EXPORTING WATER TO THE WORLD

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Water is rapidly moving from a political commodity to a market commodity as water shortages call for innovative solutions. Markets are redistributing water between traditional needs such as agriculture and urban (Anderson 1998) uses as well as reallocating the precious resource to environmental uses such as fish and wildlife habitat (Landry 1999). Though most of this reallocation is still taking place within political jurisdictions, there is increasing pressure to allow for markets across borders, making water a new export commodity. Economic growth, rising incomes, and growing populations are all contributing to the pressure to switch from political to market allocation, as growing demands outstrip government supplies.

Water marketing often starts when governments try to establish prices that more accurately reflect scarcity. According to the Organization for Economic Cooperation and Development (OECD), most countries have made substantial progress "toward the goal of more efficient and effective pricing" of water (OECD 1999, 2). These pricing reforms are encouraging private entrepreneurs to consider how they can get into the game. As a result, the global market for water already generates more than $300 billion in annual revenue. Potential growth in the industry is even more staggering. The World Bank estimates $600 billion will be invested to meet the demand for water in sanitation, irrigation, and power over the next ten years.

Like so many other commodities, water is going global. A number of recent news articles have described water as "blue gold" *(The Economist* 1999, 12) and the "the oil of the 21st Century" (Lawrence 1996, 1). Entrepreneurs are responding to supply and demand imbalance by seeking ways to transport water from countries and regions with plentiful amounts to areas in short supply. John Hayward, a water expert for the World Bank, commented that "water will be moved around the world as oil is now" (quoted in Lawrence 1996, 1). In fact, on a small scale, water is already being exported like oil in South Asia, the Middle East, and the Mediterranean. In addition, policy changes are opening up interstate water trading in Australia and the United States. But free trade critics contend that international water markets will drain countries of their most precious resource. This article examines the development of water exports throughout the world and explores policies for international and interstate water markets that confer benefits on regions exporting water.

SHORTAGES AREN'T NECESSARILY MOTHER NATURE'S FAULT

Despite the uneven and irregular supplies, water shortages are not all due to nature. Many commodities are erratically supplied but shortages need not persist. Shortages are alleviated through the market process, allowing demand and supply to equalize. For example, oranges are sold in Toronto, Canada, even though they are not grown there, and people in oil-poor Switzerland have gasoline from the oil-rich Middle East. The energy crisis of the 1970s was solved as higher prices induced demanders to conserve and suppliers to search for alternative sources of oil and other forms of energy.

Water pricing and water markets solve shortages in supply, but not while politics dominate water allocation. Water supply traditionally has come from governmental agencies which have set prices below those necessary to balance supply and demand. Low prices provide little incentive for consumers to conserve, and low revenues provide little incentive for producers to increase supply. It is not surprising that classic shortages arise.

As shortages force government agencies to reconsider their pricing policies, there is evidence that insatiable demands can be curtailed. When cities raise the price of

water by 10 percent, water demand goes down by as much as 12 percent (OECD 1999; Gibbons 1986). Simply charging for water can have an even greater effect. In some parts of the world, demand fell by as much as 61 percent during peak periods and 35 percent annually when consumers' water usage was metered (OECD 1999). Water will flow between water rich and water poor regions if real markets, not just politically controlled prices, can be brought to bear.

TRADING WATER TO QUENCH THE WORLD'S THIRST

International free trade agreements such as the North American Free Trade Agreement (NAFTA) and World Trade Organization (WTO) have the potential to create international water markets. Some foreign trade representatives see water markets as an opportunity to help alleviate water shortages in their home countries. But other countries with vast water supplies argue that it will be impossible to turn off the tap to lucrative water markets once trading begins. They worry that their countries will be drained dry under free trade. Canada, for example, has ardently opposed the idea of international water markets. With the world's largest supply of freshwater, Canada has sought to preclude water from international trade agreements, even when individuals have had clearly specified water rights and could find willing buyer-willing seller exchanges (Anderson and Grewell 2000, 6).

