

Woter Resources and Management



Name.....





Past Paper Questions

Give one reason why water security is important to all countries (2)

For a named place, describe how the problem of water supply has been managed (4)

Explain why over-abstraction of water causes problems for both people and the environment (6)

Explain what a transboundary water issue is (3)





Key Idea 3.3 Water Resources and Management

Keyword	Definition
Aquifer	A body of permeable rock which can contain or transmit groundwater.
Consumerism	The increased consumption of goods.
Consumption	The action of using up a resource.
Deficit	A shortage in the water supply.
Demand	The desire for water. A high demand means that a lot of people want it
Embedded Water	The amount of water used by other people, in factories or on farms, to create or grow the products we use.
Imbalance	The difference between supply of water. An area could have a deficit or a surplus.
Over- Abstraction	When water is abstracted at a faster rate than it is recharged.
Reservoir	A man-made lake which is created when a dam is built.
Salinisation	A process by which soluble salts build up in the soil.
Surplus	An amount which is greater than what is needed.
Transboundary Water	Rivers which run through more than one country – therefore there are multiple countries using it.
Water Footprint	The amount of water used to make an item of food or a product such as an item of clothing.
Water Insecurity	The lack of a reliable source of water or appropriate quality and quantity.
Water Scarcity	The lack of sufficient water resources to meet the demands of water usage within a region.
Water Security	When a society has enough water to ensure that everyone has clear water and enough for their needs.
Water Stress	When there is a shortage of water which creates risks for individuals, farmers or industries.
Water Transfer Scheme	When water is moved from an area of surplus to an area of deficit.
Withdrawal	The action of taking or withdrawing something.

Lesson 1: Why does supply and demand for water vary over time? LO: To explain how the supply and demand for water can change and to define what a water footprint is.

Do Now:



Match the key words with their definitions.

Water footprint	Tł	he lack of sufficient water
	re	esources to meet the demands
	0	of water usage within a region.
Water security	W	Vhere there is a shortage of
	w	vater which creates risk for
	in	ndividuals, farmers, or industries.
Water stress	Th Th	he amount of water used to
	m	nake an item of food or a
	p	product such as an item of
	C	clothing.
Water scarcity	W	Vhen a society has enough
	W	vater to ensure that everyone
	h	has clean water, sanitation,
	g	good health and enough to
	g	grow food and make items.

Where is our water supply found? Match the percentages with the water stores.



Why is water important? <u>https://www.youtube.com/watch?v=Fvkzjt3b-dU</u>

1. What percentage of Earth's water is too salty?	
2. 2% of water is 'locked up' in what?	
3. How many people have no access to safe drinking water?	
4. 4,800 people die every day from what?	
5. How much of the fresh water is used in the USA for agriculture?	
6. Which river no longer reaches the sea because of over- extraction?	

Why does supply and demand vary?

Read the graphs carefully. Answer the questions using data from the graphs.



Evolution of Global Water Use

Withdrawal and Consumption by Sector

Forecast

Assessment

1900 1925 1950 1975 2000 2025

Withdrawal

Consumption

Waste

Domestic

Forecast

Forecast

Reservoirs

1900 1925 1950 1975 2000 2025

Evaporation

Assessment

Industrial

1950 1975 2000 2025 1900 1925 1950 1975 2000 2025

Withdrawal

Waste

Consumption

Note: Domestic water consumption in developed countries (500-800 litres per person per day)

is about six times greater than in developing countries (60-150 litres per person per day).

km

3 200

2 000

900 1925

 $(\mathbf{\hat{c}})$

Withdrawal

Consumption

Waste

Agricultural

Forecast

Which continent has the highest withdrawal and consumption of water?

Suggest reasons for the high withdrawal and consumption

Which continent has the lowest withdrawal and consumption of water?

Suggest reasons for the low withdrawal and consumption

Which sector has the highest withdrawal and consumption? Suggest reasons for this.

Which sector has the lowest withdrawal and consumption? Suggest reasons for this.



