



**HWA CHONG INSTITUTION**  
**JC2 Preliminary Examination**  
**Higher 2**

**CANDIDATE  
NAME**

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**CT GROUP**

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**CENTRE  
NUMBER**

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**INDEX  
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**GEOGRAPHY**

**9751/01**

Paper 1 Structured Essay Questions

**16 September 2019**

**3 hours**

Additional Materials: Answer Paper  
World outline map

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**READ THESE INSTRUCTIONS FIRST**

Write your name and CT class clearly on all the work you hand in.

Write in dark blue or black pen on both sides of the paper.

You may use an HB pencil for any diagrams or graphs.

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.

Diagrams 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.

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.

**Submit your answers in three separate sets:**

- 1. Section A**
- 2. Section B**
- 3. Section C**

**If you have not attempted any of the questions, you are to indicate this in the answer booklet.**

### Section A – Tropical Environments

Answer **one** question from this section.

- 1 (a) Explain the main soil forming processes in the tropics. [12]
- (b) To what extent is climate the most important factor in weathering and mass movement processes in the tropics? [20]
- 2 (a) Explain the main processes involved in landform formation in the arid tropics. [12]
- (b) 'Geology is the main determinant of the nature of landforms in the arid tropics'. How far do you agree with this statement? [20]

### Section B – Development, Economy and Environment

Answer **one** question from this section.

- 3 (a) Explain the relevance of bottom-up development with reference to countries at low levels of development. [12]
- (b) To what extent can the Millennium Development Goals (MDGs) effectively measure development? [20]
- 4 (a) Explain how the nature of water scarcity might differ between countries at low and high levels of development. [12]
- (b) To what extent can governments effectively manage water resources today? [20]

[Turn over

**Section C – Sustainable Development**

Answer **one** question from this section.

- 5 (a) Explain how sustainable development involves the concept of 'needs' in countries at low levels of development. [12]
- (b) To what extent can the political and economic challenges in attaining sustainable development be overcome? [20]
- 6 (a) Explain the relationship between urban liveability and youths in countries at high levels of development. [12]
- (b) To what extent can countries achieve sustainable urban development and liveability? [20]

----- End of paper -----

# 2019 C2 Prelims H2 GEOGRAPHY PAPER 1

## Suggested Answers

- 1 (a) Explain the main soil forming processes in the tropics.

[12]

In the humid tropics the main process is eluviation due to the high amounts of rainfall and the possible subsequent illuviation of minerals and humus in the lower layers of the soil. In the arid tropics, eluviation can occur with rainfall events but capillary action is more significant.

**Calcification** is a process whereby capillary action results in increasing concentrations of calcium in the soil (Fig. 1). Calcification is typical of low-rainfall areas where potential evapotranspiration is greater than precipitation, so the movement of soil solution is upwards through the soil through capillary action. Water is drawn to the drying surface by capillary action and leaching is generally absent, apart from when occasional storms occur. Thus, although there may be some leaching, it is insufficient to remove all the calcium which then accumulates in the B horizon. Calcium carbonates and other solutes therefore remain in the soil and over time there will be an increase in its concentration due to capillary action. In extreme cases where evapotranspiration is intense, calcium may form a crust on the surface. This may be toxic to plant growth.

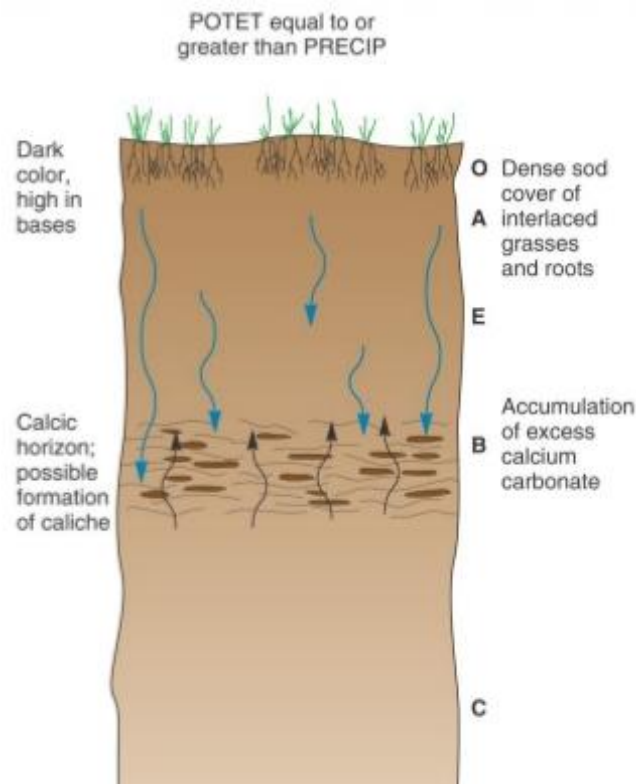


Fig. 1: Calcification

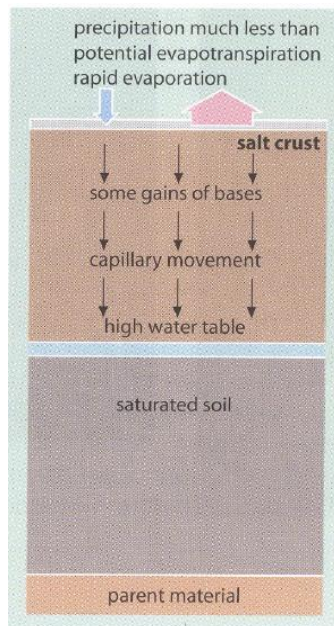
**Salinisation** is the accumulation of soluble salts of sodium, magnesium and calcium in soil to the extent that soil fertility is severely reduced. It occurs when potential evapotranspiration is greater than precipitation in places where the water table is near to the surface (Fig. 2). Capillary rise of water from a water table that is saline and close to the surface will result in the salinization of the ground. As moisture is evaporated from the surface, salts are drawn upwards in solution by capillary action. This process is therefore found in dry climates. Further evaporation results in the deposition of salt as a hard crust on the surface which has low permeability and this reduces the amount of moisture and other nutrients that can enter the soil.

**Laterisation** is the process of accumulation of sesquioxides (an oxide with three atoms of oxygen and two metal atoms) in the soil, to form **laterite** (Fig. 3), a reddish-clayey material. Laterite is commonly found in soils of tropical and subtropical environments due to high temperatures and heavy precipitation, which result in the rapid weathering of rocks and minerals, especially oxidation. Movements of large amounts of water through the soil cause eluviation and leaching to occur, resulting in a soil layer that is rich in iron oxide.

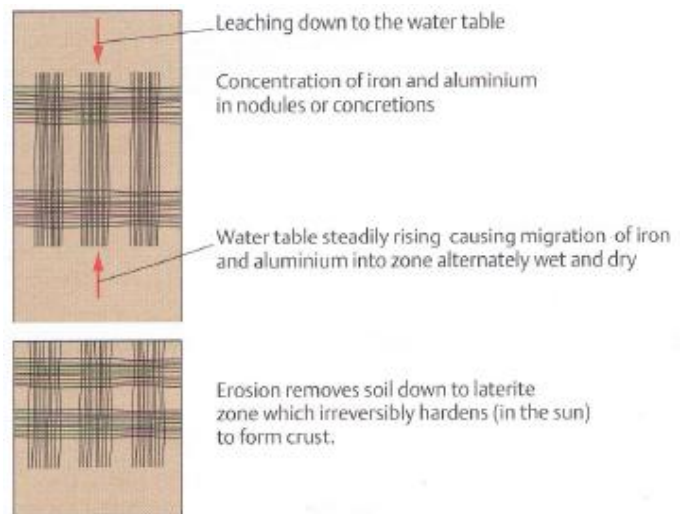
Lateritic soils may contain clay minerals; but they tend to be silica-poor, for silica is leached out by waters passing through the soil. Typical laterite is porous and claylike. It contains the iron oxide minerals such as hematite ( $\text{Fe}_2\text{O}_3$ ) and abundant gibbsite ( $\text{Al}_2\text{O}_3 \cdot 3\text{H}_2\text{O}$ ).

Almost all of the by-products of weathering, very simple small compounds or nutrient ions, are translocated out of the soil profile by leaching if not taken up by plants for nutrition. The two exceptions to this process are iron and aluminium compounds (less soluble).

A laterite horizon is formed under the surface when iron and aluminium oxides are concentrated there by groundwater flow. This layer can be up to 1.5m thick. Iron oxides thus give tropical rainforest soils their unique reddish colouring.



**Fig. 2 Salinisation**



**Fig. 3 Laterisation**

- (b) To what extent is climate the most important factor in weathering and mass movement processes in the tropics? [20]

#### Climate is important to weathering

- Refer to Peltier's diagram which reflects the relationship between mean annual temperature and rainfall in affecting weathering processes
  - Chemical weathering in general is stronger in areas with high mean annual temps and rainfall
  - Physical (or mechanical) weathering is strong in with moderate rainfall low mean annual temp

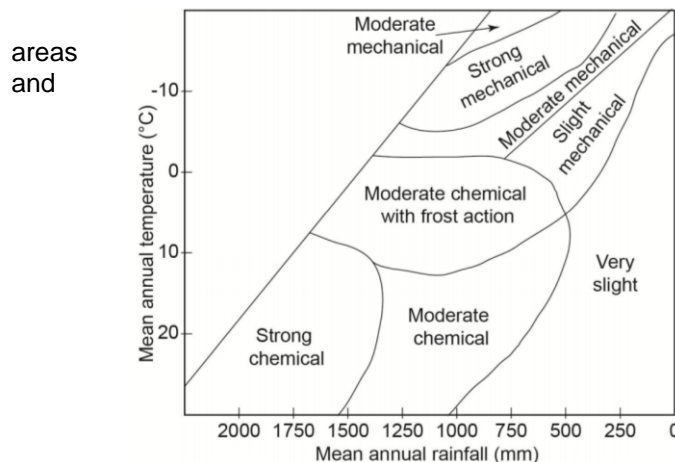


Fig. 1 Peltier's diagram

- Van Hoff's rule which states that for every 10°C increase in temperature, the rate of weathering increases 2-3 times – except for carbonation as CO<sup>2</sup> dissolves for effectively at lower temperatures
- Examples of specific processes:
  - Freeze-thaw action is most effective at low mean annual temps and moderate pptn
  - Thermal weathering – most effective in areas with large diurnal temp ranges
  - Carbonation rates can be high in humid tropical areas due to the sheer amount of water flowing through the joints of the limestone rock even though CO<sup>2</sup> might dissolve more slowly as compared to areas with lower temperatures

