Analise institucional da gestão de recursos hídricos entre Canadá e Brasil

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Resumo

Analise institucional da gestão de recursos hídricos entre Canadá e Brasil

O trabalho se dispõe a trabalhar uma analise comparativa entre as principais iniciativas institucionais existentes entre o Canadá e o Brasil em relação à gestão dos recursos hídricos. Com foco nas políticas publicas originarias desses países, o estudo pretende descobrir os desafios e oportunidades de desenvolvimento existentes em cada modelo na direção da construção de um panorama organizacional avaliativo. Para tanto, a pesquisa sobre os fatores históricos e sociais existentes em suas políticas publicas ambientais em nível macro institucional, assim como as aberturas existentes para o aperfeiçoamento na direção de um gerenciamento participativo e com aumento da eficiência de atuação de seus participantes também será realizada. Desta forma o trabalho poderá, inclusive, vislumbrar formas futuras de atuação conjunta entre os dois países, como também indicar formas diferenciadas de gestão ao nível governamental e político dos mesmos.

Palavras-chave: gerenciamento hídrico, relações internacionais, instituições.

Abstract

Institutional management analyze of water resources between Canada and Brazil

The work did a comparative analysis between the major institutional initiatives between Canada and Brazil concerning the water resources management. With a focus on public policies from those countries, the study aims to uncover the challenges and opportunities for development in each model in the direction of building an organizational landscape assessment. For that, research on the historical and social factors pertaining to their public environmental policies at the macro level institutional as well as openings for improvement towards a participatory management and increased efficiency of operation of its participants will also be held. Thus the work can even envision future forms of joint action between the two countries, but also indicate different forms of management and policy at governmental level of the same.

Keywords: water management, international relations and institutions.

Institutional management analyze of water resources between Canada and Brazil

Introdution

Water resource management is currently one of the most paradoxical issues facing the international community. While global water levels are dramatically rising, threatening to drown many sea-level countries, the world is simultaneously being forced to deal with the growing scarcity of freshwater. This impending water crisis promises "water, water everywhere, and all the boards did shrink, water, water, everywhere, not a drop to drink."[1] With the knowledge of this inevitable crisis of freshwater supply and applying the most basic type of logic, one would think that water use should be appropriated according to essential needs. Why then are countries not taking more proactive measures to conserve water and curb water usage? In comparing Canadian and Brazilian water policies and evaluating their efficiency in terms of water usage per capita, the comparison provides useful and potential viable insights in policy strategies aimed at the reduction in water usage. Although Brazil's access to safe drinking water and access to sanitation are lower than Canada, particularly in rural areas, Brazil is more effective in managing its water resources in regards to its personal water consumption per capita, particularly in urban areas. Through the establishment of this thesis, policy recommendations will be made to improve the efficiency of water management in Canada.

In order to provide a well-rounded argument for the importation of Brazilian water policy to Canada, all aspects of water policy must first be explored. Consequently, this paper is divided into four main sections, namely; the theoretical section, the comparative section, the analysis of the findings, and finally concluding remarks. In the theoretical section, the origins of water use and the various aspects of water policy specifically and water management more generally will be discussed. In the second section, the framework for comparing Brazil and Canada will be laid out by exploring the similarities and differences between Brazil and Canada and then by providing a background view of the water policy and water management frameworks in which these countries operate. In the third section an analysis and assessment of water management and water policy from both Brazil and Canada will be taken and finally the concluding section will provide recommendations towards Canada based on the findings.

Theoretical Section

Relevant to the discussion, the original use, attitudes, and policies associated with water resources are essential to developing a comprehensive analysis of contemporary water resource management. Initially used for the purposes of personal consumption, transportation and basic sanitation, water usage soon transformed into a functional commodity for commercial activity. This shift in attitudes concerning usages of water largely expanded the nature and volume of water consumption. Moreover, in places where water resources are considered to be in abundance, as is the case in most of Canada and Brazil, water is regarded as or sometimes consumed as an infinite resource. However, water is not an infinite resource but rather a finite resource. This attitude towards irresponsible water consumption leads to the "The paradox that individually rational choices lead to collectively irrational outcomes seems to challenge a fundamental with rational human beings can achieve rational results." [2] This common attitude of water as an infinite source has led to the necessity for the management of water resources and shifting the power over resources from "rational" individuals to a more collective entity, namely the state.

