

OTHER INTERNATIONAL DEVELOPMENTS

Elizabeth Haub Prize

2006 Award for Environmental Diplomacy

On December 3, 2007 in New York City, the 2006 Elizabeth Haub Award for exceptional accomplishments in the field of international environmental diplomacy was conferred on Dr Klaus Töpfer in recognition of *excellence in advocating for global environmental stewardship*. The award was presented by Pace University and the International Council of Environmental Law with the support of the Elizabeth Haub Foundation.

Opening Statement

Michelle S. Simon, Dean of the Pace University Law School, opened the ceremony with the following remarks:

“Our honourable host and hostess, Mrs and Mr Haub, Dr Burhenne, Ambassador Singh, and honoured guests: I am Michelle Simon, Dean of Pace Law School, and I am pleased to welcome you to this special evening to present The Elizabeth Haub Award for Environmental Diplomacy to Dr Klaus Töpfer.

The celebration to bestow the Diplomacy Award is something we at the Law School look forward to each year. In a moment, I will introduce you to our University’s President, Stephen Friedman, who will provide an overview of the many diplomatic achievements of this year’s laureate, Dr Klaus Töpfer. But before that, I would like to give all of you a brief overview of the Diplomacy Award’s history and purpose.

This Award was established in 1998 by Pace Law School and the International Council of Environmental

ardship of natural resources. The Award was also established to commemorate the 25th anniversary of the United Nations Stockholm Conference and the fifth anniversary of the United Nations Rio de Janeiro Earth Summit. It is wonderful to be here this evening with Helga and Erivan Haub, and Christian Haub, principals of the German-based Tengelmann Group, which operates grocery stores in Europe and the Great Atlantic & Pacific Tea Company in the United States. The Tengelmann Group was one of the first major food retailers in Germany to develop progressive environmental and conservation policies.

Each year a jury, comprised of individuals nominated by the International Council of Environmental Law and Pace Law School, reviews the most important diplomatic achievements in the field of environmental law and chooses the Haub awardee from this field. As a result, the Diplomacy Award is one of the most prominent environmental awards in the world.

The Award criteria recognise: “(a) a positive contribution to the development and promotion of international law and policy in a general way” or “(b) a particular practical accomplishment in a specific instance: a new idea or initiative leading to a new concept in the field of environmental law and policy of one or several countries, and particular initiatives in this field”. Past recipients hail from around the world, and are listed in your programme.”

Dean Simon ended her remarks by noting that “Again, it is my great honour to be with all of you tonight to celebrate Dr Klaus Töpfer and the important field of environmental diplomacy. I am now pleased to introduce the President of Pace University, Stephen J. Friedman.”

Laudatio

Following a round of applause, President Stephen J. Friedman took the podium and delivered the following address:

“Thank you Dean Simon. It is my great honour and pleasure to be with you tonight, and I thank our honourable host and hostess, Mrs and Mr Haub, Christian Haub, Dr Burhenne, Ambassador Singh, and honoured guests for their presence at this important ceremony. There can be no doubt that tonight’s Laureate is most deserving of The Elizabeth Haub Award for Environmental Diplomacy. Dr Klaus Töpfer’s achievements in the field of environmental diplomacy are numerous and remarkable.



Klaus Töpfer

Courtesy: Klein Photography

Law, in cooperation with the Haub Family, to honour the legacy of Elizabeth Haub. Elizabeth Haub was devoted to appreciating nature and to the sound stew-

I am proud of the collaboration between Pace University and the International Council of Environmental Law through which we work together to recognise and honour the achievements of our world's environmental diplomats. It is especially important to honour the legacy of Elizabeth Haub, a great entrepreneur and enthusiast for conservation.

Let me take just a few moments to highlight Dr Töpfer's exemplary career. Dr Töpfer served as Executive Director of the United Nations Environment Programme (UNEP) from 1998 to 2006. He is widely recognised as having spearheaded environmental policy as Minister of Environment in Germany. Since March 2006, Dr Töpfer has rejoined the academic world part-time to serve as Chief Professor of Environment and Sustainable Development at Tongji University, Shanghai.

He is internationally known for his personal commitment to promoting the environment and sustainable development, particularly in developing nations. He has correctly noted that "environmental policy is the peace policy of the future".

Dr Töpfer works tirelessly to achieve his vision of making the environment work to improve the lives of people today and for future generations. His lifelong efforts are testament to the fact that protecting natural resources and regulating harmful substances can spur the development of new technologies, jobs and markets. Dr Töpfer's innovative approaches to rethinking international environmental policy have yielded new recycling and waste policies throughout Europe and a new treaty for the Alps, among many other achievements.

Before being the Executive Director of UNEP, Dr Töpfer served as Federal Minister of Regional Planning, Building and Urban Development, as well as Coordinator of the Transfer of Parliament and Federal Government to Berlin. He held office as Federal Minister of the Environment, Nature Conservation and Nuclear Safety. He served as State Minister of Environment and Health and State Secretary at the Ministry of Social Affairs, Health and Environment, for the Federal State of Rhineland-Palatine.

Prior to his career in governmental and international public service, Dr Töpfer was Full Professor at the University of Hannover, Head of the Department of Planning and Information in the State Chancellery of the Federal State of Saarland, and Head of the Economics Department of the Central Institute for Regional Planning of the University of Münster.

Dr Töpfer's many honours include the Order of Merit; the Commander's Cross of the Order of Merit; and the Grand Cross of the Order of Merit; of the Federal Republic of Germany.

In addition to serving as Honorary Professor of Tongji University, Shanghai, People's Republic of China, he is an Honorary Doctor of the Technical University of Brandenburg, Cottbus, Germany. He is also Honorary Doctor of the Free University of Berlin and of the University of Essen.

Dr Töpfer was awarded the Bruno H. Schubert Environment Prize and the German Environment Prize, the most prestigious such prize in Europe. He holds a doctorate in Philosophy and a degree in Economics.

Let me offer my personal congratulations to Dr Töpfer. During this evening to celebrate the exemplary environmental diplomatic achievements of Dr Töpfer, it is important for us to pause and acknowledge the absence tonight of a previous Elizabeth Haub Prize for Environmental Law Laureate, the distinguished Pakistan lawyer Dr Parvez Hassan. Dr Hassan has lectured at Pace and visited here often. He and Professor Robinson were with Dr Töpfer in Johannesburg in 2002 lecturing at UNEP's Global Judges' Symposium in Environmental Law.

Although Dr Hassan had hoped to be here tonight, events in Pakistan dictate that he must send us his regrets. Dr Hassan conveyed that at this troubled time in Pakistan, it is important that he remain in Pakistan to press for the rule of law, restoration of the country's constitution, and the release of detained judges and legal professionals. I am sure you agree with me that the courage of individuals like Dr Hassan is commendable. Please join with me in keeping Dr Hassan in our thoughts this evening. I believe I speak for all of us when I say that it is our sincere hope that the spirit of good will and cooperation which underlie diplomacy, will prevail in Pakistan."

Presentation of Certificate and Medal

President Friedman concluded his part of the programme by introducing Ambassador Bhagwat Singh, Permanent Observer of the Asian-African Legal Consultative Organization, and Secretary of the Award Jury. In the latter capacity, it was Dr Singh's happy task to read the Pace Law School certificate conferring this award upon Dr Klaus Töpfer.

Thereupon, Ambassador Bhagwat Singh made the following remarks:

"As Secretary of the Jury, I am honoured to read the commendation of this Pace University School of Law certificate honouring Dr Klaus Töpfer with The Elizabeth Haub Award for Environmental Diplomacy.

The Dean of the Pace University School of Law, acting by virtue of the Agreement between the International Council of Environmental Law and the School of Law of Pace University periodically recognises accomplishments in the field of international environmental diplomacy. The Jury consisting of Dr Wolfgang E. Burhenne, Dean Stephen J. Friedman, Professor Roy S. Lee, Dean Emeritus Richard L. Ottinger, Professor Nicholas A. Robinson and Dean J. Gustave Speth convened at White Plains and chose Dr Töpfer in recognition of excellence in advocating for global environmental stewardship.

Now, therefore, I confer The Elizabeth Haub Award for Environmental Diplomacy for the year 2006, upon Dr Klaus Töpfer.

In testimony, whereof, on this 3rd day of December in the year 2007, I have caused the Seal of the Pace

University School of Law to be affixed to, and we have duly inscribed this Diploma.”

Remarks to the Laureate

Upon commendation of the certificate, Dr Wolfgang E. Burhenne, in his capacity as Executive Governor of the International Council of Environmental Law, hung the gold medal around the laureate's neck and after a hearty round of applause made the following remarks:

“Dear Professor Töpfer, Dear Klaus,

We are all very happy that you are here. The jury made their decision quite some time ago, but it was difficult to find a date for the ceremony between you, the Haub family, Pace University and I, as we all have our indispensable tasks.

Yes, the jury decided unanimously. However, I can only say ‘unanimously’ under the very well recognised parliamentary rule that abstentions do not count.

I abstained! Perhaps you will not be too shocked, when I provide my reasoning:

Firstly, I had the feeling that you had been praised and honoured quite often, since returning from Nairobi. Hence, I thought it would be wise to spread all of these compliments over a longer period of time!

Secondly, I also had the feeling that if I voted for my friend Klaus, that everyone would be under the impression that I lobbied for you. In this connection, I wished to remain neutral so that the appreciation of others would ring even stronger.

You are anyway aware of my feelings. The fact that you have twice graced the cover of my journal and that we have always been keen to report on how you elevated UNEP from a critical situation upon arriving, demonstrate my admiration even further.

Our personal relationship has evolved over the years. I was roughly acquainted with the Professor from Hannover and knew the State Secretary in Rheinland-Pfalz. I worked often with the Federal Minister and the man who fulfilled a bet by swimming across the then pollution-improving Rhine. During your stay in Nairobi, I tried to support you in any way possible.

Perhaps the phrase ‘stay in Nairobi’ is overstated. You likely spent more nights in an airplane or hotel during your directorship! This required the great patience and support of your wife. We applaud her as a contributor to your accomplishments! The result of all this travel, beside the tremendous successes, was rather shocking and I was not the only one who had difficulties to persuade you to seek medical treatment after our stay in Malmö. I can still remember that after getting off the airplane in Bonn, you lamented that you should have accepted the invitation to Australia. Happily, the doctor was very stern with you.

This was followed by the time when Mrs Nane Annan wished to send you greetings in the hospital,

since we expected that you would be unable to attend a dinner with her and the Secretary-General upon invitation of the German Federal President. However, I then found out that, in your desire not to miss this important occasion, although not yet cured, you had persuaded your doctor to release you for the night!

This is Klaus Töpfer!

Now, when I am asked how he is doing, I answer that he has not changed a great deal. For example, I don't watch TV that much, but my assistant told me that on one specific day he saw Professor Töpfer on an early morning programme discussing the recent UN Special Session on Climate Change and that night he was on a different channel talking about the importance of renewable energy technologies in meeting the goals of the Kyoto Protocol.

He is continually advocating for the conservation of the environment and sustainable development at all levels, with great insistence on helping developing countries.

Fighting for the cause of the developing world was his hallmark during his tenure as Executive Director of UNEP. His motto continues to be that environmental conservation is not an impediment to economic de-



Stephen J. Friedman, Bhagwat Singh, Helga Haub, Nicholas Robinson, Klaus Töpfer, Wolfgang E. Burhenne, Michelle S. Simon, Erivan Haub
Courtesy: Klein Photography

velopment. And he has preached in the South, as well as in the North that, on the contrary, environmental policy has to trigger new technology, economic opportunities and jobs.

He has also done his part in Europe. For instance, he was the initiator of the Alpine Convention. It was not easy to bring the eight alpine states to bind themselves to coordinated policies regarding subjects as varied as mountain agriculture, transport, forestry, and soil, as well as nature, conservation. That this happened is due to a large extent to Klaus Töpfer's diplomatic skills. Whatever the subject, his bottom line is always to insist on the need for dialogue, cooperation, and mutual

respect between North and South, rich or poor. This is not only for the environment *per se*, but also to avoid human conflicts. He strongly believes that environmental policy is the peace policy of the future.

Dialogue for cooperation towards sustainable development is taking place in numerous fora, one of which is the CSD (the Commission for Sustainable Development). Professor Töpfer was its President and made headlines for his methods to force a real dialogue: he simply asked the Ministers to leave their prepared statements at the reception desk and retrieve them after the session. Well, not everybody laughed...

This is Klaus Töpfer!

I will stop here, although I am very conscious of having left out innumerable achievements. For instance, I have not even touched upon those in relation to Klaus Töpfer's functions and work in Germany. But, just like you, I am impatient to hear him speak. So, let me close by wishing him all the best to continue in the same vein, with his usual vigour and sense of humour."

