

# PAPER 3



20%

70 MARKS

CALCULATOR CAN BE USED

2 HOURS AND 15 MINUTES

## 3 THEMES

- Players
- Attitudes and actions
- Futures and uncertainties

# PLAYERS

Who are the different players (individuals, groups and organisations, stakeholders) involved in geographical issues and decisions (interdependence, globalisation, systems)? Why do some players have greater influence than others (inequality)? This includes: international players (intergovernmental organisations (IGOs)), national and local government, large and small private businesses, transnational corporations (TNCs), pressure groups and non-governmental organisations (NGOs) as well as others in particular contexts.

# ATTITUDES + ACTIONS

Why do attitudes to geographical issues (identity) vary so greatly and how does this influence actions (policies and choice of strategy and management methods)? Influences on values and attitudes include identity, political and religious views, priority given to profit, importance of social justice and equality and attitudes towards the natural environment (conservation and sustainability versus exploitation).

# FUTURES + UNCERTAINTIES

There are contrasting approaches when making decisions about geographical issues that will affect people in the future. These include business as usual, priority towards more sustainable strategies and radical alternatives (mitigation and adaptation). Choice of objective will affect both people and the environment in very different ways (risk, resilience and thresholds). The outcomes of choices made today are uncertain for a range of reasons, including scientific, demographic, economic and political uncertainty.

# Timings →

- Reading ETC → 20 Mins.
- 4 Marks X3 → 15 Mins altogether.
- 8 Marks X2 → 15 Mins each.
  - 18 Marker → 30 Mins.
  - 24 Marker → 40 Mins.

# Preparing for the Synoptic Paper (3)

- Knowledge **recall** & Skills in **interpreting** geographical information.
- Analyse & *Explain trends*.
- **Evaluate material** in the resource booklet.
- Making **relevant & logical connections** & relationships to materials.
- Support argument with **evidence** (Interpret data coherently).
- Make a **valid judgement** about the **value & reliability** of the data & evidence.

## 8 Marker →

- Accurate & **relevant geography knowledge** & understanding throughout!
- **Critically investigates** the QQ (or Issue) → To produce a **coherent analysis** of data (evidence).
- Demonstrate a **range of geological connections** to relevant ideas.



# 18 Marker & 24 Marker →

- Geographical knowledge & understanding.
- **Applies knowledge** & understanding of information to *find logical connections & relationships*.
- Applies the knowledge & understanding of the information to produce a **partial (but coherent) interpretation** – Supported by evidence.
- **Valid judgements** about the value & reliability of the *quantitate & qualitative data* (evidence).
- Produce an *interpretation of quantitate & qualitative data* – **Meaningful connections to ideas across the course of study.**

# Synoptic Themes →

- **PLAYERS** → Those responsible for making decisions about people / use of space & **how the DECISION is implemented**. Closely linked to political plans & strategies etc.
- **Political plans** → UK's *economic transformation* in the **1980s** & *adoption of globalisation policies* (**BIG BANG 1986**).
- **Specific plans** → Management of **energy resources**.
- **Long term programmes** → Response to **climate change**.
- **Private Sector** → Businesses – Small business to large TNCs.
- **Public Sector** → Education, health or defence (Financed by public sources) ... *Parish council to EU*.
- **Third Sector** → Pressure groups (**Greenpeace**) or **NGOs (Oxfam)** & political '**think tanks**'.
- **Stakeholders** → (DIFFERENT FROM PLAYERS) ... They have a *viewpoint about a contested issue* – Not decision makers!

# Synoptic Themes →

- Attitudes → *Viewpoints both decision makers & stakeholders have* about certain issues.
- Actions → Ways in what they *attempt to achieve what they want*.
- Pro-Globalisation VS Anti-Climate Change!
- The Future & Uncertainties → **Can the world provide people with safe water to drink? How far will climate change play a part in any future decision making? ... Business as usual (Do nothing) VS Sustainable strategies (Radical actions).**

# TECTONICS

## PLAYERS

- Local and National Governments 1.6 (Governance)
- Role of Scientists 1.8
- Role of emergency planners 1.8
- Role of planners/engineers 1.9
- Role of NGO/Insurers 1.9

## FUTURES

- models forecasting disaster impacts with and without modification. 1.9

# GLOBALISATION

## PLAYERS

- (P: role of World Trade Organization (WTO), International Monetary Fund (IMF), World Bank) 3.2
- (P: role of European Union (EU), The Association of Southeast Asian Nations (ASEAN)) 3.2
- (P: role of governments in economic liberalisation) 3.2
- (P: role of governments in attracting foreign direct investment (FDI)) 3.2
- (P: role of TNCs) 3.3

- (P: role of TNCs) 3.6
- Opportunities for Athletes of Paralympics 3.6
- (P: role of government) 3.8

### Attitudes and Actions

- (A: attitudes of pro- and anti-immigration groups) 3.9
- (A: actions of local pressure groups) 3.9

### Futures

- (F: environmental consequences of different patterns of resource consumption) 3.9

# WATER

## PLAYERS

- (P: the role of planners in managing land use) 5.3
- (P: role of different players). 5.8
- (P: role of players in reducing water conflict risk) 5.9

## ACTIONS

- (A: contrasting attitudes to water supply) 5.9

## FUTURES

- (F: projections of future drought and flood risk) 5.6
- (F: projections of future water scarcity) 5.7

# CARBON

## PLAYERS

- (P: role of TNCs, The Organisation of the Petroleum Exporting Countries (OPEC), consumers, governments) 6.4
- (P: role of business in developing reserves, versus environmental groups and affected communities) 6.5

## ACTIONS

- (A: attitudes of global consumers to environmental issues) 6.8
- (A: attitudes of different countries, TNCs and people) 6.9



## FUTURES

- (F: uncertainty of global projections). 6.8
- (F: uncertainty of global projections). 6.9

# SUPERPOWERS

## PLAYERS

- (P: role of TNCs in maintaining power and wealth) 7.4
- (P: role of powerful countries as 'global police') 7.5
- (P: role of emerging powers) 7.8

## ACTIONS

- (A: actions and attitudes of global IGOs) 7.5
- (A: attitudes and actions of different countries) 7.6

- (A: attitudes and actions in relation to resources) 7.7
- (A: contrasting cultural ideologies) 7.8

## FUTURES

- (F: uncertainty over future power structures) 7.9

# KEY POINTS TO FOLLOW FROM EACH UNIT

# Globalisation Key Points →

- **Singapore** → One of the world's highest GDP ... Heavy engagement with overseas trade / The government argues that preserving order & its relative disregard for HRs has allowed its economic growth / Its limits rights such as freedom of expression ... Peaceful assembly & for the press / Still used **capital punishment** & the **death penalty** – Issues around the issue of human trafficking.
- Projects ran by TNCs can lead to the loss of farmland, traditional livelihoods & ecosystems / The discovery of the oil reserves in **Nigeria's River Delta** (Exploited by TNCs) ... **Contains various ecological zones** (Mangroves, swamps & rainforests) / Has a population of 31 million & **40 ethnic groups** / 70% live below the poverty line & only **20% of the area is accessible by roads!** The money brought by the oil reserves isn't reaching the local communities ... **75% of the government's income** comes from oil / **Oil spills** are common (**550** in **2014**).
- Amazon → **E-tailer** ... *Buying consumers in 180 countries.*
- **India** → **Shell Outsourcing** → *4000 staff in the country* → **"New Global Middle Class"** → **2040** ... India to be the 2<sup>nd</sup> largest economy in the world → **2500 universities in China, India & South Korea.**
- **China** → **Cultural Diffusion** → 100 million obese people in China → 5X as many obese as there were in **2005** → **2010** ... **9.7%** had diabetes in China ... **11%** in America.

# Key Points →

- **PNG** → Cultural Erosion → 800 different languages & 2000 ethnic groups / WW2 Japanese planes & submarines / 700 birds of paradise species / Evolutionary *isolated species* / 85% = agricultural work.
  - 5 companies own 90% of the global music market!
  - Over ½ of the global population live in urban settlements!
- **Mumbai** → Mega City → 40% of India's foreign trade / 43 skyscrapers above 150m / Between 1971 & 1981 experienced a population growth of 38% / "Manchester of the East" / Slum living has risen above 60%!
- **Dhaka** → Mega City → May be the first 'Mega city' to be evacuated / Contains 12 million people / "Slum Dogs" / 1 mile from nearest water pump / 9 people to 1 shack!
- **North Korea** → Switched Off → "A 2 speed world" / 13/15 of the most globalised countries are European / Sitting on \$1 trillion mineral reserve / People aren't permitted to leave the country without permission from the regime / 5 political prison camps – 80,000 to 120,000 people.
- **Sudan** → Switched Off → Land locked / Civil war ended in 2005 / Labour force consists of 47% children.
- **Lathcoats Farm** → Sustainable Food Sourcing → Every £10 spent in local businesses = £23 to local economy (Multiplier Effect) / Alcohol = Produced in Braintree / Dairy = Suffolk / Apple juice is pressed on the farm / Rolls are baked in Danbury / Pork & Beef from Suffolk!

# Superpowers Key Points →

- In **2015 to 2016** the USA supported resolutions to focus on human rights abuses (**Syria, Burundi & Yemen**).
- **Authoritarian Government (CHINA)** → **Single party** authoritarian state – Governed by the **Chinese Communist Party** since **1949** / **No general elections** / President holds all political power / **Limits freedom** of expression & religion / In recent years **better schooling & wealth & access to social media** have increased calls for more democratic freedom.
- **Democratic Government (INDIA)** → **India's Constitution consists of 444 articles** / Media & independent judiciary ensure the freedom of society / Concerns over **general inequality & discrimination**.
- The **2015** Index showed that **Denmark** was least politically corrupt country / **68% of countries have serious corruption problems** / **Somalia** was the most politically corrupt country. The **UK** ranks with a score of **81** on the Index ... along with **Germany**.
- **National Sovereignty** → The **idea that each nation has the right to govern without interference** / The ideal has limits – especially on the idea of abusing the rights of a nation's own people / Such as in **Libya** in **2011** ... **World's 10<sup>th</sup> largest oil reserve** – Government brutally repressed demonstration ... 100s killed (Government failed to meet the responsibility of protecting citizens) – UN authorised bombing raids by the **UK & French air forces** ... As well as an arms embargo – Intervention wasn't widely supported – **5 countries of the UN Security Council didn't vote** (Due to the belief of insufficient evidence) – The leader (**Gaddafi**) was dead by **October 2011** – **Libya** is still extremely unstable ... Militants are fighting against each other.

