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LEGAL IMPLICATIONS OF TRADE IN 'REAL' AND 'VIRTUAL' WATER RESOURCES

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INTRODUCTION¹

It is a truism that fresh water is a unique natural resource: it is one irreplaceable and essential for all life on Earth, which has strong cultural and religious implications in many cultures. Water resources are variable over space and time with huge differences in availability in different parts of the world, as well as wide variations in seasonal and annual precipitation.² At the same time, according to the World Health Organization (WHO), '[...] at least 1.1 billion people lack access to safe drinking water.'³ This is due to such diverse factors as climate change, demographic pressures, pollution and unsustainable management of fresh water resources. The availability of, and access to, water have thus been highlighted as among the most critical natural resource issues facing the international community. Growing awareness of the threat of global water scarcity is well highlighted in the theme of World Water Day 2007 - 'Coping with Water Scarcity' - which has underscored also the need for increased integration and cooperation to ensure sustainable, efficient and equitable management of scarce water resources, both at the international and local levels.⁴

It is now well accepted that access to water is a fundamental human right.⁵ While at the United Nations Water Conference in Mar del Plata, in 1975, priority was given to the basic human needs of safe drinking water and sanitation services, the view that efficient and sustainable use of water can only be achieved through its economic valuation has been dominant in international development and policy debates since the 1992 International Conference on Water and the Environment held in Dublin, Ireland, which led to the adoption of the so-called Dublin Statement.⁶ The World Water Vision adopted in 2000 by the World Water Council stated that water must be treated as an economic good and introduced the idea of moving towards full-cost pricing of water services for all human uses.⁷ In the face of what has been referred to as the global water crisis, it has become generally accepted by the international community that water should be treated as an economic good in order to solve problems of scarcity, inefficiency and unsustainability.

While it is acknowledged that the goal of treating water as an economic good is ultimately to achieve the sustainable use and conservation of the resource, there has been a growing interest, notably by multinational corporations, in drawing monetary profits from exploitation of water resources. Perceived water scarcity and growing needs contribute to putting a higher price on water and ensuring cost-recovery and profit. This means that water is fast becoming a pure commodity subject to the rules of pricing, markets and international trade. The international financial and trade institutions have played a significant role in this matter, amongst other things by putting increasing pressure on developing member countries to adopt a market approach to water resources under restructuring programmes. This has been reflected on the one hand by the accelerating involvement of the private sector in water management and services, in particular through privatisation of services supported by the international financial institutions.⁸ On the other hand, interest is increasing in potential profits from trading water as a good in itself both in the domestic and global contexts.⁹ Water transfers in different forms - through dam-building, pipelines, inter-basin transfers or interlinking of rivers - are becoming increasingly prevalent both within and between states.

1 The author wishes to thank Adil Khan for his research assistance.

2 Water: A Shared Responsibility. The United Nations World Water Development Report 2 (2006), at 120.

3 The Right to Water, WHO, Health and Human Rights Publications, Series no. 3 (2003), at 3.

4 See <http://www.worldwaterday.org/>

5 See General Comment No. 15, The Right to Water (Articles 11 and 12 of the International Covenant on Economic, Social and Cultural Rights), UN Doc. E/C.12/2002/11 (2002). The right to water is also enshrined in other human rights instruments; most recently, see article 28(2)(a), Convention on the Rights of Persons with Disabilities, 30 March 2007, 46 *Int'l Leg. Mat.* 443 (2007). A detailed study of the scope and content of the human right to water will be submitted by the Office of the United Nations High Commissioner for Human Rights prior to the sixth session of the Human Rights Council in September 2007. See Human Rights Council, Implementation of General Assembly Resolution 60/251 of 15 March 2006 Entitled 'Human Rights Council', UN Doc. A/HRC/2/L.3/Rev.3 (2006).

6 Principle 4, Dublin Statement on Water and Sustainable Development, International Conference on Water and the Environment, Dublin, 31 January 1992. Chapter 18.8 of Agenda 21, which was adopted at same year at the Rio Conference on Environment and Development, also clearly acknowledges that water should be managed as both an economic and social good.

7 World Water Council, World Water Vision (London: Earthscan, 2000), at 2.

8 The second World Water Forum held in the Hague in March 2000 gave particular emphasis to the need to mobilize new financial resources to solve water problems and called for greater involvement by the private sector.

9 On trade in water on the domestic level, especially within developing countries, see M. Thobani, *Tradable Property Rights to Water* (Washington DC: World Bank, 1995); M. Rosegrant and H. Binswanger, 'Markets in Tradable Water Rights: Potential for Efficiency Gains in Developing-Country Irrigation', 11 *World Development* 22 (1994).

Coupled with the problems of availability and adequacy of water resources in the world, this raises a multitude of questions concerning the impact of the international trade agreements on trade in water. Trade in water can indeed lead to conflicts between international trade liberalisation rules and domestic environmental policies. In particular, once trade in water is made subject to international trade rules, this might constrain governments in adopting measures aimed at protecting and conserving water resources at the domestic level. It is thus crucial to ensure that '[a]greements concerning trade liberalization should not curtail or inhibit a country's capacity to ensure the full realization of the right to water'.¹⁰

Unlike the other debate on the relationship between international economic law and water, namely the question of privatisation of water services under the General Agreement on Trade in Services (GATS), there has been relatively little attention brought to international trade in water. It remains very pertinent to identify the relevant issues, since commercial pressures to export water are raising growing concerns among local communities and environmental organisations over the over-exploitation of water resources and the impact of international trade agreements on national environmental policies. The topic of water will certainly be a central one within the framework of World Trade Organization (WTO) negotiations in the years to come. In this framework, the aim of this paper is to present some of the legal implications of subjecting trade in water resources to the international trade rules developed within the WTO, the extent to which these rules take account of the social and environmental values of water and whether they allow countries to protect water resources from overexploitation. These implications can be viewed from the point of view both of exporting states wishing to protect domestic water resources and of importing countries wishing to resolve problems of water scarcity through trade.

The paper in a first section briefly presents some background issues to the questions raised, namely the broad shift in international law and policy towards seeing water mainly as an economic good. Section II then turns to the primary focus of the paper, that is trade in what is referred to here as 'real' water resources.¹¹ This concerns on the one hand trade in bottled water, which is the most common form in which water is traded after it has been transformed or removed from its natural or bulk state, and on the other trade in bulk water resources, which has attracted considerable interest by multinational and domestic corporations as well as countries facing water scarcity problems. In section III, the discussion turns to the applicability of the General Agreement on Tariffs and Trade (GATT)¹² rules to trade in water. Water can also be traded when it is incorporated in products which either contain significant amounts of water or require large volumes of water to produce, particularly in the case of agricultural products. The term 'virtual water' has been coined to indicate the amount of water made available in the global market through agricultural commodity trade. Section IV addresses some of the implications of trade in virtual water from the perspective of the international trade rules. The paper ends with concluding remarks on the relationship between access to water and the international economic legal framework.

I. INTERNATIONAL TRADE IN 'REAL' WATER RESOURCES

A) Bottled Water and other Drinks Containing Water

The most common form in which water can be traded occurs after its transformation or removal from a natural or bulk state. This concerns most prevalently bottled water¹³ and other drinks containing water such as soft drinks and juices. An increasingly lucrative international market in bottled water has emerged as a consequence of growing demand for the good, with Nestlé, Danone, Coca Cola and Pepsi Cola as leading corporations in the field.¹⁴ Bottled water consumption has been steadily growing in the world for the past 30 years and consumption increases

¹⁰ Paragraph 35, General Comment No. 15, note 5 above.

¹¹ The paper does not deal with water in its natural state, i.e., shared lakes, rivers and aquifers, which are regulated under international water law in particular as concerns watercourses. These cannot be considered goods since they do not enter into commerce. This question is treated in E. Brown Weiss, 'Water Transfers and International Trade Law' in E. Brown Weiss, L. Boisson de Chazournes and N. Bernasconi-Osterwalder eds, *Fresh Water and International Economic Law* 61, 63-6 (Oxford: Oxford University Press, 2005).

¹² General Agreement on Tariffs and Trade, 15 April 1994, 1867 UNTS 3 [hereinafter GATT 1994].

