

Risks of developing pathways

There are many impacts of water transfer projects on both the source and the receiving area. These are:

Source:

- **Less water** - The reduced amount of water means that locals won't have as much to use therefore it may increase poverty
- **Ecosystem changes** – ecosystems may be degraded, destroyed, have lower functioning and productivity as a result of the decreased water
- **Pollution** - increased pollution as there is less dilution so the pollutants are more concentrated

Receiving Area:

- **More water** – solves existing demand and therefore leads to increased usage
- **Development demands** – the increased water means that development of cities may increase, along with tourism sites such as golf courses. It will also lead to better human health due to better sanitation
- **Agricultural demands** – the increased availability of water means that farmers may use it unsustainably e.g. flood irrigation
- **Pollution** – pollution from fertilisers cause eutrophication and salivation of water courses, which is then transferred in the water transfer project causing ecosystem degradation.

Water transfer projects can be on a range of scales, the case studies below cover a national example as well as a international example.

CASE STUDY: Snowy Mountains Scheme, Australia - NATIONAL

The Snowy Mountains hydro-electric scheme is the largest engineering project ever undertaken in Australia. The scheme consists of:

- 16 major dams
- 1 pumping station
- 7 power stations
- 225km of pipelines and tunnels



The scheme is mainly underground with only **2%** above ground, covering a mountainous area of **5,124km²** costing **AUS\$820 million**. It began in 1949 and as completed 25 years later in 1974. The purpose of the scheme is to collect melt water from the Snowy Mountains and divert it through tunnels in the mountains, through dams, generating electricity. The water then flows mainly into the Murray and Murrumbidgee Rivers, instead of the Snowy River like it did prior to the scheme.

Environmental Impacts:

- Dams built have caused the creation of a large storage lakes such as Lake Eucumbene. This has flooded large, valuable wildlife habitats. The decomposition of vegetation in these is releasing large amounts of CO₂ into the atmosphere.
- Diverting there river flow to New South Wales for irrigation means that the Snowy River flow is now at just 1% of what it was prior to the diversion.

Political Impacts:

- As a result of the scheme there was conflict within the government. This has meant that the Snowy Water Inquiry has created in 1998. This inquiry decided that in flow in the Snowy Mountain river has to be restored to 20% of its flow by 2010, and then eventually 28% (the level set by scientists to which it can sustain itself).



Positives:

- The scheme will displace 5 million tonnes of CO₂ as the it will generate around 74% renewable energy for the east and 28% nationwide
- The farmlands that can be irrigated by Snowy water produce million of dollars worth of crops each year
- The lakes and reservoirs created provide tourists attractions for hundreds of visitors each year.

CASE STUDY: Turkey to Israel - INTERNATIONAL

There have been many issues that have arisen due to the water transfer projects proposed between Turkey and Israel. Israel desperately needs an alternative water supply because the over-abstraction of aquifers next to the Sea of Galilee means that salt water incursion has occurred. The demand for water in Israel is ever-growing with it currently being 1.5 billion m³ per year.

Turkey has a surplus of water in the Manavgat River which could be easily sold to Israel. Water transfer projects have been discussed for years, the timeline below show this:

December 2001 - Israel and Turkey plan an undersea pipeline linked via northern Cyprus

May 2005 - Israel and Turkey discuss once again the possibility of an undersea pipeline

August 2002 - Israel begins talks with Turkey to import 50 million cubic meters of treated water each year using tankers

April 2006 - the water pipeline deal is scrapped amid fears of terrorism, as well as the fact that the cost of desalinations is falling

July 2004 - Syria objects to Turkey supply Israel with water because it already has reservoirs on the Tigris and Euphrates that are reducing water flow through Syria, therefore increased abstraction will reduce this further.

June 2007 - Turkey proposes a 'peace bridge' overland pipeline to link the Middle Eastern states

July 2008 - official figures suggest Turkey is experiencing increasing drought and its own water shortage. This could be due to global warming and poor management.

After the Gaza flotilla incident in 2010 in which Israel raided 6 aid ships in the Mediterranean Sea. As a result discussions between Turkey and Israel have halted as well as other proposals such as Bluestream 2 and Manavgat projects.

CASE STUDY: China's South-North Water Transfer

China's South-North water transfer project is one of the largest water transfer projects in the world. The project started planning in 1952, with work starting in 2002, expecting to be completed by 2050. The aim is to divert 45 billion meters cubed of water a year from the water surplus river basins in the south and east to the north where there is frequent deficit in places such as Beijing and Tianjin. The project will cost \$62 billion to complete and will involve the resettlement of people which was not popular.

There are 3 main routes in which this project is diverting water. These are:

1. **Western Routes** - work started on these in 2010, with the terrain being very difficult and the altitude being between 3000 and 5000m. The route here will pass an area of high industry. As a result it is feared that this will mean that water is polluted on transfer, as well as reduce the volumes in the Yangtze causing problems with sediment and the ecosystem
2. **Central Routes** - this is a 1267km diversion with some of the water from the Three Gorges Dam being used in order help.
3. **Eastern Route** - this route is 1,155km long diversion from the Yangtze river next to Shanghai to Beijing and Tianjin in the north.

In this project the main key player is the government sponsored 'South to North' Water Transfer Project Company, which works with each provinces water company. Other key players involved in the project as those undertaking the huge civil engineering needed building 3 major canals, pipelines, tunnels and pumping stations.