# Key Points →

- **The USA & Guantanamo Bay** → USA established a **military base** @ Guantanamo Bay (**Cuba**) in **1903** – Since the war in Afghanistan it has been used to **hold detainees in the 'war on terror'** – The USA have also been accused of expressing torture there as well! In **2004** the **Red Cross found evidence of torture** @ the camp – USA denied the evidence found ... **2009 Obama orders the camp to close** ... **2014** the **USA admits** to the use of torture ... **2017** the camp still holds **41 detainees**.
- **President Xi Jinping** suggests Taiwan & China **share an ethnicity**, language & a cultural history – **Apart of one family** ... Therefore, it is only right & proper to **accept that they are one nation**.
- The indigenous people distance themselves from the **economic & political ties forged with the Chinese in the past**.
- The **Han Chinese** only arrived approximately 400 years ago, when some of the **indigenous heritage** goes back 6,000 years.
- Solved by a bridge (**34 miles across the sea**) – Longest sea crossing in the world.
- China experienced the **Communist Revolution** – Due to Hong Kong being **ruled by Britain for 99 years** Hong Kong didn't.
- **One Country, Two Systems Law** – Hong Kong could continue how they wished for 50 years (**Till 2047**).
- Hong Kong is one of China's biggest economic cities – in **1993** Hong Kong's economy was **worth \$120 Billion** (Equivalent to **¼ of China's economy**).
- Development of **China's mega cities** → **Shenzhen, Beijing, Shanghai** – These cities eventually **eclipsed Hong Kong as the economic powerhouse of China**.
- Hong Kong degraded by making up **27% of the Chinese GDP** in the early **90s** to **only 3%** in **2017**.



# China → Ancient Silk Road

- **New road in Pakistan / New rail terminal in Kazakhstan / Seaport in Sir Lanka / Bridge in rural Laos** → One country's project → BUT touches 3 continents & **over 60% of the world's population / CHINA'S BELT** – Most ambitious infrastructure project in modern history... *Rerouting global trade / Seems like China's plan to become the world's next superpower!* / **2013** → Chinese President mentions the '**Ancient Silk Road**' (Network of trade routes – Moving ideas, culture, goods etc). / "**We should take an innovative approach** & jointly build an economic belt along the Silk" (Mention in Kazakhstan before visiting Indonesia). / In Indonesia → "**The 2 sides should work together** to build a maritime silk road for the 21<sup>st</sup> century". / **\$4 - \$8 TRILLION!** / Over 60 countries have reportedly signed agreements for China's upcoming projects (**Hungry / Kenya / Russia / Malaysia** etc). / China promotes their 'conquest to a superpower' as benefiting everyone (EXAMPLE – **BRI's Flagship Project in Pakistan**). / ... *173<sup>rd</sup> in GDP per capita* / Previously not popular for foreign investment till China came along. / ... **2001** → China agreed to build a **new port in Gwadar** → By **2018** the port (highway & railway) became a **\$62 billion-dollar Corridor** → BENEFITING BOTH COUNTRIES! / ... *Pakistan saw their highest GDP in 8 years* & China developed a new alternative route for goods (OIL & GAS – MIDDLE EAST) ... **7 out of the top 10 global contractors are CHINESE.** / For the **West** to start development in Middle East / South East countries they usually must **meet ethical standards** → China isn't bothered... **Just offer loans instead.** / Even affiliated with **Yemen / Ukraine / Iraq** (All currently **splinted by conflict**). / **More to the BRI than ECONOMICS** → In **Sir Lanka** China loaned **\$1.5 billion**... Because it soon came clear that they wouldn't be able to pay back – They allowed **China to control the port on a 99-year lease** & in **Pakistan** they have been granted a **40-year lease due to Pakistan's** inability to pay back loans. / **STRING OF PEARLS THEORY** → Predicts China is attempting to develop a **string of Chinese Navel bases** in the **Indian Ocean** – Allow station ships & guard shipping routes which will move through the region... So, although China isn't receiving their money back, they are **still achieving some very importance strategic goals.** / **China's growing influence is strongly challenging the status of the USA** (**The lone Superpower**). / **USA** → **ISOLATION** ... Trending ... **Investing in less & concluding with a loss of influence around the world / BRI** → China's way of **leveraging power** to become a global leader (Building relationships & controlling global trade).

# Superpowers → Making an Impact

- How did Saudi-Arabia end up with so many American weapons?
- **Saudi-Arabia** have condemned several air strikes in **Yemen** (**Proxy War**) since **2015** (Aimed @ civilian targets → Killed 40 children on a school bus).
- The majority of Saudi-Arabia's weapons are made in the **USA** (They are the **USA's number 1 customer**).
- **For 72 years** the 2 countries have been strategical allies (In attempt to keep the Middle East stable) → **BUT** Saudi-Arabia has been using US weapons to make the situation worst!
- OIL → Mostly discovered in **1938** / **1945** ... **DEAL** (USA ... Constant supply of oil ... SA ... Constant protection) / During the **1970s** sales of weapons to Saudi-Arabia sky rocketed!
- **Iran** → Nixon stated "Sell Iran ... **Virtually any conventional weapon it wanted**" → Borders with **RUSSIA!**
- **USA's TWIN PILLARS** = Saudi-Arabia & Iran!
- The selling of weapons was a way of protecting the oil supply in the Middle East from Russia!
- **1979** → **Islamic Revolution** in **Iran** / **ARMED WITH \$9 BILLION WORTH OF USA WEAPONS** / Made Saudi-Arabia want more weapons ... USSR had developed alliances also in the Middle East (**IRAQ & SYRIA**).
- **ENDED UP IN A PROXY WAR!**

# Superpowers → Changing Patterns of Power

## The Multi-Polar World →

- ❑ 19<sup>th</sup> Century (Didn't have a singular superpower – Although the **British Empire was the biggest**).
- ❑ Empires were established through **Communism** (*External nation takes direct control* of a territory – Sometimes by force).

## Military Influence →

- ❑ Significant in the **Bi-Polar World** ... The **balance of power shifted** – Creating new alliances.
- ❑ **Warsaw Pact** → Military pact signed by those supporting the USSR ... **The Council of Mutual Economic Assistance** was formed for economic strength.
- ❑ **NATO** – Formed for countries supporting US & Western European influences.

## Cultural Influence →

- ❑ **Cold War** was based on **propaganda** not military conflict.
- ❑ (USA) **McCarthy Trials** → Designed to **expose** anybody with **communist leanings** with daily reports on the TV & radio.
- ❑ **Films** also generated suspicion of communism.

## The Rise of China →

- ❑ Different **patterns of power** = in a vary of **degrees of geopolitical stability & risk**.
- ❑ The **Fall of the Berlin Wall (1989)** – End of East Germany communist government & the collapse of the USSR (**1991**) left the US leading a **Uni-polar world**.
- ❑ The USA economic, cultural, political & military strength has been **unrivaled**.
- ❑ Recently **China** has sought greater influence → Challenging **the USA**.
- ❑ China could over take the USA ... however they have **domestic problems** linked to its **lack of democracy** & censorship of the population .

## Emergence of a Bi-polar World →

- ❑ **British colonialism** gave the UK political & economic power until **rapid industrialisation** of the USA (Followed by the creation of the USSR) challenged their dominance.
- ❑ By **1945** ... A **Bi-polar world** had emerged (USA & USSR).
- ❑ Balance of power (**1945-1991**) → Resulted in the **Cold War**.

## Political Influence →

- ❑ The threat of **nuclear weapons** helped prevent open conflict breaking out.
- ❑ The **'Iron Curtain'** – Heavily defended border (Eastern & Western Europe – Divide between East & West Germany)... Signified the **divide** between **Capitalism & Communism**.
- ❑ **Moscow** → Strong influence across Eastern Europe (**Economic Planning & Military Operations**).

## Economic Influence →

- ❑ **Post 1945** USA adopted the **Marshall Plan** → (Aid) to **extend its economic influence & help strengthen war torn Western European Countries**.
- ❑ Aid was used to rebuild war damage / promote economic development / Prevent poverty → **ALL believed to underpin Communist influence**.
- ❑ USA provided inward investment to the **'Asian Tigers'** (**Singapore**) to enable economic growth & **prevent the further spread of communism**.
- ❑ **NEO-COLONIALISM** → 'New Colonialism' ... Influence has accelerated global development (**Large proportion spent on military hardware**).

**\$3297 million** → Given in USA Aid to the UK as part of the Marshall Plan.

**\$2296 million** → Given in USA Aid to France as part of the Marshall Plan.

**\$1448 million** → Given in USA Aid to West Germany as part of the Marshall Plan.

# Superpowers → Changing Patterns of Power

- RUSSIA ... Hard Power → Military Power
- (Finding elite troops during the 2014 Crimea annexation)
- Condemned internationally.
- Crimea has a Russian speaking majority.
- Silent & well armed.
- Ukraine president had turned his back on a potential trade deal with the EU under pressure from Russia → Angered pro-European Ukrainian's (Maidan Square Protest – 100 Died).
- **President Yanukovich** fled Ukraine (22<sup>nd</sup> Feb).
- **22<sup>nd</sup> February** the **Russia flag** was held above the **Crimean parliament in Simferopol** → THE NEXT DAY ... Crimea's international airports were also seized by 'little green men' → **4<sup>th</sup> March** Putin officially denied Russian involvement (Claimed the armed men were local self defence forces).
- **16<sup>th</sup> March** → Crimea voted to re-join Russia!

# Superpowers → Emerging Superpowers

## Rising Economic Superpowers →

- ❖ **Emerging Major Economies** → China, India & Brazil.
- ❖ **Re-Emerging Economies** → Russia.
- ❖ **Largest Trading Bloc** → EU (Completing with the USA for global economic dominance).
- ❖ **Emerging Economies** → Asian countries (Likely to be majorly global players by **2050**).

## BRICS (Brazil / Russia / India / China & South Africa) →

- ❖ By **2050** it is likely that there will be a new era of 'superpowers' ... Challenging the Uni-polar world under the USA.

## Global Governance →

- ❖ New players have emerged to promote reduced greenhouse gas emissions at the annual **UN Climate Change Conference**.
- ❖ **2015** → Saw high numbers of delegates from **China, France, Canada & Russia** showing their *commitment to emission reductions*.
- ❖ **Brazil** → *Produces 1/2 of South America's GDP / Relies on primary products for exports / Accused of corruption in 2013 (Less stable) / Accounts for over 60% of South America's total military budget / Global reputation of football / 1/2 of South America's population / Fertility rate = 1.8 / High biodiversity (13% of all global species) / World leader in biofuels / Deforestation is a major problem!*

- ❖ **Russia** → **9<sup>th</sup> largest global economy** / Highly dependant on oil & gas (vulnerable due to price fluctuations / High inequality (35% of the wealth is owned by 110 people – **2014**) ... The poorest 20% share 3% of Russia's GDP / **Maintains political influence over former USSR republics** / Military spending has increased ... Yet **Naval & Aircraft stock is ageing** / Large culture tourist industry / Pollution remains due **to toxic waste spills & mining**.