¹³ The term 'bottled water' subsumes natural mineral water, spring water and purified water. See C. Ferrier, *Bottled Water: Understanding a Social Phenomenon*, WWF Discussion Paper, 2001, at 6-8.

¹⁴ For further information, see <http://www.bottledwaterweb.com/>

by an average 12 per cent each year, in spite of its excessively high price compared to tap water and even in countries where there is access to safe public drinking water.¹⁵ While almost half of the bottled water is consumed by Western Europeans, bottle sales are also increasing in developing countries - in particular Asia - despite the fact that bottled water rarely provides adequate volumes of water for domestic use and that its cost is typically very high.

The bottled water industry is not exempt of environmental impacts, because amongst other things manufacturing, recycling or incinerating bottles requires energy and can release polluting particles into the air and water. Transporting bottled water within or between countries also implies energy needs and fuel combustion. Domestically, the extraction of groundwater necessary for production of bottled water has caused tensions with local communities. In India, 65 per cent of Indian bottlers simply pump water from any bore well or even municipal water supplies resulting, in addition to poor bottled water quality, in threatening ground water resources because of overexploitation and pollution due to purification and processing.¹⁶ Communities residing in proximity to Coca-Cola bottling plants have been experiencing severe water shortages allegedly as a result of the company's massive extraction of water from the common groundwater resource.¹⁷ The increase in bottled water consumption can thus represent a threat to domestic fresh water resources particularly in countries already facing significant water problems.

Bottled water and other drinks containing water have for a long time been considered commodities, and they remain certainly the main form in which water is traded between states and on a large scale. The trade boom in such goods that has taken place in recent years coupled with mounting concerns over scarcer water availability nevertheless make it relevant to examine the way in which the international trade rules apply to trade in these goods.

B) Bulk Water

Rather than being transformed and traded in small, defined volumes, or as part of other products, water can be traded as such, in bulk form.¹⁸ While water has always been transferred domestically and between states, mainly through canals and pipelines, the view that bulk water is a commodity that can be traded intensively on the inter-state level is a new phenomenon. Countries were reluctant to engage in the export of this natural resource particularly because, as mentioned above, water was for a long time considered a public good which could not be commodified. Technical limitations in transporting water along long distances and in determining accurately the amounts transported have also constituted an obstacle to trade in bulk water. New bulk storage and transfer technologies have now been developed to make it possible to move large volumes of water across long distances for commercial purposes, including through massive pipelines, supertankers or giant sealed water bags.¹⁹ Growing scarcity of the resource in some countries means that the price of water has increased, making this emerging market all the more appealing for both public and private entities. Opening up the international market-place to water has also been seen as an answer to the inequitable distribution of water in the world between water-rich and water-impooverished countries. Despite the high cost of transferring water over long distances²⁰ as well as growing public pressure against water trade in exporting countries,²¹ there is increasing momentum for the establishment of an international

15 Data found on the International Year of Freshwater 2003 website (www.wateryear2003.org). Sales have reached up to US\$ 50 billion worldwide in the past decade and are still growing about 10 percent a year. See P.H. Gleick et al., *The World's Water 2002-2003: the Biennial Report on Freshwater Resources* (Island Press: Washington, 2002), at 43-4.

16 See Ferrier, note 13 above, at 21.

17 See, e.g., S. Koonan, *Legal Implications of Plachimada: A Case-Study* (Geneva: International Environmental Law Research Centre, Working Paper 2007-05, 2007) available at <http://www.ielrc.org/content/w0705.pdf>.

18 Brown Weiss, note 11 above, at 66-7, defines 'bulk water removals' as 'removal by human/made diversions, including canals, taker ships, trucks, or pipeline'. This does not include removal for bottling.

19 In the late 1990s, Aquarius Water Transportation became the first company to tow bags of fresh water for export, delivering commercial bulk quantities to the Greek Islands. In 2000, another company, Nordic Water Supply, began using 5 million gallon bags - 10 times as big as the original Aquarius containers - to float water from Turkey to northern Cyprus. See further further M. Clayton, 'Forget OPEC. The next cartel may export drinking water', *Christian Science Monitor*, 30 December 2004, available at <http://www.csmonitor.com/2004/1230/p13s01-sten.html>.

20 It is still cheaper to get freshwater by other means, even by desalination of seawater.

21 Water exports are already at the forefront of public concern in some countries like water-rich Canada. See *Bulk Water Removals and International Trade Considerations: Document from the Canadian Department of Foreign Affairs and International Trade*, 16 November 1999; International Joint Commission (IJC), *Protection of the Waters of the Great Lakes: Final Report to the Governments of Canada and the United States*, 22 February 2000 (available at <http://www.ijc.org/php/publications/html/finalreport.html>). See also S.P. Little, 'Canada's Capacity to Control the Flow: Water Export and the North American Free Trade Agreement', 8 *Pace Int'l L. Rev.* (1996).

water market by multinational and domestic corporations. These factors contribute to rendering the issue a lot less theoretical than it was a few years ago and give ground to the assumption that in the near future one could witness large-scale water transfers between states.²²

New proposals for bulk water transfers at the global level include the Middle East, Europe and North America. Trade in bulk water can be conducted between governments (by contract or treaty), between private parties or between government and private parties. The 2004 tender between Israel and Turkey is one example of a large-scale water transfer taking place on a contractual basis between two states. Israel has agreed to buy 50 million cubic meters of water annually from Turkey for a duration of 20 years.²³ Israel does have alternatives to importing water, including desalination, improvements in water-use efficiency or reallocation of existing water resources within the country. Turkey is planning on similar future arrangements with other water-poor countries such as Syria, Jordan and Greece. In the European context, the European Commission has put forth a proposal for the establishment of a European Water Network allowing water from Austria to be transferred to water-scarce regions of Southern Europe.²⁴ The question of bulk water transfers is also very topical in North America. During the past half-century, there have been at least nine proposals for large-scale water diversions from Canada and Alaska, including a US\$ 100 billion mega project to pipe water from James Bay in northern Quebec to the Western United States.²⁵

Finally, it is worth mentioning that transboundary water transfers have also been arranged on the basis of international treaties as in the case of South Africa and Lesotho.²⁶ South Africa's interest lies in using water from the Lesotho Highlands to meet a growing domestic demand for water for industrial purposes. The countries entered into a 1986 agreement for the implementation of the so-called Lesotho Highlands Water Project (LHWP). In 1991, the World Bank approved a loan of \$110 million for Lesotho to finance the first phase of the project.

These trends have led to concerns in some water-rich countries and among environmental non-governmental organisations that an international water trading market will deprive governments of the freedom to prevent export of domestic water at the detriment of local communities and ecosystems. The extraction of water for bulk export can involve the disruption of ecosystems, damage to natural habitats, harm to biodiversity, and disruption of aquifers and underground water systems. Transporting bulk water worldwide also has environmental impacts; for instance, supertankers can deplete water supplies along ocean coasts since they cannot venture inland.

II. APPLICABILITY OF THE GATT/WTO RULES

A) Water as a Good or Product

Trade in goods is regulated under the GATT/WTO. Applicability of the agreement rests on the determination of whether water is a good or product.²⁷ Whether or not water is a good is a question that arises in view of its unique and essential functions which set it apart from any other product. It appears clear that water becomes a good when it is transformed from its natural state, bottled and put into commerce.²⁸ This is also the case when drinks containing water are sold. The trade in bottled water and drinks containing water in that it concerns a definite amount of freshwater traded as a separate product is therefore the most easily recognized application of water as a tradable commodity subject to the rules governing international trade. An indication that member states treat exports and

22 Relatively few long-term international trades in bulk water have actually taken place. See Gleick, note 15 above, at 44-5.

23 For further information, see <http://academic.evergreen.edu/g/grossmaz/SIMHONM/>

24 For further information, see <http://www.american.edu/TED/water-austria.htm>

25 See S. Handleman, 'Exporting Fresh Water', *Time.com*, 5 August 2001, available at <http://www.time.com/time/global/august/hotcom.html>.

26 Treaty on the Lesotho Highlands Water Project, 24 October 1986, between the Kingdom of Lesotho and the Republic of South Africa, cited in Brown Weiss, note 11 above, at 74 (The treaty has not yet been registered with the United Nations) [hereafter Lesotho-South Africa Treaty].

