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PROTECTING A HIDDEN TREASURE: THE U.N. INTERNATIONAL LAW COMMISSION AND THE INTERNATIONAL LAW OF TRANSBOUNDARY GROUND WATER RESOURCES

by Gabriel E. Eckstein*

INTRODUCTION

Ground water today is a true “hidden” treasure. It is buried from sight, often at great depths; considered priceless by many, though indispensable to all; and is occasionally stolen and often contested in court.

Historically, ground water was used primarily in the arid regions of the globe like the Middle East. The rest of the world relied on surface water resources, such as streams and lakes. Beginning in the mid 1900s, ground water began to emerge as a chief source of fresh water worldwide. This was mainly the result of the tremendous growth in development and global population that has occurred over the past century,¹ as well as technological improvements in ground water extraction.²

Today, ground water is the most extracted natural resource in the world.³ It provides more than half of humanity’s fresh-water for everyday uses such as drinking, cooking, and hygiene, as well as twenty percent of irrigated agriculture.⁴ In Europe, between sixty and ninety-nine percent of drinking water comes from ground water;⁵ in the United States, that number is between one-half to ninety-seven percent.⁶ Overall, water use today is increasing four to eight percent per year,⁷ far outpacing the global population growth of 1.4 percent annually.⁸

Given the world’s considerable reliance on this precious resource, it would be reasonable to assume that international attention to, and especially legal consideration of, ground water would be substantial. Nothing is further from the truth. Despite the growing dependence,⁹ legal and regulatory attention to ground water resources have long been secondary to surface water, especially among legislatures and policymakers and above all in the international arena.¹⁰ Today, while there are hundreds of treaties governing transboundary rivers and lakes, there is only one international agreement that directly addresses a transboundary aquifer.¹¹

Recently, the United Nations International Law Commission (“ILC” or “Commission”) embarked on an effort to address this shortcoming and to consider the international law applicable to transboundary ground water resources. This undertaking follows and builds on the Commission’s work on international watercourses, which culminated in 1997 in the U.N. Convention on the Non-Navigational Uses of International Watercourses (“Watercourse Convention”).¹² This paper reviews the work of the ILC in its present effort to codify and progressively develop the international law applicable to transboundary ground water resources. It begins with a short background of the present work and briefly considers the applicability of the 1997 Watercourse Convention to transboundary ground water resources. It then reviews the relevant

issues facing the Commission and offers commentary and analysis as appropriate.

BACKGROUND TO THE CURRENT WORK OF THE ILC

In 1997, the United Nations General Assembly took the first step to formally recognize the need to establish principles of law governing ground water resources when it adopted the Watercourse Convention. This effort was led by the ILC, which gave structure to and drafted the basic principles contained in the Convention. Under the article on definitions, a “watercourse” is defined as “a system of surface waters *and ground waters* constituting by virtue of their physical relationship a unitary whole and normally flowing into a common terminus.”¹³ An “international watercourse” is “a watercourse parts of which are situated in different states.”¹⁴ The inclusion of certain ground water resources within these definitions and, hence, the scope of the Convention, provided the clear understanding that ground water is a proper subject of international law.

While this inclusion is not a trivial occurrence, a close review of the definition of watercourse reveals that the agreement excludes many types of ground water from the Convention’s span. In particular, the Convention applies only to ground water that: 1) is physically part of a *system* of surface and ground waters; 2) is part of a *unitary whole*; 3) normally flows to a *terminus* that is *common* with the hydraulically linked surface water; and 4) has parts of the system located in *different states*. Significantly, the types and numbers of ground waters excluded from this definition are not insignificant and include both recharging and non-recharging ground water resources that are unrelated to any surface waters.¹⁵

As a result, the Convention leaves considerable gaps and generates confusion about the applicability and appropriateness of the Convention’s principles to the management (use, allocation, development, regulation, conservation, protection, etc.) of various types of transboundary ground water resources. Moreover, the fact that the Convention has not yet entered into force raises the question of whether its provisions truly represent international law applicable to any ground waters at all.¹⁶

