

91429R



Mana Tohu Mātauranga o Aotearoa
New Zealand Qualifications Authority

Level 3 Geography 2023

91429 Demonstrate understanding of a given environment(s) through selection and application of geographic concepts and skills

Credits: Four

RESOURCE BOOKLET

Refer to this booklet to answer the question for Geography 91429.

Check that this booklet has pages 2–12 in the correct order and that none of these pages is blank.

YOU MAY KEEP THIS BOOKLET AT THE END OF THE EXAMINATION.

Relevant geographic concepts

Environments

May be natural and/or cultural. They have particular characteristics and features, which can be the result of natural and/or cultural processes. The particular characteristics of an environment may be similar to and/or different from another. A cultural environment includes people and/or the built environment.

Perspectives

Ways of seeing the world that help explain differences in decisions about, responses to, and interactions with environments. Perspectives are bodies of thought, theories, or worldviews that shape people's values and have built up over time. They involve people's *perceptions* (how they view and interpret environments) and *viewpoints* (what they think) about geographic issues. Perceptions and viewpoints are influenced by people's *values* (deeply held beliefs about what is important or desirable).

Processes

A sequence of actions, natural and/or cultural, that shape and change environments, places, and societies. Some examples of geographic processes include erosion, migration, desertification, and globalisation.

Patterns

May be spatial (the arrangement of features on the Earth's surface) or temporal (how characteristics differ over time in recognisable ways).

Interaction

Involves elements of an environment affecting each other and being linked together. Interaction incorporates movement, flows, connections, links, and interrelationships, which work together and may be one- or two-way interactions. Landscapes are the visible outcome of interactions. Interaction can bring about environmental change.

Change

Involves any alteration to the natural or cultural environment. Change can be spatial and/or temporal. Change is a normal process in both natural and cultural environments. It occurs at varying rates, at different times, and in different places. Some changes are predictable, recurrent, or cyclic, while others are unpredictable or erratic. Change can bring about further change.

Sustainability

Involves adopting ways of thinking and behaving that allow individuals, groups, and societies to meet their needs and aspirations without preventing future generations from meeting theirs. Sustainable interaction with the environment may be achieved by preventing, limiting, minimising, or correcting environmental damage to water, air, and soil, as well as considering ecosystems and problems related to waste, noise, and visual pollution.

FLOODING IN SOUTHEAST ASIA

RESOURCE A: Introduction

Floods occur when water overflows or soaks land that is normally dry. These are often a result of the overflowing of drainage basins, rivers, and streams due to extreme weather conditions but can also result from storm surges on the coastline.

There are few places on Earth where people do not need to be concerned about flooding. In a study published in August 2021, scientists found that the proportion of the world's population exposed to floods grew by 20–24% between 2000 and 2015, and up to 86 million people globally lived in areas identified as flooded.

Global deaths from flooding have fluctuated over time, but other impacts of flooding, like displacement of people, can decrease people's quality of life and severely impact the development of a country.