This transfer is most notable in the case of the United States where in the middle of the twentieth century the necessity for management of water became apparent once significant water source degradation was brought to the attention of legislators.[3] Similar patterns can be observed in almost all countries. This wide-scale use and often abuse of water became political, making water use and water

[1] Samuel Taylor Coleridge. *The Rime of the Ancient Mariner* 1798

[2] Elinor Ostrom. *Governing the Commons: The Evolution of Institutions for Collective Action. (*New York: Cambridge University Press, 1990) 5

[3] Robert M. Thrall et al. *Economic Modeling for Water Policy Evaluation* (New York: North-Holland Publishing Company, 1976) 22

management a policy issue. The original use of water has metamorphosed into the current management of water which encompasses a much larger and more widespread area of control, now typically including "water supply, wastewater and water quality management, storm-and floodwater control, hydropower, transportation and water for the environment, fish/wildlife and recreation."[4] Water management has woven itself into today's societies with virtually inseparable intricacy. To remove the use of water from today's society would undoubtedly prove to be severely detrimental to those societies in a variety of manners from their economies to their general quality of life. While water was initially used at minimal levels, the supply of water has increased significantly and now is expected to be "readily available."[5]

Since water use and management of water resources are now largely managed by governments, water resource management is considered to be a political tool. Therefore, the initial uses of water which inevitably led to the commodification of water caused a shift from a hands-off government approach to water supply to a highly regulated, public government approach to water supply. The attitude transformation from water usage as an innovative technique to further commercial transactions and improve basic human functions to revelations of water supplies as a quickly diminishing resource has resulted in a myriad of issues revolving around water policy and water management and the direct implication of government in providing the service of water supplier.[6] Indeed, as will be reinforced in the following arguments, the high stakes associated with the interdependency of modern societies on water has made water management an increasingly difficult topic, particularly in increasing the costs associated with water and water supply.

With the alarming depletion of the essential resource, water has inarguably brought up questions of water resource management and various policy tools at the disposal of governments to supply water. It is a point of contention on how to approach efficient water management with some scholars arguing for the mass privatization of water supplies and others turning to more government based or public water suppliers.[7] However regardless of who water resource management devolves from, most water resource management schemes set their goals as achieving a balance between economic growth and the sustainable use of water. Most notably, sustainable water resource management is divided in two distinct directions by either the utilization of the user pay principle or the polluter pay principle. Although these two policies do by no means provide a comprehensive assessment of water resource management more generally, these two principles are most commonly employed to reduce levels of water consumption. Both of these principles will be examined in the following paragraphs and the implications of these two policy choices will also be examined.

The notion of paying for water usage lends itself to the User Pay Principle (UPP). UPP is a relatively simple concept. As indicated in the name, the user must pay for the good or service that they are using. Examples of UPP are abundant; highway tolls, hydroelectricity, and membership fees of any variety. The UPP is a distinctive technique which governments may employ to illicit a preferred type of behaviour by putting a price on undesirable behaviours or actions.[8] With regards to water consumption, setting a price on water use, an individual or company are more likely to reduce their water use in order to reduce their total costs. By making a user pay for their consumption of water, they become more conscientious of their water use. Thereby, the water user will be more likely to use water resources more responsibly because it is directly related to their personal costs. Normally, the UPP is applied in progressive stages with water costing more per litre at higher volumes.[9] As stipulated by Wise Water Use,

[4] Neil S. Grigg. *Water Resources Management: Principles, Regulations and Cases* (New York: McGraw-Hill, 1996) 516

[5] Andrew A. Dzurik and David A. Theriaque. *Water Resources Planning: Second Edition* (Lanham: Rowman & Littlefield Publishers, Inc., 1996) 153

[6] Ariel Dinar. *The Political Economy of Water Pricing Reforms* (New York: Oxford University Press, 2000) 123

[7] James Winpenny. Managing Water as an Economic Resource. (New York: Routledge, 1994) 29

[8] Hessing, Melody et al. *Canadian Natural Resource and Environmental Policy: Political Economy and Public Policy*. Second Edition. (Vancouver- UBC Press, 2005) 220

[9] James Winpenny. *Managing Water as an Economic Resource* (London: Overseas Development Institute, 1994) 44

"we undervalue this precious resource, we tend to overuse it and, in fact, abuse it." [10] By implementing UPP, governments place a monetary value on water, allowing consumers to better understand the cost of water.[11] The next element that is essential to curbing water usage is quintessentially tied up with the pricing of water. If the price of water is too low, as is current case in Canada, consumers will not be encouraged to conserve water, and conversely if the price is too high, poorer members of society will be unable to pay for water, a basic necessity.