Conclusion of the Ceremony

After further applause, the Secretary of the Jury thanked Dr Burhenne for his personal remarks and asked Dr Töpfer to take the podium to deliver his paper (to be printed as a separate article in a future issue). Following extensive

applause, Dean Michelle S. Simon made these closing remarks:

"Thank you Dr Töpfer for your excellent paper. Your work in this field is an inspiration to all of us gathered this evening. As is customary for the Haub Laureates, your paper will be printed in the journal *Environmental Policy and Law*, published under the auspices of the International Council of Environmental Law. In this way, your thoughts and comments will be available to people all over the world.

I know I speak for all of us when I say that this evening has been a wonderful tribute to the legacy of a great woman, Elizabeth Haub, and to the achievements of a great diplomat, Dr Klaus Töpfer. Dr Töpfer, I hope that this award inspires you to continue your innovative work in the field of environmental stewardship for many years to come.

I again want to express the appreciation of the Pace Law School and the International Council of Environmental Law to our honourable host and hostess, Mrs and Mr Haub, to Christian Haub, to Dr Burhenne, Ambassador Singh, and to the many honoured guests present tonight.

Please, enjoy the reception and take a moment to gather with friends old and new. Again, congratulations to Dr Töpfer, and I wish you all a wonderful night." 🌟

IWC

Intersessional Meeting on the Future

by Joanna Depledge*

Most treaty bodies have to contend with dispute and disagreement among delegations; this is the essence of negotiation. For the International Whaling Commission (IWC), however, polarisation between pro- and anti-whaling nations is such, that it has plunged the whaling regime into stalemate or, as one delegation put it, "trench warfare".¹ Disputes over the very nature of the IWC translate into hostile exchanges on the negotiation floor, which in turn exacerbate the political tension. But because each "side" can claim some benefit – the moratorium on commercial whaling still holds, but "scientific" whaling, notably by Japan, continues – there has been little incentive over the past 20 years to make real efforts to build bridges.

Over time, however, the danger that the IWC might actually disintegrate has loomed ever larger (Japan has long threatened to withdraw), while anti-whaling protests have become increasingly violent, especially on the high seas. Political confrontation over whaling takes up disproportionate time and energy for many governments and spoils otherwise friendly diplomatic relationships. At the same time, polarisation of positions makes it more diffi-

cult for the regime to effectively respond to new challenges, such as heightened environmental threats. At the fifty-ninth Annual Meeting in Anchorage (May 2007), under the leadership of US Chair Dr Bill Hogarth, governments finally agreed that something should be done.² As a first step, they decided to hold an intersessional meeting on the future of the IWC. This took place from 6–8 March 2008, in London, UK. (See also late-received article on page 172.)

The London intersessional was focused on *process* and not substance, looking at ways of improving the IWC's negotiation procedures, rather than rehashing longstanding positions. In this way, the aim was to build on areas of shared concern, rather than division, in order to enhance the negotiation atmosphere and boost confidence among delegations. All IWC member governments were invited to the meeting, with 60 (out of 78) represented, along with a dozen NGOs. Meetings were closed to the press.

In a new departure for the IWC, three outside experts were invited to attend the London intersessional, and provide their perspective on the problems facing the regime and possible ways forward: Dr Calestous Juma, former Executive Secretary of the Convention on Biological Diversity; Ambassador Raúl Estrada-Oyuela, former Chair

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of the Kyoto Protocol negotiations; and Ambassador Alvaro de Soto, former UN Special Coordinator for the Middle East Peace Process. This contribution from experienced negotiators unrelated to the whaling regime followed the approach of symposia convened by the US-based think-tank, the Pew Foundation, the latest held in January 2008.³ These received input from, among others, Ambassador Tuiloma Neroni Slade, another climate change veteran and former International Criminal Court Judge, and Juan Mayr, Chair of the negotiations on the Cartagena Biosafety Protocol and initiator of such procedural innovations as the “Vienna setting”⁴ and the use of coloured balls to determine speaking order.

A brief press release was issued at the close of the London intersessional, speaking of “intensive discussions” and “positive ways forward”. The press release listed several possible options identified by the meeting for improving the IWC’s procedures and practices.⁵

One of the options was to increase efforts to reach decisions by consensus, in order to reduce the incidence of voting, which is very common in the IWC. Although voting can enable decisions to be reached more quickly than the laborious process of building consensus, the outcome is often divisive, splitting delegations into “winners” and “losers”. Accepting voting as routine also weakens the incentive to reach consensus, encouraging delegations to focus instead on the “arithmetic” of simply clocking up votes.

Other options focussed on more effective time management, notably to ensure adequate notice of matters to be considered in order to reduce surprises, and to employ “cooling off” periods in the event of disputes. At present, regular meetings of the Scientific Committee are held immediately prior to IWC annual meetings. One idea put forward was to review this schedule, in order to provide more time for the Scientific Committee’s work to be considered.

Plenary debates in the IWC are often characterised by inflammatory exchanges and unproductive posturing (plenary meetings are rarely the best arenas for constructive negotiation in any regime). A greater use of small negotiating groups was therefore proposed in order to encourage more productive discussions. Strengthening support to the Chair in the running of meetings was also suggested, as was reviewing the composition and function of the Scientific Committee.

Contrary to current trends, the IWC tends to keep NGOs at arm’s length. Although accredited NGOs may observe proceedings, the side events, parallel forums and contributions to roundtables and workshops that are now common elsewhere in the international area are absent from the IWC. To some extent, this caution results from the polarisation of positions also among NGOs, along with the confrontational tactics of some more extreme groups. However, the input from the Pew Foundation symposia suggests that NGOs do have a valuable contribution to make to the whaling regime. It is not surprising, therefore, that one of the suggestions made at the London intersessional was to discuss how to better integrate elements of civil society into the IWC’s work. In terms of outside input, the meeting also proposed to improve coordination between the IWC and other relevant international conventions.

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In the run-up to the London intersessional, Japan announced that it would abandon plans to add 50 humpback whales to the 1000+ other whales it aims to catch for “scientific” purposes this year (the species was not previously targeted by Japan). This was seen as a goodwill gesture, and attributed partly to brokering on the part of Chair Hogarth, as well as strong pressure from Australia. Despite Japan’s move, however, the current whaling season has seen escalating tension in the southern ocean, with Greenpeace and the activist group Sea Shepherd launching sustained assaults on Japanese vessels. These are reported to have seriously disrupted whaling activities. As the London intersessional took place, reports came in of further violent attacks on Japanese whaling ships by Sea Shepherd, and alleged strong retaliation.⁶ The IWC has, in the past, adopted consensus resolutions condemning such violent action. The London intersessional reiterated this condemnation in a second press release, while calling on the governments concerned to exercise restraint in their responses.⁷ Coordinated anti-whaling protests by Sea Shepherd were also directed at the Japanese Embassy during the London meeting.

Officially, the London intersessional was exclusively centred on process. However, press reports suggested that off-line talks had taken place on possible substantive ways forward from the IWC’s impasse⁸ (indeed, it would be odd if delegates had *not* seized the opportunity for informal discussion behind-the-scenes). The basic building blocks of a way forward are not too difficult to imagine, and were discussed more openly at the Pew Foundation meetings. They would involve, in essence, allowing a limited resumption of commercial whaling (for example, around coastal waters and only for abundant species), in return for the cessation, or at least much greater international control, of “scientific” whaling. Moving towards any such compromise, however, would require much more political will and mutual trust than is currently present in the IWC, which brings us back, once again, to the importance of process and the London intersessional meeting.

Chair Hogarth will now develop recommendations to present to the forthcoming 66th Annual Meeting in Santiago, Chile (23–27 June 2008), where discussions on the IWC’s future will be given priority in proceedings. A two-day follow-up to the London intersessional will also take place immediately prior to the Annual Meeting.

Notes

1 See IWC/M08/4, Intersessional meeting on the future of the IWC, Response to the “call for input”.

2 See *EPL*, Vol. 37, No. 5, pp.381–382.

3 See <http://www.pewwhales.org/>.

4 See <http://www.unep.org/DEC/OnLineManual/Resources/Glossary/tabid/69/Default.aspx?letter=V>.

5 See <http://www.iwcoffice.org/meetings/intersession.htm>.

6 See “Whaling activist claims he was shot by Japanese coastguards” at <http://www.guardian.co.uk/environment/2008/mar/07/whaling.japan>.

7 See <http://www.iwcoffice.org/meetings/intersession.htm>.

8 See “Secret plan to let Japan resume whaling”, <http://www.independent.co.uk/environment/nature/secret-plan-to-let-japan-resume-whaling-793486.html> and “Tentative steps to whaling peace”, <http://news.bbc.co.uk/1/hi/sci/tech/7285544.stm>.

International Water Resources Law – Relative Priority Accorded to Environmental Protection –

by Owen McIntyre*

Introduction

It is now beyond debate that the principle of “equitable utilisation” is the pre-eminent rule relating to the use of international watercourses. According to this rule, the determination of a reasonable and equitable regime for the use of an international watercourse is usually understood in terms of consideration of a number of relevant factors or criteria.¹ Routinely, conventional and declaratory instruments governing the use and protection of international freshwaters stress the fact that no one of these factors nor any particular use of an international watercourse is to enjoy inherent priority over any other in the process of equitable balancing which lies at the heart of the principle of equitable utilisation.² However, among the various factors impacting upon the application of this principle, it is possible to argue that the environmental protection of international watercourses is steadily increasing in its significance and in the sophistication of how it is addressed. This is largely due to the emergence in general and customary international law of a comprehensive suite of rules, principles and legal concepts requiring enhanced protection of various aspects of the natural environment of international watercourses and riparian States. The normative content of such rules and principles is becoming increasingly clearly defined, both through their ongoing elaboration into a highly developed corpus of legal requirements and through growing understanding of their mutual relevance. Indeed, it can be argued that it is the normative sophistication and comprehensive coverage of general environmental rules that give added “voice” to environmental concerns within the determination of a reasonable and equitable regime for the utilisation of an international watercourse. In addition, these rules and principles are increasingly supported by sophisticated rules of procedure, adding further to their normative clarity and justiciability.

This article briefly examines the likely status and normative content of a number of established and emerging rules and principles of substantive and procedural international environmental law, and whether and how each has been incorporated into key instruments on the non-navigational uses of international watercourses. In so doing, it attempts to draw conclusions as to the likely impact of each rule or principle in relation to the significance of environmental considerations within the overarching doctrine of equitable utilisation of international watercourses.³ It is contended that the wide international acceptance and normative specificity and sophistication of the continually evolving corpus of general international environmental law, coupled with the existence of competent institutional machinery for its elaboration and implementation, give

environmental considerations ever-increasing “voice”, and thus greater relative significance in the determination of a reasonable and equitable regime for the use of international watercourses.

Substantive Rules and Principles of International Environmental Law

Notwithstanding the provisions of the 1997 UN Convention and other conventional provisions expressly concerned with the environmental protection of international watercourses, a number of customary international legal rules and principles can be argued to have developed in recent decades which might be expected to have a role to play in this regard. The existence and, to a lesser degree, the normative status of these rules and principles have largely been defined by “the progressive gathering of recurrent treaty provisions, recommendations made by international organizations, resolutions adopted at the end of international conferences, and other texts that can be said to have influenced State Practice”.⁴ Such rules include the obligation to prevent transboundary pollution and the rules relating to responsibility and liability for such pollution, the obligation to cooperate and the requirement for environmental impact assessments (EIA) for projects having transboundary effects, while customary principles include the precautionary principle, sustainable development, intergenerational equity and common but differentiated responsibility. Other emerging principles can be identified which may eventually comprise part of the corpus of relevant customary international environmental law, including the so-called “ecosystem approach”. The key significance of such rules and principles lies in the fact that, as the accumulated legal expression of environmental protection concerns by the international community, they indicate the issues which are likely to be identified and articulated as central in the environmental protection of international rivers and the means by which such issues are likely to be considered. The normative content of the rules and principles of customary and general international law on the environment is likely to inform the interpretation and application of the rules and principles which are set out in outline in the environmental provisions of the 1997 Convention and other relevant instruments. Indeed, it is later submitted that it is largely by virtue of the very sophistication and extensive elaboration of these substantive and procedural rules and principles of general international environmental law that environmental considerations are likely to enjoy such prominent status as a factor in determining an equitable regime for the utilisation of shared freshwater resources.