Figure 1: Global flood statistics 2000–2019



Figure 2: Number and percentage of people exposed to high flood risk 2022

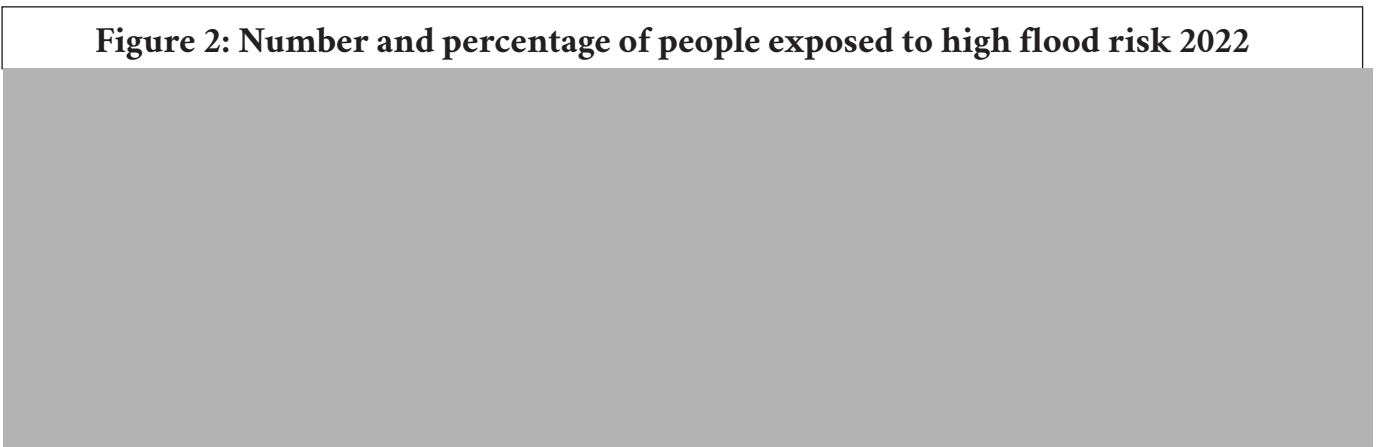
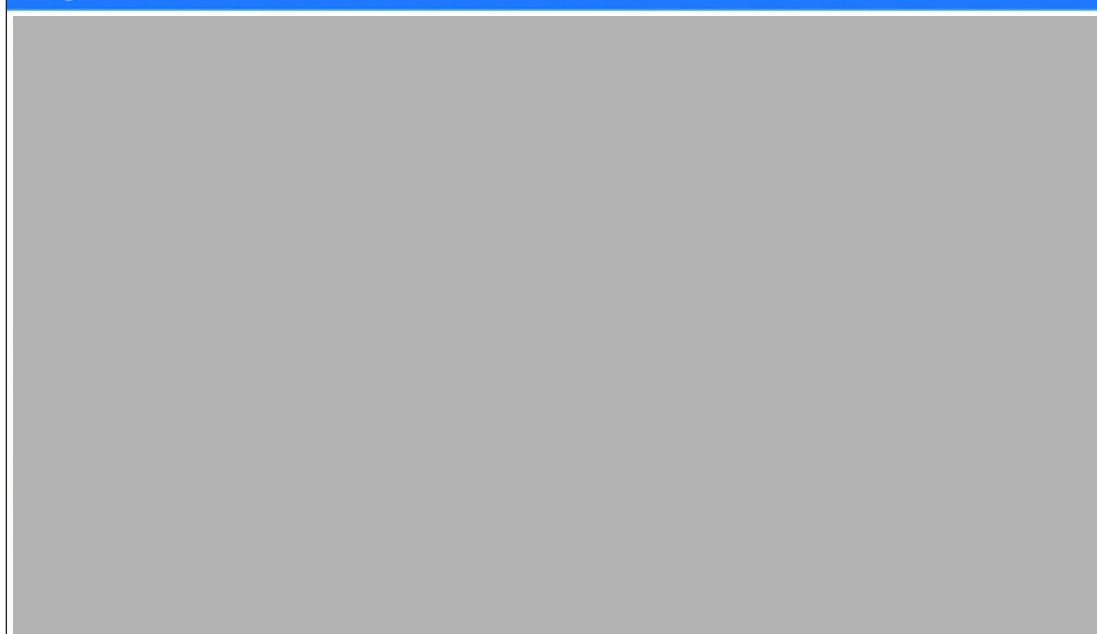


Figure 3: Map of Southeast Asia**Figure 4: The human cost of the 2017 floods in South Asia**

The monsoon rains in 2017 claimed an estimated 1,200 lives in South Asia, and affected 40 million people across Bangladesh, India, and Nepal. The resulting floods damaged and destroyed homes, schools, and health facilities, while many areas became inaccessible due to damage to hundreds of kilometres of roads and railways, as well as bridges and airports. The floods also brought several major cities to a standstill. The total costs of the 2017 monsoon season in South Asia were estimated to be around US\$1.2 billion.