27 This is indicated in articles I, III and XI, GATT 1994, note 12 above. See further R. J. Girouard, 'Water Export Restrictions: A Case Study of WTO Dispute Settlement Strategies and Outcomes', 15 *Georgetown Int'l L. Rev.* 247 (2003); J.H. Jackson, *The Jurisprudence of GATT and WTO* 58 (Cambridge: Cambridge University Press, 2000).

28 M. Cossy, 'Le statut de l'eau en droit international économique. Principaux aspects au regard des règles de l'Organisation mondiale du commerce', in L. Boisson de Chazournes and S.M.A. Salman eds, *Water Resources and International Law* 169 (Leiden: Martinus Nijhoff, 2005).

imports of bottled water like any other good can be given by the existence of notifications on technical or sanitary regulations and standards concerning bottled water in the framework of the Agreement on Technical Barriers to Trade (TBT).²⁹ For instance, bottled water exported by Canada to the United States has been expressly recognized as a tradable commodity under the North American Agreement on Free Trade (NAFTA).³⁰ Since bottled water and other drinks containing water are covered by the international trade regimes, much of the debate and concern has been focused on whether bulk water is a good or product when it is traded between states.

There is no information on the intent of the parties when negotiating the GATT relevant to the applicability of the Agreement to bulk transfers of water, and this question has indeed never been discussed in the framework of the WTO. Indeed, the absence of an explicit exclusion of water from the GATT has been read as arguing for the applicability of the Agreement to trade in this resource.³¹ On the other hand, water might not be mentioned because trading large amounts of water between states was not envisaged until recent years. Some indication as to the intent of the parties to NAFTA can be provided in the joint declaration signed in 1993, which aimed at explicitly *excluding* water in its natural state from the scope of the regional trade agreement. The governments of Canada, Mexico and the United States stated that:

'Unless water, in any form, has entered into commerce and becomes a good or product, it is not covered by the provisions of any trade agreement, including the NAFTA. And nothing in the NAFTA would obligate any NAFTA Party to either exploit its water for commercial use, or begin exporting water in any form. Water in its natural state, in lakes, rivers, reservoirs, aquifers, water basins and the like is not a good or product, is not traded, and therefore is not and never has been subject to the terms of any trade agreement.'³²

The declaration has been argued as having no legally binding force and subsequent official statements by the parties and in particular the United States provide little support to its original aim.³³ Nonetheless, the joint declaration does give some indication that states have been reluctant to bulk water to trade agreements.

The inclusion of water under the GATT Tariff List is often cited as evidence of its applicability to all forms of water. Products are identified for tariff purposes under the GATT by the Harmonizing Commodity Description and Coding System (HS), which is developed and maintained by the World Customs Organization.³⁴ It subsumes water in several forms. In particular, Tariff Heading 2201.90.0000 comprises '[w]aters, including natural or artificial mineral water and aerated waters containing added sugar or other sweetening matter or flavored and other nonalcoholic beverages, not including fruit or vegetable juices of Heading 20.09; [...] ice and snow'. Explanatory note A adds 'ordinary water of all kinds (other than sea water)'.³⁵ The inclusion of water in the Tariff Heading has been interpreted by some to imply that not only water that has been transformed from its natural state (in particular bottled water and other beverages containing water) but also that water in any form can be considered a good and thus be covered by the GATT if traded between states. Such a broad interpretation would lead to the applicability of the GATT to any type of transfer of water that was diverted or pumped in order to cross national borders. The interpretation according to which water is a good since it is included in the Tariff Schedule has been contested by some authors, on the basis that the purpose of the Schedule is not to provide a definition of the goods falling under the GATT/WTO but rather to determine that when water is classified as a good, it falls under a particular tariff heading.³⁶ Thus, the existence of a HS number would simply imply that there is a mechanism under which shipments of freshwater can be processed by national customs organizations. The HS is non-binding on member states.

29 See, e.g., Committee on Technical Barriers to Trade, Notification by the United Kingdom, G/TBT/N/GBR/14 (7 June 2006) (Spring Water and Bottled Drinking Water).

30 North American Free Trade Agreement, 17 December 1992, United States, Mexico and Canada, available at http://www.nafta-sec-alena.org/DefaultSite/index_e.aspx?DetailID=78 [hereafter NAFTA]. On the topic, see C. Baumann, Note, 'Water Wars: Canada's Upstream Battle to Ban Bulk Water Export', 10 *Minnesota J. Global Trade* 114, 119 (2001).

31 E. de Haan, 'Balancing Free Trade in Water and the Protection of Water Resources in GATT', in E. Brans et al. eds, *The Scarcity of Water* 245, 248 (London: Kluwer Law International 1997).

32 Statement by the Governments of Canada, Mexico, and the United States (1993) (on file with the author).

33 In 1993, US Trade Representative Mickey Kantor stated that 'when water is traded as a good, all provisions of the agreements governing trade in goods apply.'

34 The HS nomenclature is used as a basis for the collection of customs duties and international trade statistics by almost all countries.

35 World Customs Organization, Harmonized Commodity Description and Coding System: Explanatory Notes (3rd edn 2002).

36 See Gleick, note 15 above, at 48.

The criteria of transformation has also been applied to the determination of whether bulk water is a good or product under the GATT. This would imply that as soon as water is transformed or processed, it can be interpreted more directly as a tradable good. Some authors argue that bulk water transfers by tankers or giant plastic bags is not that different from bottling water, except in the quantities, thus making it a good.³⁷

The question of whether or not water in its bulk form can be considered a good or product under the GATT is therefore far from being settled, especially since there have to date been no disputes involving water submitted to the WTO Dispute Settlement Body (DSB). Because of its unique nature, there is a strong argument for excluding water from the scope of the GATT. Trade in such a vital resource should not be subjected to the rules of international trade since states need to retain control over domestic water resources for purposes of allocation, use and protection. In this sense, a distinction should be operated under the GATT/WTO between water and other tradable natural resources such as timber or fossil fuels which are not vital and unique. This argument can be supported by the language of the preamble to the agreement, which acknowledges the intent of the parties to conduct international trade 'while allowing for the optimal use of the world's resources in accordance with the objective of sustainable development'. A further reason for exempting trade in bulk water is that the trade dispute settlement mechanism would have exclusive competence in resolving disputes surrounding water.

The importance of determining the applicability of the international trade rules to trade in water lies of course in the possibilities for a) water exporting countries to limit or ban exportation of their water resources and b) water importing countries to bring a claim under the WTO DSB against restrictive trade measures applied by water-exporting country. It remains pertinent to examine what the consequences of the application of the GATT to trade in water would be if indeed water were to be considered a good or product under the agreement. Indeed, were a dispute be submitted to the DSB, it would be likely that water would be considered as falling under the scope of the GATT.

B) GATT Obligations

As it is well known, the main purpose of the GATT is the liberalisation of international trade through the elimination of trade restrictions. The cornerstone principles are couched in articles I, III and XI of the Agreement. Under Article I, the most-favoured nation principle dictates that all WTO member states must be treated on an equal footing and grant each other equal treatment of like products originating or destined for the territories of all other members. This principle applied to trade in water would mean that countries are prevented from discriminating between importers and exporters. Article III sets forth the national treatment principle implying that once goods have entered into a market, equal treatment must be applied to foreign and domestic goods. With respect to the import of goods, states party cannot discriminate against imports on the basis of their consumption or production practices under these provisions. This provision would be relevant in the case of states wishing to restrict water imports for instance on environmental grounds.

The conflict between water export-control measures and trade rules arises most significantly under article XI, paragraph 1. The provision reads:

'No prohibitions or restrictions other than duties, taxes or other charges, whether made effective through quotas, import or export licences or other measures, shall be instituted or maintained by any contracting party on the importation of any product of the territory of any other contracting party or on the exportation or sale for export of any product destined for the territory of any other contracting party.'

Article XI, paragraph 1, prohibits measures other than duties, taxes, or other charges, and states are required to gradually reduce tariffs upon imports and exports of goods meaning that quotas or bans on the export of water for conservation purposes could be challenged as a form of protectionism.³⁸ This obligation is particularly important with regard to trade in bulk water, since it could be interpreted as constraining WTO member governments from establishing policies, programmes or legislation to regulate or prohibit bulk water exports. If indeed applicable, one question is whether these restrictions would apply only to specific, bulk water trades once they have begun, or apply to all potential trading arrangements once trade in bulk water has begun between any WTO signatories.³⁹

³⁷ See Cossy, note 28 above, at 7-8.

