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93401



Draw a cross through the box (X) if you have NOT written in this booklet

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OUTSTANDING SCHOLARSHIP EXEMPLAR



Mana Tohu Mātauranga o Aotearoa
New Zealand Qualifications Authority

Scholarship 2025 Geography

Time allowed: Three hours
Total score: 24

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

You should answer ALL the questions in this booklet.

Pull out Resource Booklet 93401R from the centre of this booklet.

If you need more room for any answer, use the extra space provided at the back of this booklet.

Check that this booklet has pages 2–24 in the correct order and that none of these pages is blank.

Do not write in the margins (XXXX). This area will be cut off when the booklet is marked.

YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.

INSTRUCTIONS

The materials in the resource booklet will enable you to become familiar with the theme and contexts of this examination: **extreme natural events in a global context**.

Information to answer any question can be taken from any resource.

Your answers to ALL three questions must include:

- specific information from the resource booklet
- knowledge and insight you have gained from your studies in geography
- relevant original and/or effective visuals, such as maps, graphs, and diagrams.

Space for planning has been provided on pages 4, 10, and 16 to help you prepare your responses. The questions on page 3 are repeated on their respective planning pages.

QUESTION ONE

Critically analyse the change over time in extreme natural events globally, and justify what is the most significant factor(s) causing the change.

Use page 4 to plan your ideas, and begin your answer on page 5.

3, 5, 6, 7, 10, 12, 15

QUESTION TWO

Perspectives are bodies of thought, theories, or world views that shape people's values.

4, 5

On a global scale, critically evaluate through perspectives who is the most impacted by extreme natural events, and justify who is responsible for mitigating the impacts.

6,

Use page 10 to plan your ideas, and begin your answer on page 11.

8, 9, 11, 13, 14, 15, 21

QUESTION THREE

Discuss to what extent technological advancements could resolve the impact of extreme natural events across the globe.

Use page 16 to plan your ideas, and begin your answer on page 17.

10, 13, 15, 17

(18)

(19)

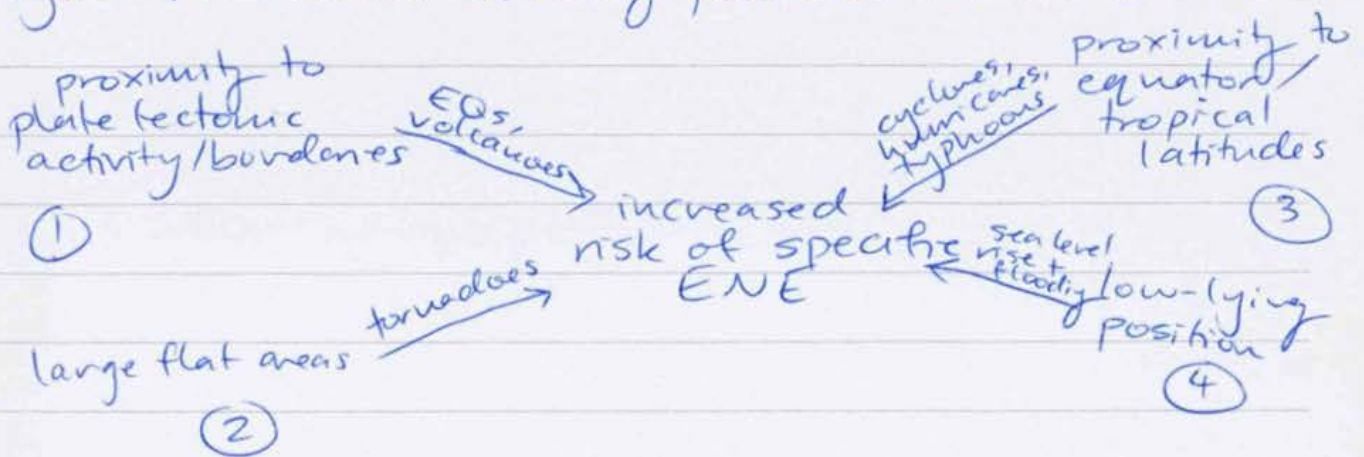
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21

Begin your answer to Question One here:

A range of factors have resulted in the change of extreme natural events (ENEs) globally, notably changing geographic processes and anthropogenic climate change. Of these, anthropogenic climate change is the most significant factor causing this observed change, as it disrupts and accelerates various physical processes around the globe.

