

How have humans changed the Aral Sea?

Student task 1:

Use the statements below to create a concept map linking the causes and effects of water over-abstraction.

The Aral Sea has been shrinking in size	Only 160 of the regions 310 bird species remain in the area since the shrinking of the sea	The Aral Sea was a huge lake in Uzbekistan and Kazakhstan (the fourth largest lake in the world)
Salt and chemicals from the lake were blown by winds and damaged crops up to 500km away	The USSR wanted to grow cotton to export and make money but the land was too dry	Fishing towns are now miles from the Aral Sea and industries were closed and led to unemployment and economic problems
The fish stocks within the Aral Sea have declined because the sea is polluted; very few of the 24 species remain (and only 4 out of 38 species of river fish)	Irrigation canals allow 30-75% of water to go to waste due to poor construction and therefore leakage and evaporation	Drinking water and parts of the seabed are heavily polluted due to weapons testing, industrial projects and pesticide/fertilizer runoff
Water was diverted from the Syr Darya and the Amu Darya rivers in order to irrigate the cotton fields	Two thirds of the population suffer from typhoid, cancers and hepatitis	Cotton production increased steadily through the 1960s to the 1980s
High evaporation meant that a lot of water was lost from the lake	The area of the Aral Sea has a tropical continental climate. Summers are hot and winters are cold and rainfall is low	The extraction of water from the rivers meant that there was less water reaching the Aral Sea
The climate has changed making the area even more arid and prone to greater temperatures	83% of children in the area have serious illnesses	Since the shrinking of the sea, only 32 of the 70 mammal species remain in the area
Health problems are caused by the wind-blown salt and dust from the dried out seabed	The high levels of evaporation have caused a salt crust around the lake edge and for the water to become more saline	The Aral Sea was heavily polluted with the fertilizers and pesticides which were used to improve the cotton crops
Over 7.2 million hectares of land were irrigated by 1989	Drinking water and crops have been made salty and polluted due to the rising water table	The former Soviet Union (USSR) focused on the growing of cotton in the central Asian regions that are now Uzbekistan and Kazakhstan
10 million people have been forced to migrate from the area as they can no longer feed themselves as the land is so infertile	Fishing employed 60000 people in villages located around the Aral Sea, but this industry has now collapsed	Infant mortality rates are the highest in the world with 10% of infants dying in their first year (mainly due to kidney and heart failure)



Students task 2:

Using the information sheet showing different opinions of the irrigation schemes, complete the following table.

Group name	In favour/against scheme?	Justification of opinion
Cotton farmer in Turkmenistan		
Ex-fisherman in Aralsk (formally on the Aral Sea)		
Farmers in Uzbekistan near the Aral Sea		
Children in Aralsk		
Hydrologist		
Politicians in Kazakhstan		
Dam operator on the Syr Darya		
Climatologist		
Local villagers in the Turkmenistan desert		

Students task 3: conflict matrix

Complete the conflict matrix to show which groups are: in conflict with each other/ in agreement with each other / have no impact on each other.

Conflict matrix	Cotton farmer	Ex-fisherman	Farmers in Uzbekistan	Children in Aralsk	Hydrologist	Politicians in Kazakhstan	Dam operator on Syr Darya	Climatologist	Local villages in Turkmenistan desert
Cotton farmer									
Ex-fisherman									
Farmers in Uzbekistan									
Children in Aralsk									
Hydrologist									
Politicians in Kazakhstan									
Dam operator on Syr Darya									
Climatologist									
Local villages in Turkmenistan desert									

Students information sheet: conflicts caused by the irrigation schemes

The Aral Sea is a landform (lake or inland sea) formed by rivers. The location of the sea, in a desert type climate, leads to high evaporation rates and therefore a high salt content. If evaporation is greater than river input the sea would shrink in size. Many people within the region however have opinions about the use of water from the Amu Darya and the Syr Darya rivers. This will lead to a conflict of interest; some people will be in favour of the irrigation scheme, others against.

Cotton farmer in Turkmenistan - “We need the water from the river to help irrigate our crops. Cotton is a thirsty crop and in the heat of the summer, the water from the canals is the only way for us to keep our livelihood”.

Ex-fisherman in Aralsk (formally on the Aral Sea) - “There is little fishing to be done here now; the rivers delta has nothing more than a trickle of water. The streets are scruffy and abandoned; dozens of fishing boats lie rusting. The lack of money has led to many of the shops closing down; we now struggle to obtain the most basic goods”.

Farmers in Uzbekistan near the Aral Sea - “The situation on the cotton lands here is pretty good, the ground is often covered with a salt layer in autumn as the water evaporates. This salt layer brings essential nutrients to the soil and allows us to increase our crop yields”.

Children on Aralsk - Giant dust storms bring in poisonous salt and chemicals (pesticides and fertilisers) from the desert. Many children suffer from cancers, typhoid and liver/kidney problems. There are on average 100 infant deaths per 1000 children.

Hydrologist - “The drop in level of the Aral Sea has led to lower ground water levels in the river deltas. This means there is less drinking water for the people of Aralsk and other towns like Muynak located on the river deltas”

Politicians in Kazakhstan - “We will continue to take water from the Syr Darya river, the water is used for drinking, farming and industry within our desert region. Without the water our economy, that relies on cotton and other industries, will not survive”

Dam operator on the Syr Darya - “The dams were built to hold back the water and to irrigate the crops. We also produce hydro-electric power that supplies the industries and towns located in the desert”

Climatologist - “The effects of the seas disappearance is felt through the whole of the region. The area is heating up; the seawater brought a cooler atmospheric condition to the central Asian region. More and more land will turn into dusty desert.”

Local villagers in the Turkmenistan desert - “The canal that diverts water from the Amu Darya provides water to our desert lands. We now have cattle, forest plantations and agricultural land. Without the canal our settlements will not survive”