

WATER RESOURCES

Surpluses and Shortages

FOCUSSING ON THE ISSUE

The availability of freshwater is a critical issue for many countries. Why do some countries face water shortages? What are some possible solutions?

Patterns and Usage

Water is the most important commodity on earth. All forms of life need it to survive. There are over 1.4 billion cubic kilometres of water around the globe. But 97 per cent of this is the saltwater of the vast oceans. Only 3 per cent is **freshwater**, and most of it is in the form of groundwater or ice.

The freshwater that is available for human consumption is unevenly distributed around the world. Some countries, like Canada, are water rich; others, like Egypt, are water poor. While Canada has no major water shortages, some parts of the country experience water scarcity, particularly the Prairies. Scientists fear that the

water supply there could be further threatened in the twenty-first century by **global warming**. The retreat of large icefields in the Rockies—upon which many major rivers depend for their water supply—could affect the continued water flow. A water shortage would not only affect people but natural ecosystems as well.

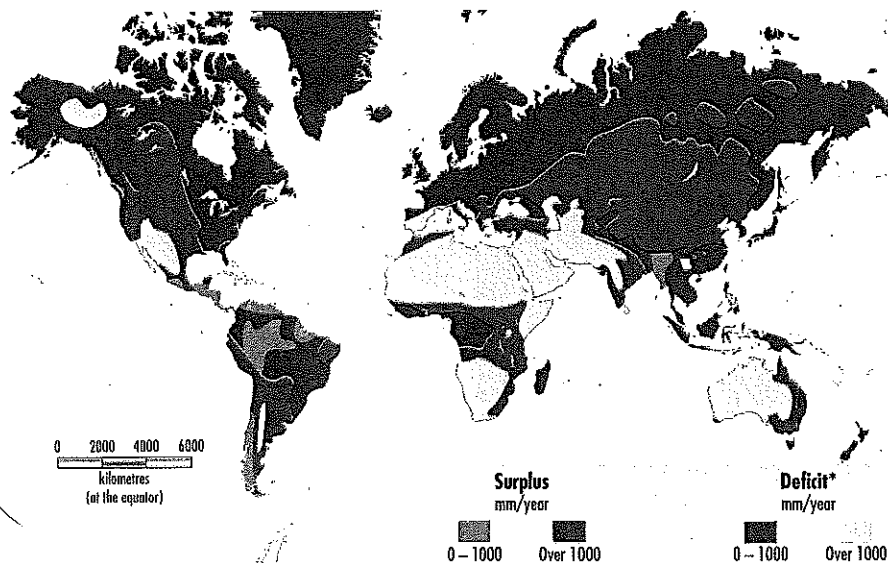
Irrigation accounts for more than 80 per cent of water consumption around the world. But the pattern of water use varies from country to country. Egypt, for example, devotes 98 per cent of its water to irrigation; Canada uses only 10 per cent for this purpose. Much of the water channelled into irrigation comes from rivers, which means the water supply is

greatly reduced for the users downstream.

The other freshwater crisis is in groundwater. One in four Canadians depends on groundwater for domestic water supplies. In many regions, these groundwater supplies are declining as a result of over-pumping. In densely populated southern Ontario, for example, many municipalities draw their water supply from underground **aquifers**. As the population continues to grow, however, so does the demand for water. But the water in these aquifers was deposited at the end of the last ice age about 10 000 years ago. It is a finite supply. When it runs out, expensive **aqueducts** may have to be built to transport water from northern lakes to southern markets. Contamination from agricultural and industrial chemicals and overflow from poorly maintained septic tanks also threaten groundwater supplies. This contamination is worsened by the fact that groundwater—unlike rivers, which flow quickly—moves slowly. Contamination can remain in groundwater for hundreds of years.

Shortages

On a global scale, water shortages threaten the economic development of many countries. Shortages could limit food production and industrial development. They could even lead to disputes or armed conflicts among some nations. While there



World Water Surplus and Deficit

* Amount by which evapotranspiration exceeds annual precipitation from M. Falkenmark, "Do We Need Hydrological Research?" in *Swedish, Forskning och Framsteg*, No. 5, 1974.

CANADIAN WATER EXPORTS

Climate change will affect the water supplies of the United States. Many studies predict that water levels in the Great Lakes could drop as the climate warms. This is because evaporation would increase because of the higher temperatures. Droughts would become more common in the Corn Belt—that area stretching from Ontario, Michigan, Ohio, Indiana, and Illinois west to Iowa and Minnesota. Climates would also become drier in the wheat-growing areas of the Great Plains that stretch from Saskatchewan to Kansas. Rivers in the southwestern United States, from Colorado and New Mexico west to California, would have lower runoff flows. This would result in more problems in a region that already suffers from serious water shortages. Lower river flows would mean less irrigation water for farmers in Arizona and California—water that is used to grow a wide variety of fruits and vegetables that are imported to Canada in the winter.

These changes would increase the pressure for Canada to export some of its surplus water to the

United States. Many Canadians are opposed to such exports, however. They feel that Canada should be cautious about preserving such a precious resource. Once we begin to sell water, it would be difficult to reverse the decision, even if we experienced our own water shortages. Others see an opportunity to turn our excess water into a valuable export. Canada could earn money for surplus water that is currently unused. Furthermore, the United States would pay for the building of canals and pipelines to move the water south. Some of these facilities could bring water to the Prairies and southern Ontario. This would offset the possible effects of the drier climate created by global warming.

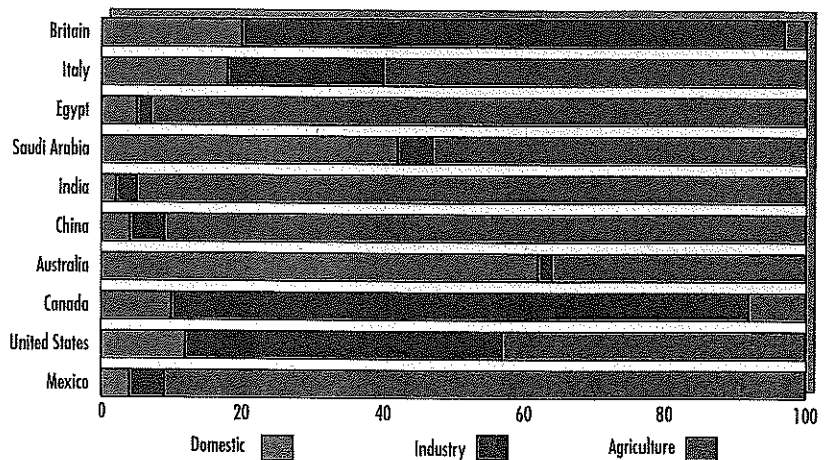
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1. List the arguments for and against exporting Canadian water to the United States. Do you think we should export our water resources? Give reasons for your answer.

are more than 300 shared river basins around the world, only 30 of these have shared-water agreements. Experts believe that a crisis could be averted through more efficient water distribution systems and reduced waste through conservation. International disputes could be avoided if countries that share mutual water resources negotiate agreements on their fair use.

To have a reasonable quality of life we need about 80 L of water per person each day. Canadians' average daily use is 360 L, making us second only to the United States in water consumption per capita.

Use of Water (by sector, selected countries)



MAKING CONNECTIONS

1. a) List all the ways in which you and your family use water every day. Is any of this water use wasteful? Explain.
 b) List the ways in which Canadian society as a whole uses water, then prioritize the list. Do you think Canadians should try to reduce their level of water consumption? If so, in what ways? If not, explain why.

KEYWORDS

freshwater
 global warming
 aquifer
 aqueduct