Candidate Name:

Paper 1 Structured Essay Questions

Additional Materials:

Answer Paper World Outline Map

INSTRUCTIONS TO CANDIDATES

Write your name, admission number and class on all the work you hand in. Write in dark blue or black pen on both sides of the paper. You may use a soft pencil for any diagrams, graphs, or rough working. Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer three questions. One from each section.

You should make reference to appropriate examples studied in the field or the classroom, even where such examples are not specifically requested by the question. Diagram and sketch maps should be drawn whenever they serve to illustrate an answer. The world outline map may be annotated and handed in with relevant answers. You are reminded of the need for good English and clear presentation in your answers.

2018 Preliminary Exams

Pre-University 3

At the end of the examination, fasten all your work securely together. The number of marks is given in brackets [] at the end of each question or part question.

GEOGRAPHY

9751/01 17 September 2018

3 hours

Class Adm No







Section A – Tropical Environments

Answer **one** question from this section.

1 (a) Explain how the characteristics of tropical climates based on the Köppen-Geiger climate classification system are similar and distinctive with one another. [12]

Indicative Content

The tropical climates are classified into the humid tropics which include Tropical Rainforest (Af), Tropical Monsoon (Am), Tropical Savanna (Aw) and arid tropics namely Sub-tropical Steppe (BSh) and Tropical Desert (BWh) climates based on the Koppen-Geiger climate classification system. Students are required to compare these tropical climates based on their characteristics, such as mean annual temperature, total annual precipitation and precipitation pattern.

A higher level response will provide detailed explanation in elaborating the similarities and differences in the climatic characteristics. Knowledge on various atmospheric processes, circulation and factors operating at different spatial scales is used purposefully to elaborate on the points of comparison made. Relevant examples are also used to substantiate response.

Levels marked using H2 generic level descriptors for 12m SEQ sub-part (a).

Suggested Response

The tropical climates are classified into the humid tropics which include Tropical Rainforest (Af), Tropical Monsoon (Am), Tropical Savanna (Aw) and arid tropics namely Sub-tropical Steppe (BSh) and Tropical Desert (BWh) climates based on the Koppen-Geiger climate classification system. All of these tropical climates are similar in having high mean annual temperature. Yet, between the humid tropics and arid tropics, there is a difference in annual temperature range, where humid tropics tend to have low annual temperature range while arid tropics tend to have larger annual temperature range. Similarly, humid and arid tropical climates differ in having high and low total annual precipitation respectively. Within the humid and arid tropical climates, there are variations that exist in their precipitation patterns.

P1: Based on Koppen-Geiger climate classification system, tropical climates all have high mean annual temperature, where the average temperature of the coldest month is above 18°C.

- Tropical climates exist almost entirely between the Tropics of Cancer and Capricorn
- The movement of the position of the overhead sun is confined within this region (summer solstice: Tropics of Cancer, winter solstice: Tropics of Capricorn, Equinox: Equator)
- Hence, the tropics is characterised by high mean annual temperature due to high angle of incidence the sun rays have with the tropics of the earth's surface, resulting in insolation to be concentrated over smaller area, thus resulting in high mean annual temperature
- Though exceptions do exist, where high altitude places within the tropics do not experience tropical climates, such as Cameron Highlands, Malaysia
- Examples of tropical climates:
 - Singapore (Af climate): Located 1°N of equator, High mean annual temperature of 27°C
 - Bamako, Mali (Aw climate): Located 13°N of the equator. High mean annual temperature of about 27°C
 - Yuma, Arizona, USA (BWh climate): Located 32°N of the equator. High mean annual temperature of 25°C

P2: Despite having similar high mean annual temperature, humid and arid tropics differ in terms of annual temperature range. Humid tropics tend to experience low annual temperature range while arid tropics tend to have large annual temperature range.

• This could be attributed to their latitudinal position and also the shifting position of the overhead sun

- Places experiencing Af climate tend to be found near the equator. Their latitudinal position subjects them to high angle of incidence of insolation throughout the year, resulting in little variation in monthly temperature across the year.
 - Singapore: Located 1°N of equator. Low annual temperature range of 1.7°C
- Am and Aw climate tend to have slight variation in monthly temperature, causing larger annual temperature range as compared to Af but still within the low range.
 - Temperatures slowly rise to their highest levels of the year before the arrival of the rain (brought either by monsoon winds or the ITCZ) but temperature drop by a few degrees due to the presence of clouds and rainfall that help to cool the climate slightly. During the 'winter' season, generally clear skies allow warm temperatures by day but nights can be cool
 - Akyab, Myanmmar: Located 20°N of the equator. Low annual temperature range of 7.8°C.
 - Bamako, Mali: Located 13°N of the equator. Annual temperature range of 7.8°C.
- Arid tropics OTOH have large annual temperature range
 - High monthly temperature during the summer due to the position of the overhead sun at the hemisphere at where the place is. Monthly temperature falls when the position of the overhead sun shifts to the other hemisphere. This leads to the high annual temperature range experienced
 - Yuma, Arizona, USA: Located 32°N of the equator. Large annual temperature range of 20°C
- P3: Similarly, the humid and arid tropics have high and low total annual precipitation respectively.
 - Humid tropics
 - Generally, the humid tropics is associated with the rising limb of the Hadley Cell and the ITCZ, and thus having total annual rainfall exceeding evapotranspiration
 - Their latitudinal position places them under the constant influence of the rising limb of the Hadley Cell and the ITCZ which encourages the formation of clouds and rainfall via convection and convergence of winds
 - o Examples
 - Belem, Brazil (Af): Located 1°S of equator. Total annual precipitation of 2740 mm.
 - Chittagong, Bangladesh (Am): Total annual precipitation of 2730mm [how topography enhances the amount of rainfall received]
 - Arid tropics
 - Their latitudinal position subjects them to the subsiding limb of the Hadley Cell. Subsidence of air inhibits the formation of clouds and hence rain, and thus arid tropics is characterised by annual potential evaporation exceeding annual precipitation
 - o Examples
 - Longreach, Australia (BSh): Close to low total annual precipitation of 266mm
 - Cairo, Egypt (BWh): 18mm of low total annual precipitation
- P4: Within the humid and arid tropics, there exists variations in precipitation pattern.
 - Humid tropics
 - Af: Rainfall is distributed nearly uniformly throughout the year. Due to their latitudinal position, places with Af climate have high TAP that is distributed evenly throughout the year because they are under the constant influence of the ITCZ and rising limb of the Hadley Cell. High rates of atmospheric convection is promoted at the rising limb of the Hadley Cell and together with the convergence of trade winds at the ITCZ, they form large cumulonimbus clouds that often bring heavy precipitation to these places
 - E.g. Singapore
 - Am: Distinct wet and dry season. Wet season largely as a result of presence of moist trade/monsoon winds that bring heavy rainfall to the region e.g. moist

SW Asian monsoon wind that bring heavy rainfall to Indian sub-continent during the middle of the year). Monthly precipitation during the peak rainfall can easily exceed 800mm. Dry season relates to the shifting of the ITCZ away from the particular hemisphere and the presence of dry winds (e.g. dry NE monsoon wind that blows past the Indian sub-continent at the end of the year) that bring little to no rain to the region

- Eg. Chittagong, Bangladesh
- Aw: Greater seasonality in precipitation: Seasonality of precipitation is attributed to their location farther away from the equator. During the high sun season (summer) the ITCZ favours the formation of afternoon thundershowers. However, when the position of the overhead sun shifts to the opposite hemisphere, the arrival of the subtropical high brings descending air and the resultant lack of precipitation. Dry seasons are more pronounced and longer lasting that those of Am climate because of their distance farther from the equator that puts them closer to the mean position of the subtropical high
 - E.g. Bamako, Mali
- Arid Tropics
 - BSh vs BWh: Precipitation occurs more often during the summer months than during the winter for BSh, as a result of localised convection. For BWh, they tend to have more precipitation during the winter months whereby lower atmospheric temperature promotes the occurrence saturation and thus the formation of clouds and rain
 - E.g. Yuma, Arizona, USA (BWh) vs Monterrey, Mexico (BSh)

Marker's Report

- To do this question, students need to have very strong content knowledge on tropical climates
- Question is poorly done because
 - Weak elaboration on how the various climate are similar or different with one another
 - Lack of accurate comparison of the various climate types
 - Lacking relevant examples to exemplify the points
- (b) Discuss the extent to which trade winds play a role in influencing rainfall patterns in the tropics. [20]

Indicative Content

The tropics can be defined as a climatic region of radiation surplus delimited by boundaries fluctuating between 30 and 35° latitude, north and south. In studying rainfall patterns in the tropics, there are a myriad of factors that influence it. The convergence of trade winds at ITCZ plays a crucial role in affecting precipitation pattern but largely in the humid tropics. It can be argued that there are many other factors such as the Hadley Cell, monsoon winds system, tropical cyclones, topography, local heating, continentality that operate at different spatial and temporal scale that could affect rainfall pattern spatially and temporally as well.

A higher level response will discuss the role of trade winds in influencing rainfall patterns in the tropics with reference to other factors at different spatial and temporal scales. The analysis should be centred upon the role of trade winds yet acknowledging that these factors do not act independently in influencing rainfall patterns in the tropics. The essay must also be well-exemplified with relevant case studies.

Synoptic links: Theme 1 (Past climates, tropical cyclones, tropical deforestation), Theme 3 (Climate Change)

Levels marked using H2 generic level descriptors for 20m SEQ sub-part (b).

