Resource 3 – Viewpoints, Options and Tasks

Causes of the current American Southwest water crisis

Worst drought: 14 years of drought from the Rocky Mountains to Arizona has been the worst in 1250 years. Reservoirs have shrunk to less than half of their capacities. Many climate experts predict that this region will continue to experience drier weather in the future. Climate change and warmer temperatures will reduce the Colorado’s flow between 5 and 35%, even if rainfall stays the same. Rainfall levels are also predicted to decrease.

Unsustainable water demand: The Colorado River supplies 7 states with water! The demand for water now outstrips the supply of water by a factor of 2. This is called a water deficit. This is unsustainable! There is a finite supply of water.

Disappearing Groundwater: Lack of groundwater in aquifers is causing the land to subside in some areas. In agricultural areas, where farmers rely on pumping out groundwater, groundwater levels are dropping rapidly. Boreholes will need to be so deep that they will become prohibitively expensive.

Less river flow: Dust storms are becoming increasingly fierce. Dust is being deposited on the snowy peaks of the Sierra Nevada. This is making them darker and causing more snow melt. This could reduce river flows in the summer as all the snow has melted.

Reduced hydropower: Reducing the level of Lake Mead will reduce the amount of hydroelectricity it can produce. This will mean more energy will be needed from fossil fuels.

Increasing population: Population in Colorado Basin States will increase from 40 million in 2015 to 76.5 million by 2060. This has the potential to significantly increase water demand and consumption. A higher population also means more water used by businesses, factories and commercial premises.

Solving the crisis - Stakeholder viewpoints

**Southern Nevada water agency:**

We are recycling more sewage effluent, offering financial incentives for citizens to get rid of their grass lawns and subsidising water-efficient household appliances such as shower heads and dishwashers so people consume less water.

If the level of Lake Mead falls below 1000 feet above sea level we will be unable to pump water to 7 out of 10 people in Nevada. We are drilling a $817 million intake tunnel under Lake Mead so we can pump water out of the reservoir.

**National water authority:**

This year we will decrease the flow of water into Lake Mead from Lake Powell further upstream in Utah. This will decrease water levels in Lake Mead and increase the water crisis for citizens of Las Vegas and for millions of acres of local farmland. Lake Mead’s outflow to states downstream will also probably be rationed.

**Farmers:**

We need as much of Lake Mead’s water as possible to make money on our farms. We know we use 75% of all the water in the region but without it we cannot grow crops and look after our cattle. If our supplies are cut we will have to dig our own boreholes and pump up groundwater to irrigate our crops. The soil is so dry that we are having to bulldoze orchards and unload herd of cattle.
City dwellers in Nevada:
We know there are 40 millions of us in the region but we all need water and we are worried about having to be rationed in our water use. America is the richest country on the planet and we shouldn’t need to have our water consumption cut!

Southern Californian citizens (downstream from Las Vegas)
Our population is set to increase from 19 million to 25 million in the next 45 years. We need our share of water from the Colorado River. People from Nevada will have to share more of their water with us! If we lose our supplies we worry that there won’t be enough technology and water to meet our needs.

Water Conservation experts
Farmers could use laser technology to ensure their fields are completely flat to reduce runoff. Arizona State uses the same amount of water as it did in 1955 despite its population growing by 12 times! Southern California’s urban water district is recycling sewage effluent, giving away high efficiency water nozzles and subsidising items like artificial turf and zero-water urinals.
Southern Nevada’s water saving measures are the most impressive. Virtually all water used indoors from home dishwashers to the toilets and bathrooms used by 40 million tourists is treated and returned to Lake Mead. Officials here boast that everyone could take a 20 minute shower every day without increasing Las Vegas’ net water consumption! Southern Nevada slashed water consumption from 2002 to 2012 despite adding 400,000 people to its population.

Brian Czech, Economist
As the Southwest region population and economy continues to grow unsustainably, water supply will hit crisis levels and create an economic depression. We need to reduce the rate of population and economic growth. Increasing water prices will hit the poorest the worst.

Pat Mulroy, ex-head of Southern Nevada Water Authority
“We can’t conserve our way out of this. And technology is not something we can pull out of our back pockets tomorrow...there are no silver bullets here.