³⁸ See also article XIII (non-discriminatory administration of quantitative restrictions), GATT 1994, note 12 above.

³⁹ Gleick, note 15 above, at 49.

Few disputes concerning the export of goods under article XI, paragraph 1, have been submitted to the WTO dispute settlement mechanism by member states. In the Canada Herring and Salmon case, the Panel found that the measures adopted by Canada prohibiting the exportation or sale for export of certain unprocessed herring and salmon were contrary to article XI, paragraph 1, and not justified under the GATT exceptions found under article XI, paragraph 2, and XX, paragraph g.⁴⁰ Under article XI, then, any prohibition maintained by a state to prohibit or to limit water exports from its territory - providing water is a good falling under the agreement - is in principle forbidden, unless it can be justified under one of the GATT exceptions. It thus remains to be examined what other provisions would allow countries to take protective measures for social and/or environmental reasons.

C) GATT Exceptions

1) Article XI, paragraph 2(a)

The GATT contains a first exception which is specifically applicable to article XI, paragraph 1. Paragraph 2(a) of this provision sets forth a temporary exception to the provisions of paragraph 1 with respect to '[e]xport prohibitions or restrictions temporarily applied to prevent or relieve critical shortages of foodstuffs or other products essential to the exporting contracting party.' When instituting export restrictions or prohibitions to prevent or relieve critical shortages of foodstuff, states must 'give due consideration to the effects of such prohibition or restriction on importing states' food security'. This condition does not apply to restrictions or prohibitions on the basis of the second ground. Since water is undoubtedly essential in preventing or relieving shortages of foodstuffs and can be considered a product essential to the exporting state, water exports could be temporarily excluded from the scope of article XI, paragraph 1.

The exception found in article XI, paragraph 2(a) would enable WTO member states to temporarily restrict water exports and justify trade-related environmental measures otherwise inconsistent with GATT principles if there is a critical shortage of water for human consumption or agricultural uses. It does not however apply to situations in which states seek to ban water exports on environmental grounds, which indeed seems to be one of the most likely scenarios for policy decisions to restrict export of domestic water resources. Were article XI, paragraph 2(a), to apply, exporting states are still required to balance their own food security interests when applying an export restriction on water as foodstuff with those of the importing state. This is a requirement of article 12, paragraph 1, of the WTO Agreement on Agriculture,⁴¹ which provides that:

'Where any Member institutes any new export prohibition or restriction on foodstuffs in accordance with paragraph 2(a) of Article XI of GATT 1994, the Member shall observe the following provisions:

(a) the Member instituting the export prohibition or restriction shall give due consideration to the effects of such prohibition or restriction on importing Members' food security [...]

Thus, a country applying a water export ban must take into account the impacts of such a measure on the food security situation of the importing country. However, how exactly articles XI, paragraph 2(a), of the GATT and 12 of the Agreement on Agriculture interrelate in this case is still to be clarified.

2) Article XX

The GATT contains a general exception to the obligations incumbent upon its member states under article XX. Thus, should restrictive or prohibitive measures applied to water exports be considered to violate provisions such as article XI, article XX could be invoked to justify such measures. This clause provides states with the possibility to derogate from GATT obligations for the protection of certain specific interests. Most significantly for the issues treated in this paper, a state can apply trade restrictions as follows:

40 Canada - Measures Affecting Exports of Unprocessed Herring and Salmon, Panel Report, Canada – Measures Affecting Exports of Unprocessed Herring and Salmon (BISD 35S/98, 22 March 1988) [hereafter *Canada Herring*]. See also Japan – Trade in Semi-conductors, Panel Report (4 May 1988) L/6309 - 35S/116; Argentina - Measures Affecting the Export of Bovine Hides and the Import of Finished Leather, Panel Report (19 December 2000) T/DS155/R.

41 Agreement on Agriculture, Annex 1A to the Marrakesh Agreement establishing the World Trade Organization and Final Act, 15 April 1994 (available at http://www.wto.org/english/docs_e/legal_e/14-ag.pdf) [hereafter Agreement on Agriculture].

‘Subject to the requirement that such measures are not applied in a manner which would constitute a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail, or a disguised restriction on international trade, nothing in this Agreement shall be construed to prevent the adoption or enforcement by any contracting party of measures: [...]

(b) necessary for the protection of human, animal or plant life or health’; [...]

(g) relating to the conservation of exhaustible natural resources, provided that such measures are made effective in conjunction with restrictions on domestic production and consumption’.

In its case-law, the DSB has adopted a restrictive interpretation of the environmental exceptions contained in paragraphs (b) or (g) of article XX. The two main cases in which governments have attempted to put limitations on trade in natural resources using article XX, the 1991 Tuna-Dolphin case and the 1998 Shrimp-Turtle case, resulted in a rejection by the Appellate Body of domestic environmental protection legislation as a basis for imposing trade restrictions. In *Shrimp-Turtle*, the Appellate Body nonetheless opened the door towards a broader application of the environmental exceptions by referring to ‘[...] concerns of the community of nations about the protection and conservation of the environment’ and the aim of sustainable development found in the Preamble to the WTO Agreement.⁴² The WTO Committee on Trade and the Environment has moreover discussed issues related to the relationship between trade rules and the multilateral environmental agreements. There is however no legal precedent to date regarding the application of article XX exceptions to trade in water.⁴³ Moreover, the disputes in which article XX was considered concerned import restrictions rather than restrictions placed on the export of a domestic resource, leaving many unresolved questions with respect to water trade restrictions. The case of export restrictions would raise additional issues relating to state sovereignty over natural resources, since it would involve a country attempting to protect its domestic resources rather than influence the production processes in another country. The following paragraphs examine how the exceptions found in article XX could potentially be applicable to trade in water, particularly bulk water.

(a) Paragraph (b)

Paragraph (b) of article XX provides that states can impose trade restrictions if they are necessary for the protection of human, animal or plant life or health. Measures have to be necessary, that is, the state must use among all available measures the one that is the least trade restrictive measure for the aim of protecting human, animal or plant life.⁴⁴ Indeed, article XX, paragraph b, aims at preventing the use of trade measures for protectionist purposes. Recent case-law by the Appellate Body gives an indication of what constitutes a ‘necessary’ measure. In *Korea Beef*, the Appellate Body provided (referring to paragraph (d) of article XX):⁴⁵

‘In sum, determination of whether a measure, which is not “indispensable”, may nevertheless be “necessary” within the contemplation of Article XX(d), involves in every case a process of weighing and balancing a series of factors which prominently include the contribution made by the compliance measure to the enforcement of the law or regulation at issue, the importance of the common interests or values protected by that law or regulation, and the accompanying impact of the law or regulation on imports or exports.’

This softens prior case-law, which had given a much more rigorous definition of the term necessary.⁴⁶ The Appellate Body therefore sets forth three conditions in determining whether a measure is necessary. Its reference to ‘common interests or values’ is noteworthy, especially since ‘[t]he more vital or important those common interests or values are, the easier it would be to accept as “necessary” a measure designed as an enforcement instrument.’⁴⁷

⁴² See paragraphs 129-130, *United States: Import Prohibition of Certain Shrimp and Shrimp Products-Report of the Appellate Body* (12 October 1998) WT/DS58/AB/R.

⁴³ In a request for consultations, Canada claimed that Korean regulations on the shelf-life and physical treatment (disinfection) of bottled water were inconsistent with articles III and XI, GATT 1994, note 12 above, as well as articles 2 and 5 of the SPS and 2 of the TBT. At the DSB meeting on 24 April 1996, the parties to the dispute announced that they reached a settlement. See *Korea - Measures Concerning Bottled Water - Request for Consultations by Canada* (WT/DS20/1, 22 November 1995).

⁴⁴ See paragraph 74, *Thailand - Restrictions on Importation of and Internal Taxes on Cigarettes* (BISD 34S) [hereafter *Thai Cigarette*].

⁴⁵ See paragraph 164, Report of the Appellate Body, ‘*Korea - Measures Affecting Imports of Fresh, Chilled and Frozen Beef*’ (WT/DS161/AB/R; WT/DS169/AB/R, 11 December 2000) [hereafter *Korea Beef*]. Further, see paragraph 161.

