93401

934010

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SUPERVISOR'S USE ONLY

SCHOLARSHIP EXEMPLAR

NZQA

NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

QUALIFY FOR THE FUTURE WORLD
KIA NOHO TAKATŪ KI TŌ ĀMUA AO!

Scholarship 2018
Geography

2.00 p.m. Wednesday 21 November 2018
Time allowed: Three hours
Total marks: 24

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

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

Carefully read the instructions on page 2 of this booklet.

Answer ALL three questions in this booklet. Each question is worth 8 marks.

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

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

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

Question	Mark
ONE	
TWO	
THREE	
TOTAL	/24

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INSTRUCTIONS

The materials in the resource booklet will enable you to become familiar with the theme and contexts of this examination: **Fresh water in a geographic context**.

Your answers to ALL three questions must incorporate a wide range of case studies from around the world, as well as information and ideas BOTH from the materials provided in the resource booklet and from your studies in geography.

Information to answer any question can be taken from any resource. Key ideas should not be repeated in your answers to different questions.

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

QUESTION ONE

strengths + weaknesses
justified ~~conclusion~~ opinion 3

Critically evaluate the importance of different geographic processes that have led to issues related to quality of freshwater supplies.

Your answer must include:

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

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

QUESTION TWO

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

Apply a range of perspectives to critically analyse the impacts of freshwater issues on people.

Your answer must include:

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

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

QUESTION THREE

Considering future global development, can we ensure fresh water sustainability? Discuss.

argue both sides + come to a justified conclusion

Your answer must include:

- specific information from the resource booklet
- knowledge and insight you have gained from your studies in Geography
- convincing communication.

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

QUESTION ONE

Critically evaluate the importance of different geographic processes that have led to issues related to quality of freshwater supplies.

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- knowledge and insight you have gained from your studies in Geography
- convincing communication
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PLANNING

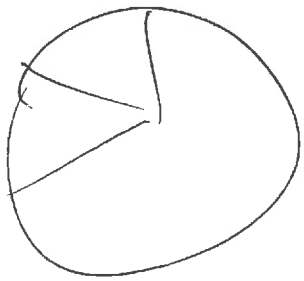
Causes

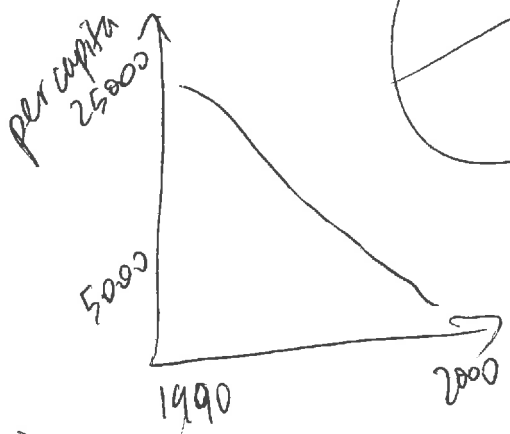
physical water scarcity

economic - poor management

- population growth
- lack of water → pg 4
- poor management
- pollution → garges river pg 5
- overuse migration
- drought → C.C. 6 - syria war
- poor access
- conflict

agriculture NZ





population of Cape Town doubled since 1999

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

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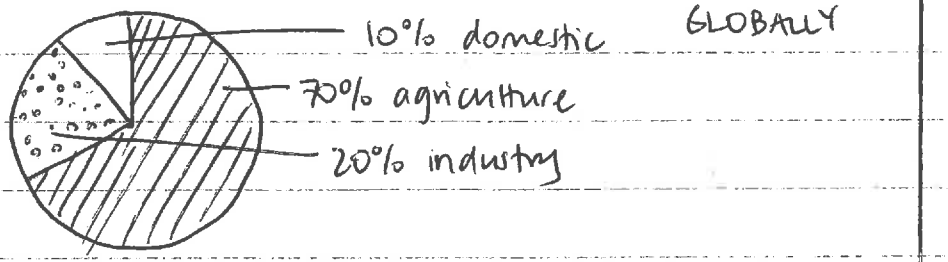
A multitude of geographic processes have led to issues related to quality of freshwater supplies. These processes include agriculture and urban waste causing pollution. Quality of freshwater effects everyone who comes into contact with it thus the processes that cause it are important, some more so than others. b

