2.29	0.99	0.32	0.43	0.40	0.86	0.78	1.09
Alifu Dhaalu	Mandhoo	5.57	3.92	2.81	-2.96	2.68	1.70	0.32	0.44	0.40	0.85	0.78	1.09
Alifu Dhaalu	Dhan'gethi	4.07	3.47	3.56	-3.46	2.20	1.53	0.32	0.44	0.40	0.85	0.78	1.08
Alifu Dhaalu	Dhihdhoo	3.08	3.71	3.55	-3.31	2.24	1.05	0.32	0.43	0.40	0.86	0.78	1.09
Alifu Dhaalu	Fenfushi	3.33	3.92	3.33	-3.10	2.38	1.02	0.32	0.43	0.40	0.86	0.78	1.09
Alifu Dhaalu	Kun'burudhoo	5.83	3.45	3.24	-3.39	2.42	2.06	0.32	0.44	0.40	0.85	0.78	1.08
Alifu Dhaalu	Dhigurah	3.40	3.58	3.59	-3.41	2.19	1.24	0.32	0.43	0.40	0.86	0.78	1.09
Alifu Dhaalu	Hangnaameedhoo	6.53	3.37	3.20	-3.45	2.44	2.28	0.32	0.44	0.40	0.85	0.78	1.08
Baa	Kudarikilu	19.41	3.08	0.46	-1.80	2.21	1.32	0.34	0.48	0.40	0.85	0.77	1.08
Baa	Kendhoo	19.53	3.15	0.47	-1.79	2.43	1.48	0.34	0.48	0.40	0.85	0.77	1.08
Baa	Kamadhoo	19.13	3.06	0.54	-1.96	2.09	1.32	0.34	0.48	0.40	0.85	0.77	1.08
Baa	Kihaadhoo	18.92	3.15	0.69	-2.15	2.30	1.57	0.34	0.48	0.40	0.85	0.77	1.08
Baa	Dhonfanu	18.82	3.17	0.76	-2.23	2.37	1.66	0.34	0.48	0.40	0.85	0.77	1.08
Baa	Dharavandhoo	18.65	3.20	0.84	-2.33	2.41	1.75	0.34	0.48	0.40	0.85	0.77	1.08

Atoll	Island	Annual precipitation change (%)						Annual average maximum temperature change (°C)					
		2030s			2050s			2030s			2050s		
		SSP 2-4.5	SSP 3-7.0	SSP 5-8.5	SSP 2-4.5	SSP 3-7.0	SSP 5-8.5	SSP 2-4.5	SSP 3-7.0	SSP 5-8.5	SSP 2-4.5	SSP 3-7.0	SSP 5-8.5
Baa	Maalhos	18.62	3.23	0.88	-2.36	2.52	1.85	0.34	0.48	0.40	0.85	0.77	1.08
Baa	Eydhafushi	18.58	3.27	0.92	-2.38	2.69	1.99	0.34	0.48	0.40	0.85	0.77	1.08
Baa	Hithaadhoo	18.56	3.44	0.94	-2.35	3.22	2.38	0.34	0.47	0.40	0.85	0.77	1.08
Baa	Thulhaadhoo	18.96	3.51	0.77	-2.17	3.40	2.41	0.34	0.47	0.40	0.85	0.77	1.08
Baa	Goidhoo	17.29	3.40	1.34	-2.75	3.15	2.61	0.34	0.47	0.40	0.85	0.77	1.08
Baa	Fehendhoo	17.47	3.43	1.28	-2.68	3.22	2.62	0.34	0.47	0.40	0.85	0.77	1.08
Baa	Fulhadhoo	17.64	3.46	1.21	-2.61	3.32	2.64	0.34	0.47	0.40	0.85	0.77	1.08
Dhaalu	Ban'didhoo	-1.23	3.52	4.06	-3.77	1.96	-0.81	0.31	0.42	0.40	0.86	0.78	1.09
Dhaalu	Maaen'boodhoo	-2.50	3.44	3.86	-3.94	2.06	-1.46	0.30	0.41	0.39	0.86	0.79	1.09
Dhaalu	Rin'budhoo	-1.20	3.80	3.94	-3.55	2.07	-0.88	0.31	0.42	0.40	0.86	0.79	1.09
Dhaalu	Kudahuvadhoo	-2.56	3.65	3.77	-3.78	2.11	-1.53	0.30	0.41	0.39	0.86	0.79	1.09
Dhaalu	Hulhudheli	-1.53	3.93	3.87	-3.47	2.12	-1.08	0.31	0.42	0.39	0.86	0.79	1.09
Dhaalu	Meedhoo	-0.88	3.48	4.09	-3.77	1.93	-0.61	0.31	0.42	0.40	0.86	0.78	1.09
Faafu	Nilandhoo	-0.34	3.83	3.92	-3.45	2.07	-0.47	0.31	0.42	0.40	0.86	0.78	1.09
Faafu	Dharan'boodhoo	-0.35	3.73	3.98	-3.54	2.02	-0.43	0.31	0.42	0.40	0.86	0.78	1.09
Faafu	Magoodhoo	-0.29	3.62	4.03	-3.62	1.97	-0.36	0.31	0.42	0.40	0.86	0.78	1.09
Faafu	Bileiydhoo	-0.05	3.56	4.04	-3.64	1.94	-0.22	0.31	0.42	0.40	0.86	0.78	1.09
Faafu	Feeali	1.04	3.50	4.00	-3.62	1.93	0.33	0.31	0.43	0.40	0.86	0.78	1.09
Gaafu Alifu	Dhevvadhoo	-10.59	-0.25	-4.20	-3.49	2.76	-2.14	0.26	0.38	0.38	0.87	0.83	1.09
Gaafu Alifu	Kon'dey	-11.01	-0.91	-4.14	-4.52	3.64	-1.84	0.26	0.38	0.38	0.87	0.84	1.09
Gaafu Alifu	Kolamaafushi	-9.28	-0.47	-3.35	-4.03	2.31	-2.63	0.27	0.39	0.38	0.87	0.83	1.09
Gaafu Alifu	Dhaandhoo	-10.41	-0.99	-3.95	-4.54	3.22	-2.20	0.26	0.38	0.38	0.87	0.83	1.09
Gaafu Alifu	Kan'duhulhudhoo	-11.69	-0.33	-4.36	-4.07	3.91	-1.43	0.26	0.38	0.38	0.87	0.84	1.09
Gaafu Alifu	Maamendhoo	-9.97	-1.10	-3.71	-4.70	3.04	-2.41	0.26	0.38	0.38	0.87	0.83	1.09
Gaafu Alifu	Nilandhoo	-10.33	-0.98	-3.92	-4.52	3.16	-2.24	0.26	0.38	0.38	0.87	0.83	1.09
Gaafu Alifu	Gemanafushi	-11.28	-0.77	-4.21	-4.43	3.79	-1.67	0.26	0.38	0.38	0.87	0.84	1.09
Gaafu Alifu	Vilin'gili	-9.77	-1.15	-3.58	-4.79	2.97	-2.50	0.26	0.38	0.38	0.87	0.83	1.09

Atoll	Island	Annual precipitation change (%)						Annual average maximum temperature change (°C)					
		2030s			2050s			2030s			2050s		
		SSP 2-4.5	SSP 3-7.0	SSP 5-8.5	SSP 2-4.5	SSP 3-7.0	SSP 5-8.5	SSP 2-4.5	SSP 3-7.0	SSP 5-8.5	SSP 2-4.5	SSP 3-7.0	SSP 5-8.5
Gaafu Dhaalu	Gahdhoo	-11.93	0.16	-4.49	-3.60	3.83	-1.33	0.26	0.38	0.39	0.87	0.84	1.09
Gaafu Dhaalu	Thinadhoo	-10.58	0.33	-4.27	-2.31	2.15	-2.13	0.27	0.38	0.38	0.87	0.83	1.09
Gaafu Dhaalu	Hoadehdhoo	-10.98	0.53	-4.45	-2.09	2.31	-1.97	0.26	0.38	0.39	0.87	0.84	1.09
Gaafu Dhaalu	Vaadhoo	-12.12	0.85	-4.66	-2.69	3.50	-1.32	0.26	0.38	0.39	0.88	0.84	1.09
Gaafu Dhaalu	Nadellaa	-11.69	0.98	-4.65	-1.85	2.73	-1.64	0.26	0.38	0.39	0.88	0.84	1.09
Gaafu Dhaalu	Fiyoari	-12.07	1.13	-4.71	-2.09	3.16	-1.42	0.26	0.38	0.39	0.88	0.84	1.09
Gaafu Dhaalu	Rathafandhoo	-11.91	1.05	-4.69	-2.03	3.00	-1.51	0.26	0.38	0.39	0.88	0.84	1.09
Gaafu Dhaalu	Faresmaathodaa	-12.19	1.14	-4.71	-2.25	3.34	-1.33	0.26	0.38	0.39	0.88	0.84	1.09
Gaafu Dhaalu	Madaveli	-10.92	0.50	-4.42	-2.11	2.28	-2.00	0.26	0.38	0.39	0.87	0.84	1.09
Haa Alifu	Vashafaru	12.02	0.72	1.88	4.84	-1.52	-4.20	0.34	0.48	0.40	0.84	0.75	1.06
Haa Alifu	Huvarafushi	11.38	0.93	2.62	4.82	-1.66	-4.09	0.35	0.48	0.40	0.84	0.75	1.05
Haa Alifu	Uligamu	10.49	0.88	3.04	5.11	-1.50	-4.22	0.34	0.48	0.40	0.84	0.75	1.05
Haa Alifu	Utheemu	12.60	0.78	1.67	4.61	-1.63	-4.05	0.34	0.48	0.40	0.84	0.75	1.06
Haa Alifu	Kelaa	11.49	0.67	2.06	5.04	-1.36	-4.35	0.34	0.48	0.40	0.84	0.75	1.05
Haa Alifu	Dhihdhoo	12.12	0.76	1.91	4.78	-1.58	-4.13	0.34	0.48	0.40	0.84	0.75	1.06
Haa Alifu	Maarandhoo	12.52	0.89	1.92	4.55	-1.70	-3.96	0.34	0.48	0.40	0.84	0.75	1.06
Haa Alifu	Muraidhoo	12.55	0.73	1.60	4.65	-1.57	-4.12	0.34	0.48	0.40	0.84	0.75	1.06
Haa Alifu	Mulhadhoo	11.07	0.84	2.63	5.04	-1.54	-4.19	0.34	0.48	0.40	0.84	0.75	1.05
Haa Alifu	Ihavandhoo	11.64	0.91	2.45	4.78	-1.66	-4.07	0.35	0.48	0.40	0.84	0.75	1.05
Haa Alifu	Thuraakunu	10.31	0.90	3.17	5.13	-1.49	-4.22	0.34	0.48	0.40	0.84	0.75	1.05
Haa Alifu	Thakandhoo	12.59	0.88	1.87	4.54	-1.70	-3.96	0.34	0.48	0.40	0.84	0.75	1.06
Haa Alifu	Baarah	12.73	0.70	1.44	4.59	-1.55	-4.14	0.34	0.48	0.40	0.84	0.75	1.06
Haa Alifu	Filladhoo	12.07	0.67	1.73	4.84	-1.44	-4.28	0.34	0.48	0.40	0.84	0.75	1.06
Haa Dhaalu	Finey	13.43	0.87	1.36	4.25	-1.70	-3.83	0.34	0.48	0.40	0.84	0.75	1.06
Haa Dhaalu	Naivaadhoo	13.50	0.99	1.51	4.14	-1.73	-3.74	0.35	0.48	0.40	0.84	0.75	1.06
Haa Dhaalu	Nellaidhoo	13.78	1.00	1.36	4.04	-1.72	-3.69	0.35	0.48	0.40	0.84	0.75	1.06
Haa Dhaalu	Hirimaradhoo	13.64	0.91	1.31	4.15	-1.72	-3.77	0.34	0.48	0.40	0.84	0.75	1.06