	USA	BRAZIL	RUSSIA	INDIA	CHINA	SOUTH AFRICA
HDI	0.90	0.75	0.80	0.60	0.70	0.40
GDP (Per Capita US\$ PPP)	56000	15000	24000	6000	14000	13000
Internet Users (% pop)	88	60	71	35	52	49
GDP from Agriculture (%)	1.6	5.8	4.0	18	10	2.5
Population Growth Rate (%)	0.77	0.8	0.2	1.3	0.44	-0.48

# Superpowers → Emerging Superpowers

- Explaining Changing Patterns of Power →
- Wallerstein's World Systems Theory →
  - Developed in **1974** / Helped to explain capitalist world systems & the development gap.
  - The world's economic "**core regions**" (HICs) drive the world economy → **Import, process & add value** (Profit from) processing primary materials from **peripheral regions**.
  - Stems from unequal trading between former colonial rulers & colonies.
  - *Unequal Trade (PRESENT)* → **Exports of primary products dominate the economies of developing countries** whilst **core regions dominate ownership of production lines** (Dictating what is produced & by who).
  - **Currently the Western 'Core' owns & consumes 75% of global goods and services!**
- Modernisation Theory →
  - During the **1940s** ... America viewed advancing communism as a major threat – Leading to the promotion of the Modernisation Theory.
  - **Idea ... To deliver Capitalism & Modern Institutional Reforms** (Capitalism was the **solution to poverty**).
  - Establishment of **the IMF & WB** helped achieve reform (**Focusing on currency stability / Development loans**).
  - Without the reform the '**poverty trap**' was said to still remain – Developing economies would be *held back by traditional family values*.
  - As a response to growing communism the **USA targeted their investment on countries bordering China & USSR** (Such as **Japan / India / South Korea**).
- Dependency Theory →
  - Argues that the dependency of developing countries on wealthier nations is the cause of poverty!
  - **Trade Patterns** → **Exportation of primary resources** to developing nations in **return for manufactured goods**.
  - Tariffs are added to processed imports (So that the **TERMS OF TRADE** aren't in favour of the developing country!).
  - Developing countries are unable to add value to primary goods so profits remain low... This deters investment & maintains poverty ... Although the countries remain **trapped in a vicious cycle!**
  - Production of primary produce (**Agricultural**) → Goods **exported** in primary state → **Low** value → **Low** profits → **No** investment in manufacturing/machinery!

**Asian Tigers** → Hong Kong / Singapore / South Korea / Taiwan ...  
**Capitalist** ... Taken over by Japan = Highly developed (**Samsung**).

**PARETO OPTIMALITY ...**  
Due to **finite resources**, you cannot make one person better off without making **someone else worse off!**  
**Rich hoard resources & keep the poor poor** since they are **unwilling to loose their dominant position!**

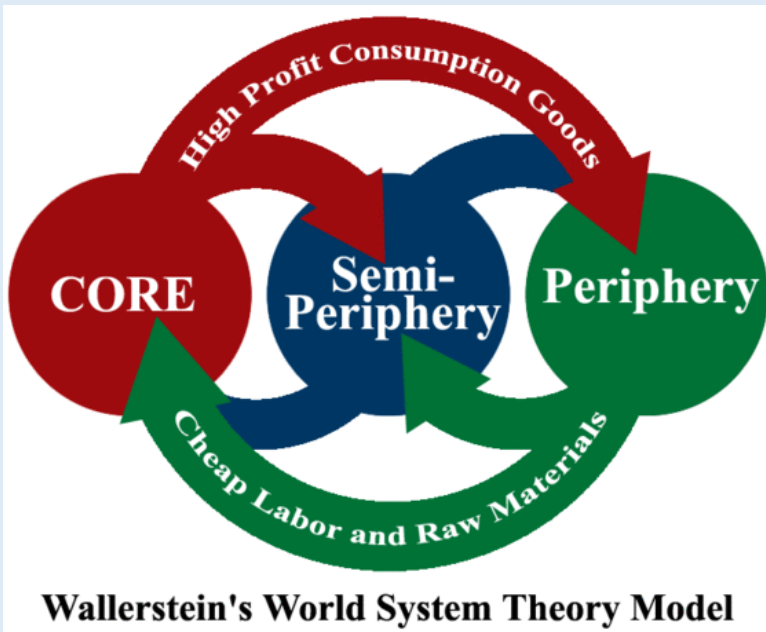


# Superpowers → Emerging Superpowers?

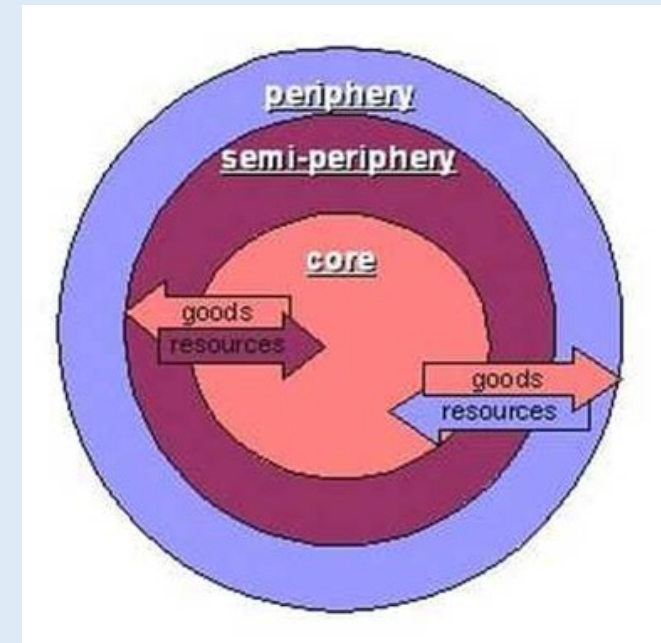
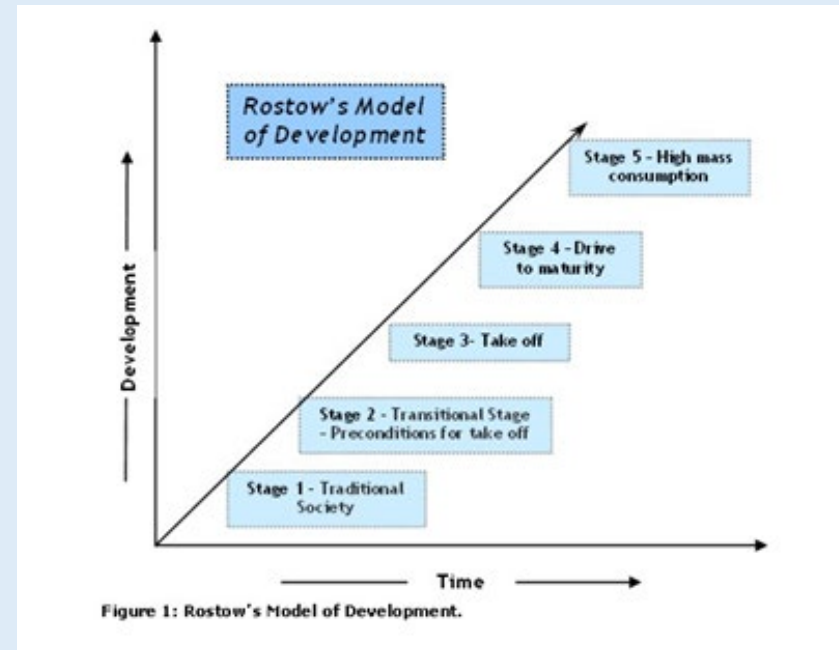
- **The Core is shifting** ... Different countries are developing to become apart of the core!
- **Focuses too much on the economy** (Fails to consider other strengths – Military & Culture).

- A **Neo-colonial idea** – Uneven power structure.
- Suggests **West is best**.

- The **rise of the Asian Tigers** argues against the theory.
- **IMF & WB** loans mean manufacturing has taken off in **financial & industrial** based economies!



- ❑ Views a **3 tier world** (China as 'Semi Periphery')!



- ❑ Rich keep poor underdeveloped by *exploiting cheap resources* with the most skilled workers (**BRAIN DRAIN**).

# Superpowers → Global Networking



- The Influence of IGOs →
- **The World Economic Forum** ... A Swiss (Not for Profit) Organisation **formed in 1971** / Promotes **public-private cooperation** at its annual forum in Davos... / Aims to **bring businesses together** and **widen society to improve the world** (Discussing world issues – Corruption & Terrorism which impact economic & social systems).
- **The International Monetary Fund (IMF)** ... **Founded in 1944** / Aims to **stabilise global currencies** / Provides **loans to assist developing countries** in **reducing poverty & preventing communism** / Sets up **SAPs** (Structural Attachment Programmes) as a condition of loans to promote capitalism within a country / **8 COUNTRIES CONTROL 47% OF THE VOTE BETWEEN THEM!**
- **The World Bank** ... **Founded in 1944** / Aims to **support capitalism by financing project loans** to developing countries & to **eliminate poverty** whilst implementing sustainable goals / **Provides finance after natural disasters & humanitarian emergencies**.
- **The World Trade Organisation (WTO)** ... Focuses on **trade & rules** which **ensure capitalism remains strong** / Aims to **free up global trade & reduce trade barriers** by **negotiating free trade agreements** / Currently they are working on poverty reduction programmes: **Removing farm subsidies in developing countries** to **stimulate efficient production** (Cheap imports undercuts local farmers ... forcing them out of business).
- TNCs as Global Players →
- TNCs aren't recent (the **East India Company** ran most of India throughout the 18<sup>th</sup> & 19<sup>th</sup> century) ... But they are recent as being global players.
- Top TNCs are becoming more international → In **2006 6/10 TNCs were American**.. By **2015 the figure has fallen to 3/10** → Reflects the **growing influence** of the **Chinese TNCs**.
- Many TNCs are **publicly owned & driven by profit** ... BUT **Chinese TNCs are state-led** (Operating commercially whilst returning **all profit to the state**).
- Increasingly Asian TNCs are gaining influence → **Japan** = 2<sup>nd</sup> (2008) / **UK** = 3<sup>rd</sup> (2008) / **China** = 4<sup>th</sup> (2008) / **Canada** = 6<sup>th</sup> (2008) / **India** = 10<sup>th</sup> (2008).
- TNCs as Players in Global Trade → The global shift in manufacturing has led to a **rapid increase in exports from developing countries** → Shifted economic power towards **emerging countries** (Made TNCs extremely powerful) ... Most of the increase in global trade = **intra-company** (**TRADE BETWEEN DIFFERENT BRANCHES OR ACTIVITIES OF THE SAME COMPANY**).