~~The process of farming cattle especially for milk and meat~~ //

The process of dairy farming in ~~New~~ New Zealand especially has led to issues related to quality of freshwater supplies. The quality of water in rivers as such as the Waikato, Whanganui and Selwyn has been declining for some time. Agriculture accounts for 70% of freshwater consumption as figure 1 below illustrates: //

FIGURE 1 CONSUMPTION OF FRESHWATER BY SECTOR GLOBALLY



But not only does agriculture account for water scarcity – physical and economic - it accounts for quality issues as well. Nitrogen and phosphorous are the main pollutants, nutrients that cause the most concern for the health of New Zealand freshwater supplies. Pollution occurs as a result of run-off of fertilisers, animal faeces and urine. Dairy farming especially in New Zealand has intensified greatly over the last decade which has resulted in nitrogen leaching

leaching increasing 29% from 1990 to 2012, as New Zealand dairy herds grew by 69% between 1994 and 2015. ~~There~~ Dairy farmers are aware of the damage they are doing, thus have put in place some measures ~~to~~ in an effort to alleviate the effects. For example 97% of major waterways on dairy farms have now been fenced off and 99.7% of ~~a~~ regular stock crossings have had bridges or culverts put in. ~~It is important to note though~~ This is as a result of the 2013 Sustainable Dairy Water Accord. A 2015 Federated Farmers and Dairy NZ survey concluded that ~~farmers~~ individual farms had spent an average of $18,000 a year on ~~prac~~ sustainable water management practices, 70% of that being on effluent management in the five years between 2010 and 2015. Therefore one could argue that the geographic process of agriculture is of less importance in leading to issues relating to quality of freshwater supplies because some of the effects have been lessened.

Another geographic process that has led to issues related to quality of freshwater supplies is pollution due ~~human~~ domestic and industrial waste. The Ganges in India ~~which~~ supplies freshwater to one tenth of the worlds population. As well as water levels in the Ganges Basin declining at a rate of 6.31cm/year, the river is in imminent danger as a result of heavy pollution – it has become one of the most polluted on the planet. Pollutants include dead bodies, industrial effluent and urban sewage so it is no wonder the amount of toxins and bacteria found in the river is now almost

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3000 times the limit that the World Health Organisation deems as safe. Delhi, India's national capital dumps 60% of its untreated sewage into the river denying hundreds of millions of people access to clean water. ~~This is very important.~~ The importance of this process must be rated highly because it is an issue that affects ~~so many~~ so many people in the surrounding areas. 4

Another geographic process that has led to issues related to quality of freshwater supplies is urban drift. This is a huge issue in Pacific Islands such as Tuvalu. With climate change meaning rising seas and ~~loss~~ loss of homes are ~~a~~ a close reality ~~for~~ for many ~~pacific~~ Pacific Island nations, citizens are flocking to the main centres to escape the threats that could take away their homelands. Tuvalu's fresh water supply is already under strain as El Nino has brought a lack of rain meaning ~~supply~~ freshwater is scarce. Many of the aquifers are contaminated with salt water because the island is so small and inherently surrounded by sea. Growth of settlements on the main island as a result of urban drift has meant that the water quality has decreased as a greater lack of sanitation abounds. As figure 2 over the page illustrates, the geographic process of changing ~~Economic water scarcity arises from poor water management and the geographic process of water management can~~ climates paired with the geographic process of urban drift can ~~can~~ lead to issues relating to quality of fresh water supplies. 6

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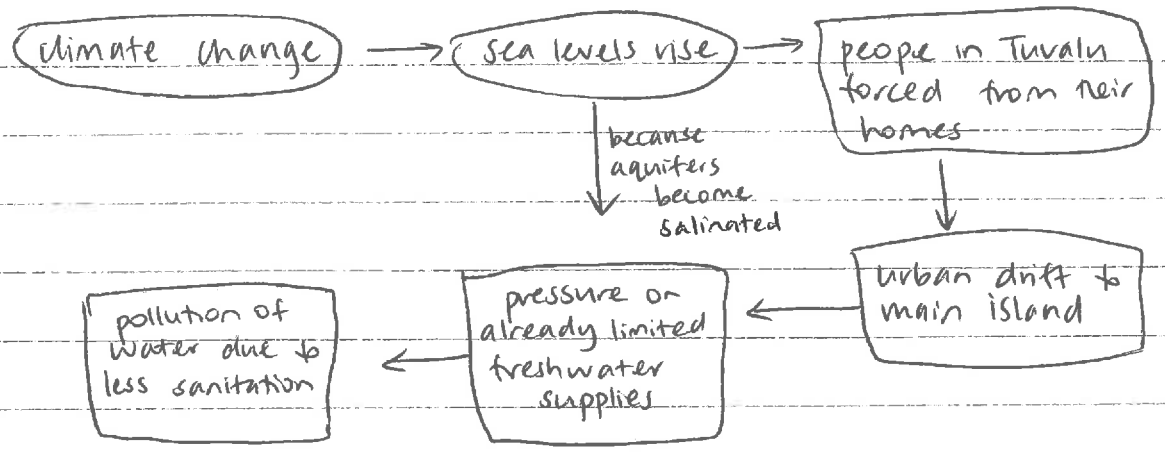
FIGURE 2 IMPACT OF CLIMATE CHANGE AND ~~URBAN~~ URBAN DRIFT