ENEs result from a combination of ~~for~~ environmental factors, and different ENEs occur at different frequencies and severities depending largely on physical location. The uneven spatial distribution of physical processes across the globe result in differing risk potentials in certain areas, as seen in Figure 4. Figure 4. factors affecting potential for ENEs



Each of the factors outlined in Figure 4 tend to be found in regions where ~~less~~ less-economically developed countries (LEDCs) are located, demonstrating the disparate impacts ~~at the~~ of ENEs on LEDCs. This is outlined by the World Risk

Report, where both the exposure of countries to natural disasters and their ability to cope with such events are considered. The Netherlands, a more economically developed country (MEDC) had a much lower risk percentage at 8.29% compared to a LEDC, Bangladesh, which had ~~exposed~~ similar exposure levels. While not a direct change in ENEs globally, considering their changing impacts on people globally is a crucial aspect of analysing this.

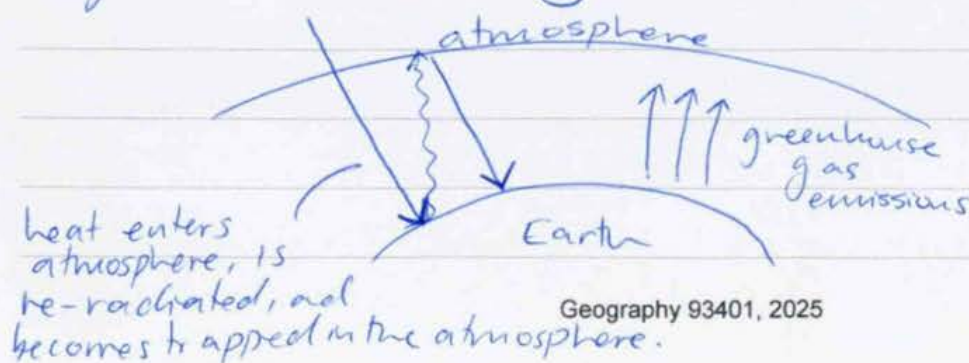
Understanding how different ENEs have higher potential of occurrence in certain geographic areas, it is important to recognise that changes in this frequency and severity can be influenced by completely natural ~~changes~~ environmental factors, outside of human influence. An example of this was the 2021 NZ floods, which resulted from increased rainfall due to the El Niño Southern Oscillation (ENSO). The two phases of ENSO, El Niño and La Niña, alter ~~the~~ ^{trade} winds across the Southern Ocean and ocean temperatures, which in turn bring ^{to certain areas} increased or decreased rainfall. Therefore, ENEs can be caused by natural climatic changes, such as periods of increased rainfall due to ENSO. Similar effects such as the

Coriolis effect, caused by the rotation of the Earth, also influence ocean movement, which can increase the chances of ocean-related ENEs for coastal countries.

Another natural factor to consider is plate tectonics. The tectonic plates of the Earth are continuously changing, sliding past or impacting each other at convergent and transform boundaries. As the crusts of these plates subduct or build up ~~elastic potential~~ elastic potential energy, the potential for volcanic eruptions, earthquakes and tsunamis increases. This means changes over time in ENEs globally such as increased volcanic or seismic activity can be due to natural environmental factors.

However, while these natural environmental factors are important, the most significant factor causing the increased rate and severity of change ~~is a~~ in ENEs globally is anthropogenic climate change.

Figure 5. Anthropogenic climate change



* As seen in figure 5

Anthropogenic climate change is the increased rate of climatic changes as a result of human activity and greenhouse gas emissions*, which contribute to changing geographic landscapes and increasing global temperatures respectively. It is the most significant factor in changes in ENEs over time, because it not only exacerbates natural changes, but it can also result in disruptions to natural processes that result in unprecedented changes, impacting affected areas more as they are unlikely to have the necessary infrastructure and warning systems in place.