Figure 5: The share of population that is flood-exposed and living on less than US\$5.50 per day

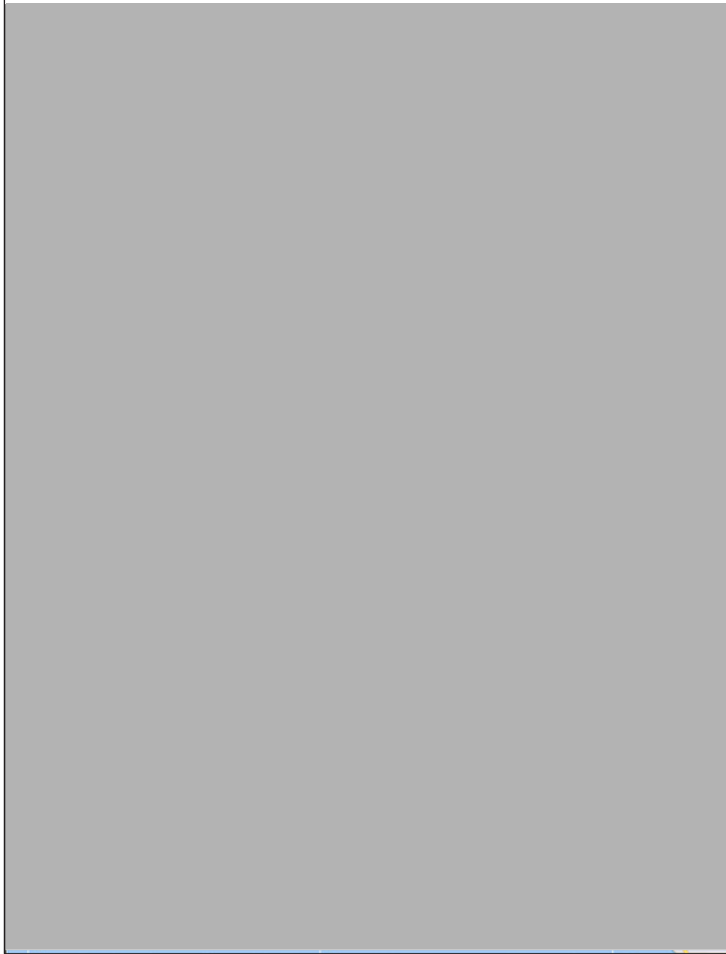


Figure 6: Global flood events by type and total population exposed, 2000–2015



RESOURCE B: Bangladesh

Figure 7: Location of Bangladesh



Bangladesh is a Southeast Asian country that borders India, Myanmar, and the Bay of Bengal.

It is home to the 8th largest population in the world, with 169 million people. Almost half of Bangladesh's population is employed in the agricultural sector, with 70% of its 150,000 km² land used for agricultural purposes. The country ranks 144th in the world in 2023 for Gross Domestic Product (GDP) per capita.

Bangladesh is located on the delta of both the Ganges and Brahmaputra River systems. It is located on low-lying land at the merging of two large river systems, and has a high population density. Rapid urbanisation has changed the land, adding more and more impermeable surfaces. These changes prevent rainfall from draining naturally into the landscape. Bangladesh is well known for experiencing annual floods that have impacted on the country in various ways. Home to the world's three most powerful rivers,

Bangladesh has seen an increased likelihood of flooding since the late 1990s. As a result, the country has been coping with various flood hazards, resulting in an economic crisis.

A **delta** is a geographic feature that occurs when a river flows into a large body of water, usually an ocean. It is formed by the river depositing fertile sediment at the river mouth over time. The delta gets its name from the triangular shape it usually takes. Delta is a Greek letter that is shaped like a triangle.