The other alternative to UPP is a similar concept, the Polluter Pays Principle (PPP). Whereas most water resource management systems focus on fees or charging for water usage, such as metering, the PPP attempts to charge users for the pollution costs associated with water usage. Prominent and obvious examples of PPP are air travel footprint fees, gas guzzlers taxes and so on and so forth. The PPP serves as an "economic charge...related to environmental damage caused by the discharge, or the cost of prevention, treatment or restitution" of water.[12] This economic charge is enforced on all water consumption, driving up the price of water and providing an incentive for individual consumers to use less water. The logic that PPP perpetuates is that less water use would mean "less pollution" which in turn "would safeguard more water resources for consumption purposes and reduce the cost of treating contaminated supplies."[13] It's a win, win situation. The PPP is effective insofar as it provides a deterrent to the use of water beyond necessity. However, PPP is generally regarded as a less effective tool for individual households and is a more effective tool in regards to industrial or commercial use. Therefore, for the purposes of individuals or personal water consumption as is the aim of this paper, UPP is considered to be the most viable tool at the disposal of governments to curb water usage.

The strength of UPP is evident. While most environmental policy doesn't make economic sense, the UPP is different. As economist Roberts' describes "to create green jobs because green is good is a bizarre concept to an economist".[14] The implication being economic justification for environmental progression's sake just isn't there, as is apparent with the current global economic system. An advantage of UPP over PPP is that UPP "mediates between economic imperatives and the perception of water as a life source for human, wildlife and plant communities."[15] Whereas most environmental policy, like PPP, just adds on taxes or invests money in environmentally-friendly development, UPP is a rational calculation of how much water actually costs. Fairly pricing water is an essential element for the success of UPP. Moreover, an advantage of the correct usage of both UPP and PPP lies in the ability of governments to shift responsibility back to individual consumers. Although governments could simply ration units of water to individual consumers and households (probably not the most popular political move), by charging users for water consumption through UPP or inversely charging for the related pollution, PPP, they are shifting the responsibility to individuals to self-manage. Clearly, applying the UPP of charging for water consumption or pollution encourages individuals to act in a certain way but it by no means prohibits it. Ultimately, it is still the choice of individual consumers to act as they wish, similar to high taxes on tobacco. The use of tobacco and the overuse of water are detrimental to individuals and to society as a whole and the government is voicing its view on the matter by making these things more expensive. Therefore, the government is giving individuals an additional incentive to behave in a more responsible fashion.

Water pricing has been a point of contention for governments dating back to the decision to its origins in water usage. Governments concerned about alarming increases in water consumption,

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[10] Environment Canada. Wise Water Use. http://webcache.googleusercontent.com/search?q=cache:WwFoUcGpNysJ:www.ec.gc.ca/eau-water/default.asp%3Flang%3DEn%26n%3DF25C70EC+user+pay+principle+canada&cd=10&hl=en&ct=clnk&gl=ca

[11] Idem

[12] James Winpenny. *Managing Water as an Economic Resourc*e (London: Overseas Development Institute, 1994) 51

[13] Idem

[14] Peter Katel. *Jobs Outlook.* (*CQ Researcher,* 4 June 2010). 489

[15] Deveoppment durable, Environnement et Parcs Quebec. 2010 Quebec Water Policy :Water Our Life. Our Future. http://www.mddep.gouv.qc.ca/eau/politique/index-en.htm

decreases in water quality and difficulties associated with providing water to countries' poorest members, began charging for water.[16] The question then quickly arose as to how much water should cost? Several methods attempt to answer these questions, including both volumetric methods and non-volumetric methods. While volumetric methods are concerned with efficiency, non-volumetric methods are more concerned with factors such as income distribution.[17] However, in Brazil for example, water costs are determined by a combination of efficiency and income distribution, utilizing a volumetric and non-volumetric combination method. For residential water, higher-income countries have fairly inelastic demand where lower-income countries have fairly elastic demand.[18] For high-level income countries like Canada, the pricing of water has a significantly lower impact on household income where GDP per capita is estimated at $45, 467.[19] On the other hand, in countries like Brazil, where GDP per capita is significantly lower at $10, 609,[20] pricing has much larger implications for household incomes and more importantly impacts accessibility to water.[21] Therefore, in the formulation of policies regarding water pricing, lower-income countries must bear in mind the affordability of residential water whereas higher-income countries have a larger margin of manoeuvre in the pricing of residential water rates.