Suggested Response

The tropics can be defined as a climatic region of radiation surplus delimited by boundaries fluctuating between 30 and 35° north and south of the equator. Based on the Koppen-Geiger climate classification system, tropical climates can be broadly classified into humid tropics which include tropical rainforest (Af), tropical monsoon (Am), tropical savannah (Aw) and arid tropics which include sub-tropical steppe (BSh) and tropical desert climates (BWh). These tropical climates exhibit variations in their rainfall patterns, such as uniformity and seasonality in precipitation or even year-to-year variability in precipitation. Although the convergence of trade winds at the Intertropical Convergence Zone (ITCZ) can largely explain for rainfall patterns in the humid tropics, especially for Af and Aw climates, by itself it does not account for rainfall patterns in the entire tropics. Furthermore, trade winds itself is unable to explain for possible long term climatic changes and also does not account for local variations in rainfall patterns. Hence, trade winds influence rainfall patterns in the tropics to a small extent.

P1 [spatial scale/seasonal variations]: The convergence of trade winds at the ITCZ largely account for the high total annual precipitation in the humid tropics and the seasonality of precipitation that Aw climate experiences.

- Trade winds are formed as a result of atmospheric pressure gradient that exists between the sub-tropical high and equatorial low of the Hadley Cell
- Formation of NE and SE trades that converge at the ITCZ
- Position of the ITCZ follows the position of the overhead sun
- Af climate has high total annual precipitation that is well distributed across the year due to ITCZ that is characterised by large bands of cloud that brings high amounts of rainfall
 - E.g. Singapore: Located 1°N of equator. Total annual precipitation of 2410 mm. Rainfall is distributed nearly uniformly throughout the year and all months average at 220 mm of rainfall under the influence of the ITCZ
- Aw: Seasonality of precipitation is attributed to their location farther away from the equator. During the high sun season (summer) the ITCZ favours the formation of afternoon thundershowers. However, when the position of the overhead sun shifts to the opposite hemisphere, the arrival of the subtropical high brings descending air and the resultant lack of precipitation. Dry seasons are more pronounced and longer lasting that those of Am climate because of their distance farther from the equator that puts them closer to the mean position of the subtropical high
 - E.g. Acapulco, Mexico: Located 17°N of the equator, it has moderate total annual precipitation of 1175mm. Great seasonality in precipitation, with wet season during the middle of the year where monthly rainfall exceeds 200mm with the arrival of the ITCZ while the end and start of the year has low monthly rainfall of less than 40mm of rainfall as the ITCZ shifts to the other hemisphere

P2: [spatial variation – humid vs arid] However, trade winds alone do not account for rainfall pattern for the entire tropics, especially in the arid tropics.

- Af: The high total annual precipitation that Af climate has is not attributed to the role of ITCZ alone. As places experiencing Af climate tend to exist within 10°N/S of the equator, their position near the equator puts them under the influence both the ITCZ and rising limb of the Hadley Cell. At the rising limb of the Hadley Cell, atmospheric convectional activity is promoted that often bring heavy thundershowers in mid to late afternoon
- Am: High total annual precipitation of Am climate is largely attributed to the role of monsoon winds. Wet season largely as a result of presence of moist monsoon winds that bring heavy rainfall to the region. Monthly precipitation during the peak rainfall can easily exceed 800mm. Dry season relates to the shifting of the ITCZ away from the particular hemisphere and the presence of dry winds that bring little to no rain to the region. Am climate has higher TAP than Aw because of the contribution of both monsoon winds and ITCZ
 - E.g. Chittagong, Bangladesh: High total annual precipitation of 2730mm, with wet season in the middle of the year where monthly rainfall goes above 100mm and can exceed 500mm while dry season during the rest of the year where monthly rainfall goes below 60mm
- BSh/BWh low total annual precipitation: Their latitudinal position subjects them to the subsiding limb of the Hadley Cell. Subsidence of air inhibits the formation of clouds and

hence rain, and thus arid tropics is characterised by annual potential evaporation exceeding annual precipitation

- E.g. Longreach, Australia (BSh): Close to low total annual precipitation of 266mm and Cairo, Egypt (BWh): 18mm of low total annual precipitation
- BSh vs BWh pattern: Precipitation occurs more often during the summer months than during the winter for BSh, as a result of localised convection. For BWh, they tend to have more precipitation during the winter months whereby lower atmospheric temperature promotes the occurrence saturation and thus the formation of clouds and rain
 - E.g. Yuma, Arizona, USA (BWh) vs Monterrey, Mexico (BSh)

P3: [spatial scale – global vs local] Also, trade winds that operate at the global scale is unable to explain for variations in rainfall patterns at the local scale.

- At the local scale, topography which is the study of the shape and features of the surface of the Earth has an influence on the amount of rainfall received
- Orographic or relief rainfall is the result of condensation and cloud formation in moist air that has been physically forced to rise over topographic barriers
- When warm moist air blows against a mountain range, it is forced to rise
 - As it rises, the air moves into a higher elevation where the surrounding air pressure is much lower
 - o This allows the parcel of rising air to expand and undergo adiabatic cooling
 - When saturation is reached at dew point temperature, condensation occurs and water vapour changes into water droplets to form clouds
 - This result in heavy rainfall on the windward side of the mountain
- At the leeward side of the mountain, dry air descends
 - The air parcel is going into an environment where the surrounding air pressure is higher
 - The air parcel will be compressed, and compression of air heats this air parcel and undergoes adiabatic warming
 - With adiabatic warming, relative humidity of the air parcel decreases. Little to no clouds form at the leeward side which bring little to no rain
- Although the convergence of trade winds may bring high amount of rainfall, topography has the influence to cause marked variations in the amount of rainfall received on the windward and leeward sides of topographic barriers
 - An example of a topographic barrier is the Himalayas which results in heavy rainfall in Terai region located in the windward slope but dry conditions to the leeward slope, such as places like the Tibetan plateau and Mongolia's Gobi Desert despite the onset of monsoon and trade winds during the middle of the year

P4: [temporal influence: short vs long term] Even though trade winds may be able to account for short term periodic changes to rainfall patterns, it is unable to be used to explain for long term changes in rainfall patterns.

- El Nino that occurs in the Pacific Ocean basin every 3-7 years is due to the weakening or even reversal of trade winds that cause changes to the amount of rainfall received in the eastern and western Pacific
 - El Nino in 2017 delivered 10 times as much rainfall than usual to Peru that cost at least 62 people's lives
 - OTOH, 2016 El Nino resulted in drought in countries like Malaysia and Singapore in the Western Pacific
- However, trade winds would not be able to account for rainfall pattern across longer time period
 - [Future] Human-induced climate change
 - Humans have been modifying the earth's surface on a large scale especially through deforestation. With less or no vegetation, transpiration, which is an output of the hydrological cycle, is reduced. This lowers the amount of atmospheric water vapour for the formation of clouds and hence decreases the amount of precipitation

- E.g. In the Amazon Basin, deforestation in the 'Arc Deforestation' area in 2010 has reduced annual mean rainfall across the Amazon basin by about 1.8%. It is estimated that business-as-usual deforestation would result in a reduction of mean annual rainfall by about 8.1% by 2050
- [Past to possible future] Climate change
 - Desiccation of pluvial lakes in the tropics suggest that the climate was much cooler with increased precipitation during the Pleistocene. However, during Holocene interglacial period, the climate became more arid and pluvial lakes contracted
 - E.g. The Dead Sea is currently 1,292 feet below mean sea level, but records proved that its waters originally filled its basin to 1,400 feet above its present level
 - Such changes to climate could be attributed to the drivers such as orbital forcing, solar forcing and reduction in thermohaline circulation and not due to the role of trade winds

Conclusion

In conclusion, the role of trade winds in influencing rainfall patterns in the tropics is to a small extent. Although it largely accounts for the high total annual precipitation in the humid tropics and seasonality of precipitation that Aw climate receives, it alone is unable to account for rainfall pattern in the entire tropics, especially the arid tropics. Furthermore, as a wind system that operate on a global/macro scale, it is unable to account for local variations in rainfall pattern that could be influenced by factors such as topography. Even though trade winds play a role in causing short term periodic climatic changes to the Pacific region, it is unable to explain for long term changes to rainfall patterns as induced by other natural and human drivers. Trade winds may play a large role in providing explanation to the high amount of precipitation received in the humid tropics, but rainfall in the tropics is influenced by many other atmospheric processes and factors that are interrelated that could complement or negate the effects of others. It is insufficient to look at only one particular factor to understand tropical climates, as they are a result of the effects multiple factors and processes.

Marker's Report:

- Another question that is poorly done students need to learn how to choose questions that are to their favour (Question 2 is an easier question to score as compared to Q1!)
- Weak content knowledge to elaborate
- Lacks evaluation. Many students are very descriptive and only listed out the various factors but did not evaluate the role of trade winds (what do trade winds do or not do?). Other atmospheric processes/factors should only come in the explanation not in the argument

2 (a) Explain the impacts of tropical deforestation at different spatial scales. [12]

Indicative Content

Tropical deforestation refers to the loss of tropical forests due to removal or clearance of trees in forested areas. Impacts of tropical deforestation include landslides, soil erosion and sedimentation, disruption of ecosystems and loss of biodiversity, disruption of biogeochemical cycles and release of sored carbon. Students have to classify these impacts to discuss how they have an effect at different spatial scales.

A higher level response will discuss how these impacts may cut across various spatial scales and not necessarily confined to a certain spatial scale. Impacts should also not be seen in silo but rather there is interrelationships between the impacts as well. Impacts of tropical deforestation at different spatial scales should be exemplified with relevant examples throughout the essay.