During the 1999 WTO conference, a congressional delegation from the Great Lakes region and trade representatives from Canada tried to ensure that water exports are prohibited. The Clinton administration resisted the move, contending that treaties currently in place are sufficient. Deputy U.S. Trade Representative Richard Fisher added that bringing the issue before the conference "would risk creating an international issue where none currently exists" (Terrana 1999).

Free trade critics have advanced a number of arguments to support the position that NAFTA and the WTO adversely affect member countries' ability to control water exports, while free trade proponents contend that NAFTA strengthens the hand of government in controlling exports (Johnson 1994, 56). These agreements place limitations on the ability of member countries to impose export restrictions and taxes that could effectively place an embargo on water exports. The trade agreements, however, allow countries to control the allocation of water in its natural state while allowing opportunities for water exports (Johnson 1994, 57).

The General Agreement on Tarriffs and Trade (GATT), NAFTA, and similar agreements impose obligations respecting trade in products. The ordinary meaning of product is "something that is produced." In order for water to be considered a product under trade agreements such as NAFTA, it must be gathered, stored, treated, bottled, or otherwise packaged (Johnson 1994 57). Water in a pipeline or tanker would also be considered a tradable product under these agreements and is subject to international trade obligations. Water in its natural state is not a product and is not affected by these agreements (International Joint Commission 2000; Johnson 1994, 57; Little 1996, 142).

Several reviewers have suggested ways that countries such as Canada could control exports without violating international obligations (Johnson 1994, 63; Little 1996, 150). First, any restrictions must affect exporters from all member countries equally so that the national treatment requirements are not violated. Second, the restrictions must regulate water in the natural state and should place allocation requirements on its general use. Restrictions should not specifically prohibit companies from acquiring licenses for water exports. In order to comply with existing trade agreements, any restrictions would have to have an environmental objective and attempt to regulate the general use and conservation of water (Johnson 1994, 58).

EXPORTS AND LARGE SCALE WATER PROJECTS

Water export markets can come in many sizes, from large-scale megaprojects to smaller, more economically feasible proposals. Much of the resistance to international water markets has little to do with real markets and a lot to do with government intervention. When water transfers are proposed, they are usually for massive projects that require extensive government subsidies (Anderson 1994, 4). The tremendous cost of these projects prevents them from being built.

In North America alone there have been a number of grandiose water export schemes proposed since the 1950s. One of the most notorious is the North American Water and Power Alliance (NAWPA), which proposed to divert 308 billion cubic meters (250 million acre-feet) per year of Canadian and Alaskan waters through Canada to the United States and Mexico. This diversion scheme was developed in 1964 by the Los Angeles-based Ralph M. Parsons Company. The construction cost of NAWPA at that time was estimated to be between $80 billion and $100 billion ($414 billion and $517 billion in 1998 dollars), but the project has never got off the ground

because of its cost. Similarly, the Great Recycling and Northern Development (GRAND) canal project, first conceived in 1959, would have diverted water from James Bay in Northern Canada to the Great Lakes where the water would be stored until transferred to a final destination in the United States. The estimated cost of the project in 1984 was $100 billion.

These and several other megawater projects met stiff public resistance and would not have been launched without substantial governmental subsidies. Even the NAWPA, which claimed to be entirely backed by the private sector, asked the Canadian, United States, and Mexican governments to fund a $50 million environmental analysis. These projects have invoked suspicion and misunderstanding of what water transactions would look like under a free trade regime.

A fundamental problem with most proposed international water transfers is that the people who would benefit would not have to pay the enormous costs of the projects. On the demand side, the "buying" country has an insatiable thirst because the real cost of water consumption is hidden in subsidies, taxes, and other fiscal illusions (Anderson 1994, 4). On the supply side, the citizens of the "selling" country gain little or nothing if exports are allowed. This makes it nearly costless for them to ban exports. Consequently, water management agencies and water users are not faced with the full price of using the resource. Users do not pay the costs of storing and delivering the water, nor do they face the opportunity costs of banning water exports.