In examining the role of such rules and principles, it is not strictly necessary to engage in the ongoing debate over the precise legal status of those which are often assumed to enjoy binding force in customary international law, as

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merely “declarative” norms of international environmental law can, by exerting a compliance pull on States⁵ and, more importantly, by influencing negotiations and other second-party control mechanisms, play a very significant role.⁶ Further, international environmental norms, though declaratory in nature, can be expected to play a significant role in informing the rules and principles contained in the 1997 Convention and other treaty instruments.⁷ More specifically, Dupuy suggests that both trends identified in treaty practice and soft law guidelines defined by international institutions can be taken into consideration “to define more concretely the material contents of ‘due diligence’”.⁸

Of course, the consistent inclusion of normative rules and principles in the declarations and resolutions of international organisations, and of the United Nations in particular, contributes significantly to the process of custom generation.⁹ This process might be expected to have made a particularly significant contribution to the development of international environmental law where the use of soft law declaratory instruments has been so widespread.¹⁰ As Hohmann points out, “rules of customary law initiated through declarations find their way into agreements and *vice versa*”.¹¹

The single most important source of rules and principles that may have crystallised into generally binding norms of customary international environmental law is the accumulated corpus of relevant multilateral and bilateral treaties. Of course, the consistent inclusion of a provision of a particular normative character in bilateral treaties also provides significant evidence of acceptance of a rule in international law. In relation to shared water resources in particular, by 1963 a UN publication¹² had listed 253 treaties on non-navigational uses of international rivers and in 1974 another UN document¹³ identified a further 52 bilateral and multilateral agreements that had been concluded in the intervening period. Clearly, this reservoir of treaty practice has greatly assisted the International Law Commission in the elaboration of the 1994 Draft Articles which formed the basis of the 1997 Convention and led State actors and intergovernmental bodies to argue that there are principles of international law which can be applied to the preservation and environmental protection of international watercourses in the absence of bilateral and multilateral agreements.¹⁴ In turn, the inclusion of certain rules and principles in the ILC’s Draft Articles, and subsequently in the Convention, must greatly enhance their status as established or emerging rules of general customary law, particularly in light of the ILC’s particular function within the UN system and the cautious approach taken to its role of progressive development of international law, tempered by the constraints imposed by the reality of international State practice.¹⁵

It is also worth noting that in recent years commentators have noted the increasingly significant role that multilateral development banks (MDBs) and other development agencies can play in implementing sustainable development standards and principles.¹⁶ Indeed, Handl argues that MDBs are legally obliged, even though their charters may not include explicit environmental obligations or mandates,

to act in accordance with international environmental norms possessing the status of customary international law or general principles of law.¹⁷ He argues that this obligation may require not merely avoiding lending to projects which may cause environmental harm, but also a more positive obligation “to act affirmatively toward realising the goals of sustainable development generally”.¹⁸ Indeed, over 40 of the world’s commercial leading banks have now agreed to abide by the World Bank Group’s voluntary code of environmental standards, the so-called “Equator Principles”, when making loans for infrastructure projects, particularly in less developed countries.¹⁹ Similarly, international trade law plays an increasingly active role in identifying and applying emerging rules of international environmental law in the course of international trade disputes. For example, the World Trade Organization (WTO) Appellate Body has recently endorsed the concept of “sustainable development” as a general objective of international law in the *Shrimp-Turtle* case,²⁰ while, in the *Beef Hormones* case,²¹ it incorporated elements of the so-called “precautionary principle” into the WTO Agreement and thus into the very fabric of the international trading system.

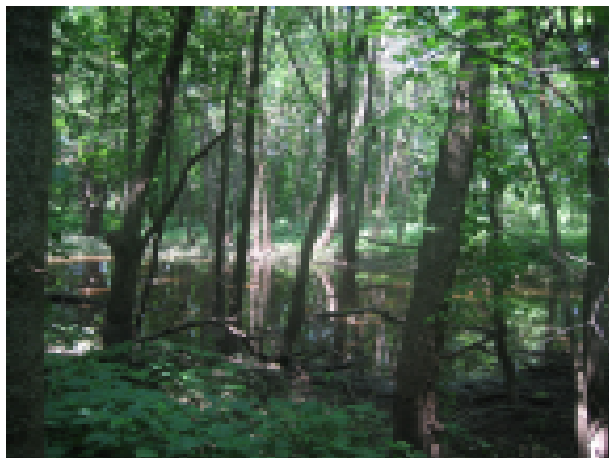
It is widely accepted that the obligation to prevent transboundary harm by means of pollution is well established. It receives support from the vast majority of academic commentators,²² in judicial and arbitral statements,²³ in leading declarations and resolutions adopted by the international community,²⁴ in codifications of international law adopted by intergovernmental agencies²⁵ and learned associations,²⁶ and in a number of normative environmental treaty regimes.²⁷ However, few who support the status of this obligation as a rule of customary international law would argue that it prohibits all transboundary harm.²⁸ It is widely understood that this rule applies subject to a number of considerable limitations, including the fact that the prohibition is normally understood as reflecting an obligation as to performance, based on standards of “due diligence”, rather than an absolute obligation as to result.²⁹ Also, despite some uncertainty as to the precise normative content of the duty to prevent harm by pollution, it is clear that it is the primary or cardinal rule of customary international environmental law that has given rise to many, if not all, of the other relevant rules and principles and that it is informed, to a very significant extent, by the requirements of these other rules.

For example, the duty to cooperate, though largely embodying procedural requirements to notify, exchange information, consult and negotiate, is absolutely central to the discharge of the due diligence standards of the obligation to prevent harm. Equally, transboundary environmental impact assessment is central to the practical discharge of the duty to notify of planned projects, and thus to effective cooperation.³⁰

Transboundary EIA has also been linked to the general principle of non-discrimination,³¹ as have dispute settlement procedures which give priority to private recourse by adversely affected individuals to domestic courts and remedies in the avoidance and resolution of disputes over international watercourses. Such dispute settlement

procedures can also be seen to give effect to the “polluter pays” principle.

In turn, the precautionary principle can play a vital role in identifying when a transboundary EIA would be necessary and then in comprehensively setting out all the environmental risks inherent in a planned project. Indeed, it is widely accepted that the use of anticipatory EIA procedures is one of the key means of giving practical effect to the more normatively obscure precautionary principle.³² Also, outside of formal EIA procedures, the precautionary principle has a role to play in identifying general standards of due diligence for the purposes of the duty to prevent transboundary harm. For example, it is clear that the duty of prevention would normally extend to a significant risk of transboundary environmental interference causing significant harm, thereby requiring precautionary risk assessment.³³ Obligations, of one form or another, relating to the application of clean production methods or the setting of precautionary environmental standards, techniques or practices are almost always associated with the



Kishwaukee River State Fish and Wildlife Area, near Kirkland, Illinois in DeKalb County, Illinois, USA. Wetlands habitat
Courtesy: Wikimedia

application of the precautionary principle in international instruments.³⁴ In relation to the impact of the precautionary principle on other norms of international environmental law, Birnie and Boyle note that “the ILC Special Rapporteur is right to suggest that the precautionary principle is already included in the principles of prevention and prior authorization, and in environmental impact assessment, ‘and could not be divorced therefrom’”.³⁵ Another increasingly important application of the precautionary principle is that of the ecosystem approach to natural resource management which, though by no means required under customary international law, is employed with increasing frequency in watercourse conventions.³⁶ The precautionary principle has a pervasive relevance in international environmental law and it would appear, for example, that a precautionary approach is to be taken to the task of identifying “a grave and imminent peril” for the purposes of establishing the existence of a state of “necessity” under draft Article 25 of the International Law Commission’s 1996 draft Articles on Responsibility of States for Inter-

nationally Wrongful Acts.³⁷ The Special Rapporteur’s second report suggests that a measure of scientific uncertainty about the prospect of damage should not disqualify a State from invoking necessity.³⁸

However, of particular significance to the recent and future development of norms and principles of international environmental law is the almost universally accepted notion of sustainable development. It has been described as “an umbrella notion encompassing a range of more specific principles that give it effect”,³⁹ including EIA, access to information and participation in environmental decision making, the precautionary principle,⁴⁰ inter-generational equity, intra-generational equity and the ecosystem approach. More importantly, it facilitates the reconciliation of international law on protection of the environment and international law on the use of shared resources by permitting account to be taken of both environmental and non-environmental considerations, including social, economic and developmental goals. The duty of prevention has also been linked implicitly to the notion of sustainable development, and thus to equitable utilisation, by the proposal contained in the International Law Commission’s 2001 draft Convention on the Prevention of Transboundary Harm from Hazardous Activities,⁴¹ that States potentially in dispute over the prevention of transboundary harm must negotiate an equitable balancing of interests in accordance with a range of factors listed in the draft, rather as watercourse States must establish an equitable regime for the use of shared freshwater resources under the principle of equitable utilisation. Indeed, in the specific context of shared freshwater resources, the principle of equitable and reasonable utilisation, the predominant normative concept of international freshwater law, can be regarded as the legal procedure which “operationalises” the notion of sustainable development.⁴² Therefore, in relation to shared freshwater resources, sustainable development facilitates the thorough consideration of all the various aspects of environmental protection in the determination of an equitable regime for the utilisation of the resource. In other words, it involves the use of the waters on the basis of a regime of equitable utilisation which takes full account of the environmental protection of the shared resource. Such a regime might more appropriately be called one of “equitable and sustainable utilisation”.

In relation to intergenerational equity, a principle at the normative core of the notion of sustainable development, it is clear that the precautionary principle has a role to play in achieving a balance of interests between present and future generations.⁴³ According to Redgwell, the principle generally provides that “where there is a threat to the global environment, yet scientific uncertainties persist, steps can and should be taken that will benefit the present generation in any event and mitigate suspected adverse impacts upon future generations”.⁴⁴ Similarly, it is clear that the principle of common but differentiated responsibility, another core component of sustainable development, has a role to play in identifying the due diligence standards which might be expected of particular States under the duty to prevent transboundary harm. Indeed,

the general obligation to exercise due diligence in preventing or mitigating adverse transboundary effects has, for many years, taken account of the differing capabilities of States.⁴⁵ Common but differentiated responsibility may also impact to modify application of the precautionary principle, as is acknowledged in Principle 15 of the Rio Declaration.⁴⁶

Therefore, the position in relation to the normative status and substantive content of both more established and emerging rules and principles of international environmental law, and their application to shared international freshwater resources, is far from simple. It is clear, however, that customary and conventional rules and principles are closely interrelated. While the consistent articulation of certain rules in conventional regimes lends support to the case that those rules have achieved the status of customary international law, established and even emerging customary rules and principles significantly influence the application of conventional regimes. Indeed, having regard to the work of the International Law Commission, not to mention the many other intergovernmental agencies and learned associations involved in the formulation of international environmental law and policy, it is possible to argue that most generally applicable conventional and declaratory instruments relating to the environment consist of little more than codifications of existing custom or established State practice. Of course, once particular rules or principles have been included in such codifying instruments, their customary status is likely to be greatly enhanced. Moreover, each of the rules or principles of international environmental law identified above, whether customary or conventional in origin, are themselves closely interrelated, having some significance for the normative status or practical application of one or more of the others.

Of course, while States remain free to enter into whatever binding conventional environmental arrangements that they deem necessary, the principle of equitable utilisation has long been the uncontested cornerstone of the law of international watercourses and it is ordinarily within the framework of this principle that factors pertaining to environmental protection are considered. In considering the relevant weight to be given to environmental factors in the course of such a balancing of interests and the processes by which they can be incorporated into an equitable regime for the utilisation of shared freshwater resources, it is suggested that the growing corpus of broadly supported environmental rules and principles alluded to above emphasises the likely significance of environmental factors in this process and provides detailed mechanisms and procedures by means of which environmental considerations can be taken on board and environmental damage can thus be prevented or mitigated. Indeed, it can be argued that the extensive elaboration and detailed articulation of environmental rules and principles in recent years, both of substantive elements such as the due diligence standards required and of procedural obligations such as the duty to notify, significantly enhance the weight to be accorded to environmental considerations in the balancing of factors involved in the determination of an equita-

ble regime for the utilisation of an international watercourse.