#### **Other factors that are important to weathering**

- Gradient – steeper the gradient, less infiltration, less weathering
- Vegetation – is strongly linked to climate. Forests are:
  - Associated with biological weathering causing root wedging and CW due to the presence of organic acids
- Grain size – smaller grain size, greater surface area esp for CW
- Geology - jointing – spaces present for infiltration of water for CW
- Geology – mineral composition – calcium carbonate in limestone makes it susceptible to carbonation and feldspars and mica can undergo hydrolysis to form kaolinite and iron

#### **Climate is important to mass movement processes**

- MM occurs when shear stress > shear strength
- The supply of water determines shear strength and shear stress – some water content increases the cohesion between particles and increases shear strength while too much water decreases shear strength as water acts as a lubricant as well as increases shear stress due to the weight
  - This relationship between water and MM affects the type of mass movement e.g. flows such as mudflows occur due to high water content (water supply can be caused by

#### **Other factors that are important to mass movement**

- Geology – joints and failure planes – reduces shear strength, link to slides such as slump and rock slide
- Density of vegetation – dense vegetation increases shear strength due to cohesion of soil and reduces occurrence MM. Vegetation can also increase shear stress by adding weight to the slope.
- Gradient – steep gradient increases shear stress
- Shocks – earthquakes and other shocks applied to slopes can increase shear stress
- Human activity – slopes can be steepened by road cuts which increases shear stress

#### **Conclusion**

- Climate is the most important factor in generally determining the nature/type of weathering and mass movement.
- However in very specific situations, a combination of factors can become the main determinant of a MM event e.g. Vajont Dam landslide → the construction of the dam caused the channel level to rise and saturate areas that had bedding planes that were inclined towards the canyon. Thus the saturation of the ground reduced shear strength and caused a major landslide to occur as massive amounts of rocks and soil moved over the failure planes into the lake. Hence this MM event was due to a combination of human activity and geology.

2 (a) Explain the main processes involved in landform formation in the arid tropics.

[12]

#### **Main landform formation processes in the arid tropics**

- Weathering – thermal weathering and salt crystal growth
- Erosion
  - Fluvial – rilling and gullyng,

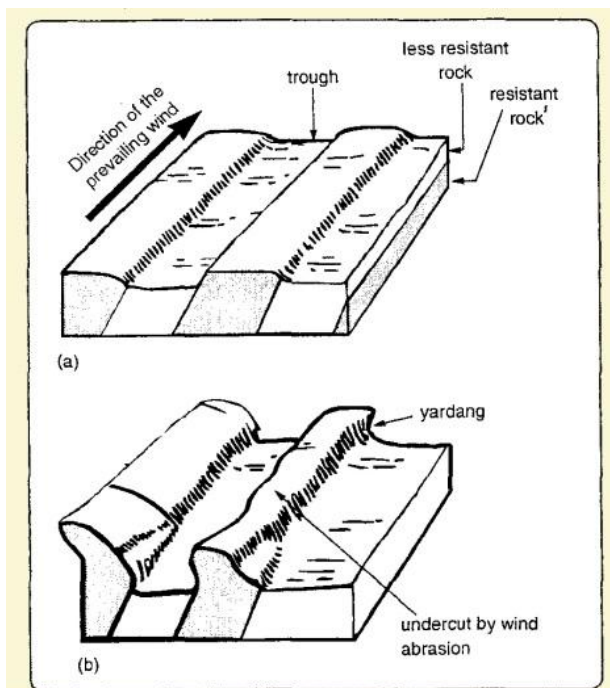
- Aeolian – deflation, abrasion
- Transportation
  - Aeolian – saltation, reputation, suspension and creep
- Deposition
  - Aeolian – sedimentation, accretion and encroachment

(b) 'Geology is the main determinant of the nature of landforms in the arid tropics'.  
How far do you agree with this statement?

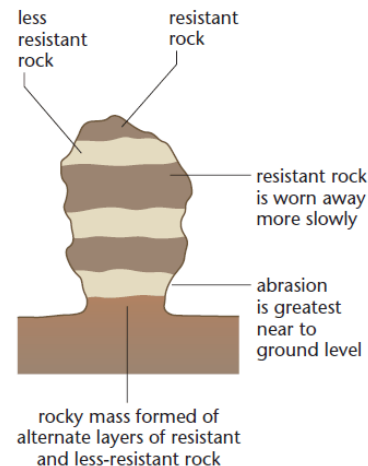
[20]

### Geology is the main determinant of landforms in arid areas

- Alternating layers of resistant and less resistant rock and their dip
  - Vertical alignment – yardangs
  - Horizontal alignment - a type of yardang called zeugen or rock pedestal
- Grain size
  - Grain size is another factor governing dune profile. The sand in transport becomes coarser and more poorly sorted as wind speed and rates of mass transport increase toward the dune crest. These patterns reflect changes in the competence of the wind, which is capable of transporting larger grains and a wider range of grain sizes as its speed increases in space and time.
  - A coarse-grained sand dune has a greater difference in threshold velocity between the crest area and its lower levels than a finer-grained sand dune of a similar profile. A coarse-grained sand dune will have much longer periods of erosion taking place only at or near the crest, thus lowering the dune profile. This explains why all dunes composed of coarse grains such as whaleback and "zibar" are flat and low.



Yardang development



Zeugen

### Other factors determine the landforms in arid areas

- Sand supply and wind direction – Transverse dunes require abundant sand supply and unidirectional winds while star dunes also require abundant sand supply but are formed with multi-directional winds
- Climate – in general, the arid climate causes the dominance of certain processes such as rilling and gullying and aeolian processes to occur which in turn shape the landforms
- Wind velocity – the higher the wind velocity, the larger amount and size of sand grains that can be transported. This can affect the supply of sediments for loess formation as well as the amount of sediments carried in saltation and subsequently causing abrasion.
- Permeability – the lower permeability of surfaces in arid areas, the more surface runoff and erosion

occurs

- Height at which erosional processes occur the greatest – about 1-2 m for abrasion. Results in the erosion at the base of bedrock and narrowing of the base

## Section B – Development, Economy and Environment

Answer **one** question from this section.

- 3 (a) Explain the relevance of bottom-up development with reference to countries at low levels of development. [12]

### Relevance of bottom – up development to LDCs

- High inclusivity and participatory levels from locals
- 'Development from below', hence closely related to specific sociocultural, historical and institutional conditions, as locals will know what is best to develop for their communities
- E.g. Chambamontera, Peru where the locals do not have access to electrical mains as the government is unwilling to pay high costs just to expand the electricity grid to a small population. A group of villagers collaborated with a charity, Practical Aid, and made use of the abundant rainfall levels to produce electricity through installing nearly 50 microhydro schemes, therefore increasing their quality of life.
- Relatively less expensive and less detrimental to the environment where locals are more aware of the conditions of their surroundings and thus choosing a more appropriate technology
- Small scale and links to sustainability and improved human development
- E.g. wells and hand pumps installed in Africa by a UK NGO, Water Aid, cost only 22 pounds each, providing clean water and eliminating the need for women and children to travel long distances to collect water

- (b) To what extent can the Millennium Development Goals (MDGs) effectively measure development? [20]

The eight **Millennium Development Goals (MDGs)** – which range from halving extreme poverty rates to halting the spread of HIV/AIDS and providing universal primary education, all by the target date of 2015 – form a blueprint agreed to by all the world's countries and all the world's leading development institutions.

### Indicative content:

*Students should examine how the MDGs utilizes development indicators to measure (and incentivize) progress, and evaluate its relevance as a framework especially for developing countries, and perhaps less so for developed countries. They should demonstrate an understanding of what development entails, and how the MDGs were a movement away from a narrow understanding of development as economic growth. In the assessment of the robustness of the MDGs, some comparison could be made with other measures of development. Some awareness of the challenges of data collection, the difficulties of comparisons across different countries (e.g. different cultural contexts/ developmental focus) and the shift towards sustainable development and the SDGs.*

- 4 (a) Explain how the nature of water scarcity might differ between countries at low and high levels of development. [12]

Water scarcity is the lack of sufficient available water resources to meet the demands of water usage within a region. It is defined as a gap between available supply and expressed demand of freshwater in a specified domain, under prevailing institutional arrangements (e.g. resource 'pricing' and retail charging arrangements) and infrastructural conditions (UNFAO).

Water scarcity = an excess of water demand over available supply

Scarcity is signaled by unsatisfied demand, tensions between users, competition for water, over-extraction of groundwater and insufficient flows to the natural environment.

The nature of water scarcity refers to the causes leading to either (or both) absolute scarcity, or relative scarcity in different developmental contexts.

Water scarcity can be defined as the point at which the aggregate impact of all users impinges on the supply or quality of water under prevailing institutional arrangements to the extent that the demand by all sectors, including the environment, cannot be satisfied fully.

Water scarcity is a relative concept and can occur at any level of supply or demand. Scarcity may be a social construct (a product of affluence, expectations and customary behaviour) or the consequence of altered supply patterns - stemming from climate change for example. *Absolute water scarcity* is the result of inadequate natural water resources to supply a region's demand.

According to the United Nations Development Programme, *relative (or socio-economic) scarcity* is found more often to be the cause of countries or regions experiencing water scarcity, as most countries or regions have enough water to meet household, industrial, agricultural, and environmental needs, but lack the means to provide it in an accessible manner.

(b) To what extent can governments effectively manage water resources today? [20]

Even though conflicts over water may arise as a result of various underlying factors, they ultimately revolve around the basic issues of limited water quantity, water quality and timing of water flow. While water cooperation tends to cover a broad spectrum of water issues including water quantity, quality, economic development, hydropower and joint management, most water conflicts tend to relate to water quantity and infrastructure. Conflict over water sources involve but are not limited to the international scale.

Indicative content:

*Students should assess the effectiveness of governments in managing water resources at both the urban and national scale as well as internationally, and make clear what "effective management" entails e.g. balance competing interests over water, manage water scarcity, ensure equitable water distribution, distribute costs and benefits of water initiatives equitably, make accessible reliable sources of information concerning water. Some awareness of the challenges faced by LDCs and their vulnerability in the face of climate change.*

## Section C – Sustainable Development

Answer **one** question from this section.