However, the implications of environmental degradation have brought the question of water pricing one step further, how much should water cost in terms of environmental impact? Should water be priced in accordance with the rising scarcity of water? If water is fairly priced at a rate that would recover the costs of extraction and some environmental costs such as the European Union (EU) directive that sets cost of water at "the costs of water services, including environmental, social and resource costs,"[22] people would want to find ways to use less water to accomplish the same ends and quickly. The solution then becomes increasingly difficult as the ability to fairly price water lies in the versatility of a government to price water in consideration of economic costs, social costs and now environmental costs.

The plethora of scholarly initiative in the realm water resource management is evident by the volumes of literature. However, the essential elements of water resource management lie in the application of the UPP with effective water pricing.

Comparative Section

In comparing Brazil and Canada, many similarities can be observed. Both countries are relatively large, ranking second and fifth in the world in kilometric area, both have significant proportion of their population living in urban areas, both countries have federal systems of government, both countries rank ninth and eight in gross domestic product (GDP) and both countries are richly endowed with natural resources.[23] Although comparisons between the two countries on population, population density, GDP per capita, human development index and types of federal systems offer a less symmetric comparison, the similarities are significant enough to provide and recommend water management strategies and policies. Even though the type of federal systems in place in Brazil and Canada are different, federal systems in general share a complexity that significantly impacts services distribution. Therefore, based on these assumptions, in comparing Brazil and Canadian water management policies, the positives associated with either countries polices may be extrapolated to the other country as a viable policy option.

Canadian water law and policy

[16] Ariel Dinar. *The Political Economy of Water Pricing Reforms* (New York: Oxford University Press, 2000) 123
[17] Idem 106
[18] Robert A. Young. *Determining the Economic Value of Water: Concepts and Methods*. (Washington D.C.: RFF Press, 2005) 269
[19] http://www.unwater.org/statistics.html
[20] Idem
[21] Ariel Dinar *The Political Economy of Water Pricing Reforms* (New York: Oxford University Press, 2000) 126
[22] Joseph Schleich and Thomas Hillenbrand. 2009. *Determinants of Residential Water Demand in Germany*. (*Ecological Economics*. Vol 68, Issue 6) P. 1757
[23] http://www.unwater.org/statistics.html

The unique federal parliamentary system in place in Canada, the way in which the federal government may approach the water resource management problem, is a complex affair. Beginning with the 1867 Constitution Act, the Canadian government formalized the delineation of responsibilities and handed over natural resources down to the provinces. Essentially, the federal government has limited jurisdiction over water governance in terms of water distribution. Provinces, with the addition of the territory of Nunavut, have sole jurisdiction over bodies of water that fall exclusively within their geographical borders as well as jurisdiction over "flow regulation, authorization of water use development, water supply, pollution control, thermal and hydroelectric power development."[24] On the other side of the spectrum, the federal government has control over fisheries, international relations, navigation, and federal lands.[25] Curiously, the federal government retains the ability, under Article 4 of the Canada Water Act, to "enter into an arrangement with one or more provincial governments to establish, on a national, provincial, regional, lake or river-basin basis, intergovernmental committees or other bodies" in the effort to facilitate the formulation of policy.[26] Although overarching mechanisms are in place for federal-provincial cohesion, the political power necessary to do so renders these mechanisms virtually redundant. Unfortunately, the lines between Canadian federal and provincial jurisdiction have become increasingly blurred over the years with several notable issues bringing heated debates and friction both between the provinces and between provinces and the federal government.

