

Learning Outcome(s): Evaluate the contrasting impacts of sea level rise on coastal communities in The Maldives, Bangladesh and The Netherlands

Do it now:

1. Which ocean are the Maldives in?
2. What continent is Bangladesh on?
3. Where are the Netherlands?
4. Why are sea levels rising?
5. Where are you hoping to go on holiday this summer?



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Progression steps:

1. Identify the causes of recent sea level rise
2. Identify the impacts of sea level rise in 3 contrasting locations
3. Evaluate the contrasting impacts of sea level rise in 3 locations

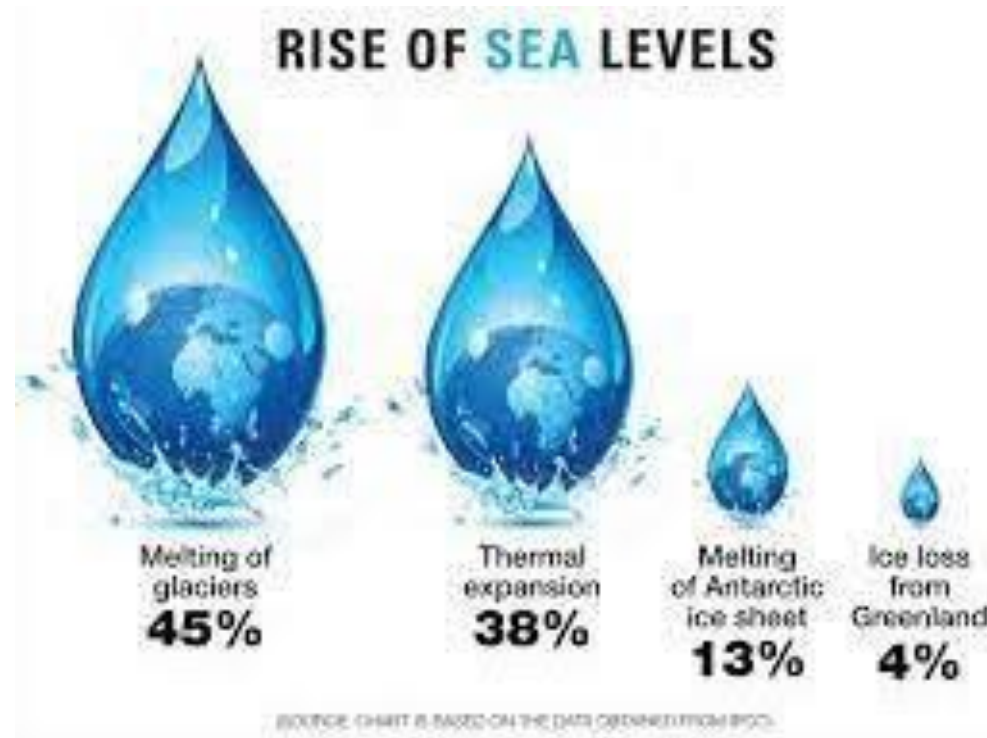


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Why are sea levels rising?

Human activity has produced more CO². This has caused global warming. Land based ice sheets are melting. Warmer oceans cause thermal expansion.



What are the impacts?

- Inundation (sea encroaches inland)
- Coastal erosion
- Salinisation of farmland (soil gets salty)
- Coastal flooding
- Damage to infrastructure
- Displacement of people