5 (a) Explain how sustainable development involves the concept of 'needs' in countries at low levels of development. [12]

- Define SD : SD is development that meets the needs of the present without compromising the ability of future generations to meet their own needs
- SD also involves meeting the goals within the three dimensions of the economy, society and environment.
- One of the main concerns in SD is the concept of 'needs', in particular the essential needs of the world's poor, to which overriding priority should be given
- The consideration of meeting the needs of the world's poor is important in the context of SD because the unsustainable development of LDCs will threaten development on a global scale. However, if needs are met, LDCs hold vast potential in contributing to SD in LDCs and DCs:
  - Meeting **essential needs** requires not only a new era of economic growth for nations in which the majority are poor, but an assurance that those poor get their fair share of the resources required to sustain that growth. Such equity would be aided by political systems that secure effective citizen participation in decision making and by greater democracy in international decision making.
  - Rapidly growing populations can increase the pressure on resources and slow any rise in

living standards; thus sustainable development can only be pursued if population size and growth are in harmony with the changing productive potential of the ecosystem.

- Meeting essential needs of countries at low levels of development include:

**Jobs** : The most basic of all needs is for employment. Between 1985 and 2000 the labour force in developing countries will increase by nearly 800 million, and new livelihood opportunities will have to be generated for 60 million persons every year.

- The pace and pattern of economic development have to generate sustainable work opportunities on this scale and at a level of productivity that would enable poor households to meet minimum consumption standards.

**Food** : more food is required to feed people and to tackle undernourishment.

- Annual increases of 5.0 per cent in calories and 5.8 per cent in proteins are needed in Africa; of 3.4 and 4.0 per cent, respectively, in Latin America; and of 3.5 and 4.5 per cent in Asia.
- Foodgrains and starchy roots are the primary sources of calories, while proteins are obtained primarily from products like milk, meat, fish, pulses, and oil-seeds.

**Energy** : Energy consumption patterns need to change.

- LDCs need fuelwood and coal as sources of energy. The minimum requirements for cooking fuel in most developing countries appear to be on the order of 250 kilogrammes of coal equivalent per capita per year. Though, this is a fraction of the household energy consumption in industrial countries, corrective action is needed to preserve the ecological base.

**Housing, water supply, sanitation, and health care** : Deficiencies in these areas are often visible manifestations of environmental stress.

- In LDCs, the failure to meet these key needs is one of the major causes of many communicable diseases such as malaria, gastro-intestinal infestations, cholera, and typhoid.
- Population growth and the drift into cities threaten to make these problems worse.
- Planners must find ways of relying more on supporting community initiatives and self-help efforts and on effectively using low-cost technologies

- (b) To what extent can the political and economic challenges in attaining sustainable development be overcome? [20]

The main political and economic challenges in attaining SD can be exemplified by the two international conferences: Rio de Janeiro 1992 UNCED and Rio de Janeiro 2012 UNCSD

### **Rio de Janeiro 1992 - UN Conference on Environment and Development (aka Rio Earth Summit)**

#### **1. Rio Declaration**

Political:

- Even though USA agreed to the Rio Declaration, it still insisted on issuing a press release to explain how it interpreted key phrases differently e.g. stressing that “Development” is not right but “a goal we hold”
- Contradiction in some of the principles. For example, the second principle defended the sovereignty of countries, but also required nations to ensure that activities within their jurisdiction do not cause damage to the environments of other states.

Economic:

The third principle stated that development must meet the needs of the present and future

generations. However, in many cases, this will require a drastic change in industries, such as a forfeiting of high emission heavy industries, and the abolishment of a consumerist culture. This will come as a blow to the business of affected industries, and they will do their best to stop this. E.g. GM and Ford lobbied against the new EPA fuel consumption standard.

## 2. Agenda 21

### Political:

- Political motives have obstructed the inclusion/implementation of SD principles. Some issues were excluded at the insistence of lobby groups and national delegations, while the language was blurred to avoid offence in other instances
- OPEC opposed mentions of fuel efficiency, alternative energy sources etc
- TNCs were portrayed in a favourable light
- Diplomatic compromise to maintain friendly relations between states was prioritised over feasible policies
- Agreements between countries that goes against Agenda 21

### Economic:

- LDCs : Require large amounts of funding in order to support plans like infrastructural development for sanitary systems, education, economic restructuring to reduce focus on the export industry etc. EIAs may also add to the existing red tape in project management
- DCs: Changes to energy sources may lead to unemployment in areas that rely heavily on fossil fuels

## 3. UN Framework Convention on Climate Change (UNFCCC)

### Political:

- Political negotiations have failed to obtain meaningful global commitments to greenhouse gas reductions
- UNFCCC is an inefficient system for enacting international policies as the framework system includes over 190 countries and negotiations are governed by consensus.
- Each country promotes its own agenda, thus it is difficult to come to an agreement
  - Countries have met 20 times since 1992, yet carbon emissions have yet to improve.
  - Kyoto Protocol - Carbon emissions trading to allow countries who have excess credits to put out in the market for trade (countries like US refused to ratify it)
  - 2016 Paris Agreement – one of the more successful attempts at in recent years – about 90% of nations have ratified it
  - At COP 21 in Paris, on 12 December 2015, Parties to the UNFCCC reached a landmark agreement to combat climate change and to accelerate and intensify the actions and investments needed for a sustainable low carbon future. The Paris Agreement builds upon the Convention and – for the first time – brings all nations into a common cause to undertake take ambitious efforts to combat climate change and adapt to its effects, with enhanced support to assist developing countries to do so.

### Economic:

- Reluctance by countries to sacrifice economic development for environmental outcomes
- Canada withdrew from the Kyoto Protocol in 2011 out of a desire to not force its citizens to pay penalties that would result in wealth transfers out of Canada
- Especially when some countries do not agree to certain conventions, it can easily influence other countries to do the same because they do not want to miss out on the economic gains

### Evaluation for Rio Earth Summit

Challenges in inclusion of environmental value in economic analysis - hard for economic development and environmental conservation to go hand-in-hand

## Rio de Janeiro 2012 - UN Conference on Sustainable Development (aka Rio +20)

### 1. The Future We Want: Green economy (DCs)

Political:

- Shift to green economy requires high political will and commitment to implement measures accordingly. For example sustainable public procurement, sustainable land use and urban policy, integrated management of freshwater, monitoring and accountability measures; and awareness and education campaigns.
- Questions on the definition of the green economy - how it should be left for countries to interpret it and implement measures, instead of it being a top-down definition imposed by the UN

Economic:

- Concerns over the impact of binding climate targets with Emission Trading Schemes and legislation on protection of biodiversity, waste management and air quality may result in economic growth and thus development being sacrificed
- Market-based instruments like subsidies and greening of tax systems may result in certain areas being underserved/value because they are impossible to sell on the market such as Public goods. These may be non-rivalrous or non-excludable, which makes it difficult for a firm to sell the product or service

## 2. The Future we want: Green Economy (LDCs)

Political:

- LDCs said that this agenda is a screen for a new wave of green protectionism to be ushered in from DCs
- DCs hostile to foreign trade attempt to block imports on ecological grounds, achieving traditional protectionist goals via non-traditional means
- Green protectionism discriminates against 'brown' goods that do not conform with green regulations and standards, and typically recognises LDCs as standard-takers and DCs as standard-makers

Economic:

- LDCs want to avoid the increasing financial burden of a green economy as they lack natural reserves
- Transition to a green economy requires substantial additional public expenditure as sustainable financing needs to be ensured across sectors, including agriculture, forestry, energy, health and education, as well as across economic segments, such as small and medium-sized enterprises, infrastructure and innovation
- However, DCs are unable to provide such funding and assistance
- LDCs oppose the integration of social and environmental costs in economic decision-making eg. using taxes to internalise social and environmental costs will increase the price of goods relative to other countries', reducing competitiveness and affecting domestic consumption

### Overall evaluation

- Challenges both in the political and economic spheres abound in attempts to achieve SD
- However, some headway has been made in various fields such as improvements made in the development of alternative energy technology and the push for the development of the green economy
- Alternative energy (solar power and micro hydropower projects) is used extensively even in remote areas in LDCs and can prove to be sustainable, providing such communities with energy and job opportunities.

## 6 (a) Explain the relationship between urban liveability and youths in countries at high levels of development.

[12]

- Liveability reflects the wellbeing of a community and comprises the many characteristics that make a location a place where people want to live, work and invest now and in the future. Such characteristics include safety, economic opportunities and welfare, health, convenience, mobility, and recreation.
- Strong, direct relationship between urban liveability and youths in countries at high levels of development. For a city to be liveable in the context of youths, their needs must be met to ensure their well-being physically, emotionally and financially.

- Being young in the city has certain distinctive features as youths experience urban spaces differently from adults
- While there may be greater educational support for youths, they might be neglected in urban policies and planning
- Hence they may value urban liveability that is egalitarian, open and inclusive
- Certain urban – based difficulties and benefits young people experience are not found elsewhere and liveability is a combination of the impact of environmental stressors with socio – cultural influences on urban behavior, dwelling and everyday life
- For countries at high levels of development, certain components of urban liveability might impact more on young people's lives e.g. space and place, affordability and accessibility and control and freedom

Factors that help determine the liveability of youths in DC cities include:

- **Social and cultural attributes** e.g. gender, race, educational status
- **Economic based factors** e.g. personal/ household income, education fees, salaries, workplace discrimination
- **Political components** e.g. right to vote, citizenship, curfews, control of public space
- **Health and well-being**
  - is threatened by lifestyles that are associated with lower levels of physical activity, less time spent exploring the natural environment, poor eating habits, harmful levels of alcohol consumption, illicit drug use, prescription drug dependency and misuse, rising levels of obesity, non-fatal chronic illness, increasing stress levels and mental health challenges. Programmes need to be in place to address the challenges of such issues.
- **Quality of basic education and opportunities for tertiary education**
  - This is linked to the greater demands for skills and know-how in the context of a knowledge-based economy
- **Employment**
  - Youths require access to employment to gain financial independence and access to housing
- **Participation in urban governance**
  - Youths are often seen as being beneficiaries of government programs and interventions, rather than as agents of change. However, young people wield immense power in creating change and possess the potential to address challenges and gain opportunities through participatory urban governance
- **Public spaces**
  - Need for such spaces for recreation and freedom of expression
  - In the urban context, youths are often seen to be infringing on shared spaces and hence the development spaces that are designed for their specific needs e.g. \*SCAPE Singapore
- **Involvement in the environment**
  - Greater exposure to current affairs enable youths to understand their roles and position in the ongoing debates on sustainable development and climate change.
  - Many youths understand the need for immediate action for the benefit of the current and future generations and some are involved in programmes and events dedicated to the cause of climate change
- Range of examples from some cities needed to illustrate the direct and close relationship between liveability and youths

(b) To what extent can countries achieve sustainable urban development and liveability?