Atoll	Island	Annual precipitation change (%)						Annual average maximum temperature change (°C)					
		2030s			2050s			2030s			2050s		
		SSP 2-4.5	SSP 3-7.0	SSP 5-8.5	SSP 2-4.5	SSP 3-7.0	SSP 5-8.5	SSP 2-4.5	SSP 3-7.0	SSP 5-8.5	SSP 2-4.5	SSP 3-7.0	SSP 5-8.5
Haa Dhaalu	Kurin'bee	14.19	0.98	1.09	3.90	-1.70	-3.62	0.35	0.48	0.40	0.84	0.75	1.06
Haa Dhaalu	Kumundhoo	14.96	0.99	0.66	3.58	-1.64	-3.45	0.34	0.49	0.40	0.84	0.75	1.06
Haa Dhaalu	Neykurendhoo	15.26	1.10	0.64	3.41	-1.59	-3.32	0.35	0.49	0.40	0.84	0.75	1.06
Haa Dhaalu	Vaikaradhoo	15.23	1.13	0.70	3.41	-1.59	-3.31	0.35	0.49	0.40	0.84	0.75	1.06
Haa Dhaalu	Makunudhoo	16.66	1.61	0.43	2.63	-1.12	-2.80	0.35	0.49	0.40	0.84	0.76	1.07
Haa Dhaalu	Kulhudhuffushi	14.50	0.93	0.83	3.79	-1.67	-3.59	0.34	0.48	0.40	0.84	0.75	1.06
Haa Dhaalu	Nolhivaramu	14.16	0.89	0.97	3.96	-1.69	-3.69	0.34	0.48	0.40	0.84	0.75	1.06
Haa Dhaalu	Nolhivaranfaru	13.82	0.83	1.06	4.11	-1.68	-3.81	0.34	0.48	0.40	0.84	0.75	1.06
Haa Dhaalu	Hanimaadhoo	13.27	0.75	1.23	4.36	-1.63	-3.98	0.34	0.48	0.40	0.84	0.75	1.06
Laamu	Mundoo	-5.18	0.08	1.92	-6.06	1.96	-2.97	0.28	0.40	0.39	0.87	0.80	1.09
Laamu	Gan	-5.45	-0.18	1.50	-6.16	2.05	-3.10	0.28	0.40	0.39	0.87	0.80	1.09
Laamu	Hithadhoo	-5.78	0.15	1.02	-5.95	2.17	-3.08	0.28	0.40	0.39	0.87	0.80	1.09
Laamu	Kunahandhoo	-5.82	0.19	0.96	-5.91	2.18	-3.07	0.28	0.40	0.39	0.87	0.80	1.09
Laamu	Maamendhoo	-5.72	0.19	1.11	-5.94	2.16	-3.06	0.28	0.40	0.39	0.87	0.80	1.09
Laamu	Fonadhoo	-5.69	-0.22	1.13	-6.15	2.13	-3.15	0.28	0.40	0.39	0.87	0.80	1.09
Laamu	Maavah	-5.48	0.92	1.49	-5.57	2.13	-2.87	0.28	0.40	0.39	0.87	0.80	1.09
Laamu	Maabaidhoo	-5.14	0.13	1.99	-6.03	1.95	-2.95	0.28	0.40	0.39	0.87	0.80	1.09
Laamu	Isdhoo	-4.87	0.18	2.37	-5.99	1.82	-2.82	0.28	0.40	0.39	0.87	0.80	1.09
Laamu	Kalaidhoo	-4.89	0.23	2.34	-5.98	1.85	-2.82	0.28	0.40	0.39	0.87	0.80	1.09
Laamu	Dhan'bidhoo	-4.95	0.24	2.26	-5.98	1.88	-2.85	0.28	0.40	0.39	0.87	0.80	1.09
Lhaviyani	Naifaru	18.92	2.73	0.11	-1.70	1.05	0.41	0.34	0.48	0.40	0.85	0.77	1.08
Lhaviyani	Hinnavaru	18.90	2.63	-0.04	-1.57	0.79	0.15	0.34	0.48	0.40	0.85	0.76	1.08
Lhaviyani	Kurendhoo	18.39	2.88	0.35	-2.26	1.11	0.72	0.34	0.48	0.40	0.85	0.77	1.08
Lhaviyani	Olhuvelifushi	17.84	2.92	0.39	-2.67	0.87	0.75	0.33	0.48	0.40	0.85	0.77	1.08
Meemu	Dhiggaru	-0.79	2.04	4.66	-4.72	0.83	0.09	0.31	0.42	0.40	0.86	0.78	1.08
Meemu	Muli	-1.89	1.78	4.54	-4.92	0.96	-0.61	0.30	0.42	0.39	0.86	0.78	1.08
Meemu	Naalaafushi	-2.01	1.76	4.51	-4.93	0.99	-0.69	0.30	0.42	0.39	0.86	0.78	1.08

Atoll	Island	Annual precipitation change (%)						Annual average maximum temperature change (°C)					
		2030s			2050s			2030s			2050s		
		SSP 2-4.5	SSP 3-7.0	SSP 5-8.5	SSP 2-4.5	SSP 3-7.0	SSP 5-8.5	SSP 2-4.5	SSP 3-7.0	SSP 5-8.5	SSP 2-4.5	SSP 3-7.0	SSP 5-8.5
Meemu	Maduvvari	-0.84	2.02	4.66	-4.74	0.82	0.07	0.31	0.42	0.40	0.86	0.78	1.08
Meemu	Veyvah	-1.71	1.78	4.59	-4.90	0.89	-0.45	0.30	0.42	0.39	0.86	0.78	1.08
Meemu	Kolhufushi	-2.47	2.05	4.27	-4.83	1.39	-1.17	0.30	0.41	0.39	0.86	0.79	1.08
Meemu	Mulah	-1.74	1.81	4.57	-4.89	0.93	-0.50	0.30	0.42	0.39	0.86	0.78	1.08
Meemu	Raiymandhoo	-0.99	1.85	4.70	-4.84	0.69	0.08	0.31	0.42	0.40	0.86	0.78	1.08
Noonu	Landhoo	18.64	1.81	-0.82	0.14	-0.50	-1.61	0.34	0.49	0.40	0.85	0.76	1.07
Noonu	Maalhendhoo	18.60	1.77	-0.83	0.25	-0.55	-1.68	0.34	0.49	0.40	0.85	0.76	1.07
Noonu	Fohdhoo	19.32	2.21	-0.42	-0.25	0.34	-0.66	0.34	0.49	0.40	0.85	0.76	1.07
Noonu	Kudafari	18.73	1.83	-0.75	0.22	-0.42	-1.51	0.34	0.49	0.40	0.85	0.76	1.07
Noonu	Manadhoo	18.94	2.08	-0.61	-0.36	-0.07	-1.02	0.34	0.49	0.40	0.85	0.76	1.07
Noonu	Velidhoo	19.29	2.34	-0.33	-0.66	0.52	-0.40	0.34	0.49	0.40	0.85	0.76	1.08
Noonu	Lhohi	18.91	1.98	-0.65	-0.08	-0.18	-1.20	0.34	0.49	0.40	0.85	0.76	1.07
Noonu	Maafaru	18.75	1.92	-0.76	-0.15	-0.35	-1.37	0.34	0.49	0.40	0.85	0.76	1.07
Noonu	Ken'dhikulhudhoo	18.51	1.67	-0.82	0.54	-0.64	-1.83	0.34	0.49	0.40	0.85	0.76	1.07
Noonu	Magoodhoo	19.00	2.07	-0.58	-0.25	-0.03	-1.00	0.34	0.49	0.40	0.85	0.76	1.07
Noonu	Hen'badhoo	18.48	1.65	-0.80	0.64	-0.66	-1.86	0.34	0.49	0.40	0.85	0.76	1.07
Noonu	Miladhoo	18.98	2.04	-0.60	-0.19	-0.07	-1.06	0.34	0.49	0.40	0.85	0.76	1.07
Noonu	Holhudhoo	19.23	2.17	-0.46	-0.25	0.24	-0.75	0.34	0.49	0.40	0.85	0.76	1.07
Raa	Maduvvari	20.29	2.94	-0.03	-0.94	2.00	0.78	0.34	0.48	0.40	0.85	0.77	1.08
Raa	Rasmaadhoo	19.88	2.68	-0.10	-0.83	1.38	0.31	0.34	0.48	0.40	0.85	0.76	1.08
Raa	An'golhitheemu	19.67	2.26	-0.41	0.14	0.55	-0.63	0.35	0.49	0.40	0.85	0.76	1.08
Raa	Maakurathu	19.86	2.60	-0.17	-0.66	1.21	0.13	0.34	0.48	0.40	0.85	0.76	1.08
Raa	Innamaadhoo	19.87	2.70	-0.07	-0.88	1.43	0.37	0.34	0.48	0.40	0.85	0.76	1.08
Raa	Kinolhas	19.85	2.89	0.12	-1.24	1.83	0.80	0.34	0.48	0.40	0.85	0.77	1.08
Raa	Alifushi	19.17	1.98	-0.47	0.92	-0.04	-1.32	0.35	0.49	0.40	0.85	0.76	1.07
Raa	Rasgetheemu	19.64	2.24	-0.42	0.21	0.50	-0.69	0.35	0.49	0.40	0.85	0.76	1.08
Raa	Hulhudhuffaaru	19.72	2.31	-0.38	0.02	0.65	-0.52	0.34	0.49	0.40	0.85	0.76	1.08

Atoll	Island	Annual precipitation change (%)						Annual average maximum temperature change (°C)					
		2030s			2050s			2030s			2050s		
		SSP 2-4.5	SSP 3-7.0	SSP 5-8.5	SSP 2-4.5	SSP 3-7.0	SSP 5-8.5	SSP 2-4.5	SSP 3-7.0	SSP 5-8.5	SSP 2-4.5	SSP 3-7.0	SSP 5-8.5
Raa	Meedhoo	20.09	2.93	0.06	-1.11	1.97	0.83	0.34	0.48	0.40	0.85	0.77	1.08
Raa	Dhuvaafaru	19.85	2.56	-0.21	-0.56	1.13	0.04	0.34	0.48	0.40	0.85	0.76	1.08
Raa	Fainu	19.85	2.86	0.09	-1.19	1.76	0.73	0.34	0.48	0.40	0.85	0.77	1.08
Raa	Vaadhoo	19.52	2.15	-0.45	0.42	0.33	-0.89	0.35	0.49	0.40	0.85	0.76	1.07
Raa	Un'goofaaru	19.84	2.49	-0.27	-0.39	1.00	-0.12	0.34	0.48	0.40	0.85	0.76	1.08
Raa	In'guraidhoo	19.86	2.83	0.06	-1.14	1.71	0.68	0.34	0.48	0.40	0.85	0.77	1.08
Seenu	Meedhoo	-15.05	5.76	-3.83	-0.47	5.62	0.27	0.26	0.39	0.40	0.89	0.86	1.10
Seenu	Hulhudhoo	-15.07	5.83	-3.81	-0.43	5.64	0.28	0.26	0.39	0.40	0.89	0.86	1.10
Seenu	Feydhoo	-15.22	6.43	-3.57	0.03	5.73	0.17	0.27	0.39	0.40	0.89	0.86	1.11
Seenu	Maradhoofeydhoo	-15.20	6.37	-3.59	0.04	5.69	0.15	0.27	0.39	0.40	0.89	0.86	1.10
Seenu	Maradhoo	-15.17	6.33	-3.62	0.05	5.66	0.14	0.27	0.39	0.40	0.89	0.86	1.10
Seenu	Hithadhoo	-15.03	5.99	-3.77	0.04	5.46	0.06	0.27	0.39	0.40	0.89	0.86	1.10
Shaviyani	Milandhoo	17.00	1.16	-0.41	2.31	-1.30	-2.86	0.34	0.49	0.40	0.85	0.76	1.07
Shaviyani	Narudhoo	17.17	1.21	-0.42	2.22	-1.25	-2.75	0.34	0.49	0.40	0.85	0.76	1.07
Shaviyani	Foakaidhoo	16.81	1.18	-0.21	2.52	-1.33	-2.87	0.34	0.49	0.40	0.84	0.76	1.07
Shaviyani	Goidhoo	16.24	1.28	0.31	2.91	-1.39	-2.97	0.35	0.49	0.40	0.84	0.76	1.07
Shaviyani	Funadhoo	17.77	1.35	-0.66	1.64	-1.05	-2.45	0.34	0.49	0.40	0.85	0.76	1.07
Shaviyani	Lhaimagu	17.75	1.35	-0.60	1.72	-1.05	-2.44	0.34	0.49	0.40	0.85	0.76	1.07
Shaviyani	Noomaraa	16.07	1.12	0.17	3.00	-1.48	-3.10	0.34	0.49	0.40	0.84	0.75	1.07
Shaviyani	Bileiyfahi	16.91	1.34	0.01	2.54	-1.23	-2.72	0.35	0.49	0.40	0.84	0.76	1.07
Shaviyani	Kan'ditheemu	16.18	1.28	0.36	2.94	-1.40	-2.99	0.35	0.49	0.40	0.84	0.76	1.07
Shaviyani	Feydhoo	16.66	1.23	-0.01	2.67	-1.34	-2.86	0.35	0.49	0.40	0.84	0.76	1.07
Shaviyani	Maroshi	17.69	1.43	-0.34	1.98	-0.99	-2.37	0.35	0.49	0.40	0.85	0.76	1.07
Shaviyani	Maaun'goodhoo	18.35	1.57	-0.70	1.07	-0.74	-1.99	0.34	0.49	0.40	0.85	0.76	1.07
Shaviyani	Feevah	16.60	1.10	-0.23	2.62	-1.40	-3.01	0.34	0.49	0.40	0.84	0.75	1.07
Shaviyani	Komandoo	18.59	1.71	-0.50	1.27	-0.51	-1.78	0.35	0.49	0.40	0.85	0.76	1.07
Thaa	Vandhoo	-4.11	2.90	3.04	-4.37	2.11	-2.20	0.29	0.41	0.39	0.87	0.79	1.09