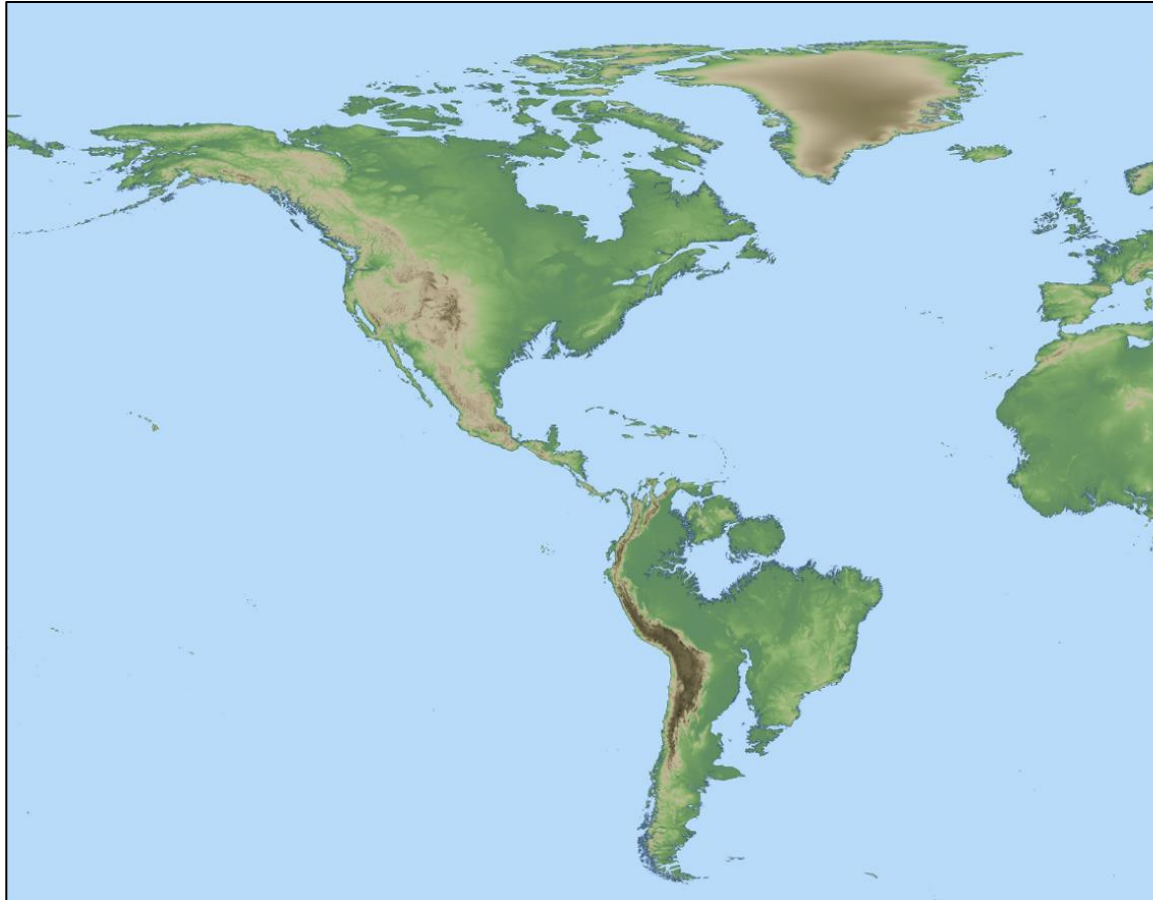
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Why is it a global issue?

Emission are created by all countries (Some more than others). We are all responsible.