Procedural Rules of International Environmental Law

If one accepts that the applicable customary rules for the use of shared freshwater resources require that significant harm to other watercourse States should be avoided and, ultimately, that such use must be equitable and reasonable, it follows that a State will need to know of the current or proposed uses of a neighbouring State in order to ascertain whether any use will cause significant harm within its territory or to the shared water resource or whether such use will be equitable and reasonable. In addition to a notification procedure, legal machinery is required by means of which watercourse States may consult and negotiate in respect of proposed works or utilisation of shared waters. Commentators can point out the proliferation, since the 1972 UN Conference on the Human Environment,⁴⁷ “of treaty instruments requiring States not so much to prevent environmental harm as to observe a number of discrete procedures before permitting the conduct of activities which may cause such harm”.⁴⁸

Generally, procedural obligations provide a framework for the early and amicable resolution of environmental disputes by ensuring that interested parties are adequately informed of proposed projects and their potential environmental implications, by providing a form of procedural due process for the participation of interested parties, including, where appropriate, the citizens of the State of origin and the citizens of potentially affected States,⁴⁹ and by providing an opportunity for compromise to be reached, involving, for example, alteration of the original proposal or the inclusion of remedial measures to mitigate any likely adverse environmental effects.⁵⁰

The existence of a general customary obligation on States to cooperate in respect of the development and utilisation of international watercourses was first suggested in the *Lac Lanoux Arbitration*.⁵¹ More recently, the International Court of Justice emphasised the necessity of cooperation among watercourse States in the *Gabcikovo-Nagymaros* case, stating, for example, that “[O]nly by international cooperation could action be taken to alleviate ... problems [of navigation, flood control, and environmental protection]”.⁵² However, members of the International Law Commission, in the course of their discussions on the subject of international watercourses, differed on whether the need for States to cooperate was a mere aspiration or a binding legal duty.⁵³ However, despite disagreement over the precise legal status of the duty to cooperate *per se*, most agreed that it was an “umbrella term, embracing a complex of more specific obligations which, by and large, do reflect customary international law”.⁵⁴ For example, Reuter concluded that “[T]he obligation to cooperate was a kind of label for an entire range of obligations”.⁵⁵ Sands takes a similar view and explains that the obligation to cooperate has “been translated into more specific commitments”.⁵⁶ However, despite the misgivings of some of its members about the precise legal nature and status of the obligation to cooperate, the International

Law Commission eventually decided to include an express reference to this duty in its 1994 Draft Articles.⁵⁷ This reference formed the basis of Article 8 of the 1997 UN Watercourses Convention, which recognises the practical importance of the duty to cooperate for the attainment of the twin goals of optimal utilisation and adequate protection of an international watercourse.⁵⁸ The Convention includes further detailed requirements which give practical effect to the rather vague obligation to cooperate, including the obligations to notify, consult and negotiate, exchange information, and participate in dispute settlement procedures.

The general principle requiring notice and consideration of the transboundary environmental impact of national activities is based on the informed self-interest of nations and has long received broad international support. Indeed, in light of the failure of the 1972 United Nations Conference on the Human Environment to adopt a proposed Principle 20 on notification,⁵⁹ the United Nations General Assembly subsequently adopted, by a vote of 115 to 0 with 10 abstentions, a Resolution specifically addressing the issue of notice of activities having potential for transboundary environmental harm.⁶⁰ In relation to international water resources in particular, the United States Federal Water Pollution Act of 1956 provides an early and highly developed example of notice and consultation provisions applying in relation to water pollution that may have international dimensions.⁶¹ Indeed, Okowa points out that, prior to the 1972 Stockholm process, the inclusion of such procedural obligations is especially common in early treaties concerned with regulating the conduct of international watercourses.⁶² Describing the significance of procedural rules in relation to international water law in 1977, Schachter linked the central importance of such rules to the inherent flexibility of the equitable utilisation principle.⁶³ More recently, the United Nations Economic Commission for Europe (ECE) 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes imposes upon parties a range of procedural obligations relating to, *inter alia*, the exchange of information on existing and planned uses of shared waters, participation in consultations and the provision of warnings.⁶⁴ The 1997 UN Watercourses Convention similarly contains detailed procedural provisions. As early as 1971, Bourne had argued that the requirement of reasonableness inherent in the ILA's 1966 Helsinki Rules requires prior notice of uses of international watercourses that might have significant environmental impacts on other watercourse States and involvement of such States at the planning stage rather than after the damage has occurred.⁶⁵ Furthermore, he usefully elaborated detailed procedural rules for involving potentially affected watercourse States which, having regard to the procedural rules eventually adopted under the 1997 Convention and to recent developments in customary international law, now appear prophetic.⁶⁶

It is worth noting that the International Law Commission's 2001 draft Convention on the Prevention of Transboundary Harm from Hazardous Activities,⁶⁷ in addition to confirming the general obligation to prevent transbound-

ary harm, codifies existing related international obligations relating to environmental impact assessment, notification, consultation, monitoring and diligent control of activities likely to cause such harm. These related procedural obligations operate to discharge the more general duty of States to cooperate in the reasonable and equitable utilisation of international watercourses. At least as regards the duty to provide neighbouring States with prior notice of plans to exploit a shared natural resource, commentators agree that it is an obligatory requirement under customary international law⁶⁸ or "as a principle generally recognised in international environmental law".⁶⁹ Several States have sought to rely on the duty to provide prior notification in the course of international disputes.⁷⁰ The obligation certainly receives broad support in important recent conventional⁷¹ and declaratory instruments.⁷² In addition, Okowa asserts that, even where it is not expressly provided for, the obligation to notify "must be taken as implicit in any requirement to conduct environmental impact assessment", as such assessments are required with a view to protecting the interests of third States.⁷³ There is potential for uncertainty as to which States are likely to be affected by a particular activity and consequently entitled to notification, or as to which types of activities and forms of injuries the State or origin must notify to the potentially affected States, though both the precautionary principle and the more inclusive ecosystem approach might function to address these questions. Article 12 of the 1997 UN Convention acknowledges the link between effective notification and transboundary EIA by expressly requiring that the results of any EIA accompany the notification. The duty to notify may be facilitated by institutional machinery and the widely adopted 1992 ECE Convention requires Parties to enter into bilateral or multilateral agreements or other arrangements which provide for the establishment of joint bodies to have responsibility for, *inter alia*, "the exchange of information on existing and planned uses of water and related installations that are likely to cause transboundary impact"⁷⁴ and to "participate in the implementation of environmental impact assessments relating to transboundary waters, in accordance with appropriate international regulations".⁷⁵ In a rare example of a treaty instrument taking a broader, more ecosystem-oriented approach to international cooperation, Article 9 also provides for the involvement of non-riparian coastal States "directly and significantly affected by transboundary impact ... in the activities of multilateral joint bodies established by Parties riparian to such transboundary waters".⁷⁶ The joint bodies which Parties are required to establish shall have among their tasks "[T]o participate in the implementation of environmental impact assessments relating to transboundary waters, in accordance with appropriate international regulations".⁷⁷

Other related obligations under the duty to cooperate include the duty to negotiate in good faith,⁷⁸ the duty to warn and duties relating to more general and regular exchange of information. According to Okowa, "[A]most all the treaty instruments on environmental protection provide for the exchange of information on a regular basis",⁷⁹ and McCaffrey perceives this obligation as "a necessary

adjunct to, or perhaps even an integral part of, the obligations of equitable utilization and prevention of significant harm".⁸⁰ Similarly, the Experts Group on Environmental Law of the World Commission on Environment and Development linked the obligation closely to the principle of equitable utilisation, stating that "the duty to provide information may in principle pertain to many factors ... which may have to be taken into account in order to arrive at a reasonable and equitable use of a transboundary natural resource".⁸¹ Though determination of breach of such an obligation is bound to be problematic in the absence of uniform principles or rules regulating the collection or dissemination of information, Okowa speculates that "should damage occur, failure to supply such information may be taken as evidence that the State on whom the duty is incumbent has not exercised due diligence over activities under its jurisdiction and control".⁸² This duty is most effectively achieved through the establishment of permanent river basin institutions to facilitate common management of the shared water resources.⁸³

Procedural obligations appear to play a particularly significant role in relation to regimes for the protection of water or other shared natural resources. It is therefore widely accepted that, despite some lack of certainty as to the existence of a similar customary requirement in relation to environmental obligations generally, customary law



The world's largest freshwater fish – the Chinese Paddlefish (*Psephurus gladius*)

Courtesy: wordpress

in the context of shared water resources imposes a binding obligation to notify other States, supply information and enter into consultations.⁸⁴ Early support for the existence of these customary obligations is to be found in a long line of European⁸⁵ and other⁸⁶ treaties and State practice⁸⁷ on the utilisation of international watercourses and Okowa points out that these duties are generally complied with even in the absence of applicable treaty provisions.⁸⁸ Similarly, in a comprehensive study of practice surrounding the duty to warn in customary international law, Woodliffe concludes that it is more developed in situations that involve the use of a shared natural resource (SNR), such as an international watercourse system.⁸⁹

There can be little doubt that the procedural rules set down in the 1997 UN Convention codify and formalise

many existing rules of customary international law. In so doing the Convention further strengthens and legitimises such rules.⁹⁰ Having particular regard to the law of international watercourses, however, the absolutely central role of procedural rules in facilitating effective application of the overarching principle of equitable utilisation, not to mention the subsidiary rule on the prohibition of significant transboundary harm, lends such procedural rules, and their elaboration through the 1997 Convention, added significance. As ILC Special Rapporteur McCaffrey concluded in his Third Report:

"Thus the doctrine of equitable utilization does not exist in isolation. It is part of a normative structure that includes procedural requirements necessary to its implementation: the substantive and procedural principles form an integrated whole".⁹¹

Conclusion

There remains considerable debate surrounding the role and influence of environmental factors in general, and the environmental impact of the use of an international watercourse on other watercourse States in particular, in determining an equitable regime for the utilisation of international watercourses. Some leading authorities have concluded that the causing of significant harm to the environment is a special category of injury which makes the harmful

utilisation an inequitable use of the watercourse *per se*.⁹² Though the International Law Association has clearly articulated the opposing view, stating that "uses of the waters by a basin State that cause pollution in a co-basin State must be considered from the overall perspective of what constitutes an equitable utilization",⁹³ this pronouncement dates from before the advent of modern international environmental law and policy normally associated with the 1972 Stockholm process. The International Law Commission has been rather more circumspect with regard to the significance of the obligation to prevent transboundary harm for the operation of the principle of equitable utilisation⁹⁴ but, despite much prevarication and debate,⁹⁵ the final version of Article 7, adopted by the Commission in 1994, makes

no mention of pollution and simply subordinates the obligation to prevent significant harm to the principle of equitable and reasonable utilisation.⁹⁶

Therefore, at least in relation to Articles 5 and 7, it would appear that pollution is not to be given special treatment nor viewed as a particularly significant class of harm. However, the ILC's 1994 Draft Articles, and subsequently the 1997 UN Convention, proceeded to include a general obligation to protect and preserve the ecosystems of international watercourses⁹⁷ and an obligation to prevent, reduce and control pollution of an international watercourse that may cause significant harm to other watercourse States or their environment.⁹⁸ Similarly, the Convention requires watercourse States to take all measures necessary to protect and preserve the marine environment.⁹⁹ Neither the

Convention nor the commentary to the earlier Draft Articles elaborate on the relationship between these obligations and the principle of equitable utilisation and, in particular, on whether the scope of the latter principle is limited by the operation of these environmental obligations.

At any rate, it is possible to argue that environmental factors are likely to enjoy a certain priority, or at least an increasing significance, within the balancing process that comprises practical implementation of the principle of equitable utilisation. Though any conclusions as the relative significance of factors relating to environmental protection could only ever amount to "rules of thumb" or broad guidelines to assist the diplomatic negotiator, legal advisor or judicial decision maker, they are useful and necessary nonetheless.¹⁰⁰ Despite the fact that Articles 6(3) and 10(1) of the 1997 Convention respectively provide that no particular factor or use enjoys inherent priority, it would certainly appear that, along with the consideration of vital human needs which are accorded a special position under Article 10(2), factors relating to environmental protection, as articulated or alluded to in Articles 5, 6, 7, 20, 21, 22 and 23, enjoy enhanced significance by virtue of their express and detailed inclusion. Article 21(3), for example, specifically lists indicative measures and methods to prevent, reduce and control pollution of an international watercourse on which watercourse States shall consult with a view to reaching agreement.¹⁰¹ Clearly, such detailed conventional guidance for the practical implementation of the obligation to prevent, reduce and control pollution of an international watercourse that may cause significant harm to other watercourse States is of considerable assistance in determining whether environmental factors have been adequately considered, or in ensuring that environmental obligations are duly discharged, as a component of an equitable regime for the utilisation of shared waters. Obviously, the implementation of detailed environmental provisions will be greatly assisted where international joint bodies have been established with the requisite technical and other resources to facilitate appropriate fact-finding and consultation. Some commentators have interpreted Articles 7, 20 and 21 [of the ILC Draft Articles] as establishing the requirement of due diligence as the determinative criterion so that harm due to a failure to satisfy this requirement is inequitable *per se*.¹⁰²

Procedural obligations, however, and the requirement to conduct an EIA in particular, play a key role in ensuring that environmental considerations relating to a planned or continuing use of a watercourse are adequately understood and presented and thus that they may properly be taken into account. Also, the principle of sustainable development, if it is to be equated with the principle of equitable utilisation in the particular context of international watercourses, would lend support to the proposition that considerations of environmental protection enjoy very considerable significance under the latter principle, as environmental protection has always constituted a major element of the former. Further, the widespread use of international joint commissions to facilitate the common management of international watercourses plays an important role in ensuring that factors relating to environmental pro-

tection are identified, articulated and given due consideration in determining regimes for the equitable utilisation of those watercourses. Such international bodies are charged with a variety of functions, ranging from fact-finding roles to the settlement of disputes but, as their environmental responsibilities are normally expressly included in their founding instruments, they would usually enjoy a clear mandate to act in the interest of environmental protection as well as the technical, legal, political and administrative expertise to do so effectively. Finally, it is a moot point whether several of the proposed rules and principles of international environmental law have achieved the status of "custom" for the purposes of Article 10(1) of the UN Convention and, accordingly, for determining whether considerations of environmental protection may enjoy priority over other relevant factors. Indeed, regardless of whether or not they have formally achieved customary status, the sophisticated and detailed articulation of the rules and principles of international environmental law provides a comprehensive set of reference standards and procedures to assist the consideration of environmental impacts and benefits. It is contended that it is the degree of normative specificity of rules and principles of environmental protection, substantive and procedural, that in practice plays the most significant role in ensuring that environmental values are accorded very considerable, and even disproportionate,¹⁰³ weight in any equitable balancing of interests.