Over 60% of people in Bangladesh work in the delta area, mostly in agriculture. Abundant crops that grow well in the delta area include jute, rice, and tea. Because of the soil and ample water supply, rice can be grown and harvested three times a year in some areas. Fishing and fish farms are another important resource for the region, with shrimp exports an important source of income.

The area has many islands in between river branches. Some of these islands are accessible only by ferry boats, and many of them do not yet have an electricity infrastructure. However, solar panels have allowed residents to have some power.

RESOURCE C: Causes of flooding in Bangladesh

Flooding can be caused by a range of factors from both the natural and cultural environment, such as those seen in the annotated diagram below.

Bangladesh is a particularly flood-prone country mainly because it is a land of floodplains and deltas built up by mighty rivers such as the Ganges, Padma, and Meghna. These rivers are swollen twice a year by meltwater from the Himalayas and by the summer monsoon. Hilly areas between the rivers and behind Chittagong are often subject to flash floods.



Figure 9: Bangladesh population density and low elevation coastal zones



RESOURCE D: Impacts of flooding in Bangladesh

Since 1970, the scale, intensity, and duration of floods have increased in Bangladesh, causing human suffering, disruptions in normal life and activity, and damage to infrastructure, crops, and agricultural land, with severe impacts on the economy.

The flooding pattern in Bangladesh points towards an increase in frequency over the years. Historical and recent data show that during the past 40 years, at least seven major floods have taken place in Bangladesh.