⁴⁶ See, e.g., paragraph 73, *Thai Cigarettes*, note 44 above.

⁴⁷ See paragraph 162, *Korea Beef*, note 45 above.

The exception found in paragraph (b) has been used by states in several disputes on the basis of the protection of human⁴⁸ or animal health. While these cases concerned restrictions on import, nothing in the text of paragraph (b) suggests that export cannot be concerned.

It could be argued that export restrictions on domestic water resources could be justified under this clause if resulting water scarcity represented a threat to biodiversity, ecosystems, natural habitats, or led to shortages of water for consumption or agricultural purposes. Restrictions would also have to be necessary, that is, aimed at protecting common interests or values; water, as indeed a 'vital resource' would without doubt fit into this. Consequently, if export restrictions were adopted in a broader plan of national water management aimed at preventing domestic water scarcity, export restrictions could fall within this provision.

(b) Paragraph (g)

Paragraph (g) of article XX allows states to take restrictive trade measures relating to the conservation of exhaustible natural resources. Any measures adopted under this article cannot be adopted for protectionist reasons.⁴⁹ This provision has also been the object of several disputes submitted to the WTO DSB.

For trade in water to be restricted for conservation purposes by member states under paragraph (g) of article XX, water must firstly constitute an 'exhaustible natural resource' in the sense of this provision. Paragraph (g) appears to have been originally drafted in regard to such resources as minerals or fossil fuels. There is no indication in the GATT that water could be considered an exhaustible natural resource, and indeed it is likely that water was not even contemplated during the drafting of the Agreement - not more than other 'renewable' resources such as animals, plants and soil. However, WTO case-law has considered as renewable such biological resources as tuna, salmon, herring, dolphins or sea turtles, as well as non-biological ones (air). In *Shrimp-Turtle*, the Appellate Body applied an evolutionary interpretation to the concept of exhaustible natural resource. In determining that sea turtles constitute 'exhaustible natural resources' for purposes of article XX (g), it provided that '[f]rom the perspective embodied in the preamble of the *WTO Agreement*, we note that the generic term "natural resources" in Article XX(g) is not "static" in its content or reference but is rather "by definition, evolutionary".'⁵⁰ It found that sea turtles are exhaustible natural resources because the species concerned are listed in CITES as species threatened with extinction.⁵¹ In *Reformulated Gasoline*, the Appellate Body considered that clean air was an exhaustible natural resource since it could be polluted.⁵²

An examination of WTO case-law relating to the applicability of article XX, paragraph (g), to natural resources would indicate that the Appellate Body could look favourably upon considering water an exhaustible natural resource for the purposes of this provision. While many sources of water are renewable resources made available by the hydrologic cycle of the atmospheric-oceanic-terrestrial system,⁵³ water may also be non-renewable in some situations and some water sources can be made non-renewable through human action.⁵⁴ Thus all water resources cannot be treated alike for the purpose of determining whether they are exhaustible or not. Paragraph (g) could be argued to apply to water stocks that are not being replenished at a significant rate compared with the rate of use. In this case, there would be a strong argument for applying the exception to restrictions on trade in water where the resources are non-renewable or exhaustible through overuse or abuse. Gleick cites the example of groundwater overdraft in which human extraction exceeds natural replenishments. In the case of exports, some argue that water from the Great Lakes should be considered non-renewable since only a very small part of the lakes are renewable and the vast bulk of the stored water was laid down in geologic times.⁵⁵ Thus in some circumstances, exports of

48 See, e.g., *Thai Cigarettes*, note 44 above; *European Communities - Measures Affecting Asbestos and Asbestos-Containing Products* (WT/DS/135/R, 18 September 2000).

49 See paragraphs 4.4-4.7, *Canada Herring*, note 40 above.

50 See paragraph 130, Report of the Appellate Body, United States - Import Prohibition of Certain Shrimp and Shrimp Products (WT/DS58/AB/R, 12 October 1998) (italics in text) [hereafter *Shrimp Turtle*].

51 See *ibid.*, paragraph 132.

52 United States - Standards for Reformulated and Conventional Gasoline (WT/DS2, 20 May 1996) [hereafter *Reformulated Gasoline*].

53 In this sense, continued flows of water are not affected by withdrawals and use of water.

54 Gleick, note 15 above, at 39 and 49-50. For instance, some groundwater basins and lakes have very slow rates of recharge and inflow, and thus water extracted from these basins or bodies of water in excess of the natural recharge or inflow rate reduces the total stock available for later use. Contamination of a groundwater stock can also make a renewable resource into a non-renewable one.

55 See the 1999 Report of the IJC concluding the Great Lakes are non-renewable, note 21 above.

bulk water from the lakes could lead to irreversible decline in the lake levels. Similarly, cases where water stocks are contaminated by human action also represent the conversion of renewable water resources in a non-renewable one.

The second condition for the applicability of paragraph (g) is that the restrictive trade measure must 'relate to' conservation of the resource. In this regard, the Appellate Body has applied a fairly broad interpretation of this criteria in *Reformulated Gasoline* and *Shrimp-Turtle*. In the latter case, it ruled that to determine if relates to, one must look at 'the relationship between the general structure and design of the measure [...] at stake [...] and the policy goal it purports to serve [...]'.⁵⁶

Finally, measures must be made effective in conjunction with restrictions on domestic production and consumption. The interpretation of this condition has also been loosened by the Appellate Body.⁵⁷ In *Reformulated Gasoline*, the Appellate Body determined that '[t]he clause is a requirement of *even-handedness* in the imposition of restrictions, in the name of conservation, upon the production or consumption of exhaustible natural resources'.⁵⁸

Provided export restrictive measures are part of a state's conservation policies aimed at the protection of national water resources, export restrictions on exhaustible flows of water could fall under the non-renewable mineral resources category for exemption under paragraph (g).⁵⁹ The exporting state would also have to restrict domestic consumption of water for conservation purposes in order to meet the conditions of paragraph (g).

(c) Chapeau

In addition to meeting the conditions set forth in article XX paragraphs (b) or (g), a measure must also comply with the chapeau to article XX, which prohibits the use of trade restrictions when these result in unjustifiable discrimination between states or form a disguised restriction to trade. According to the Appellate Body, the chapeau of article XX is 'but one expression of the principle of good faith'.⁶⁰ The interpretation of the chapeau involves the balancing of interests of the member invoking an exception under article XX and the rights of other members under substantive provisions of the GATT 'so that neither of the competing rights will cancel out the other and thereby distort and nullify or impair the balance of rights and obligations constructed by the Members themselves in that Agreement'.⁶¹ A case-by case analysis would thus be required in the case of trade restrictions on water to determine whether they comply with the chapeau.

In conclusion, until an actual dispute concerning trade restrictions on water is brought before the DSB, the impact of the WTO case-law is uncertain for the protection of water resources under article XX, paragraphs (b) and (g). The trade and environment case-law tends to point to the fact that a state wishing to ban water exports as part of its domestic water policy would have difficulty justifying it under the GATT exceptions. The state would have to argue that the restrictions can be justified under the GATT exceptions on environmental or human health grounds, provided the restrictions are implemented in a non-discriminatory manner and do not form a disguised restriction on trade.

III. THE CASE OF TRADE IN VIRTUAL WATER

A) The Concept of Virtual Water Trade

Water can also be traded when it is incorporated in products which either contain significant amounts of water or that require large volumes of water to produce. The term 'virtual water' was coined to define the volume of water required to produce a given product.⁶² Since the agricultural sector is the largest economic sector which uses

⁵⁶ See paragraph 137, *Shrimp Turtle*, note 50 above.

⁵⁷ For previous interpretation, see, e.g., paragraph 4.6, *Canada Herring*, note 40 above.

⁵⁸ (Italics in text). See also paragraphs 143-5, *Shrimp-Turtle*, note 50 above.

⁵⁹ Renewable flows of water could qualify under paragraph (b) as necessary to protect human, animal or plant life or health.

⁶⁰ See paragraph 158, *Shrimp-Turtle*, note 50 above.

⁶¹ See *ibid.*, paragraph 159.