# Superpowers → Players in International Decision Making

- Attitudes & actions of IGOs towards Geopolitical Stability →
- UN → Formed to **maintain peace** after WW2 (Sub-Organisations are still important to geopolitical stability) ... **193 members** ... Maintaining peace / *Promoting human rights* / Social & economic developments / *Providing humanitarian relief & aid work*.
- UN Security Council & Peacekeeping → Responsible for preventing conflict / **5 PERMANENT** members (Able to **veto any resolution**) / Authorised military & peacekeeping missions to conflicts (**Democratic Republic of Congo (2004-2009)**).
- International Courts of Justice → **Settles disputes** between UN member countries & advise on international law / Has **15 judges** (Represent different global regions) / *Deals with cases brought forward by individual countries not individual people!*
- UN & Climate Change → The **annual UN Climate Conference** aim to make progress in managing climate change / The **2015 Paris Agreement** engages all countries in significantly reducing emissions / The agreement has been *undermined by climate change deniers (TRUMP)*.

## International Players & Global Policing →

Formalised alliances between countries are important in increasing interdependence / geo strategy & global influence!

Economic Alliances → The **European Union** forms a 'free trade area'... with 28 member states in **2016** / **Free movement of people & a common currency** / Principle = Economic strength insures against poverty & the policies should work towards reducing inequality / Influences environmental issues & human rights ... **Future is less stable following the UK vote to leave the EU in 2016.**

Military Alliances → The **North Atlantic Treaty Organisation (NATO)** ... Formed in **1949** (@ Beginning of the Cold War) / **A dominant international military alliance** / Principle = **An attack on one member is an attack on all** / NATO's influence diminished at the end of the Cold War ... However the recent increase in Russian military activity has brought it to the fore again.

Environmental Alliances → The **Intergovernmental Panel on Climate Change (IPCC)** ... Established in **1988** by the UN / **Members representing 120 countries** / Produces reports on climate change – **Aiming to assemble evidence from peer-reviewed publications to ensure the stabilisation of greenhouse gas concentrations.**

# Superpowers → Superpowers & the Environment

- **Monitoring the Earth's Atmosphere** → The greatest concentration (**Measured by NASA**) is found in **North America, Europe, India & China** ... Coincide with the areas of high population density & with developed or emerging economies.
- Globally **CO2 emissions rose by 53%** between **1990 & 2013** → Within this period **China's emissions increased by 286%** - 5X the global rate = World's largest CO2 emitter.
- **China** → 6.5 tonnes of CO2 per capita / **USA** → 17.6 tonnes of CO2 per capita / **Germany** → 9.2 tonnes of CO2 per capita.
- **Global Agreements on CO2 Emissions** → Superpowers *differ in their willingness* to act.
- **China** must be included in any global reduction agreement if it is to be successful – In **2016** China agreed to some emission targets (Progress towards these will determine the success or failure of the **2015 Paris Climate Agreement**).
- **Russia** also supported the **2015** Paris Agreement by agreeing to lower CO2 emissions prior to the **1990s** levels – However this could allow Russia to increase their emissions since the CO2 levels in **1990** were *much higher than when the USSR collapsed* in **1991**.
- Since **2005**, the **USA** has led the way – Reducing total emissions by using renewable energy & energy efficiency measures ... Whether this will continue under the **leadership of Trump = UNKNOWN!**
- The **EU** is another leader of climate initiatives such as carbon trading / emissions reductions & renewable energy = *Aims to cut 20%* of its energy consumption by **2020**.

# Superpowers → Contested Places

- Is it time to drawn borders on the Artic Ocean?
- **Svalbard** → Russia Coal Mine / Russian Flags / Statue of Communist Russia Leader Lenin → LOOSES MONEY ... There for stratal reasons → **Allows influence** in the region.
- Predicted to hold *30% of undiscovered natural gas & 13% of undiscovered oil*.
- Summer is longer → Decreasing time for containerisation (**Cut across Arctic**) from Western companies to Asia!
- **Norway's** continental shelf data → Is the only proof which has been approved!
- **Greenland's (Denmark) & Russia's & Canada's** data supposedly overlap one another!
- **2007** → Russia planted their own flag on the seafloor!
- **By 2020** → **50 airfields** & military exercises in the Arctic (Published with Reindeers & Husky's)!
- USA haven't acted upon the extending military influence of Russia in the Arctic!
- TOURSIM in Svalbard ... **STATEMENT RATHER THAN A FUNCTION** → Projection of culture & identity of being Russian (Association & Influence of a place) → **SOFT POWER** ... On a country which is Norway's.
- **15 submarines & 110 aircraft** etc → Still following rules!

# Superpowers → Challenges for the Future

- Economic Restructuring →
- In the *Western area* 'economic restructuring' shifted **employment from manufacturing to tertiary & quaternary sectors** → Lead to long term challenges.
- Economic costs → Widespread unemployment (Loss of traditional mining & manufacturing) / Social costs → **Social cohesion** LOST ... Due to a **spiral of decline** & people had to migrate to find work.
- Debt Problem & Financial Crisis (2007 to 2008) →
- Occurred among *US & European mortgage lending markets* ... **Sub-Prime Lending** ... US Banks allowed low income earners with insecure jobs to be given mortgages which they would struggle to repay – Though risky they were packed with more secure investments & sold on global markets → CAUSED BANKS TO HAVE DEBT ... WORTHLESS PROPERTY '**BUBBLE BURST**'.
- Confidence in the global banking system was shattered (Some of the largest banks **collapsed – Lehmann Brothers**) ... In the UK some banks (**Lloyds**) were **bailed out with government money** ... OTHERS such as the **Royal Bank of Scotland were nationalised**.
- Impact of the Financial Crisis →
- Despite bank bailouts ... the **repercussions** of the financial crisis were huge & countries reacted differently – The **US government increased national debt to maintain consumer spending & an economic multiplier effect** ... The UK government adopted **AUSTERITY** & reduced government spending – Creating little growth. **Greece** was a badly hit country – **High unemployment resulted in hate crime against immigrants**.

# Superpowers → Challenges for the Future

- Maintaining Global Military Power → As a *uni-polar superpower* most countries admire the **USA & their allies** due to their massive military spending ... For help & assistance when tensions arise ... Between **2016 & 2017** the **UK had the 5<sup>th</sup> largest defence budget (\$56 Billion)** – **10% of the US's defence budget**.
- Naval Power → **Austerity** lead to the *decline in the UK's defence budget* / Debates whether it is best to have a large number of low costing ships (Strength in numbers) or a small number of high tech ships!
- Nuclear Weapons → The on going debate about having weapons which may never be used! *Weaponry can deter the escalation of conflict* / Although in **2016** the UK did replace their *trident nuclear deterrent*.
- Air Power → Current warfare is focused on fast response aircraft opposed to naval fleets.
- Intelligence Services → *Government spending is increasing towards antiterrorism work!*
- Space Exploration → **Space budgets promote exploration** ... India & China are adopting major space programmes & launching space flights more cheaply.
- Futures & Uncertainties (Future Power Structures) →
  - The balance of global power in **2030 & 2050** is uncertain – Several possible outcomes ... Continued US dominance / Bi-polar structure / Multi-polar structure.
  - Based on current data ... *China could take over the US as the world's largest economy* between **2025 & 2030** ... However in the **1980s Japan** was predicted to challenge the USA ... The *Asia financial crisis* occurred in **1997** ... Prevented this!

# Tectonics Key Points →

- **Haiti 2010 (Mag – 7)** → *60% of government buildings were destroyed* / 316,000 dead / **50 hospitals & 1300 schools damaged** / Shallow *5 mile focus* / *Shanty towns* (Poor health & sanitation) / \$100 million from USA & **\$330 million given from the EU for aid** / *4.3 million were provided with weekly rations* / Support for the 70% left without a job.
- **Christchurch 2011 (Mag – 6.3)** → Shallow **focus of 3.1 miles** / *181 people were killed* / 2,000 injured / *50% of city buildings were damaged* / 80% of the city was left without electricity / By **August 80% of roads were repaired** / Chemical toilets provided.
- **Japan 2011 (Tsunami)** → *500KM squared of coastal plains were hit destroying farmland & communities* / 6 million homes lost electricity & 1 million had no running water / *100,000 Japanese soldiers were sent for search & rescue* / Considered a tsunami defence system / Triggered by a **9.0 earthquake**.
- **Iceland 2010 (Volcano)** → Over the course of *8 days ... 100,000 flights were cancelled* / **British Airways lost \$26 million daily** / **Cars were unable to reach European factories** (BMW was down by 7,000 cars in 1 week).
- **Montserrat 1995 (Volcano)** → 5 year eruption / 2/3s of the population was evacuated (Aging population) / ¼ of the infrastructure was destroyed ... Collapse of tourist industry.
  - **Mitigation → Preparedness → Response → Recovery**
  - **Relief → Rehabilitation → Reconstruction**

# Water Key Points →

- ✓ Problem also occurring in **New Orleans, Venice & Miami & Mexico City.**
- ✓ Submerged by rising sea levels!
- ✓ Areas at risk in **South East Asia** → **Bangkok, Ho Chi Minh & Manila.**
- ✓ But areas in **Jakarta** (Indonesia) are sinking at a rate of 10 inches per year.
- ✓ **Canals** have become *polluted, clogged & stagnant* – **Contributing to flooding rather than alleviating it.**
- ✓ Suffered from a flood every 5 years since the 1990s.
- ✓ City population → **10 Million** ... The Metropolitan Population of Jakarta is **30 Million.**
- ✓ Transformed into a '**Concrete Jungle**'.
- ✓ **LINKED TO** – **Subsidence** ... Occurs when *groundwater is extracted causing layers of rock & sediment to compact* → Since people and businesses are having to do so as the Government fails to provide clean piped water to a majority (**Government provides for less than 40% of the population**).
- ✓ Since **1985** more than **13ft of subsidence has been observed.**
- ✓ It is predicted that by **2050** *95% of Jakarta will be below the sea.*
- ✓ **Java** is also suffering greater flooding.
- ✓ Even with the **additional warming of ½ a degree** could bring sea level rise to coastlines ... **Affecting 10 Million!**
- ✓ 14,000 people have been evicted (**Displaced by force from the government**)... Corrupt!



# Deficits Within The Hydrological System → Brazil Drought 2014 to 2015

## TYPES OF DROUGHT →

- **Meteorological** ... Reduced precipitation to normal.
- **Agricultural** ... Insufficient water for irrigation of crops.
- **Hydrological** ... Drainage basins suffer shortfalls.