To accentuate the complexity of water jurisdiction, neither the federal nor the provincial governments actually deliver water to individual households. The individual provinces independently assume the responsibility of distributing water to the public.[27] The provinces in turn may decide either to privatize water or they may choose to delegate the responsibilities to the municipalities who equally hold the power to hand out private contracts or distribute it themselves.[28] Moreover, how any given province pays for their respective water supply is entirely dependent on how they distribute it; in the case of privatization, companies collect the costs from individuals, in other instances municipal and provincial taxes cover the cost.[29] In this jubilee of delegating responsibilities, the federal government ends up as a somewhat outside player towards resource management. From the constitutional right granted to the provinces to control water supply, to the various combinations of municipal, public-private water distribution, Canada's capacity to influence the management of water within the provincial jurisdiction becomes alarmingly inconsequential. Surprisingly, fifty-five percent of water distributed to Canadian households is metered.[30] Through all these public-private partnerships, fifty-five percent of Canadian households pay for their water according to usage.

Brazilian water law and policy

Brazil has a long history of seeking solutions related to water management. There has been an attempt to codify and regulate the vital issue of water usage and legislation concerning water usage or water management is equally vast, overlapping and complex. In a comparative perspective, however, it is more accessible than the Canadian law regulating the matter, as it is more concentrated in terms of source and organization. This is due to the way laws and decrees are organized in Brazil, under codes and generally linked to one another. Such legislation is put to action under a number of organisms organized to operate on different levels.

[24] Environment Canada 2010. Provincial/Territorial. Environment Canada. http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=24C5BD18-1

[25] Environment Canada 2010. Federal Policy and Legislation. http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=E05A7F81-1

[26] Canada Water Act 1985 http://laws.justice.gc.ca/eng/C-11/page-2.html#anchorbo-ga:l_I-gb:s_4

[27] Environment Canada. 2010. *Water: Chapter 4B: What Will This Cost Me*? http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=23CA8A0D-1

[28] Environment Canada. 2010. *Water: Chapter 4B: What Will This Cost Me*? http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=23CA8A0D-1

[29] Environment Canada. 2010. *Water: Chapter 4B: What Will This Cost Me*? http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=23CA8A0D-1

[30] http://www.unwater.org/statistics.html

The key elements to water management in Brazil is quintessential with the understanding of water as a public asset; that it has multiple uses at different levels of government; that its management is preferably decentralized; and that society has a voice and can participate through the river basin, defined as its unit of analysis and management and organized as River Basin Committees. Water law and regulation in Brazil is a federal matter, and as a consequence is very comprehensive. The Brazilian states have been developing their own laws under the directives of the 1988 Constitution and exercising their constitutional right related to water management. However, as it happens in federations, many responsibilities have been delegated down to other levels of government, such as at the state level or municipal level. As is the case in most federations, these delegations are not uniformly handed down to states, privileging different states with different agreements and responsibilities. This type of system is a multi-level or more bottom-up style of management opposed to an autonomous or even top-down style of management. In such states the model adopted is the consortia.

The Union is responsible for lakes, rivers, water courses in federal land or that run across states or into other countries. The states regulate surface or underground waters that are stored, sprung and crossing state land, with the legal exceptions associated with the existence of works done by the Union in any of these state water bodies (Articles 20 and 26). The most important pieces of legislation are listed under Appendix A.

As a natural resource that is finite, water has economic, social and environmental value. In order to sensibly control its use and raise awareness towards responsible water management, it is important to verify and know the data concerning water consumption.

Brazil verifies water management largely through water counters that are periodically checked. Users are then charged according to their water consumption and consequent pollution levels. It is an economic mechanism that has the advantage of promoting self-management in a participative fashion. The metered rate method is the one that encourages better water management.[31] In addition to monitoring water consumption, the water counters are also an important instrument for charging for water consumption. Brazil has increased both the price of water and the percentage of the population that has to contribute to paying fares towards their consumption.

The logic behind charging for water consumption in a PPP fashion is that if one uses more water, they will consequently pollute more. Charging users for the actual amount of water consumed in their household encourages them to take proactive measures such as controlling leaks, using less water and, as a result, these consumers both waste and pollute less. This measure was adopted in Brazil as a response to the extreme levels of water quality degradation in notable and important rivers such as the São Paulo River which suffered greatly up until the 90s. This particular style of water policy has witnessed a drop in water consumption and has contributed to a severe reduction in the amount of water available in the most populated areas. The success of the Brazilian strategy for reduced water consumption is best summed up in P.D. Lopes work:

> "the new legal framework plans for integrated, decentralised and participatory management at the level of the main river basins, the setting-up of basin organisations and the establishment of charges for water use and pollution. It is a very encouraging example on the Brazilian and Latin-American scale." [32]

Brazil, with its approach to water management has come up with encouraging results for other countries of similar governmental structure. Brazil, although highly decentralized in its water management policy, has managed to provide a successful and relatively widespread system of water supply and water services.