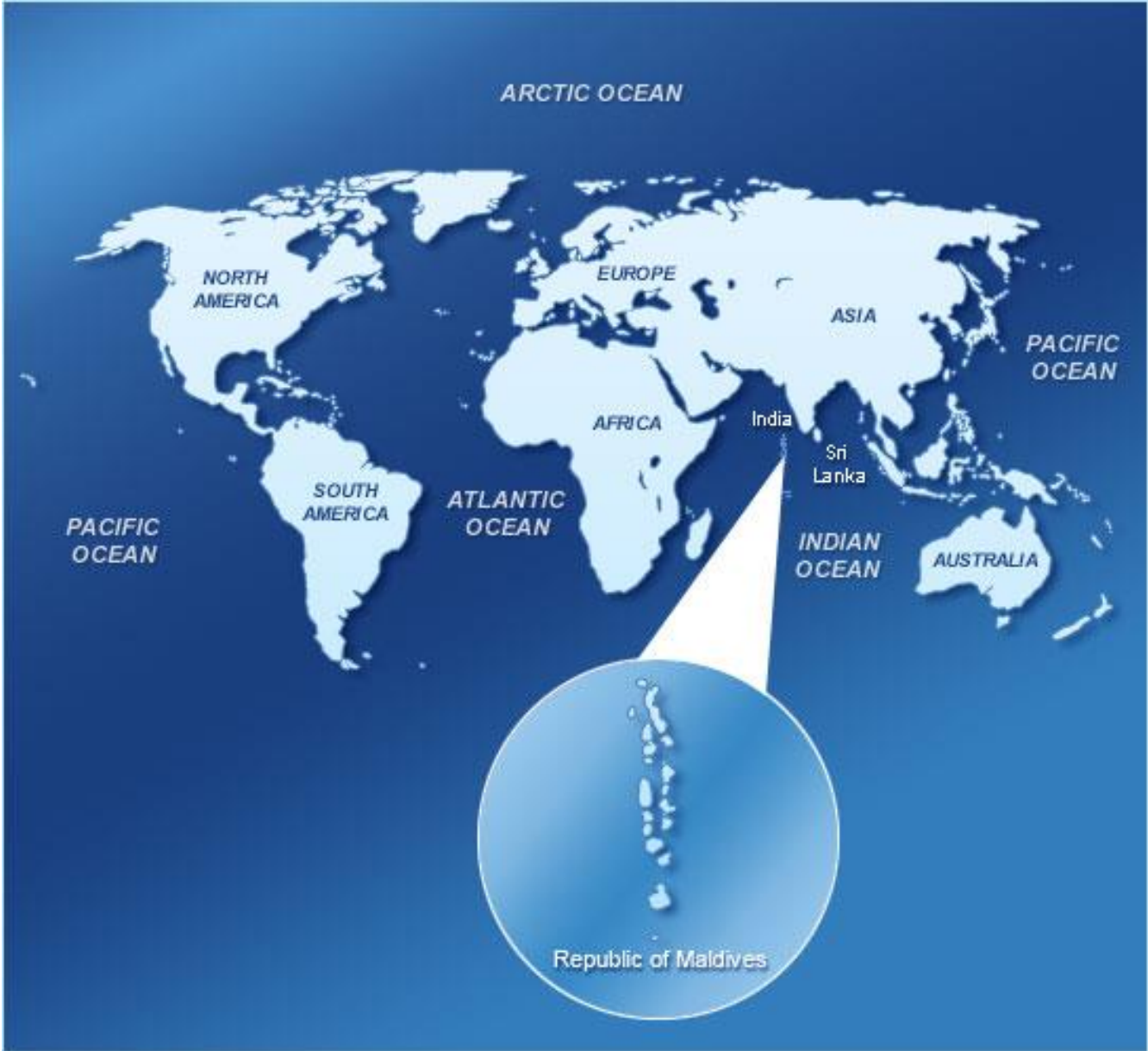


but sea level rise will not affect the world evenly