~~The~~ Many existing changes and patterns have been accelerated and intensified by anthropogenic climate change. In the tropical latitudes, increasing ocean temperatures due to global warming result in more evaporation and therefore more rainfall. This was seen in 2024, with countries of Vietnam, Myanmar, Laos, and Thailand significantly impacted by Typhoon Yagi, which brought torrential rains on top of existing seasonal rainfall (a change caused by natural factors), showing how anthropogenic climate change directly influences changes in ENEs. Increasing global temperatures have had similar effects

of amplification of ENEs in other areas, with heatwaves 2-8 times ~~more~~ ^{more frequent}, droughts 1.7 times ~~as~~ ^{more frequent}, and extreme rainstorms 1.3 times ~~more~~ ^{more frequent}. The desertification of Afghanistan, and LEDC with extreme poverty and political instability, resulted from an increase in temperatures combined with the human activity of deforestation, driven mainly by four decades of war. 70% of the original forest cover has been lost since the 1950s, resulting in a very arid landscape that is prone to drought. While LEDCs are most heavily impacted by changes in ENEs due to their poorer infrastructure and lower recovery capacity, increased global temperatures, "indisputably caused by human influence" as the IPCC states, ~~also~~ results in a global shift toward more frequent and more severe ENEs, seen in the 2019-2020 Australian wildfires, which was a devastating ENE resulting from the exacerbation of bushfire season. Therefore, it becomes clear to see how anthropogenic climate change is the most significant factor in changes in ENEs due to its widespread influence across the globe.

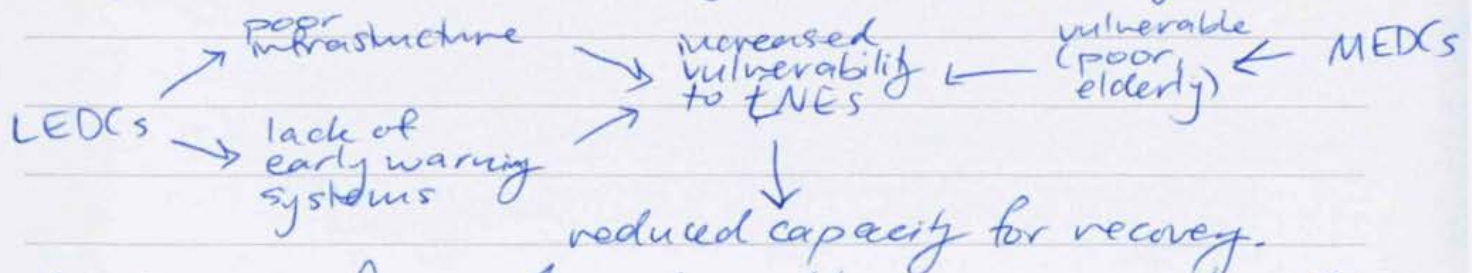
In contrast to the amplification of existing potential for certain ENEs, anthropogenic

Begin your answer to **Question Two** here:

It is through a range of perspectives that those most impacted by extreme natural events (ENEs) can be seen, most significantly from a social perspective, and also economic and environmental perspectives. Additionally, it is more economically developed countries (MEDCs) that hold the greatest responsibility for mitigating these impacts, as they have the greatest capacity for recovery and abundance of resources.

Through a social perspective, the most significant human impact is loss of life and injury, and this most impacts vulnerable people within LEDCs and MEDCs.

Figure 1. How vulnerability impacts recovery.



As seen in figure 1, vulnerable groups exist within both LEDCs and MEDCs, however LEDCs are most widely impacted due to widespread poor infrastructure and lack of early warning systems. This can be seen in the 2004 Indian Ocean tsunami, where a lack of evacuation infrastructure and preparedness meant that countries such as Indonesia and Sri Lanka (LEDCs) experienced mass casualties due to widespread

