

Lesson

V I D E O

Teacher's Notes

WORLD

WATER

RESOURCES



Duration: 22 mins

BACKGROUND INFORMATION

WORLDWATER RESOURCES - FACTS

- Water covers 71% of the earth's surface. Of this amount:
 - 93% is in the oceans
 - 2.5% lies in underground aquifers
 - 2% is in ice caps
 - 2.5% is available freshwater that we can use.
- Global water consumption has risen 6 fold since 1900.
- Each Australian household uses around 700L of water a day.
- The UN predicts that 1/3 of the world's population currently lives in countries already experiencing moderate to high water stress. This is measured by each country's ratio of water consumption to water availability – its use-to-resource index which gauges overall pressure on water resources. Moderate to high stress translates to consumption levels that exceed 20% of available supply. UN predicts that this figure could rise to 2/3 in the next 30 years.
- Developing nations are particularly vulnerable to water scarcity as in addition to high water stress, they have little money to implement sustainable practices, technologies, or pay high water pricing schemes.

(Source: UNEP World Resources Institute – Sustainable Development Information Service)

TIMING INFORMATION

MIN	TOPIC
00:48	Title - World Water Resources
03:29	The Middle East - Water Wars
06:39	China - The Impact of Dams
12:18	Australia - Water & the Environment
22:07	End Titles

SUMMARY

This video provides an overview of the global geographic issue of access to fresh water.

It investigates:

- the social and ecological dimensions of the issue
- different approaches to management of fresh water (at various scales)
- conflict within and between communities
- implications for social justice and equity

The video includes an introductory section that provides facts about global water resources – availability, distribution and consumption. Then the video examines issues surrounding access to fresh water, through three sample studies in the Middle East, China, and Australia. The conclusion discusses challenges for the future.

THE MIDDLE EAST – WATER WARS

Throughout the Middle East, water demand is expected to exceed availability in the near future. This region is characterized by:

- Growing population
- Existing religious and political tension
- Geographical concentration of population through urbanization
- High predominance of agriculture as major water user (up to 90% in some countries)
- Rapidly developing industry and agriculture
- Heavy reliance on aquifers/groundwater

In **Qatar**, the absence of permanent surface water means agriculture is entirely dependent on irrigation from pumped groundwater. It is estimated that Qatar aquifers will be depleted in 20 to 30 years time. Pollution is also a problem - in **Syria** insufficient sewage disposal systems, and industrial waste dumping, have damaged all major river basins.

But chronic water shortages in the region have resulted in the development of technological solutions – such as Israel's pressure, or drip, irrigation. All of Israel's irrigated areas now use this method which has reduced water consumption per unit of land by 50-70%. Israel also has over 30 desalination facilities, mostly in the Eilat area, which use osmosis to treat brackish water. Half of Eilat's water needs are supplied by desalination.

(Source: UN FAO)

CHINA – THE THREE GORGES DAM

The Yangtze River is China's longest river, and the third greatest river in the world after the Nile and Amazon. It is one of the world's busiest shipping routes – it's deep waters allow ships to reach Wuhan, which is 1,100 km upriver from the coast. The Yangtze River and Three Gorges have great importance to Chinese culture, inspiring literature, art and folklore through the ages, and linked to many historical events, customs and myths. But during the monsoon rains in summer, tributaries swell and can create severe floods. Flooding along the Yangtze has claimed over 500,000 lives this century alone, and caused billion of dollars of damage.

Before 1949 there were virtually no large-scale water projects in China. But under a national campaign by the Communist Party, the last 40 years has seen dams constructed on all of China's major rivers. The Three Gorges Dam is the country's largest, and most expensive hydro-electric project.

Three Gorges Dam specifications:	
Height	185m
Length	640km
Construction period	20 years
Total storage capacity	39.3 x 109 cubic m
Power generation	17, 680 MW
Inundation – population	1, 131, 800 people
Inundation – cultural sites	828
Inundation – agricultural land	98, 753 ha

(Source: Dai Qing 1989, « The River Dragon Has Come »)

AUSTRALIA: WATER AND THE ENVIRONMENT

Much of Australia's agricultural land has been created from semi-arid land by the introduction of large irrigation schemes such as the MIA (Murrumbidgee Irrigation Area). Irrigation now produces over 1/4 of all food crops, but this has come at a great environmental cost - 20-24% of the MIA is affected by both water logging and salinity.