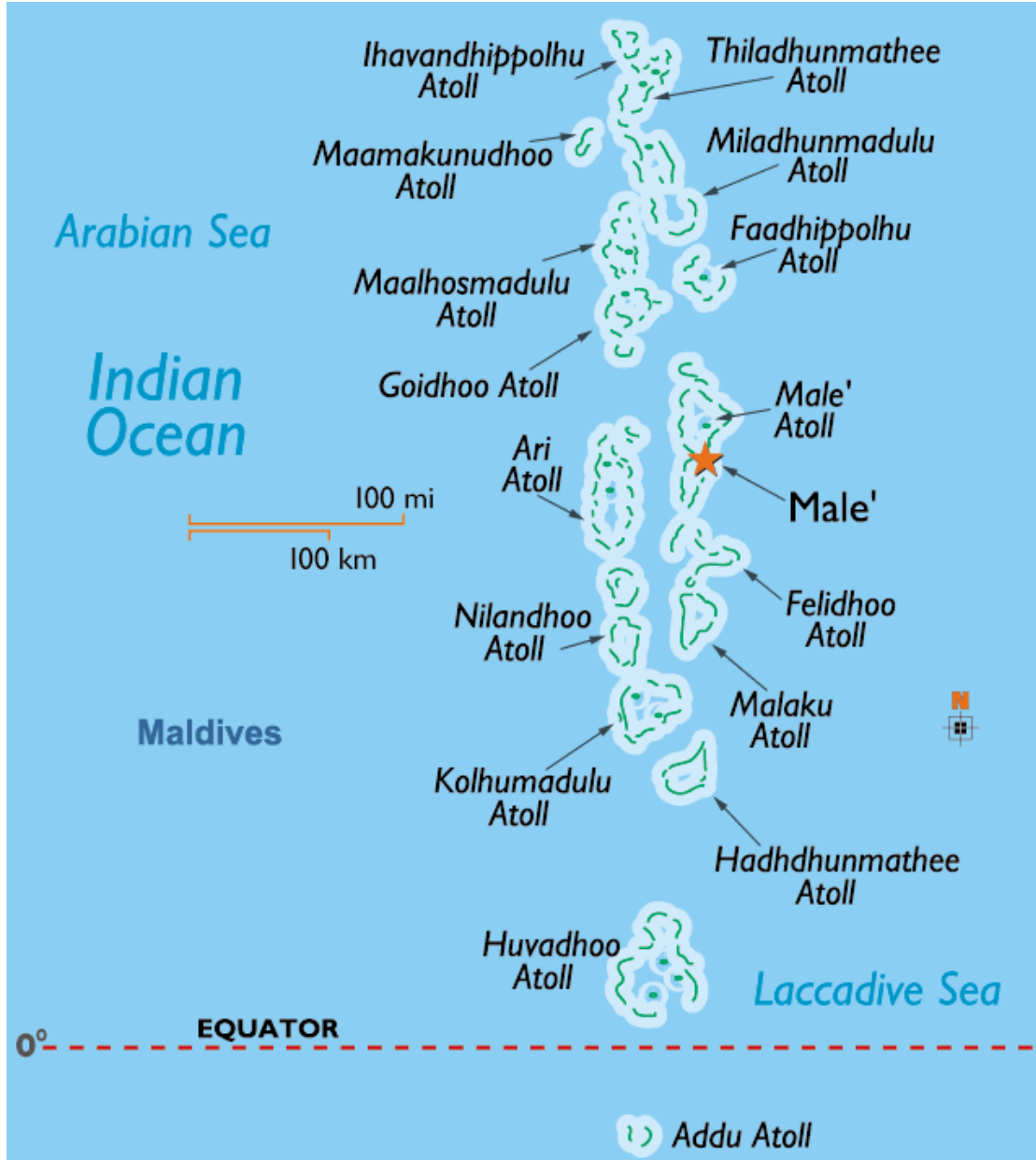


The Maldives

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