In terms of substantive rules, one needs only to consider the ongoing, organic development of environmental due diligence standards which underpin the duty of prevention of significant harm, and which can be found to exist in relation to a wide range of activities, of types of plant and equipment, of protective or preventive works, of technical studies and assessments, and so on. Similarly, one needs only to consider the comprehensive set of procedures and standards which could be found in relation to the conduct of an EIA. Such detailed procedures and standards now exist in relation to literally dozens of industry sectors and categories of activity as well as to various classes of habitat and ecosystem. In terms of purely procedural rules, one has only to think of the detailed elaboration of guidance on the duty of watercourse States to consult in relation to the adoption of environmental measures under Article 21(3) of the 1997 Convention. It is contended that, by formalising the values, means and procedures by which questions of environmental protection are to be considered within the framework of equitable utilisation, the parallel and independent development of a complex but interrelated corpus of environmental rules and principles performs a vital function in ensuring that such questions are indeed so considered. While disparaging what she considers to be the disproportionate, and possibly inequitable, pre-eminence of environmental considerations (over developmental considerations) within applications of the concept of sustainable development and in the allocation of transboundary natural resources, Fuentes suggests that it is possible:

"to explain the advantageous position that environmental concerns are gaining, as compared to the slow

pace of the developmental aspects of sustainable development, by emphasizing the inadequacies of the international law-making process in the fields of international economic and cooperation law".¹⁰⁴

This of course suggests that the effectiveness of the international law-making process in the field of environmental law is to some degree responsible for the priority she perceives being accorded to environmental concerns.

Notes

¹ See, for example, Article V(2) of the International Law Association's 1966 Helsinki Rules on the Uses of the Waters on International Rivers, ILA, *Report of the Fifty-second Conference* 484, (Helsinki, 1966), and Article 6(1) of the 1997 United Nations Convention on the Law of the Non-navigational Uses of International Watercourses, (1997) 36 *ILM* 719, (New York, 21 May 1997), not yet in force, (hereinafter, the "UN Convention"). While 103 States approved the 1997 Resolution to adopt the UN Convention, ratifications remain insufficient to bring it into force. Under Article 36 of the Convention, entry into force requires 35 instruments of ratification, acceptance, accession or approval, but as yet only 12 States are party to the Convention (see *United Nations Treaty Collection On-line*, available at <http://www.un.org>). However, though the Convention has not entered into force, it is likely to remain highly influential and persuasive as a statement of current customary and general international law on international watercourses as it is the culmination of over 20 years of in-depth research by the International Law Commission into the state of international watercourse law and practice.

² See, for example, Article 6(3) and Article 10(1) of the 1997 UN Convention.

³ His work is based on, and to some extent summarises, a programme of research which culminated in publication of a monograph in late 2007 – O. McIntyre, 2007, *Environmental Protection of International Watercourses under International Law* (Aldershot: Ashgate).

⁴ P.M. Dupuy, "Overview of the Existing Customary Legal Regime Regarding International Pollution", in D.B. Magraw, 1991, *International Law and Pollution*, 61, at 61 (Philadelphia: University of Pennsylvania Press).

⁵ See further T.M. Franck, 1990, *The Power of Legitimacy Among Nations*, at 41–42; M.E. O'Connell, 1995, "Enforcement and the Success of International Environmental Law", 3 *Indiana Journal of Global Legal Studies* 47.

⁶ D. Bodansky, 1995, "Customary (and Not So Customary) International Environmental Law", 3 *Global Legal Studies Journal* 105, at 112–119. See also H.E. Chodosh, 1991, "Neither Treaty Nor Custom: The Emergence of Declarative International Law", 26 *Texas International Law Journal* 87; and N.C.H. Dunbar, 1983, "The Myth of Customary International Law", 8 *Australian Yearbook of International Law*.

⁷ Dupuy, *supra*, n. 4, at 61–62.

⁸ *Ibid.*, at 69.

⁹ *South West Africa Case (Second Phase)*, (1966) ICJ Rep. 248, at 292, *per Judge Tanaka*.

¹⁰ See H. Hohmann, 1994, *Precautionary Legal Duties and Principles of Modern International Environmental Law* at 335 (London: Graham & Trotman). See also M. Akehurst, 1974–75, "Custom as a Source of International Law", 47 *British Yearbook of International Law*, at 3.

¹¹ Hohmann, *ibid.*, at 337.

¹² *UN Legislative Series, Legislative Texts and Treaty Provisions Concerning the Utilization of International Rivers for Other Purposes than Navigation*, UN Doc. ST/LEG/LER.B/12. See C.O. Okidi, 1992, "Preservation and Protection Under the 1991 ILC Draft Articles on the Law of International Watercourses", 3 *Colorado Journal of International Environmental Law and Policy* 143, at 144.

¹³ *Legal Problems Relating to the Non-navigational Uses of International Watercourses*, UN Doc. A/CN.4/274, prepared during the 26th session of the ILC, and reproduced in [1974] 1 *Yearbook of the International Law Commission*. See Okidi, *ibid.*

¹⁴ This argument was urged in the recommendations of the 1977 United Nations Water Conference held at Mar del Plata, Argentina. See *Report of the United Nations Water Conference*, UN Doc. E/CONF.70/29, at 115. See further Okidi, *ibid.*, at 159.

¹⁵ See further J. Brunnee and S.J. Toope, 1994, "Environmental Security and Freshwater Resources: A Case for International Ecosystem Law", 5 *Yearbook of International Environmental Law* 41, at 58.

¹⁶ See, in particular, G. Handl, 2001, *Multilateral Development Banking: Environmental Principles and Concepts Reflecting General International Law and Public Policy* (London: Kluwer Law International). See also B. Richardson, 2002, *Environmental Regulation through Financial Organisations* (The Hague: Kluwer Law International); A.N. Gowland Gualtieri, 2001, "The Environmental Accountability of the World Bank to Non-state Actors", 72 *British Yearbook of International Law* 213; and P.T.B. Kohona, 2004, "Implementing Global Standards – The Emerging Role of the Non-state Sector", 34/6 *Environmental Policy and Law* 260.

¹⁷ *Ibid.*, at 13–19.

¹⁸ *Ibid.*, at 31.

¹⁹ The International Finance Corporation, the private sector lending arm of the World Bank Group, developed the so-called "Equator Principles" (see www.ifc.org) which are applicable to project financing and have already been cited in the context of a number of disputes, including those concerning the Karahnjukar Power Plant in Iceland and the Baku-Tbilisi-Ceyhan (BTC) Pipeline Project. See further Kohona, *supra*, n. 16.

²⁰ *US-Import Prohibition of Certain Shrimp and Shrimp Products* (1998), WTO Appellate Body, WT/DS58/AB/R.

²¹ *Measures Concerning Meat and Bone Products* (1998), WTO Appellate Body, at paras 120–125.

²² See, *inter alia*, P. Birnie and A. Boyle, 2002, *International Law and the Environment*, (2nd Ed.) at 104–105 (Oxford: Oxford University Press); P.M. Dupuy, *supra*, n. 4, at 63; A. Kiss and D. Shelton, 1991, *International Environmental Law*, at 130; P. Sands, 1995, *Principles of International Environmental Law*, at 190; E.B. Weiss, S.C. McCaffrey, D.B. Magraw, P.C. Szasz and R.E. Lutz, 1998, *International Environmental Law and Policy*, at 317; S.E. Gaines, 1991, "Taking Responsibility for Transboundary Environmental Effects", 14 *Hastings International and Comparative Law Review* 781, at 796–797; D. Hunter, J. Salzman and D. Zaelke, 1998, *International Environmental Law and Policy*, at 345; D. Wirth, 1995, "The Rio Declaration on Environment and Development: Two Steps Forward and One Back, or Vice Versa?", 29 *Georgia Law Review* 599, at 620; and R. Wolfrum, 1990, "Purposes and Principles of International Environmental Law", 33 *German Yearbook of International Law* 308, at 309. For a more sceptical view, see J.H. Knox, 2002, "The Myth and Reality of Transboundary Environmental Impact Assessment", 96 *American Journal of International Law* 291, at 293; O. Schachter, 1991, "The Emergence of International Environmental Law", 44 *Journal of International Affairs* 457, at 463; and Bodansky, *supra*, n. 6, at 110–111.

²³ *Trail Smelter Arbitration, U.S. v. Canada*, 3 R.I.A.A., (1941), at 1965. *Corfu Channel case, U.K. v. Albania*, ICJ Rep. (1949) 4, at 22. *Lac Lanoux Arbitration (France v. Spain)*, award of 16 Nov. 1957, 12 R.I.A.A. 281, see (1974) *Yearbook of the International Law Commission*, vol. 2, part 2, 194, at 197, para 1065. *Request for an Examination of the Situation in Accordance with Paragraph 63 of the Court's Judgment of 20 December 1974 in Nuclear Tests [New Zealand v. France]*, Order 22 IX 95, ICJ Rep. (1995) 288. *Advisory Opinion on the Legality or Threat of Use of Nuclear Weapons*, (1996) ICJ Rep. 226, at para. 29. *Case Concerning the Gabčíkovo-Nagymaros Project*, ICJ Rep. (1997) 7; see further O. McIntyre, 1998, "Environmental Protection of International Rivers, Case Analysis of the ICJ Judgment in the Case concerning the Gabčíkovo-Nagymaros Project (Hungary/Slovakia)", 10 *Journal of Environmental Law* 79–91.

²⁴ Principle 21 of the Stockholm Declaration, *Report of the United Nations Conference on the Human Environment*, (Stockholm, June 5–16, 1972), part I, chapter I, reprinted in 11 *ILM* 1416 (1972). 1973 UNGA Resolution on Co-operation in the Field of Environment Concerning Natural Resources Shared by Two or More States, UNGA Res. 3129 (XXVIII), UN GAOR Supp. (no. 30A), UN Doc. A/9030/Add.1 (1973). 1974 Resolution proclaiming the Charter of Economic Rights and Duties, UNGA Res. 3281, 29 UN GAOR Supp. (No. 31), at 50, UN Doc. A/9631 (1975), reprinted in 14 *ILM* 251 (1975). 1974 OECD Recommendation on the Control of Eutrophication of Waters, OECD Council Recommendation C(74)220, reprinted in OECD, 1986, *OECD and the Environment*, at 44–45. OECD Recommendation on Strategies for Specific Pollutants Control, OECD Council Recommendation C(74)221, reprinted *ibid.* OECD Recommendation on Transfrontier Pollution, OECD Council Recommendation C(74)224, reprinted *ibid.* 1975 Final Act of the Conference on Security and Co-operation in Europe, 14 *ILM* 1292 (1975). Principle 3 of the 1978 UNEP Principles of Conduct in the Field of the Environment Concerning Resources Shared by Two or More States, UNEP/IG/12/2 (1978). Articles 10 and 11 of the 1985 ASEAN Agreement on the Conservation of Nature and Natural Resources, (1985) 15 *Environmental Policy and Law*, at 64. Principle 2 of the Rio Declaration, *Rio Declaration on Environment and Development*, UN Doc. A/CONF.151/5/Rev.1 (1992), 31 *ILM* 876.

²⁵ For example, the International Law Commission's 1996 draft articles on the general issue of transboundary harm, *Report of the Working Group on International Liability for Injurious Consequences Arising Out of Acts Not Prohibited by International Law*, in *Report of the International Law Commission* (1996) GAOR A/51/10, ANNEX 1, at 235. See also the International Law Commission's 2001 draft Convention on the Prevention of Transboundary Harm from Hazardous Activities, *Report of the International Law Commission* (2001) GAOR A/56/10. See further A. Boyle and D. Freestone (Eds), 1999, *Sustainable Development and International Law*, chapter 4 (Oxford: OUP). See, in particular, the survey of relevant State practice conducted by the ILC, *Survey of State Practice Relevant to International Liability for Injurious Consequences, etc.* (1984) UN Doc. ST/LEG/15.