Salinity refers to the amount of dissolved salt minerals in the soil. It occurs when irrigation methods lead to the raising of underground water tables which carry dissolved salts in the soil to the surface. When the salt reaches the surface it renders the land useless. The salt not only kills crops, but except for native plants such as saltbush, it also kills the majority of native plants and trees.

In many countries around the world, management schemes are being developed to try and solve these problems of water logging and salinity. An example is a CSIRO water-re-use project in Griffith. Instead of being discharged on land or in rivers, water used in irrigation areas is diverted to the project, and put through a series of treatments to concentrate and collect the salt, which is then sold in commercial quantities.

This project raises a key issue of fresh water management, which is to look at waste water as a resource. This idea is also used in urban contexts to move beyond recycling, and reduce consumption. Housing re-designs, such as the Sustainable House in Sydney, can re-use and recycle all waste materials (roof water, sewerage, storm water), and result in saving 100,000L of water each year.

RESEARCH & ESSAY QUESTIONS

1. Agriculture currently accounts for around 70% of global water consumption. The UN predicts a 50-100% increase in irrigation by 2025. What are some implications of this?
2. “Water wars are inevitable in the Middle East”. Do you agree or disagree – why?
3. Imagine you are an Israeli living in the West Bank. Write a short piece about how you feel about your access to fresh water.
Imagine you are a Palestinian living in the West Bank. Write a short piece about how you feel about your access to fresh water.
4. With current technology, cities around the world could cut their water consumption by up to 33%. Discuss some of the ways this reduction could occur including changes in industry, people’s lifestyles, urban design.
5. “Legislation is more powerful than education in achieving water conservation.” Do you agree or disagree – why?
6. “In the near future, technological advances, and cost effectiveness, will make desalimization a real option. So water conservation isn’t such a drastic, pressing issue as some would have us believe”. Write a response to this statement.

CREDITS

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QUESTIONS FROM THE VIDEO

INTRODUCTION

1. Composition of the world's water resources (fill in the table)

Oceans %
Aquifers %
Ice caps %
Freshwater %

2. Why is global water use increasing?

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THE MIDDLE EAST – WATER WARS

3. What is an aquifer?

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4. What is the difference between Israeli's and Palestinians access to freshwater in the West Bank?

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5. What is the root cause of conflict over water in the Middle East?

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6. Why can it be difficult to make laws in regions like the Middle East regulating water use?

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CHINA – THE THREE GORGES DAM

7. What is a catchment?

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8. Fill in the details about the Yangtze River

Location of Yangtze River headwaters	
Length of Yangtze River	
Population living in Yangtze River catchment	
Proportion of China's food grown in catchment	

9. List the advantages and disadvantages of the 3 Gorges Dam
ADVANTAGES

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DISADVANTAGES

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10. What are some alternatives to building large dams? Could these have been used instead of the Three Gorges Dam – why, why not?

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AUSTRALIA

11. What is salinity?

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12. Explain how irrigation leads to salinity

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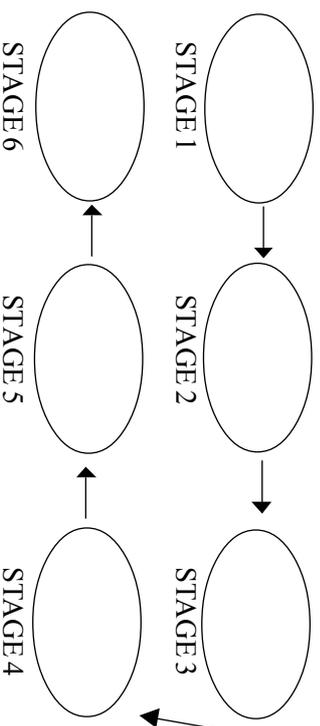
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13. Explain how re-using salty wastewater from irrigation areas can reduce salinity problems

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14. In the circles below, write what happens at each stage of the CSIRO water re-use project.



15. Draw a diagram to explain the water and waste cycles Michael has established in his house.