Write a list of all the different ways you use water each day. Estimate how much water this uses.

Estimate the water usage for each of these.





This pie chart represents a typical HIC household's water use each day.

How do you think this would be different in an LIC household?



What is consumerism?

Give examples of embedded water.

What has changed supply and demand? Categorise the statements into social, economic and environmental reasons for the change in water supply and demand.

New industries are being introduced across the World. Some industries such as clothing require huge amounts of water.	Crop irrigation has changed over time. As rainfall patterns change more irrigation is required to grow crops. The types of irrigation have changed.	The World's population has grown. As it grows more water is required to help feed and water the people living here. There is only a fixed amount of water available.	More people are living in desert areas e.g. Dubai. These are areas with little rainfall and usually resided in by people with a higher income.
Increasing food demands. Most foods have embedded water. As our diets change the demand for water changes.	Rising Consumerism – people are buying more products than ever before. Shops such as Primark with their 'throwaway fashion' have increased consumerism.	Economic growth is leading to countries becoming more industrialised and more people will have piped water to their homes.	As warmer temperatures increase the demand for water, the amount of freshwater available may decline.
Livestock farming has increased and this has increased the amount of embedded water being used.	Water is essential for producing hydroelectric power. Steam is needed to drive the turbines in fossil fuelled and nuclear power plants.	More houses are being built with multiple bathrooms – this creates more opportunities to use water in the home.	There have been improvements in personal hygiene, so now people take showers more often.
As people's standards of living increase so does their use of water. People tend to eat more meat and have more water consuming goods.	More food is grown in greenhouses to meet rising demands for out of season food. This requires watering throughout the year.	More homes now have gardens. Many have sprinkler systems and these use large quantities of water.	People have more leisure time now than in the past. Locations such as golf courses require large quantities of water to stay green.

What are the connections between these three ideas? Why has water demand grown over time?



Lesson 2: What is water security and why does it matter? LO: To understand the implications of water security and how this can cause regional instability.

Do Now:



What is water security?





Describe the pattern of water stress (3)

Explain why this is likely to cause water insecurity? (4)



through their teenage years.



Why does water security have positive impacts on a country's development?



Write down a minimum of 5 positive impacts water security can have on a country. Explain how each positive impact would benefit the country





What causes water insecurity?



What are the causes and impacts of water insecurity? Use the two images to help you to complete the table.

Human causes	Human impacts	Physical causes	Physical impacts

This is not the case for many people in other parts of the world, especially those living in developing countries. The United Nations claims that two out of

countries may be shown water shortages.





Exam Practice:

Give one reason why water security is important to all countries (2)

Lesson 3: What is over-abstraction

LO: To explain what over-abstraction is and to understand the consequences for HICs and LICs.

Do Now



What is over-abstraction?



Background information on the Aral Sea

What happened to the Aral Sea?

	Reasons for over-abstraction	Effects of over-abstraction
an &	Reasons for over-abstraction	
Aral Sea, Kazakhsto Uzbekistan (LIC)		

https://www.youtube.com/watch?v=5N-_69cWyKo



Background information on the Colorado River

What ha	р	pened	to	the	Colorado	River?

	Reasons for over-abstraction	Effects of over-abstraction
JSA (HIC)		
lo River, L		
Colorad		

https://www.youtube.com/watch?v=SHkBAKLFZcs



Explain why over-abstraction of water causes problems for both people and the environment (6) – upload this to Teams.

Plan here

Homework: Complete the next page on Coca Cola in India. How is this case study different to the Colorado River and The Aral Sea. Revise the Aral Sea Take 10 sheet

<u>Coca Cola and</u>	What is the message behind this ima	ge?
Why have there been protests about Coca Cola in India?		
	What was the problem with the fertiliser given by coca cola?	Watch this clip to help you: <u>https://www.youtube.co</u> <u>m/watch?v=qlsyjfwkIwU</u>
Why have harvests yields dropped? What impact could that have?	What other complaints have the villagers in Kerala had?	How has Coca Cola tried to resolve the issues they have caused in India?