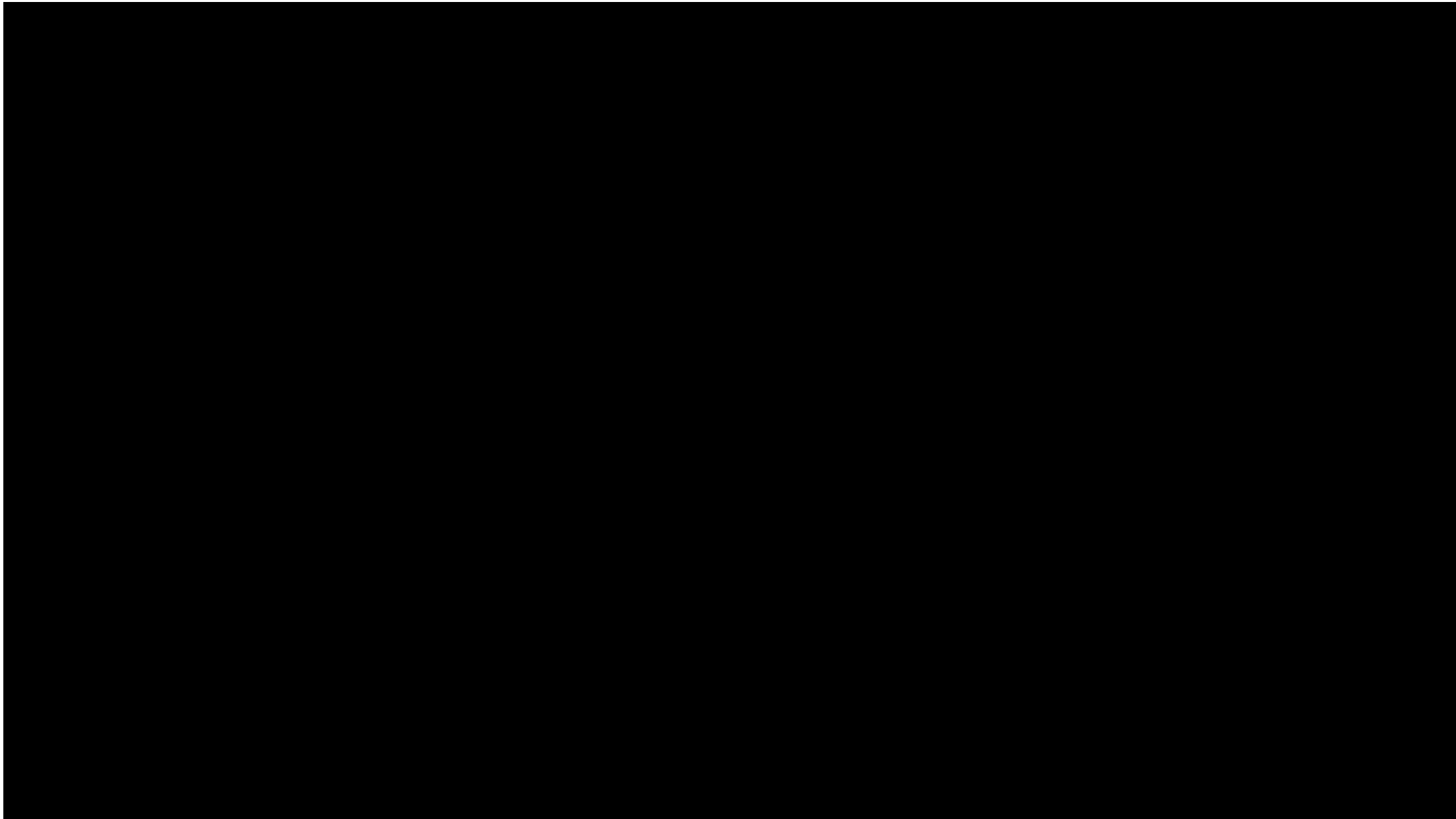


The Maldives



Visit
while you still can...







How
vulnerable?