In order for the resistance to international and interstate trading to lessen increasing water scarcity will have to drive up potential gains from trade. This will require policies that allow individuals, not federal, provincial, or state governments, to realize these gains as well as face the opportunity cost of not selling water. Markets that rely on clearly defined and tradable water rights are overcoming many of these challenges. In several communities where rights are well defined and local citizens benefit from the transfers, water export is supported.

NORTH AMERICAN WATER TRADING

In the early 1990s, international water trades among Canada, the United States and the rest of the world seemed imminent. In British Columbia, six Canadian companies held licenses to export nearly 55.5 million cubic meters (45,000 acre-feet) of water annually. The companies planned to ship water with ocean tankers to regions in need of water.

Shortly after issuing the permits, however, the provincial government shifted its policy on bulk water exports. Due to mounting public opposition to bulk exports, the provincial government revoked the licenses and banned bulk water exports. The opposition centered around environmental concerns and the way the permits were granted. Critics contended that the exporters were not facing the real cost of water because licenses were given out for minimal administrative fees.

An American firm, Sun Belt Water Inc., filed a lawsuit against the provincial government of British Columbia under NAFTA because of the export ban. In 1991, Sun Belt and its Canadian-based partner company, Snowcap Waters, won a contract to supply the city of Goleta, California, with water from British Columbia. The two companies planned to use ocean tankers to transport the water. However, Sun Belt and Snowcap were forced to default on the contract when the provincial government placed a moratorium on bulk water exports. Both companies promptly sued British Columbia's government. The province settled with Snowcap, but refused Sun Belt's claim of $300 million in damages. As a result, Sun Belt filed a claim in Canadian federal court under NAFTA. The international trade agreement entitles companies operating across international boundaries and trading recognized commodities to similar legal rights as their like domestic counterparts. Sun Belt asserts that British Columbia's government did not provide equal treatment to both foreign and national investors when it settled with Canadian-owned Snowcap but not with U.S.-owned Sun Belt. This is the first water case tried under NAFTA and the outcome of the case is eagerly awaited by proponents and opponents on both sides of the border.

The case gained renewed interest in 1999 when a Canadian company, Nova Group Ltd., obtained a permit from the Ontario government to export water from the Great Lakes. The permit allowed the company to export 600 million liters of water annually from Lake Superior to Asia by 2002. However, a political firestorm in both Canada and the United States forced the Ontario government to cancel the company's permit and ban bulk water exports. Democratic and Republican congressional members from the Great Lake states responded with legislation in both the House and Senate to place a moratorium on Great Lake water exports. The bills were an overreaction to speculative environmental concerns that exports would lower lake levels. Similarly, Canada has proposed amendments to the International Boundary Waters Treaty with the United States to give the federal governments on both sides of the border regulatory power to prohibit bulk water removals from boundary waters, principally the Great Lakes.

As a result of Nova Group's proposal, the International Joint Commission (IJC) took up the issue of water exports. The IJC is a United States-Canada commission formed under the 1909 Boundary Waters Treaty to make policy recommendations and settle water disputes between the two countries. In March 2000, the IJC issued a final policy report recommending that Canadian and United States federal, provincial, and state governments not permit the removal of water from the Great Lakes. The only exception is if the permit applicant can show that the removal will not have any adverse environmental effects. In addition, the applicant would have "to demonstrate that there are no practical alternatives to the removal, sound planning has been applied in the proposal, the cumulative impacts of the removal has been considered, and that conservation practices are in place in the region importing the water among other considerations" (International Joint Commission 2000, 45). While the IJC has no binding legal powers of enforcement in either country, the United States and Canada will most likely act on the IJC's recommendation because its recommendations have never been deliberately disregarded (Huffman 1994, 14).

The IJC may be responding more to public sentiment than to any real environmental threat that water exports pose to the Great Lakes. The commission conducted an extensive analysis of the demand for bulk water exports from the Great Lakes and found that it is limited due to transportation costs. The report states that "although it seems clear that climate change and continued reports of worldwide water shortages will continue to keep discussion of bulk water shipments alive, the cost of such shipments makes it unlikely that there will be serious efforts to take Great Lakes water to foreign markets, and cost will continue to serve as an impediment to bulk shipments from coastal waters" (International Joint Commission 2000). The commission also pointed out that federally operated diversions from the Great Lakes far exceed the amounts proposed for bulk water exports. For example, the federally controlled Chicago Diversion redirects about 97 cubic meters per second of water from Lake Michigan into the Mississippi River Basin (International Joint Commission 2000), an amount 4,550 times greater than Nova Group planned to export.

