

Cost and
environmental impact
environmental
sciences essay



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Group 2Assessment Title: Final ReportAssignment Title: Write a

recommendation report in which you compare two water provision methods

for an arid region of your choice. Consider these two methods in two

requirements which is Cost and Environmental impact. Student ID Number:

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Introduction

The populations in the world are increasing, there are nearly 7 billion populations in the world (USCB, 2013), the water resource is limited nevertheless there are only 5 per cent water in the world is freshwater, so the water resource in the world is not enough to supply for human survival. According to United National Educational, Scientific Culture Organization (2006), there is a quarter of land is arid regions. Arid regions mean its average of rainfall is up to 350 mm per year, there is not enough freshwater supply to the nationals (IISD, n. d.). According to the Australia Bureau of Statistic (2012), over 80 per cent of Australia’s rainfall average is up to 300 mm per year, it means Australia is an arid region. The propose of this report is to compare two water provision methods which is desalination and groundwater, and analysis the data in cost and environmental impact and give some recommendations to that arid region.

Background

Australia is the driest land where still have human live in, the desert of Australia is in the central and the southern of Australia (NYNRM, N. D.). In appendix 1, it shows the rainfall average in different part of Australia. Over 80 per cent of Australia's rainfall average is less than 300 mm per year, only few part of Australia has enough rainfall. Due to the land form and low rainfall, there are sparely populated in the arid part of Australia (CSIRO, 2011). There are 22 million populations live in Australia (ABS, 2013), and 1. 6 million populations live in South Australia which is arid area (ABC News, 2012). There are not enough water resources in Southern Australia. One of the water resources in South Australia is the river of Murray Darling Basin. 83 per cent of Murray Darling Basin water is used by agriculture industry and only 17 per cent of water is for household (ABS, 2009). That means there is not enough water supplies in Southern Australia, so the government have to adopt another water provision method to solve the water shortage problem.

Introduction of water provision methods

Desalination

Staff and Wetterau (2011) stated that desalination is to build a desalination plant and use technology to desalinate the salinity and mineral which is in seawater, after the desalination, the seawater become fresh water, it can be used by irrigation, agricultural and household. In Australia, desalination has been used for over last thirty years (CSIRO, 2012), in Adelaide, desalination plant can produce 50 per cent fresh water of Adelaide's demand (Palmer, 2012).

Using groundwater

Groundwater is the water which is to hoard under the land surface of the world. The water fills the gap between the soil and the rock underground (see appendix 2). After the flow of the soil and rock, the water becomes fresh water, it can be used for agricultural and drink (The Groundwater Foundation, 2013). Due to the Southern Australia which is low rainfall area and do not have enough establishment for water storage, groundwater is one of the main source of drinking water which is 70 per cent and half of irrigate in Australia is rely on the groundwater (AUSLIG, 2012).

Introduce requirement

To solve the water provision problem in arid region, the government should consider in two important requirements, which are cost and environmental impact.

Cost

Cost is a very important element for government or household to decide which water provision system should be chosen. The cost of the water provision system should be cost effective for every household can be assumed. Australia is one of the richest countries in Asia – Pacific. It means in Australia, the cost of the water provision is not the most important requirement that need to be concerned (Index Of Economic Freedom, 2013).

Environmental impact

Environment is human's life-support system (CDO, 2003), so the environment impact cannot be neglected in water provision system. In Australia, environment impact is the most important element which will

consider using the water provision system because if the environment broken, it will never recover.

Comparison of options

Cost

Cost of Desalination

Let's take a southern city in Australia - Adelaide as an example. According to Palmer (2012), Adelaide's desalination plant can supply up to half of the Adelaide's water demand, but the cost is very high. The total cost of desalination plant is AUD \$328 million, including 1 million to build a 50GY/yr desalination plant in 2008. In 2009, the government to extend the desalination plant to 100GY/yr cost 228 million (DSEWPC, 2010). The cost of every household is based on the water usage, in 2012, a household uses only 4 kilolitres a year cost AUD\$85. 02/kl, water usage in 140 kilolitres per cost AUD\$4. 54/kl, the cost will charge AUD\$3. 39/KL when a household using 431 kilolitres per year (ACT, 2012).

Cost of using groundwater

According to National Water Commission (2012), there are 23, 000 bores to mining the groundwater for population's use. It costs AUD\$ 872 million with the maintenance costs in 2010 to 2011. As a result of groundwater is the main resource in Australia, Australia government has to strictly control the quality and management, there are 550 staff to manage , and it costs AUD \$110 million in 2010 to 2011 (Merz, 2012).

Environment Impact

Environment impact of desalination

For the environmental impact, there have a few negative environmental impact of desalination. To begin with building a desalination plant, it will cause pollution problems, such as air pollution. Take greenhouse gas emission as an example, because the desalination plant is worked by the machines, and the machine will exhaust greenhouse gas when it is working (Younos, 2005). Besides, seawater desalination plant will increase the salinity and the temperature in the seawater because the desalination plant is to desalinate the salinity in the seawater to be fresh water, and the removed salt will discharge into the sea. The salinity increased and temperature increased may lead some endangered marine may not suitable to live in the sea, they will extinct in few decade (Micale & Rizzuti, 2009).

Environment impact of using groundwater

Groundwater is the main water resource in Southern Australia, however, groundwater is limited. There are some environmental impacts of overuse groundwater. First of all, overusing groundwater incurs land subsidence. Let's take one inland state in Australia - New South Wales as an example. Groundwater has already been mining over 80 per cent in New South Wales and New South Wales have land subsidence since 2001 because of overuse groundwater (CRCWQRA, 2006). Furthermore, according to Tomlinson (2011), over mining groundwater will also generate dryland desalination, which means increasing the salinity in the groundwater is not suitable for drinking or the plant's growth.

Conclusion

Central and Southern part of Australia is an arid area. Cost of desalination is higher than groundwater. Seawater is unlimited but groundwater is limited. Desalination causes air pollution and increases the salinity in the seawater. Over mining groundwater causes land subsidence and dryland desalination. Desalination can produce more fresh water to use.

Recommendation

Although the cost of desalination is higher than groundwater in Australia, due to the Australia is a rich country, it does not need to worry about the cost, it does need to consider about the environmental impact. For the environment impact of desalination, government can have some processes to solve it. For example, the salt which have desalinated from the seawater should not discharge into the seawater, it can fabricate to be the industrial salt for sell usage. This process not only can alleviate the environmental impact, it can also reduce the cost. Besides, to solve the environmental impact of groundwater can avoid overuse groundwater. However, to combine these two water provisions of desalination and groundwater in cost and environmental impact, these two water provision methods are both suitable to use in Australia.