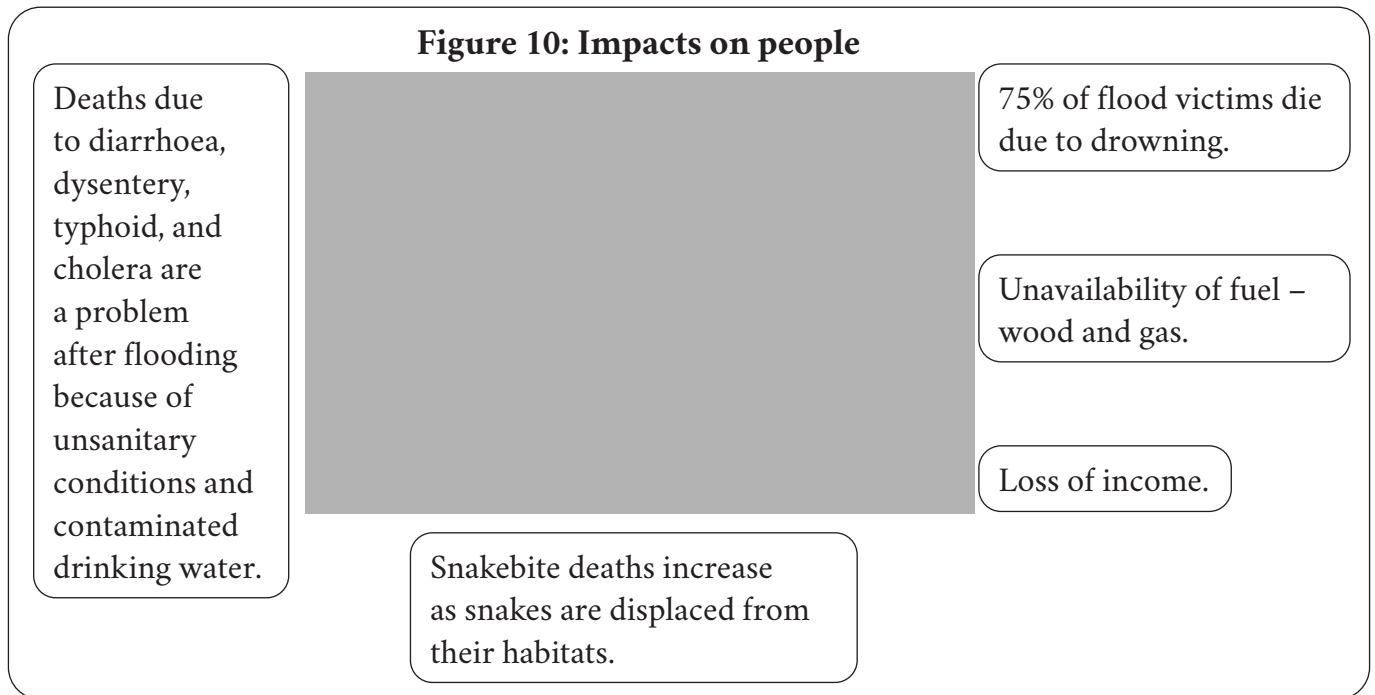


Figure 11: Community members strengthening a dyke. (A dyke is a thick wall that is built to stop water flooding onto very low-lying land from a river or from the sea.)

Embankments

One of the main infrastructure projects Bangladesh has implemented to reduce damage from flooding is the US\$6 billion embankments it has built around its two largest rivers. The embankments, which are 7,555 km long and 7 m high, are walls built from cobblestones and earth, aimed at increasing the discharge of water the river channel can hold, reducing the risks of flooding in the process.