The bottled water industry is the major demander of bulk water. But even here, the IJC found that the Great Lakes region is a net importer of water. When intrabasin trade in bottled water is subtracted from the total trade, the region imports about 141 million liters and exports roughly 10 million liters.

The IJC concluded that difficulty and the high-cost of moving water in bulk will encourage people to seek cheaper local sources. This is certainly true when the cost of exporting water is compared to local water prices for agricultural water, typically the cheapest source. For example, prices for water transported short distances range between US$0.75 and US$1.50 per cubic meter. Those costs go up considerably for longer distances. A recent review of water prices around the globe showed that the average price for water from agriculture was US$0.05 per cubic meter (OECD 1999; World Bank 1998). As a result, no one is moving water great distances. That may change as water becomes more scarce and prices rise or shipping costs fall significantly, but for now, most countries have significant amounts of cheap water available locally.

The Canadian government has taken a strong position against water exports. In early 1999, the Canadian Parliament passed a resolution to develop, in cooperation with the provinces and territories, a nationwide accord banning bulk water removals. Much like the United States, the provinces have jurisdiction over water allocation so the accord required the approval of the provinces. However, the provinces are reluctant to relinquish control over water to federal government. All four western provinces and Quebec have refused to sign the federal agreement. Despite their unwillingness to sign, British Columbia, Alberta, and Quebec already have bans in place and several other provinces are considering similar restrictions.

With Canada clogging the flow on water exports, companies are shifting their focus to Alaska. One such company is the Vancouver, British Columbia-based Global Water Corporation. The company holds a contract with the city of Sitka, Alaska, to export up to 18,500 cubic meters (15 acre-feet) annually for the next thirty years from nearby Blue Lake (Swagel 1998, 79). Global Water has been paying the city of Sitka $25,000 a year for the past five years for the option to export water. That amount increases to $75,000 during the sixth year of the option contract. In addition, the city will receive royalties based on a sliding scale ranging from .002 to 3 cents per gallon if and when water is exported.

While there are concerns within the community about selling water, the deal has broad support from most residents. In 1999, a referendum approving the lease agreement for the company's docks passed by a 3 to 1 margin. One reason for the support is that the costs and benefits for exporting water are internalized. In contrast, water exports in Canada have been vehemently opposed because provincial governments were giving away water to companies with no direct returns to local citizens. The acrimony surrounding most exports has been averted in Sitka because the community holds the rights to the water

in Blue Lake. Because Global Water Company must compensate the city for any water it takes, it becomes costly for the local community to say no. The potential payoff for Sitka could be enormous, reaching as much as several million dollars a year. For local citizens this translates into lower property taxes, better roads, and improved municipal recreational opportunities.

Global Water Corporation expects to begin exporting water by the close of 2000. It has contracts with a Chinese supplier and others throughout Southeast Asia. Despite a downturn in the Asian economy and slow negotiations with Chinese trade officials, Global Water is proceeding with the construction of a $3.5 million dock designed specifically for loading water onto tankers.

WATER EXPORTS FROM NEW ZEALAND

Several New Zealand entrepreneurs also see potential in water exports. Okuru Enterprises Limited and Southland Water Company are two New Zealand companies that claim they are close to shipping water throughout Southeast Asia and other parts of the world. Okuru Enterprises has been working toward this goal for over nine years. The company spent the first four years obtaining the New Zealand government's approval to export water and the last five years seeking buyers.

For Southland Water Company's founder, John Fletcher, the idea of water exports goes back even further. In 1971, Fletcher's first export company, Resources Development Ltd., had a twenty-year right to export New Zealand water. The company was nearly successful in completing the country's first commercial water export, but as it was loading tankers with water for a customer in Bahrain, a labor dispute broke out delaying the shipment. The customer cancelled the order, leaving the company with financial losses from which it never recovered. Fletcher revived his ambition in 1993 with Aquamarine Limited, but was forced to liquidate the company five years later when it was unable to obtain federal approval to export water. Southland Water is the entrepreneur's newest effort to realize his longtime dream, but the company is having difficulty convincing local officials to approve its permit to export water.