- ▶ Drought occurs when there is a *water deficit compared to the average rainfall for the same period* (In Brazil the rainfall is usually predictable).
- ▶ Moist air moves westwards from the South Atlantic across the Amazon Basin → Then turning southwards at the **Andes mountains** (Maintaining the flow of moisture around the basin).
- ▶ **Worst drought in 80 years!**
- ▶ The high pressure systems diverted rain bearing winds north (Heavy rainfall landed in Bolivia opposed to Brazil).
- ▶ **IMPACTS** → Water rationing / **Those reliant on hydrological power suffer from power cuts** / Reservoirs dry up – Some down to 1% capacity / Increased groundwater abstraction – **Reducing aquifers to dangerously low levels** / **A reduced crop of Arabica coffee beans** (Increasing the global coffee prices by 50%).





# Deficits Within the Hydrological System → Deforestation /

## Droughts & Feedback

- ▶ Deforestation in the Amazon has **reached & passed a tipping point** → Changing hydrological & climatic cycles permanently.
- ▶ The **Positive Feedback Loop of deforestation** (Less rainfall) ... Reduces the ability of the rainforest to regenerate & recycle rainfall.
- ▶ Tropical forests are important in regulating regional climate & generating flows of moisture across the continent → BUT global climate change & **ENSO** & deforestation has the ability to change this flow ... **Extreme weather becomes more frequent.**
- ▶ **Human Activity & Drought** → **OVER ABSTRACTION** ... Strongly contributed to Brazil's drought in 2014/15 ... Residents tried to **avoid cuts in supply by illegal drilling** (Licenses are expensive) ... **70%** of the wells were illegally drilled (Caused further issues with water contamination).
- ▶ **The Impact of Drought on Rainforest Ecosystems** → The Amazon = "**The Earth's Lungs**" ... Absorbing CO<sub>2</sub> and respiring O<sub>2</sub> back into the atmosphere ... **Prolonged drought** causes forest stress & can cause a series of **chain reactions.**
- ▶ Following '**Forest Die Off**' → **Less transpiration** occurs.
- ▶ Younger trees die **reducing the canopy coverage** / Reducing the humidity, water vapour (**RAINFALL**) / Dying vegetation & **surface tree litter** (Easy to catch fire) / **High winds** often turn small fires into wildfires.



### The Impact of Drought on Wetland Ecosystems



- ▶ Wildlife on the **Pantanal in South America** depend on the **permanent wetland on the floodplain for survival.**
- ▶ Usually between **November & April** rainfall floods the Pantanal ... Changing into an **aquatic habitat** (Areas near the river are forested & savanna grassland further away – HIGHLY AFFECTED).
- ▶ **Trees died at an increasing rate** – Reducing animal habitats / **ecotourism & cattle ranches.**
- ▶ Farms cleared ungrazed land by burning ... **Fires spread to the wetlands & forests.**



# Climate Change → Good, Bad Unpredictable!



- ▶ **Climate is changing →** (On a global scale) Some places may **reduce current water scarcity** – BUT a **deficit could be the result in other areas.**
- ▶ **Droughts =** Reduced inputs / **Reduced storage in soil, rivers & lakes** / Higher rates of evaporation / **Growing importance of groundwater.**
- ▶ **THE GOOD (SAHEL) →** (South Fringe of the Sahara Desert) ... Annual rainfall varies between **100MM to 600MM** / Majority of the rainfall comes during the **Monsoon season (July → September)** ... Monsoon rains failed during the **1970s & 1980s** = Drought ... Since **1996** they have experienced several **wet years** → **Regreening = To create productive farmland maybe possible.**
- ▶ **THE BAD (CALIFORNIA) → Facing increasing water problems** due to the variation in rainfall ... **2015** saw the **4<sup>th</sup> year of drought** due to rising temperatures (INCREASED EVAPOURATION RATES / REDUCED PRECIPITATION) ... **Consequences** = Water rationing / **Farmers abandoning their fields** / **Increased risk of wild fires** ... Apparent problems already faced → Surface runoff & soil moisture levels have declined / Forests have become **scrub & grassland** / **Ground water levels fell by 30M between 2011 & 2015** / Reservoir levels have fallen / Permanent snow levels were at a record low in 2015 – **Meltwater is crucial in water supply.**





# Climate Change → Global Climate Problems

- ▶ Global climate patterns are mainly **caused by atmospheric circulation** → **Ocean currents** also play a part (**Surface winds take surface water with them**)... Walker Cell = Pacific Ocean / LA NINA / EL NINO...
- ▶ **Western Pacific Pressure** = *Wind circulating* around the Walker cell is **LOW / LOW INTENSITY** of La Nina / **HIGH** chance of an El Nino cycle occurring.
- ▶ **Western Pacific Rainfall** = *Winds circulating* around the Walker cell are **HEAVY / VERY HIGH INTENSITY** of La Nina / **LOW** chance of an El Nino cycle occurring.
- ▶ **Predicting Future Climate Change** → **EL NINO Southern Oscillation** = The **change in air pressure between 'normal years' & El Nino (Occurs every 3 to 8 years)** → *Difference in pressure* measured between **Easter Island** (West of South America) & **Darwin** (Northern Australia) → A **sharp drop** in pressure means El Nino is **imminent (About to happen)**.
- ▶ **Futures & Uncertainties (Predictions are uncertain)** → El Nino events have been occurring for the last **15000 years** – But *climate change maybe increasing their duration & intensity* → Could have a significant **impact on water supplies ... BUT** as **planet warms** → Different locations of the world warm @ different rates / **La Nina & El Nino events will become more frequent & intense** / Pacific regions will have floods following droughts (Visa Versa).





# Water Insecurity - Causes → Global Water Crisis



- ▶ Only 50% of available water is only used → So in theory there isn't a water shortage.
- ▶ **BUT** ... The **UN** stated "The lack of freshwater is emerging as the biggest challenge of the twenty-first century" / 1/3 of the world's population is affected by water shortages & lack of safe water / Rapid population growth in areas of limited supplies uneven global distribution of water & deterioration in water quality all increases the number of people facing severe water shortages.
- ▶ By 2025 → ½ of the world's population will be living in water deficit areas.
- ▶ ½ of the world's rivers no longer flow all year.
- ▶ 12% of the world's population consume 85% of its water.
- ▶ ½ of the world's rivers & lakes are heavily polluted.

## Causes of Water Insecurity →

- Health, livelihoods & welfare depend on freshwater being available.
- **Risks** occur due to the **high demand** for water & the **misuse of water resources**.
- **Groundwater Contamination Puerto Rica (2015)** → Seepage from a leaking industrial tank at Retrio Industrial Park contaminated the wells which provided water to the local people (+ soil stores).

## Water Scarcity / Stress / Insecurity →

- ❑ **Water Scarcity** = Less than 1000m<sup>3</sup> available per person per year.
- ❑ **Physical Scarcity** = Not enough water to meet demands.
- ❑ **Economic Scarcity** = Water is available but people cannot afford it.
- ❑ **Water Stress** = Less than 1700m<sup>3</sup> available per person per year.
- ❑ **Water Insecurity** = Present & future supplies cannot be guaranteed.

# Water Insecurity → The Consequences

## ▶ Water & Economic Development →

▶ By **2030** a **40% water gap** (shortfall) in supply may exist.

▶ **Global demand is increasing because** ... **ENERGY GENERATION** needs water (*Linked to 75% of the UK's consumption*) / **Global Food Production – Agriculture** is under demand to increase food supply by 60% in **2050**.

## ▶ Water & Potential for Conflict →

▶ **263 rivers form or cross international boundaries** & **90% of countries share a drainage basin** with another country ... **Dams & diversion schemes** are built to meet the increasing demand – Can affect river flow.



## THE Provides MURRAY DARLING BASIN (MDB) →

❑ **75% of Australia's water & 40% of its agricultural production** ... Increasing demand & mismanagement have put supplies under threat.

❑ Since the **1920s** there has been a 5 fold increase in water extraction in the MDB.

❑ The MDB crosses several natural environments (**Wide variation in rainfall**).

❑ **2012** → A **new agreement set limits on the amount of water which could be used by agriculture**, industry & urban residents as well as the government.

❑ The aim was to make sure there is water for all – Following no negative impacts on the natural environment.

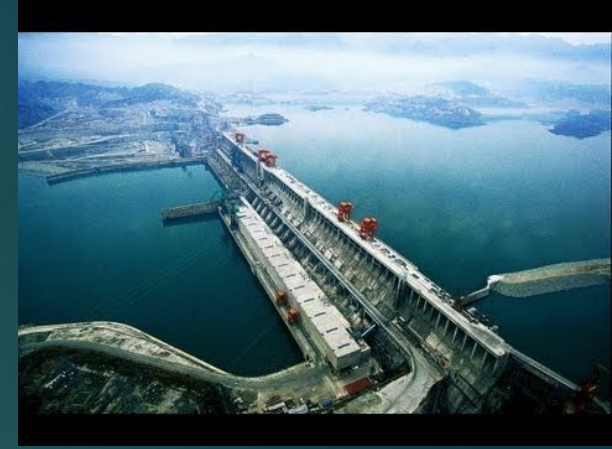
### ❑ **SUCCESS?**

❑ Rural communities in the MDB claimed not enough water was being made available for irrigation – Farms were therefore unable to grow food & communities were dying.

❑ In one area **500 farm jobs were lost between 2012 & 2014** – Population fell by 18%.



# Water Insecurity → Managing Supplies



▶ **Hard Engineering** → Dams / Water transfer projects / Desalination / Long standing methods.

## ▶ WATER TRANSFER (SOUTH NORTH WATER – CHINA) →

▶ **The Beijing** region only has 7% of China's water (Water will be taken from the **Yangtze to Northern China**).

▶ Due to be completed in **2050**.

▶ Will reduce water shortage risks (In Beijing) & improve economic development ... Will also reduce the abstraction of groundwater.

▶ **Will submerge 370KM of land.**

▶ **345,000 people will have to be relocated.**

▶ **Risks draining too much water from South China.**

▶ The Eastern area is industrial & risks further pollution.

## ▶ MEGA DAM (THREE GORGES DAM – CHINA) → **Controversial & Expensive.**

▶ Designed to **control flooding on the Yangtze (Biggest River in China)** & to **improve water supply** by regulating the flow (Shortly followed by a **HEP** – The River would become navigable).

▶ The electricity generated is necessary for China's growth.

▶ It has already **flooded 632KM of land.**

▶ 1.3 million people were relocated (**Destroyed 1500 villages**).

▶ Low water quality due to industrial pollution ... **Decomposing vegetation produces methane in reservoir.**

## ▶ DESALINATION (ISREAL) →

▶ **5 plants** take water directly from the **Mediterranean.**

▶ Aim is to provide **70% of Israel's domestic water supply** by **2020**.

▶ Provides a reliable & predictable water supply.