Levels marked using H2 generic level descriptors for 12m SEQ sub-part (a).

Suggested Response

Tropical deforestation refers to the loss of tropical forests due to removal or clearance of trees in forested areas. Due to deforestation, impacts at various spatial scales could be resulted, such as landslides and soil erosion at the immediate local scale that can have knock on impact on regional scale when sedimentation causes flooding along the river. Disruption of ecosystems though occurs at the local or regional scale can affect global biodiversity. Lastly, as trees act as carbon sink, deforestation would result in the release of stored carbon that could enhance greenhouse effect and increases the rate of global warming.

P1: At the immediate local scale, the removal of trees could lead to impacts such as soil erosion and landslides.

- Soil erosion
 - \circ ~ When trees are removed, it reduces interception within the drainage basin
 - Rainfall intensity reaching the ground increases and increases the chance of it being higher than the infiltration capacity of the ground which encourages the occurrence of Hortonian OLF that could move soil particles along with it as rainwash
 - Without vegetation/trees to intercept rainfall, rainsplash effect is also more likely to take place, resulting in splash erosion. Also, rainsplash effect compacts the soil, and lowers soil porosity which increases the chance of OLF occurring and hence increases the chance of occurrence of rainwash as well
 - E.g. Scientists have estimated that a third of the world's arable land has been lost through soil erosion and other types of degradation since the 1960s due to deforestation for agricultural land
- Landslides
 - Trees help to bind and consolidate soil material on slope with their roots
 - With deforestation, the removal of trees reduces shear strength of the slope due to less cohesive soil material
 - With heavy rainfall, shear stress acting on the slope could exceed its shear strength, triggering the occurrence of a landslide
 - E.g. The cutting down of at least 28,000 trees in the area where the village of Malin is in Pune, India was partly the cause of a deadly mudslide in 2014

P2: Soil erosion and landslides as a result of deforestation have the potential to cause sedimentation in rivers that could bring about flooding in the region.

- Soil and slope materials from soil erosion and mass movement could be transported to rivers and streams where they get deposited
- Sedimentation refers to the accumulation of materials/sediments in water bodies such as rivers
- With sedimentation, it reduces width and/or depth/capacity of the river, causing the river to be unable to hold as much discharge as before, increasing the likelihood of

flooding that could take place that is not necessarily confined to where deforestation has occurred in the vicinity but downstream as well

• E.g. Deforestation has increased the proportion of the drainage basin in China, East Asia and the Amazon to be subjected to erosion which in the long run have contributed to the issue of siltation. Heavy siltation/sedimentation has raised the river bed increasing the risk of flooding in the Yangtze river basin in China, major river basins of humid tropics in East Asia and the Amazonian Basin

P3: Also, forests often serve as habitats for large amount of biodiversity and deforestation though disrupts ecosystems at the local scale, it could cause loss of biodiversity at the global scale.

- Tropical forests support about two thirds of all known species and contain 65 per cent of the world's 10, 000 endangered species despite covering less than 10% of Earth's land surface
- Deforestation depletes biodiversity by destroying habitat, by separating contiguous areas of rainforest from each other, by interfering with plant reproduction, and by exposing organisms of deep forest to "edge" effects
- Forests, especially those in the tropics, serve as storehouses of biodiversity and consequently deforestation, fragmentation and degradation destroys the biodiversity as a whole and habitat for migratory species including the endangered ones, some of which have still to be catalogued
- Biodiversity losses of today are comparable to the great mass extinctions of eons past
- Many of the species being lost are vital to the preservation of our ecosystems, or to significant parts of them
- E.g. Biodiversity in Borneo: One year after logging began in one area surveyed, some species such as the Burmese brown tortoise, had disappeared from the areas and populations of ungulates, hornbills (despite their protected status) were significantly lower.

P4: Deforestation also leads to the release of stored carbon that could bring about global climatic impact by increasing the rate at which global warming occurs.

- Deforestation through direct burning of the logged trees, decomposition of biomass and other processes disrupts the global carbon cycle by increasing the concentration of atmospheric carbon dioxide
- Removal of trees also reduces the ability to remove subsequent inputs of carbon dioxide by photosynthesis (removal of carbon sink)
- Deforestation increases the rate at which carbon dioxide is released from the soil into the atmosphere
 - Carbon in the soil accumulates through the decay of organic matter, such as dead leaves and animals
 - As deforestation exposes soil to sunlight, this increases soil temperature and the rate of carbon oxidation in the soil. Carbon oxidation is a process by which carbon in the soil reacts with oxygen in the atmosphere to produce carbon dioxide
- Deforestation contributes to global warming which occurs from increased atmospheric concentrations of greenhouse gases (GHG) that enhances natural greenhouse effect, leading to net increase in the global mean temperature as the forests are primary terrestrial sink of carbon
- E.g. Tropical deforestation is responsible for the emission of roughly two billion tonnes of carbon (as CO2) to the atmosphere per year. Release of the carbon dioxide due to global deforestation is equivalent to an estimated 25 per cent of emissions from combustion of fossil fuels

Marker's Report

- A handful of students misinterpreted the term 'spatial scales'. Note that there is a difference between 'across space/spatially' and with 'spatial scales'
- Lack of content knowledge from syllabus

- For those who applied the content knowledge to the context, there is a need to meaningfully analyse how the impacts could cut across different scales etc.
- (b) 'Deforestation is an issue that can be managed in the tropics'.

To what extent do you agree with this statement?

[20]

Indicative Content

After discussing about the impacts of tropical deforestation, students are now required to evaluate upon the management of the issue. In this essay, students should critically analyse why deforestation occur (causes) and persist (causes, failure of strategies to manage deforestation), although it perhaps could be managed with strategies.

A higher level response will discuss the interplay between causes of tropical deforestation and strategies to manage deforestation to evaluate if it is an issue that can be managed. A range of causes and strategies that act on a variety of scales should be used in the discussion to highlight the complexity of the issue.

Synoptic links: Theme 2 (Development, TNCs, Managing Resource Base, Resource Appraisal), Theme 3 (Sustainable Development, Climate Change)

Suggest Response

Introduction

Deforestation refers to the loss of forests due to removal or clearance of trees in forested areas. In the tropics, deforestation has become an issue of concern as the magnitude of land-use changes to non-forested land use is large, albeit decreasing in recent decades. It has been estimated that 18.7 million acres of forests are lost annually due to anthropogenic alteration of tropical vegetation for a myriad of reasons that include but not limited to agricultural expansion, demand for resources such as timbre and palm oil as well as for space due to population growth and for development. Although there have been strategies put in place that can help to manage the issue of deforestation if properly enforced, often these strategies do not address the root cause of deforestation, making them ineffective in managing the issue. Furthermore, the current capitalistic economic system that unfavours developing countries worsens the issue especially when most tropical forests exist in these developing countries. As development in developing countries continues in the near future, the undervaluation of forests in the current economic system will result in mismanagement of forests for economic and social needs. Hence, I agree with the statement only to a small extent.

Body Paragraphs

P1: The issue of deforestation can be managed in the tropics if strategies taken are well implemented and enforced to reduce the rate or prevent deforestation from happening.

- Deforestation involves the removals of trees on a large scale and it brings about many consequences such as increasing the rate of global warming, soil erosion, loss in biodiversity and ecosystem services. This unsustainable human activity has to be reduced or even prevented to protect and conserve the forests that we have in the tropics that serve many purposes which include their role as carbon sinks to mitigate climate change
- One major agent of deforestation is TNCs which use the forest for the production of their goods. Being an agent of deforestation also meant that TNCs have the ability to reverse this trend. Some TNCs have implemented 'zero deforestation' policies in their supply chains by holding their suppliers accountable for producing commodities like timber and paper in a way that does not fuel deforestation
 - For example, one such TNC is McDonald's that has pledged in April 2015 to end deforestation across its entire supply chain. McDonald's promised not to contribute to deforestation in areas most critical to reducing carbon in the atmosphere - known as high carbon value and high carbon stock forests. By having commitments like this from major agents of deforestation and if these

agents follow through their commitments, the rate of tropical deforestation can be reduced or done in a more sustainable manner

- In an attempt to manage deforestation, states have also put in place strategies like policies to protect forests
 - The Brazilian state has introduced various policies, legislative and regulative measures to protect the Amazonian forest. This included the Action Plan for the Prevention and Control of Deforestation in the Legal Amazon (PPCDAm), introduced in 2004 to coordinate efforts among federal, state, and municipal governments, and civil organizations. Approximately half of the deforestation that was avoided in the Brazilian Amazon during 2005-2009 was the result of government conservation policies. Policies introduced in the second half of the 2000s helped avoid 62,000 km² of deforested area between 2005 and 2009

P2: However, strategies fail to manage the issue of deforestation in the tropics in the long run as they often do not address the root cause of the issue.

- There are various causes of deforestation such as logging and urbanisation but the main root cause of deforestation lies in overconsumption as a result of development. In the name of development, activities like irrational and unscrupulous logging, cash crops and cattle ranching are carried out. Despite the developed countries making up one quarter of the world's population, they consume almost four-fifth of the world's resources. This lifestyle of overconsumption of resources is also being advertised in and forced upon developing countries, causing the world to be using forest resources in an unsustainable manner
 - If strategies to manage tropical deforestation do not manage this lifestyle of overconsumption of resources, they will be unsuccessful as deforestation will continue as long as there is the demand for the resources. Despite McDonald's commitment in 'zero deforestation', palm oil which is a major contributor of deforestation and used in many of its products, if the demand for goods containing palm oil continue to rise with limited availability of sustainably sourced palm oil is limited today, deforestation may still continue or even worsen.
 - Besides TNCs, to manage tropical deforestation, United Nations, which is a supranational body, initiated the REDD (Reducing Emissions from Deforestation and forest Degradation) program whereby a market-based approach is taken to create a financial value for the carbon stored in forests, offering economic incentives for developing countries to reduce emissions from forested land and invest in low carbon-paths to sustainable development. Yet, in Keo Seima, Cambodia, despite the REDD programme being implemented, logging was still rampant among residents as the demand for forest resources present a source of livelihood for these villagers.
- Without tackling the root cause of deforestation, strategies will not be successful in managing the issue of deforestation

P3: Furthermore, the current capitalistic economic system that unfavours developing countries worsens the issue especially when most tropical forests exist in these developing countries.