[20]

### **Sustainable Urban Development**

- SUD is a process of integration and evolution among the subsystems making up a city (economic, social, physical and environmental), which aim to provide the local population a stable level of wellbeing in the long term, without compromising the possibilities of development of surrounding areas and controlling the harmful effects of development on the environment.
- Sustainable urban development is therefore a fundamental contribution to economic growth and social progress. It will ensure good quality of life for the population; it will provide job opportunities, good housing, and access to resources, energy and social services.
- SUD can be achieved by managing certain urban issues:
  - Non-hazardous solid waste management – linear vs circular urban metabolism and ecological

footprint of cities

- Slum management – the provision of physical and social infrastructure to raise the quality of life in especially the LDC cities. Such strategies are coupled with providing the people access to employment opportunities as well as spaces for recreation and leisure
- Traffic congestion management – the development of integrated urban places designed to bring people, activities, buildings, and public spaces together, with easy walking and cycling connection between them and near-excellent transit service to the rest of the city. It means inclusive access for all to local and citywide opportunities and resources by the most efficient and healthful combination of mobility modes, at the lowest financial and environmental costs.
- Grappling with limited land space in cities and tradeoffs – e.g. in the case of Singapore, having more parks and open spaces means that more of us will live in high-rise housing. Allocating more land for industries could mean loss of waterfront and heritage areas. Having more roads and a smoother drive to work may result in smoggier air and more noise pollution. Land use plans need to cater to multiple needs e.g. to facilitate economic growth by providing more industrial land for petro-chemical and aeronautical industries, hotel and tourism projects, as well as an expanding financial sector. These are then balanced with social considerations for achieving a high quality living environment to meet rising aspirations such as more variety of good quality housing, more greenery and more leisure choices.
- A discussion of a range of management strategies is needed and how some are limited by the delicate balance of the three dimensions of SD as well as the multiple stakeholders involved in the issues.

### **Liveability**

- Need to appreciate the meaning and scope of urban liveability e.g. how it varies for different development levels and for different groups of people
- Students need to point out the subjective nature of urban liveability, such as that its nature varies between various groups in the city and the nature and perception of the various stakeholders
- Links could be made to sustainability E.g. for some cities, additional evaluations are based on proximity, access and sustainability.
- For others, they may also need to look into particular challenges posed by their own dense and rapid urbanization (e.g. Singapore) and how it works to make the living and working environment more liveable for the whole population
- Range of examples (and counter examples) is important in the evaluation of how to address issues of liveability for different groups of people e.g. elderly and youths



**HWA CHONG INSTITUTION**  
**JC2 Preliminary Examination**  
**Higher 2**

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**INDEX  
NUMBER**

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**GEOGRAPHY**

**9751/02**

Additional Materials: Answer Paper  
1 Insert  
World outline map

**20 September 2019**  
**3 hours**

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**READ THESE INSTRUCTIONS FIRST**

Write your name and CT class clearly on all the work you hand in.  
Write in dark blue or black pen on both sides of the paper.  
You may use an HB pencil for any diagrams or graphs.  
Do not use staples, paper clips, highlighters, glue or correction fluid.

Candidates answer **all** questions.

The Insert contains all the Resources referred to in the questions.  
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.  
Diagrams 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.

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.

**Submit your answers in two separate sets:**

- 1. Questions 1 and 2**
- 2. Questions 3 and 4**

**If you have not attempted any of the questions, indicate this in the answer booklet.**

**Section A****Theme 4 - Geographical Investigation**

- 1 A group of 17 year old students investigated the impact of wind direction on rainfall in Singapore. Their study spanned 12 months from January to December in 2018. To collect primary data on rainfall and wind direction and speed, the students placed handmade rain gauges and data loggers at four sites, one each in the Northern, Eastern, Southern and Western parts of Singapore. The equipment was located on the roof tops of buildings where the students had access to.

Due to their busy schedules in school, they visited the sites to record the data once a week and sometimes more than a week lapsed before any of them were able to visit the sites.

The students also referred to secondary sources such as the National Environment Agency website to gather data to corroborate their findings.

Resource 1 shows the map of spatial distribution of total annual rainfall in Singapore. Resource 2 shows average hourly variation of surface wind speed (m/s) and direction for each month in Singapore. Resource 3 shows (a) a data logger with wind vane and anemometer and (b) a handmade rain gauge.

- (a) With reference to Resources 1 and 2, suggest a suitable research question for this study and explain how it may be well-defined. [4]
- (b) Assess the effectiveness of the data representation shown in Resource 2. [4]
- (c) Referring to Resource 3 and the context provided, identify and explain **two** possible issues with accuracy and/or reliability. [6]
- (d) With reference to the Resources and your own knowledge, to what extent would the students be able to answer the research question suggested in (a)? [4]
- (e) Students from another school were interested to conduct a similar study. What advice should the group of students who have conducted the investigation give them? [7]

[Turn over

**Section B****Theme 1 - Tropical Environments****Deforestation and REDD+ in Indonesia**

- 2** Reducing Emissions from Deforestation and forest Degradation, plus the sustainable management of forests, and the conservation and enhancement of forest carbon stocks (REDD+), is an essential part of the global efforts to mitigate climate change.

Resource 4 shows deforestation in Riau Province, Sumatra, Indonesia in 2014. Resource 5 shows the criteria for achieving effective outcomes for REDD+ projects in Indonesia. Resource 6 shows the gains and losses in REDD+ forests and biophysical forests. Resource 7 shows a comparison of REDD+ finance received and domestic expenditure on agricultural and biofuel subsidies .

- (a) With reference to Resource 4, describe the nature of deforestation and explain the possible physical impacts on the environment. **[5]**
- (b) Suggest reasons for the differences in achieving effective outcomes for REDD+ projects in Indonesia shown in Resource 5. **[4]**
- (c) With reference to Resource 6, suggest which country may be the most successful in managing deforestation and explain why. **[5]**
- (d) With reference to Resource 7, compare the REDD+ finance, biofuel and agriculture subsidies in Indonesia and Brazil. **[3]**
- (e) With reference to the resources and your own knowledge, assess the effectiveness of REDD+ in Indonesia. **[8]**

**[Turn over**

## Theme 2 - Development, Economy and Environment

### Huawei's Global Production Network

- 3** Huawei Technologies Co., Ltd. is a Chinese multinational technology company that provides telecommunications equipment and sells consumer electronics, including smartphones and is headquartered in Shenzhen, China. Huawei has deployed its products and services in more than 170 countries, and as of 2011 it served 45 of the 50 largest telecom operators. Although successful internationally, Huawei has faced difficulties in some markets. In 2018, it pulled out of the U.S. consumer market.

Resource 8 shows a typical smartphone supply chain network. Resource 9 shows Huawei's major U.S. suppliers. Resource 10 shows how Huawei's supply chain has altered since 2018. Resource 11 shows some impacts of Huawei's altered supply chain.

- (a) Using Resources 8-10, describe the characteristics of Huawei's global production network. **[4]**
- (b) Suggest reasons for Huawei's global production network you have described in (a). **[4]**
- (c) With the help of Resources 10 and 11, explain the key impacts of Huawei's decision to pull out of the U.S. consumer market in 2018. **[6]**
- (d) Suggest **one** limitation of Resource 10 in showing Huawei's inter-firm networks. **[2]**
- (e) Using the resources and your own knowledge, evaluate the extent to which TNCs can regulate economic activities. **[9]**

**[Turn over**

**Theme 3 : Sustainable Development****Solid Waste Management in Tanzania**

- 4 Resource 12 shows the relationship between Ecological footprint and the Human Development Index of selected countries. Resource 13 shows types of solid waste in Arusha City and Mbeya City. Resource 14 shows solid waste management statistics in selected cities in Tanzania.
- (a) Suggest reasons for the differences in the distribution shown in Resource 12. [4]
  - (b) Compare the type of solid waste collected in Arusha and Mbeya cities as shown in Resource 13. [4]
  - (c) With reference to Resource 13, suggest and explain **one** waste management strategy that can manage waste effectively in Arusha City. [4]
  - (d) Using Resource 14, identify and explain **two** issues with solid waste management in Tanzania. [6]
  - (e) With reference to the resources and your own knowledge, evaluate the importance of understanding the ecological footprint to manage solid waste in Tanzania. [7]

**[Turn over**

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**Acknowledgements:**

Question 1 Resource 1	© <a href="http://www.weather.gov.sg/climate-climate-of-singapore/">http://www.weather.gov.sg/climate-climate-of-singapore/</a>
Question 1 Resource 2	© <a href="http://www.weather.gov.sg/climate-climate-of-singapore/">http://www.weather.gov.sg/climate-climate-of-singapore/</a>
Question 1 Resource 3	© <a href="https://www.news24.com/">https://www.news24.com/</a> ; <a href="https://www.pace-sci.com/wind-speed.htm">https://www.pace-sci.com/wind-speed.htm</a>
Question 2 Resource 4	© <a href="https://news.mongabay.com">https://news.mongabay.com</a>
Question 2 Resource 5	© <a href="https://www.researchgate.net">https://www.researchgate.net</a>
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Question 2 Resource 7	© <a href="https://news.mongabay.com">https://news.mongabay.com</a>
Question 3 Resource 8	© <a href="https://www.slideshare.net/RISHIBANSHIWAL/smartphone-industry-analysis">https://www.slideshare.net/RISHIBANSHIWAL/smartphone-industry-analysis</a>
Question 3 Resource 9	© <a href="https://www.caixinglobal.com/2018-12-06/chart-huaweis-dependence-on-us-suppliers-101356383.html">https://www.caixinglobal.com/2018-12-06/chart-huaweis-dependence-on-us-suppliers-101356383.html</a>
Question 3 Resource 10	© <a href="https://www.gzeromedia.com/graphic-truth-huaweis-supply-chain-bind">https://www.gzeromedia.com/graphic-truth-huaweis-supply-chain-bind</a>
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Question 4 Resource 12	© <a href="http://www.oecd.org/greengrowth/38875804.pdf">http://www.oecd.org/greengrowth/38875804.pdf</a>
Question 4 Resource 13	© <a href="https://www.researchgate.net/publication/">https://www.researchgate.net/publication/</a>
Question 4 Resource 14	© <a href="https://www.researchgate.net/publication/">https://www.researchgate.net/publication/</a>