Ted Kowalski, water manager for Colorado State
“I don’t believe that water conservation in itself is enough to meet the growing needs that we see, especially if another 5 million people move into our state.”

Herb Guenther, former state senator and water resources manager
“The only thing that will limit our ability to meet future demands is if we don’t eventually go to ocean desalination.”
Franz Ackerman, senior energy economist

"Desalting plants are extremely expensive and the costs of building and maintaining a network of water pipelines into the interior would be astronomical. Disposing of the salt is a major environmental concern and communities along the coast are not going to welcome not-very-attractive desalting plants to California with open arms". California would need to generate enormous amounts of power to run the desalting plants. It would also cost about $500 a month to supply desalinated water to one home. Those costs follow inflation; as energy prices get pricier, so does desalinated water.

K Bruce, Desert Research Institute Las Vegas

"If population growth and economic activity are not curbed or managed in a sustainable way, the result will be constant, ever-steepening increases in water prices – a situation that will become so untenable that at some point you will have a reverse trend in – massive depopulation"

Bibliography


Sustainable Decision Making Exercise – **Sections and Tasks**

**The Background** (Use ‘Resource 1 PPT’ and ‘Resource 2 doc’)

**Task 1** – Introductory facts

a. Locate Las Vegas, the Colorado River and the American Southwest (Include an annotated map)
b. Compare the climate of Las Vegas with London (Include climate graphs. Manipulate the data)
c. Describe and explain the growth of Las Vegas (use a graph)
d. Include an annotated photo of Lake Mead
e. Describe how the levels of Lake Meade are changing (use historical water height data).

**Task 2** - Explain why there is a water crisis in the American Southwest. Evaluate the causes.

**The Options** - The following 5 options are available.

A. Build more **desalination plants** on California and Mexico’s Pacific coast. This will supply more water to the people of Southern California. **Build pipelines** to carry ‘blue gold’ into the desert states of Nevada, Arizona and Utah.
B. Increase **water conservation** measures to limit water use. Increase the strictness of water conservation.
C. Raise the **price of water** to consumers.
D. **Scrap government financial** help for house building, mining and high tech industries. **Limit** population and economic growth.
E. **Strict planning controls** on new buildings. Only allow high population density housing developments with water-saving features built-in.
As a geographer you are known for your ability to see multiple aspects of this water crisis. You have been employed to advise a range of key stakeholders on the future of the Southwest’s water use. Select a combination of two options to improve the economic, social and environmental sustainability of this whole region. Some options are more sustainable than others.

Write a report with the following paragraphs:

a. State your choice of options (Select 2).
b. Explain the advantages and disadvantages of your recommended options.
c. Explain why you rejected one option.
d. Explain the advantages of your rejected option.
e. Conclusion.

Refer to stakeholder perceptions and sustainability throughout. Discuss why it is difficult to find a perfect sustainable solution.

Mark Scheme

Level 3 (8 to 10 marks)
✓ You complete all tasks, especially task 3 (decision)
✓ Your writing includes plenty of specific place detail.
✓ Task 3:
  ✓ You refer to sustainability in your answer
  ✓ You demonstrate an appreciation of the complex nature of this crisis and that there is no one perfect solution
  ✓ You back up your statements with data.
  ✓ You explain stakeholder views. May refer to conflicts.
  ✓ You include a conclusion.
✓ Task 2: You explain and evaluate the causes of the water crisis
✓ Task 1: Neat presentation with correct annotations and data manipulation. You include maps.

Level 2: (5 to 7 marks)
✓ Maximum L2 - Task 3 complete but tasks 1 and 2 incomplete or missing
✓ You refer to some place detail.
✓ Task 3 attempted but not fully complete
  ✓ Lacks discussion or sustainability, complexity, stakeholder perceptions, numerical data
  ✓ May name stakeholders but unlikely to refer to their perceptions.
  ✓ Likely to lack a conclusion although this will be brief and unsupported.
✓ Task 2: You explain the causes but don’t evaluate them.
✓ Task 1: Likely to include text only, lacks data manipulation. May include graphics but these are not referred to or lack annotation.

Level 1 (1 to 4 marks)
✓ Vague writing
✓ Task 3 missing or vague
✓ You don’t follow the task instructions
✓ Lacks place detail.