Atoll	Island	Annual precipitation change (%)						Annual average maximum temperature change (°C)					
		2030s			2050s			2030s			2050s		
		SSP 2-4.5	SSP 3-7.0	SSP 5-8.5	SSP 2-4.5	SSP 3-7.0	SSP 5-8.5	SSP 2-4.5	SSP 3-7.0	SSP 5-8.5	SSP 2-4.5	SSP 3-7.0	SSP 5-8.5
Thaa	Kan'doodhoo	-4.00	3.04	3.11	-4.26	2.11	-2.15	0.29	0.41	0.39	0.87	0.79	1.09
Thaa	Burunee	-3.22	2.80	3.73	-4.47	1.99	-1.76	0.30	0.41	0.39	0.87	0.79	1.09
Thaa	Vilufushi	-3.56	2.02	3.67	-4.99	1.80	-1.93	0.29	0.41	0.39	0.87	0.79	1.09
Thaa	Hirilandhoo	-4.17	2.90	2.98	-4.36	2.10	-2.23	0.29	0.41	0.39	0.87	0.79	1.09
Thaa	Omadhoo	-4.56	2.37	2.66	-4.74	2.10	-2.40	0.29	0.40	0.39	0.87	0.79	1.09
Thaa	Veymandoo	-4.53	2.16	2.72	-4.92	2.09	-2.41	0.29	0.40	0.39	0.87	0.79	1.09
Thaa	Thimarafushi	-4.49	2.02	2.79	-5.03	2.08	-2.41	0.29	0.40	0.39	0.87	0.79	1.09
Thaa	Gaadhiffushi	-4.38	1.87	2.93	-5.13	2.03	-2.38	0.29	0.41	0.39	0.87	0.79	1.09
Thaa	Guraidhoo	-4.20	1.63	3.16	-5.27	1.91	-2.31	0.29	0.41	0.39	0.87	0.79	1.09
Thaa	Dhiyamigili	-4.15	1.60	3.21	-5.28	1.88	-2.29	0.29	0.41	0.39	0.87	0.79	1.09
Thaa	Kin'bidhoo	-4.57	2.22	2.66	-4.86	2.10	-2.42	0.29	0.40	0.39	0.87	0.79	1.09
Thaa	Madifushi	-4.10	1.56	3.26	-5.29	1.85	-2.26	0.29	0.41	0.39	0.87	0.79	1.09
Vaavu	Fulidhoo	3.78	2.62	4.23	-4.22	1.13	1.95	0.32	0.44	0.40	0.85	0.78	1.08
Vaavu	Thinadhoo	1.90	2.35	4.55	-4.46	0.76	1.42	0.31	0.43	0.40	0.86	0.78	1.08
Vaavu	Felidhoo	1.76	2.33	4.57	-4.47	0.73	1.38	0.31	0.43	0.40	0.86	0.78	1.08
Vaavu	Keyodhoo	1.68	2.32	4.58	-4.48	0.73	1.35	0.31	0.43	0.40	0.86	0.78	1.08
Vaavu	Rakeedhoo	0.67	2.40	4.58	-4.45	0.94	0.76	0.31	0.43	0.40	0.86	0.78	1.08
Gnaviyani	Fuvahmulah	-14.28	3.64	-4.31	-1.81	5.22	0.17	0.26	0.39	0.39	0.88	0.85	1.10
Kaafu	Kaashidhoo	16.36	3.19	1.45	-3.35	1.76	1.97	0.33	0.47	0.40	0.85	0.77	1.08
Kaafu	Gaafaru	14.43	3.15	2.07	-3.78	1.72	2.42	0.33	0.47	0.40	0.85	0.77	1.08
Kaafu	Dhiffushi	10.96	2.91	2.88	-4.30	0.93	2.74	0.33	0.46	0.40	0.85	0.78	1.07
Kaafu	Thulusdhoo	10.40	2.86	3.06	-4.26	1.07	2.81	0.32	0.46	0.40	0.85	0.78	1.08
Kaafu	Huraa	10.09	2.84	3.15	-4.23	1.16	2.83	0.32	0.46	0.40	0.85	0.78	1.08
Kaafu	Hinmafushi	9.89	2.83	3.20	-4.21	1.23	2.85	0.32	0.46	0.40	0.85	0.78	1.08
MLE	Vilin'gili	8.65	2.77	3.46	-4.16	1.35	2.83	0.32	0.45	0.40	0.85	0.78	1.08
Kaafu	Guraidhoo	5.81	2.62	3.96	-4.23	1.13	2.50	0.32	0.44	0.40	0.85	0.78	1.08
Kaafu	Maafushi	6.17	2.62	3.92	-4.24	1.10	2.58	0.32	0.44	0.40	0.85	0.78	1.08

Atoll	Island	Annual precipitation change (%)						Annual average maximum temperature change (°C)					
		2030s			2050s			2030s			2050s		
		SSP 2-4.5	SSP 3-7.0	SSP 5-8.5	SSP 2-4.5	SSP 3-7.0	SSP 5-8.5	SSP 2-4.5	SSP 3-7.0	SSP 5-8.5	SSP 2-4.5	SSP 3-7.0	SSP 5-8.5
MLE	Hulhumaale	9.05	2.77	3.39	-4.21	1.23	2.85	0.32	0.45	0.40	0.85	0.78	1.08
MLE	Maale	8.60	2.76	3.47	-4.19	1.27	2.83	0.32	0.45	0.40	0.85	0.78	1.08
Kaafu	Gulhi	6.64	2.63	3.84	-4.25	1.09	2.66	0.32	0.45	0.40	0.85	0.78	1.08
Alifu Dhaalu	Mahibadhoo	5.53	3.38	3.37	-3.48	2.32	2.02	0.32	0.44	0.40	0.85	0.78	1.08

Note: More detailed data, for all three SSPs, other future periods and other climate parameters is available as a separate spreadsheet.