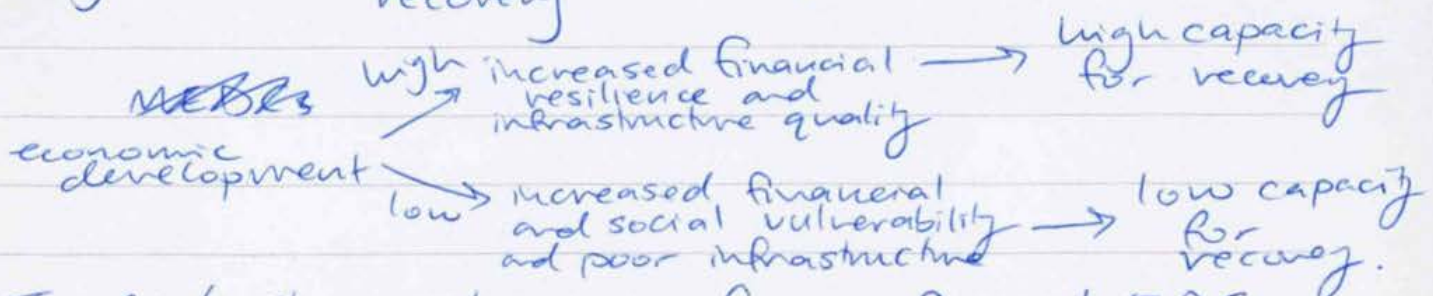
destruction, resulting in over 230,000 deaths. By contrast, Japan, a MEDC, had an ENE of a much higher magnitude during the 2011 Tohoku earthquake and tsunami, however had far less casualties, (around 20,000). This was due to well-designed infrastructure and public education campaigns and drills which ensured greater ^{community} resilience. As a result, it becomes clear to see how, through a social perspective, vulnerable people in LEDCs are most impacted by loss of life and injury.

However, within societies in MEDCs, vulnerable minority and indigenous groups are also significantly impacted by ENEs, as even though their nations have financial resilience, and therefore capacity for a greater recovery rate, they do not have the financial security or ^{sufficient} access to aid to keep up, widening disparities. This was seen in the U.S in 2005, when Hurricane Katrina most severely impacted poorer, predominantly black communities. Similarly, during the extensive wildfires in Australia in 2020, Indigenous Australians suffered worse impacts due to inappropriate planning and unsuitable interventions by authorities. Therefore, while vulnerability is more widespread in LEDCs, it can be understood through a social perspective

that vulnerable people within communities, as well as entire communities, are significantly impacted by ENEs.

Through an economic perspective, economic loss is the greatest impact of ENEs, and this impacts both MEDCs and LEDCs significantly, however, poorer infrastructure in LEDCs means that ~~the~~ the economic impacts affect LEDCs for a disproportionate amount of time, even if the absolute economic loss is greater in MEDCs. Considering North America, there has been a significant increase in the number of climate disasters with losses exceeding \$1 billion over time, with \$978B and \$568B in losses in the 2010s and 2020s respectively. While these are significant amounts, the well-adapted infrastructure and extensive monitoring and warning systems made possible by their high level of economic development mean they are able to recover quickly.

Figure 2. Economic development influence on recovery



In contrast, as shown in figure 2., LEDCs are equally vulnerable to economic loss, however the initial ~~loss~~ compromised financial stability

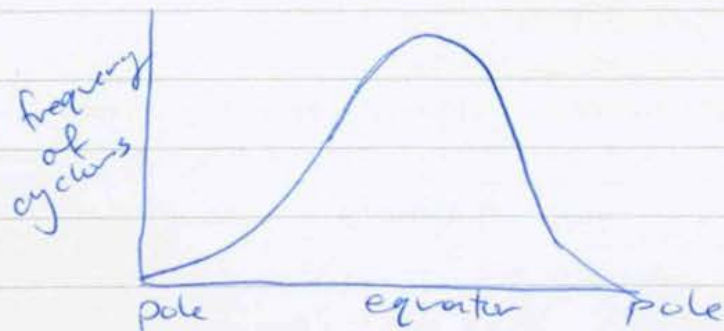
exacerbates both economic and social impacts, highlighting the interconnections between these impacts and how they compound to most significantly impact ~~the~~ vulnerable communities in LEDCs.

