BRIEFING NOTE ON WATER

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Introduction

Let me start by saying how pleased I am with the format of this project. Though no more knowledgeable (and no less prejudiced) on Canada - US relationships than others who changed as adults from American to Canadian citizenship, I am less interested in projects that focus exclusively on water problems. There is an unhappy tendency among us water specialists to write as if water policy can be developed by focussing politically on the water sector and geographically on the watershed. The water sector and the watershed are indeed important perspectives, but they are rarely sufficient for policy. Tony Allan, at the School for Oriental and Asian Studies, University of London, writes that water resource management "will fail if it is not recognized by practioners and policy-makers that sustainability is as much about the social and the economic as about the water in the environment."[1] Elsewhere, he points to experience in the Middle East, which he correctly calls "the most water-challenged region in the world," as "a spectacular demonstration that natural resources such as water do not determine socio-economic development; on the contrary, socio-economic development determines water management options.[2]

This briefing note will point to several issues. Throughout, my two primary points are:

- First, although both Canada and the United States face major water issues or "threats" (as they were called in a recent report from Environment Canada),[3] those *threats must be resolved internally, not by bulk water exports or inter-basin diversions.*
- Second, neither nation will find much internal resolution from supply-side projects. Whether the issue is water quantity or water quality, *the future lies with efforts to moderate demands for fresh water, not to increase supply.*

Is Canada Water-Rich and the United States Water-Poor?

Canada receives just under 3000 cubic kilometres of renewable fresh water every year, about the same as China or Indonesia, but dwarfed by Brazil's 8000 or Russia's 5000. The United States is not far behind Canada with nearly 2500.[4] However, all these nations are water-rich compared with most of the world. True, not all the water is conveniently located to population densities. Notably, in Canada, 48% of our water drains either to the Arctic Ocean or to Hudson's Bay.[5] An

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estimated 12% of Canada, or 1.2 million square km , is covered by lakes and rivers, but only 3% of the area covered by water in Canada is located in inhabited regions. The Great Lakes rank among the 15 largest lakes in the world, but the bulk of their volume is a stock that is not available for use. It is not evident that Canada is notably more water rich than the United States.

Perhaps, however, the United States is, by virtue of its greater population and economy, water poor in a sense that Canada is not. This position too is hard to justify. Western states are facing real shortages, but so too are western provinces. Until about 1970, water withdrawals in the United States tracked GNP quite closely. Then they began to grow more slowly. Since 1980, withdrawals have been stable or even declining a little, which means that water use per capita and per dollar of GNP is declining substantially. It is not clear that the United States needs more water. Nor does Canada, which seems to be following a similar pattern; water withdrawals did not increase during the first half of the last decade.[6] What has happened since, we do not know. Statistics Canada stopped issuing comprehensive survey reports on water use after 1996.

There is a further problem with notions of water wealth and water poverty. The world's water crisis is not water to drink but water to grow food.[7] By far the bulk of global water withdrawals are for agriculture – 80% or more in many nations. Canada is at the low end with only 8% of its withdrawals,[b] and the United States in the middle with 42% of its withdrawals, for agriculture.[8] What moderates these differences is trade – not trade in water, but trade in commodities. Given that one tonne of grain requires around 1000 tonnes of water (whether from rain or irrigation), traders will want to move grain, not water. Moreover, without denying that many cities are short of water, the surprisingly rapid fall in the cost of desalination has put a limit of about $1 per cubic metre (plus piping) for household water, only double what Canadians and Americans already pay (and far below what people pay in most nations). In sum, it is worth moving oil; it is not worth moving water – unless it is in bottles, for which people will pay quite extraordinary sums. (Half the bottled water consumed in the United States comes from Canada.)[9]

Water Efficiency and Water Conservation

The conventional approach to supply-demand problems for water focussed almost entirely on the supply side – extending pipelines, constructing dams, and drilling deeper. Though remarkably successful since the approach was initiated by the Romans, it has now run its course. Capital costs per cubic metre are doubling every decade or so, and the public is concerned about the environmental effects of major construction projects.