ANNEX C: Multi-hazard exposure and vulnerability maps per atoll

Figure 122: Multi-hazard exposure and vulnerability: Haa Alifu atoll

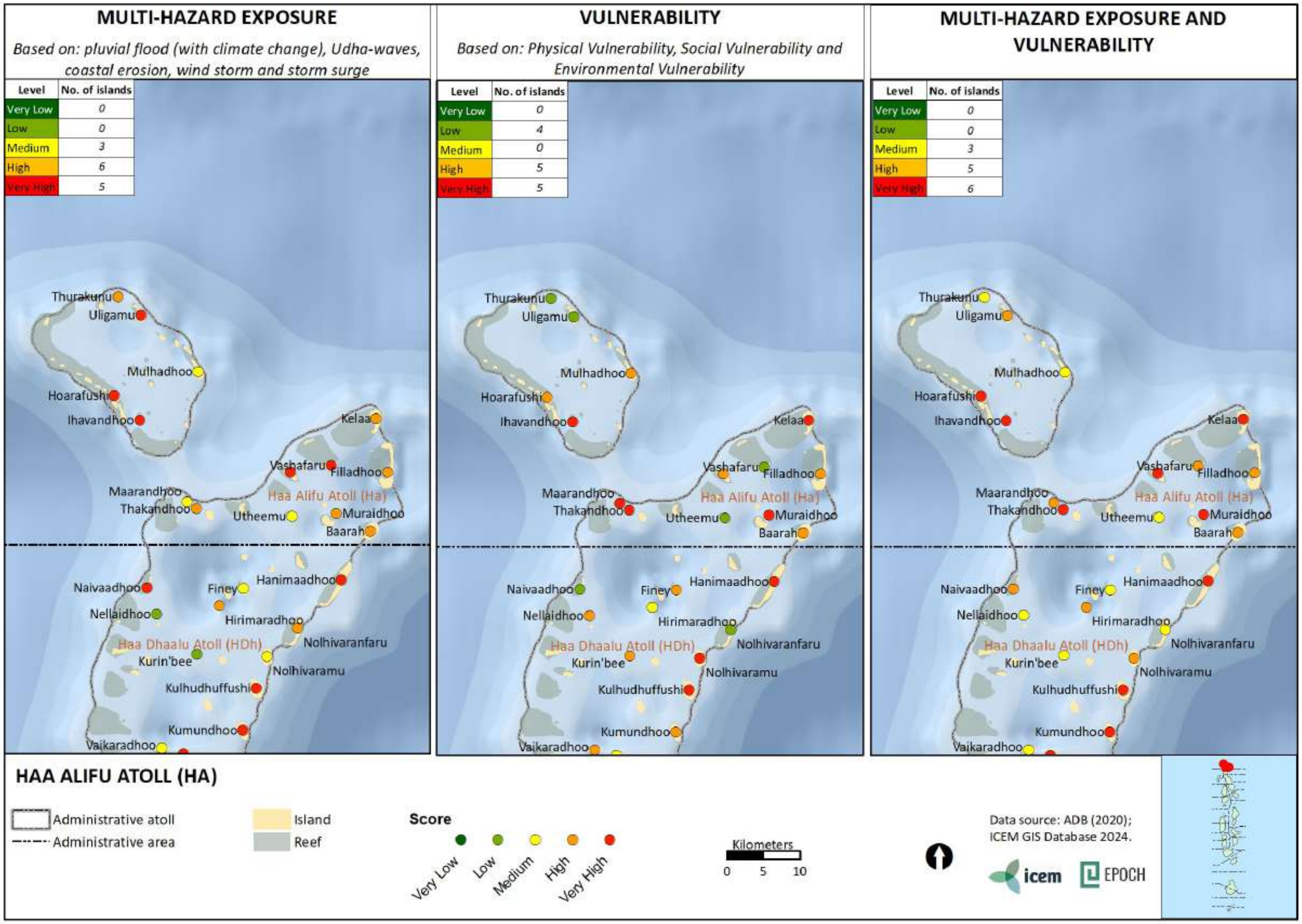


Figure 123: Multi-hazard exposure and vulnerability: Haa Dhaalu atoll

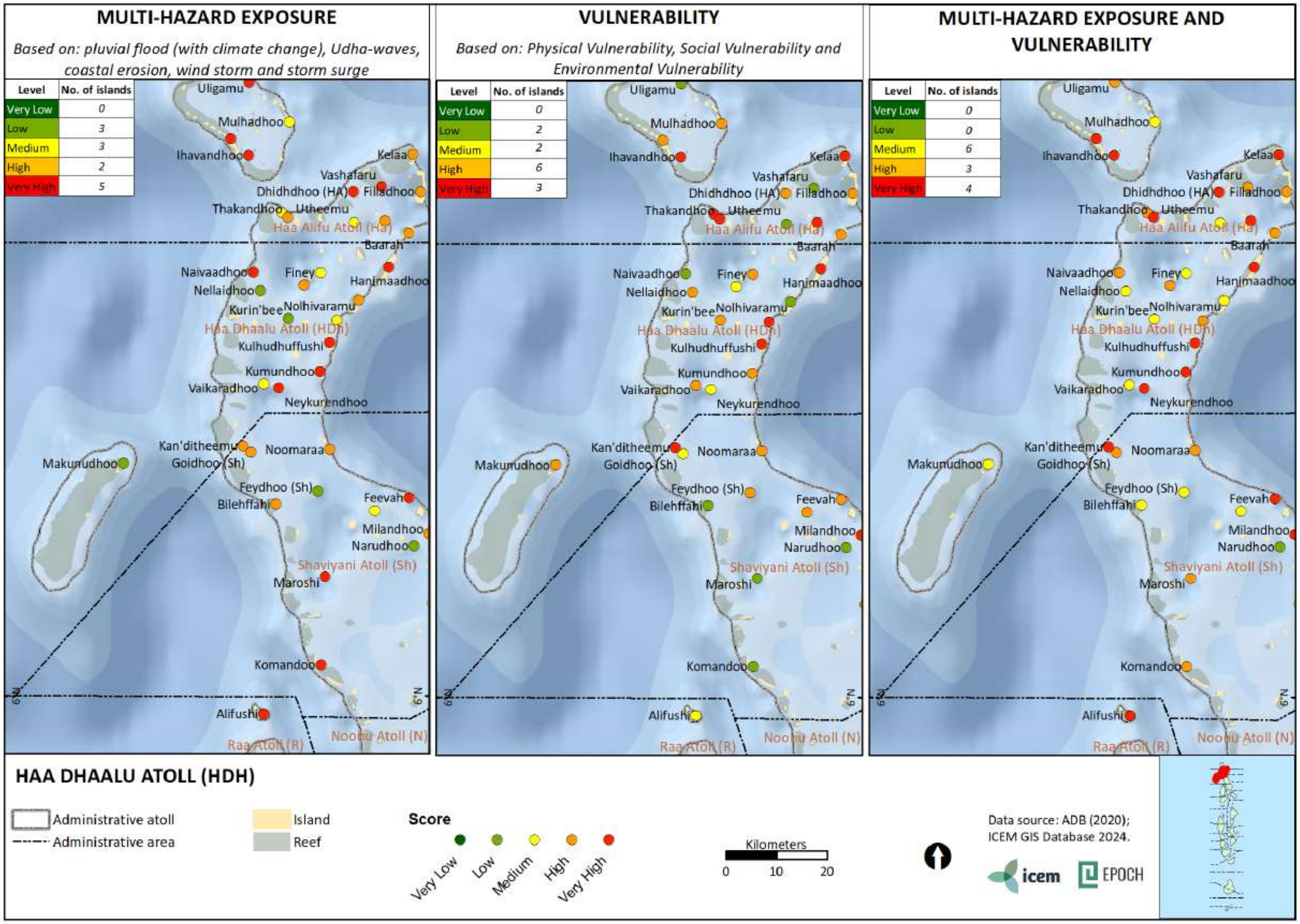


Figure 124: Multi-hazard exposure and vulnerability: Shaviyani atoll

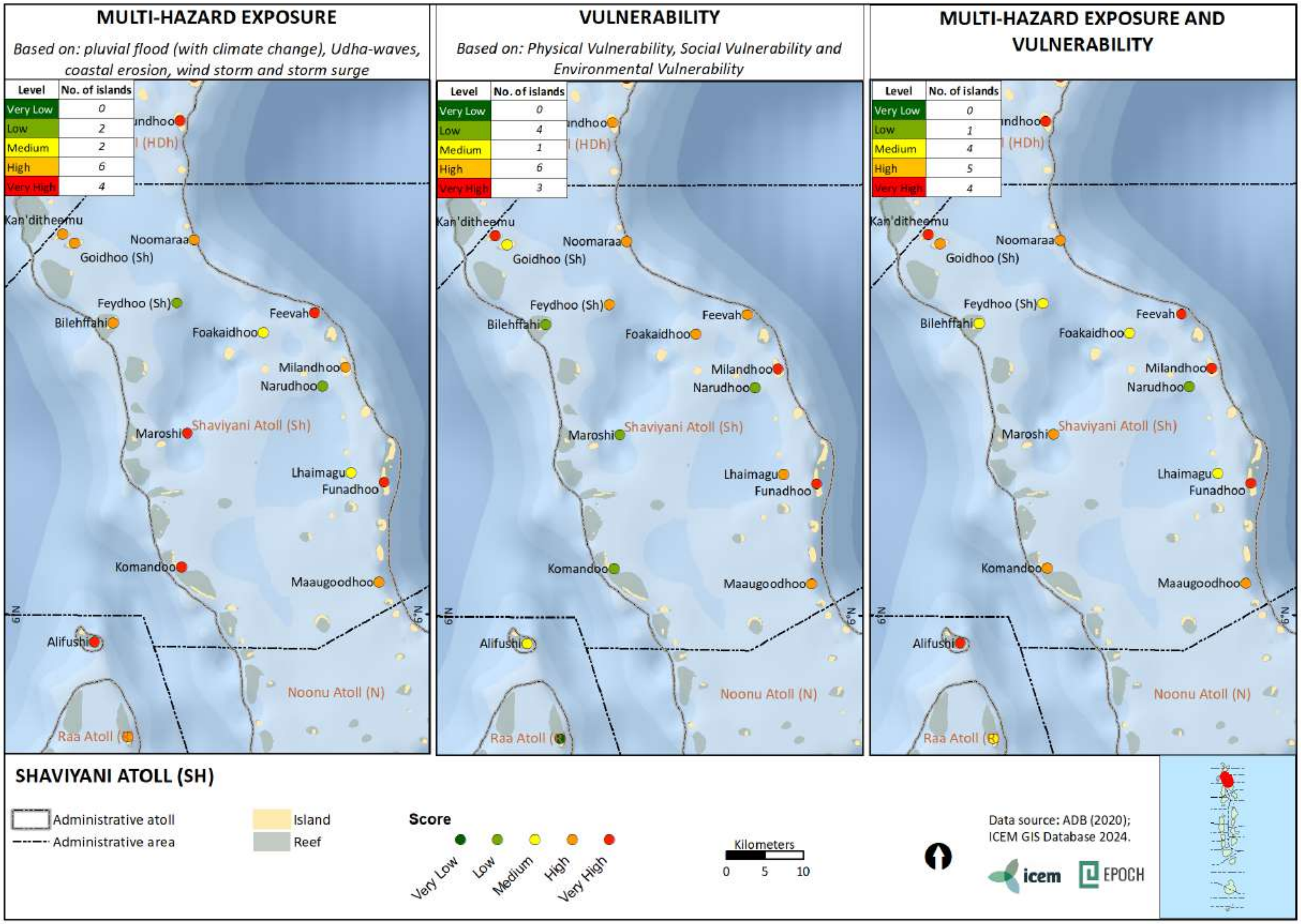