Drought, a major climatic hazard, severely affects agriculture and its contribution to the economy of most Southeast Asian countries. This has resulted in up to 25% of the GDP of LEDCs like Myanmar being lost. While the absolute values may be lower than losses of MEDCs, which have greater investment in buildings and infrastructure, the impact of economic loss on LEDCs is most impactful because of the disastrous impacts on livelihood and financial security.

It is through an environmental perspective that the responsibility of MEDCs in mitigating the impacts of ENEs, due to the uneven impacts of anthropogenic climate change on ~~LEDCs~~ LEDCs. LEDCs tend to be located in geographic locations that are prone to climate disasters. For example, the Philippines are located on the Pacific Ring of Fire, which lays on top of tectonic plate boundaries, resulting in a high frequency of ENEs such as earthquakes, volcanic eruptions, and tsunamis. Similarly, countries located in tropical latitudes (5° - 30° north and south of the equator) are more

prove to cyclones, hurricanes, and typhoons, due to warmer ocean temperatures.

Figure 3. Trend in cyclone frequency near equator.

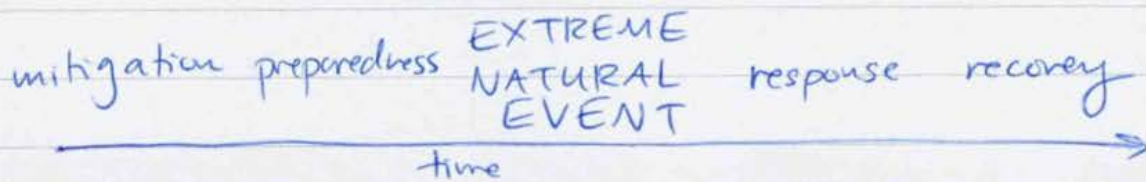


Therefore, it can be seen that LEDCs already face a geographical disadvantage, causing them to be most impacted by ENEs. These impacts are exacerbated by anthropogenic climate change, in which human emission of greenhouse gases result in increasing global temperatures and changing weather patterns globally, ultimately worsening the impact of ENEs. MEDCs, therefore, hold the primary responsibility in mitigating these impacts, not only because of their political and financial capability to do so, but also because of their disproportionate contributions to global greenhouse emissions that primarily impact LEDCs in geographically vulnerable areas. This has been seen in the low-lying LEDCs Kiribati and Tuvalu, where rising sea levels threaten to erase entire islands and displace people, creating environmental refugees. Plans have begun to be made to relocate these people to New Zealand, demonstrating the responsibility of MEDC countries to aid in disaster response.

Begin your answer to Question Three here:

As technological advancements are made in disaster mitigation, preparedness, and response strategies, they have the potential to resolve significant impacts of ENEs across the globe to a large extent; however, the equitable distribution of these through global frameworks and in conjunction with a focus on education is crucial to this success.

Figure. 7. Strategies surrounding extreme natural events over time.



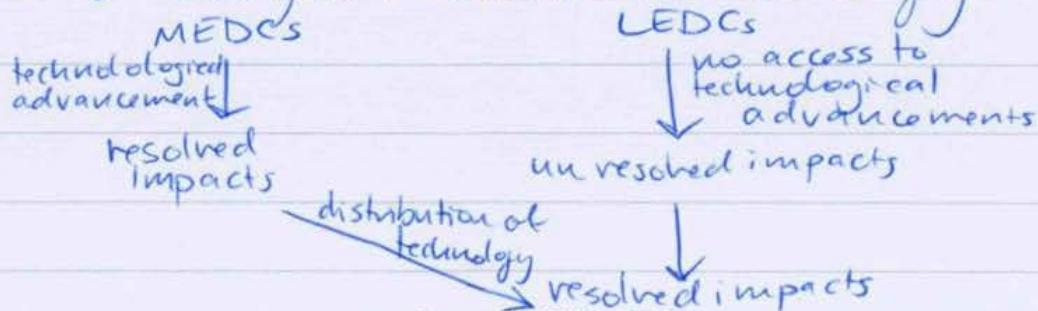
Technological advancements play a large role in resolving the impacts of extreme natural events across the globe, particularly in the 'preparedness' phase of extreme natural events, as seen in Figure 7.