Lesson 4 Title: What are the solutions of an imbalance in supply and demand? LO: To understand what China have done to try to combat water scarcity.

Do Now:



What is a water transfer scheme?

Where is China?





What is the China North South Project? https://www.youtube.com/watch?v=o2atf6s--w4

How many billion cubic metres of water is it expected to move?	
In which area of China is water most needed?	
How many canals ae being built?	
Which two rivers will link the canals?	
What are considered to be the biggest problems with the project?	

Why does China need a water transfer scheme?

Describe the pattern of regional variations shown on the map. Suggest reasons why China needs a water-transfer scheme.



Why does China need a water transfer scheme? Read through the information and answer the questions below.

Beijing, China's capital, may soon run out of water. Each year, the gap between water demand and supply widens, wells dry up, groundwater and rivers become polluted and ground subsidence worsens.

Why is this happening?

The causes of this deteriorating situation are both physical and human. Northeast China, where Beijing is located, is prone to floods and, in recent years, droughts. Most precipitation falls between July and September, sometimes more than half of it within 3 days. Several wet years can be followed by several dry years. The capital's population of 16 million makes it the second largest city after Shanghai. On the coast, not far from Beijing, is China's third largest city, Tianjin (population 11 million), a major port with heavy industry, commerce and developing services. Beijing's annual population growth rate is stabilising at about 2.5% as a result of efforts by the government to restrict family size, but rural–urban migrants continue to arrive. The situation in Tianjin is similar.

Water supply

Beijing draws 60% of its water supply from aquifers. These are overexploited, but the water quality is still acceptable. In the late 1970s and early 1980s, a series of droughts led to increased demands for irrigation water. This lowered the water table in some areas by as much as 40 m, and some wells were pumped down to the bedrock. Much of Beijing has subsided by between 0.5 m and 1 m per year because of all this abstraction. Tianjin relies on groundwater for about 30% of its water supply, but **salt water incursion** makes the water brackish. Surface water supply in the region depends on five major rivers which enter the Hai He river system. Upstream withdrawals and contamination of these

rivers have a negative effect on downstream cities, and Beijing also makes Tianjin's water problems worse by the scale of its abstractions and pollution. An aqueduct 2,500 km long has been built, the first phase of a scheme to divert water from the Three Gorges Dam to the Beijing–Tianjin region. Projects to improve water quality and conserve water have also been implemented.

Demand for water

Water demand in the Beijing–Tianjin region is currently 4.9 billion m3 per year and continues to rise. Of this, agriculture accounts for about 65%, although the use of water-saving technologies means irrigation demands are levelling off. Industrial output in the region has increased more than sixfold in the last 20 years. Water demand has not risen as fast as this as industries have become more water-efficient and recycle their waste water and there has been a shift from heavy to high-tech industry. The fastest rate of increase is in domestic water use: consumption has risen tenfold in the last 50 years and now averages 240 litres per person per day.

The China North South Project

The south of China is rich in water resources but the north is not. To redistribute these resources and to even out the availability of water, a gigantic south-north water diversion project was begun in 2003. It is expected to take 50 years to complete and will cost \$62 billion. The project involves building three canals which run 1,300 km across the eastern, middle and western parts of China and link the country's four major rivers: the Yangtze, Yellow, Huai and Han (Figure 2.21). The



Figure 2.21 China's South–North Transfer Proiect

scale of engineering involved in this scheme is awesome. It will transfer a total of 44.8 billion m3 of water per year. Central government will provide 60% of the cost of the scheme, with the rest coming from local authorities, which, in turn, will charge domestic and industrial users. Water conservation, improved irrigation, pollution treatment and environmental protection are included in the plans. Critics are concerned about the uncertainties and risks associated with the project. These include the likelihood of significant ecological and environmental impacts along the waterways, resettlement issues and worsening water quality. The pollution of the Yangtze River is already at alarming levels. Untreated industrial and city wastewater is being mixed unchecked with agricultural runoff containing pesticides and fertilisers. The Huai River is already severely polluted and the water of the Yellow River is undrinkable. Some experts fear an ecological disaster.