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**GEOGRAPHY**

**9751/02**

Data Response Questions

**20 September 2019**

**INSERT**

**3 hours**

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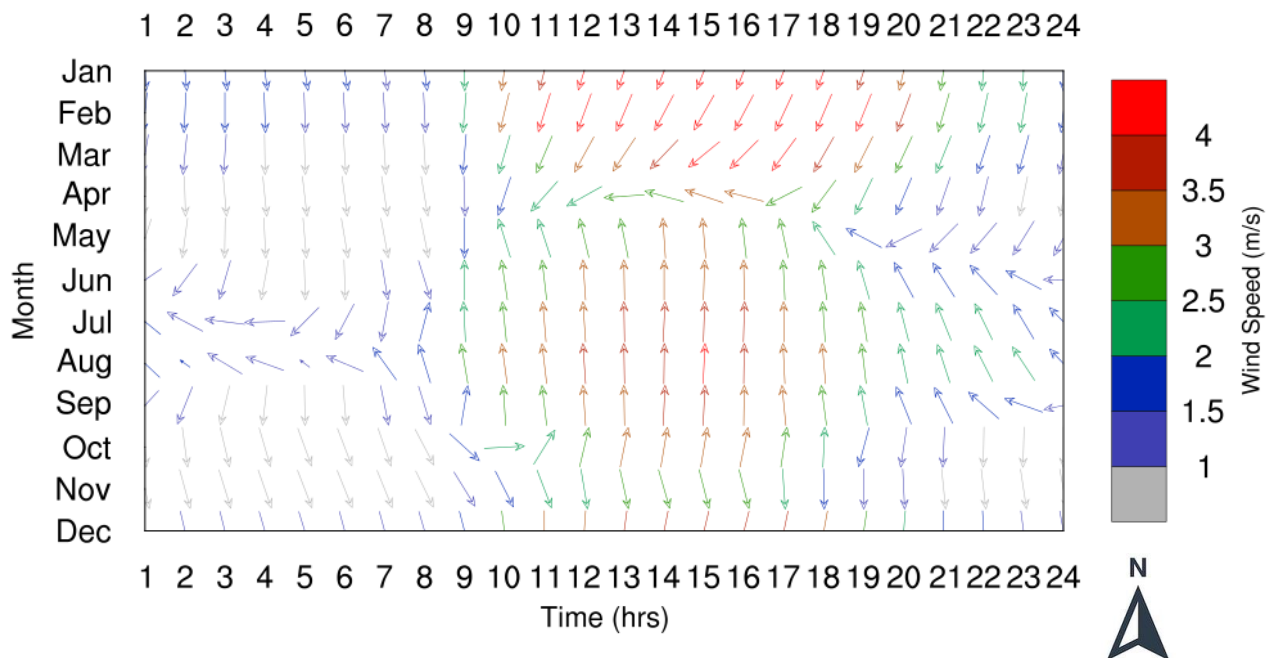
**READ THESE INSTRUCTIONS FIRST**

This Insert contains all the Resources referred to in the questions.

**Resource 1 for Question 1**  
**Map of spatial distribution of total annual rainfall in Singapore**  
 taken from the NEA website



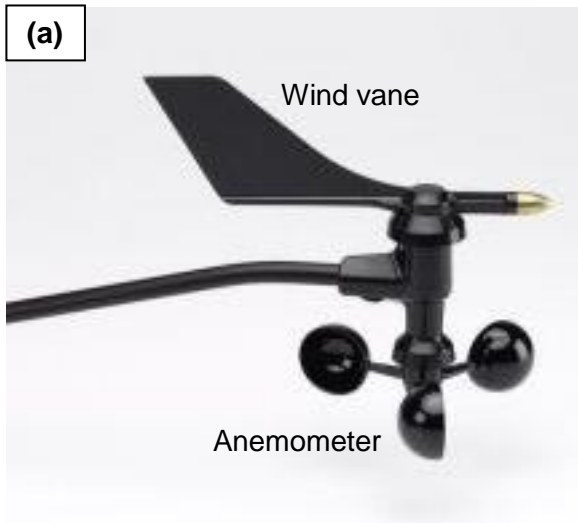
**Resource 2 for Question 1**  
**Average hourly variation of surface wind speed (m/s) and direction for each month in Singapore from data recorded by the students**



[Turn over

## Resource 3 for Question 1

- (a) Data logger with wind vane and anemometer to measure wind direction and speed, and (b) a handmade rain gauge using a plastic bottle



[Turn over

**Resource 4 for Question 2**  
**Deforestation in Riau Province, Sumatra, Indonesia in February 2014**



**Resource 5 for Question 2**  
**Criteria for achieving effective outcomes for REDD+ projects in Indonesia**

Project Name	Criteria				
	Finance	Community Involvement	Monitoring	Boundary Enforcement	Carbon & Biodiversity
Harapan	-	-	-	-	?
Rimba	+	+/-	+	+	+
Raya					
Kapuas	+/-	+	-	+/-	?
Hulu					

Key:

+ : has achieved some effectiveness

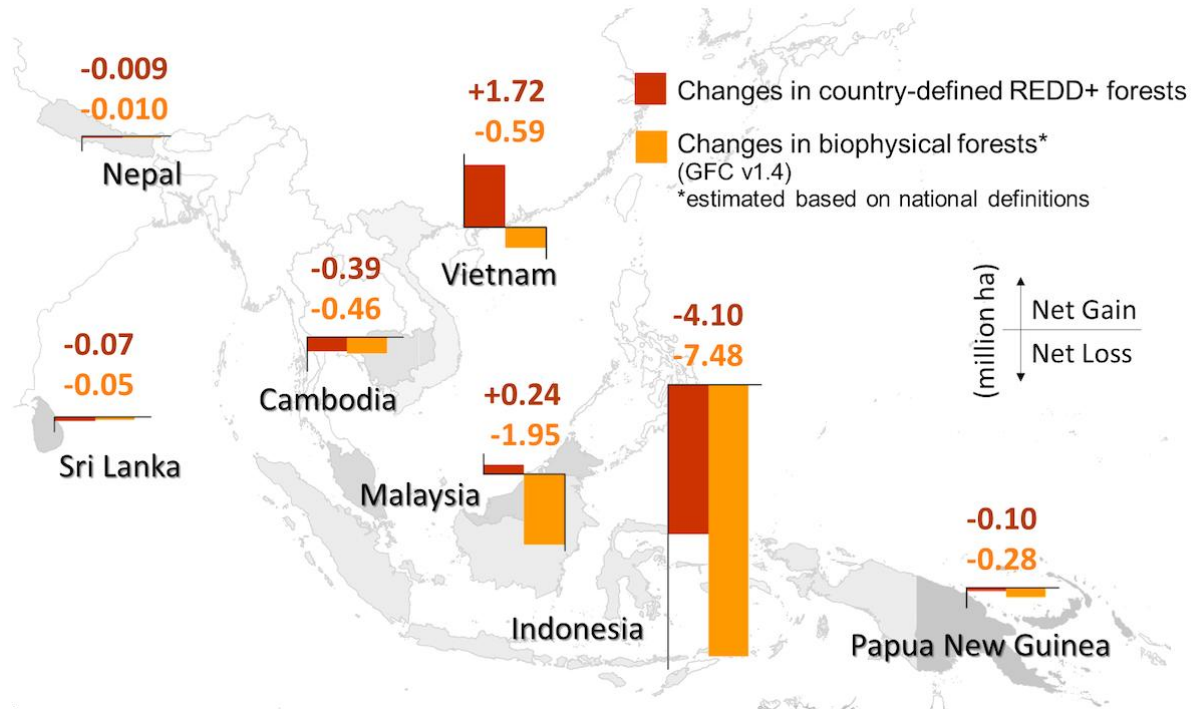
+/- : some effectiveness but still facing some challenges

- : has yet to achieve effectiveness

? : unverified/uncertain outcomes

[Turn over

**Resource 6 for Question 2**  
**Gains and losses in REDD+ forests and biophysical forests**

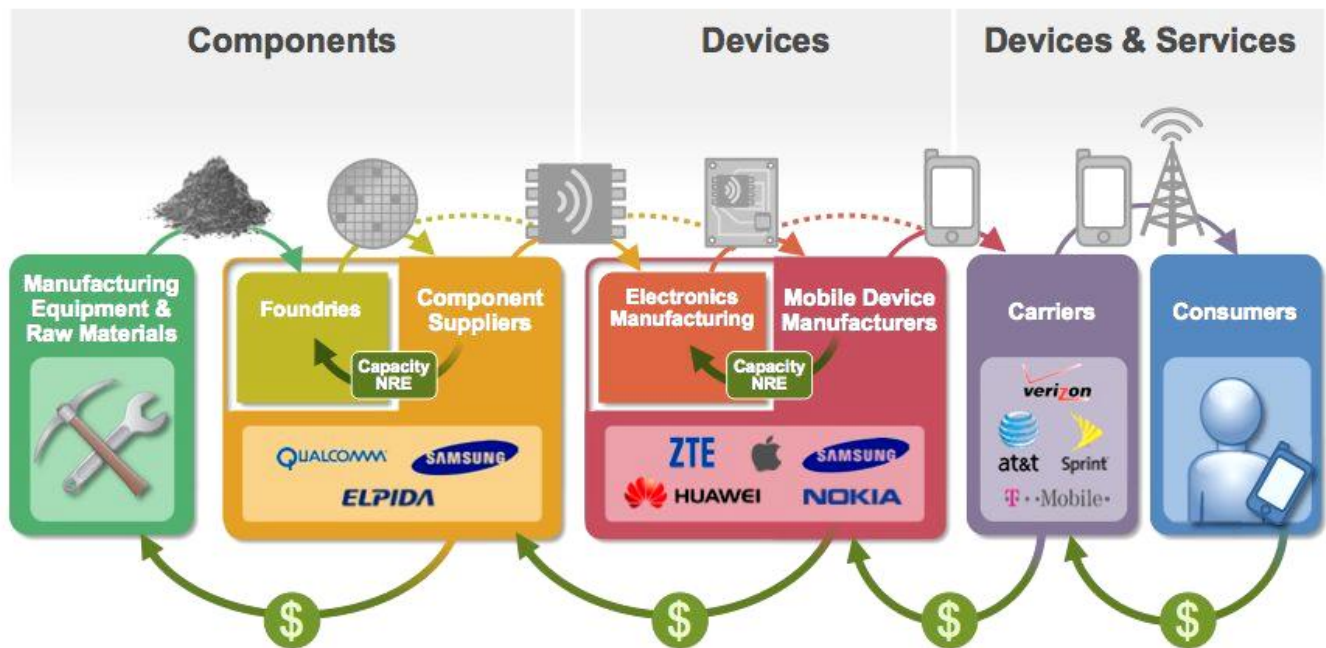


**Resource 7 for Question 2**  
**Comparison of REDD+ finance received and domestic expenditure on agricultural and biofuel subsidies (annual average \$ million)**

