

**2279/01/O/N/24**

1 (a) (i) Suggest two sources where the information shown in Fig. 1.1 could be found. [2]

- **Government reports or publications from agencies** such as the National Environment Agency (NEA) or Singapore Meteorological Service which often provide **official climate change data and projections**.
- **Scientific research articles or academic journals** on climate change and sea-level rise, which would provide **detailed studies and long-term trends** based on research conducted by experts.

(ii) Evaluate the usefulness of Figs. 1.2 and 1.3 as sources of information about land use change. [6]

Useful:

- Figs. 1.2 and 1.3 are useful because they **allow for a clear comparison of land use changes** in Pasir Panjang between 1975 and 2023. The maps highlight significant developments, such as the creation of the Pasir Panjang Container Terminal, which **indicates coastal land reclamation for industrial and port activities over the years**. [1 mark] The **expansion of urban residential areas and transportation infrastructure**, such as the construction of the West Coast Highway, is also clearly visible. [1 mark]
- Additionally, the maps use **colour coding and clear symbols**, making it easy to identify different land uses such as industrial zones, green spaces, and urban areas. [1 mark] The **grid references and scale** on both maps enable accurate measurement of land changes, allowing for a more precise spatial analysis. [1 mark]

Not useful:

- The maps may not be useful as they do not explain the **reasons behind the changes**, such as government policies, population growth, or economic developments. [1 mark]
- Also, the **level of detail between the two maps varies**, with the 2023 map showing more infrastructure detail than the 1975 map, which could **make direct comparison difficult**. [1 mark]

(b) (i) Using Fig. 1.3, explain why West Coast Park (4043) and the Alexandra Village Industrial Estate (4542) are suitable data collection sites. [4]

**West Coast Park (4043):**

- West Coast Park is located near the coastline and close to the **Pasir Panjang Container Terminal**, making it a relevant site for understanding the concerns of visitors and residents regarding the direct impacts of sea level rise, such as flooding and coastal erosion. [1 mark]

- It is also a **recreational area where locals and visitors gather**, allowing researchers to **collect diverse perspectives** on how sea level changes could affect public spaces and leisure activities. [1 mark]

**Alexandra Village Industrial Estate (4542):**

- This industrial estate is inland and home to various businesses. Conducting surveys here allows researchers to gather opinions from business owners and workers who may have concerns about economic impacts, such as damage to infrastructure or disruptions in the supply chain due to sea level rise. [1 mark]
- Being further from the coast, this site also helps to assess whether inland businesses perceive the risk of sea level rise as less urgent compared to those closer to the shore. [1 mark]

(ii) Use the information from Table 1.1 to complete the bar graph for the Pasir Panjang visitors for interviews conducted at 5.0 metres or more above sea level. [4]

**Pasir Panjang visitors:**

- Build barriers: **9** responses
- Help businesses move: **7** responses
- Help residents move: **6** responses
- New reclamation above 5.0m: **4** responses
- Reduce carbon footprint: **8** responses

**Note:** Ensure that each pattern corresponds to a specific action the Singapore Government should prioritise.

(c) Suggest how the students could improve their investigation into land use change and sea level change. [4]

**1. Increase the sample size:**

The students could **survey more participants** from different locations and demographics to obtain a **more representative and reliable** set of results. This would help ensure that **diverse opinions** from various socioeconomic groups are considered. [1 mark]

**2. Use a wider range of data sources:**

Incorporating **secondary data from government reports, satellite images, or historical records** could provide more accurate and comprehensive information about long-term land use changes and sea level trends. [1 mark]

**3. Extend the duration of the investigation:**

Conducting **surveys across different seasons and times of day** would capture variations in visitor patterns and opinions, leading to more balanced and consistent findings. [1 mark]

**4. Include qualitative interviews:**

Adding **open-ended interviews with experts**, such as urban planners or environmental scientists, could provide deeper insights into the causes and potential solutions for land use and sea level changes. [1 mark]

- 2 (a) (i) Describe the characteristics of either the involvement stage or the stagnation stage in the evolution of a tourist destination. [3]