⁶² See J.A. Allan, 'Overall Perspectives on Countries and Regions', in P. Rogers and P. Lydon eds, *Water in the Arab World: Perspectives and prognoses* 65 (Cambridge, Massachusetts: Harvard University Press, 1994). See also J.A. Allan, 'Virtual Water – the Water, Food, and Trade Nexus: Useful Concept or Misleading Metaphor?' (2003) 28 *Water Int'l* 4.

water resources at the global level,⁶³ agricultural products form a significant part of the trade in water-intensive goods and it is mainly with respect to these goods that the discussion on virtual water trade has taken place.⁶⁴ The implications of virtual water trade are well illustrated by the fact that the production of one kilogram of grain requires approximately 1000 to 2000 kilograms of water.⁶⁵ In many countries, significant amounts of water go towards water-intensive commercial crops grown in arid or semi-arid areas. The virtual water content of products strongly varies from place to place, depending upon the climate, technology adopted for farming and corresponding yields.⁶⁶ Trade in virtual water on the regional and international levels has been steadily increasing over the past decades, with about 15 per cent of the water used in the world for export in virtual form.⁶⁷ The United States and Canada are the biggest exporters of virtual water in the world, with India also figuring amongst the top exporters in part due to the large volume of exported agricultural products⁶⁸ including cotton, a very water-intensive cash crop mainly grown in dry regions.⁶⁹

The implementation of a sustainable virtual water trade is increasingly being viewed as one solution to further water use efficiency in the light of existing water scarcity, and global and regional imbalances in water availability. In the discussion on the implications of virtual water trade as a policy option for countries, it has been pointed out that virtual water trade 'should be encouraged to promote water savings for arid countries and at a global level through enhancing food security through appropriate and fair trade agreements.'⁷⁰ Since the export of water-intensive products contributes to the loss of significant amounts of domestic water resources, it is argued that water-scarce countries can meet their water demand for food by importing water-intensive agricultural products such as cereals from countries with sufficient or abundant water resources (water-rich countries).⁷¹ In this manner, rather than producing water-intensive products, water scarce countries can optimise the use of available domestic

63 Of the three main uses of water - household/municipal, industrial and agricultural - the latter amounts to 75 per cent. See Vital Water Graphics, UNEP 2003; World Water Assessment Programme, The UN World Water Development Report (2003).

64 According to Hoekstra, 67 per cent of the global virtual water trade is related to international trade in crops, 23 per cent to trade in livestock and livestock products and 10 per cent to trade in industrial products. See A.Y. Hoekstra ed, *Virtual Water Trade: Proceedings of the International Expert Meeting on Virtual Water Trade*, Value of Water Research Report Series No. 12 (February 2003), at 16. We do not look here at trade in water-intensive industrial goods.

65 As reported by the World Water Council (at <http://www.worldwatercouncil.org/index.php?id=866>). Rice has the largest share in the total volume water used for global crop production, followed by wheat. Moreover, livestock products have a higher virtual water content than crop products. See further A.Y. Hoekstra and A.K. Chapagain, 'Water footprints of nations: Water used by people as a function of their consumption pattern', 21 *Water Resources Management* 35, 38 (2007).

66 For instance, in regions with a high evaporative demand, the water requirement per unit of crop production is relatively large; water-inefficient agricultural practices mean that water productivity in terms of output per drop of water is relatively low. See *ibid*, at 46.

67 See the facts and figures on virtual water found on the site of the International Year of Freshwater 2003 (available at <http://www.wateryear2003.org>).

68 See K.B. Gupta, 'The Hidden Export of Water through Principal Crops across Different Regions in India: Social, Economic and Environmental Implications' (Paper presented at a National Seminar, Chanidgarh, National Institute of Technical Teachers' Training and Research (NITTTR), 2005); O.P. Singh et al, Virtual Water Trade in Dairy Economy: Irrigation Water Productivity in Gujarat, Economic and Political Weekly, 31 July 2004. See also S. Perveen, 'Water: The Hidden Export', *India Together*, August 2004 (available at <http://www.indiatogether.org/2004/aug/env-virtwater.htm>); S. Kerbart Sivakumar, 'It's Called "Virtual Water"', *The Hindu*, June 2004 (available at <http://www.hinduonnet.com/mag/2004/06/06/stories/2004060600150200.htm>); A. Bhandari, 'Sold! Waters of India', *The Times of New Delhi, Edition India*, 21 July 2004 (available at http://www.waterfootprint.org/Reports/Waters_of%20India.pdf).

69 The extensive irrigation of cotton has severe impacts on water resources leading to a depletion of surface or groundwater which can affect the river catchments and the wetlands laying downstream. See World Wide Fund for Nature (WWF), *The impact of cotton on freshwater resources and ecosystems: A preliminary Synthesis*, 1999.

70 See P. van Hofwegen, World Water Council, *Virtual Water Trade: Conscious Choices* (August 2003). The World Bank also finds that increasing water scarcity in the next two decades will mean that since agriculture consumes by far the largest percentage of water, most countries will take water from agriculture, allocate it to other sectors, and rely on increased food imports to meet their domestic needs. See World Bank, *Investment Note 1.3: Agricultural Trade, Water, and Food Security*. See further T. Allan, 'Watersheds and Problemsheds: Explaining the Absence of Armed Conflict over Water in the Middle East', 2 *Middle East Rev Int'l Affairs J.* (1998).

71 See M.W. Rosegrant, X. Cai and S.A. Cline, *Global Water Outlook to 2025: Averting an Impending Crisis* 9 (International Food Policy Research Institute, 2002). Further, see J.A. Allen, 'Virtual Water Eliminates Water Wars? A Case Study from the Middle East, Virtual Water Trade' and J. Warner, 'Virtual Water - Virtual Benefits? Scarcity, Distribution, Security and Conflict Reconsidered', in Hoekstra, note 64 above.

water resources.⁷² For instance, Jordan has been seen as having successfully externalised its water footprint by importing wheat and rice products from the United States which has higher water productivity.⁷³ Virtual water trade can in this manner represent an alternative to large-scale water transfer schemes which aim to redistribute water on the national or regional levels, often with significant adverse environmental and social impacts. The current debate in India over the inter-linking of rivers project, which aims at remedying water scarcity in the more arid regions, has included discussion of the value of virtual water trade across different states through the trade of principal crops.⁷⁴

On the other hand, there are reasons to be cautious about the value of promoting a virtual water trade.⁷⁵ For instance, when a country establishes a national policy for virtual water imports to alleviate its water problem, it will not necessarily develop alternatives in terms of crops or employment to ensure that the livelihoods of farmers are not unduly affected. There can also be significant alterations in the organisation and ownership of means of agricultural production within the country. Virtual water trade might also have environmental costs that outweigh the benefits stemming from more efficient global water use; these include not only the environmental costs of shipping of products but also the risks of over-exploitation of water resources even in water-rich countries where export of water-intensive crops is encouraged. A further aspect remains whether the countries facing the most severe water scarcity will actually be able to afford importing virtual water.

This paper does not go into the discussion of the pros and cons of virtual water trade. The concept of virtual water trade is well embedded in the Dublin Principles and other international policy documents that have promoted the economic aspects of water.⁷⁶ It rests indeed on the further development of global trade liberalization by developed and developing countries in order to encourage water-scarce countries to increase imports of agricultural water-intensive products and for water-rich regions to grow water-intensive products for export worldwide.⁷⁷ This is viewed as conducive to increased economic efficiency in the agricultural sector. However, it is clear that virtual water trade should also integrate the social and environmental values of water. Only in this sense can the concept be viewed as a means of using international and regional trade to forward sustainable water management and conservation goals. Since international trade presently involves a significant part of products whose production is water-intensive, it is important to assess whether the international trade rules allow for the integration of the social and environmental values of water when trade in water-intensive commercial crops is concerned. There has been little research on this topic, and the following section aims to provide some initial thoughts on whether the international trade framework takes into account the water content of agricultural products.

B) Relationship with the International Trade Rules

Since the most important virtual water exports and imports relate to agricultural products, it is within the WTO framework that the link between the emerging discourse on virtual water trade as a means to achieve more sustainable water use and the international trade rules appears. Trade in virtual water can be discussed in relation to several aspects of the WTO work programme that is currently being negotiated. This section focuses on some of the issues arising under the Agreement on Agriculture, which came into force on 1 January 1995.⁷⁸ The agreement's broad

72 The virtual water concept is closely linked to the 'water footprint' concept, which aims to determine on a national level the total volume of freshwater that is used to produce the goods and services consumed by the inhabitants of a country. Since not all goods consumed in one particular country are produced in that country, the water footprint consists both in the use of domestic water resources and use of water outside the borders of the country which implies quantifying the flows of virtual water leaving and entering the country. India (13 per cent), China (12 per cent) and the United States (9 per cent) have been found to be the largest consumers of the global water resources. See Hoekstra and Chapagain, note 65 above, at 43.