	REDD+ Finance (2006-2014 Annual Average)	Agricultural Subsidies (2010-2012 Annual Average)	Biofuel Subsidies (2009)
Brazil	158	11,082	2,700
Chile	0	709	v/a
China	9	160,023	500
Indonesia	165	27,072	79
Mexico	12	7,880	n/a
<b>Total</b>	<b>346</b>	<b>206,766</b>	<b>3,279</b>

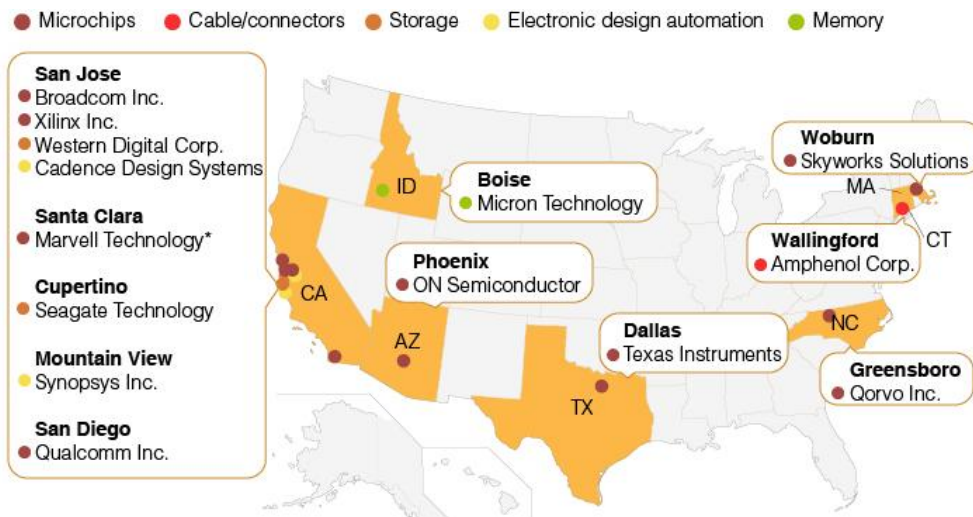
[Turn over

**Resource 8 for Question 3**  
**Smartphone supply chain network**



\* Some of the smartphone manufacturing firms are also component suppliers such as Samsung, LG and Sony which produce and sell to other manufacturers

**Resource 9 for Question 3**  
**Huawei's major U.S. suppliers**

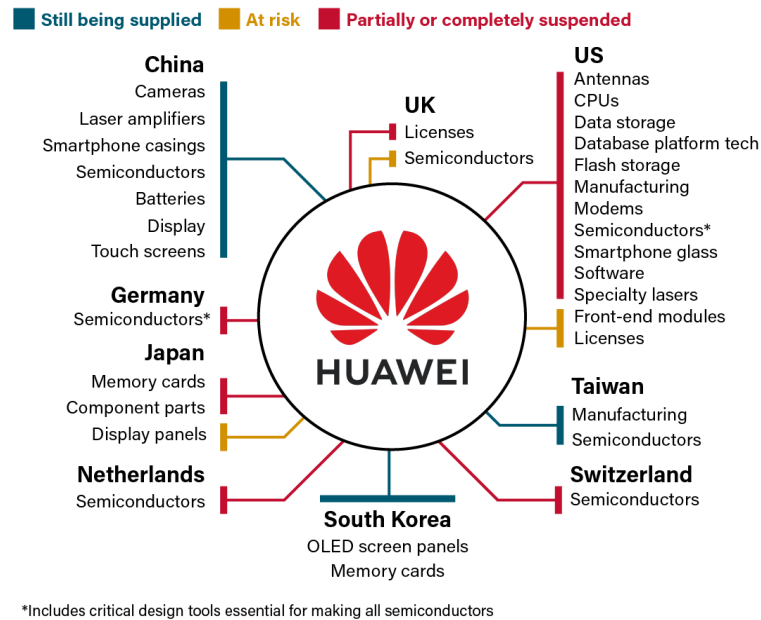


\*Company officially lists its headquarters as Bermuda, but its main operations are in California.

[Turn over

### Resource 10 for Question 3

#### Huawei's supply chain and responses by suppliers to the US ban on sale of technology to Huawei



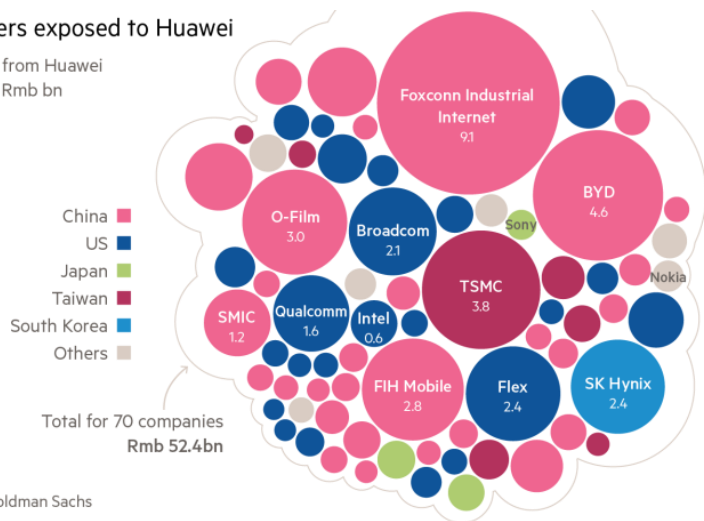
### Resource 11 for Question 3

#### A Flex factory in Zhuhai, China (left) and suppliers that are exposed to Huawei (right)



#### Suppliers exposed to Huawei

Revenue from Huawei  
Q3 2018, Rmb bn



Source: Goldman Sachs  
© FT

\*Left, a Flex factory in the southern Chinese city of Zhuhai, where a worker said production for Huawei had been partially halted.

[Turn over



**Resource 14 for Question 4**  
**Solid waste management statistics in selected cities in Tanzania**

Urban centres	Population	Generation rate (tons/day)	Collection rate (tons/day)	Percentage (%)	Recycled/reused (tons/day)	Total number of wards	Service coverage (wards)
Mbeya city council	385,279	400.0	140.0	35.0	Unknown	36	8
Mwanza city council	706,453	338.0	227.0	67.2	Unknown	18	8
Tanga city council	313,625	185.3	166.8	90.0	14.0	27	11
Arusha city council	507,903	550.0	302.0	54.9	8.8	25	15
Moshi municipality	210,000	225.0	203.0	90.2	Unknown	21	12
Dodoma municipality	507,350	305.0	100.0	32.8	Unknown	47	15
Lindi municipality	78,841	23.0	11.0	47.8	Unknown	18	5
Mtwara-mikindani municipality	108,299	97.5	59.0	60.5	Unknown	18	5

**Acknowledgements:**

Question 1 Resource 1 © <http://www.weather.gov.sg/climate-climate-of-singapore/>  
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 Question 4 Resource 12 © <http://www.oecd.org/greengrowth/38875804.pdf>  
 Question 4 Resource 13 © <https://www.researchgate.net/publication/>

# 2019 H2 Geography Paper 2

## Suggested Mainpoints

### Section A

#### Theme 4 - Geographical Investigation

- 1 Resource 1 shows the map of spatial distribution of rainfall in Singapore. Resource 2 shows hourly variation of surface wind speed (m/s) and direction for each month in Singapore. Resource 3 shows (a) a data logger with wind vane and anemometer and (b) a handmade rain gauge.

- (a) With reference to Resources 1 and 2, suggest a suitable research question for this study and explain how it may be well-defined. [4]

- Research question: To what extent is spatial rainfall distribution in Singapore influenced by wind direction?
- Independent variable: wind direction
- Dependent variable: rainfall distribution
- Controlled variable: Singapore

- (b) Assess the effectiveness of the data representation shown in Resource 2. [4]

*At least one positive and one negative aspect with reference to R2 and explanation.*

#### Positive:

- Use of colour to represent wind speed for the arrows helps differentiate the different wind speeds
- The arrows all placed together over a period of 24 hours and over one year allows for comparison between the different times of day and year

#### Negative:

- Some colours are too similar to tell the difference between the speeds e.g. between 1 - 2 m/s
- No information if the data reflects average wind speed or which part of Singapore it is collected

- (c) Referring to Resource 3 and the context provided, identify and explain **two** possible issues with accuracy and/or reliability. [6]

*Points be made with clear reference to accuracy and/or reliability. Reference must be made to R3.*

#### Accuracy:

- Nature of rain gauge
  - Handmade hence each rain gauge is not produced with strict standardisation of dimensions
  - Markings on bottle done manually and slight variations can occur with each rain gauge produced. Parallax error may occur during marking and reading
  - Presence of gravel/pebbles at base can cause irregularities as size of gravel differ unless the volume of rainwater is measured carefully with a measuring cylinder
- Long time lapse between data collection
  - Evaporation can occur and reduce the total volume collected in rain gauge
  - Sometimes, data collection is done on other days and more than one week has lapsed

#### Reliability

- Too few data sites (far too few) to draw conclusions on the spatial distribution of rainfall
- Sampling of sites is by convenience

- (d) With reference to the Resources and your own knowledge, to what extent would the students be able to answer the research question suggested in (a)? [4]

#### Relevant data collected

- Relevant data has been collected regarding wind direction, rainfall amounts etc

**However, there is insufficient data**

- To answer the question, more data collection sites are needed to provide data on different parts of Singapore