Recognizing the need to better articulate the rules governing transboundary ground water resources, the ILC recently launched an effort to address this deficiency in the Convention

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and international law in general. At its fifty-fourth session in 2002, the ILC appointed Ambassador Chusei Yamada of Japan Special Rapporteur for the subject of shared natural resources, which includes ground water.¹⁷ To date, the Special Rapporteur has produced two reports and two addenda focusing on ground water resources. While neither the Special Rapporteur nor the Commission have indicated whether they intend to produce a treaty or mere guidelines, the ILC's fundamental purpose is the codification and progressive development of international law. Significantly, in his Second Report, which was submitted in the spring of 1994, the Special Rapporteur presented a general structure for a future ground water instrument based largely on the Watercourse Convention. He also presented in that Report six draft articles for consideration by the ILC (*see Annex*). In introducing this proposed structure and draft articles, the Special Rapporteur assured the ILC Members that his work to

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date does not represent a final and definitive interpretation of international law. Rather, his proposal is merely intended "to provoke substantive discussions, to identify the areas to be addressed and to promote better understanding of the problems of groundwaters."¹⁸ A third report is expected from the Special Rapporteur in the spring of 2005.

PRELIMINARY ISSUES CONSIDERED BY THE SPECIAL RAPPORTEUR

SHARED VS. INTERNATIONAL VS. TRANSBOUNDARY

Based on the original mandate from the ILC, the Special Rapporteur was asked to address ground water resources within the rubric of shared natural resources. Following the submission of his First Report, some of the Members of the ILC and its parent body, the Sixth Committee of the United Nations, expressed considerable doubt about the use of the term "shared."¹⁹ The term "shared" relates to ownership and suggests that the resource at issue may be subject to common or equal ownership, and possibly subject to the common heritage of mankind.²⁰ Given the sensitivities expressed in both bodies, the Special Rapporteur amended the focus of his present work to "transboundary groundwaters."²¹

While this terminology mollified most Members' concerns, this terminology is a divergence from the approach of the Watercourse Convention, which addresses "international" watercourses. In his First Report, the Special Rapporteur explains that an aquifer is international where it is "part of a system where groundwater interacts with surface water that is at some point intersected by a boundary."²² Thus, a purely domestic aquifer that is hydraulically linked to a river that traverses an international boundary would constitute an international aquifer, or an aquifer that is a part of an international watercourse, and would fall within the scope of the Watercourse Convention.²³ In contrast, the Special Rapporteur defines a "transboundary" aquifer as "groundwater body that is intersected by a boundary itself."²⁴ He further notes that this distinction would classify a transboundary aquifer as a sub-category of international aquifers.²⁵ However, a transboundary aquifer would be subject to the Watercourse Convention only if it fulfills the other criteria of international watercourses (i.e., part of a system with surface water that is a unitary whole and which flows to a common terminus).²⁶

While both descriptors (international and transboundary) could have relevance for the new instrument, their use is largely dependent on the scope of the instrument. The relevant and preliminary question that must be addressed is whether the resulting agreement will apply solely to aquifers that traverse an international boundary, or whether it will have a broader scope. In using the term "transboundary," the Reports suggest that the Special Rapporteur intends to limit the scope of the instrument to the former. While this nomenclature is not necessarily problematic, it could certainly foster confusion in the event that there is a question as to dual applicability of the Watercourse Convention and of the present instrument. The Special Rapporteur, however, has indicated that should a situation of dual applicability become evident in the course of the present work, he would propose an article to prevent such conflict.²⁷