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[31] D.M. Tate and D.M. Lacelle. *Municipal Water Rates in Canada: Current practices and Prices,* 1991 http://www.ec.gc.ca/water/en/info/pubs/sss/e_sss30.htm

[32] P.D. Lopes. *Who is managing what water? – Water management in shared-legal and institutional cases.* 2004

Moreover, Brazil's National Water Resources Policy (Law 9.433/97) establishes in the second article as one of its main objectives to prevent a water crisis resulting from inappropriate or irresponsible use of natural resources. One of the instruments at the government's disposal to follow through on its legal obligation is to charge for water consumption. In article seven, the guidelines and criteria for the application of such water use fees are outlined. Under federal management, Law 9.984/00 establishes that the National Water Agency (ANA) is responsible for conducting technical studies to determine how much to charge for the usage of water. Article thirty-two puts the role of encouraging the charging of fees for the utilization of water resources under the National Water Resources Management System. Finally, it is the River Basin Committees at the municipal level that are responsible for establishing the mechanisms for collecting the fees as well as recommending such fees be installed.

> "Throughout much of the twentieth century, water was mobilized as a strategic resource for societies undergoing modernization, industrialization, urbanization, and agricultural intensification. A prevailing assumption amongst water planners was that sustained growth in water demands was inevitable, given economic growth, increasing population, and increasing consumption per capita."[33]

Analysis

There is a trend on the internationalization of public policies; therefore, it is only natural that Canada uses the experiences of other countries, as Brazil has done in defining its own policy. Many similarities unite Brazil and Canada and make a good case-study for the Canadian development of its water charging system.

More specifically to water and water resources, Canada and Brazil have both interesting parallels and differences. Both countries are widely viewed as holding major freshwater supply sources. Brazil produces 8233 cubic kilometres of water per year whereas Canada produces 3300 cubic kilometres of water per year.[34] Even though the discrepancy between these two figures seems large, Canada and Brazil are the top two suppliers of freshwater in the world, contributing to a consensus amongst both countries populations of water as an abundant resource. Moreover, both countries boast high percentages of accessibility to safe drinking water with Canadians having 100% access and Brazilians 96%, a number that increases when measuring urban population exclusively.[35] The most surprising statistics and discrepancies lie in the two countries divergence on water consumption. While Canadians consume on average 343 litres of water per day per capita, Brazil is much lower with 143 litres of water consumed per day per capita.[36] Likewise, meters measuring water consumption are present in fifty-five percent of all Canadian households while Brazil has meters in seventy-six percent of households.[37] Even more surprising, is that the average municipal cost of water in Canada is estimated at $0.31 per cubic metre where in Brazil the figure is six-fold at $1.82.[38] These statistics reveal large discrepancies between the two countries despite their other similarities. Canadians pay little for their water and in turn consume very large quantities as opposed to Brazilians who pay a respectable amount for their water and in turn consume far smaller quantities of water. Evident by the price of water and the prevalence of metering in the two countries, the water resource management strategies and water policy tools utilized by these two countries are clearly different. Therefore, the tools and strategies that Brazil currently employs can serve as useful trials towards the reduction of water consumption in Canada. In other words, using Brazilian water policy and water management strategies are beneficial to the reduction of water usage that is widespread in Canada.

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[33] Karen J. Bakker. *An Uncooperative Commodity: privatizing Water in England and Wales.* (London: Oxford University Press, 2003)

[34] http://www.unwater.org/statistics.html

[35] Idem

[36] Idem

[37] http://www.unwater.org/statistics.html

[38] Environment Canada. Wise Water Use. http://webcache.googleusercontent.com/search?q=cache:WwFoUcGpNysJ:www.ec.gc.ca/eau-water/default.asp%3Flang%3DEn%26n%3DF25C70EC+user+pay+principle+canada&cd=10&hl=en&ct=clnk&gl=ca