The alternative is to shift emphasis to policies and programs on water efficiency and water conservation. (Though overlapping, the two are not the same: efficiency refers to reductions in the quantity of water to achieve a given task, as with watering lawns with low-flow sprinklers; conservation refers to changes in the nature of the task, as with planting greenery that does not require watering.) Water demand management is a powerful tool when used in a comprehensive,

[b] Canadian data in these tables are distorted by the 80% reported for "industrial" withdrawals, most of which is cooling water for power plants, a non-consumptive use that has only minimal effects on water quantity and quality.

long-term and integrated strategy, not just as a temporary adjustment in emergencies. Contrary to what is commonly alleged:

- Opportunities to increase water-use efficiency are large. Studies of specific areas and sectors typically find cost-effective savings of one-third of more.[10]
- Water use is significantly affected by market forces. Comparisons of Canadian cities show reductions in water use of 25 to 40% just from the introduction of metres, and up to 70% when water is priced by volume.[11]
- Demand-side measures are less risky than supply-side measures. Apart from nuclear power, it is hard to think of any project more susceptible to cost over-runs than dams, and their economics depends on climate patterns that are changing.

Thanks to these forces, which are largely the result of individual decisions, not government programs, most water use projections are proving to be too high – at the global level[12] and within the Great Lakes basin.[13] Despite this record, little research has been undertaken to determine specifically how householders, managers, and farmers are saving water, or why. All that is clear is that they know how to save water, and that they are doing so despite retail prices for water in Canada and the United States that barely cover O&M costs for water supply (and even less for wastewater treatment). Prices for the much larger deliveries of water to industry and to agriculture are even lower. (I do not mean to trivialize water pricing policy. Some social aims may be served by keeping water prices below full costs.)

Greater efficiency will go far toward reducing supply-demand gaps for water. However, ultimately we have to ask what we are using the water for, which means going beyond efficiency to conservation. Apart from the 50 litres or so per person-day needed for drinking, cooking and sanitation, there are many substitutes for human uses of water. With some exceptions (mainly related to ecological services), the demand for water is not for the resource itself, but for the services provided by that resource. By looking at water as a bundle of services, rather than as a commodity, many more options can be conceived to satisfy demands.

Staying with examples around the home, it is very much a human choice whether we plant a lawn, which is very water intensive, or a drought-tolerant land cover. (This is not a trivial example. Half the water used during in the summer is for lawn and garden watering.) It is also a human choice what to eat. It takes three to five times as much water to produce diets high in meat as those based mainly (not entirely) on vegetable proteins. We choose to use potable water to flush toilets, and simultaneously neglect opportunities to re-use gray water (wastewater other than that from the toilet) locally rather than pumping it away. (Nor is this example trivial. Some 80% of the cost of sanitation systems lies with collection and transportation; only 20% is for treatment.) We are limited in opportunities to cut use of fresh water only by imagination – and by a host of social, cultural, economic and political barriers!

Conservation and efficiency are brought together in an alternative paradigm for management called the water soft path. Modelled on a highly successful approach to energy policy,[14] it offers the potential for fundamental change. Very briefly, soft path approaches to natural resources management rely on a multitude of geographically distributed, relatively small-scale sources of supply coupled with ultra-efficient ways of meeting end-use demands. In contrast, hard paths rely on large-scale, capital-intensive sources of supply and centralized management. Soft paths

draw supplies from renewable resources and seek methods of waste disposal that emulate natural processes. Hard paths rely on nonrenewable resource supplies and use chemicals and fossil fuels for waste treatment and disposal. The literature on soft path concepts and analytics for fresh water is small but growing.[15]

In summary, we have lived for a long time on a huge water subsidy provided to us by nature. Our historical patterns of economic development are based on a myth of abundance that is no longer viable as a guide for policy, but that has left us a legacy of barriers, including the prevalence of the myth itself.

Developing Nations

This project focuses on Canada and the United States, not developing countries. However, both Canada and the United States have active programs of international assistance, and those programs put a lot of emphasis on fresh water. Therefore, I want to caution against any simple extension of our approaches to lower income nations. At the macro level, water efficiency and water conservation in industrialized nations should yield absolute reductions in water use. Not so in developing nations, where they are more likely to improve equity – to transfer water from farmers at the head of an irrigation canal to those at the end, or from richer people on a water pipeline to poorer people who buy water in cans from venders. At the micro level, we typically recommend lining irrigation canals to reduce losses to seepage. In developing nations, that seepage may be the best source of potable water for the poorest people in the village.