~~sea levels~~

The geographic processes that have led to issues relating to quality of freshwater supplies that have been discussed are agricultural pollutants, industrial and domestic pollutants and the combination of urban drift and climate change. The most important of these processes is industrial and domestic pollution in freshwater supplies such as the Ganges River in India. This is because ~~in~~ such rivers are often near heavily populated urban centres, which is why they are polluted in the first place. ~~However this a~~ Thus, hundreds of thousands of ~~people are affected~~ if not millions of people are affected by the ~~less than average water quality~~ dangerously low water quality. Whereas in the case of agricultural pollutants, the ~~an~~ issue is confined only to areas such as New Zealand which have a very intensive farming agenda. Likewise with urban drift and climate change, that particular example is likely to be contained to regions in the Pacific. However, ~~water~~

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freshwater quality is an issue that is caused by so many different processes and factors, It is hard to pinpoint just one. Take for example, population growth and poor water management. These processes all combine to lead to issues relating to quality of freshwater supplies. //

06

QUESTION TWO

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

Apply a range of perspectives to critically analyse the impacts of freshwater issues on people.

Your answer must include:

- specific information from the resource booklet
- knowledge and insight you have gained from your studies in Geography
- convincing communication
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PLANNING

IMPACTS

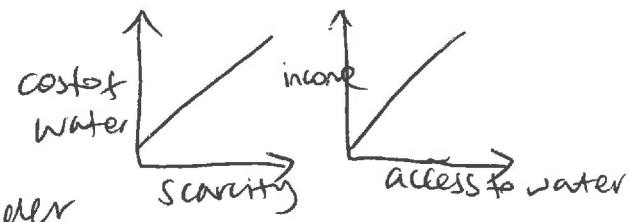
social

(1) hunger — LEDC's

poverty — leads to generational inequality

lack of education

sickness / disease — diarrhoea



(2) cape town

desalination – Kuwait Dubai

agriculture — – drip irrigation
– drought resistant crops
– fence off 97%
99.7% culverts

