couraged by its commercial implications, for it has reached the threshold of economic feasibility. It is a timely development, and the United nations has declared the 1980s as the International Water Supply and Sanitation Decade, intended to transform radically the lives of many millions of people. Universal access to clean water and sanitation would reduce substantially the burden of disease in the developing regions where about eighty percent of all illness is blamed on the inadequate water supply. It would stimulate food production and other industrial development and end the drudgery in the lives of women and children who walk several miles daily to fetch water, often unsafe, for their families' needs.

Saudi Arabia already relies considerably on desalinated water. At present, there are twenty operational desalination plants, according to the Arab League Educational, Cultural and Scientific Organization, and by the turn of the century their number will be increased by fifty. Some plants are to be built aboard ships which could serve several areas a year as the need arises, leaving behind vast quantities of fresh water stored for consumption while the mobile plants are deployed elsewhere.

Significantly, the process is not limited to sea water. It can be used for the purification of water of salts as well as various other materials dissolved in it. One obvious early application, therefore, is re-purification of water resources in industrially developed regions such as North America where the local ground water supplies have become polluted or inadequate. The traditional approach to desalination is simple distillation involving the boiling and subsequent condensation of water without salt and other unwanted materials. This process requires an economically unacceptable consumption of energy. It is still used on a big scale, but only by the richest of the rich. There appears little prospect of finding a way to reduce the requisite energy input.

Reverse-osmosis

Compare this with the reverse-osmosis process, borrowed from nature and developed by water engineers over the past decade and a half. At present, still at an early stage of development, reverse-osmosis requires about half the investment in energy needed in distillation to produce the same quantity of pure water. And new developments in membrane materials and engineering techniques — which may well emerge from the Toronto-Riyadh project and elsewhere — are expected shortly to reduce the present energy input by half again. Water purification installations based on the new process can be built in something like half the space and two-thirds of the time it takes to erect comparable distillation plants. Reverse-osmosis is a process used by fish. It reverses the usual tendency of liquids filtering through a membrane — as in the case of plants taking up nutrients from the soil — to flow from a dilute solution on the one side to a concentrated one on the other. Modern water treatment plants deploy man-made materials for filters including millions of hair-thin tubes. The sea water molecules are forced through these at pressures of hundreds of kilograms per square centimeter. The dissolved solids in the water, including the salts, are simply left behind.

Such plants are being installed for many purposes, such as one in Algeria to serve a paper mill, one in the Caspian Sea in the Soviet Union as part of an energy complex and a third in Venezuela, also in connection with energy development. Several in North America are to serve the needs of agriculture and environment modification.

In Saudi Arabia, fresh research is to be carried out mainly at King Saud University's college of engineering which is already a leading regional centre for hydraulic and solar energy development studies. The university was founded in 1957. It has developed considerable modern research resources since the early 1970s when the recurring waves of the global oil "crisis" made the kingdom rich. Its collaboration program with the University of Toronto, which is to be reviewed every six months, is financed by Saudi Arabia. Several other Canadian universities — including McGill and Concordia in Montreal and Guelph in Ontario — have been approached by the Saudi Government seeking to develop further exchange programs in such spheres as agriculture, architecture, medicine, urban planning, communications, education, construction and linguistics.

These exchanges reflect an urgent pace of development throughout the region. During a recent UN debate, an Arabian Gulf spokesman declared: "The world today possesses the scientific and technological capacity to ensure drinking water and sanitation for every society in the world — hence the close link between drinking water supply and sanitaiton on the one hand and international cooperation on the other."

Given the rapid development of desalination technology and the will of the rich world to satisfy the urgent global need for ample fresh water supplies in the service of agriculture, industry and public health care, the reverse-osmosis process may perhaps become universally available during this decade. □