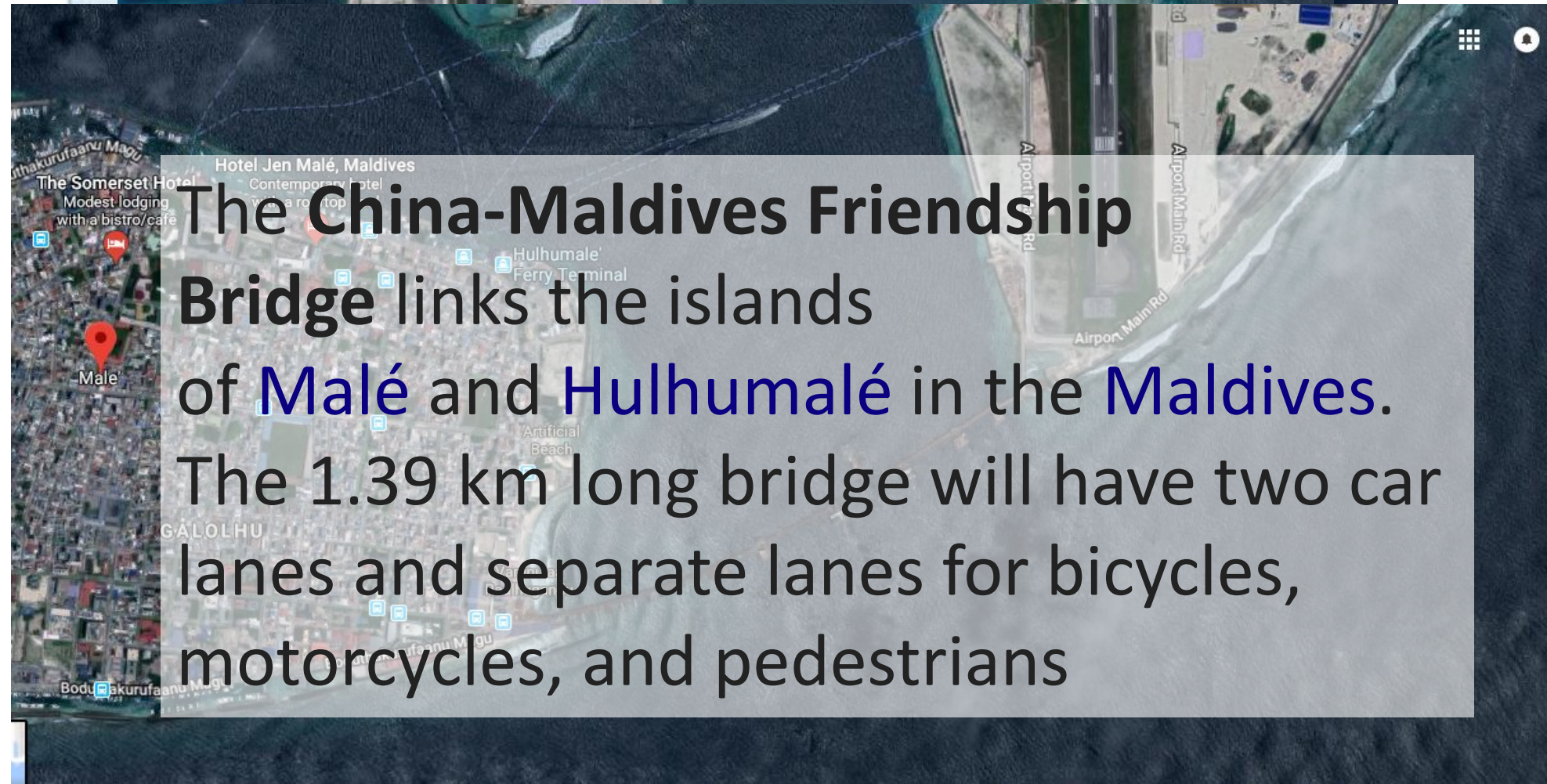
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Male: Capital
of The
Maldives



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Ma



The China-Maldives Friendship Bridge links the islands of **Malé** and **Hulhumalé** in the **Maldives**. The 1.39 km long bridge will have two car lanes and separate lanes for bicycles, motorcycles, and pedestrians

Google

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Learning Outcome(s): Evaluate the contrasting impacts of sea level rise on coastal communities in The Maldives, Bangladesh and The Netherlands



Bangladesh

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The Netherlands

Maintenance

The yearly costs for management and maintenance for primary flood defences in the Netherlands is estimated to be approximately € 350 million per year (AFPM, 2006). With a total length of primary flood defences of about 3600 km the estimated costs for management and maintenance become € 100,000 per km flood defence per year.