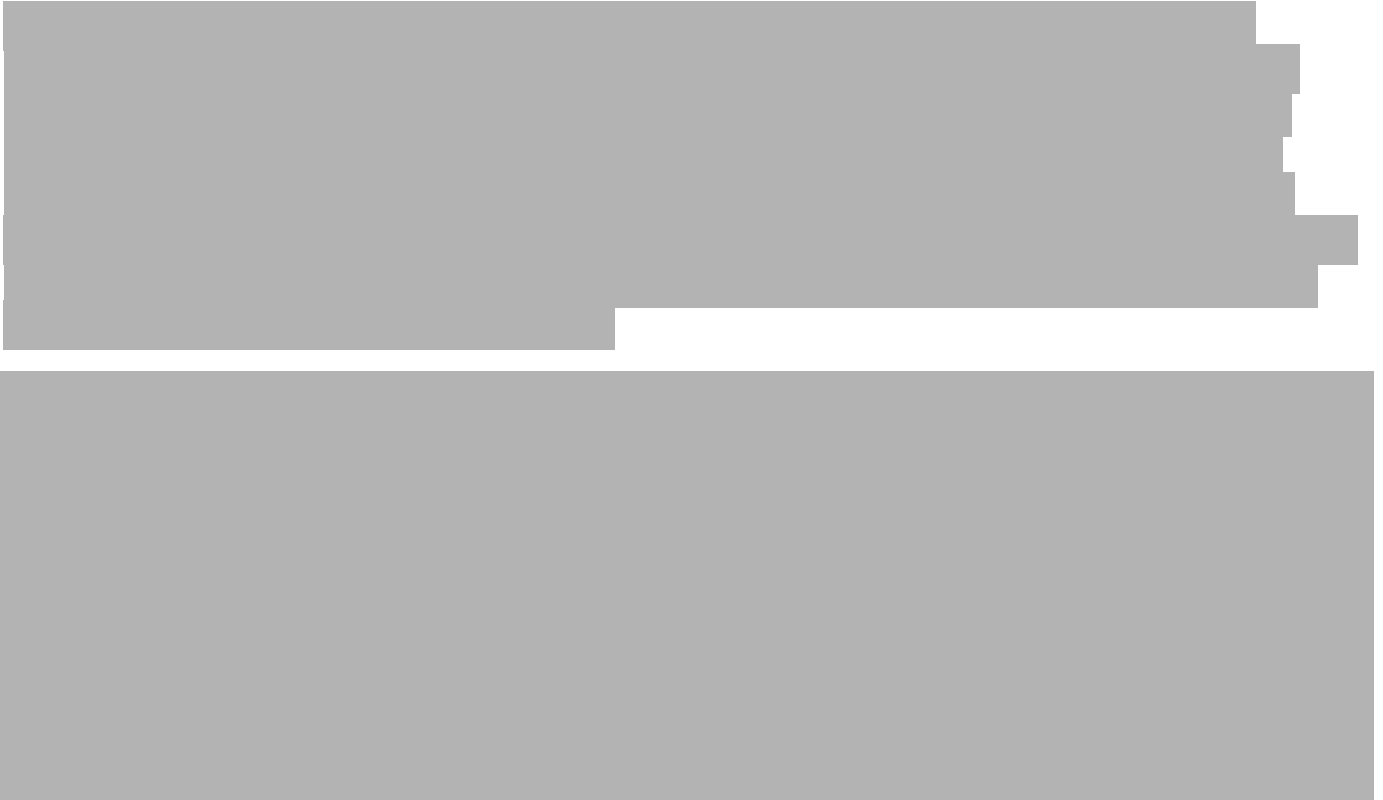


Figure 12: Raised embankments in Bangladesh.

Flood shelters



Figure 13: Comparison of flooding events 1988–2007



Impacts of flooding in 2022

Heavy, pre-monsoon rains affected Bangladesh beginning mid-May 2022, leading to landslides, river overflow, and floods. The May flooding displaced millions and was among the worst in Bangladesh.