**However, there are issues in data collection leading to inaccuracies**

- Rainfall data may not be collected simultaneously from every site, thus the time of data collection is not held constant
- Rainfall is also not collected daily and this restricts the access to data which may help reflect changes in wind direction and rainfall amounts

- (e) Students from another school were interested to conduct a similar study. What advice should the group of students who have conducted the investigation give them? [7]

*At least 3-4 points that are well explained*

- Increase reliability
  - Increase number of sites
  - Sample sites by random sampling
- Increase accuracy
  - Use measuring cylinder to measure rainfall amounts
  - Use automated rain gauge e.g. one with a tipping bucket but such equipment is expensive
- Safety
  - Safety must be observed at roof top
  - Checking of weather before data collection and taking note of lightning alerts
- Scope of investigation
  - Students may want to consider narrowing the scope of the investigation such as reducing the time frame and reducing the spatial extent

Level	Marks	Descriptor
3	7-8	Response demonstrates a clear knowledge and understanding of the context in the question. Uses relevant, detailed and accurate factual information and conceptual understanding. Reflects strong critical thinking skills and may include perceptive insights for the strongest responses. Source(s) is well used to support the response. Provides a logical and well-developed evaluation well founded on evidence and/or different viewpoints.
2	4-6	A satisfactory response which is generally sound and contains relevant points, but may not always focus on the context in the question. Uses factual information and conceptual understanding that is generally appropriate to the given context but lacks detail and may contain some inaccuracies. Displays general critical thinking skills. Source(s) is used to support parts of the response. Provides an evaluation, which may be limited in depth and sufficient elaboration in some parts.
1	1-3	Response shows a poor understanding of the context in the question. Uses basic factual information and conceptual understanding which has some, but limited relevance to the question. Source(s) is not used or not accurately used to support the response. Provides little or no evaluation
0	0	No creditworthy response.

## Theme 1 - Tropical Environments

### Deforestation and REDD+ in Indonesia

- 2 Reducing Emissions from Deforestation and forest Degradation, plus the sustainable management of forests, and the conservation and enhancement of forest carbon stocks (REDD+), is an essential part of the global efforts to mitigate climate change.

Resource 4 shows deforestation in Riau Province, Sumatra, Indonesia in 2014. Resource 5 shows the criteria for achieving effective outcomes for REDD+ projects in Indonesia. Resource 6 shows the gains and losses in REDD+ forests and biophysical forests. Resource 7 shows a comparison of REDD+ finance received and domestic expenditure on agricultural and biofuel subsidies .

- (a) With reference to Resource 4, describe the nature of deforestation and explain the possible physical impacts on the environment. [5]

#### Nature of deforestation

- Area has been divided into sections and deforestation has occurred in different sections at different timings as shown by the brown, light green and dark green areas
- Clear-cutting or clear-felling has been carried out – most or all the trees in selected areas have been uniformly cut down, leaving what seems to be bare soil in some sections

#### Physical impacts on the environment

- Lower humidity. Vegetation release moisture to the atmosphere through transpiration, hence without trees, less transpiration occurs.
- Higher temperatures. Lack of or absence of shade from trees allow insolation to reach the ground directly to be absorbed, raising temperatures.
- Higher precipitation may occur in the immediate area and timing of deforestation due to greater evaporation from the soil and strong thermals due to the higher temperatures. However, as moisture is not released slowly to the atmosphere without the presence of the trees, rainfall will decrease eventually.
- Soil erosion and lower soil fertility. Without the protection of the vegetation to reduce rain drop impact, soil erosion can occur. If surface runoff occurs, the fertile top soil will be eroded into streams and lakes.

- (b) Suggest reasons for the differences in achieving effective outcomes for REDD+ projects in Indonesia shown in Resource 5. [4]

#### Brief description of the performance of the projects

- None of the projects have achieved major positive results.
- Rimba is the best performing project with 4/5 criteria having achieved some effectiveness
- Harapan is the worst performing project which has yet to achieve effectiveness in any of the criteria

#### Possible reasons

- General : Quality of management by government agency with effective enforcement
- General : The strictness of the validation and verification process undertaken in the assessment of the projects may vary
- Finance : access to sustainable source of finance from DCs or NGOs is important as these projects require
- Community Involvement : Cooperation and participation in project by the community. Sound planning to include different groups in the local community, their roles and expected outcomes
- Monitoring : regular checks are made on the ground to ensure that planned action to be taken is executed such as conservation of forest carbon stocks by retaining primary forests as well as enhancement of forest carbon stocks such as afforestation and deforestation.
- Boundary Enforcement : Much human and financial resources is required to enforce areas involved in the projects to ensure that there is no encroachment from other landowners and activities.
- Carbon & Biodiversity : this requires much data to be collected to check on the carbon stocks and the biodiversity in an area. This might explain the “?” for Harapan and Kapuas projects. More effort to collect data can help reflect the effectiveness of the project.

- (c) With reference to Resource 6, suggest which country may be the most successful in managing deforestation and explain why. [5]

- Overall, Vietnam is the most successful in managing deforestation
- Vietnam has a gain of 1.72 million ha in country-defined REDD+ forests and a loss of 0.59 million ha in biophysical forests. All the other countries recorded losses in both categories except for Malaysia which recorded just 0.24 million ha for the country-defined REDD+ forests.

#### Possible reasons

- Political will by authorities to ensure that sound policies effective action is taken such as monitoring and enforcement
- Active data collection on different scales to provide accurate and updated information. This allows for effective decisions to be made by authorities.
- Policies to encourage development of service sector to reduce reliance on timber or other activities that require massive land clearance e.g. ecotourism
- Development of alternative methods to tapping on forest resources that can limit forest clearance such as agroforestry
- Ground-up or bottom-up initiatives by local communities to reduce forest clearance and degradation. This can be done by seeking alternative sources of income and employment.

- (d) With reference to Resource 7, compare the REDD+ finance, biofuel and agriculture subsidies in Indonesia and Brazil. [3]

#### Similarity

- Similar amount of REDD+ Finance - \$158 million in Brazil, \$165 million in Indonesia

#### Differences

- Agricultural subsidies are 59% greater in Indonesia (27072) than Brazil (11082)
- Biofuel subsidies are 97% greater in Brazil (2700) than Indonesia (79)

- (e) With reference to the resources and your own knowledge, assess the effectiveness of REDD+ in Indonesia. [8]

#### REDD+ in Indonesia is largely ineffective

- **R4** - Practices such as clear-felling are still be carried out. Other practices such as selective cutting can be carried out. Selective cutting is the cutting down of selected trees in a forest so that growth of other trees is not affected. This is done according to criteria regarding minimum tree size for harvesting, specifications of the number, spacing and size classes of residual trees per area, and allowable cut.
- **R5** – Difficult in most cases e.g. Raya and Hulu projects to assess the effectiveness of projects as data is often not collected/available. Reflects the lack of rigour in the authorities to track and monitor the success of the project.
- **R6** – Indonesia recorded net loss in both country-defined REDD+ forests and biophysical<sup>1</sup> forests. Gains should have occurred in at least the country-defined REDD+ forests. Instead, Indonesia recorded 4.10 million ha net loss. **However**, note that the net loss in the country-defined REDD+ forests is 45.2% lower than the net loss in biophysical forests, possibly reflecting some success.
- **Own knowledge** – A report in 2017 reflected that despite the US\$1 billion REDD deal, agreed with Norway in 2010, so far Indonesia has failed to reduce its emissions from deforestation and forest degradation. Between 2010 and 2015, Indonesia lost a total of 9.9 million hectares of tree cover.

#### REDD+ in Indonesia can achieve some effectiveness

- **R5** – At least Rimba project reflects some success, achieving some effectiveness in all of the criteria listed. Kapuas project has returned some success as well.
- **Own knowledge** – Indonesia has an agreement with Norway under the REDD+ scheme that was signed since 2010. In 2019, Indonesia and Norway have agreed on a first payment from a \$1

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<sup>1</sup> A biophysical environment is a biotic and abiotic surrounding of an organism or population, and consequently includes the factors that have an influence in their survival, development, and evolution

billion deal under which Indonesia preserves its rainforests to curb carbon dioxide emissions, although the amount of the first payment still needs to be negotiated by both sides,. However, Indonesia is pushing for a higher valuation than the \$5 per ton of carbon dioxide equivalent that Norway paid Brazil under a similar deal. Nevertheless, Indonesia still has work to do to ensure a consistent pace of progress and tackle the forest fires that account for much of the loss of its forests. All these may indicate that Norway has acknowledged that Indonesia has made progress in protecting its forests.

Level	Marks	Descriptor
3	7-8	Response demonstrates a clear knowledge and understanding of the context in the question. Uses relevant, detailed and accurate factual information and conceptual understanding. Reflects strong critical thinking skills and may include perceptive insights for the strongest responses. Source(s) is well used to support the response. Provides a logical and well-developed evaluation well founded on evidence and/or different viewpoints.
2	4-6	A satisfactory response which is generally sound and contains relevant points, but may not always focus on the context in the question. Uses factual information and conceptual understanding that is generally appropriate to the given context but lacks detail and may contain some inaccuracies. Displays general critical thinking skills. Source(s) is used to support parts of the response. Provides an evaluation, which may be limited in depth and sufficient elaboration in some parts.
1	1-3	Response shows a poor understanding of the context in the question. Uses basic factual information and conceptual understanding which has some, but limited relevance to the question. Source(s) is not used or not accurately used to support the response. Provides little or no evaluation
0	0	No creditworthy response.

## Theme 2 - Development, Economy and Environment

### Huawei's Global Production Network

- 3 Huawei Technologies Co., Ltd. is a Chinese multinational technology company that provides telecommunications equipment and sells consumer electronics, including smartphones and is headquartered in Shenzhen, China. Huawei has deployed its products and services in more than 170 countries, and as of 2011 it served 45 of the 50 largest telecom operators. Although successful internationally, Huawei has faced difficulties in some markets. In 2018, it pulled out of the U.S. consumer market.

Resource 8 shows a typical smartphone supply chain network. Resource 9 shows Huawei's major U.S. suppliers. Resource 10 shows how Huawei's supply chain has altered since 2018. Resource 11 shows some impacts of Huawei's altered supply chain.