(12) economic

-fighting bottled water companies

Stanley, Victoria

White Pine Michigan
250 gallon/min
400 gallon/min

cultural

pg 9 + 15

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

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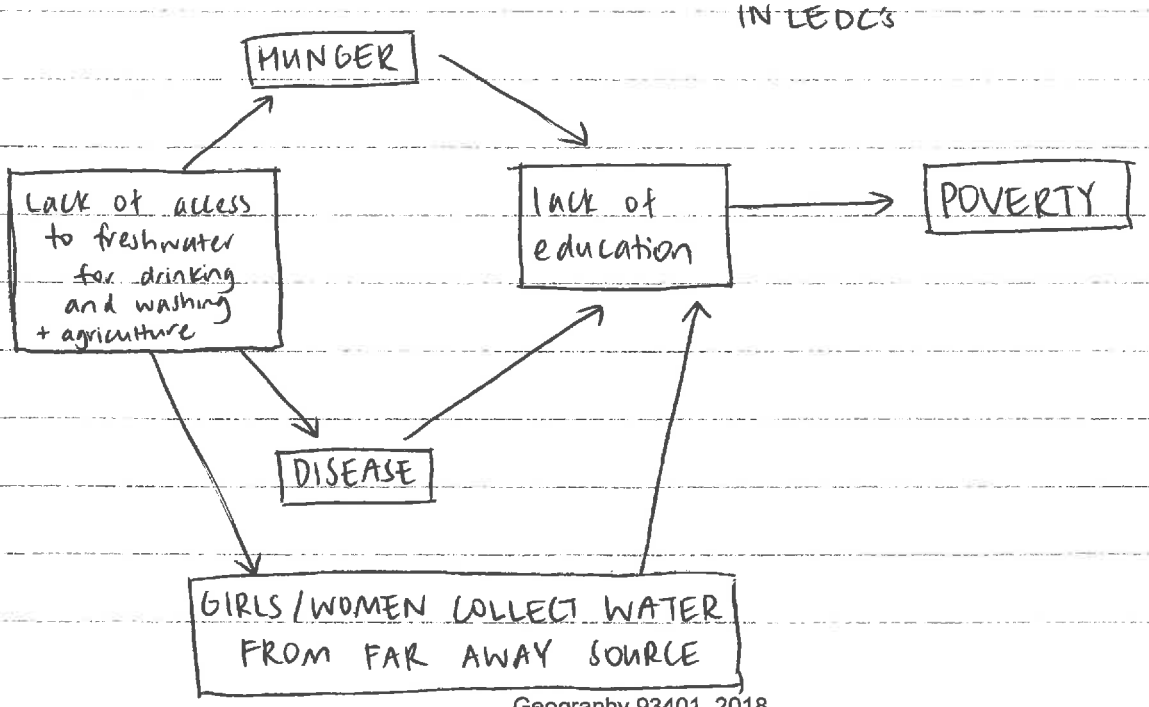
Freshwater issues have many impacts on people which can be analysed from a range of perspectives including social, economic and cultural. Impacts have already been felt around the world from the drought-ridden plains of Africa to the United States to New Zealand. Since we all need water to survive, no country or person is exempt from issues concerning freshwater, or the impacts of those issues.//

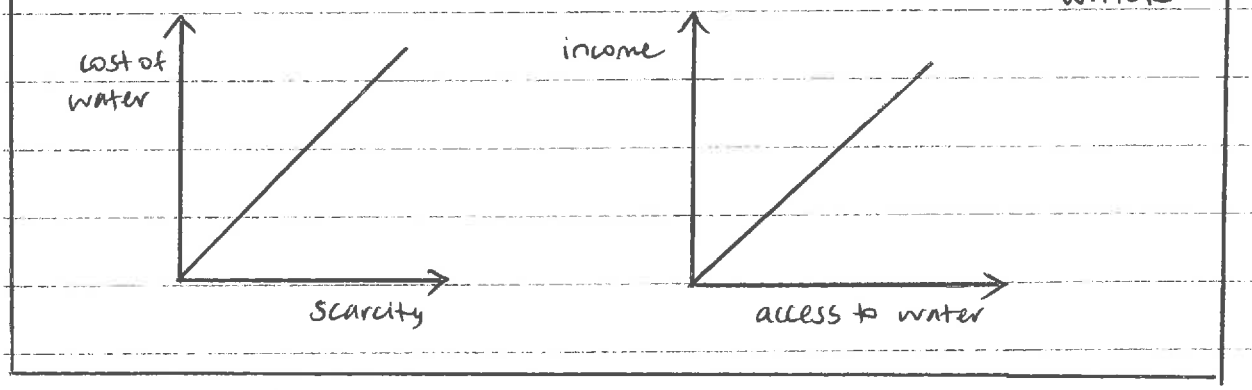
Looking at the impacts from a social perspective it is clear to see that poorer people and countries are hardest hit when it comes to the impacts of freshwater issues on people. Today, in 41 countries one fifth of people drink water from a source that is not protected from contamination. Since 1990, 2.6 billion people have gained access to potable water so progress has been made but it is not enough. A lack of access to freshwater leads to a range of impacts as figure 1 below shows: //

FIGURE 1 IMPACTS OF FRESHWATER SCARCITY ON PEOPLE IN LEDCs



As the diagram states, a lack of freshwater for drinking and washing invariably leads to disease. Diarrhoea is such a disease that is very common in LEDC's especially among children. Globally it is estimated that 2.2 million people will die from diarrhoeal diseases each year It is not only among children that it is a problem, adults are affected too. In fact work day losses due to lack of sanitation accounts of 3-5% of losses in GDP globally. When children are too sick to go to school they miss out on education which means they lack the opportunity to gain the skills to lift their family out of poverty, thus leaving them stuck in poverty.