What reasons are given for the project? Categorise them into social, environmental and economical.

Summarise the key points of the article

What are the advantages and disadvantages of the project?

Provides a solution to water shortage - due to climate change, pollution and frequent droughts

Fish and other river species will be depleted	Northern	China is renowned for its centre of e, population and industry which the		
Relocation of 1.27 million	scheme will help support			
people over 17 years	Han river will be polluted from the Yangtze river			
Aims to channel 44.8 billion of metres of freshwater annu the Yangtze river in southe to the north through three	cubic ually from ern China canal	Hugely expensive project – currently costing \$79 billion, (more than the Three Gorges Dam)		
systems: the Eastern, the and the Western.	Central	Forced 180,000 people in Hubei and 160,000 in Henan to leave their homes		

Plans to build more dams, causing more disruption

Do the advantages outweigh the disadvantages?

Why is the project controversial? <u>https://www.youtube.com/watch?v=66gH9mcAx7M</u>.

The northern part of China has rich mineral and land resources. These could play an increasing role in satisfying the demands of the growing industrial cities in the north. These industrial cities are vital to continued economic growth and have been important in improving living conditions in China in the last 30 years.

Shortage of water is becoming an increasingly restrictive factor in the area. Without a major water transfer project, the northern area will face increasing food and water shortages, resulting in falling living standards, the threat of industrial decline and growing poverty.

There is no doubt that Northern China has water supply problems and there is a need for increased management to resolve them.

However, at a cost of over \$60 billion, this project is a massive risk both financially and environmentally. Water wastage and pollution make large volumes of water unusable. Dealing with these existing problems would reduce the need for such an expensive project.

Thousands of people will be forced off their land by this project and there will be major disruption to the environment.

For a named place, describe how the problem of water supply had been managed (4)

Homework: Complete the page below on the Kielder Water Project. How does it compare to the China south-north project? Revise the Take 10 sheet on the water transfer scheme.

1. Where is Kielder reservoir?	2. What is a water transfer scheme?	3. Give 3 social impacts of Kielder reservoir?	4. Which river does it regulate the flow of?
5. Give 2 economic impacts of building the dam.	6. What environmental benefits does the reservoir provide?	7. How much water can be provided by Kielder Reservoir a day?	8. How could the reservoir be used as a tourist feature?
9. Why did people need to be relocated?	10. What conflict could be caused as a result of the reservoir?	11. When was the reservoir completed?	12. In what ways was the scheme successful?
13. Why was the site a good choice for a reservoir?	14. What type of energy is produced at Kielder?	15. Which industries was the reservoir supposed to support?	16. Why did they create the reservoir?

Lesson 5: How is the supply of water managed in the UK? LO: To explain the need for water transfer schemes in the UK.

Do Now!



What is the difference between a lake and a reservoir?





How variable is the water supply in the UK?

1. Read the comments in the table and colour code them into social, economic, and environmental benefits.

- 2. Locate Kielder Water on the map
- 3. Highlight 10 key facts from the information boxes.

Colour code these into environmental, economic and social benefits of the reservoir.

¼ million visitors each year	The conservation hatchery for Salmon breeds the Arctic Char, unique to Ennerdale Water but in decline.	The Calvert trust provides activities for the disabled along with an orienteering course and water sports
Schools and youth groups use the area for recreation	Caravan sites, youth hostels and hotels accommodate people	Water levels always remain high – drought has never been known
Northumberland Water manage the area to maintain good quality water	Skyspace is a hilltop observatory and a sculpture trail links this to the centre	A visitor centre and local shops all benefit from tourism
An all-terrain path skirts 40 km around the edge of the reservoir	The Forestry commission ensure the woodland is extracted sustainably whilst protecting environments	Birdwatching at the Bird of Prey centre along with Salmon fishing opened in August 2008
The HEP plant generates 6MW enough for 4000 homes per year	Jobs were made available during the construction phase and through maintenance of the dam wall	Habitats have been protected especially for the Ospreys and indigenous Red Squirrels
An eco-village nearby is powered by waste chips from the forestry process	Mountain biking, downhill trials and horse riding paths have been provided	Forestry generates cash around the reservoir