Name of chosen stage: Involvement Stage

- In the involvement stage, **local residents begin to engage with tourists by providing basic services** such as accommodation, food, and guided tours. [1 mark]
- There is an **increase in promotional activities**, and the destination starts to gain recognition, attracting a steady flow of visitors. [1 mark]
- **Infrastructure development begins**, including the construction of roads and facilities, and local authorities may start planning for future tourism growth. [1 mark]

Name of chosen stage: Stagnation Stage

- In the stagnation stage, the number of tourists reaches its peak, and the **destination becomes overcrowded**. [1 mark]
- Tourist **facilities and attractions often become outdated**, and the natural or cultural **appeal of the destination may decline** due to overuse and environmental degradation. [1 mark]
- At this point, the tourist experience may deteriorate, leading to a **decrease in visitor satisfaction and potential economic stagnation** for businesses reliant on tourism. [1 mark]

- (ii) Using Fig. 2.1, describe the relationship between tourist personality characteristics and the evolution of a tourist destination. [3]

- At the early stages of a tourist destination's development (**exploration and involvement**), tourists are typically **venturers/ adventurous** individuals who seek new, unexplored locations. [1 mark]
- As the destination becomes more developed and **enters the consolidation stage**, it starts attracting a wider variety of tourists, including those who prefer **more structured experiences**. [1 mark]
- By the time the destination reaches the **stagnation stage**, it mainly attracts **dependable tourists**, who prefer familiar, well-established destinations and are less adventurous. [1 mark]

- (b) 'Sustainable tourism is mostly the responsibility of the government at a travel destination.' With reference to Fig. 2.2, to what extent do you consider this statement to be true? Explain your answer. [9]

The **national and local governments** bear responsibility for ensuring sustainable tourism. According to **Fig. 2.2**, **30%** of respondents believe that the **national government** should be primarily responsible. This is because governments have the authority to **implement large-scale policies and enforce laws** that regulate tourism activities. These measures can include setting environmental protection guidelines, limiting visitor numbers in ecologically sensitive areas, and investing in infrastructure, such as waste management systems or eco-friendly public transport. Additionally, **14%** of respondents feel that **local governments** also play a crucial role. **Local authorities are better positioned to address region-specific issues** by managing land use, supporting local conservation initiatives, and promoting sustainable community-based tourism projects. This dual role of national and local governments is essential in ensuring that tourism development aligns with environmental and social sustainability goals.

**Tourists themselves** also share responsibility for sustainable tourism, although only **9%** of respondents in **Fig. 2.2** recognise this. Tourists **directly influence the sustainability of a destination through their behaviour and choices**. They can contribute by adopting eco-friendly practices such as reducing waste, respecting local customs, and supporting low-impact tourism activities. Responsible tourist behaviour includes using public transportation, choosing accommodations that follow green practices, and avoiding activities that harm the environment or exploit wildlife. While their impact may seem individual, the **cumulative effects** of responsible tourism behaviour can significantly contribute to preserving destinations for future visitors.

**Residents and local businesses** also have an important role to play in promoting sustainable tourism. According to **Fig. 2.2**, **12%** of respondents believe that **residents** should share responsibility, as they are directly affected by tourism and have a **vested interest in protecting their community's cultural and environmental assets**. Residents can contribute by promoting authentic cultural experiences and supporting initiatives that balance tourism growth with community welfare. Furthermore, **21%** of respondents believe that **local businesses** carry significant responsibility, as they **directly profit from tourism**. Businesses can implement sustainable practices such as reducing plastic use, offering eco-friendly services, and supporting local economies through fair wages and ethical sourcing. Their commitment to sustainability can enhance the overall visitor experience while ensuring long-term economic and environmental benefits for the destination.

In conclusion, while all stakeholders contribute to sustainable tourism, the **government holds the greatest responsibility due to its ability to implement and enforce large-scale policies**. This is particularly evident in developed countries where governments are typically better equipped with stronger regulatory frameworks, financial resources, and infrastructure to lead sustainability initiatives effectively. However, in less developed countries, since the governments may lack the financial resources, infrastructure, or institutional capacity to enforce sustainability measures effectively, greater responsibility may fall on international organisations, non-governmental organisations (NGOs), and local businesses to drive sustainable practices. Nevertheless, regardless of development level, collaboration among governments, businesses, residents, and tourists is essential

for achieving long-term sustainability. Therefore, I **agree to a large extent** that the government holds the main responsibility, but the extent of this responsibility can shift depending on the resources and capacity available in a country's level of development.