Figure 125: Multi-hazard exposure and vulnerability: Noonu atoll

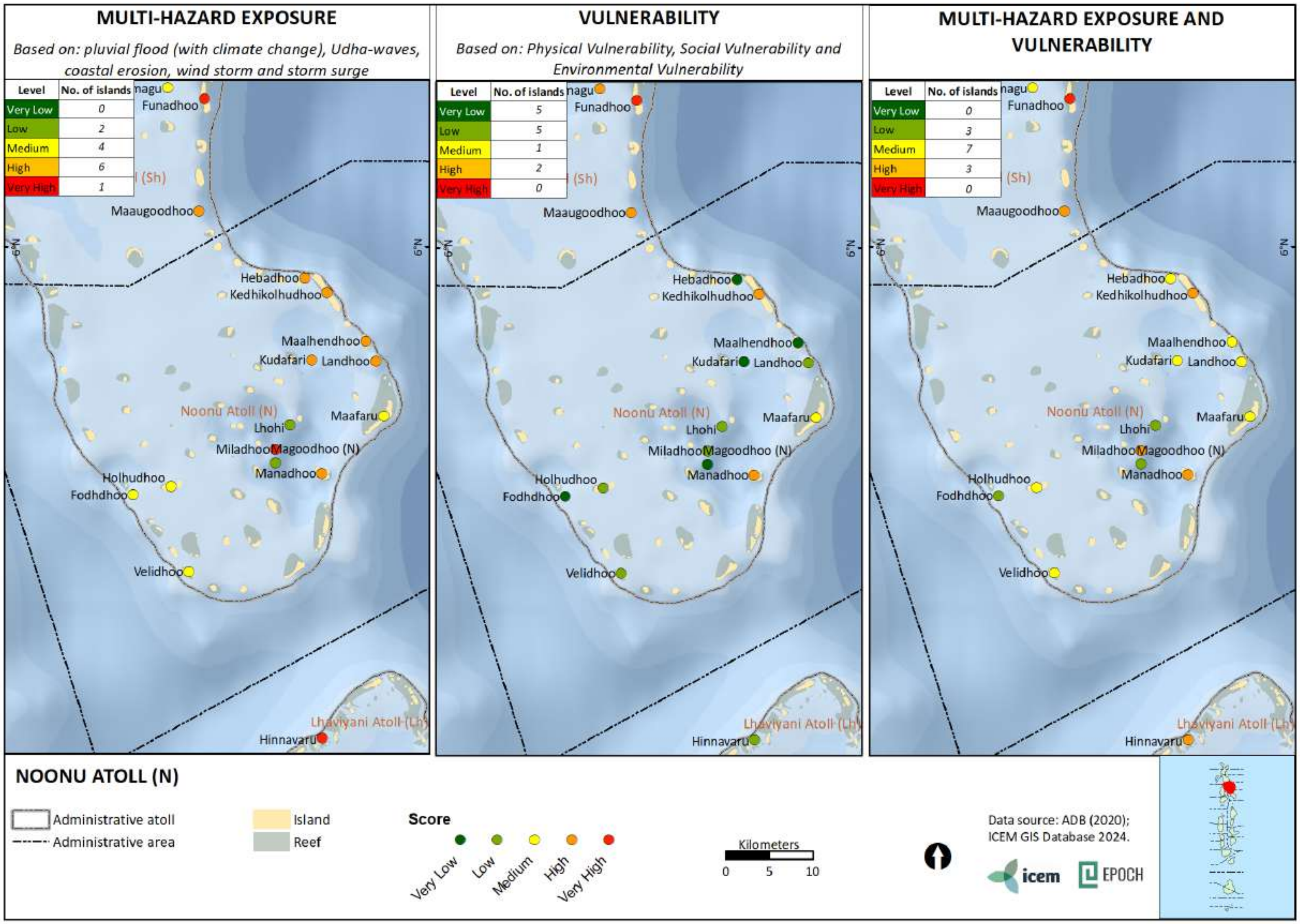


Figure 126: Multi-hazard exposure and vulnerability: Raa atoll

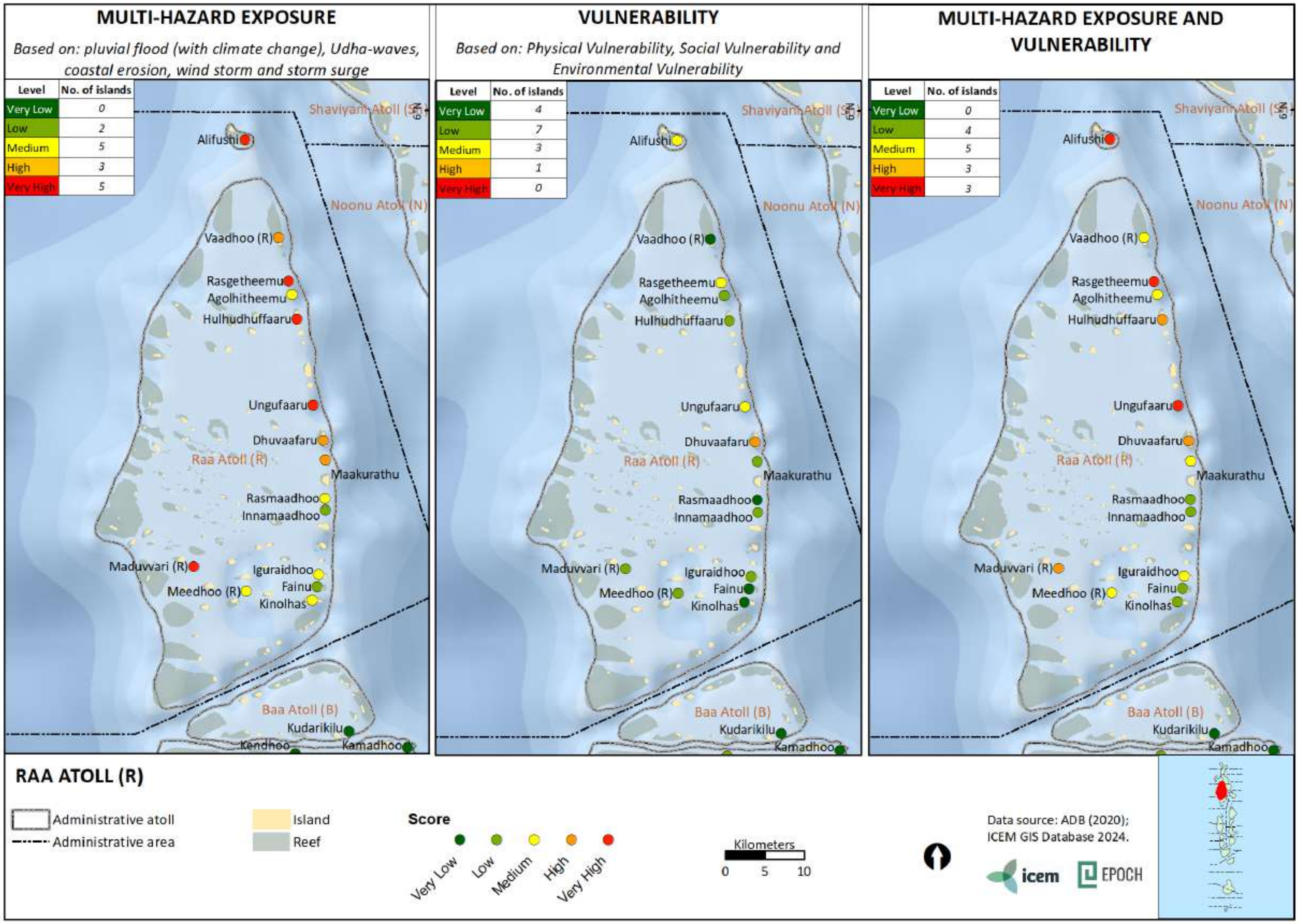


Figure 127: Multi-hazard exposure and vulnerability: Lhaviyani atoll

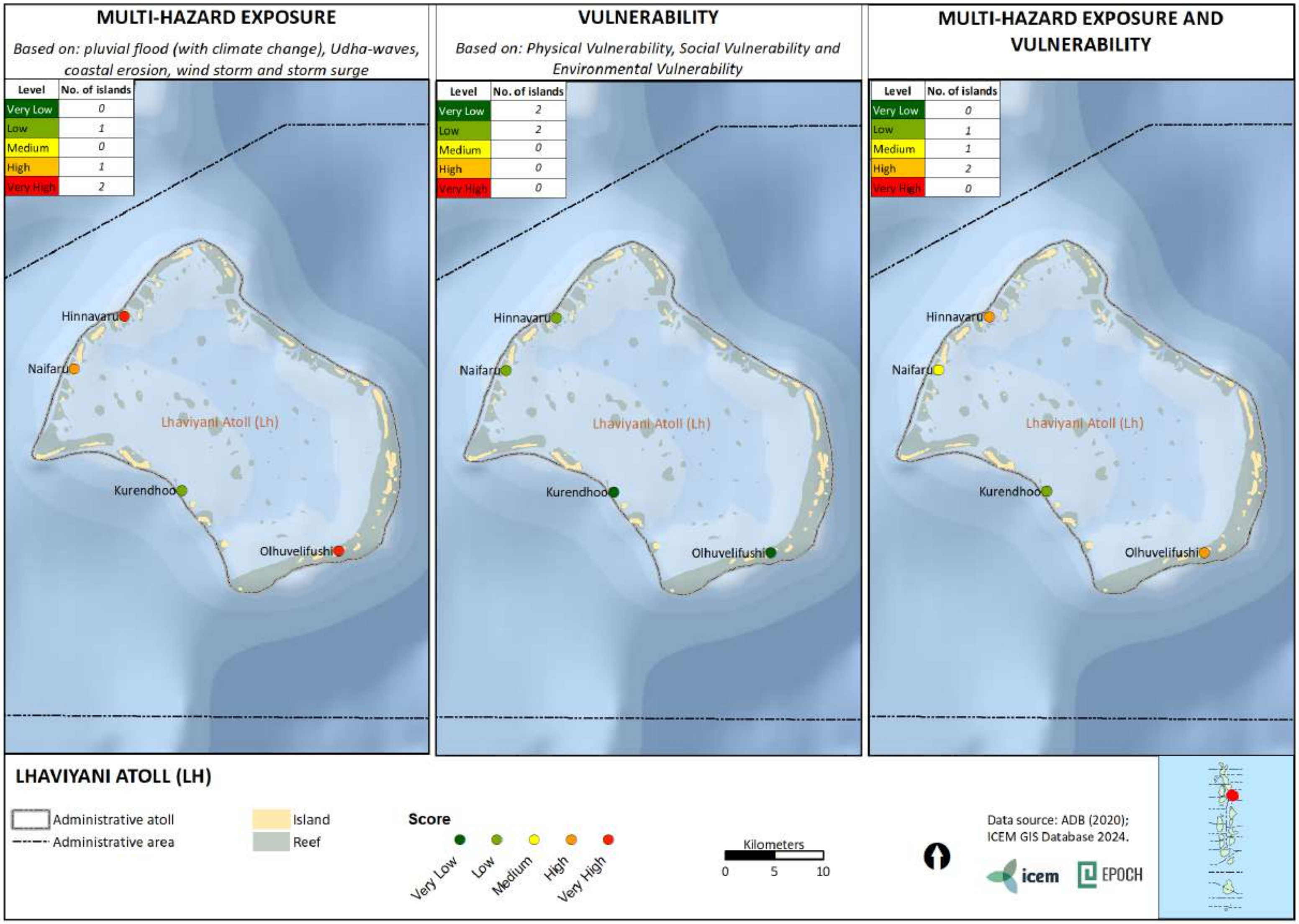


Figure 128: Multi-hazard exposure and vulnerability: Baa atoll

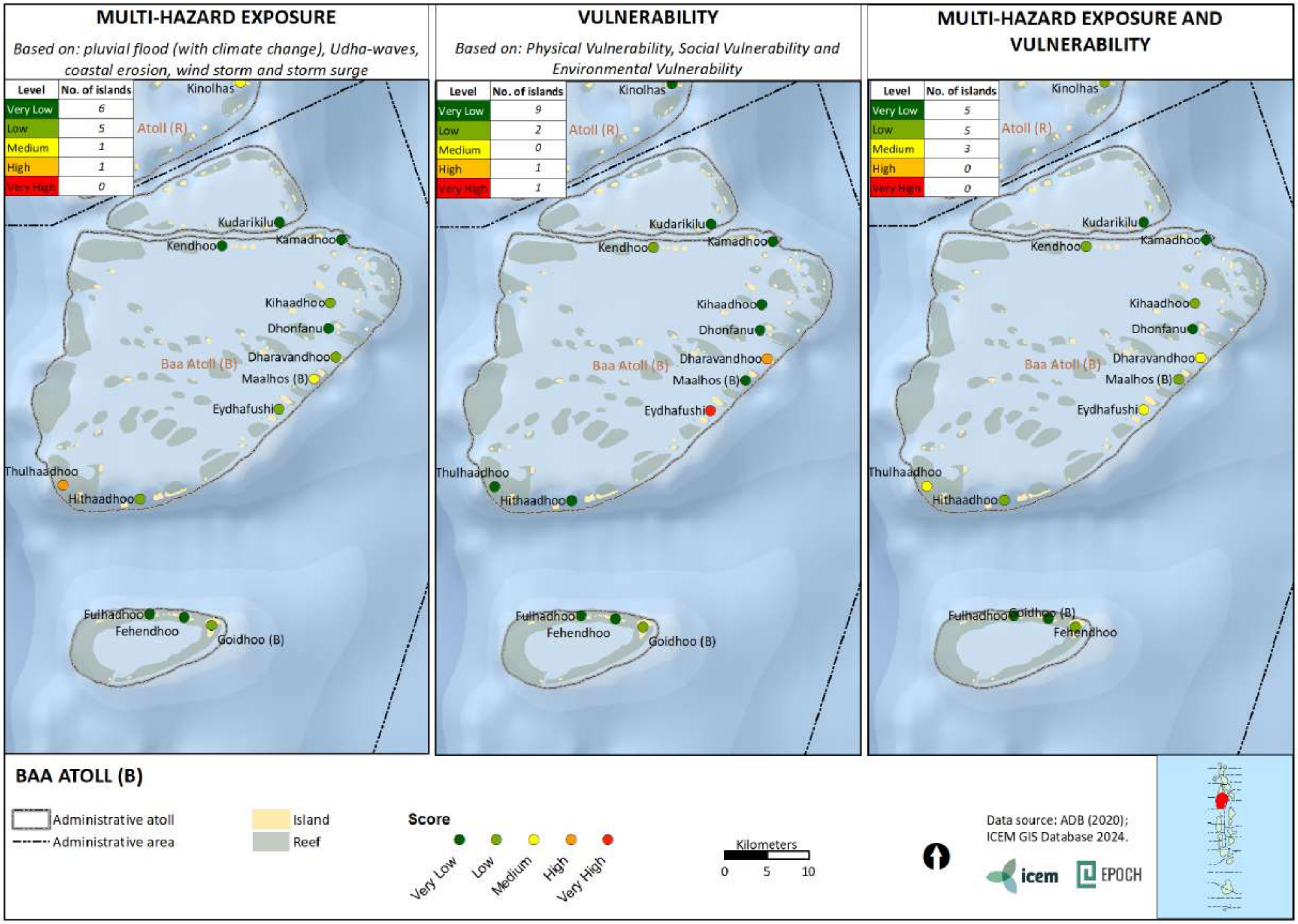