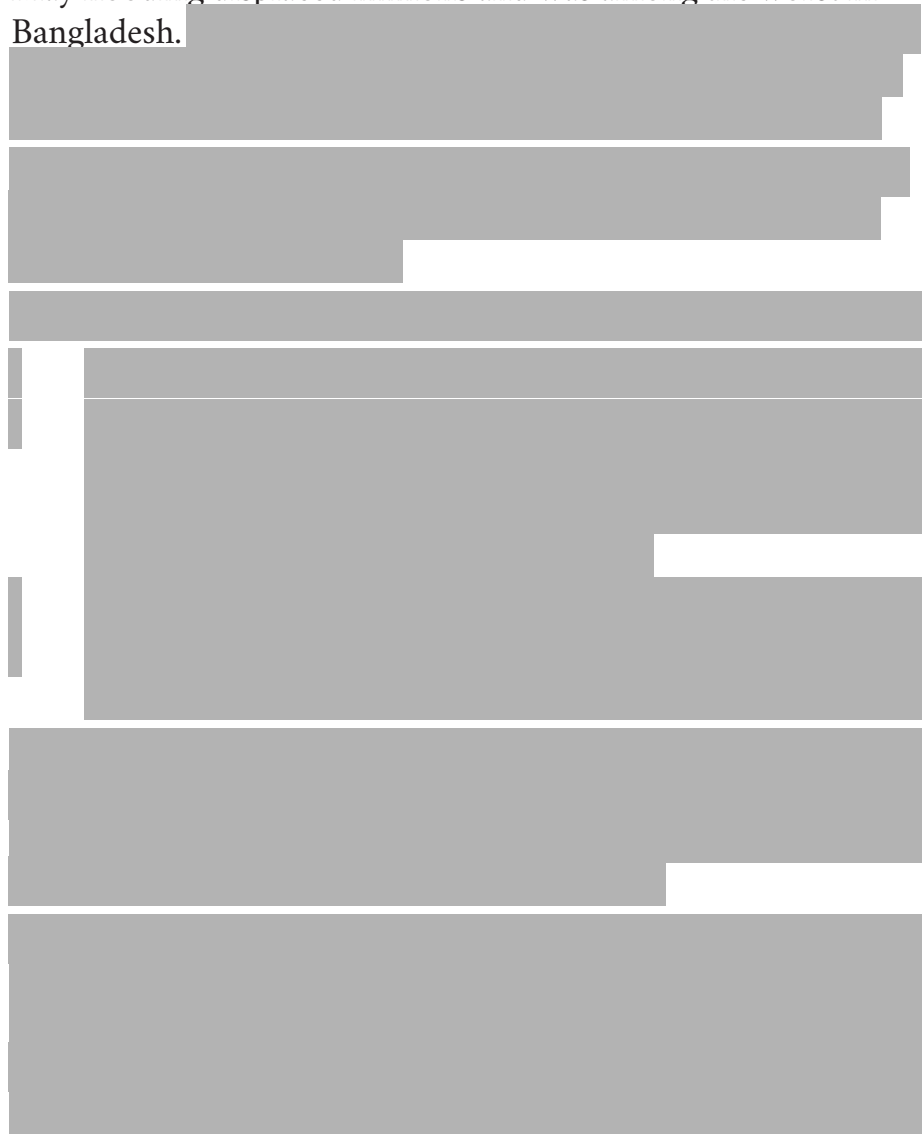


Figure 14: Bangladesh flooding.

Acknowledgements

Material from the following sources has been adapted for use in this assessment:

Resource A

<https://education.nationalgeographic.org/resource/flood>
https://www.researchgate.net/figure/Global-flood-statistics-2000-2019-a-Annual-flood-frequency-b-Annual-flood-induced_fig1_347217811
<https://www.nature.com/articles/s41467-022-30727-4/figures/3>
<http://www.yourchildlearns.com/online-atlas/southeast-asia-map.htm>
<https://sdgasiapacific.net/advocacy-resources/0000028>
https://blogs.worldbank.org/climatechange/flood-risk-already-affects-181-billion-people-climate-change-and-unplanned?cid=ECR_TT_worldbank_EN_EXT
<https://earthobservatory.nasa.gov/images/148866/research-shows-more-people-living-in-floodplains>

Resource B

https://commons.wikimedia.org/wiki/File:Map_Bangladesh_RoadRail.png
<https://www.cia.gov/the-world-factbook/countries/bangladesh/>
<https://water104website.weebly.com/bangladesh-flooding-and-impacts.html>
<https://a-z-animals.com/blog/meet-the-largest-delta-on-earth/>

Resource C

<https://freshclick.wordpress.com/2009/03/27/causes-of-the-flooding-in-bangladesh/>
<https://www.cia.gov/the-world-factbook/countries/bangladesh/>
<http://www.changemag-diinsider.com/blog/2020-monsoon-flood-in-bangladesh-a-sign-of-changing-times>
<http://nemo.gov.vc/nemo/index.php/hazards/flooding/265-what-causes-flood>
<https://geographyrevisionalevel.weebly.com/5a---meteorological-causes-of-flooding.html>
<https://sedac.ciesin.columbia.edu/downloads/maps/lec2/lec2-urban-rural-population-land-area-estimates-v2/lec2-urban-rural-land-area-estimates-v2-2010-bgd.jpg>

Resource D

<https://www.sciencedirect.com/science/article/pii/S2212094714000930>
<https://www.ipsnews.net/Library/2016/08/dhaka-flooding-640-629x420.jpg>
<https://www.bothends.org/en/Whats-new/News/Bangladesh-Involving-communities-for-free-rivers/>
<https://www.worldbank.org/en/results/2022/08/24/helping-bangladesh-protect-its-coastal-communities-from-tidal-flooding-and-storm-surges>
<https://www.science.org/content/article/sea-levels-rise-bangladeshi-islanders-must-decide-between-keeping-water-out-or-letting>
<https://water104website.weebly.com/bangladesh-flooding-and-impacts.html>
<https://www.slideshare.net/cgiarclimate/flood-management-in-bangladesh-pd-cdmpii-upd-28-nov13>
<https://disasterphilanthropy.org/disasters/2022-south-asian-floods/>
<https://english.news.cn/asiapacific/20220619/f2ba28263a8c4e109b7fd403b092a8fd/c.html>