▶ **Each plant requires own power station** – Adding **CO2 emissions** – But **most energy is solar** ... **HOWEVER** do produce vast amounts of **salt & brine** which can harm ecosystems.

- 2KM Long!
- 17 year project!
- 60 Stories High!





# Water Insecurity → Managing Supplies → Achieving Water Security **SINGAPORE**

- ▶ **Singapore is 1 degree North of the equator** – Has an average of **178 rain days** each year ... Lacks space to supply a significant water supply its inhabitants & thirsty industries.
- ▶ **Water demand is expected to have doubled by 2060!**
- ▶ Singapore is determined to move away from its reliance on fresh water imports from Malaysia.
- ▶ **Imported Water** → Singapore has a water treatment works in Malaysia – Extracting up to **250 million gallons per day (Reaching 40% of their needs)** ... Malaysia is also able to **buy back 2%** of the water once it has been purified!
- ▶ **Catchment Water** → Aquifers are of little significance to Singapore! Nor do they have any natural rivers or lakes no more than 10km in length (Kallang River = Longest) / **Population pressure** – High rise flats dominating skylines / **STORAGE IS A CHALLENGE!** / **PUB** wish to change this with *'collect every drop of water'* ... A network of 17 reservoirs capturing water from 2/3's of the country!
- ▶ **EXAMPLE → Marina Reservoir** → Completed in **2008** / **Land reclamation** & **Marina Barrage** (Traps salt water – flushed out to sea @ low tide) / After 2 years the reservoir was able to provide 10% of Singapore's freshwater!
- ▶ **NEWater** → To become more self sufficient the **PUB** seeks to *'reuse water endlessly'* (Circular Economic approach)... supplies mainly to the non domestic sector (Households might feel uncomfortable about their water coming from sewers – Is drinkable)! Wants to reach 55% of the national consumption by 2060!
- ▶ **Desalination** → Considered to be 'Climate proof' ... Expensive method of supplying water (Uses a great deal of electricity) / But will bring Singapore improved water security as access to salt water is guaranteed & Takes up less space! **ALTERNATIVE** – Biomimicry ... Mangrove trees are able to extract salt from seawater!



# Water Insecurity → Managing Supplies ... Equality of Water Supply in Lilongwe



- ▶ **Water Supply** → Land locked in South-eastern Africa / Estimated population of just over 1.1 million / In 1964 when Malawi gained independence... the population was just 20,000! / Short wet season & a long dry season / LWB takes water from the main river ... stores it in 2 dams ... cleans it in 2 water treatment plants / Underground pipes – constructed in the 1960s when Britain initially had political control / Malawi's first President (Hastings Banda) wished for the city to become a 'garden city' → In the south people must pay for their water & manually transport it to their place of residence.
- ▶ **Population Growth** → Added on residences live in the south / The LWB claims that its water is accessible by 78% (Impressive – Population growth has been uneven) of the urban population – The remaining 22% must access water from shallow wells or boreholes.
- ▶ **Challenges** → Creating or maintaining a water supply network is expensive & complex / Only 5% of the city's residents have piped waste removal / Due to population growth (rise in demand for more water) the height of the dams will have to be raised.
- ▶ **Finances** → In 2017 Malawi's GDP was ranked 151 out of 194 / Urban population growth has occurred in low income sectors / Recently secured Japanese aid for new equipment to maintain constant water pressure in the pipe network.
- ▶ **The Equality of Supply** → Human rights perspective ... Greatest areas in need are the 26 administrative districts in the south where 70% of the population lives → There is evidence that they haven't done this yet! **DAMAGED PIPEWORK** → Some pipes were found exposed (& with cracks) ... Decreasing the water quality. **CONTAMINATION** → Increased risks of illness (Buckets weren't clean! **VARIABLE SUPPLY & CONSUMPTION** → During the dry seasons the Kiosks were frequently denied water ... meaning residents had to store water (Allowing time for microorganisms to develop & grow).





# Carbon Key Points →

- *Questioning how to reuse & recycle offshore gas & oil industry.*
- In the **Asian Pacific** alone, there are nearly **2,600 platforms** ... 35,000 wells & **7.5 million tonnes of steel** to be **decommissioned** over the next decade.
- The potential cost could reach **£78 billion**.
- By **2038** ... *7,000 oilfields are set to be decommissioned* (30 years old) ... All owned by either **Malaysia, Indonesia, India & Thailand**.
- **Australia** is expecting **40 offshore fields to cease operation** over the next decade.
- **2021** → Set up 40 years ago ... *600 of the North Seas installations are due to be removed*.
- Oil & Gas companies are set to face a **bill of £24 billion** between **2018 and 2022**.
- Decommissioning in **Asia** was a "**Mammoth Task**".
- In **2014** ... A study conducted by the **University of California** found that **California's 27 oil platforms are among the world's most productive marine fish habitats**
- In the **Gulf of Mexico** (Alternative Response) ... "**Rigs to Reef**" ... Oil companies *modify the structure to support the marine life as an artificial reef*.
- More than **530 rigs have been "reefed"**.
- **HOWEVER**, ... *Outside the USA only 2 rigs have been reefed* ... In **Brunei & Malaysia**.

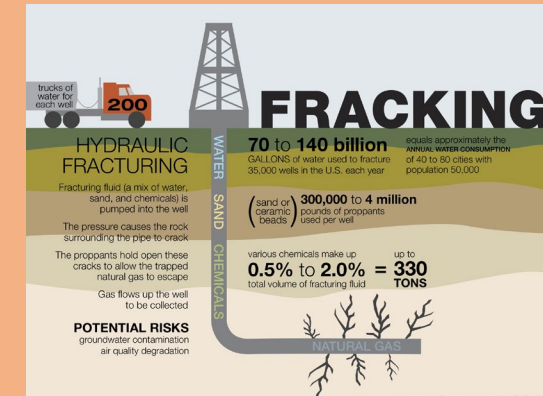
# Energy (Carbon) Key Points →

- The energy balance of Greece is *strongly dependant on imported oil*.
- The recent introduction of natural gas will increase the diversity of the energy mix – Consumption has been increased.
- **Electricity** is generally *generated from lignite (60%)* – Leading to high CO2 intensity values.
- Greece does have a vast capacity of installed wind.
- *Transport is the most energy consuming sector* in Greece.
- **8501kg/cap of CO2** (Per Capita).
- (**2004**) **57%** of the **Primary energy supply** is reliant on **oil** ... Only **5% Renewable**.
- Greece's **gross inland consumption** has been *steadily increasing* – Up to **37%** over a period of **1990 to 2004**.
- *Greece's share of oil & solid fuels is significantly above the EU-27 average* (38%).
- In **2004** **oil** accounted for **88% of Greece's total imports**.
- Supplied by **Russia, Iran & Saudi Arabia**.
- *Energy imported has been increased by 60%* since **1990**.
- In **2005** **Greece was the 10<sup>th</sup> largest country** in terms of **installed wind capacity** in the EU.

Quote From Prisoner's of Geography → "Nature is more powerful than man, we can only go as far as determining our own fate".

## The Carbon Cycle & Energy Security → 2015 The Year it all Changed

- **The Conflict** → (Dec 2015) 195 countries adopted the first legally binding global climate deal – Paris Climate Conference.
- Governments were in agreement (LONG TERM GOAL) to keeping the increase in global temperatures *below 2 degrees* above pre-Industrial levels → Requires serious reductions in *global greenhouse gas emission*.
- **PROBLEM** → The world is heavily reliant on **fossil fuels** – burning then releases carbon dioxide into the atmosphere – *Main driver* of Climate Change!
- There was a dip in global emissions due to the global financial crisis!
- Warmer winters reduces demand for the energy in the EU.
- **INDIA** → Giving up fossil fuels ...
- Abandoning fossil fuels could *threaten economic development*...
- India depends on coal for 66% of its energy & intends to double their coal output by 2020.
- India is the 1/3 largest CO2 emitter after China & USA – But they still wish to **reduce their dependency on fuels...** would mean more domestic coal.
- Currently in India there are 600 million new users of electricity (driving India's demand for coal).
- **Why do Oil Prices Fluctuate?**
- The price of oil reflects *political & economic* factors (Market Demand).
- **PREVIOUSLY** – OPEC producers increased oil production to prevent a sharp price increase.
- **USA** → World's largest oil consumer / Drives global prices / USA oil prices have fallen sharply since 2012 due to new supplies of oil and shale gas from North America **Fracking**.
- **OPEC** → Has cut prices to compete in order to maintain its market share and for **geopolitical motives!**



## The Carbon Cycle → A Balanced Carbon Cycle

- **Fossil Fuel Combustion** → Earth's carbon *reservoirs act as sources* (Adding carbon to atmosphere) & sinks (Removing it) ... If **sources & sinks are equal the carbon cycle is in equilibrium** (BALANCE).
- **Balance** → Maintaining a *steady amount of CO2 in the atmosphere helps to stabilise global temperatures...* **BUT** human activity has increased CO2 inputs (**Without corresponding increases in natural sinks – Oceans & Forests**)... Increasing atmospheric stores of carbon are said to be the main belief as to why global temperatures are rising. THEN AGAIN ... Fossil *fuel combustion has altered the balance of carbon pathways* (FLOWS) ... *Carbon released in large amounts has increased the rate of flows.*
- **Arctic Amplification** → The **Arctic Region** is *warming 2X as fast as the global average ...* **Melting Permafrost releases CO2 & CH2** – Increasing their concentration in the atmosphere ... Results in '**positive feedback**' – Rise in temperatures & further melting ... **Climate change is altering the Arctic Tundra** due to extensive melting & sea ice in the summer (*Reducing snow coverage & permafrost*) ... *Shrubs & trees previously not able to survive have begun to establish themselves & in Alaska the red fox has spread Northwards & competes with the Arctic fox for territory & food.*
- **Implications for Climate** → Likely to **vary** ... The largest *increases in temperatures* are expected to be over the **Eastern & Northern parts of Europe in the Winter & over the Southern districts during the Summer** ... Annual precipitation is expected to *increase in Northern Europe & decrease in Southern Europe*... **Extreme weather** events are more likely to **increase in frequency & intensity.**
- **Implications for the Hydrological Cycle** → By **2100** the **Eastern Alps & most of the Western Alps can be expected to be ice free** ... Less winter snow & rainfall ... Greater flooding in winter & drought in the summer ... As glaciers have retreated... discharge & sediment yields would fall & water quality would decline.