Evidently, governments attempting to curb water usage should avoid setting the price of water at too low of a rate which can be counterintuitive to the UPP and water usage reduction. Taking all social, environmental and social considerations of water pricing, one would assume that in a high-income country, water pricing would have minimal social cost considerations and should compensate by assessing environmental costs, that the price of water would be reasonably higher. Lamentably, regardless of the fact that in Canada for example, fifty-five percent of Canadians have metered water usage, water usage is still incredibly high. This is largely due to the fact, as previously mentioned, that the cost of water in Canada is so low that Canadians on average pay $0.31 per cubic metre compared to Brazilians who pay $1.82 per cubic metre.[39] How is it that Canadians, with an average income more than four times the average income of Brazilians, pay one-sixth of the cost for water that Brazilians do? It is no wonder that in Canada, water is seen as an abundant and limitless resource. Water is more or less seen as a free good with most Canadians unaware of the fact that they directly pay for their water usage, the cost being so minimal. Although UPP is in effect in fifty-percent of Canada in some shape or form, the inadequate pricing of water renders the UPP ineffective, with Canadian water consumption at a skyrocket rate of 343 litres per day per capita compared to 143 litres per day per capita for Brazilians.[40] However, because most Canadians' water usage does not have a significant impact on the cost to an individual or to a household, there is less of an incentive to invest in more water efficient technologies that would in different circumstances save them money.[41] Ultimately, the option is left to the consumer to self-regulate. If the consumer is not given proper incentive to use their water efficiently, they will remain uninterested in opting for more water efficient uses.

Moreover, as previously discussed the impact of water pricing has direct repercussions on water usage rates. Generally speaking, the more expensive the water, the less water individuals will consume. However, in order to guarantee that everyone has access to water, water must be priced at equilibrium between costs and accessibility. Brazil has managed to achieve this equilibrium by reaching the balance with satisfying the needs of poorer classes of society not able to pay for water and maintaining a sustainable price for other water users. In the case of Canada, with GDP per capita at a much higher level, the percentage of citizens that would potentially not be able to afford higher priced water would be much more minimal and therefore, the equilibrium between demand and cost would be much higher, resulting in the ability to charge for water at a higher cost. Therefore, Canada would reduce the amount of water consumption by elevating its price of water per cubic metre to a more sustainable level. Metering will remain inefficient and water will continue to be consumed at irresponsible rates if the cost of water remains so negligible. Canada would do well to follow the lead of Brazil water policy of charging more for household of individual water consumption.

The intricacies and cost implications of water management has led to a wave of new concepts in water policy,

> "many of which should have been widely applied to Canada. Their basic aims were to improve efficiency, take the external effects of water use more specifically into account and integrate water development into overall economic and social planning."[42]

However, the fact that the average of water in Canada remains so negligible refutes this statement and highlights an important direction in which Canadian and provincial legislators should take into consideration.

Moreover, in order to promote more sustainable water usage, civil society, alongside with government and water users from all walks of life, all have to take action, assume responsibility and get

[39] Environment Canada. Wise Water Use. http://webcache.googleusercontent.com/search?q=cache:WwFoUcGpNysJ:www.ec.gc.ca/eau-water/default.asp%3Flang%3DEn%26n%3DF25C70EC+user+pay+principle+canada&cd=10&hl=en&ct=clnk&gl=ca

[40] http://www.unwater.org/statistics.html

[41] Melody Hessing. *Canadian Natural Resource and Environmental Policy: Political Economy and Public Policy. Second Edition*. (Vancouver- UBC Press, 2005) P. 221

[42] Harold D. Foster. *Water – The Emerging Crisis in Canada* (Toronto: James Lorimer & Company, 1981)

involved in the decision-making process of water management. It is such an important subject that no level of government or member of society should waive their responsibilities. Brazil's usage of the river basin as the unit of analysis provides an interesting take on the ability to incorporate multiple members of Brazilian society into the management of its water resources. For example, having Water Basin Committees provides avenues for individual citizens to have an input on how to allocate or use their resources. Rather than having a more centralized or top-down approach to water resource management, a more decentralized or bottom-up approach that allows individuals to claim a stake in their country's natural resources allows for more citizen accountability and most likely more responsible and lower water consumption. Since both Canada and Brazil have relatively large sources of freshwater, and since both countries largely operate water supply through their municipalities, it is plausible to use Brazil's highly decentralized approach of the water basin as the unit of analysis. This shift to more localized management encourages the self-management of water resources and an increased sense of responsibility for water consumers.