- Wealthy countries or the erstwhile colonial powers having deficit of their own natural resources are mainly sustaining on the resources of the financially poorer countries that are generally natural resource rich. Unfortunately, the governments of these poor resource rich countries had generally adopted the same growth-syndrome as their western neighbours or their erstwhile colonial master giving emphasis on maximizing exports, revenues and exploiting their rich natural resources unsustainably for short-term gains
 - Bias in trade relations: For the primary producers it becomes necessary to export a larger quantity of goods in order to buy the same, or even a smaller, quantity of manufactured goods
 - E.g. In 2006, Indonesia and Malaysia supplies 44% and 43% of the global supply of palm oil

- Also, pursuing the guided development agenda, the financially poorer countries are on a heavy international debt and are now feeling the urgency of repaying these huge debts due to escalating interest rates. Such a situation compels these debt-ridden poorer countries to exploit their rich natural resources, including their forests, partly to earn foreign exchange for servicing their debt
 - For instance, construction of roads for logging operations in some South-east Asian countries was funded by Japanese aid which allowed the Japanese timber companies to exploit the forests of these countries

P4: As development in developing countries continues in the near future, the undervaluation of forests in the current economic system will result in mismanagement of forests for economic and social needs.

- Undervaluation of forests in the current economic system
 - Forests gain value only when they are cleared for obtaining legal title through 'improvement'
 - Capitalist society tends to value the things that the market values and dismisses and does not respect whatever has no value for the market. Case seen for public environmental goods and services such as forests which translates into a growing process of environmental deterioration and destruction
- Development
 - Due to undervaluation of forests, forests are often exploited and value for their instrumental rather than intrinsic or inherent uses
 - o Countries often prioritise economic and social needs over environmental needs
 - In the name of development, forests are cleared to produce further capital and incentives
 - Tropical deforestation is caused by the drive for maximizing profits within the agricultural sector. Higher prices for crops and lower prices for farm inputs also spur faster deforestation. Technological innovations make farming more profitable either prompting the expansion of farms into forest or attract new farmers to forest frontiers. Example: Brazil's deforestation to clear land for cash crops production (soybeans, coffee)
 - Rampant consumerism by the developed countries frequently has been claimed as a major reason for tropical deforestation. The opening of tropical countries to the world commodity markets accelerated deforestation. The products include coffee, sugar, bananas, cotton and beef in Central America and oil palm, rubber and timber in Southeast Asia
- Overpopulation/poverty/urbanisation
 - More people require more food and space which requires more land for agriculture and habitation. This in turn results in more clearing of forests
 - Expanding cities and towns require land to establish the infrastructures necessary to support growing population which is done by clearing the forests. Researchers found that deforestation is now driven largely by urbanization and trade
 - Social and economic development in Singapore have contributed to the loss of 90% of its original rainforest. Tropical rainforests found mostly in developing countries, such as in South East Asia, will be subjected to deforestation to clear land for more space for development

Conclusion

In conclusion, I agree with the statement to a small extent. Albeit that there are strategies that could manage the issue of deforestation by preventing or reduce the rate at which it is happening if they are well implemented and enforced, strategies do not manage the issue in the long run as they often do not address the root cause of tropical deforestation. Furthermore, the bias built into the global economic system makes it difficult to address the issue of deforestation that developing countries are facing. Deforestation is also a thorny issue to manage due to its undervaluation in the current economic system that unfavours its existence and provides

justification for its clearance for other 'greater' purposes. Deforestation is a complex issue that requires stakeholders at various levels to work together to address its importance and value to the society. Unfortunately, if countries continue to prioritise economic development over environmental conservation and only see forests for its instrumental value, the issue of deforestation will persist and sustainable development harder to be achieved.

Marker's Report

- Students who attempted Q2 generally did better than those who did Q1
- However, majority focused on evaluating the strategies when the question requires you to evaluate on the issue and not the strategies. Strategies should only form part of the essay.
- Topics from other themes should be brought into the discussion
- Lack of concrete case studies to illustrate arguments

Section B – Development, Economy and Environment

Answer one question from this section.

3 (a) Explain the reasons for underperforming resource-rich countries. [12]

I: Explain

R: What are the reasons behind resource-rich countries underperforming?

A:

Introduction:

Natural resource-rich countries, as the term suggests, possess an abundance of natural resource which could be utilised for economic and technological advancements. However, it has been observed that most of these resource-rich countries have lower economic and income growth when compared with natural resource poor countries. Wealth in extractive sectors (oil, gas and mining) in general contributes little to national, local and regional development and the alleviation of poverty. Examples of resource-rich countries which are under performing are Nigeria and Venezuela.

Body Para 1:

One of the reasons behind resource-rich countries underperforming would be the economic leakage due to the repatriation of revenue earned. There is a tendency for multinational enterprises involved in natural resource exploitation to repatriate profits, rather than reinvesting in the local economy. Natural resources tend to be owned by firms with significant degrees of monopoly and monopsony power. Examples would be global multinationals such as De Beers diamond mining, oil production by Shell, BP and Esso. This means that the profits from selling natural resources are taken primarily by a small percentage of wealthy shareholders (often foreign). This means profits flow back to the country of the multinational and do not directly benefit the developing economy. Furthermore, the level of tax paid by multinationals is often set at low level to attract investment. Developing economies such as Nigeria, a country blessed with large amount of oil, but cursed with weak legal structures and history of business also see profits syphoned off by corruption. Mining companies do provide employment, but the percentage of earnings going to workers is often low.

Body Para 2:

Monetary value of natural resources in world markets is notoriously volatile and countries which depend on such natural resources solely to generate income for the nation would be awaiting its own doom in the long run, some even in the short run. Instability in prices of many natural resources creates uncertainty, hampering long-term planning. In the real world, the trading relationships between the industrialised

countries and the low-income, primary-producing countries are often unequal. In the first place, there is a long-term tendency of the composition of demand to change as income rise. Thus, the growth in demand for manufactured goods and services tends to be greater than the growth in demand for primary products. This immediately builds a bias into trade relationships between the two groups of countries, such as Nigeria as mentioned above and the United States (Nigeria's largest buyer of crude oil), favouring the industrialised countries such as the US at the expense of the primary producers such as Nigeria, which are often the resource-rich countries. Over time, these inequalities tend to be reinforced through the operation of the cumulative processes of economic growth. As the price of manufactured goods increases relative to the price of primary products, the terms of trade move against the primary producers and in favour of the industrial producers. For the primary producers it becomes necessary to export a larger quantity of goods in order to buy the same, or even a smaller, quantity of manufactured goods. In other words, they have to run faster just to stand still or to avoid going backwards. Although the terms of trade do indeed fluctuate over time, there is no doubt that they have generally, and systematically, deteriorated for the non-oil primary producing countries over the years.

Body Para 3:

Additionally, due to the high level of technology used in extractive industries, the type of jobs created are actually not suited to the profile of the labour force in the resourcerich but underdeveloped countries. These TNCs in the extractive industries therefore employ larger number of skilled labour (often from their home countries) in order to manage the operations and even to operate the high-tech machines. Papua New Guinea (PNG)'s famous OK Tedi copper mine generated 40% of public revenues and 80% of exports. However, OK Tedi only provided 2,000 jobs. Another example is PNG's new Liquefied Natural Gas Project – it may double GDP in five years, but the project will only create 8,000 jobs. Most of PNG's 6.6 million people still live on subsistence agriculture and are poor.

Body Para 4:

The very presence of oil and gas resources within developing countries exacerbates the risk of violent conflict. The list of civil conflicts fought at least in part for control of oil and gas resources is long. A partial list would include Nigeria, Angola, Burma, Papua New Guinea (Bougainville), Chad, Pakistan (Balochistan), and of course Sudan. Econometric studies confirm that the risk of civil war greatly increases when countries depend on the export of primary commodities, particularly fossil fuels. At least three factors could explain this correlation. First, the prospect of resource rents may be an incentive to rebel or secede. Second, wealth from resources may enable rebel groups to finance their operations. Third, the high levels of corruption, extortion, and poor governance that accompany resource wealth often generate grievances leading to rebellion.

- Most candidates who attempted this question scored L3.
- Whilst most are able to provide examples for the reasons they have provided, the elaborations of the reasons are found wanting, especially for the factor of volatile nature of the natural resources.

Marker's Report

(b) Discuss the extent to which overpopulation can help explain the level of development of low-income countries. [20]

I: Discuss

R: To what extent can overpopulation account for the level of development of lowincome countries?

A:

Introduction:

Overpopulation is the state whereby the human population rises to an extent exceeding the carrying capacity of the ecological setting. It is believed that overpopulation will place great demands on resources and land, leading to widespread environmental issues in addition to impacting global economies and standards of living. However, in a world where technology is in a state of flux and economic systems preside over the distribution of various resources in the world, it is perhaps too simplistic to reason that a single problem of overpopulation can explain the poor economic performance, widespread poverty and low standard of living in some of the low-income countries. Therefore, overpopulation can only help explain the level of development of low-income countries to a small extent.