Other Issues

Other issues that cannot be covered here deserve attention in the context of Canada - US relationships. For example:

- Work is urgently needed to map groundwater resources, and to define linkages between ground and surface waters. Even in the Great Lakes basin, knowledge is scanty,[16] and this limits our ability to manage water efficiently and sustainably.

- Both Canada and the United States need guidelines and probably regulations on how much water must be left *in situ*, and how to time withdrawals and releases, to protect ecosystems.[17] These flows (in the case of a river) or volumes (in case of lake or aquifer) would have to remain beyond the reach of any internal or international obligations to supply or divert water.

- Decentralization of management for wastewater and for stormwater, along with the use of ecological rather than chemical methods, are neglected areas of work. There are many projects in Canada but they represent scattered success stories compared with the better funded and better organized efforts in the United States through the National Decentralized Water Resources Capacity Development Project and the National Community Decentralized Wastewater Demonstration Projects funded by the U.S. Environmental Protection Agency. This work can identify opportunities to reduce the risks from and the high costs of wastewater flows, and possibly to harmonize approaches on such areas as the Great Lakes.

Conclusion

There is no shortage of work needed to improve water management at all levels in Canada and the United States, nor is there any shortage of opportunities to coordinate our efforts. Such coordination will be mainly in four forms:

- sharing of research results and data collection;
- joint management where waters are found along, over, or under the border;
- re-conceiving policy approaches to management of fresh water resources; and
- trade in commodities, not water.

Sharing research and data do not occasion much problem though both have been severely (and inadvisably!) hindered by budget cuts since the 1990s. Joint management is already working reasonably well, mainly through the work of the International Joint Commission, a governance concept that may be "exportable" to other regions.[c] The Great Lakes Commission and other regional bodies also deserve credit.

Less progress is evident with policy. Demand management is beginning to be taken seriously, particularly by water-constrained municipalities. Soft path studies are being undertaken by several non-governmental organizations, notably the Pacific Institute in Oakland, California, and Friends of the Earth Canada in Ottawa, Ontario. However, water management at the provincial/state and national levels still treats demand as secondary. For one current example, neither the draft Great Lakes Basin Sustainable Water Resources Agreement ("Annex 2001") nor its accompanying draft Great Lakes Basin Water Resources Compact requires that requests for new withdrawals be accompanied by evidence showing that potential efficiency gains, to say nothing of conservation, have been fully explored before new withdrawal will be considered.[18]

The fourth area of Canada-US interaction, and arguably the most significant and contentious of all, is trade. Trade of commodities grown or made with water – "virtual water" as it is called[19] – has been, and will continue to be, our "bulk water exports." And, when it comes to trade of commodities, the toughest bargaining will not be between Canada and the United States but within each nation. For example, one of the best ways for the United States to reduce its demand for irrigation is to import more grains from Canada, but this will affect some very powerful economic and political interests in the United States.

Finally, it is time that both Canada and the United States reduce their egregiously large demands on limited supplies of fresh water. Whether from ecological, economic or social perspectives, the potential gains are enormous. Just as with trade, however, the political barriers to greater water efficiency and water conservation are also enormous. Only by focussing on those barriers, rather than specific technologies or narrow regulations, will we make the real gains in water management that can support for sustainable development in each nation, along with resolution of shared water issues.

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[c] Friends of the Earth Canada and Friends of the Earth Middle East have put forward a joint proposal for exchange visits and staff training to adapt the IJC model for Israeli, Palestinian and Jordanian interests in the Dead Sea basin. The Centre for Contemporary Jewish Studies at the University of Miami in Florida believes that the IJC model is applicable to the entire rift valley including those portions in Syria and Lebanon.

Endnotes

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15. A nearly complete guide to the literature is found in David B. Brooks, *Another Path Not Taken: A Methodological Exploration of Water Soft Paths for Canada and Elsewhere*, revised version (Ottawa: Friends of the Earth Canada, 2004). See also Gleick, *op. cit*., fn. 12; and Gary Wolff and Peter H. Gleick, The Soft Path for Water, In Peter H. Gleick (ed.), *The World's Water: The Biennial Report on Freshwater Resources, 2002-2003* (Washington, DC: Island Press, 2002).

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19. J. A. Allan, Virtual Water – the Water, Food and Trade Nexus: Useful Concept or Misleading Metaphor? *Water International*, 28:2 (March 2002), 4-11..