# The Carbon Cycle → Energy Security

- **Level of Economic Development → UK ...** GDP per Capita (PPP) = **\$41,200** (2015) / Use **2752 kg oil equivalent** per capita. **NORWAY ...** **\$61,500** GDP per Capita (2015) / **5854 kg oil equivalent** (2014).
- **Environmental Priorities → UK ...** Intends to *broaden energy mix with renewable sources* & more nuclear power / 2015 – CO2 emissions were 7.13 tonnes per capita ... **Down from 11.5** in **1980**. **NORWAY ...** Intends to be *carbon neutral* by **2050** / In **2015** **CO2 emissions were 11.74 tonnes per capita from 11.6** in **1989**.
- **Energy Players →** The energy pathway can be described as the *flow of energy between producer & consumer* – With addition to how it reaches the consumer.
- **Energy TNCS →** Explore, exploit & distribute energy resources / Have own supply lines & invest in distribution & the processing of raw materials / Aim to secure profits for shareholders ... **BP (UK) , SHELL (UK & Netherlands), Exxon (USA) ...** **New players – Gazprom & Rosneft (Russia), Petrobras (Brazil), PetroChina Corp (China).**
- **OPEC →** Aim to *co-ordinate & unify petroleum policies* of the members to ensure stabilisation of oil markets... From 2012 to 2016 maintain outputs at high levels kept oil prices low ... To compete with the USA's oil production from fracking.
- **National Governments →** *Meet international obligations* whilst *securing energy supplies for the nation & supporting economic growth* / Regulate the role of private companies & set environmental priorities... **EDF (France) & China General Nuclear are** both backed by the government – Development of nuclear plants such as **Hinkley Point C in the UK**.
- **Consumers →** Create the **driven demand** / Usually based upon *competitive petrol prices* etc / Including **protests about the expansion of nuclear energy & fracking!**

## The Carbon Cycle → Geopolitics of Energy

### • Why is there conflict?

- Our energy resource is **finite**, but our **demand is unlimited**.
- Problems arise when trying to export & import these resources between countries (**Disruption** to the energy supply / The **environmental impacts** of using it / Energy **shortage** in developing nations).

### • Examples of Conflict →

- *Terrorism threats* to the **USA** from **Iraq** (If the USA carries on exploiting it for its oil!).
- **Saudi-Arabia** can breakdown their links with the **USA** (If they feel like they aren't being treated fairly when trading) → **USA's biggest importer!**
- **Russian** president (Putin) warned the west that he would cut off their oil supply if **Moscow wasn't treated as an equal trade partner!**
- Some developing countries *elect religious leaders* (Which don't run the country as a free market economy) → Disrupts links with the west & prevents trade of resources!
- *TNC's exploit* resources in developing countries!

### • How is the Geopolitics of Energy Managed?

- **OPEC** → Ensures there is **no conflict** / Ensures the **stabilisation of oil prices** (**Secure & reliable & economically equitable**) → 12 countries which **own 80% of the global oil supply** → Saudi-Arabia / Brazil / Africa!





- 1. USA
- 2. China
- 3. Japan
- 4. India
- 5. Russia

## Players in the Security of Energy Pathways/Supplies →

### Consumers

- Increase demand from consumers result in energy companies needing to provide more to meet the demand! (SUPPLY & DEMAND).
- **Fossil Fuels** → Burning more fossil fuels to maintain the demand.
- **Hydroelectric Power** → Water stored in reservoirs – Left to build up during the night when demand is at lowest!
- **Decreasing the Demand** → **Electric Cars** (Introducing zones such as *London's Ultra Low Emission Zone* – Charging £100 to drive through middle of London!) / **Renewable Energy Sources** (*Wind turbines* or *Solar Panels* or *Hydroelectric Power*) / **Members of Protocols** ... *Kyoto* & *EU Emission Trading Scheme* & *Climate Change Act 2008* & *Carbon Plan* / **Introducing green technologies in public transport** (Contribute to ¼ of all greenhouse gas emissions in UK) / **Agricultural Re-Evaluation** (Contribute to 1/3 of all greenhouse gas emissions).
- **Influencing the increase of energy consumption** → Population increase / Improving the **standard of living** / Industrialisation / Rural to Urban migration!
- **Future Occurrences** → Western EU to become more energy efficient (**France & nuclear energy supply**) / Energy consumption – expected to **double by 2050** / Energy consumption in the developing world expected to increase by 1/3 / Energy consumption of the developed world and developing world is expected to be **equal** by 2050!
- In **2017** China's oil imports exceeded those of the USA (on average each month) → **China = 8.4 million bpd USA = 7.9 million bpd!**
- **Japan** → **Consumes 5.3%** of the worlds total energy consumption (3<sup>rd</sup> behind USA & China).

## The Carbon Cycle → Fossil Fuels (Still the Norm)

- In the last 30 years **50% of all coral has been lost** → Oceans consist of **1/3 of the CO2** we release into the atmosphere → **OCEAN CANT KEEP UP!**
- **47% of land** in the USA is used for FOOD PRODUCTION → **70% OF THAT IS USED TO FEED CATTLE ...** Methane from Cattle is more harmful than CO2 ... 1 molecule of Methane is equivalent to **23 molecules of CO2!** Chicken requires 20% less land than beef!
- Fossil Fuel Demand →
- Development increases with demand / **Fossil Fuels still obtain 86% of the global energy mix** / Since the **1990s** **global energy consumption has increased by 50%** ... Mostly due to China!
- **China's oi reserves are only 10% of those in Canada** & China is now the 2<sup>nd</sup> biggest importer behind the USA!
- Energy Pathways →
- The pathways are dependant on multi-lateral & bilateral agreements ... For security reasons when Gazprom exports their gas to Europe they try & avoid **'transit states'** (A country where by the energy flows through which aren't entitle to the energy).
- Trade Flow, shipping routes & disruptions →
- Shipping tankers more ½ of the worlds oil / The majority travels through **8 major chokepoints** / 20% of the worlds oil passes through the **Strait of Hormuz** (Between the **Gulf of Oman & the Persian Gulf**) ... When threatened or disturbed the oil prices can steeply rise!



# The Carbon Cycle → Alternatives to Fossil Fuels

- The UK's Changing Energy Mix →
- The **UK's use of fuel is falling** – **60% of the UK's energy is imported** – To produce a *more secure future* the UK is willing to **decouple the economy from fossil fuels**.
- **Increasing renewable energy** → According to '**Friends of the Earth**' ... Wind energy could provide **25% of the UK's electrical** needs by **2020**... Then again solar power has grown rapidly by 86% from 2015 to 2016.
- Developing new nuclear power stations – **Hinkley Point C**.
- *Reducing energies* such as those through the use of **LEDs**.
- *Recycling energy* that would **normally be wasted**.
- Renewable & Recyclable Energy Sources → In a *privatised energy market* – **Energy companies invest** when the **government guarantees a minimum price** per mega watt hour (MWh) → **STIRKE PRICE**... **Biomass (£80)** / **Solar Power (£50-80)** / **HEP (£100)**.
- Alternatives to Fossil Fuels – Costs & Benefits →
- Nuclear Power – Japan → Before the **2011** Earthquake & Tsunami **NP provided 27% of Japan's electricity** – Due to damage on the **Fukushima plant** all were closed ... Has been reintroduced.
- Nuclear Power – UK (Hinkley Point C) → A **£18 billion project** – To provide **25,000 jobs & energy for 60 years** – Includes **French State owned EDF & China General Nuclear**.
- Wind Power – Hornsea Project 1 → **190m wind turbines** will provide enough power for a million homes by **2020** – Located 121km off the **Yorkshire Coast** = **2000 construction jobs**.
- Wind Power – Aylesbury → A wind turbine **25m taller than any other** onshore turbines to **supply 2000 homes**.. Can be seen as **harmful to birds** (intermittent supply).
- Solar Power – Chapel Lane Solar Farm (Christchurch) → UK's largest solar farm ... **servicing 75% of homes in Bournemouth**. Covers an equivalent area of **175 football pitches** → **ALTHOUGH consume farmland which arguably should be used for food**.

# The Carbon Cycle → Alternatives to Fossil Fuels

- The Growth of Biofuels →

- Brazil was the *first to produce biofuel from sugar cane* in the **1970s** / **Bio-ethanol** produced was used as vehicle fuel / **Emits 80% less CO2 emissions than petrol** / Since **2003** *Brazil's use of biofuels has reduced CO2 emissions by over 350 million tons.*
- **OTHER COUNTRIES HAVE FOLLOWED →** **Malaysia** has *cleared forests to plant oil palms* (**EU grows oilseed rape & the USA grows maize**) ... Although does result in deforestation & social unrest – In Brazil farmers lost land to sugar cane & unable to grow food for themselves (Rural to Urban Migration ... Problems).

- How 'carbon neutral' are biofuels →

- Plants require *fertiliser & pesticide* – Which **originate from fossil fuels** ... Clearing forests to grow biofuels requires a **loss in a carbon sink** ... **Biomass** needs a fuel to '**kick start**' ... Most renewable installations require the **use of energy during their construction** (Adding to the CO2 emissions).

- Reducing Carbon Emissions (Radical Technology) →

- Carbon Capture & Storage → From *coal-fired power stations* / CO2 is stored, compressed & transported by pipeline to a well (Then injected into an **underground aquifer**) / Able to *cut CO2 emissions by 19%* - But not yet viable.
- Hydrogen Fuel Cells → **Water** becomes the *by product* of hydrogen (Via **chemical energy**) / Highly energy efficient / But separating hydrogen from other elements uses energy – Able to be provided by renewable energy.
- Electric Vehicles → Difficult problem within the *distance travelled* before recharging / **Batteries can still be highly toxic.**

# The Carbon Cycle → Threats to the Carbon & Water Cycle

- Ocean Acidification →
- Oceans are a *massive carbon sink* / They have *absorbed approximately 30% of all CO<sub>2</sub> produced by human activity* since **1800** ... *50% of that produced via fossil fuels* / As the *CO<sub>2</sub> increases in the oceans the pH decreases* (BECOMING MORE ACIDIC).
- The Problems for Coral →
- **Coral Polyps** achieve their *colour through algae* which live in their tissues / *Algae produces the foods for the coral via carbohydrates produced during photosynthesis* / The **ideal temperature** range for Polyps is between **23 to 29 degrees** / **Coral bleaching** occurs in the coral becomes too hot / At the current rate the **pH could fall to 7.8** by **2100** – Dissolving coral skeletons & causing reefs to disintegrate – **CROSSED THE CRITICAL THRESHOLD.**
- Increasing Drought →
- Affected by ocean currents, atmospheric circulation etc / It is said that **climate belts are changing increasingly fast** – Increasing warming / **Mid & High Latitude regions** will experience **more change** than those which are **tropical & subtropical regions** / Cold zones are decreasing & hot zones are increasing.
- Drought in the Amazon →
- The Amazon Basin suffered severe droughts in **2005, 2010 & 2014/15** / **Holds 17% of the worlds terrestrial vegetation carbon store** / The *drought shut down the functions of the Amazon* / **Has the possibility to change from a carbon sink to a carbon source.**

# The Carbon Cycle → Degrading the Water & Carbon Cycle

- Changing Precipitation Patterns →
- *Models predict* as the *temperature rises the precipitation pattern will change* / *Wets get wetter & dry gets drier!* Warmer air traps more water vapour – Earth is a closed system.
- As the **atmospheric circulation changes** – **storm tracks will shuffle further towards the Poles.**
- Ocean Health – Threats & Impacts →
- Loss of Mangroves →
- *Mangroves stabilise the coastline from erosion*, provide protection *against* harsh weather & *provide fishing nurseries*. Since **1950** (Globally) **50% of our Mangrove forests have been lost** – Clearing them for tourism or aquaculture has equated to 25%.
- Loss of Food →
- **520 million people depend on fisheries for food & income** – Climate change is affecting the productivity of species & their biological processes / *Warming waters in the North Atlantic are killing cold water plankton ... Arctic Krill (Whale food) are declining by up to 75% per decade in parts of the Southern Ocean* / Ocean acidification is causing coral bleaching.