FIGURE 2 RELATIONSHIPS BETWEEN MONEY & ACCESS TO WATER



As figure 2 above demonstrates, when water is scarce, the cost goes up, which makes it even harder for families in poverty to have adequate access to water. In the same way, when access to water increases so does income because individuals are healthy, able to get an education and irrigate their crops to earn an income.

Another example of the impacts of freshwater issues on people that can be analysed from a social perspective is the case study of Day Zero and Cape Town. Cape Town may be the first major city to run out of water in

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the near future. Day Zero, the apocalyptic code name for the day the city's municipal water taps are turned off was initially predicted for February and then July 2018. It has been extended until April 2019 but the impacts have been huge. A family in Cape Town's Table View neighbourhood have made some huge changes in their lifestyle which has helped the city bring down daily water use to 505 million litres. However the aim is to reduce that to 450 million litres. The family have adapted to the need to reduce their freshwater consumption by only showering for 2 mins every second day and reusing that grey water to flush the toilets. City authorities have also had to crack down on informal car washes, handing out $500 fines to those breaching the rules. The equivalent of a months wages. The water crisis has impacted the rich more than the poor, who already used less than 50L per person per day. From a social perspective these issues may have brought about a greater awareness of inequality in the city, ~~and~~ which could hopefully lead to greater social justice.

Addressing the impacts of freshwater on people from a cultural perspective allows for a wider analysis. ~~One such case study that fits this~~ A relevant case study occurs right here in New Zealand. In 1983, Parori Springs in Whangarei ran dry for the first time. This had an impact on the surrounding ecosystem as watercress stopped growing, the eels disappeared and many other species including freshwater crayfish died. This in turn

impacted the local Maori tribe as their traditional food source was lost. The reason the springs ran dry in the first place was the Whangarei District Council drilled directly into the aquifer upstream to extract water for the town's residents. A lack of consideration for cultural values, caused the near extinction of the life force of the native people an unarguably negative effect. This brings up the point ~~of~~ that has been asked time and time again, who own's water? Water ownership is another issue in its own right which brings about the next point.

From an economic perspective, water is a valuable resource that many botting companies have been taking advantage of and earning huge profits. For example in Stanley, Victoria residents fought a 4 year court battle to stop Japanese beverage giant Asahi bottling water from a highland aquifer. The residents were overruled and ended up with A$90,000 in ~~court fees~~ legal fees to deal with. This freshwater issue had a profound financial impact on the people involved. Likewise, in Michigan, Nestle has been botting water from White ~~the~~ Pine Spring something residents have been adverse to for a long time. Nestle are taking 250 gallons/minute for less than $200 a year and have just been approved by local authorities to increase that amount to ~~400~~ 400 gallons/minute. ~~Not only has this~~ For a small town earning income off a resource that happens to be available may seem like a great bonus. But not when you consider the environmental effects. This issues ~~can~~ also occurs in New Zealand with companies only paying ~~$0~~ 1/3 of a

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cent ~~to~~ per m^3 as opposed to ratepayers who pay $1.60 for water to their homes. This issue impacts people economically because they are paying more for the same water – sure there's the infrastructure to maintain but these companies will just sell the water back to consumers for an even higher price. Doesn't sound like a fair deal. And who has the right to sell the water to them anyway? /4

The impacts of freshwater issues on people can be analysed from a range of perspectives including social, cultural, and economic. Water is a resource that we all need, thus rich and poor alike are affected, albeit in different ways. There are countless other impacts that could be discussed such as the impact of freshwater issues on people through the impacts on agriculture. But for now, the world might need to take a look at the vast inequalities surrounding the use and ownership of freshwater if Millenium Goal number 6 is to be achieved. /

06

QUESTION THREE

Considering future global development, can we ensure fresh water sustainability? Discuss.

Your answer must include:

- specific information from the resource booklet
- knowledge and insight you have gained from your studies in Geography
- convincing communication.