<u>The need for water transfer</u> Kielder Water is a major water-transfer scheme. Before it was completed, the British government considered setting up a 'national water grid' (like the electricity grid) to transfer water from areas of the country with a surplus (e.g. Wales), to areas with a deficit (e.g. the south-east). This idea became popular in the 1970s, because of drought, but it didn't happen in the end. By 2006, a national water grid was being talked about again – after some lengthy dry periods, and when the impacts of climate change became clearer. So far, it still hasn't happened. Largest Reservoir in the UK by capacity – 200 billion litres

27.5 mile Shoreline [43.2km]

10 km long

Serves Tyneside, Wearside and Teeside rivers.

A link to the Derwent Reservoir and Ouse in Yorkshire exist ensuring water

It is a water-transfer scheme (water is transferred from one area to another). The water from the reservoir is released into the Rivers Tyne, Derwent, Wear and Tees. This helps to maintain river flows when levels are low. Extra water can also be released for household and industrial use Kielder Water can provide up to 909 million litres of water a day (almost as much as all the other sources in the

Kielder Water is one of Europe's largest man-made lakes. It houses the Kielder Hydroelectric plant – England's biggest HEP scheme.

The turbine house is located just below the Kielder dam and is powered by dual turbines capable of producing just over 6 megawatts of 'green' power.





Exam Question: For a named place, describe how the problem of water supply has been managed (4)

Lesson 6: What is a transboundary water issue?

LO: To understand the international issues facing future water management of the River Nile across national boundaries.

Do Now:



Describe the route of the River Nile. Which countries does it pass through? What direction does it flow?

https://www.youtube.com/watch?v=TI6VaNG8_nE





Why are there transboundary issues on the River Nile?

Read through the 6 statements. Which is the most important use of the Nile? Put them in order from most important to least important. Complete the questions.

Why is the Nile important?

1. The White Nile rapids in Uganda attract thousands of tourists a year, as does Lake Victoria on the boarder of Kenya, Uganda and Tanzania.	2. Egypt places demands on the Aswan Dam to water the desert in order to plant food crops. All other countries along the Nile's course would also like to increase their farming potential so they can sell their products
3. The Nile is home to many animals, including the Nile crocodile and hippopotamus. Many areas along the Nile have been protected as National Parks eg. Murchison Falls in Uganda	4. In countries that often lack good roads and railways, the lakes on the Nile and the Nile itself can make transport links within and between countries. The waterways can help promote trade, particularly useful for landlocked countries like Burundi and Rwanda.
5. Most African countries are experiencing growing populations as well as increasing economic development. With bigger populations, more water is needed.	6. East Africa regularly suffers drought periods (northern Kenya is suffering an ongoing drought). If the Nile's water can be stored in reservoirs it might be able to reduce the effects of drought.

Which is the most important use? Which is the least important use? Put them in order.

Why did you choose this order? Explain your reasons

Is there conflict between the countries? Highlight where there are conflicts in the text above. What solutions could there be?

Which country deserves the water? Explain your reasons.