# The Carbon Cycle → Responding to Climate Change

- Future Emissions, Atmospheric Concentration Levels & Climate Warming →
- Climate models are set to **predict that surface temperatures will continue to rise 2-6 degrees between 2000 & 2100** / Temperatures are expected to rise more **rapidly over the Northern Hemisphere** (More land than ocean).
- Why Is The Future Climate Change so Uncertain →
- Physical Factors → Oceans & forests act as carbon sinks & store heat – Globally the area of forest land is decreasing significantly due to human activity & choice.
- Human Factors → The rate of growth of emissions hasn't followed global economic recovery! **Renewable energy sources accounted for 66% of increased electricity production in 2015!** Increasing affluence in emerging economies results in more emissions.
- Feedback Mechanisms →
- **Dampen** (Negative Feedback) or **Amplify** (Positive Feedback) ... **Permafrost releasing carbon & methane into the atmosphere** ... **Carbon release from peatlands** (When warm the peat decomposes emitting carbon through methane).
- Tipping Point → A **critical threshold** ... **Forest Die Back** (In drought trees die – Stopping the absorption of moisture) & **changes to the thermohaline cycle** ... Melting ice sheets could effectively block the conveyor belt.

# The Carbon Cycle → Responding to Climate Change

- Facing the Future →
- **Adaptation Strategies →** Ways to live with the impact of climate change... *Water conservation & management* (Smart irrigation & recycling water & reducing water use for agriculture) ... *Resilient Agriculture systems* (Conservation cropping) ... *Solar Radiation Management* (Climate Engineering) ... *Land Use Planning & Flood Risk Management* (Development on flood plains are limited).
- **Mitigation Strategies →** Rebalance the carbon cycle & reduce the impacts of climate change... *Carbon Capture Storage* ... *Renewable Switching* (Sweden leads the way) ... *Afforestation & Reforestation* (Canada & Sweden lead once again) ... *Carbon Taxation* ... *Energy Efficiency* (Reducing energy consumption in building & manufacturing).
- Global Agreements & National Actions →
- **2015 PARIS CLIMATE AGREEMENT** – Adopted by *195 countries* (Legally binding climate deal) ... Limit the average temperature *increase to 1.5 degrees* above pre industrial levels ... Support developing countries.
- Actions & Attitudes →
- *Reducing emissions may lead to increasing manufacturing costs for TNCs*... People at risk of coastal flooding etc view climate change more seriously than others.

# Reality Check

-  **1.** **Carbon dioxide** concentration is 40% higher than in pre-industrial times.
-  **2.** **Human activity** caused most of the warming between 1951 and 2010.
-  **3.** Earth's surface **warmed 0.85°C** over the period 1880 to 2012.
-  **4.** **Heatwaves and heavy rains** have become more frequent since the 1950s.
-  **5.** Arctic sea **ice has declined** on average 3.8% per decade since 1979.
-  **6.** Global **sea level is expected to rise** between 26 and 82 cm by 2100.
-  **7.** Only an **aggressive mitigation scenario** can keep temperature rise below 2°C.

Source: IPCC Working Group I - Fifth Assessment Report



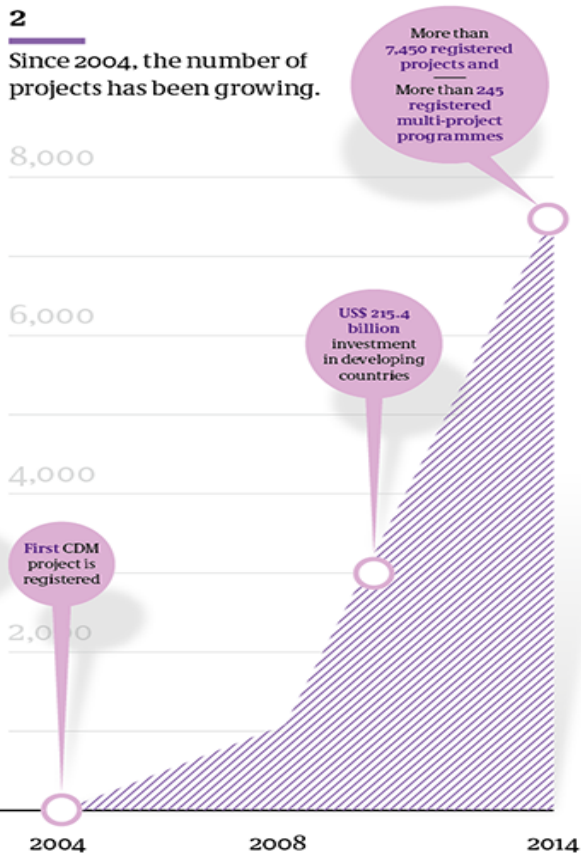
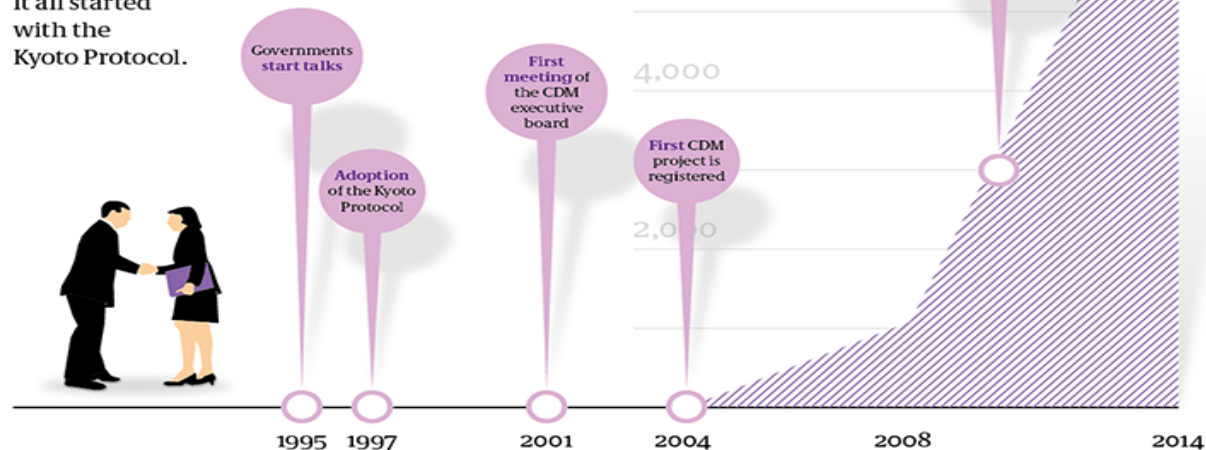
# Achievements of the Clean Development Mechanism

## Building the largest carbon offset instrument in the world

Under the Clean Development Mechanism (CDM), developing-country projects that reduce emissions and contribute to sustainable development earn credits that can be sold to countries or companies with a commitment to reduce emissions.

### How did it start?

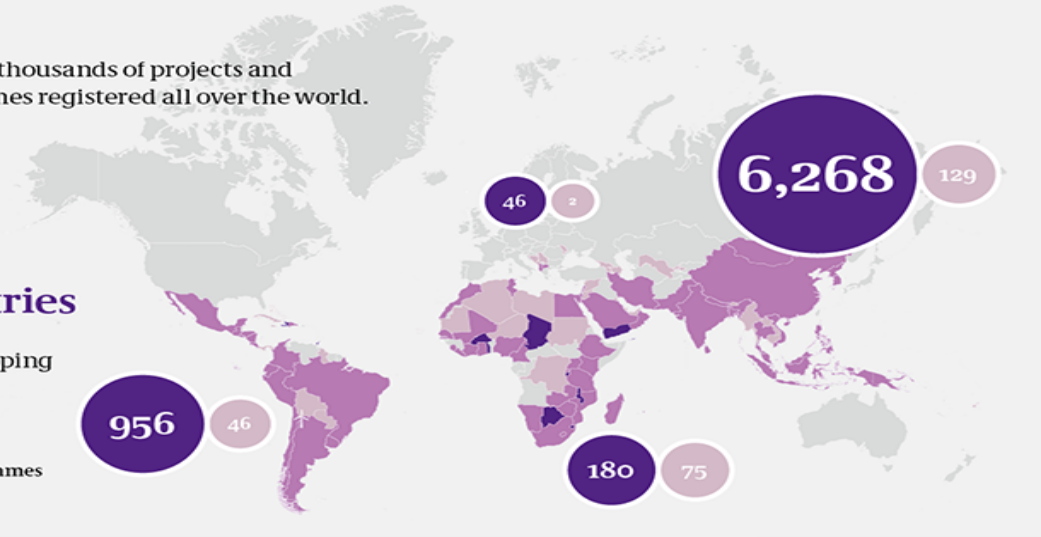
**1**  
It all started with the Kyoto Protocol.



**3**  
There are thousands of projects and programmes registered all over the world.

**128 countries**  
of which  
105 developing countries

● Projects  
● Programmes  
● Both



**4**  
Ranging from clean cookstoves to large industrial projects.

CDM is facilitating technology transfer, income and employment generation, economic development and improvement of air quality in developing countries.

### Key facts

- US\$ 9.5–13.5 billion direct benefits to host countries from sale of CERs (as of 2012)
- More than 1.5 billion tonnes CO<sub>2</sub> avoided
- US\$ 3.5 billion saved by developed countries in compliance costs (as of 2012)

### How does it work?

It starts with a project developer recognizing the potential to earn saleable credits

**Project developer** prepares a proposal for a project that reduces emissions

**Host country** Developing country grants its approval

**Third-party certifier** validates the information in the project proposal

**CDM executive board** registers the CDM project

**Project developer** monitors emission reductions

**Third-party certifier** verifies emission reductions

**CDM executive board** issues carbon credits

**Project developer** sells credits to industrialized countries or companies