Body Paragraph 1 [Counter stand]:

P: It is true that countries with widespread poverty are often plagued with large population size, with large number of population experience famine and plagued with widespread diseases, where it is apparent that the authorities are unable to cope with the exploding population size.

EE: In fact, this is the doomsday scenario painted by Thomas Malthus in his Theory of Population change. Malthus expressed a pessimistic view over the danger of overpopulation and claimed that food supply was the main limit to population growth. Malthus believed that the human population increases geometrically whereas food supplies can grow only arithmetically, being limited by available new land. This is when preventive checks and positive checks will kick in. Preventive checks are methods which people can choose to reduce human fertility such as abstinence or delaying marriages. Positive checks are anything which increases mortality such as low living standards, unhealthy living conditions resulting in diseases, war and famine. In the case of countries with high poverty rate such as Burundi, a country with limited natural resources and agricultural land with a GDP per capita of \$271 which is the 2nd lowest in the world in 2012, it is often found that these countries would also register high population growth. For example, Burundi has the 2nd highest birth rate in the world of 6.04 in 2016.

L: Thus, it is often argued that population is the paramount factor in determining of the environment is able to withstand the onslaught of demands and impacts that uncontrolled population growth can inflict upon the environment.

Body Paragraph 2 [Pro stand]:

P: However, to not proceed to delve deeper into the reasons behind overpopulation which can seemingly result in low economic development of any country would be too naïve and simplistic.

EE: In fact, there have been countries which may have been considered as overpopulated which would, by the cause and effect suggested by the question, have resulted in low-income status of these countries. However, the opposite has been observed to be true as Malthus has overlooked one very important factor which may affect carrying capacity and thus, enable any less well-endowed countries to carry population far beyond its initial carrying capacity. According to Esther Boserup, population growth will trigger technological gains and therefore, agricultural growth. Malthus was not able to anticipate that food supplies could be increased not only by

increasing the supply of land (which he saw was finite) but also by improving fertilizers, crop strains and so forth. In fact, in most of the advanced countries the rate of increase of food production has been much greater than the rate of population growth. Even in India now, thanks to the Green Revolution, the increase in food production is greater than the increase in population. Singapore, whose carrying capacity would only be about 100,000 people if calculated based on available land size, would be a low income country if not far reaching technological innovations which ensures that more than 5.5 million people in the country is living decently with one of the highest GDP per capita in the world.

L: In other words, rather than pointing to overpopulation as the main cause of widespread poverty, countries which have not been able to yield from technological innovations might see that their resources seemingly are inadequate to meet the basic needs of their expanding population.

Body Paragraph 3 [Pro stand]:

P: The overpopulation argument is easily used as part of an elaborate apologetic through which class, ethnic, or (neo-)colonial repression may be justified but if one delves deeper, it can be realised that a lot of low-income countries are actually rich in resources and should not be in such predicaments, if not for the economic system dominated by the capitalists and elite ruling classes which have left the allocation of resources to market forces and a few elite ruling classes of the State which resulted in failed allocation of resources.

EE: The exploitative social relation between capital and labour is essential for the creation of surplus value which is gained by underpaying labour to produce a profit. This allows for the accumulation of capital by a small number of individuals who through dispossession and accumulation bring about the formation of a powerful capitalist class. When capital becomes concentrated in this manner in the hands of a few, overproduction results when workers earn insufficient wages to purchase the goods that may be available to them, leading the system to its own collapse. Unfortunately, this capital accumulation by the few elites often take place at the expense of resource-rich countries were resources are extracted by exploiting labour. Thus, the local mass population remains poor whilst the economic gains were syphoned off by the elites, sometimes foreigners. Sierra Leone, a country with high population growth, has significant mineral, agricultural and fishery resources that could lead the country to economic growth. However, the country is still one of the top 10 poorest countries in the world. Rampant corruption meant that most of the economic gains have been siphoned off by the military and/or the TNCs and local farmers and workers have to cope with high inflation and low income.

L: Therefore, it can be seen from the example of Sierra Leone that overpopulation may just be a façade that hides the true problem of resource allocation as Harvey has suggested.

Body Paragraph 4 [Pro stand]:

P: Harvey has further posited that the problem of overpopulation resulting in lowincome country may be a result of a fundamental flaw in human's value system of how Man places arbitrary values on nature which leads to indiscriminate exploitation of available use values to the point of ecological collapse.

EE: Capital has often exhausted and even permanently destroyed the resources latent in nature in certain locations. This has been particularly true when capital is geographically mobile. When the cotton growers in the American South or the coffee growers of Brazil exhausted their soils they simply moved on to other more fertile lands where the profitable pickings were even easier. Colonies were mined for their resources without regard to the local (often indigenous) population's well-being, leading to widespread poverty. The ecological effects are localised, leaving behind an uneven geographical

landscape of abandoned mining towns exhausted, soils, toxic waste dumps and devalued asset values which ultimately lowers the standard of living of locals surviving on the land.

L: By questioning our value system which has resulted in ecological collapse, one would easily realise that overpopulation is but a façade to mask the inherent problem in our economic system resulting in widespread poverty in several countries in the world.

Conclusion:

In 1798 Thomas Malthus erroneously predicted social catastrophe (spreading famine, disease, war) as exponential population growth outran the capacity to increase food supplies and even up till today, several countries plagued with widespread poverty have attempted to use his theories to justify the poor standard of living in the country. However, one would have to delve deeper into the concept of 'overpopulation' to realise that there are several other more deep-seated reasons for the problems that are plaguing the low-income countries now.

Synoptic link: [Theme 1: SD] There is perhaps a need to re-evaluate how our economic system allocates resources to ensure equity and justice. At the root of it all, it might boil down to our humans have erroneously (not) assign values to nature, bringing about unsustainable development and ultimately, to our own demise.

Marker's Report

- Problematic to dump Malthus, Boserup and Harvey's theories as the answers without really addressing the question: this is not asking candidates to evaluate the validity of Malthus, Boserup and Harvey, but rather, using their theories to validate the statement or otherwise. Do note that there is a difference.
- For candidates who are able to craft TS answering to the questions, elaborations may still be weaker as there needs to be more targeted elaborations <u>to answer the question</u>, not just elaborating on Malthus, Boserup and Harvey's theories.

4 (a) Explain the factors contributing to transboundary water conflict. [12]

I: Explain

R: What are the reasons behind transboundary water conflict?

A:

Introduction:

While the underlying reasons for water-related controversy can be numerous, such as power struggles and competing development interests, all water disputes can be attributed to one or more of three issues: quantity, quality, and timing.

Body Paragraph 1:

Competing claims for a limited quantity of water are the most obvious reason for waterrelated conflict. The potential for tensions over allocation increases when the resource is scarce. But even when pressure on the resource is limited, its allocation to different uses and users can be highly contested. As people become more aware of environmental issues and the economic value of ecosystems, they also claim water to support the environment and the livelihoods it sustains. The Mekong is one of the world's major rivers. From the Tibetan Plateau, it runs through China's Yunnan province, Myanmar, Thailand, Laos, Cambodia and Vietnam. The mainstream Lancang/Mekong Dams in Yunnan Province hold incalculable risks and costs for the millions of people residing along the downstream stretch of the Mekong River and in the Mekong Delta. Silt and sediment required to sustain agriculture along river banks and in the Delta will be retained behind dam walls not only on the mainstream Lancang/Mekong but also behind dam walls on its tributaries, fish migration routes will be impeded, and natural seasonal (monsoonal) flows to which the river's ecosystem and people have adapted to over generations will be altered. An example of conflict occurred in 2004 when a sudden drop in the water level led to anti-China demonstrations in Mekong river countries

Body Paragraph 2:

Another contentious issue is water quality. Low quality—whether caused by pollution from wastewater and pesticides or excessive levels of salt, nutrients, or suspended solids—makes water inappropriate for drinking, industry, and sometimes even agriculture. Unclean water can pose serious threats to human and ecosystem health. Water guality degradation can therefore become a source of dispute between those who cause it and those affected by it. Further, water quality issues can lead to public protests if they affect livelihoods and the environment. Water quality is closely linked to quantity: decreasing water quantity concentrates pollution, while excessive water quantity, such as flooding, can lead to contamination from overflowing sewage. The Colorado River is the primary source of water for a region that receives little annual rainfall. The Colorado River Basin offers a major renewable water supply in the southwestern US. the signing of the Colorado River Compact in 1922 was an important milestone in the management of the Colorado River and became the foundation for the law of the river. this compact included the seven Colorado River Basin states (Wyoming, Colorado, Utah, New Mexico, Nevada, Arizona and California), and apportioned water from the Colorado River between the Upper and Lower Basin states. Mexico was initially excluded from the compact until 1944 when Mexico was guaranteed 1850 million cu m of Colorado water. However, no provision was made for water quality, which has now become a contentious issue. Water now delivered to Mexico has already been used in the Wellton-Mohawk Irrigation district close to the USA-Mexico border. It is often of high salinity before its transfer to Mexico. A desalination plant was completed in 1992 at Yuma, Arizona but was only fully operational until early 2004 as it was considered too expensive to run. the salinity of the source water is also affecting the amount of reclaimed water for use in the Lower Basin states. Potable use and resultant wastewater treatment concentrates the salts

Body Paragraph 3:

Third, the timing of water flow is important in many ways. Thus the operational patterns of dams are often contested. Upstream users, for example, might release water from reservoirs in the winter for hydropower production, while downstream users might need it for irrigation in the summer. In addition, water flow patterns are crucial to maintaining freshwater ecosystems that depend on seasonal flooding. When unilateral development initiatives produce international tensions, it becomes more difficult to support cooperative behaviour. As mistrust between riparians grows, threats and disputes rage across boundaries. One of the most important sources of water for both Israelis and Palestinians, the Mountain Aquifer, is threatened by pollution from untreated sewage. The existing conflict has impeded donor initiatives to build wastewater treatment plants in Palestine, setting the stage for a vicious circle as groundwater pollution increases regional water scarcity and, in turn, exacerbates the Israeli-Palestinian conflict.