Figure 129: Multi-hazard exposure and vulnerability: Kaafu atoll

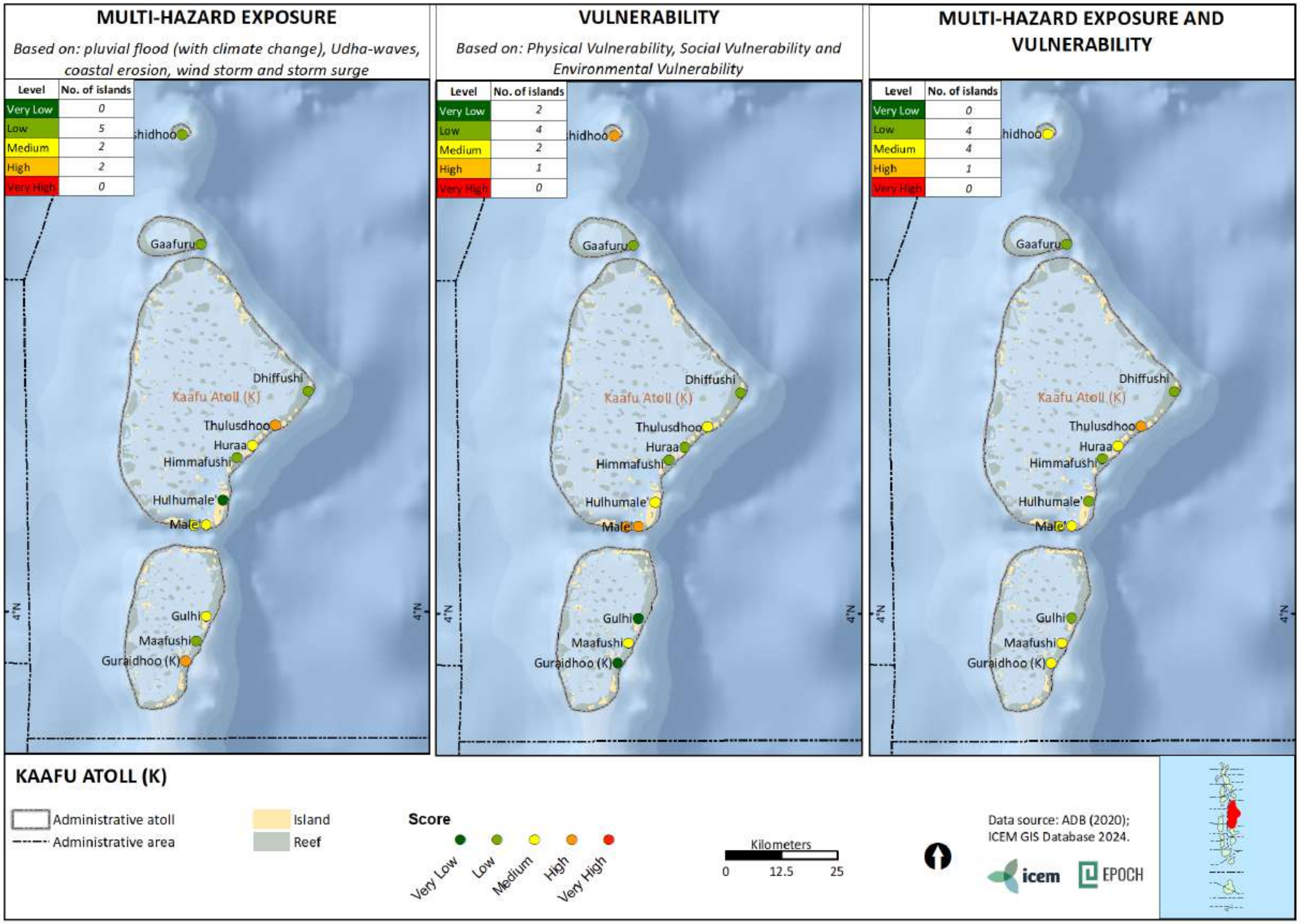


Figure 130: Multi-hazard exposure and vulnerability: Alifu Alifu atoll

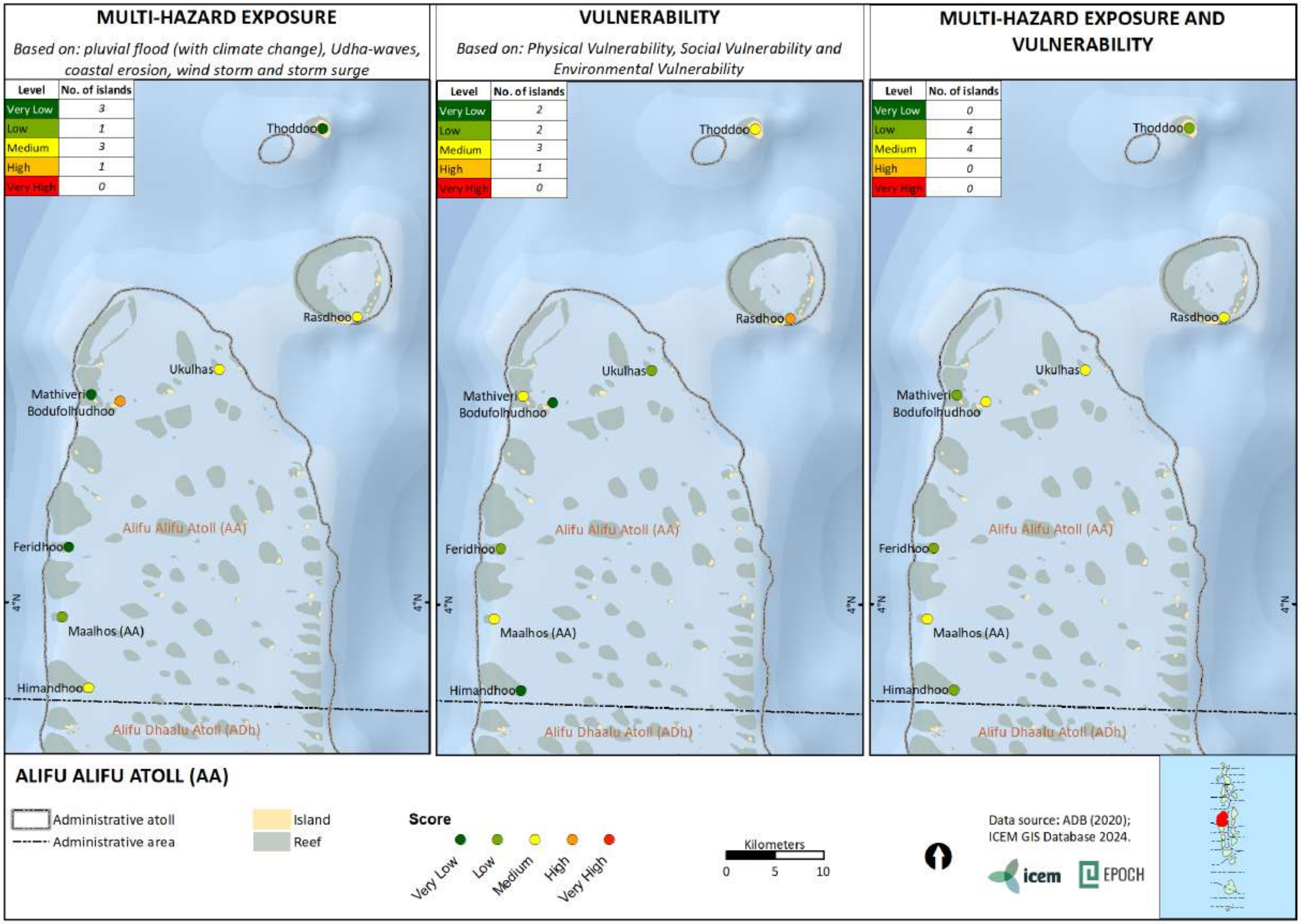


Figure 131: Multi-hazard exposure and vulnerability: Alifu Dhaalu atoll

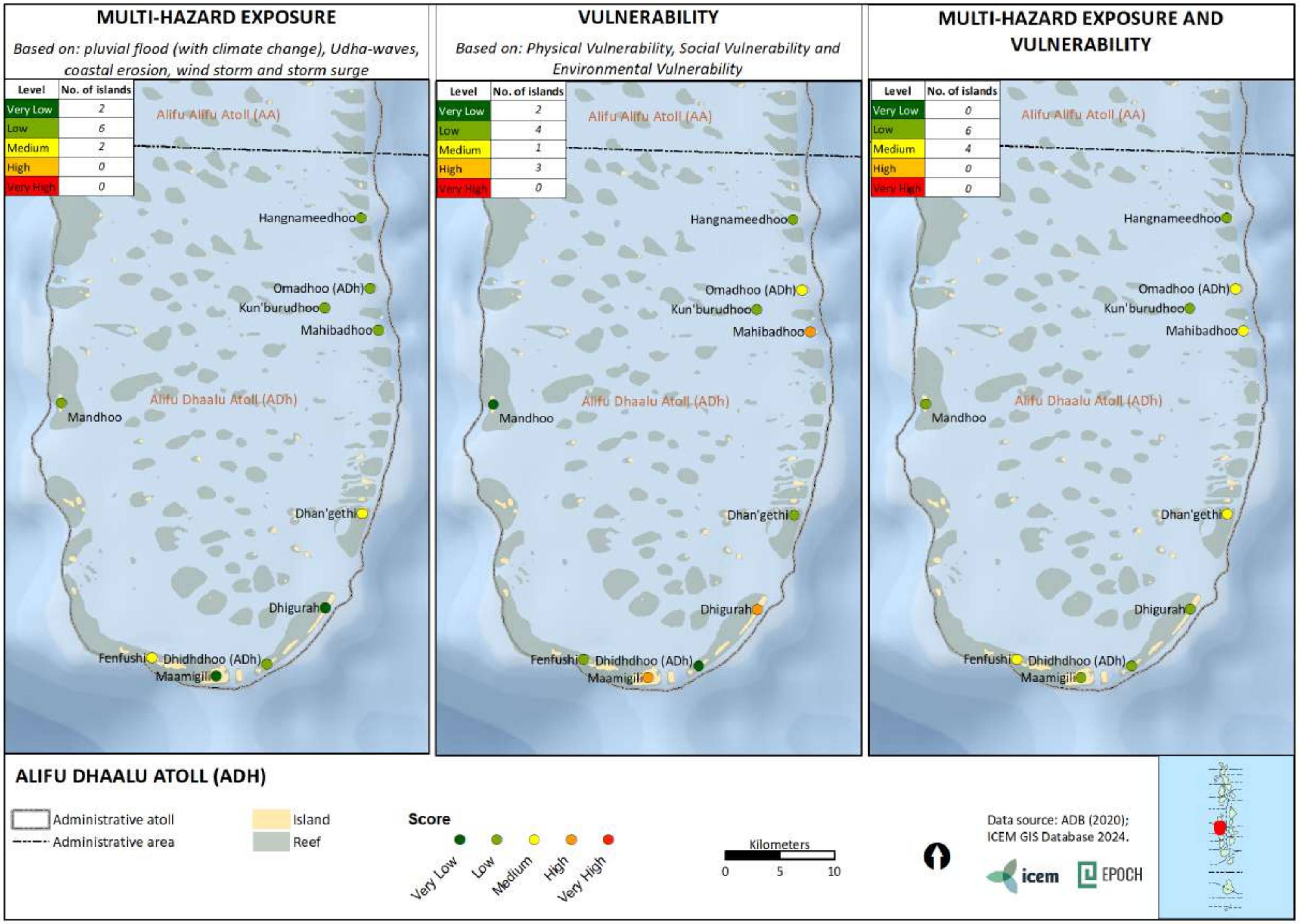


Figure 132: Multi-hazard exposure and vulnerability: Vaavu atoll

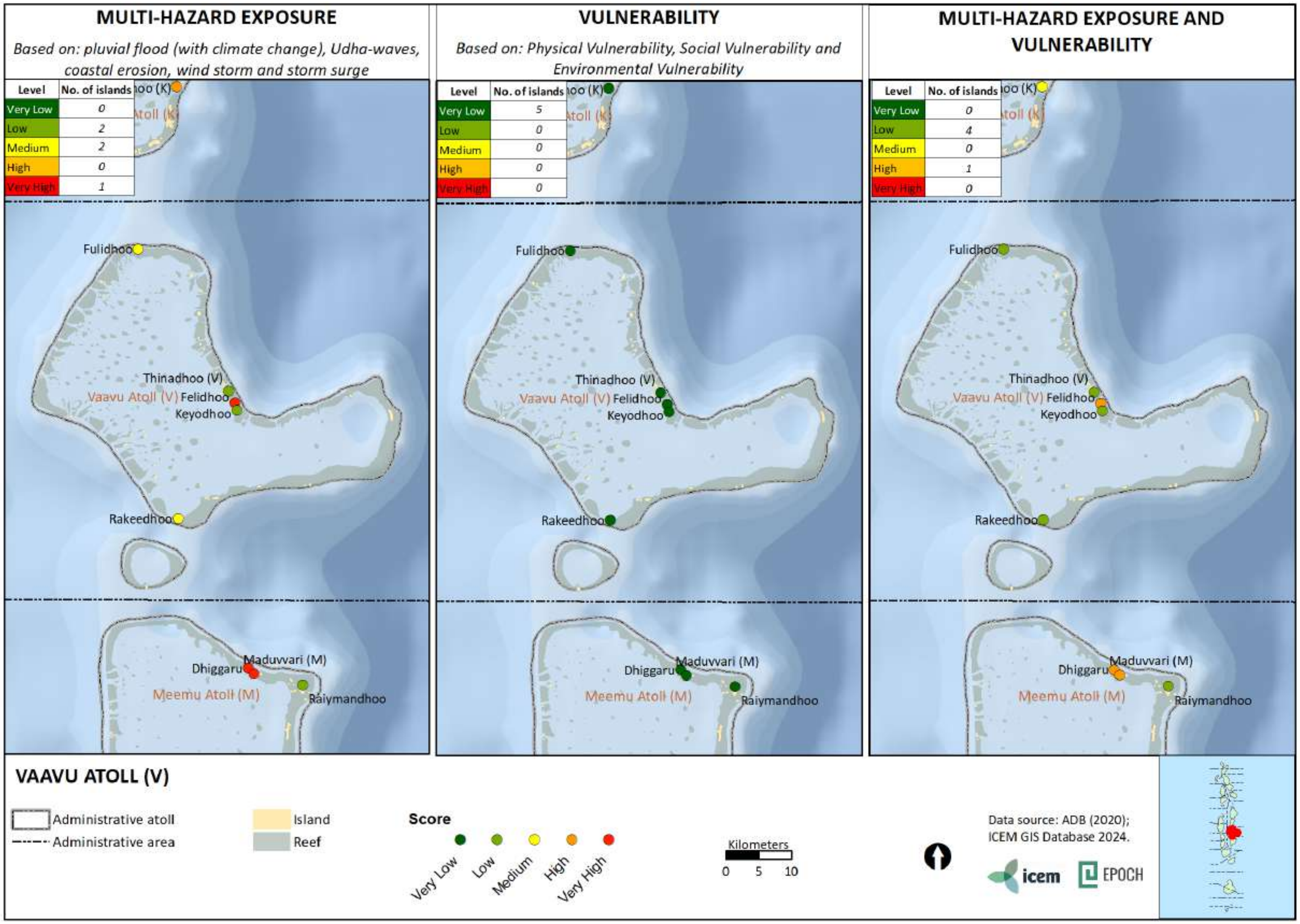