73 *Ibid.* at 46.

74 On some of the broader, regional implications, see, e.g., S. Parveen and I-M- Faisal, 'Trading virtual water between Bangladesh and India: a politico-economic dilemma' (2004) 6 *Water Policy* 1.

75 See, e.g., M. Dinesh Kumar and O.P. Singh, 'Virtual Water in Global Food and Water Policy Making: Is There a Need for Rethinking?', 19 *Water Resources Management* 759 (2005).

76 See note 6 above and related text.

77 The World Bank suggests that the lack of market access for agricultural commodities in high-income countries and the agricultural subsidies in developed countries contribute to supporting water-intensive activities. See World Bank, note 70 above.

78 Generally, see J. A. McMahon, *The WTO Agreement on Agriculture: A Commentary* (Oxford: Oxford University Press, 2006).

scope includes basic agricultural products (such as wheat, milk or live animals); products derived from them (butter or meat); and all processed agricultural products.⁷⁹ It also applies to fibres such as cotton, wool and silk, and raw animal skins destined for leather production, but excludes fish and fish products as well as forestry products.

While the original GATT provisions on agricultural trade allowed certain non-tariff measures such as import quotas and the use of export subsidies normally prohibited for industrial products, the Agreement on Agriculture sets specific commitments by WTO member states to improve market access and reduce trade-distorting agricultural subsidies. Member states commitments are to be implemented within a six-year period beginning in 1995 for developed countries, and a ten-year period for developing countries.⁸⁰

The Agreement on Agriculture prohibits all agriculture-specific, non-tariff measures, and provides for the eventual reduction in tariffs for agricultural products.⁸¹ The tariffication package agreed upon during the Uruguay Round requires the replacement of agriculture-specific non-tariff measures with tariffs that allow equivalent levels of protection.⁸² The Schedules of Commitments of individual WTO member states now include tariffs on virtually all agricultural products traded internationally, meaning that virtually all agricultural protection is currently in the form of tariffs.⁸³ Since the process of converting quotas and other non-tariff barriers into tariffs might reduce market access where the quota had been small and tariffication produces a high tariff, each member state is required to include minimum and current access commitments for all tariffied products in its Schedules.⁸⁴

WTO member states have also undertaken binding obligations with respect to the reduction and/or elimination of trade-distorting agricultural subsidies in order to promote international trade and improve market access.⁸⁵ Subsidies exist under the WTO where 'there is a financial contribution by a government or any public body within the territory of a Member' or if 'there is any form of income or price support [...]'. Subsidies for the agricultural framework are provided for both export and domestic policy purposes. Under the agreement, the use of export subsidies is now prohibited unless they are subject to product-specific reduction commitments within the limits specified in the schedule of the WTO Member concerned.⁸⁶ Where they are listed, the agreement requires WTO members to cut both the amount of money they spend on export subsidies and the quantities of exports that receive subsidies.⁸⁷

Reforming the current agricultural domestic support system in developed countries has been one central goal of the Doha Round negotiations. The Agreement on Agriculture requires the reduction of all domestic support that is considered trade-distorting. Trade-distorting measures fall into what is referred to as the 'Amber Box'.⁸⁸ These measures are subject to reduction commitments as specified in the schedule of each WTO member providing such support. Article 6 of the agreement exempts a number of domestic support measures from reduction commitments.⁸⁹ Inter alia, it allows, and excludes from reduction commitments, domestic support measures with minimal impact on trade, which are referred to as 'Green Box' policies. For measures to be exempted, they must have no, or little

79 See article 1, Agreement on Agriculture, note 41 above. See also Annex 1.

80 See *ibid.*, article 1(f).

81 See *ibid.*, articles 4.1 and 4.2. Measures that are to be converted into tariff equivalents are listed in footnote 1 to article 4.2.

82 Tariffication does not apply to primary agricultural products, which can impact both goods that are for domestic consumption and those for export purposes. See *ibid.*, Annex 5.

83 For developed countries, the average reduction was to be 36 per cent over six years, whereas for developing members the average reduction was to be 24 per cent to be implemented over a ten-year period. Least developed countries were not required to undertake any reduction commitments, although they were required to tariffify and bind their tariffs.

84 Further, see McMahon, note 78 above, at 50ff.

85 Commitments on subsidies are also found in the Agreement on Subsidies and Countervailing Measures, Annex 1A to the Marrakesh Agreement establishing the World Trade Organization and Final Act, 15 April 1994 (available at http://www.wto.org/english/docs_e/legal_e/24-scm.pdf) [hereafter Subsidies Agreement] and the GATT 1994. See in particular article XVI, GATT 1994, note 12 above. Agricultural subsidies are dealt with in other fora than the WTO, including the Organisation for Economic Co-operation and Development (OECD) and the Food and Agriculture Organization (FAO).

86 See articles 3.3, 8 and 10, Agreement on Agriculture, note 41 above. See also *ibid.*, articles 9.2(b) and 9.4.

87 Taking averages for 1986-90 as the base level, developed countries agreed to cut the value of export subsidies by 36 per cent over the six years starting in 1995 (24 per cent over 10 years for developing countries). Developed countries also agreed to reduce the quantities of subsidized exports by 21 per cent over the six years (14 per cent over 10 years for developing countries). Least-developed countries do not need to make any cuts.

88 Commitments regarding the reduction of Amber Box measures are expressed in terms of a total aggregate measurement of support (Total AMS), which includes all product-specific support and non-product-specific support as one single figure. See articles 1(a) and 3, Agreement on Agriculture, note 41 above.

89 See *ibid.*, annex 2, paragraphs 2-13.

trade-distorting effects or effects on production,⁹⁰ and must be provided through a publicly funded government programme not involving transfers from consumers by charging consumers higher prices.⁹¹ Among them are expenditures under environmental programmes, as well as infrastructural services including water supply facilities.⁹²

How is the question of trade in virtual water to be addressed in the framework of the Agreement on Agriculture? For the purposes of furthering the sustainability of trade in virtual water, the WTO legal regime should take into account the water-intensive nature of agricultural products as well more generally the needs of water-scarce member countries. Generally speaking, there are limited provisions in the Agreement on Agriculture on the need to address non-trade concerns, including those that are the closest related to water, namely food security⁹³ and environmental protection. The preamble to the agreement notes in this regard that:

[...] Commitments under the reform programme should be made in an equitable way among all Members, having regard to non-trade concerns, including food security and the need to protect the environment; having regard to the agreement that special and differential treatment for developing countries is an integral element of the negotiations, and taking into account the possible negative effects of the implementation of the reform programme on least-developed and net food-importing developing countries.

While the agreement appears to grant special and differential treatment in relation to development, with attention given to the particular situation and problems of least-developed countries (LDCs),⁹⁴ this classification does not take into account the differences in water needs of various member states. The negotiations for continuing the reform process, which were incorporated into the broader negotiating agenda set at the 2001 Ministerial Conference in Doha, Qatar,⁹⁵ have taken note of non-trade concerns, such as environmental protection, food security and rural development reflected in the negotiating proposals already submitted.⁹⁶ But it is not likely that water scarcity is one of the non-trade concerns that has been directly mentioned. At any rate, trade negotiations on agriculture were suspended in 2006 after Ministers from the G-6 countries (European Union, United States, Japan, Australia, Brazil and India) failed to reach agreement on the depth and extent of tariff and subsidy cuts in agriculture.⁹⁷

In renewing the market access regime, member states would therefore need to take into account not just trade factors such as competitiveness but also the particular requirements of water-intensive agricultural products. In this manner, tariff levels and minimum access would be determined in light of water conservation requirements. This would mean that market access of water-intensive products to exporting countries would be significantly reduced and importation of water-intensive products by water-scarce countries would be increased.⁹⁸ Tariff levels and minimum access for water-intensive products may also be determined by taking account of yearly and seasonal fluctuations of water resources availability. If such a division of labour that takes into account water factors reaches optimum conditions, international trade in water-embedded products might have positive impacts on environmental and other policy objectives related to the efficient and sustainable distribution of water resources. It would allow scarce water resources in water-poor countries to be used for basic human and other needs.