A number of solutions, such as the use of satellites and radars to monitor natural disasters like volcanic eruptions, landslides and wildfires, are already in place. Additionally, AI can be utilised to process and interpret large amounts of data in order to make predictions means governments can ensure people have been evacuated before the disaster occurs, ~~save~~ potentially saving thousands of lives. The effectiveness of

these warning systems can be seen in the difference between the 2010 Haiti earthquake and the 2011 Tohoku earthquake and tsunami. Japan had ~~these~~ ^{simpler} technologies in place, allowing them to anticipate the disaster and send alerts to all of the people, enabling them to evacuate and resulting in only 20,000 deaths. In Haiti, however, a lack of co-ordinated response and early warning systems meant that people did not have sufficient time or access to sufficient evacuation infrastructure to evacuate, resulting in over 230,000 deaths. Therefore, with loss of human life being the most significant impact of ENEs, technological advancements have the potential to resolve these impacts to a great extent.

However, the only way that this great extent can become fully realised is through the equitable distribution of these technologies through global frameworks, enabling LEDCs to gain resilience against ENEs.

Figure 8. Delayed distribution of technology



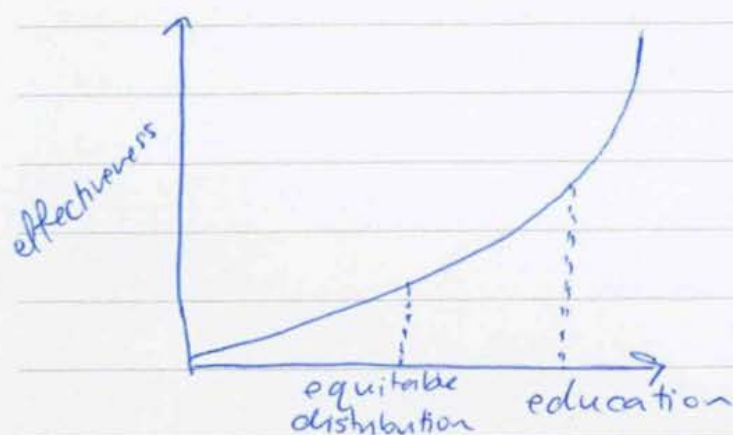
As illustrated in figure 8, MEDCs are responsible for the distribution of ~~for~~ these advanced technologies to LEDCs, and a delayed response will only further deepen ~~disparities~~ inequalities and reduce the recovery capacity ~~an~~ and resilience of LEDCs, thus reducing the extent to which technological advancements can resolve overall impacts of ENEs. Through shared responsibility and global co-operation, the equitable distribution of these advancements will strengthen global disaster response framework, increasing global resilience to ENEs.

~~These~~ This could be made possible through frameworks such as the Sendai Framework, which provides member states with concrete actions to protect development gains from the risk of disaster. One of their seven ~~of~~ targets, to substantially increase the availability of and access to multi-hazard early warning systems, will be able to become realised through the distribution of technological advancements across the globe and the sharing of key disaster risk information gained through them. However, it is important to note that when global co-operation is required, political conflicts can pose a limitation to resolving the impact of ENEs. For example,

Following the 2008 Myanmar earthquake, the authoritarian government refused international aid, resulting in a much higher death toll. This ^{lack of willingness to co-operate} could potentially reduce the extent to which technological advancements can resolve the impact of ENEs.

A crucial factor that must work alongside the global introduction of these advancements is education. The most ^{significant} ~~important~~ impact of ENEs globally is the loss of human life that results, so the use of technological advancements without education around disaster preparedness and response will minimise their effectiveness. Education campaigns, drills, and school-based programs not only help to educate people about how to best prepare for and respond to a disaster, but they also build community resilience and increase the capacity for ~~res~~ recovery. In Japan, a MEDC prone to earthquakes and tsunamis, a strong ^{cultural} sense of collective responsibility fostered through mandatory school and workplace drills and education work in conjunction with the technological advancements of early warning systems result in a maximised reduction in the loss of lives.