<u>Uganda</u> - The Ugandan population is expected to triple by 2050, to 97 million – raising demand for food and water. The government's priority is to build dams to produce electricity, which will restrict the flow of water to the downstream countries of Sudan and Egypt.	<u>Sudan</u> - The Blue Nile and White Nile meet in Sudan. Southern Sudan has swamps and rainforests, but a large part of the north is the Nubian Desert. Sudan is facing the problems of desertification and a falling water table. The Sudanese government wants to expand the use of irrigation to increase the food supply, which will mean taking more water from the Nile.
Ethiopia - Ethiopia's population was 85 million in 2010, but a high population growth rate of 3.2% means that the population is expected to reach 150 million by 2050 – leading to greater demands for both water and food. With the pressure of its growing population, Ethiopia wants to keep more if the Nile's water for its own needs. This is likely to lead to a serious dispute with Sudan and Egypt if they receive less water as a result. The Ethiopian government wants to build big dams to create hydroelectric power, which can be exported to neighbouring countries to generate much-needed income.	Egypt - Egypt's population was 79 million in 2010, but is expected to raise to 122 million by 2050 – leading to a massive increase in demand for water and food. The country relies on the Nile for 90% of its water supply. The Nile's water is used to irrigate farmland on either side of the river – allowing crops to be grown for domestic use and for export (to meet the growing global demand).

https://www.youtube.com/watch?v=VB_vn_QQZqA

What are the solutions to a transboundary water issue?

- A. Pan African Conference : the Governments were invited to a conference to discuss their views on how the River Nile should be managed. It was decided to carefully regulate the flow of the Aswan Dam so not to affect people living in Egypt.
- B. Egypt gave money to the Government in Sudan, so that communities could develop wells to help save water and allow them to have a better quality of life.
- C. The UN has been working with communities in Sudan to reduce desertification, by placing stones in the lines to trap sand and water.

These 3 solutions were put in place to try and reduce the conflict and issues arising from the use of the Nile.

When there are many countries competing for one resource it is difficult to come to a solution that will work for all of the stakeholders.

The solutions also may not work forever, so the governments would need to be constantly communicating to ensure that the water supply is fair for everyone.

Exam practice: Transboundary rivers can cause a number of issues. Using an area that you have studied, discuss the issues that have arisen as a result of transboundary waters (8+4).

Lesson 7: Are Dams the answer?

LO: To explain what a dam is and to find out if they are a viable solution to water issues.

Do Now:



What is the Aswan Dam?

https://www.youtube.com/watch?v=EVI9smugt2E

Describe the location of the Aswan Dam.





What are the advantages and disadvantages of the Aswan Dam?

Traditionally the River Nile has been used for irrigation in two ways: -

- 1. Basin Irrigation When the river floods its banks in the summer it waters the surrounding fields on the floodplain depositing a fertile layer of silt. Earth banks are constructed around the fields to trap the flood water on them.
- 2. Lifting the water from the River with either a shaduf, sakia wheel or an Archimedes screw.

The Aswan Dam was opened in 1970. It is 4km long and took 10 years to build. Lake Nasser which formed behind the dam is 550km in length.

Task:

Sort the following 16 ideas about the dam into the categories below:

Advantages	Disadvantages
More land can be irrigated.	Salt is left on the fields because the water from irrigation soon evaporates.
Water is stored and irrigation can take place all year round.	Electricity is produced, providing power for villages, cities and industries as well as diesel pumps used for irrigation.
Two or three crops can be grown a year rather than one.	The delta is getting smaller because it is getting less silt deposited.

Fertilizers cost farmers money	Fewer nutrients reach the sea so there is less food for fish and fewer fish to be caught.
Soil becomes less fertile as silt is no longer being deposited on the floodplain.	Villages along the Nile have a reliable water supply
The river level stays fairly steady which helps water transport.	Lake Nasser is filling with silt.
Fertilizer is polluting the Nile	Villages near to the Nile are safe from floods
As water snails are no longer being swept out to sea, bilharzia is increasing.	Lake Nasser stocks fish which creates jobs (fishermen) and provides a better diet.

<u>Challenge</u> – prioritise the top two advantages and disadvantages and explain why you feel they are more important than the rest. Consider the environment, the economy and social reasons.