²⁶ For example, Article 3(1) of the International Law Association's Montreal Rules of International Law Applicable to Transfrontier Pollution, *International Law Association, Report of the 60th Conference* (1982), at 1–3.

²⁷ Notably, Article 194(2) of the 1982 UN Convention on the Law of the Sea, 21 *ILM* (1982) 1261, see also Article 192(2); 1992 Espoo Convention on the Transboundary Effects of Industrial Accidents, 31 *ILM* (1992) 1333; Article 3 of the

Convention on Biological Diversity, 31 *ILM* (1992) 818; Preamble to the Framework Convention on Climate Change, 31 *ILM* (1992) 851.

²⁸ For an example of one of the very few commentators who continue to argue that the prohibition applies to all transboundary harm, see S.E. Gaines, 1991, "Taking Responsibility for Transboundary Environmental Effects", 14 *Hastings International and Comparative Law Quarterly* 781, at 796–797.

²⁹ See further A.E. Boyle, 1990, "State Responsibility and International Liability for Injurious Consequences of Acts Not Prohibited by International Law", 39 *International and Comparative Law Quarterly* 1, at 14–15; R. Pisillo-Mazzeschi, 1991, "Forms of International Responsibility for Environmental Harm", in F. Francioni and T. Scovazzi (Eds.), *International Responsibility for Environmental Harm* 15, at 24; and G. Handl, 1986, "National Uses of Transboundary Air Resources: The International Entitlement Issue Reconsidered", 26 *Natural Resources Journal* 405, at 429.

³⁰ See Birnie and Boyle, *supra*, n. 22, at 131. See further P.N. Okowa, 1996, "Procedural Obligations in International Environmental Agreements", 67 *British Yearbook of International Law* 275, at 279.

³¹ See Knox, *supra*, n. 22, at 293. Knox similarly concludes, at 295–296, that "Principle 21 does seem logically to require... transboundary environmental impact assessment. Otherwise, the substantive prohibition on transboundary harm would be largely meaningless, except perhaps as a basis for *post hoc* determination of compensation owed to the affected state".

³² In his separate opinion appended to the *Gabcikovo-Nagymaros* case, *supra*, n. 23, Judge Weeramantry expressly describes environmental impact assessment as "a specific application of the larger general principle of caution", at 21. See also *Request for an Examination of the Situation*, *supra*, n. 23, Dissenting Opinion, Palmer, at 412, Dissenting Opinion, Weeramantry, at 345.

³³ See, for example, Experts Group on Environmental Law of the World Commission on Environment and Development, 1987, *Environmental Protection and Sustainable Development: Legal Principles and Recommendations*, Article 10, at 75. Also printed in J. Lammers and R.D. Munro (Eds.), 1986, *Environmental Protection and Sustainable Development: Legal Principles and Recommendations Adopted by the Experts Group on Environmental Law of the World Commission on Environment and Development* (London: Graham & Trotman/Martinus Nijhoff Publishers).

³⁴ For example, 1991 Bamako Convention, Article 4(3)(f); 1992 OSPAR Convention, Article 2(3)(b)(ii) and Appendix I; Baltic Convention, Article 23(3) and Annex II; 1979 Long-Range Transboundary Air Pollution Convention, Article 6, 1988 Nitrogen Oxides Protocol, Article 2(2)(a) and 1991 Volatile Organic Compounds Protocol, Article 3(3); 1991 UNGA Res. 46/215 on Large-scale Pelagic Drift-net Fishing and its Impact on the Living Marine Resources of the World's Oceans and Seas; 1995 Fish Stocks Agreement, Article 5(e).

³⁵ *Supra*, n. 22, at 120, citing *Report of the International Law Commission* (2000) GAOR A/55/10, para. 716.

³⁶ On the ecosystem approach, see further O. McIntyre, 2004, "The Emergence of an 'Ecosystem Approach' to the Protection of International Watercourses under International Law", 13/1 *Review of European Community and International Environmental Law* 1.

³⁷ *Supra*, n. 25, at 235. Similarly, in the *Gabcikovo-Nagymaros* case, *supra*, n. 23, the ICJ strongly suggests that environmental concerns are likely to be relevant in determining the essential interests of States for the purposes of invoking a state of "necessity".

³⁸ J. Crawford, *Second Report on State Responsibility*, UN Doc. A/CN.4/498/Add.2 (1999), para. 289, at 31.

³⁹ Brunnée and Toope, *supra*, n. 15, at 66.

⁴⁰ For example, Trouwborst suggests that the endorsement of the goal of sustainable development in Article 5 of the 1997 Convention automatically implies a recognition of the precautionary principle, as the latter is so firmly linked to the former. See A. Trouwborst, 2003, *Evolution and Status of the Precautionary Principle in International Law*, at 111 (New York: Aspen Publishers).

⁴¹ *Supra*, n. 25.

⁴² See P.K. Wouters and A.S. Rieu-Clarke, 2001, "The Role of International Water Law in Promoting Sustainable Development", 12 *Water Law* 281, at 283; M. Kroes, "The Protection of International Watercourses as Sources of Fresh Water in the Interest of Future Generations", in E.H.P. Brans, E.J. de Haan, J. Rinzema and A. Nollkaemper (Eds.), 1997, *The Scarcity of Water: Emerging Legal and Policy Responses*, at 83 (The Hague: Kluwer Law International); McIntyre, *supra*, n. 23, at 88.

⁴³ See generally E. Brown-Weiss, 1989, *In Fairness to Future Generations* (Tokyo/New York: United Nations University Press/Transnational Publishers).

⁴⁴ C. Redgwell, 1999, *Intergenerational Trusts and Environmental Protection*, at 139 (Manchester: University of Manchester Press).

⁴⁵ See, for example, Article 2 of the 1972 London Dumping Convention, which requires the parties to take effective measures "according to their scientific, technical and economic capabilities" (Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 11 *ILM* 1294 (1972), in force 30 August 1975).

⁴⁶ *Supra*, n. 24. Principle 15 provides that:

"In order to protect the environment, the precautionary approach shall be

widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation" (emphasis added).

⁴⁷ *Report of the UN Conference on the Human Environment*, UN Doc. A/CONF.48/14; (1972) 11 *ILM* 1416.

⁴⁸ Okowa, *supra*, n. 30, at 275. See generally F.L. Kirgis, 1982, *Prior Consultation in International Law* (Charlottesville: University Press of Virginia); P. Sands, 1994, *Principles of International Law*, chapter 16, at 596 (Manchester: Manchester University Press); and A. Boyle, 1994, "The Principle of Co-operation: The Environment", in V. Lowe and C. Warbrick, *The United Nations and the Principle of International Law*, at 120 (London and New York: Routledge).

⁴⁹ In the context of transboundary water resources, see, for example, Article 16 of the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes, (1992) 31 *ILM* 1312, which requires that all "Riparian Parties" make available to the public the following information:

- (a) Water-quality objectives;
- (b) Permits issued and conditions required to be met;
- (c) Results of water and effluent sampling carried out for the purposes of monitoring and assessment, as well as results of checking compliance with the water-quality objectives or the permit conditions.

⁵⁰ See further Okowa, *supra*, n.30, at 277–278.

⁵¹ *Supra*, n. 23, at 308. See C.B. Bourne, 1972, "Procedure in the Development of International Drainage Basins: The Duty to Consult and to Negotiate", *Annuaire Canadien de Droit International* 219.

⁵² *Supra*, n. 23, at 20.

⁵³ [1987] *Yearbook of the International Law Commission*, vol. 1, at 71–85. See S. McCaffrey, 2001, *The Law of International Watercourses*, at 401 (Oxford: OUP).

⁵⁴ McCaffrey, *ibid.*

⁵⁵ [1987] *Yearbook of the International Law Commission*, vol. 1, at 75.

⁵⁶ P. Sands, *supra*, n. 48, at 197–198. According to Sands, these specific commitments include:

"[R]ules on environmental impact assessment...; rules ensuring that neighbouring states receive necessary information (requiring information exchange, consultation and notification)...; the provision of emergency information...; and transboundary enforcement of environmental standards".

⁵⁷ *Report of the International Law Commission* (1994), at 105.

⁵⁸ Article 8(1) provides:

"Watercourse States shall cooperate on the basis of sovereign equality, territorial integrity, mutual benefit and good faith in order to attain optimal utilization and adequate protection of an international watercourse".

⁵⁹ Principle 20 was rejected primarily due to Brazilian opposition, which was due to the fact that Brazil was planning to build three high dams on the Parana River which is an important source of water for downstream Argentina. See A.E. Utton, 1973, "International Environmental Law and Consultation Mechanisms", 12 *Columbia Journal of Transnational Law* 56, at 71–72.

⁶⁰ UNGA Resolution 2995, Dec. 15, 1972, reprinted in (1973) 68 *Department of State Bulletin*, at 56–57. The General Assembly resolved that it:

"Recognizes that cooperation between States in the field of the environment... will be effectively achieved if official and public knowledge is provided of the technical data relating to the work to be carried out by States within their national jurisdiction with a view to avoiding significant harm that may occur in the human environment of the adjacent area" and that "The technical data referred to... will be given and received in the best spirit of cooperation and neighbourliness...".

⁶¹ Section 466g(d)(2). Cited in Utton, *supra*, n. 59, at 65–66.

⁶² *Supra*, n.30, at 275. Examples cited include the General Convention of 14 December 1931 between Romania and Yugoslavia concerning the Hydraulic System, 135 *LNTS* 31; the Agreement of 10 April 1922 for the Settlement of Questions Relating to Watercourses and Dykes on the German-Danish Frontier, 10 *LNTS* 201; the Treaty of 24 February 1950 between Hungary and the USSR concerning the Regime of Soviet-Hungarian State Frontier, UN *Legislative Texts and Treaty Provisions concerning the Utilization of International Rivers for other Purposes than Navigation* (hereinafter *Legislative Texts*), No. 226, at 823; the Agreement of 8 July 1948 between Poland and the USSR concerning the Regime of the Polish-Soviet State Frontier, 37 *UNTS* 25; the Treaty of 11 January 1909 between Great Britain and the United States of America relating to Boundary Waters and Questions concerning the Boundary between Canada and the United States, *Legislative Texts*, No. 79, at 260; the Convention of 11 May 1929 between Norway and Sweden on Certain Questions relating to the Law on Watercourses, 120 *LNTS* 263.

⁶³ O. Schachter, 1977, *Sharing the World's Resources*, at 69 (New York: Columbia University Press), cited in McCaffrey, *supra*, n. 53, at 398. According to Schachter:

"It is reasonable... that procedural requirements should be regarded as essential to the equitable sharing of water resources. They have particular importance because of the breadth and flexibility of the formulae for equitable use and appropriation. In the absence of hard and precise rules for allocation, there is a relatively greater need for specifying requirements for advance notice,

consultation, and decision procedures. Such requirements are, in fact, commonly found in agreements by neighbouring States concerning common lakes and rivers”.

⁶⁴ *Supra*, n. 49. By the end of 2000, the Convention had 26 Signatories and 32 Parties (see <http://untreaty.un.org/> ...). See generally A. Nollkaemper, 1993, *The Legal Regime for Transboundary Water Pollution: Between Discretion and Constraint* (Dordrecht: Martinus Nijhoff Publishers).

⁶⁵ C.B. Bourne, 1971, “International Law and Pollution of International Rivers and Lakes”, *University of British Columbia Law Review* 121.

⁶⁶ *Ibid.*, at 122.

⁶⁷ *Supra*, n. 25.

⁶⁸ See, for example, J. de Arechaga, 1978, “International Law in the Past Third of a Century”, 1 *Recueil des Cours de l'Académie de Droit International*, at 198; F.L. Kirgis, *supra*, n. 48, at 86, 128; UN, 1975, *Management of International Water Resources: Institutional and Legal Aspects*, UN Doc. ST/ESA/5, at 50–51.

⁶⁹ See J.G. Lammers, 1985, “The Present State of Research Carried Out by the English-speaking Section of the Centre for Studies and Research”, in *La pollution transfrontière et le droit international*, at 109–110 (Académie de Droit International de La Haye – Centre d'études et de recherche de droit international et des relations internationales).

⁷⁰ See, for example, the *Lac Lanoux Arbitration*, *supra*, n. 23; the *Itaipú Dam dispute*, see McCaffrey, *supra*, n. 53, at 265–267; and Sudan's claim that Egypt had failed to notify it of the technical details of the Aswan High Dam, see McCaffrey, *ibid.*, at 233 *et seq.*

⁷¹ See, for example, Articles 3 and 10 of the 1992 Convention on the Transboundary Effects of Industrial Accidents, *supra*, n. 27.