Figure 9. Effectiveness of technological advancements as different factors are introduced



A similar initiative has been implemented in Bangladesh by the collaboration between the government and the Bangladesh Red Crescent Society, ~~which~~ The programme educates rural and coastal communities on the need to go to safe shelters during emergencies and the importance of paying attention to early warnings, resulting in an exponential increase in number of lives saved, as seen in Figure 9. This ~~system~~ programme allowed half a million people to be moved from harm's way in less than 24 hours, demonstrating the need for an integrated response of technology and education in bridging the vulnerability and resilience gap between MEDCs and LEDCs.

Therefore, technological advancements, particularly in the form of preparedness strategies and early

Extra space if required.

Write the question number(s) if applicable.

QUESTION
NUMBER

2. However, mitigation, which is action to lessen negative long-term impacts, relies on global co-operation and an acceptance of responsibility from MEDCs, rather than responding only after ENEs have occurred. Several frameworks exist, such as the Sendai Framework for Disaster Risk Reduction (2015-2030), which recognises the importance of shared responsibility and collective action in increasing community resilience and infrastructure quality globally, while the Paris Climate Agreement (2015) recognises the importance of collectively working towards sustainability goals and reducing global ~~climate~~ emissions. The COP27 agreement expands on this, highlighting the responsibility of MEDCs in supporting LEDCs in becoming more resilient through financial support and responsibility for emissions. MEDCs have the ability to provide and financial support to LEDCs, ~~ultimately~~ and this is crucial in strengthening global climate disaster frameworks.
2. Ultimately, it is the vulnerable people of LEDCs that are most impacted by ENEs, seen through social, economic, and environmental perspectives. Through these

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6.QUESTION
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7. perspectives, the emphasis on the responsibility of MEDCs to mitigate these impacts becomes fully realised.

→ Figure 6. goes here (next page)

1. Climate change can also disrupt normal climate patterns, emphasising ^{its} significance as a factor to changes in ENEs. 2021 saw deadly heat waves across Europe, with temperatures rising above 40°C. The unprecedented nature of this ENE in Europe meant people were not educated in heat disaster responses, and there was a critical lack of ^{cooling} infrastructure, resulting in masses of casualties. Similarly, unprecedented flooding in Germany in 2023 also highlighted a lack of education and infrastructure. Therefore, anthropogenic climate change not only exacerbates existing changing patterns in ENEs over time, but can even disrupt them entirely, resulting in widespread impacts and destruction in unprepared nations, regardless of their level of economic development.

4. Thus, while both natural environmental ^{factors} and human factors are significant factors in the changes in ENEs over time globally,

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1. it is the human factors that are most significant due to their widespread, unprecedented impacts on ENE risks.

1. Figure 6. Impacts of disruptions to natural systems

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graph LR
    A[change in ENEs over time] -- natural --> B[preparedness, warning systems in place]
    A -- human --> C[unprecedented]
    B --> D[reduced destruction]
    C --> E[increased destruction]
  
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3. warning systems, have the potential to reduce loss of life - the most significant impact of ENEs - to a great extent. In order to maximise this effectiveness, an integrated response utilising global frameworks and education programmes is needed to build community resilience and recovery rate in the more vulnerable LEDCs across the globe.

93401

Outstanding Scholarship

Subject: Geography

Standard: 93401

Total score: 20

Q	Score	Marker commentary
1	07	The response demonstrates clear, perceptive insight through the deliberate selection and integration of evidence. The analysis of temporal change is sophisticated, recognising both complexity and the interrelationships between key factors. Visuals are purposefully chosen and enhance the argument, rather than repeating it. Communication is consistently coherent, controlled, and highly convincing.
2	07	This response shows sustained critical depth, using multiple perspectives in a nuanced and purposeful way. Effectively integrated evidence supports an argument that is both original and analytically sound. The discussion addresses who is impacted and who is responsible with clarity and maturity, demonstrating independence of thought and a high level of evaluative skill. Communication remains fluent and well structured throughout.
3	06	High level critical thinking is demonstrated in the response, acknowledging the complexity and limitations of relying on technological solutions to address impacts. The discussion is logically developed and insightful, integrating visuals and evidence effectively, which contributes to a clear, coherent, and thoughtful argument.