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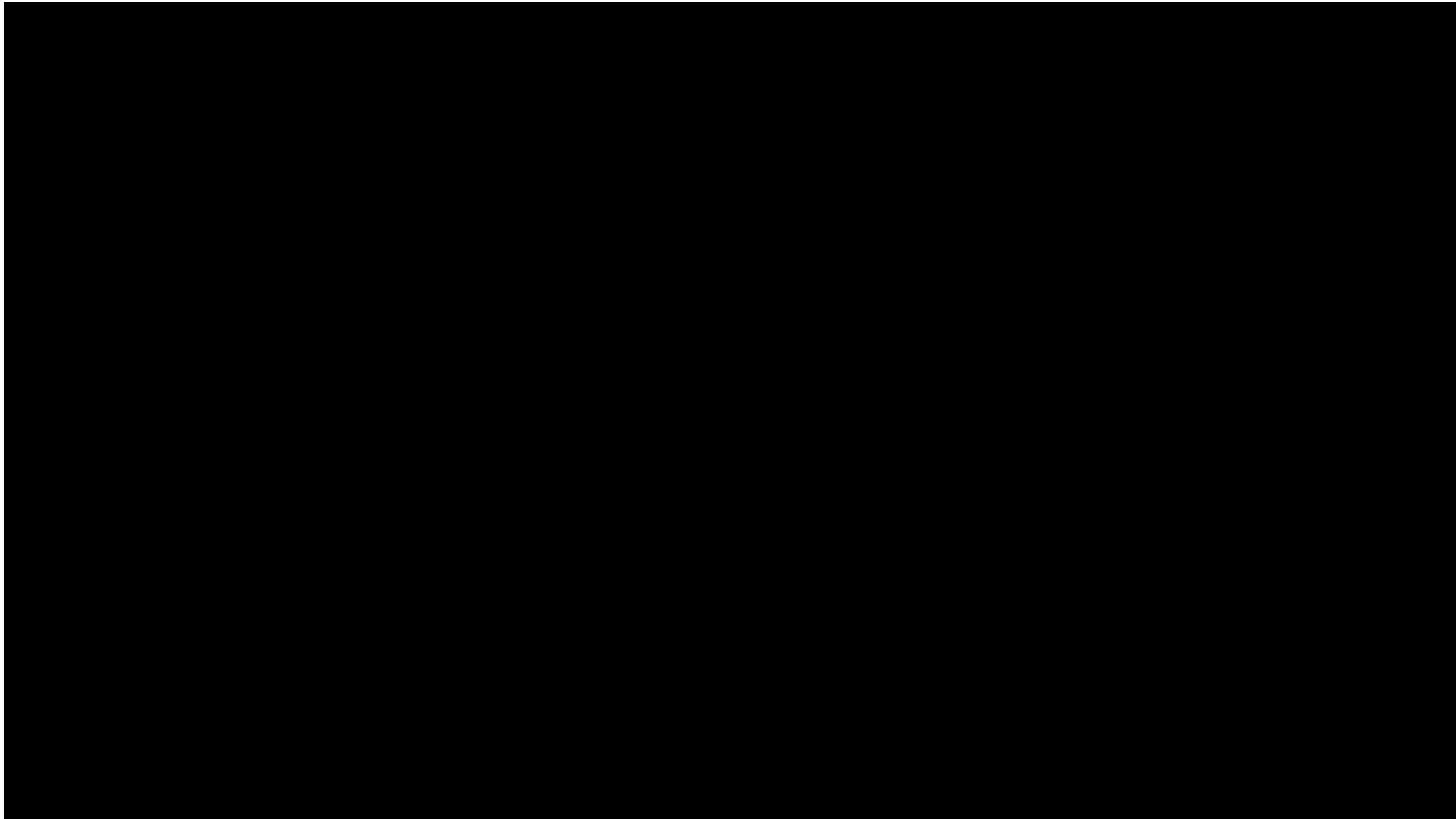
Unit costs and relation to sea level rise (Kok et al., 2008)

Table 2-3 provides an overview of the unit cost prices as applied for the Netherlands.