⁷² See, for example, Recommendation 51(b)(i) of the 1972 Stockholm Declaration, *supra*, n. 24, which provided that:

“when major water resource activities are contemplated that may have a significant environmental effect on another country, the other country should be notified well in advance of the activity envisaged”.

⁷³ *Supra*, n.30, at 289. However, the 1991 ECE Convention on Environmental Impact Assessment, 30 *ILM* 802, expressly includes the obligation to notify under Article 3.

⁷⁴ *Supra*, n. 49, Article 9(2)(h).

⁷⁵ Article 9(2)(j).

⁷⁶ Article 9(3) and (4).

⁷⁷ Article 9(2)(j).

⁷⁸ Negotiations would not be so conducted where one party terminates the negotiations without justification, imposes abnormal delays or time limits, fails to adhere to the agreed procedure, or systematically refuses to consider the proposals or the interests of the other party. See *Lac Lanoux Arbitration*, *supra*, n. 23, at 307.

⁷⁹ *Supra*, n.30, at 300.

⁸⁰ *Supra*, n. 53, at 411. He goes on to explain that:

“without data and information from co-riparian states concerning the condition of the watercourse, it will be very difficult, if not impossible, for a state not only to regulate uses and provide protection (e.g. against floods and pollution) within its territory, but also to ensure that its utilization is equitable and reasonable *vis-à-vis* other states sharing the watercourse”.

⁸¹ *Supra*, n. 33, at 95.

⁸² *Supra*, n. 30, at 300.

⁸³ See Dupuy, *supra*, n. 4, at 73, who concludes that such regular exchange of information by means of such permanent regional institutions “seems to be the most appropriate way of establishing a reasonable and equitable use of shared natural resources, as is required by international law”.

⁸⁴ See, for example, J. Bruhacs, 1993, *The Law of Non-navigational Uses of International Watercourses*, at 176–177 (Dordrecht: Martinus Nijhoff Publishers).

⁸⁵ For example, the 1921 Barcelona Convention on the Regime of Navigable Waterways of International Concern, 7 *LNTS* 35; the 1948 Convention regarding the Regime of Navigation on the Danube, 33 *UNTS* 196; the 1963 Berne Convention on the International Commission for the Protection of the Rhine, reprinted in *Tractatenblad Van Het Koninkrijk Der Nederlanden*; the 1964 Agreement Concerning the Use of Waters in Frontier Waters concluded between Poland and the USSR, 552 *UNTS* 175; Article 9 of the 1974 Agreement concerning Co-operation in Water Economy Questions in Frontier Rivers concluded between the German Democratic Republic and Czechoslovakia, reprinted in *Sozialistische Landeskultur Umweltschutz, Textangabe Ausgewählter Rechtsvorschriften, Staatsverslag Der Deutsch Dem. Rep.* 375 (1978); the 1976 Convention on the Protection of the Rhine against Chemical Pollution, (1977) 16 *ILM* 242. For an extensive survey, see Kirgis, *supra*, n. 48, Chapter 2.

⁸⁶ For example, Article IX of the 1909 Boundary Waters Treaty, *supra*, n. 62; the 1959 Nile Waters Agreement; Article 6 of the 1960 Indus Waters Treaty, 419 *UNTS* 125; the 1964 Agreement concerning the Niger Commission, 587 *UNTS* 19; the 1971 Act of Santiago concerning Hydrologic Basins concluded between Argentina and Chile; the 1973 US-Mexico Agreement on the Permanent and Definitive Solution to the Problem of the Salinity of the Colorado River, (1973) 12 *ILM* 1105; Article 9 of the 1978 US-Canada Great Lakes Water Quality Agreement, 30 *UST* 1383.

⁸⁷ For a comprehensive survey of State practice in this area, see J.G. Lammers, 1984, *Pollution of International Watercourses*, at 165, *et seq.* (Dordrecht: Nijhoff).

⁸⁸ *Supra*, n.30, at 319.

⁸⁹ J. Woodliffe, 1990, “Tackling Transboundary Environmental Hazards in Cases of Emergency: The Emerging Legal Framework” in R. White and B. Smythe (Eds), *Current Issues in European and International Law* 105, at 114–5 (London: Sweet & Maxwell). He explains, at 115, that:

“Because utilisation of a SNR heightens the risk of transfrontier environmental harm, there is a broad measure of juristic support for the existence of a duty to warn states of any emergency situation which might cause sudden harmful effects to their environment”.

⁹⁰ See C.B. Bourne, 1992, “The International Law Commission's Draft Articles on the Law of International Watercourses: Principles and Planned Measures”, 3 *Colorado Journal of International Environmental Law and Policy* 65, at 72 who, in summarising the procedural rules as set down in Part II of the ILC Draft Articles, concludes that:

“For the most part, the basic requirements of the exchange of information, notice, consultation, and negotiation now form part of customary international law. In fleshing out these basic rules, such as providing for a six-month time limit, the ILC has engaged in beneficial progressive development of the law. ... the new provisions merely elaborate the existing law and will make it more effective. Insofar as these provisions constitute new law, they should have little difficulty in gaining ready acceptance by the international community”.

⁹¹ *Supra*, n. 53, at 411, citing McCaffrey, *Third Report*, at 23, para. 34.

⁹² For example, Nollkaemper, *supra*, n. 64, at 68–69.

⁹³ International Law Association, 1966, *Report of the Fifty-second Conference* (Helsinki), at 499.

⁹⁴ See generally X. Fuentes, 1996, “The Criteria for the Equitable Utilization of International Rivers”, 67 *British Yearbook of International Law* 337, at 409–411.

⁹⁵ In 1993, the Special Rapporteur, Mr Robert Rosenstock, considering that the Draft Articles should be reconsidered and updated to reflect developments in the area of international environmental law and practice, proposed a redraft of Article 7 which would have made it clear that equitable and reasonable utilization was the decisive criterion in determining the permissible uses of an international watercourse but which would also have given special treatment to pollution so that it created a rebuttable presumption of inequity. See R. Rosenstock, 1993, “Non-navigational Uses of International Watercourses”, 23 *Environmental Policy and Law* 241, at 242.

⁹⁶ See *Report of the International Law Commission to the General Assembly on the Work of its Forty-sixth Session*, Doc.A/49/10 (1994), at 236, where the commentary to Article 7 explains that:

“In certain circumstances ‘equitable and reasonable utilization’ of an international watercourse may still involve significant harm to another watercourse State. Generally in such instances, the principle of equitable and reasonable utilization remains the guiding criterion in balancing the interests at stake”.

⁹⁷ Articles 20 and 22.

⁹⁸ Article 21(2).

⁹⁹ Article 23.

¹⁰⁰ See, for example, J.M. Wenig, 1995, “Water and Peace: The Past, the Present and the Future of the Jordan River Watercourse: An International Law Analysis”, 27 *New York University Journal of International Law and Policy* 331, at 348, who notes that “consideration of all these factors without a method of gauging their relative importance cannot provide conclusive and realistic conclusions to disputes over international waters”.

¹⁰¹ These include:

- (a) Setting joint water-quality objectives and criteria;
- (b) Establishing techniques and practices to address pollution from point and non-point sources;
- (c) Establishing lists of substances the introduction of which into the waters of an international watercourse is to be prohibited, limited, investigated or monitored.

¹⁰² Brunnée and Toope, *supra*, n. 15, who conclude, at 63–64, that:

“[T]he Draft Articles adopted in 1994 ... ultimately make due diligence the decisive criterion. Thus, significant harm resulting from a failure to exercise due diligence violates both the transboundary harm and equitable use principles”.

See further, however, Fuentes, *supra*, n. 94, who strongly disagrees with this interpretation, at 411.

¹⁰³ Indeed, Fuentes, in an examination of the relative priority accorded to environmental and developmental values respectively under the concept of sustainable development, concludes that “The balance seems to tip in favour of the protection of the environment”, [and that] “environmental protection has developed to a certain extent at the expense of international economic law relating to development”. X. Fuentes, 2002, “International Law-Making in the Field of Sustainable Development: The Unequal Competition between Development and the Environment”, 2 *International Environmental Agreements: Politics, Law and Economics* 109, at 109.

¹⁰⁴ *Ibid.*, at 112.



The Case of Urban Water Management

by J. Fried and J.L. Martin-Bordes*

Applying the principle “Think globally, act locally”, local Agendas 21 are a policy instrument enabling the integration of the principles of sustainable development into all the policies, projects and plans for a territory or a city. They should be supported by a strategy, or territorial action programme, defining the objectives, methods and instruments to implement sustainable development locally. Our purpose in this paper is to understand whether and how such a policy and its supporting strategy can be implemented by small and medium-sized municipalities which, because of their size, may face difficulties in simultaneously handling the short and long-term aspects, and other problems of scale.

Actually, time and space scales introduce paradoxes in the conception and implementation of sustainable urban development policies for any city: *e.g.*, the long term of sustainability versus the short term of political and financial interests, or the dimensions and technical characteristics and the resulting costs of a comprehensive and efficient infrastructure versus the financial and technical capacities of the local authority which plans, decides, builds and manages. These paradoxes are further complicated when they concern small and medium-sized municipalities, without significant financial, scientific, technical and human resources, that are often also characterised by a lack of usable communication tools.

In general, the territory chosen to implement sustainable development has to be at a scale consistent with a coordinated management of economic and social development and environmental protection, especially in terms of financial and technical capacities and institutional and legal organisation. There are no rules to define such a scale but, in France for example, a number of municipalities are organising their sustainable development and establishing their Agenda 21 according to a concept, introduced and supported by a set of laws, known as “intercommunality”. Intercommunality is the association of several municipalities to pool their various resources, services and competences and reach a scale of operation compatible with sound elaboration and implementation of a sustainable development policy.

Such an association is not specific to France, although French legislation clearly emphasises sustainable development preoccupations, and, to illustrate this point, we present two examples, one in France and the other one in the USA, namely the Béthunois area in the North of France and Orange County in Southern California, and we propose some guidelines and recommendations, to be supported and developed by further research.

Small and Medium-sized Intercommunalities: Sustainable Development Challenges

The association of municipalities with intercommunalities provides the right critical mass in terms of population and financial means to address sustainable development challenges in a federate manner. However, the instruments necessary to implement a sustainable development policy still need to be adapted to the characteristics of the intercommunality, in terms of scale and financial capacity. This leads us to introduce the concept of “medium-sized intercommunality”, which in France are defined as those intercommunalities with a range of population between 20,000 and 200,000 inhabitants (Pornon, 1998). Most of these medium-sized intercommunalities present the following characteristics (Martin *et al.*, 2002):

- few computerised structures or structures still in the process of being computerised;
- data scattered amongst different services, which are not capitalised;
- lack of tools for forecasting and simulation;
- lack of communication tools, usable by the local authorities, water board personnel and other stakeholders.

In most cases, these intercommunalities are responsible for urban water management issues including water supply and sanitation for their municipalities. Nowadays, the intercommunalities are facing new challenges due to an increase in water supply demands and subsequent sanitation requirements, among others. To understand how the systems operate is possible today thanks to the existing information systems and modelling and simulation tools, but complementary developments are necessary to adapt these tools to the urban water management forecasts and strategies in a sustainable manner. If large intercommunalities have the necessary dynamics for setting up and operating these tools, small and medium-sized intercommunalities are rarely equipped and their competences, tools and human and resources are limited (Boulémia *et al.*, 2000).

Water managers need to have tools and technologies to meet problems related to daily management and mid and long-term development plans. These tools may allow them, on the one hand, to be autonomous in order to develop their own management strategies and decision-making processes and on the other hand, to facilitate data collection and analysis for the study of the urban water systems.

In the particular case of urban groundwater management, which we illustrate by two case studies, the activities concerning the exploitation of groundwater are diverse and rely on a great amount of data and many variables from various sources and of varying levels of quality according to their objective (*e.g.* diagnostic, interpretation, forecasting, planning) and to their implementation (short, medium or long-term). Managers and decision makers

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often have to make quick and effective decisions, which requires knowledge of the physical behaviour of the hydrological system and the use of suitable indicators on the functioning of the system. These indicators are defined by the manager and the local authorities according to their management priorities but also according to the indications and standards from the official documents.

Institutional and Legal Instruments Supporting Sustainable Development

In France, the concept of intercommunality was introduced by four laws adopted between 1999 and 2002 with the objective of strengthening the consistency of urban and territorial policies and bringing a legal value to local sustainable development.

These laws stimulate sustainable development in three ways:

- Think and act at the right territorial scales;
- Give its significance to the long term with respect to the short term;
- Reinforce public participation.