Using Brazil as a template based on its comparatively impressive track record, Canada could import Brazilian style water management policies. In particular, importing Brazil's water basin strategy would shift the Canadian responsibility of water consumption to the individual consumers more effectively through the more bottoms-up or decentralized approach. Granted that many Canadian municipalities operate water supply in different fashions, allowing for municipalities to create a more open forum for their citizens to participate in the water management process would result in increased accountability and responsibility towards the usage of their natural resources. As is the case in the Brazilian Water Basin Committees, Brazilians have a direct say in how their resources will be used and how much water should cost. In this decentralized approach, it allows for water pricing to be handled on a municipality to municipality basis. Therefore, those communities or municipalities who have higher rates of poverty can adjust the pricing of water accordingly, providing a more representative and fair system of water management.

Conclusions

The discrepancy between Canada's water consumption compared to other developed and less developed states like Brazil draws attention to Canada's blatant disregard for the global freshwater crisis and underscores the attitude of water consumption and commodity of water as an infinite resource. Taking this into consideration, immediate and drastic changes need to be adopted to rectify and greatly reduce Canadian water consumption. Granted that the complex Canadian political infrastructure makes unifying Canada behind any type of nationwide water consumption campaign difficult, certain tools do have more promise than others in facing the crisis. Brazil provides a compatible model for Canada to follow. Although Brazil does not have the same federal system, both countries share the intricacies and complexities of three-tier government. Of most importance is increasing the price of water and providing a more interactive relationship between the formulation of policy and the citizens. The UPP will only be effective if the price of water serves as a deterrent towards water consumption. As Dinar points out, in some Canadian municipalities, the marginal price of water does not cover its marginal costs.[43] Embarrassingly enough, these marginal costs do not even include social or environmental costs. This situation has to be reversed if Canadian municipalities across Canada want to reverse the pattern of excessive water consumption. Delegating more responsibilities to the municipal level will allow for municipality preferences to be considered and for citizens to assume responsibility.

Once water was introduced and established into the functioning of states, to reverse back to a state of limited water consumption would have devastating consequences on state infrastructures. Because the implications surrounding water are so great, the pricing, policy and consumption of water is a highly sensitive issue that requires comprehensive and thorough assessments before any government attempts to alter the structure of water resource management. It is of equal importance that before fees are implemented for water consumption that an understanding of what the price of water should incorporate is reached as well as fully exploring the various ways of implementing it as well as taking into consideration any existing regulations concerning the matter.

[43] Ariel Dinar. *The Political Economy of Water Pricing Reforms* (New York: Oxford University Press, 2000) 129

This essay just scratches the surface of a discussion that is very deep and essential to any society. Water management policies and the legislation that enforces such policies have to be under constant revision and discussion in order to achieve best results towards the usage of such a vital substance. The challenge lies on defining the way of doing it.

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Appendix A

Law 24.643 (1934) – the Water Code, altered by posterior regulation to enhance its effects

Law 4771 (1965) – about the protection and preservation of water and the surrounding forest

Federal law 6.938 (1981) – established the national policies towards environment

Resolution 20 (1986) – classifies water and defines its quality under CONAMA, the federal environmental council

State Decree 27,576 (1987) - the creation of the Water Resources State Council (WRSC) and the Coordinating Committee of the Water Resources State Plan and Management System

Decree 24,489 (1988) - the Piracicaba River Basin is declared the basic water management model for the whole State of São Paulo, with reflects on the 1988 Constitution.

Federal Constitution (1988) - explicit reference to the need of implementing a National Water Resources Management System (NWRMS) and establishes water resources jurisdictions (articles 20,21, 22)

São Paulo State Constitution (1989) – dedicates a section to water resources

Decree 32.954 (1991) - the State of São Paulo approved the Water Resources State Plan which was the first technical document on water resources

Law 7.663 (1991) defines the State of São Paulo Water Policy and creates the State's Water Management System (SWMS).

Federal law 9.433 (1997) – the most relevant to Brazil, it is the federal water law; instituted the national policy of Hydric resources and defined the water management model to be implemented throughout the country

Law 9.605 (1998) – Law of Nature and Environmental Crimes, declared hydric pollution to be a crime in water streams destined to public usage

Federal law 9.795 (1999) – instituted the national policies to environmental education

Federal law 9.984 (2000) – creates the national water agency (ANA)

Federal law 9.985 (2000) – institutes the national policies for nature preservation

Federal law 10.257 (2001) – institutes national policies towards the city