PLANNING

YES! natural

Technology

☆ - Lifesaver bottle

- Bill Gates reinvented toilet

☆ - water recapture – grey water recapture

Singapore 30%

- desalination
- effluent recycling Tel Aviv Shafdan Israel

Israel 86% Spain 18%

140m m^3

NO!

environmental

lack of supply of water

drought - climate change

population growth

overuse

pollution

Cape Town averted Day Zero

CONCLUSION

water source

policy

industry utilities agri.

consumers

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

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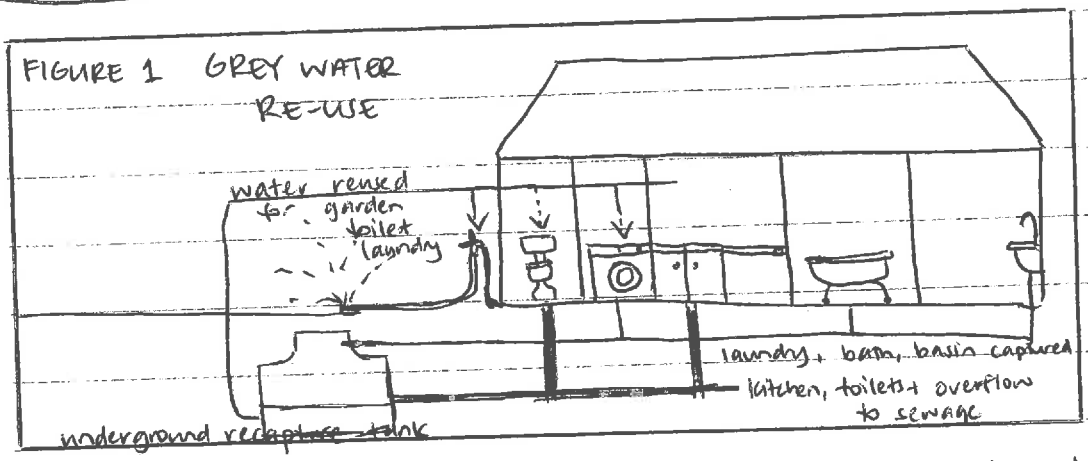
Can we ensure fresh water sustainability? The population of the world is growing at such a fast rate that it is unlikely freshwater supply will be able to meet demand in years to come. But what if we considered the possibility for changes in technology which would allow for ~~water~~ freshwater sustainability? For this precious resource which has been described as "the next oil" to be available for our grandchildren's grandchildren in order to sustain life on Earth. 4

Technological developments can have positive and negative effects on fresh-water supply. Take the Green Revolution as an example, where new varieties of crops were engineered, crops that suddenly needed irrigating, thus putting a strain on global freshwater supplies. It is no wonder agriculture accounts for 70% of freshwater use worldwide. Despite this, technology also has the power to turn the 'water crisis' on its head with new inventions paving the way to a sustainable future of water recapture, desalination and effluent recycling. The Shafdan Wastewater Treatment plant near Tel Aviv in Israel is paving the way in the area of effluent recycling. Wastewater, effluent and sewage are transported to the plant which uses leading technologies to treat the water and produce 140 million cubic metres of water which is used to irrigate 50,000 acres of agricultural land, every year. The rest of the world has something to learn from Israel, a country situated in a desert, if ~~anyone~~ any country were to have issues with freshwater it would

be them. On top of that, 86% of the water that goes down the drain in Israel is recaptured, the next best performing country in this area is Spain, who recapture only 19%. As well as ensuring water is recycled, Israel have employed technologies to successfully rely on desalination, with 5 desalination plants on its coastline providing for as much as 60% of the areas freshwater needs.

Another example of a way freshwater sustainability can be ensured is on a much smaller scale.

FIGURE 1 GREY WATER RE-USE



As figure 1 above shows, water from the laundry, bath, shower and handbasins can be reused for the garden hose, laundry and toilets after being stored in an underground recapture tank. The overflow from the tank, kitchen, and toilet water all go to the sewage treatment plant. If all households had this system installed, imagine how sustainable we would be.

Bill Gates "Reinvented Toilet" is ~~another~~ further example of the use of technology to ensure freshwater sustainability. The Bill and Melinda Gates Foundation invested $294 million over 7 years to fund the research behind this

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toilet which from human effluent produces clean, safe drinking water and solids that can be used as fertiliser, put on open land without further treatment. This remarkable invention even had Bill Gates who tasted water made from faeces saying he "would happily drink it everyday." The "Reinvented Toilet" would allow LEDC's with lower levels of sanitation, a clean way to dispose of their human waste and clean drinking water – a win all round! On and fertiliser for their crops.

On the other hand, and regardless of technological advancements, it may still be possible that freshwater sustainability will not be able to be ensured. With the global population growing at an unprecedented rate it is highly likely ~~water is got~~ access to freshwater is going to be increasingly problematic. As soon as 2025, over 60% of the worlds population may face freshwater shortages. The world population could rise from 7.4 billion today to 10 billion by 2050, which will increase global freshwater demand by 55%.