Hydroelectric Power has been created and this provides electricity.	Flooding is better controlled; therefore catastrophic flooding is prevented.	Egypt had to borrow a lot of money from the Russians to set up the dam.	Irrigation channels have been developed so that water now runs into the desert.	The high evaporation means that a lot of salt comes to the surface of the soil.
Fish that live in Lake Nasser can easily be fished and this has created fishing tourism.	Water snails led to an increase in diseases such as bilharzia as they are not moved by the Nile.	New farmland has been created on either side of the river.	90,000 people were made homeless when land was flooded to create the reservoir.	Silt has become trapped behind the dam lowering the level of the reservoir.
Salinization of the soil can kill plants and reduce the amount of crops being produced.	Cairo brick makers are suffering as they no longer have enough silt to make their bricks.	Many will suffer from a lack of water if they don't have an irrigation channel.	A greater variety of crops can be grown.	Artificial fertiliser is now required and this is very expensive for the farmers.
The Temples of Abu Simnel had to be moved.	Farmland in front of the dam is now less fertile as the silt doesn't reach it.	The River Nile can now be navigated by boat all year round as water levels are constant.	Villages along the Nile have a reliable supply of water.	Fertiliser is polluting the Nile leading to eutrophication in places.

Are dams the answer? Give 2 reasons why dams should be built and 2 reasons why dams shouldn't be built.



Case study knowledge is important. Learn these ŎQŎ The salt content of the remaining The dam has reduced evaporation Fertilisers and pesticides poisoned Over-abstraction of water from BX them to your 6 and 8 S There was widespread poverty 10 facts and apply water poisoned and killed mark questions. to it almost drying out. when industries moved and increased water levels by up to 3m the Aral has led the water in places. the fish. away. The Aral Sea is located across the cotton farms used large amounts E Air pollution has increased due to ouilt, splitting the Aral Sea in 2. In 2005 the Kokarai Dam was Mass migration away from the \Diamond **333** of water for irrigation and borders of Uzbekistan The northern part is diverted from rivers. evaporation leaving a lot of water was Aral Sea occurred. and Kazakhstan. fertiliser behind. now filling up.



Case study knowledge is important. Learn these 10 facts and apply them to your 6 and 8 mark questions.	The storm killed two people in Cumbria and the Republic of Ireland.	The strongest gusts were B1mph.	More than 1000 people were evacuated across Cumbria.	There were more than 100 flood warnings and more than ,,,,,, 70 flood alerts in North England.	After the floods a £50m repair and renew scheme was announced for Cumbria
T dke Storm Desmor	Storm Desmond was an extratropical evelone that hit on the 5 th -6 th December 2015.	Record-breaking amounts of rain fell in Cumbria. 341.4mm in 24 hrs on 4 th December.	Estimated E500m of damage caused across Cumbria.	50,000 people were without power across cumbria and Lancashire.	The Army was deployed to aid recovery in Cumbria and Lancashire.

T dk e	Case study knowledge is important. Learn these 10 facts and apply them to your 6 and 8 mark questions.
Large floods are becoming more frequent – at least 1 //// every 5 years.	50 million people live in flood prone areas.
80% of Bangladesh is a flood plain or delta.	3 large rivers flow through Bangladesh – The Ganges, Meghna &
Flooding in 2007 made 9 million people homeless.	In 2007 approximately 1000 people died either from drowning or waterborne
Bangladesh is a Very Poor country and has little money to spend on flood defences.	NGOS have tried to introduce cost-effective methods e.g. NGO Cluster villages.
Short term response: Food aid, hospital care, water purification tablets.	Long term response: Building embankments, flood warning systems, raised flood shelters.



T d k e 10	Case study knowledge is important. Learn these 10 facts and apply them to your 6 and 8 mark questions.
The Colorado River is in west of the USA. It travels through 7 states.	It is the most heavily used source of irrigation water in the USA.
The river is so heavily abstracted that it no longer reaches the sea.	Thirsty crops such as rice and cotton are grown in this area.
A series of dams such as the Hoover Dam have been built to support the needs of 30 million people.	In 2012 the USA and Mexico signed a new water sharing deal.
Strict water conservation methods have been put into place.	Fishermen in Mexico have had to move elsewhere as the mouth of the river has dried up.
The water volume of Lake Mead has dropped by 60%.	There is ongoing conflict between Mexico and the USA.