- (a) Using Resources 8-10, describe the characteristics of Huawei's global production network. **[4]**
- Resource 8 – output of one stage forms the input of the next stage, increase in value down the circuit
  - Resource 9 – international production and general complexity demonstrating diversification e.g. relying on different suppliers for the same components
  - Resource 10 – international supply chain in both DCs (e.g. UK, US, Japan, Germany) and LDCs (e.g. NIEs like Taiwan and S. Korea, China), with China and the US being the main suppliers of component parts
- (b) Suggest reasons for Huawei's global production network you have described in (a). **[4]**
- Diversification to cushion supply chain shocks
  - Role of governments in attracting Huawei to set up plants there
  - Cheaper to fragment the production process

- Market factors which could cut logistical costs
  - US: important market and collaborator
  - China: important home market base (growing middle class) and regional market base for Asia (emerging markets, growing demand)

Other DCs/ NIEs: technological expertise, relatively skilled workforce (relatively cheap labour in Taiwan and China where the technology is fast catching up too)

**(c)** With the help of Resources 10 and 11, explain the key impacts of Huawei's decision to pull out of the U.S. consumer market in 2018. **[6]**

- Resource 10 – shows those at risk (e.g. semiconductors in UK, display panels in Japan) which might now be suspended with the loss of the US market, majority still being supplied to China (and likely to increase in the short term as new suppliers/ partnerships are being formed/ explored), those still supplied (e.g. Taiwan and S. Korea) might increase if the firm decides to focus more on Asia as a market
- Resource 11- job losses in the short term at least even in China as production is partially halted (may switch to other localities if Huawei decides to consolidate the market back home/ in Asia), suppliers to the firm likely to lose revenue in the short term (quote some figures) or having to explore new options/ partnerships if they still want to maintain US market access

**(d)** Suggest **one** limitation of Resource 10 in showing Huawei's inter-firm networks. **[2]**

- Info gaps: may not capture all the inter – firm networks (e.g. strategic alliances, joint ventures, etc.) or value creation; even outsourcing can be very complex
- As the trade war is developing, information is still in the process of being updated amidst possible gag orders in order to protect business interests/ due to the political sensitivity of the issue
- Scale/ extent of inter – firm network not shown
- Confidentiality of supply chain – likely not to be fully transparent
- Focus should be on inter – firm networks

**(e)** Using the resources and your own knowledge, evaluate the extent to which TNCs can regulate economic activities. **[9]**

- TNCs – scale of operations and economic/ political clout
- Still subject to intervening obstacles such as state action and the political landscape e.g. in this case boycott by the US government
- Factors to consider: role of governments, other non – state actors
- Need for some balance/ consideration of other actors
- Need to refer to both the resources (e.g. for role of governments) as well as own knowledge (e.g. for non – state actors like consumer groups, media, etc.) and other GPN actors (see table )

GPN actors	Role	Value activity	Examples in manufacturing	Examples in service industries
Lead firms	Coordination and control	Product and market definition	Apple and Samsung (ICT), Toyota (automobiles)	HSBC (banking), Singapore Airlines (transport)
Strategic partners	Partial or complete solutions to lead firms	Co-design and development in manufacturing or advanced services	Hon Hai or Flextronics (ICT), ZF (automobiles)	IBM Banking (banking), Boeing or Airbus (transport)
Specialized suppliers (industry-specific)	Dedicated supplies to support lead firms and/or their partners	High value modules, components or products	Intel (ICT), Delphi and Denso (automobiles)	Microsoft (ICT), Fidelity or Schroders (banking), Amadeus (transport)
Specialized suppliers (multi-industrial)	Critical supplies to lead firms or partners	Cross-industrial intermediate goods or services	DHL (ICT), Panasonic Automotive (automobiles)	DHL (banking), Panasonic Avionics (transport)
Generic suppliers	Arm's length providers of supplies	Standardized and low-value products or services	Plastics in ICT and automobile manufacturing	Cleaning in banking and transport services
Key customers	Transfer of value to lead firms	Intermediate or final consumption	Other lead firms or consumers	Other lead firms or consumers

Source: Yeung and Coe (2015: Table 3, 45).

Level	Marks	Descriptor
3	7-9	<p>Response demonstrates a clear knowledge and understanding of the context in the question. Uses relevant, detailed and accurate factual information and conceptual understanding. Reflects strong critical thinking skills and may include perceptive insights for the strongest responses. Source(s) is well used to support the response.</p> <ul style="list-style-type: none"> <li>Provides a logical and well-developed evaluation well founded on evidence and/or different viewpoints.</li> </ul>
2	4-6	<p>A satisfactory response which is generally sound and contains relevant points, but may not always focus on the context in the question. Uses factual information and conceptual understanding that is generally appropriate to the given context but lacks detail and may contain some inaccuracies. Displays general critical thinking skills. Source(s) is used to support parts of the response.</p> <ul style="list-style-type: none"> <li>Provides an evaluation, which may be limited in depth and sufficient elaboration in some parts.</li> </ul>
1	1-3	<p>Response shows a poor understanding of the context in the question. Uses basic factual information and conceptual understanding which has some, but limited relevance to the question. Source(s) is not used or not accurately used to support the response.</p> <ul style="list-style-type: none"> <li>Provides little or no evaluation</li> </ul>
0	0	No creditworthy response.

## Theme 3 : Sustainable Development

### Solid Waste Management in Tanzania

4 Resource 12 shows the relationship between Ecological footprint and the Human Development Index of selected countries. Resource 13 shows types of solid waste in Arusha City and Mbeya City. Resource 14 shows solid waste management statistics in selected cities in Tanzania.

(a) Suggest reasons for the differences in the distribution shown in Resource 12. [4]

- **Countries with high HDI and high EF are generally located in Europe, North America and Asia-Pacific e.g. US (EF: 9, HDI: 0.92)**
  - Economic structure – Capitalism<sup>2</sup>. Little concern for the impacts of production processes and waste produced on the environment. Highly anthropocentric.
  - Private lifestyles – high private car ownership, high energy consumption, consumerism<sup>3</sup>, high meat protein diet
  - Result in large land area needed to produce the natural resources that the country consumes and to absorb the waste it produces
- **Countries with low HDI and low EF are generally located in Africa and Asia Pacific e.g. Tanzania (EF: 1.7, HDI: 0.42)**
  - Lower energy consumption
  - Lower meat protein diet
  - Result in the smaller land area needed to produce the natural resources that the country consumes and to absorb its waste
- **Only one country from Latin America within the Sustainable Development Quadrant**
- **Concentration of Latin American and European countries located near the SD Quadrant**

(b) Compare the type of solid waste collected in Arusha and Mbeya cities as shown in Resource 13. [4]

#### Similarity

- Both cities have plastic at rank no. 2
- Glass in both cities has the lowest %

#### Differences

- Very high food waste in Mbeya at 76% while food waste and wood in Arusha is at 10%
- Arusha's highest % is organic at 39% while Mbeya's is food waste at 76%

(c) With reference to Resource 13, suggest and explain **one** waste management strategy that can manage waste effectively in Arusha City. [4]

- Recycling – this strategy would be useful to manage the plastic, paper, metal and glass waste. These waste that is generated in industrial or domestic activities can be sorted into the different categories and recycled to form new products e.g. organic and food waste can be composted to produce fertilisers  
In many LDC cities, informal waste pickers scavenge and pick recyclable items and very effectively put these materials back into the system. Other positive aspects of recycling that makes it sustainable :
  - reduces the amount of waste sent to landfills and incinerators
  - Conserves natural resources such as timber, water and minerals
  - Increases economic security by tapping a domestic source of materials
  - Prevents pollution by reducing the need to collect new raw materials
  - Saves energy
  - Helps create jobs in the recycling and manufacturing industries

(Other strategies can be identified as well but their effects should be largely positive)

<sup>2</sup> An economic and political system in which a country's trade and industry are controlled by private owners for profit, rather than by the state.

<sup>3</sup> Human desire to own and obtain products and goods in excess of one's basic needs.

(d) Using Resource 14, identify and explain **two** issues with solid waste management. [6]

- Generation rate > Collection rate in cities such as Mbeya
  - Disposal of waste in the streets → accumulation in large amounts leads to smell, infestation by rodents, water-borne diseases when waste traps water
- Low recycling rate
  - Increases amount of waste
  - Clogging of public spaces such as drains and rivers and polluting them
  - Pollutes oceans and cause danger to wildlife when they consume plastics
- % of service coverage is low for most cities
  - Some areas may be too remote and may not be able to afford the service
  - If no alternatives are in place, such areas will see a build-up in solid waste and the accompanying health and environmental issues

(e) With reference to the resources and your own knowledge, evaluate the importance of understanding the ecological footprint to manage solid waste in Tanzania. [7]

*At least 3 main points with explanation and evaluation*

Define EF: Ecological footprint refers to the ecological assets that a given population requires to produce the natural resources it consumes (e.g. livestock, fish, timber, space, water) and to absorb its waste (e.g. CO<sub>2</sub>)

#### Understanding EF is important

- From R12, high HDI is associated with high EF → In considering the inputs and outputs to the city, EF can help cities evaluate the amount of resources they use for consumption and how much they can actually reduce to reduce their EF
  - Cities can also consider how reducing waste produced will also mean reducing the land and other areas of the environment to absorb the waste
- From R13, R14 and EF, the cities can gain understanding of the types of waste produced (esp. recyclable materials such as plastic and food waste) and the potential of the practices of reduce, reuse and recycle to reduce the EF.
- The use of alternative energy can also be considered to reduce the resources used as input and the waste produced as output of the system
- Comparisons can be made with the other cities to understand how well Tanzania is performing
- Tanzania can also understand the importance of recycling and reusing and adapt its available resources to do that e.g. emphasis on the informal waste picking sector

#### Understanding EF is less important

- Tanzania's EF is one of the lowest compared to other LDCs and DCs, so there may not be much concern over EF
- HOWEVER, EF provides some conceptual understanding of how solid waste can be managed as well as how Tanzania's development path should proceed to raise its HDI but keep its EF low

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2	3-5	A satisfactory response which is generally sound and contains relevant points, but may not always focus on the context in the question. Uses factual information and conceptual understanding that is generally appropriate to the given context but lacks detail and may contain some inaccuracies. Displays general critical thinking skills. Source(s) is used to support parts of the response. Provides an evaluation, which may be limited in depth and sufficient elaboration in some parts.
1	1-2	Response shows a poor understanding of the context in the question. Uses basic factual information and conceptual understanding which has some, but limited

		relevance to the question. Source(s) is not used or not accurately used to support the response. Provides little or no evaluation
0	0	No creditworthy response.