WATER EXPORT TECHNOLOGY

Though a number of attempts have been made and even a few contracts signed, no company is commercially exporting water by way of large tankers. However, barges and small tankers are being used to export small amounts of water short distances. Barges routinely supply water to islands in the Bahamas, and small tankers occasionally deliver water to Japan, Taiwan, and Korea (Gleick 1998, 200). These small vessels are also useful in emergency situations. In fact, during the Gulf War, American troops were supplied with water shipped in from Turkey.

Water bags technology is another approach that offers a great deal of promise. With increasing frequency, water is exported by filling large fabric or plastic sealed bags that are towed across oceans. These bags range in size from 750 cubic meters (198,129 gallons) to 17,000 cubic meters (4.5 million gallons), but the larger bags are not in commercial use, and until recently, were not able to sustain the rigor of ocean transport (Gleick 1998, 200).

A handful of companies are using the bag technology to deliver water for $1 to $2 per cubic meter, which is typically cheaper than the cost of desalinated water. Aquarius Water Transportation of the United Kingdom and Greece was the first company to commercially deliver water with bags (Gleick 1998, 200). In 1997, it began hauling 290,000 cubic meters (76.6 million gallons) of water from Greece to the tiny island of Aegina, a distance of 13 miles. The water supplements the island's main supply which comes by tanker. Aquarius may be called upon for more deliveries on Aegina and throughout the Greek Isles because the company's bagged water is cheaper than tankered water.

In 1997, Nordic Water Supply Company based in Oslo, Norway, completed the first international export of water with bags when it signed a supply contract with Turkey to deliver water to northern Cyprus. The contract called for more than seven million cubic meters to be delivered within two years at an annual cost of $4.1 million (Gleick 1998, 203). The deal drew immediate protest from the Cyprus government, which does not recognize Turkey's claim on the northern part of the island. However, Nordic carried out the contract contending that there are no United Nations mandatory sanctions against the Turkish regime in northern Cyprus.

Clearly, exporting water by bags and tankers will not alleviate growing global thirst. This approach is expensive and the amount of water that can be transported is small relative to demand. Yet, bag and tanker exports are a way to provide immediate relief to drought stricken areas and to places looking for water to supplement existing sources. The recent developments of bag and tanker exports also demonstrate the type of entrepreneurial solutions that develop when market forces come into play.

INTERSTATE WATER MARKETS

Interstate (within nation) water markets offer a blueprint for how global water markets might work. With the

increasing demands and growing value of water, proposals to develop water markets that cross political boundaries have increased. A few interstate markets are emerging in Australia and the United States.

Australia has the longest and most extensive experience with interstate trading. In the 1970s, states within Australia's Murray-Darling Basin first introduced water rights. The basin covers over a million square kilometers and drains parts of four states – New South Wales, Victoria, South Australia, and Queensland. South Australia was the first state to introduce water trading (Bjornlund and McKay 1998). By the early 1980s, intrastate trading was occurring throughout the basin states. Growing water scarcity problems, however, created pressure to expand the market and allow interstate trades. The first interstate transfer took place in 1992, a five-year lease of nearly 9.9 million cubic meters (8,000 acre-feet) from a river in New South Wales to a cotton farm in South Australia (Sturgess 1996, 135).

Interstate trading in Australia has grown considerably since this first deal. In 1998, a pilot project was introduced to allow permanent interstate water right trades within the basin. The project is overseen by the Murray-Darling Basin Commission, which coordinates administrative and legal procedures among the participating states of South Australia, New South Wales, and Victoria. This arrangement avoids the complications that can arise from trading water rights with different legal entitlements and restrictions. The commission has established water rights for the basin rather than for arbitrarily defined geopolitical boundaries. As a result, water rights are more easily traded across state boundaries. Not surprisingly, land with water rights increased significantly (Anderson 1998, 429).