- Generally high L3 was awarded.
- Could have improved to a higher level if elaboration could be detailed on each of the given cause.
- Some responses lacked example.

Marker's Report

(b) Evaluate the effectiveness of strategies used to manage transboundary sources of water supply and associated conflicts. [20]

I: Evaluate

R: To what extent have the strategies used to manage transboundary sources of water supply and associated conflicts been successful? A:

Introduction:

International basins that include political boundaries of two or more countries cover 45.3 percent of Earth's land surface, host about 40 percent of the world's population, and account for approximately 60 percent of global river flow. Water was an underlying source of political stress and one of the most difficult topics in subsequent negotiations. In other words, even though the wars were not fought over water, allocation disagreements were an impediment to peace. If one were to measure the 'effectiveness' of strategies to manage transboundary sources of water supply by the number of wars and physical conflicts that countries have inflicted upon one another, then the strategies must have worked extremely well as it has been observed that no war has erupted primarily due to water conflicts in the past century. However, if one were to define effectiveness of these strategies as whether or not the lives of the people whose lives depend on the rivers have improved, then it can be argued that the strategies would be effective to a small extent. Considering that there are still millions of people who are unable to access to clean water from the rivers for drinking and daily use, it seems that at a local level, the strategies may have been ineffective.

Body Paragraph 1 [Counter stand]:

P: Transboundary water management strategies provide a platform for multiple stakeholders in multiple countries for constructive debates and decision making in order to try to resolve competing interests for a win-win situation.

EE: Even if the negotiation process can be lengthy, most disputes are resolved peacefully and cooperatively on the able. Such cooperative water management mechanisms can anticipate conflict and solve smouldering disputes, provided that all stakeholders are included in the decision making process and given the means (information, trained staff, and financial support) to act as equal partners. Since 1996, 125 member organisations from 49 countries have been part of the International Network of Basin Organisations whose objectives include: facilitating the exchange of experiences and expertise among network members; promoting the principles and means of sound water management in sustainable development cooperation programmes; promoting the exchange of information and training programmes for the different actors involved in water management. On the international level, river basin commissions with representatives from all riparian states have been successfully involved in joint riparian water resources management. Especially in transboundary basins, achieving cooperation has been a drawn-out and costly process. Recognising this, the World Bank agreed to facilitate the Nile Basin Initiative negotiation process for 20 years. In the Nile basic case, an "elite model" that seeks consensus between high-level representatives before encouraging broader participation has enjoyed some success in developing a shared vision for basin management.

L: Thus, such water management mechanisms do allow countries to put forth their issues and disagreements on the table for negotiation and in doing so, with third parties facilitating, some improvements have been made. **P:** However, although there are have been numerous numbers of platforms serving as strategies for countries to negotiate deals for transboundary water sources to ensure equity amongst all riparian states, the problems associated with individual transboundary water systems are very country-specific.

EE: They accommodate factors including fears over national sovereignty, political sensitivities, historical grievances and national self-interest. Thus, developing international principles for the management, and control of such resources remains problematic. Furthermore, it is also recognised that realising the outcomes of international agreements will need to depend on close consideration of local interests and appropriate understanding, tools and capacity at that level if measures to achieve those goals are to be implemented. Therefore, if the number of countries involved as stakeholders in the river management, the more difficult it is for outcomes to be desirable for all stakeholders. For example, the Colorado River treaty between the US and Mexico were successful in allowing Mexico to rightfully access good quality river water because there are only 2 countries involved and both the US and Mexico do have cordial relationship. The upstream riparian state, the US, shows commitment and willingness to resolve the conflict of interest over shared water resources and both nations are willing to re-negotiate and re-interpret the 1944 Treaty and credit must be given to the US for their willingness to 'keep their promise' regarding the supply of water to Mexico. the water treaties were re-negotiated to a higher level within the 1993 North American Agreement on Environmental Cooperation between Canada, US and Mexico. This leads to the founding of a highly regulated administration which jointly decided laws, verifications and sanctions. With this agreement, the mere advisory functions of water commission is upgraded to one with legal and political weight.

L: However, such cases are few and far between due to the unique condition of the (only) two riparian states and their relationship.

Body Paragraph 3 [Pro stand]:

P: Many of these river agreements also involve large numbers of countries or riparian states, and the fact that not all states possess equal bargaining chips or power may render such agreements or cooperation ineffective for countries with lesser bargaining power.

EE: Some agreements have hinged upon economic cooperation to jointly utilise the rivers for joint economic purposes to bring about better standards of living for the people of all the riparian states. This depends on the willingness shown by all states to 'compromise' their sovereignty during discussion and cooperation. nations should not look at 'restrictive sovereignty'. Rather, they should look at sovereignty from the perspective of positive cooperation and interdependence. However, this is easier said than done. The Mekong River Commission, while having good intentions and objectives to resolve any potential conflicts of interest among riparian nations, is not as effective as it plans to be. For example, China is one of the most powerful nations in the Mekong region and without its participation in the main inter-governmental cooperation framework for managing the Mekong Basin's resources, the main inter-governmental cooperation framework for managing the Basin's resources will be ineffectively carried out.

L: Therefore, till date, there has been reports of the Mekong river being dammed or polluted upstream, reflecting the difficulty of coming up with a consensus if there are too many states with unequal power in the negotiation.

Body Paragraph 4 [Pro stand]:

P: Finally, although many water agreements have stressed the importance of protecting the immediate environment of the rivers as environmental degradation of, and surrounding the river may bring about negative economic consequences, it is sometimes

even harder for developing economies to want to partake in this narrative to protect their rivers.

EE: Given the fact that many of the riparian countries of some rivers are either at the early stage of the economic development or rebuilding their economy, environment strategy of resolving the conflict of interest over shared water resources will not be very much favoured by the riparian countries. For example, since the livelihood and prosperity of a growing population living in the Mekong River Basin depends on a healthy environment, there have been plans to provide a framework for managing the Mekong River and an indicative Mekong River Basin Environmental Report card to inform the people of the basin about environment conditions, urging riparian states to take care of the Mekong River basin. However, given the fact that many of the riparian countries of the Mekong River region are either at the early stage of the conflict of interest over shared water resources will not be very much favoured by the riparian countries, rendering such approaches to be ineffective.

L: Therefore, with many countries whose leaders may lack the foresight or planning skills to approach the problem holistically, it is hard for water agreements to be effective to bring about better standards of living for the millions of people whose lives depend on the river.

Conclusion:

Water management is, by definition, conflict management. For all the twenty-first century wizardry—dynamic modeling, remote sensing, geographic information systems, desalination, biotechnology, or demand management—and the new-found concern with globalization and privatization, the crux of water disputes is still about little more than opening a diversion gate or garbage floating downstream. Yet anyone attempting to manage water-related conflicts must keep in mind that rather than being simply another environmental input, water is regularly treated as a security issue, a gift of nature, or a focal point for local society. Disputes, therefore, are more than "simply" fights over a quantity of a resource; they are arguments over conflicting attitudes, meanings, and contexts. Obviously, there are no guarantees that the future will look like the past; the worlds of water and conflict are undergoing slow but steady changes. An unprecedented number of people lack access to a safe, stable supply of water. As exploitation of the world's water supplies increases, quality is becoming a more serious problem than quantity, and water use is shifting to less traditional sources like deep fossil aquifers, wastewater reclamation, and interbasin transfers. Conflict, too, is becoming less traditional, driven increasingly by internal or local pressures or, more subtly, by poverty and instability. These changes suggest that tomorrow's water disputes may look very different from today's.

Marker's Report

- Substantiation of arguments is lacking in the responses.
- May be effective to use a single case study but evaluating it from multiple angles (e.g, why Mekong River Commission was not very effective at several levels/scales).
- Higher level of response would consider not just economic benefits of such water management strategies but an evaluation of the environmental impacts or benefits of such water agreements. It would also look into the nuances of negotiating such agreements or consensus such as the difference in bargaining power and negotiating stances of the riparian states.

Section C – Sustainable Development

Answer one question from this section.

5 (a) Explain the evidence of climate change since the last Ice Age. [12]

I: Explain

R: What are the evidence showing climate change since the last Ice Age?

Introduction:

Though huge gaps exist in our knowledge of past climates, scientists have learned much about the climatic history of earth. Humans continue to gain insights into past climates based on information left in the geological and biological records through what are called proxy indicators. Proxy data gives us some idea of paleoclimates, the climates of the past, must have been like. Methods to uncover evidence of climate change since the last Ice Age (last glacial maximum was about 20,000 years ago) is explained below.