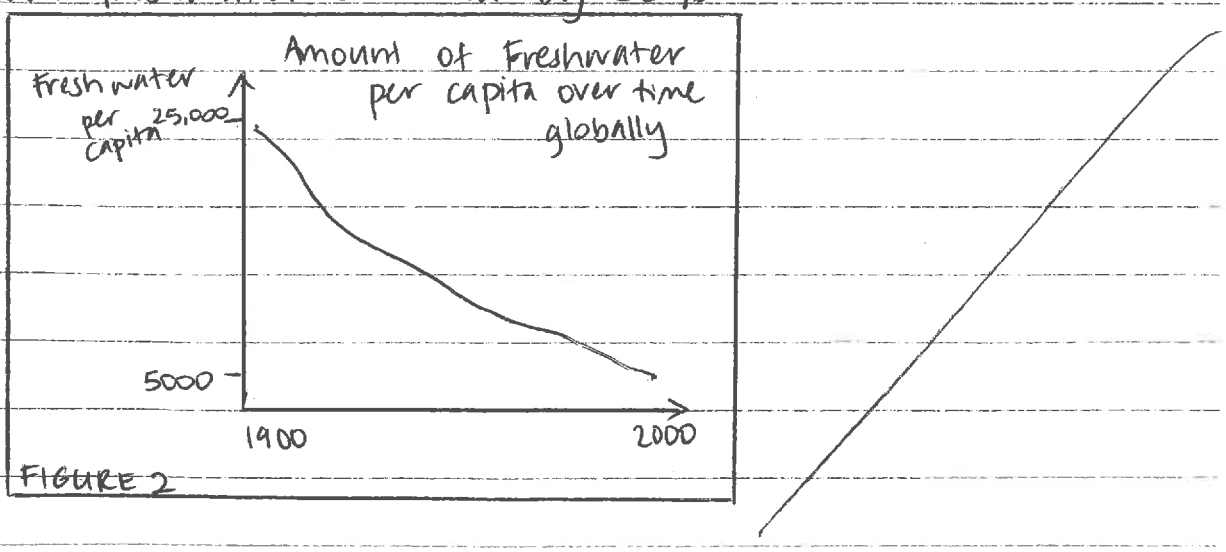

FIGURE 2

As figure 2 above demonstrates, the amount of freshwater

per capita has been steadily decreasing over the last 100 years. Looking into the future with the population increasing almost exponentially, it is certain that line will follow a downward trajectory. There is just not enough freshwater in the world. It is that simple.

In addition to population growth, climate change will play a big role in the lack of freshwater sustainability. With a problem already imminent, it seems climate change will intensify the devastation. Worst affected will be the world's poorest countries which lack a capacity to adapt, such as Ethiopia, Kenya and Somalia whose food supply is already in a state of emergency as 10 million people have been affected by the worst water shortage in 60 years. Professor David Grey who has worked on international water management for 45 years says these countries have "limited capacity, limited resources, limited knowledge" and yet they will be most affected by the change that is more than likely to bring about more droughts. ~~The amount of fr~~ Freshwater in these countries will not be able to be sustained without outside help. Even ~~[illegible]~~ more economically developed countries such as the US, specifically California and Australia have suffered droughts possibly an effect of climate change. Freshwater is going to be more scarce ~~when~~ the number and intensity of droughts increase as a result of climate change.