Table 2-3: overview cost estimates the Netherlands

The Netherlands	
Dike (Millions € per km)	<div>Dike heightening (per m)<ul style="list-style-type: none">9 – 10.8 (rural) (Kok et al., 2008)18 – 21.6 (urban) (Kok et al., 2008)4 – 11 (rural) (Eijgenraam, 2006)6.9 (rural) (Fugro and Arcadis, 2006)13.8 (urban) (Arcadis and Fugro, 2006)</div>
Beach Nourishment (€ per m ³ material)	<div><ul style="list-style-type: none">2.3 – 6.7 (Stive, pers. comm., 2009)3 (Kok et al., 2008)2.85 (Arcadis and Fugro, 2006)3.72 (Foreshore nourishments) (RWS, 2009)7.55 (Beach nourishments) (RWS, 2009)</div>
Maintenance	0.1 M€/km flood defence/year (AFPM, 2006)

Kok et al. (2008) applied these cost prices to determine the costs of sea level rise for the Netherlands. Therefore several factors need to be applied to the unit costs to determine the costs of the coastal defence system. These factors include the length of the coastal defences, the cost of storm surge barriers (section 2.4) and the costs of beach nourishments. Also the required height of the defence measures was determined based on its relation with sea level, by several conversion factors. As shown in Table 2-3 a different unit cost for rural and urban areas was applied. The results of this exercise are shown in Figure 2-11, depicting the contribution of several aspects of the coastal water system.



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1	 Singapore	85,020	2016 Rank order	Nation	GNI per capita US \$
2	 Kuwait	83,150			
3	 Brunei	83,010			
4	 United Arab Emirates	72,830			
14	 Netherlands	49,930			
23	 United Kingdom	41,640			
67	 Maldives	16,710			
138	 Bangladesh	3,790			
176	 Burundi	770			
177	 Liberia	700			
177	 Central African Republic	700			

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Learning Objective: Evaluate the contrasting impacts of sea level rise in The Maldives, Bangladesh and The Netherlands			Name: _____	
☆ Why is sea level rising globally?	☆ What are the key differences between The Netherlands and Bangladesh?	☆ What are the impacts of rising sea level on coastal communities globally?	☆ Why is rising sea level a global issue; not merely a national issue for the nations affected?	
Climate change video clip notes:				
	Economic and human data e.g. GNI per capita, population, population density	Environmental impacts of sea level rise – the physical geography	Economic, Social & political impacts of sea level rise	
The Maldives				
Bangladesh				
The Netherlands				
TASK: <ul style="list-style-type: none">Title: An evaluation of the contrasting impacts of sea level rise in The Maldives, Bangladesh and the NetherlandsTo research and share notes on the 3 contrasting locationsTo add to the shared data with individual researchTo create an illustrated (annotated maps and photos, 6-10 images maximum) report of 500 words which clearly addresses the title				
			Due: first day back in September [Printed off please]	

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Title: Evaluate the contrasting impacts of sea level rise in The Maldives, Bangladesh and the Netherlands

Suggested structure

Introduction:

Define sea level rise and outline the causes; briefly explain how this will affect the world unevenly

Main body of report:

Explain how sea level rise will affect the 3 places: Maldives, Bangladesh, and Netherlands.
Refer to data and specific facts from your classwork (A3 sheet)
Outline why it will affect each country differently

Conclusion:

summarise which is worse affected