Figure 133: Multi-hazard exposure and vulnerability: Faafu atoll

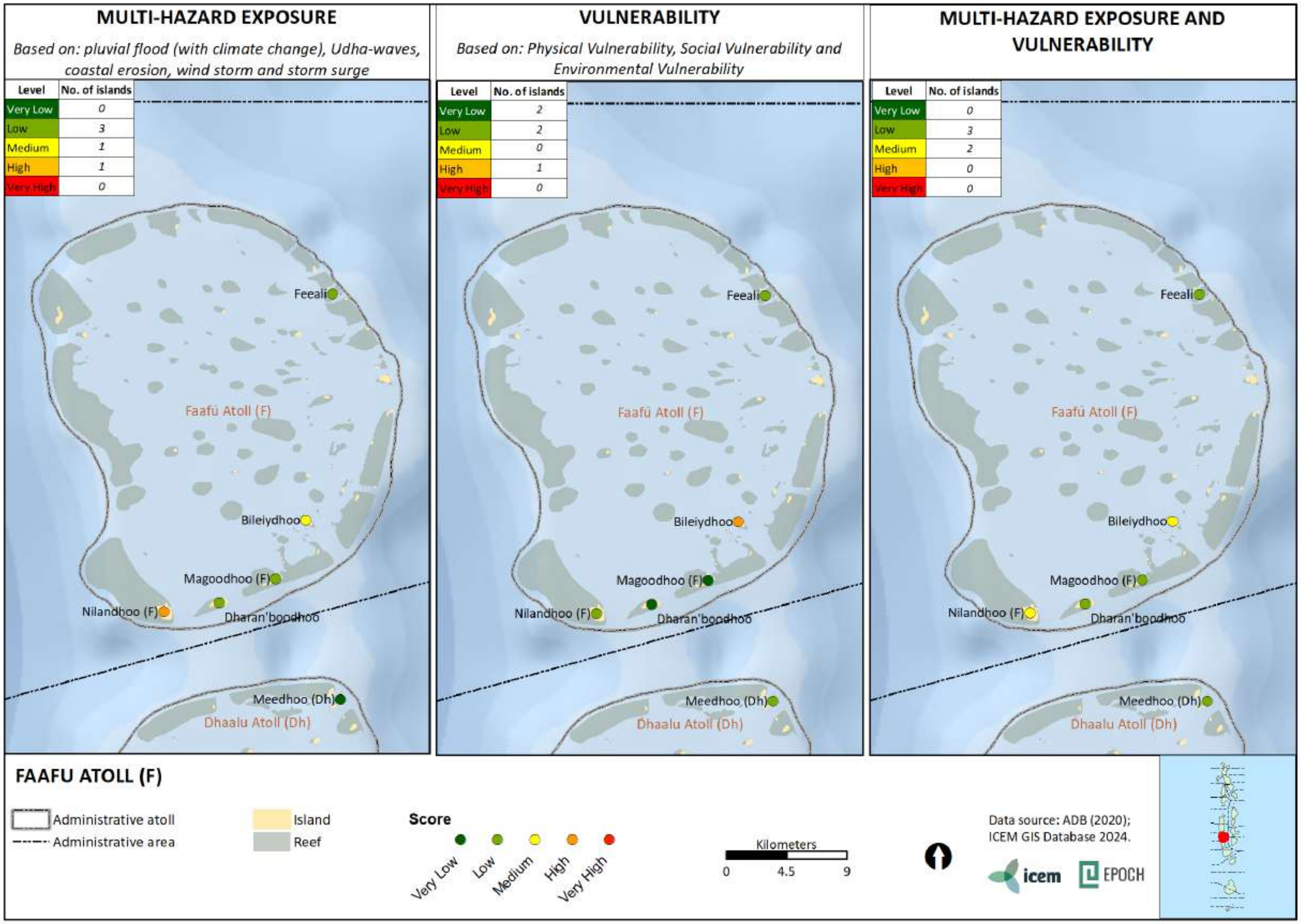


Figure 134: Multi-hazard exposure and vulnerability: Meemu atoll

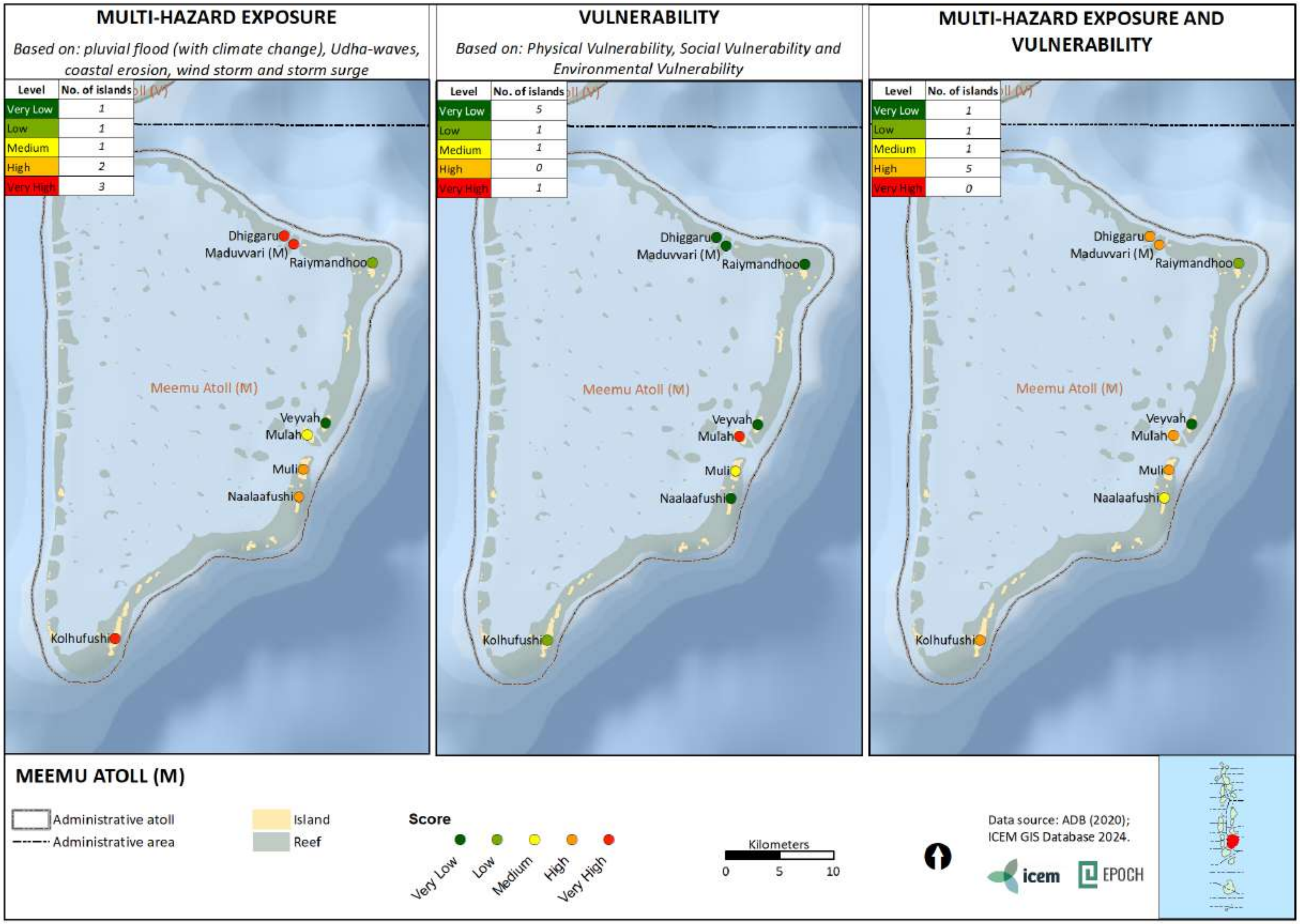


Figure 135: Multi-hazard exposure and vulnerability: Thaa atoll

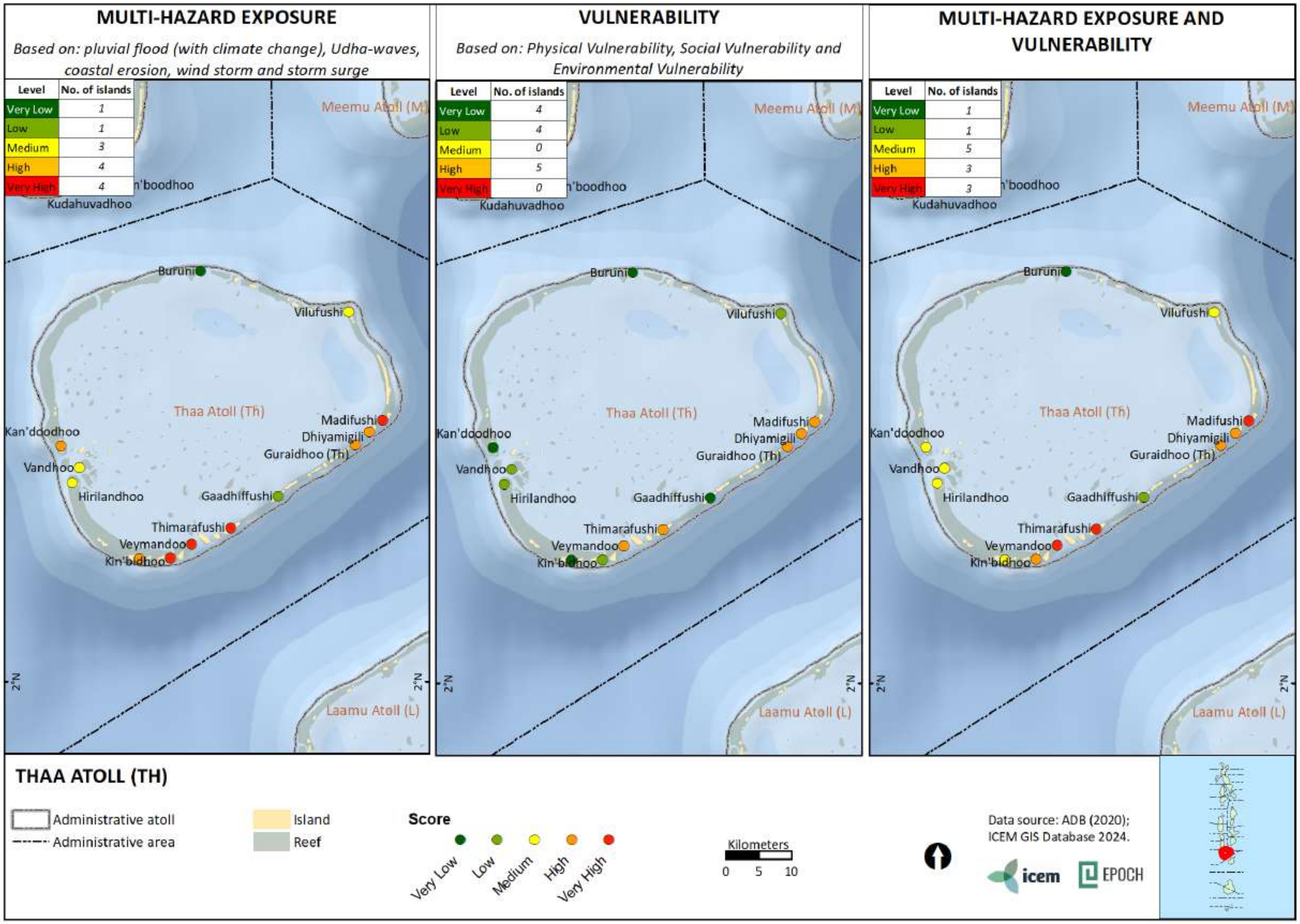


Figure 136: Multi-hazard exposure and vulnerability: Laamu atoll

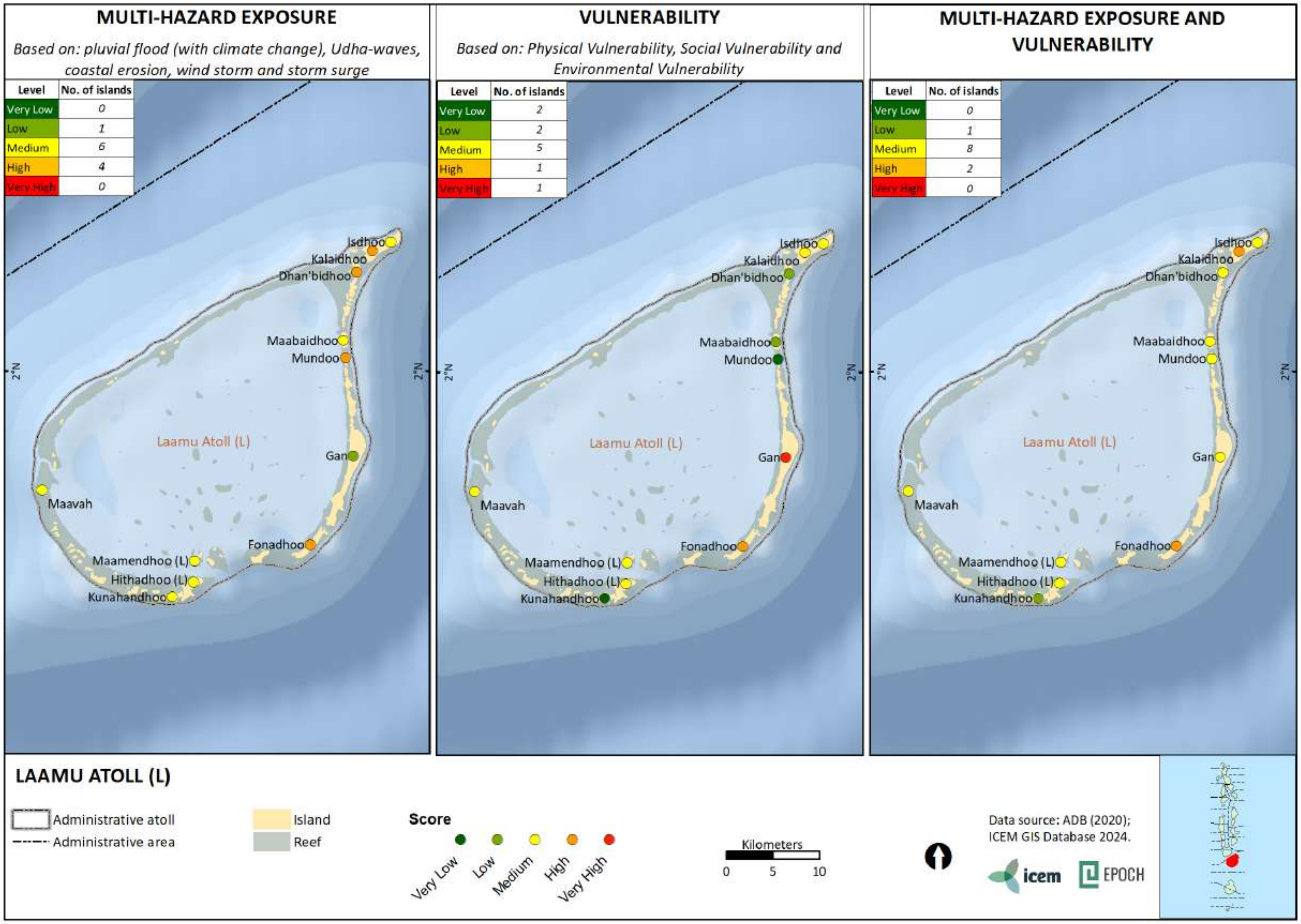