Body Paragraph 1:

The study of ocean deposits can enable us to get a glimpse into the isotopic records of oxygen in the ocean, thereby allowing us to understand the climate conditions at any point in time reflected by the age of the ocean deposits. Chemical composition of the shells of foraminifera (a form of zooplankton) are studied for the isotopic record of oxygen in ocean. The chemical composition of the shells they construct is affected by the chemistry of the ocean waters in which they live. When foraminifera die, the hard shells fall to the ocean floor, to accumulate as ocean sediment. Cores of sediment recovered from the deep oceans provide a record of these organisms that goes back in time, as successive generations of shells have been deposited on those of their predecessors. An analysis of the isotopic composition of the calcium carbonate in these shells would provide a picture of changing ocean chemistry over time. During glacial period, water is continuously removed from the oceans and stored on land in the form of snow and ice. Water molecules are removed from the oceans by evaporation but not returned via condensation and rainfall. The remaining ocean slowly becomes depleted in the lighter isotope (O16 isotope)/ enriched with the heavier isotope (O18 isotope). There will be higher O18 content in the water and hence in the shells of foraminifera during glacial period and the reverse for interglacial periods. Thus, the O16 and O18 isotopes in ocean deposits will allow us to estimate the glacial and interglacial periods.

Body Paragraph 2:

A remarkably detailed record of past changes in climate has been established from ice cores, mainly from the Greenland and Antarctic ice sheets and from glaciers at lower latitudes. Snow that accumulates at high altitude does not melt but gets buried by later snowfall and compressed into ice. As more snow accumulates, the ice itself is slowly compressed, flowing outwards towards the edge of the ice sheet. By drilling down through the centre of an ice sheet, a record of past snowfall events can be recovered. Scientists have also determined the O18/O16 ratio for deep ice cores obtained. In the ice that forms during glacial period, there would be higher concentration of O16 isotope due to higher evaporation rates of O16 isotopes, and hence less concentration of O18 isotopes in the ice that forms. Ice cores also provide information on the past chemistry of the atmosphere. As new snow falls onto a glacier, bubbles of the ambient air were trapped in the ice. They can be used to reconstruct how the composition of the atmosphere has changed from glacial to interglacial periods. The concentration of the atmosphere has changed from glacial to interglacial periods. The concentration of the atmosphere has changed from glacial to interglacial periods. The concentration of the iter varying levels in the air. There exists a strong correlation between past

temperatures and concentrations of carbon dioxide and methane. Low levels of these gases are observed during glacial periods while high levels are observed during interglacial periods

Body Paragraph 3:

Since the distribution of vegetation is largely controlled by climate, an understanding of changes in the plant communities of an area over time can be used to infer how the climate in that particular location may have changed over time. Pollen grains are extremely resistant to decay and have a form that differs from one plant to another. Lake sediments may contain pollen grains deposited from the vegetation in the local region. The study of deposition of pollen grains allow one to infer the past climate at a local scale. Cores of sediment from lakes can thus give a picture of what vegetation was like in the past. It is also possible to map out how individual species have migrated over time.

Marker's Report:

- Question is poorly done.
- Many students have confused evidences of climate change with factors contributing to climate change.
- Most students have not addressed the context of the question "last ice age" well and explicitly.
- (b) 'Adaptation strategies to lower impacts of climate change is more worthy an investment than mitigation strategies against climate change'.

Discuss the validity of the statement.

[20]

I: Discuss

R: To what extent are adaptation strategies a worthier an investment than mitigation strategies against climate change? A:

Introduction

Climate change is defined as a change in any statistical property of the atmosphere, such as a change in mean temperature. Limiting the effects of climate change is necessary to achieve sustainable development and equity. Two responses to climate change are mitigation and adaptation. Mitigation refers to human intervention to reduce the sources or enhance the sinks of greenhouse gases (GHGs) so as to reduce the rate of climatic change via the management of its drivers. Adaptation is the process of adjustment to actual or expected climate and its effects, to moderate harm or exploit beneficial opportunities. If one were to calculate the returns of adaptation and mitigation strategies against climate change and decide if which one is more worthy, it would perhaps be useful to assess based on the geographical concepts of place and time. For countries especially countries of low level of development bearing the brunt of the effects of climate change, it would perhaps be worthy to invest in adaptation strategies as they are more immediate and could save lives and properties against the onslaught of impacts of climate change. However, if one were to assess the long term returns of the both mitigation and adaptation strategies for both developed and developing countries, one could argue that mitigation strategies would be worth the investment in the long run. Therefore, it is to a small extent that adaptation strategies are more worthy an investment than mitigation strategies.

Body Paragraph 1 [Counter stand]:

P: Adaptation strategies are indeed one of the most important investment for countries which are facing threats from effects of climate change, especially for countries of low development, because as compared to mitigation strategies, effects of adaptation strategies are more immediate, especially in the face of increasing incidence of extreme weather events.

EE: In fact, The IPCC urged particular attention be given to adaptation in developing countries where climate change brings additional threats and compounds existing risks and vulnerabilities within countries with the fewest resources and where the majority of the world's poor live. Governments at various levels are starting to develop adaptation plans and policies and to integrate climate-change considerations into broader development plans and to increase the adaptive capacity of their city or country. In Kenya, for example, droughts which once occurred every 10 years has become an annual event, wiping out livestock and causing famine. As an alternative to food aid, an NGO-financed Meat Safety Net Programme pays herders a fair, fixed price for the weakest cows or goats. The animals are slaughtered and the meat and hide are returned to the seller. They can then use the money to restock, pay food or pay off debts. Kenya is a country with low adaptive capacity and without this investment from NGOs and various other stakeholders, the farmers and many others in Kenya would have led worse lives or even lost their lives in the short run when there is more extreme weather in the region.

L: As compared to mitigation strategy, adaptation strategies like that mentioned above would have saved lives and properties more than others and is definitely a worthier investment especially in the context of low-income development countries which are vulnerable to climate change impacts.

Body Paragraph 2 [Pro stand]:

P: Unfortunately, although adaptation strategies' effects are immediate, they unfortunately are unable to ensure that the strategies could hold off the impacts of climate change forever, as long as climate change continues to exacerbate the various impacts of various climatic disasters.

EE: This is especially true for hard adaptation strategies which rely mostly on man-made structures to offer direct protection by defending vulnerable areas. These usually involve capital-intensive, large, complex, inflexible technology and infrastructure. However, not only are they capital intensive, but they also lack flexibility and adaptability to sudden changes in projections of climate change. Developing countries would often have to borrow money from the World Bank or International Monetary Fund and incur huge interest whilst trying to pay off the debt, which constitutes huge investment with high opportunity cost for such countries. Unfortunately, this 'investment' is unable to last long as climate change may actually mean that it is often inadequate to build these infrastructures to last a stronger hurricane, or storm surge, or extreme temperatures. For example, sea level has risen by 50cm/century in New Orleans which increases the risk of coastal flooding. Flood defences have been improved after each flood. However, no systematic risk management practice has been implemented. The 2005 flood affected 80% of the city and killed 1800 people, despite the flood walls being built and reinforced almost every year by the local government.

L: Thus, it will be naïve for authorities to think that as long as they 'invest' more to build costly infrastructure to protect its people against impacts of climate change, they would surely be protected, bring into doubt the real 'returns' of such adaptation strategies.

Body Paragraph 3 [Pro stand]:

P: On the contrary, strategies to mitigate climate change are more worthy an investment because they address the root cause of climate change, which is definitely worth the investment in the long run in order to eradicate impacts of climate change in the long run, as opposed to adaptation strategies.

EE: Mitigation strategies involve ways to either reduce emissions of GHGs or enhancing carbon sinks on earth. Through these strategies, the amount of GHGs that trap heat in the atmosphere and 'responsible' for the rise in global average temperature on earth would be reduced. This would then slow down the rate at which climate is changing and its associated impacts. To mitigate climate change, the Kyoto Protocol which is an international treaty, was set up in 1997 and it placed obligations on developed countries to cut down their current GHG emissions to an average of 5% against 1990 levels. It was the first ever global climate diplomacy and results have shown that the sum of emissions from nations with legally binded Kyoto targets have fallen. Besides at the international arena, countries have also stepped up in their mitigation efforts. To reduce emissions associated with deforestation, Brazil has slowed down its rate of deforestation by half in late 2000s through policies rolled out. Also, Thailand has successfully restored 10 hectares of mangroves in coastal areas in a bid to enhance its carbon sink. All these strategies aim to deal with climate change by reducing the amount of GHGs in the atmosphere.

L: Therefore, in order to resolve the root cause so that in the long run, adaptation strategies could take a backseat, mitigation strategies would certainly be imperative.

Body Paragraph 4 [Pro stand]:

P: More importantly, what humans deem as 'worthy' may not so for the entire ecosystem, such as adaptation strategies who have been argued to be extremely anthropocentric – focusing on protecting humans at the expense of the environment and

EE: To illustrate, there has been efforts to improve the provision of potable water as weather variability due to climate change could present significant challenges for the management of water resources. One such method is desalination, a costly method to treat seawater such that it becomes potable. As the cost is high of both setting up and running the systems are high, it definitely requires high amount of capital investment from the government to set up and run the system. Even for countries which foresee water supplies being unstable or unpredictable because of unpredictable weather and climatic conditions, it may seem like a worthy investment to build desalination plants, as seen in the success of Singapore. However, this may not be the case in other countries as such desalination plants increase the salinity of soil or rivers further downstream, destroying ecosystems and the environment. For all the flora and fauna which would be destroyed due to this strategy, one would question the true net worth of such methods. L: Hence, if one were to view the issue from a systems perspective, adaptation strategies succeeding to protect humans at the expense of other natural environments may not be that worthy of an investment after all, the 'worthiness' is defined narrowly by humans for our own benefit.