- 3 (a) Annotate **Fig. 3.1** to explain how **relief rain** is formed. [4]

**Annotations should include the following:**

- **Sea (starting point of moist air):** Warm, moist air from the sea is blown toward the land by prevailing winds.
- **Windward side (as air rises):** The moist air is forced to rise up the windward side of the mountain, causing it to cool as it gains altitude.
- **Cloud formation at the peak:** As the air rises and cools, it reaches its dew point. Condensation occurs, forming clouds.
- **Rainfall on the windward side:** Continuous cooling leads to condensation and eventually rainfall on the windward side of the mountain.

- (b) With reference to Fig. 3.2, suggest how this cyclone might have affected the economy of Dominica. [3]

- The cyclone caused severe damage to roads, buildings, and power lines, as seen in Fig. 3.2, leading to **high repair and reconstruction costs** for the government. [1 mark] This **diverts funds away** from other essential services such as healthcare and education, **slowing down economic recovery** and increasing national debt. [1 mark]
- Shops, markets, and businesses were **destroyed or severely damaged**, leading to temporary or permanent closures. [1 mark] This resulted in widespread **job losses and reduced household incomes**, affecting both business owners and workers dependent on tourism, trade, and services. [1 mark]

- (c) With reference to Fig. 3.3, explain how vulnerable conditions within communities are affected by climate risks. [3]

- Climate risks can severely affect health care by **increasing the spread of diseases due to poor sanitation, water contamination, and the collapse of health facilities** during extreme weather events. [1 mark] For example, warmer temperatures and stagnant floodwaters can lead to a rise in **vector-borne diseases** such as dengue and malaria. [1 additional mark]
- Droughts and extreme weather events can **reduce crop yields** and lead to food shortages, making it harder for communities to access affordable and nutritious food. [1 mark] More frequent wildfires and heatwaves can **destroy agricultural land and livestock**, further worsening food insecurity and increasing the cost of basic necessities. [1 mark]

- Climate risks such as prolonged droughts can **lead to water shortages**, affecting drinking water supply and sanitation in vulnerable communities. [1 mark] Additionally, extreme rainfall and flooding can **contaminate freshwater sources**, spreading waterborne diseases and making clean water access more difficult. [1 mark]

(d) (i) Using Fig. 3.4, describe the distribution of two climate change impacts. [2]

- Hotter and drier bushfire conditions are mainly concentrated in the **southeastern region of Australia**, particularly around major cities like **Melbourne** and **Sydney**. [1 mark]
- More intense cyclones are mainly found in the **northwest and northeastern coastal areas** of Australia, particularly near the **Indian Ocean and Pacific Ocean**. [1 mark]
- More frequent severe thunderstorms occur **mainly along the eastern and southeastern coasts of Australia**, including areas near **Brisbane, Sydney, and Melbourne**. [1 mark]

(ii) Explain how an increase in atmospheric temperature can affect terrestrial fauna in countries such as Australia. [3]

- An increase in atmospheric temperature can negatively affect terrestrial fauna by **disrupting natural habitats and ecosystems**. Higher temperatures can lead to **habitat loss** due to **more frequent wildfires**, destroying the natural environment where species live. [1 mark]
- Additionally, rising temperatures can **reduce the availability of water and food resources**, as droughts become more common and vegetation declines, impacting herbivores and the animals that depend on them. [1 mark]
- As temperatures rise, animals may be forced to **migrate to cooler regions or higher altitudes to survive**. This movement can lead to increased competition for resources in new habitats and disrupt existing ecosystems, potentially causing the decline of less adaptable species. [1 mark]
- Furthermore, temperature extremes can affect animal health by **increasing the spread of heat-related illnesses and diseases**, reducing reproductive success and potentially leading to population declines for vulnerable species. [1 mark]