Figure 137: Multi-hazard exposure and vulnerability: Gaafu Alifu atoll

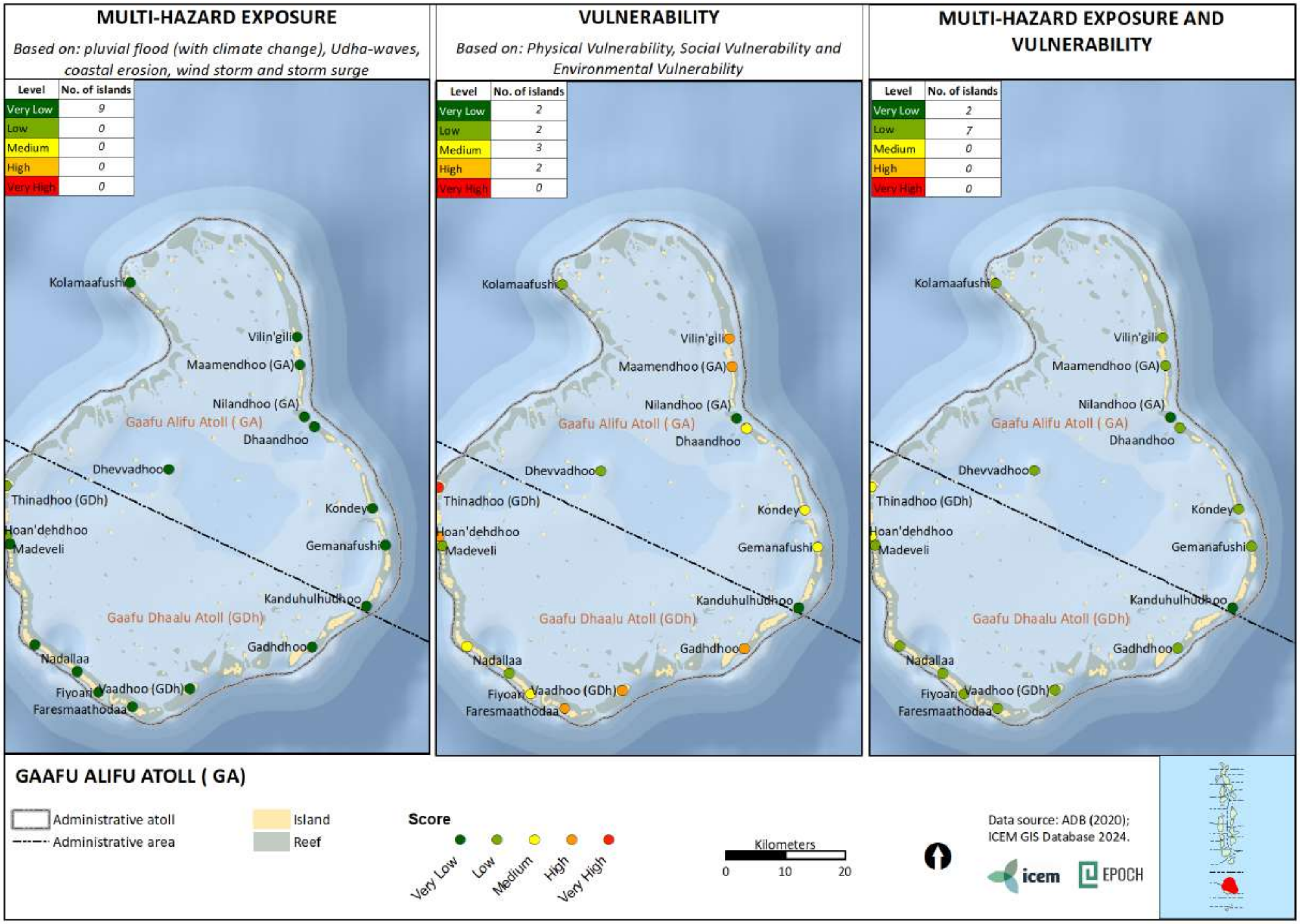


Figure 138: Multi-hazard exposure and vulnerability: Gaafu Dhaalu atoll

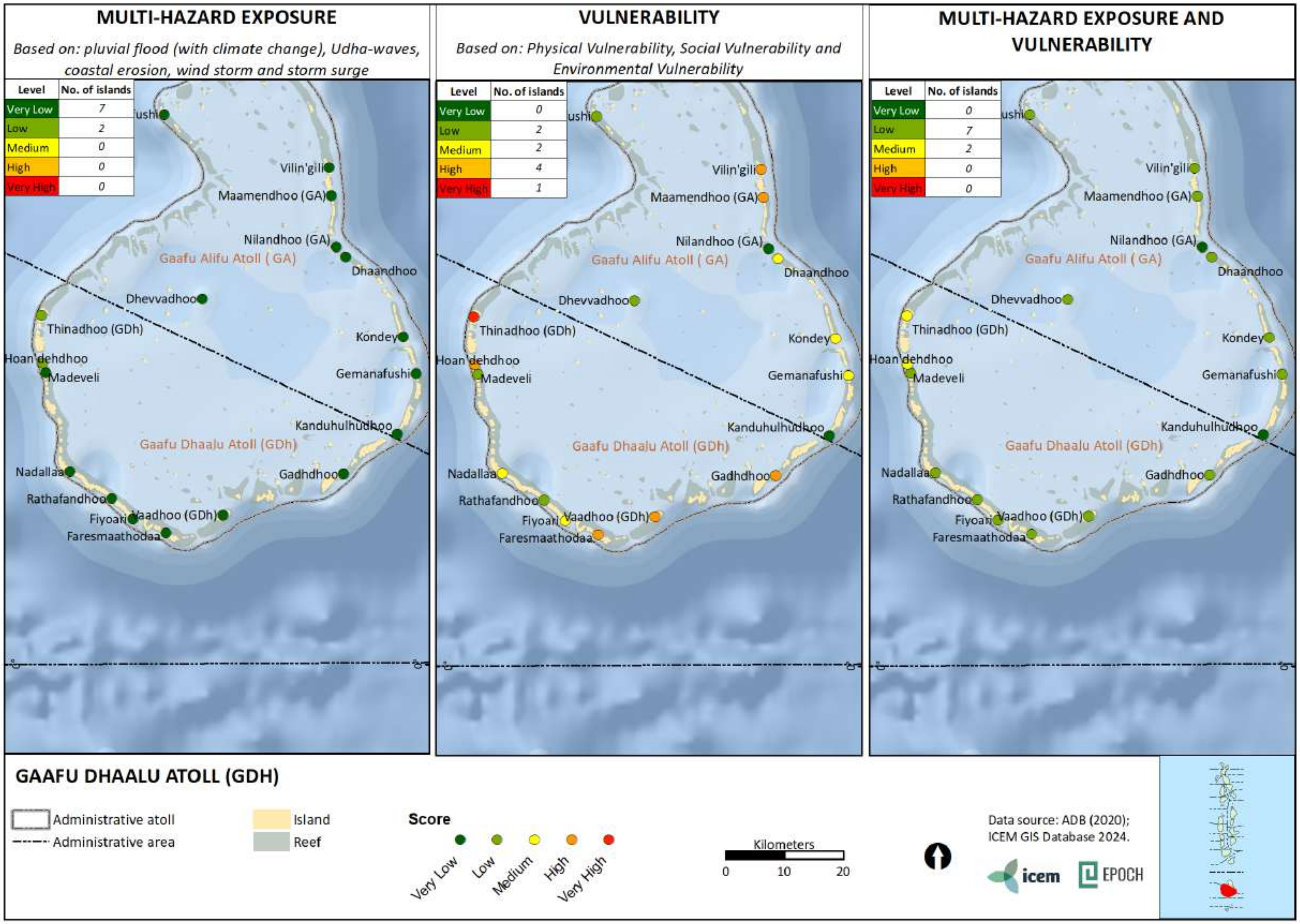


Figure 139: Multi-hazard exposure and vulnerability: Gnaviyani atoll

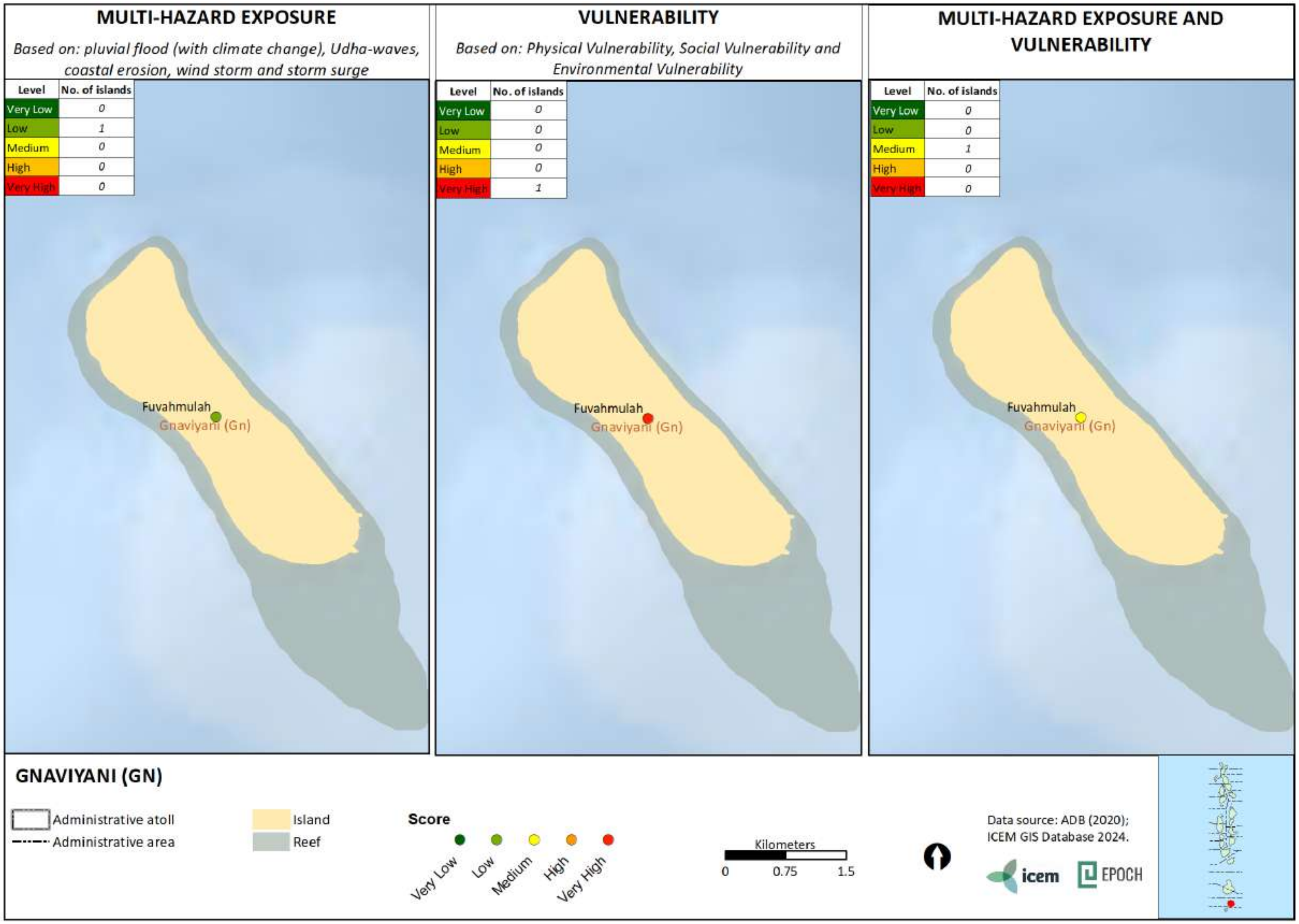


Figure 140: Multi-hazard exposure and vulnerability: Addu City