Since the program's inception, more than 3,431 megalitres (906 million gallons) of water have been traded across state borders (Murray-Darling Basin Commission 1999, 27). The Murray-Darling Basin Commission (1999, 28) reports that most permanent interstate trades transfer water from low-value uses to higher-value irrigation developments such as horticulture and viticulture enterprises. The pilot project has been so successful in such a short period that the commission is considering ways to expand interstate trading into the rest of the region. Currently, trading is limited to the Mallee region of the basin, which spans the three states involved in the project.

The evolution of interstate trading in the Murray-Darling Basin is the type of water marketing federation that Huffman (1994) recommends to deal with water issues between the United States and Canada and the United States and Mexico. The federation would provide a single political authority over the definition, transfer, and enforcement of water rights and the regulation of water use in a particular basin. Such an organization could take many forms, but at a minimum it would unify water rights, making them transferable and enforceable on both sides of the border. The federation would have the authority to enforce legitimate rights claims and would decide whether proposed rights transfers or water sales infringe on existing vested rights.

A similar interstate trading arrangement is taking shape in the United State's lower Colorado River Basin where a recent agreement allows Arizona to bank water for California and Nevada. Initiated by the U.S. Department of Interior to serve interstate water needs, the new interstate water banking program is an expansion of Arizona's water banking program. The bank was first started in 1996 to allow Arizona more use of its shares of the Colorado River. At that time, the state legislature limited the bank to intrastate trades.

Under the new agreement, California and Nevada will be allowed to store river water in Arizona's underground aquifers, banking it for the future. When either state needs water, it takes its share of the river plus some of Arizona's unused allotment. In return, Arizona pumps water from the aquifer, with California and Nevada paying the pumping and storage cost plus a fixed rate for the water.

Nevada is expected to be the new bank's biggest customer because the state has experienced record growth in Las Vegas and holds a small share in the Colorado River. California, on the other hand, is showing little interest in the bank. For years, the state has benefited from unused river allocations by upstream states. As of now, any unused water allocated to Arizona and Nevada runs downstream to California, which consumes it at a rate of nearly 1,233 million cubic meters per year. With the bank in place, Arizona and Nevada can either store the water or charge California for its use. The upper basin states of Colorado, Utah, New Mexico, and Wyoming, which are not currently utilizing their full river allotment provided under the Colorado River Compact, would like to see the interstate banking program include them.

CONCLUSION

It is sometimes said that water runs uphill to money but gushes uphill to politics. In the past this has been true throughout the world where huge water projects funded by government have "made the desert bloom like a rose."

Supply-side solutions with governments building subsidized dams and delivery systems to supply cheap water are becoming harder and harder to implement due to fiscal and environmental constraints. Water crises are becoming more common around the world, building pressure to change the institutions that govern water allocation.

Water markets and water exports are improving the way water is managed and used. They have created huge incentives to conserve water where none previously existed and they are providing an equitable and efficient way to reallocate water to meet our constantly changing and growing needs. The enormous financial potential of these markets encourages much needed new investment from the private sector. But despite these rapid changes, water markets face a number of challenges. The success and future of these nascent markets ultimately hinges on legislative activities and government's ability to establish water rights that encourage active trading. This requires defining what water can be exported, how benefits and costs are allocated, and establishing clearly defined, secure, and tradable water rights. Such water rights ensure that owners bear the benefits and costs of their decision to keep or trade water.

Water exports could play a greater role in supplying water to regions with limited alternative sources, alleviating the stresses of drought, and providing a reliable source of high quality drinking water. But this requires realistic prices that give consumers an incentive to conserve and entrepreneurs an incentive to increase supplies. At today's relatively low prices, profits may not be sufficient to stimulate massive expansions in this small but growing portion of water markets. For example, at $1.00 per cubic meter of water, the delivery of 1,000 cubic meters (264,172 gallons) only grosses $1,000 compared to over $125,000 for oil assuming a price of $20 per barrel. More water crises will change these numbers, however, and will make it difficult to keep a good market down.

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