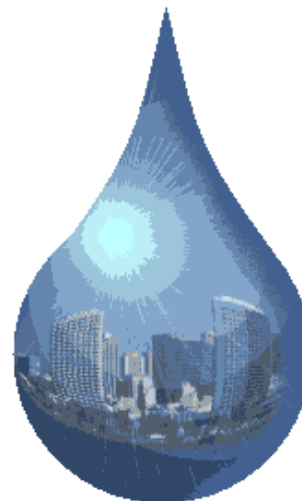
Two of these laws can be of direct assistance to small and medium-sized municipalities, suffering from a lack of financial means, by giving them the legal opportunity to join efforts and capacities and create a genuine fiscal and economic solidarity. Of course water management is not explicitly specified within these laws but they cover resource management in general and it is up to the water managers to fully understand the scope of these laws and apply the planning, organisational and economic opportunities, which they offer, to their field of water management:

- The law of “Orientation for territorial planning and sustainable development”, June 25, 1999, officially introduces sustainable development as a mode of development and public action for the municipalities of a territory, giving them the legal possibility of associating themselves and sharing their capacities. According to this law, in an urban area of more than 50,000 inhabitants, where one or several communes have more than 15,000 inhabitants, the intercommunal public institutions dealing with territorial planning and economic development and the communes which are not members of these public institutions can associate themselves and design a project of “agglomération” (conurbation), whose legal expression in French is the “contrat d’agglomération” (conurbation contract). This project, on the one hand, determines the orientations concerning economic development and social cohesion, planning and urbanisation, transportation and lodging, urban policy, environmental and resources management policy according to the principles of local agendas 21, and on the other hand, identifies the measures necessary to implement these orientations. These conurbation contracts are established between the State, the Region and the municipalities, according to the principles of sustainable development and emphasising proximity, the mobilisation of the actors and the specificities of the urban challenges.

- The law concerning the “reinforcement and the simplification of intercommunal cooperation”, July 12, 1999, has created a new instrument of intercommunal cooperation, the “communauté d’agglomération” (conurbation community), which is supported, on the one hand, by the association of strong competences for land-use planning, economic development and urban social development, and, on the other hand, by the mobilisation of a fiscal resource transferred from the commune to the intercommunal structure, the professional tax. And this creates a genuine fiscal and economic solidarity at intercommunal level.

The two other laws are also interesting, although they do not directly concern the small and medium-sized urban communities: the law of 13 December 2000 stimulates solidarity and develops participation and local democracy while insisting on a more economical use of space by introducing new planning instruments like the territorial consistency schemes and the local urban plans; the law of 27 February 2002 strengthens local democracy, *e.g.*, creating district councils in communes over 80,000 inhabitants, which could be applied in an association of communes.

The “conurbation contract” defines the choices of development and spatial organisation of the communes at the scale of the intercommunality (or association), within which the “contract” will coordinate the relevant public policies, such as water supply, sanitation, waste water treatment, storm water among others. It defines the spatial scale



Courtesy: GDRC

of action of the association of communes and contributes to the strengthening of the intercommunality. It is the basis upon which a number of French municipalities are now establishing their agendas 21, namely as an “intercommunal agenda 21”, such as, among others, Poitiers with 10 municipalities and 110,000 inhabitants, and Saint Etienne with 43 municipalities and 390,000 inhabitants.

In the USA, the structure of city governments is rather similar to the federal structure of the Federation and the States: an elected mayor, with the executive power, and a

council whose members are either elected or selected in electoral districts, with the legislative power. But some public services, and water in particular, are managed by specific local public authorities called “districts” or “authorities” and created by a specific law. These authorities are geographically distinct from the cities and this is where an equivalence to the French intercommunality can be found: a water authority or district will gather a number of cities, or parts of cities, and create a synergy in terms of water supply, sanitation and waste water treatment and reuse; in some cases other uses of water are dealt with by the water district, such as, for instance, fire protection in the Bangor Water District of Maine (<http://www.bangorwater.org>).

Although many of these districts were created quite a long time before the 1987 Brundtland UN report (*e.g.*, the Bangor Water District was created in 1957 and the Orange County Water District in 1933), they now constitute a valuable facilitator and practical instrument for sustainable water management, comparable, for water of course, to the “conurbation contract” and the intercommunality in France, but at a much larger geographical scale corresponding to the respective sizes of the two countries.

Management and Decision-making Tools for Medium-sized Intercommunalities

Since the emergence of Geographical Information Systems (GIS), priority has been given to management applications. The applications in decision-making support, in particular in small and medium-sized communities, are less developed. However, local authorities and water managers and practitioners in these intercommunalities have recently expressed a very strong request for equipment and data-processing and modelling tools which, in the medium term, will have to be not only daily management tools but also instruments for future development in their territory (Boulémia *et al.*, 2000). These tools, contrary to the management tools meant for technicians, must allow the anticipation of a phenomenon and provide the appropriate decision-making framework.

Two Case-studies of Intercommunalities Dealing with Groundwater Management for Urban Supply

The SIVOM (Syndicat Intercommunal à Vocation Multiple) of the Intercommunality of the Béthunois (France): Science for Sustainable Groundwater Management

The SIVOM of the Community of the Béthunois has the mandate for 32 technical tasks including the production and supply of drinking water for 13 boroughs in an area of 51km². The population was 40,000 in 2004. The local community, wishing to preserve its groundwater resource, which is the main source of freshwater in the area, while responding to the increasing demands for water, needed suitable tools to understand the behaviour of the aquifer system, in order to model and monitor its response to an increase in groundwater abstraction.

The local authorities of the SIVOM and the regional university, the University of Artois, initiated a partnership by which the university would provide technical and

scientific assistance to the local authorities to assist them in developing and implementing a methodological approach for the sustainable management and protection of the groundwater resource. In particular, the study also focused on the impact that an unsustainable exploitation plan may have on the natural phenomena occurring in the aquifer, such as the natural denitrification process. In this research project, the researchers of the “Hydrology, Soil and Environment” team of the University proposed a methodology for a better understanding of the functioning of the aquifer system using management tools such as GIS, databases and models, and for monitoring and preservation of the resource.

The Orange County Water District, California (USA): Finance and Techniques for Sustainable Groundwater Management

The Orange County Water District manages the groundwater basin in coastal Southern California, which provides the majority of water demands in the area. The District was formed by a special act of the California Legislature in 1933 for the purpose of protecting the Basin. It does not deliver water directly to the 2.3 million residents of 21 cities south of Los Angeles, an area of about 1000km², which is done by water retailers, such as the Irvine Ranch Water District. But it ensures the availability and good quality of the water supply, essentially groundwater, at the lowest reasonable cost and in an environmentally responsible manner (Orange County Water District). The District is governed by a 10-member Board of Directors, elected in seven districts of approximately equal population or appointed by the city councils of three cities. The Board sets the policy and the budget. It should be stressed that the district is medium-sized on a US scale and this is why it was chosen. It could be compared to the Metropolitan Water District of Southern California which serves 18 million inhabitants (Orange County Water District, 2004).

The water exploitation management is based on financial incentives: a Replenishment Assessment (RA) or pump tax is charged on all water pumped; each year, the District determines the Basin Production Percentage, *i.e.*, the percentage of each city’s annual demand which can be satisfied with groundwater. Cities can pump more if they pay a supplementary tax which makes the cost of that water equal to the cost of purchasing imported water. The RA funds are used to construct, operate and maintain facilities to protect and increase groundwater supplies, *e.g.*, by purchasing imported water for additional groundwater recharge (*e.g.*, from the Metropolitan Water District of Southern California).

A major feature is the groundwater replenishment system (GRS), the world’s largest water purification and reuse project, which certainly could not be managed by one city alone. The system also protects the aquifer from sea water intrusion, stimulating solidarity among all users who are financially collectively responsible for the system, whether they live near the sea or further inland. Another interesting feature is that the District has a Research and Development group, carrying out laboratory, field and

mathematical modelling research, to find solutions to short-term problems of the area as well as longer-term more general research questions.

Public participation, a significant principle of Agenda 21, is a requirement of the State of California Water Code. Therefore the District holds public meetings as part of the regularly scheduled board meetings. Besides other classic communication means such as public reports or water producers' workshops, the District informs and engages the public in groundwater discussions through an active speakers' bureau, media releases, the water education class "Orange County Water 101" for adults at no cost, and a Children's Water Education Festival in partnership with the Disneyland Resort.

Recommendations for Better Access of Medium-sized Intercommunalities to Sustainable Development Instruments

From experience and analysis of the difficulties that small and medium-sized intercommunalities are currently facing in the sustainable management of their urban water systems and water resources, illustrated through two case studies, we propose some guidelines for action in the domains of education, training and research that will enable the implementation of the sustainable development instruments and methods described in this paper.

The first set of recommendations aims at facilitating closer cooperation between the local authorities and water managers, and higher education and research institutions. The second set of recommendations proposes some of the new directions that research may take to support effectively the needs of intercommunalities.

Cooperation with Higher Education and Research Institutions

- Partnerships between local authorities and neighbouring (local) universities or research institutions to compensate for the lack of scientific and technical means and expertise;
- In particular, participation of universities and research institutions in the creation of specific instruments for the intercommunity, adapted to the local context, both technical and managerial;
- Conversely, financial investments in these institutions for applied educational programmes: *e.g.*, Masters and PhD degrees;
- Short and longer-term internships offered to students in intercommunity technical services;
- Professional training: participation of intercommunity technical services staff in intensive short courses offered by universities, research institutions or international organisations.

New Directions for Research in Support of Intercommunalities

- Stimulate multidisciplinary research in the institutional, political, legal and financial domains of interest for the small and medium-sized intercommunalities;
- In the same spirit, promote the integration of human and social sciences into engineering studies (*e.g.*, on

urban water conflicts and on user perceptions of the quality of the urban water services);

- Establish applied research programmes addressing issues relevant to the intercommunity coping with local problems and needs;
- Strengthen the communication mechanisms between the local authorities, the technical services and the scientific researchers through a triologue platform so that decisions are made based on the technical and scientific advice and support of all the different stakeholders.

Conclusion

In this paper, we have underlined that in order for municipalities associated in small and medium-size intercommunalities to achieve sustainability of their water management some specific developments and adapted instruments are necessary to cope with limited financial resources and scarce technical skills. We have shown two successful case studies where beneficial partnerships have been established between the intercommunity wishing to respond to the water demands of its population and the local groups of research that provided the necessary technical and scientific knowledge and expertise for better management and decision-making processes within the intercommunity. The methods and instruments applied in these two cases could be adapted to other small and medium-sized intercommunalities facing different technical problems. We have proposed some orientations, tested through our own case studies, to support research and technical cooperation between the local authorities, the water managers at the technical level, and the scientific community.

References

- Bangor Water District, 614 State Street, Bangor, ME 04401, USA. See: www.bangorwater.org.
- Boulémia, C., Henry, E., Top, G., Martin, J.L. and Masson, F.X. 2000, « Axes de développement d'outils d'aide à la décision dans les moyennes collectivités à partir d'un Système d'Information Géographique. Cas des réseaux d'assainissement et d'alimentation en eau », dans *Actes de la 2^{ème} Conférence Internationale sur l'Aide à la Décision dans le domaine du Génie Civil et Urbain*, Lyon, 20–22 novembre 2000, Vol. 1, 473–482.
- Cités Unies France, l'organisation territoriale américaine, document de travail pour la réunion constitutive du Groupe pays France/Etats-Unis, 29/10/2003. See: www.cites-unies-france.org.
- Irvine Ranch Water District, P.O. Box 57000, Irvine, California 92619-7000, USA. See: www.irwd.com.
- Journal Officiel de la République Française. See: www.legifrance.gouv.fr.
- Martin, J.L., Carlier, E., Boulémia, C. and Henry E. 2002, "Approach to an integrated groundwater resource management in a medium-sized local community: setting up of a management and decision-making support tool. Case of the chalk aquifer in the Béthunois area (Nord-Pas de Calais), France", in *Proceedings of the Fifth International Conference on Hydroinformatics*, Cardiff, 1–5 July 2002, Vol. 2, 1000–1005.
- Metropolitan Water District of Southern California, 700 N. Alameda Street, Los Angeles, CA 90012-2944, USA. See: www.mwdh2o.com.
- Orange County Water District, Records Department, *A History of Orange County Water District*, P.O. Box 8300, Fountain Valley, CA 92728-8300, USA.
- Orange County Water District, 2004, *Groundwater Management Plan*. See: www.ocwd.com.
- Pornon, H. 1998, « Le marché des SIG. Évolution et perspectives ». *Revue XYZ*, n°75, 2^{ème} trimestre 1998, pp. 68–70.
- Rival, S. 2003, « Prise en compte du développement durable dans les politiques intercommunales », *Mémoire de DESS Maintenance Urbaine et Développement Durable 2002-2003*, Institut Francilien des Géosciences-Pôle Ville, Université de Marne-la-Vallée.