With respect to the regulation of domestic support measures, some agricultural subsidies can have harmful effects on water resources.⁹⁹ Irrigation subsidies, which are arguably those that encourage the most waste, pollution and

90 See *ibid.*, annex 2, paragraph 1.

91 See *ibid.*, annex 2, paragraph 1(a) and (b).

92 See *ibid.*, annex 2, paragraph 2(g).

93 See, e.g., K.R. Gray, *Right to Food Principles vis-à-vis Rules Governing International Trade* (British Institute of International and Comparative Law, 2003), at 10.

94 See Preamble, Agreement on Agriculture, note 41 above. Special and differential treatment takes the form of increased flexibility for developing countries to implement reduction commitments with LDCs not required to undertake any such commitments. Article 20 permits members to take the non-trade concerns of developing countries into account in the negotiations. Special and differential treatment is also acknowledged in the Doha Declaration as necessary to 'enable developing countries to effectively take into account their development needs, including food security and rural development.'

95 See *ibid.*, article 20.

96 See further the WTO gateway on agriculture at http://www.wto.org/english/tratop_e/agric_e/negoti_e.htm

97 See further, International Centre for Trade and Sustainable Development (ICTSD), *Agriculture Negotiations at the WTO: Developments and Setbacks since the Hong Kong Ministerial Conference* (Quarterly Intelligence Report No. 14, August 2006) [available at http://www.agradepolicy.org/output/resource/Ag_Negs_Aug06_Final.pdf].

98 In this sense, see K. Mori, 'Virtual Water Trade in Global Governance', in Hoekstra, note 64 above, 119, at 120.

99 On the adverse environmental effects of agricultural subsidies, see, e.g., A. La Vina et al., *Reforming Agricultural Subsidies* (Washington DC: World Resources Institute, 2006); R. Perkins, *Sustainable Development Should be the Objective for a New Agreement on Agriculture* (WWF, 2001). For an in-depth discussion, see Bernasconi-Osterwalder, note 102 above, at 208-9.

contamination of fresh water on the largest scale, can lead to excessive water and sponsor the planting of water-intensive crops.¹⁰⁰ Examples include the planting of water-intensive crops like cotton, alfalfa and rice in desert-like climates such as California's Central Valley or the drying of the more shallow tube wells and the destruction of freshwater aquifers in India due to massive water pumping for irrigation purposes.¹⁰¹ This raises the question of whether the international rules on subsidies can be effective in reducing and eliminating agricultural water subsidies that might promote unsustainable virtual water trade, as well as in allowing for subsidies that might be beneficial for these purposes.¹⁰² It appears that in the WTO framework whether subsidies are environmentally beneficial or not is not taken into consideration by the international trade rules, which only address trade-distorting subsidies. Water-related subsidies, and in particular those that relate to the water-intensiveness of products, are not addressed at all. Since the value of water embedded in a product is not properly recognised and reflected in trading prices for agricultural commodities, it has been suggested that domestic support measures for virtual water trade could be placed in the Green Box category.¹⁰³ The classification system of different measures as trade-distorting or not is however particularly nebulous,¹⁰⁴ and according to one author 'may impede an efficient reduction of environmentally harmful water-related subsidies for various reasons.'¹⁰⁵ The existing rules regarding subsidies under the Agreement on Agriculture could potentially play an important role in the effective reduction or elimination of agricultural subsidies that promote, for instance, the growing of water-intensive crops in a water-scarce region. However, for this purpose, the WTO framework would have to adequately allow for non-trade considerations to be taken into account, particularly those regarding protection of water resources.

CONCLUDING REMARKS

This paper has attempted to draw out some of concerns that are emerging with respect to a growing international trade in fresh water resources, whether water is traded directly or as part of the production of traded goods. Trade in water is indeed viewed as one means of addressing the increasing threat of global water scarcity. That water can and should be treated like any other good under the international trade rules only strengthens the commodification of water resources which we have witnessed over the past two decades. In turn, the legal treatment of water under the international trade rules becomes one additional means through which water can be more easily treated as an economic and tradable food at the national level, including when drinking water is concerned, and reflects the growing influence of the international economic institutions on water policies in the South.

Trade in real and virtual water resources fall under the WTO framework as the primary forum dealing with these questions. With respect first to trade in real water resources, two perspectives in the debate can be identified. From the point of view of states wishing to protect domestic water resources from export, it is clear that once water enters into commerce, it will be very difficult for it not to fall under the GATT rules. As they stand, these rules do not integrate sufficiently non-trade considerations, in particular those related to water. Greater attention should thus be given to the way in which the GATT exceptions, especially article XX, could be used to allow for states to adopt restrictive measures on trade in water for social and environmental reasons. On the other hand, since the current case-law does not seem to fully provide protection for states wanting to include water export ban in domestic water conservation policy, it will be important for states wishing to curtail the diversion of bulk water resources from export to put in place national conservation strategies.

While from the point of view of importing countries, especially those water-scarce ones, the possibility to import large amounts of fresh water is certainly attractive as one way to relieve pressure on domestic water problems, it cannot be used as a substitute for the adoption and implementation of national policies on sustainable water management. Conflicts might emerge under the WTO framework between exporter states which have plentiful water resources on their territory but may wish to restrict exports in order to protect national water resources from

100 *Ibid.*, at 210-13. See, e.g., A. De Moor and P. Calamai, *Subsidizing Unsustainable Development: Undermining the Earth with Public Funds* (1997).

101 These examples and others are mentioned in N. Bernasconi-Osterwalder, 'Water, Agriculture, and Subsidies', in Brown Weiss, *Boisson de Chazournes and Bernasconi-Osterwalder*, note 11 above, at 212-13.

102 *Ibid.*, at 207.

103 Mori, note 98 above, at 120.

104 In particular, there is no institutional organ supervising the accuracy of a notification of a subsidy as a Green Box subsidy.

105 See Bernasconi-Osterwalder, note 101 above, at 220.

over-exploitation, and importer countries which lack sufficient or adequate freshwater resources and wish to import water.

While the likely impacts of implementing trade obligations on water management will become greater as liberalisation on trade advances, greater trade liberalisation and market access can be viewed as having some positive outcomes when used in the virtual water trade debate, since declining water availability in some regions may be offset by openness of agricultural markets. Virtual water trade is seen as one solution to enable water scarce countries to save important quantities of freshwater domestically if it is carried out in a sustainable manner. Nevertheless, the water content of agricultural produce and the water situation of member states have not been addressed in the framework of the current rules on international trade of agricultural goods. This might impede national conservation strategies put in place to further sustainable virtual water trade, lead to over-exploitation of water resources and increase in the degradation to water limits even in water-rich countries. Consequently, adverse environmental and social impacts arising from increases in agricultural market access must be addressed and agricultural rules must more generally be negotiated with the aim to promote sustainable development.

The issues that arise in relation to trade in real water resources on the one hand and trade in virtual water on the other are thus very different, yet raise in the end similar queries as to whether the current trade system is or not the ideal approach for the international community to address water management and water scarcity problems from the point of view of the accounting of the social and environmental values of water. The traditional conflicts which have occurred in the trade regimes between economic and environmental goals thus take on a new dimension when water is concerned, begging the question of whether certain considerations specific to the problematic of freshwater resources should constrain the market perspective. Existing gaps could be filled by entrenching the role of human rights and environmental concerns in the interpretation of WTO agreements, incorporating right to water language into WTO requirements, and facilitating better integration of social and environmental concerns into negotiations and implementation of WTO agreements. This would serve more generally the goal of the Johannesburg Plan of Implementation to

[p]romote mutual supportiveness between the multilateral trading system and the multilateral environmental agreements, consistent with sustainable development goals, in support of the work program agreed through WTO, while recognizing the importance of maintaining the integrity of both sets of instruments.¹⁰⁶

¹⁰⁶ Paragraph 91, World Summit on Sustainable Development, Plan of Implementation, 4 September 2002, UN Doc. A/CONF.199/CRP.7/Rev. 1 (2002).

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