Conclusion:

Whilst adaptation strategies are definitely important to save lives and properties in the short run, it certainly cannot be a cat and mouse game – of catching up with scarier and more detrimental effects of climate change by building taller, stronger and smarter infrastructure or adaptable plans. Governments would still need to put in concerted effort to ensure that their future generations of children do not have to keep up with this cat and mouse game – that the future is one which is sustainable and mitigation

efforts would have to be stepped up to ensure that this is not just a few targets and policies written on policy papers but never fulfilled. If the earth can be saved from effects of climate change in the long term and our children can have the same safe and clean environment as enjoyed by their fathers, then this would then be the worthiest investment that any government and authority can make.

Marker's Report:

- Students have generally shown a good understanding on the different strengths and weaknesses of mitigation strategies and adaptation strategies.
- Students can afford to engage more critically with the debates surrounding climate change.
- 6 (a) Explain the difficulties of measuring urban liveability in cities of low levels of development. [12]

I: Explain

R: How difficult is it to measure urban liveability in cities of low levels of development? A:

Introduction:

Liveability - defined as a perspective on the quality of urban life space - is hugely complex and contextual. Liveability is a subjective rather than an absolute term and its precise meaning depends on the place, time and purpose of the assessment and on the value system of the assessor. A liveable city can be understood as one where essential needs of the urban population such as food, shelter and security are fulfilled. But recent discussions, particularly in the context of developed countries, have framed the notion of a "liveable city" akin to a "desirable city." This shift in emphasis from minimum requirements for liveability to lifestyle choices has brought with it a cottage industry of international ranking systems and indicators that compare cities on the basis of material wellbeing, as well as social and environmental performance indicators. However, for cities of low levels of development, this 'industry' of measuring and ranking cities have brought about problems as one would discover that it is not straightforward or easy to measure urban liveability at cities of low levels of development.

Body Paragraph 1:

It is difficult to measure liveability in cities of low level of development in accordance to the basket of indicators as stipulated by many in the liveability indexes as the basis of these comparisons may be western-centric. A good example would be The Mercer Quality of Living Survey ranks cities on their quality of life. Cities are evaluated based on 39 factors including political environment, economic environment, natural environment, personal safety, health, education, transportation and other public service factors. Cities were compared to New York City which was given a base score of 100. Mercer's Quality of Living Survey is dominated by well-manicured older European cities such as Zurich, Geneva, Vienna, Copenhagen, Helsinki and Munich, as well as New World metropolises in the western world like Vancouver and Toronto; Auckland, New Zealand; and Perth and Melbourne in Australia. Therefore, it would be difficult to measure the cities of low

development based on the same basket of indicators and compare them with other cities in the world for a fair and unbiased comparison.

Body Paragraph 2:

Even if one were to ignore the difficulty of using the same basket of measurements to compare cities of different contexts and insist on using the indicators to assess a city's liveability, it would be difficult to attain reliable data for meaningful assessment in the cities of low levels of development. Liveability indexes such Economic Intelligence Unit (EIU) Liveability Ranking scores each city <u>on over 30 qualitative and quantitative factors</u>, across five broad categories: 1) Stability; 2) Healthcare; 3) Culture and Environment; 4) Education and 5) Infrastructure. Like many other indicators, EIU's liveability ratings allow urban authorities to monitor and keep track of past impacts, present state and future plans to design policies that can better the state of urban environments. However, in cities of low development where there are informal housing and economy, one can imagine how strenuous it would be gather to data on education and infrastructure. Even if there would be data in these areas, the reliability of the data would be questionable.

Body Paragraph 3:

As mentioned above, liveability as a concept is extremely subjective and to truly measure liveability in the cities of low development can be difficult as urban dwellers even within the same city has different views and opinions about liveability. EIU's measurement of liveability had ranked Beijing as the most liveable city in China, much to the disdain of the millions in China as it is well known that Beijing is heavily polluted. Berkeley Earth's scientific director, Richard Muller, as saying that breathing Beijing's air is the equivalent of smoking almost 40 cigarettes a day and calculates that air pollution causes 1.6 million deaths a year in China, or 17 percent of the total. However, there are also many in China who felt that should Beijing be less liveable, why would thousands still flock to the capital city for work every year. Therefore, there must be some aspects of Beijing which outweighs the effect of pollution in these urban dwellers' minds. It is therefore difficult to measure a defined set of indicators for liveability when such a concept is in itself controversial and subjective.

Marker's Report:

- Question is poorly done.
- In most scripts, the concept of "urban liveability" has not been carefully unpacked.
- Some students have confused sustainable urban development indicators with liveability indicators.
- Most students have not addressed the context of the question "in cities of low levels of development" well and explicitly.
- (b) "Cities are liveable places for the elderly".

How far do you agree with the statement?

[20]

could be said to be a biological reality, being "old" is simultaneously a social construct. Westernization and capitalist development today is fast expanding negatives connotations of an "elderly" associated with "physical decline", "immobility" and "unproductivity". Such social constructs, norms and expectations associated with an "elderly" have spatial consequences. This means that urban environments can become sites where ageism, defined as the stereotyping and discriminating of individuals or groups on the basis of their age, can be reproduced.

This essay agrees with the statement to a small extent. While cities could be liveable places for the elderly if sound policies are put in place to create "age friendly" environments, a critical analysis will reveal that cities in general continue to be unliveable sites with the diverse and heterogeneous experiences of elderly neglected. At the same time, a large portion of the elderly population continues to be economically marginalise as they struggle to remain compatible with the capitalistic economy. Cities will remain unliveable spaces if elderly are financially insecure – without the capacity to afford and have their social needs catered. Lastly, cities remain largely designed for a "mythical average person" – super-mobile, without dependants or disabilities. This person is more likely to be young than old. The result is the continued exclusion and spatial segregation of elderly from urban landscapes.

<u>Body</u>

TS1: Cities could be liveable places for the elderly if sound policies are put in place to create "age friendly" urban environments.

An age-friendly city encourages active ageing - defined as the process of optimizing opportunities for health, participation and security in order to enhance quality of life as people age. In practical terms, an age-friendly city adapts its structures and services to be accessible to and inclusive of older people with varying needs and capacities.

Case Study: Milan, Italy has made a commitment to accessibility which goes above and beyond what is required by Italian and European law. Its building standards not only support accessibility and usability but they also promote Universal Design standards. There is a high level of accessibility across most means of transportation with two of the city's four metro lines fully compliant for people with disability and elderly. Recently, Milan, Italy won the Access City Award – the European prize for making cities more accessible to people with disabilities and elderly.

Creating an age-friendly city requires strong political commitment. This commitment to construct age-friendly cities however remain unseen in most cities across the world.

TS2: Most cities across the world continue to be unliveable sites with the diverse and heterogeneous experiences of elderly neglected.

Case Study: Elderly is not a heterogeneous category. "Old age" intersects with other identity markers such as class, race, ethnicity, religion, gender, sexuality etc. to create varying levels of marginal experiences for elderly. A research performed by Ontario Human Rights Commission of elderly experiences in Toronto, Canada has found out that while older men do experience particular concerns, the unique and often compounded disadvantage experienced by older women needs to be recognised. Owing to a number of factors including longer life expectancy, labour force participation patterns, wage inequality, social programs and systems designed primarily from a male-centred or gender-neutral perspective, older women are more likely to experience poverty. This however continues to be unrecognised by most urban policymakers.

TS3: Next, a large portion of the elderly population continues to be economically marginalise as they struggle to remain compatible with the capitalistic economy. Cities will remain unliveable spaces if they are financially insecure – without the capacity to afford and have their social needs catered.

Capitalism promotes people who are productive and independent. They should earn for their life and pay taxes for the state. Elderly are unable to meet the requirements of an "ideal citizen" in a capitalistic economy. The elderly population are not able to work as efficiently as the young. They may also experience health limitations and are unable to perform types of work that demand physical strength. These biological and physiological restrictions also reduce their mobility, a feature commonly desired by employers. Economic marginalisation of the elderly is also perpetuated by the "social construction" of old age associating elderly population with characteristics of "physical decline", "immobility" and "unproductivity". In addition, there is also a belief that elderly are outdated and unable to master the techniques of handling modern technologies. While such associations are gross generalisations, they have reduced the elderly population's economic mobility and chances.

Case Study: Based on a research from the Australian Human Rights Commission, it is documented that 27% of Australians aged 50 years and above have had experienced some form age discrimination at workplace in the last two years.

TS4: Lastly, cities remain largely designed and thought to cater for a "mythical average person" – super-mobile, without dependants or disabilities. This person is more likely to be young than old. The result is the continued exclusion and spatial segregation of elderly from urban landscapes.

The physical urban reality and social construct that elderly do not belong to many urban spaces have restricted their mobility. An implication of spatial exclusion brought about by elderly unfriendly urban design is segregation – whereby "selfimposed house arrest" of the elderly have meant that city centres have become agecleansed youth enclaves. A city that excludes certain social groups is an unjust and unliveable city.

Case Study: Spatial exclusion can be witnessed in the context of Singapore where elderly who only speak dialects and mother tongues face issues orientating in urban environments that cater predominantly to English speakers. Lack of intelligible signage discourage elderly from exploring far from their familiar home and neighbourhood, physically excluding them from many urban experiences.

Extension

This essay has argued that cities remain largely unliveable places for the elderly. In extension, looking ahead, as an ageing population becomes an increasing reality across cities in both the developed and developing world, addressing the marginal experiences of elderly is crucial, and these efforts have to be immediate if policymakers and political authorities are interested in improving the urban liveability of cities.

Marker's Report:

- Students have generally shown a good understanding on the possibilities and challenges for elderly living in the city.
- Most examples that students have drawn upon to support their arguments are from the context of Singapore.