Weighing up the arguments for and against the stance

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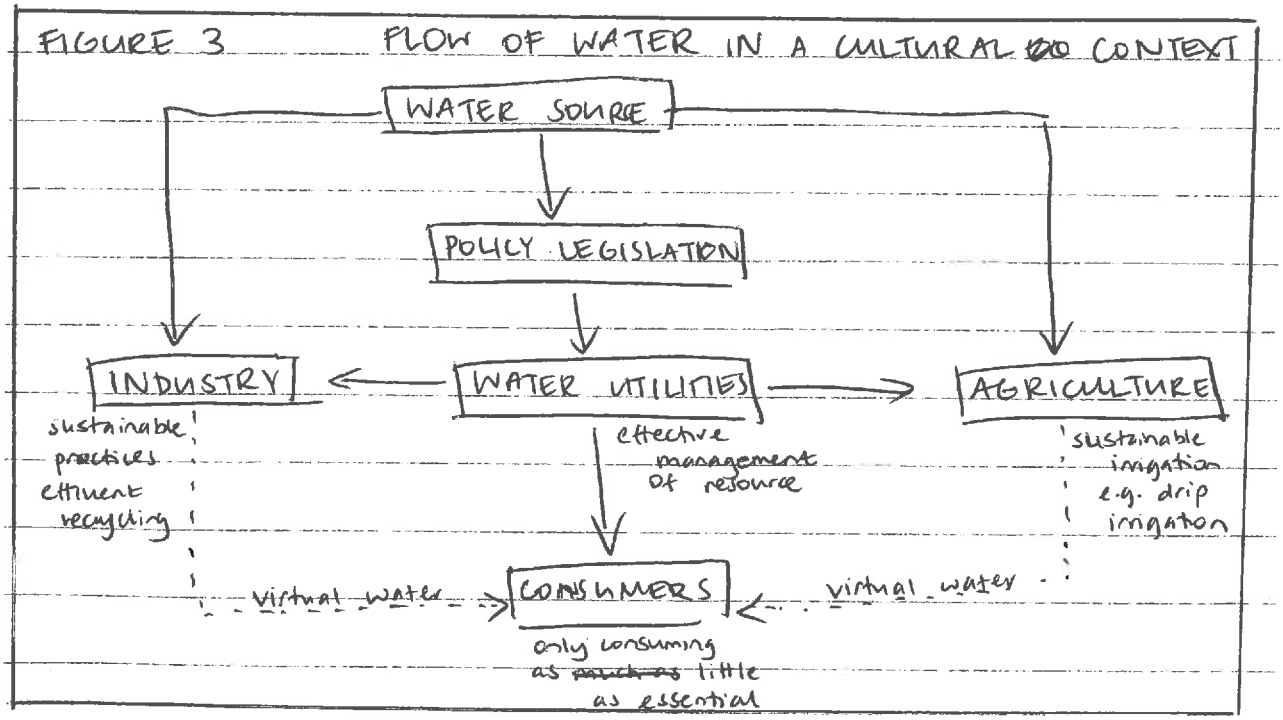
that we can ensure freshwater sustainability it is clear to see that it is going to take a lot of effort from those with the resources. But it is possible, we can ensure freshwater sustainability if the right steps are taken. For example, Michael Pritchard inventor of the lifesaver Bottle says that with just $20bn invested into getting the lifesaver bottle into places that need it, ~~will ensure~~ achievement of the Millenium Goal number 6 will be ensured. Of course this doesn't ensure water sustainability directly but it does allow people in developing countries access to clean, safe drinking water which they are lacking. Ensuring ~~water's~~ freshwater sustainability will involve the whole world and every piece in the freshwater puzzle as figure 3 below demonstrates:

FIGURE 3 FLOW OF WATER IN A CULTURAL CONTEXT



For freshwater sustainability to be ensured, water utilities, agriculture, industry, policy & legislation and consumers must all do their own bit to stop fresh water being wasted, polluted and overused.

05

Scholarship Exemplar 2018

Subject	Geography	Standard	93401	Total score	17

Q	Score	Annotation
1	6	The candidate writes a safe introduction that starts to set up the argument. Critical evaluation is evident throughout the response. Diagrams are effectively integrated to support the answer. There is some insight demonstrated. Specific evidence is used to back up the argument. Clearly, this response reaches Scholarship. However, to gain a score of 7 or higher, more depth and breadth to the response is required, and also improved justification throughout the paragraphs to strengthen the argument.
2	6	An effective introduction, which sets up the response. A good understanding of perspectives is demonstrated, along with a range of perspectives used. The visuals are thoughtful and integrated. The impacts on people are critically analysed with a range of evidence. There is evidence of the significance of impacts. The conclusion could have been stronger to show insight and the overall significance to reach a score of 7. This response has the depth and breadth to reach Scholarship level.
3	5	Paragraphing is effectively used, giving the written response structure. The candidate demonstrates clarity in the discussion and demonstrates the ability to integrate original evidence to enhance the answer. A balanced approach to the discussion is evident through evaluating the positive and negatives. To score a 6 or above: the introduction needed to set up the argument more effectively, as was done in Q1 and Q2. Figure 1 is also unnecessary and weakens the answer. If the introduction offered a stronger stance this would have supported the argument from the outset. The conclusion lacked the sophistication for a 6 or higher.