AQUIFER SYSTEM APPROACH

In formulating the draft articles on transboundary aquifers, Special Rapporteur Yamada has opted to focus his efforts on "aquifer systems" rather than on "ground water." This is apparent in the principles offered in the Second Report all of which address the management and protection of *transboundary aquifer systems*. The Special Rapporteur explains that this nomenclature is preferable because the term "ground water" may be somewhat cumbersome and legally imprecise for the purpose of a legal instrument. The Special Rapporteur considers the terms "aquifer" and "aquifer systems" as more technically and legally precise.²⁸ In his Second Report, the Special Rapporteur defines an aquifer in Article 2 as "a permeable water-bearing rock formation capable of yielding exploitable quantities of water,"²⁹ and aquifer system as "an aquifer or a series of aquifers, each associated with specific rock formations, that are hydraulically connected."³⁰

In developing an aquifer system-based approach, the Special Rapporteur is promoting a science-based approach for the regulation of ground water resources. This approach is evident in the Special Rapporteur's two addenda, which offer a great deal of technical and factual data on the science of ground water.³¹ It is also evident given the Special Rapporteur's ongo-

ing use of an advisory group convened at his request and composed of hydrogeologists and other scientists and legal professionals with expertise in international water law.³²

By formulating principles of law that focus on an aquifer system, the analysis considers the matrix, the water contained therein, and the interrelated strata surrounding the rock formation. From a hydrogeological perspective, it is inconceivable how any authority could manage or regulate ground water without considering the aquifer itself and the interrelated adjacent formations. This approach, however, is somewhat of a departure from the Watercourse Convention, which concentrates on the “uses of international watercourses and of their waters,” but not the watercourse itself.³³

The definition of aquifer, however, is not beyond criticism. By describing an aquifer in terms of exploitability, the Special Rapporteur’s definition excludes aquifers that are not currently “exploitable” (i.e., for technological or economic reasons), but which might be “exploitable” in the future. Similarly, the term “quantities” intimates the present production requirement of a minimum volume of water in order for a water-bearing rock formation to be deemed an aquifer. The effect of these two terms may jeopardize the future development of water-bearing strata that are not yet exploitable or whose productivity presently is low, but which in the future could become more productive. An alternative definition, which would include deep aquifers and low volume water-bearing strata that presently may not be economically harvested, might be: a permeable water-bearing rock formation capable of yielding water and the water contained therein.

In addition, the commentary to the definition of aquifer indicates that recharge and discharge zones are not included within the meaning of the term.³⁴ This is a deviation from the hydrogeological definition of aquifer, which includes both zones. Most hydrogeologic texts define an aquifer in terms of its potential for storing, transmitting and producing water in usable quantities.³⁵ The recharge and discharge zones are mere extensions of the aquifer that could, if saturated, achieve these criteria. Here, however, the definition restricts an aquifer only to a formation that is actually water bearing. The Special Rapporteur excluded the recharge and discharge zones from the definition because of the need for and difficulty in establishing geographic limitations for an aquifer. From a hydrogeologic perspective, protection of the recharge and discharge zones is crucial to the protection of the aquifer because of the prominent causal relationship between what occurs in the two zones (i.e., introduction of pollutants, changes in the rate of discharge, etc.) and the health of the aquifer. An alternative to including the recharge and discharge zones within the definition of aquifer, and one which the Special Rapporteur may yet consider, is a separate provision that would offer adequate protection to the zones and the aquifer. Such a provision would have to regulate activities in these areas to minimize any detrimental impacts on the recharge and discharge zones.

SCOPE

One of the preliminary issues addressed by the Special Rapporteur, though one that may be revisited, is the question of scope of the present work and any instrument that results from this initiative. Under the original mandate of the ILC, the Commission was assigned the task of considering the interna-

tional law applicable to ground water resources unrelated to surface waters.³⁶ The intent here was to supplement the Watercourse Convention to the extent that the Convention excludes this specific type of ground water.

In his First Report on Outlines, however, the Special Rapporteur recognized that hydrogeology – the science of ground water – treats ground water resources as a whole and does not distinguish between aquifers that are related or unrelated to surface waters.³⁷ Thereafter, in his Second Report, he questioned the practicability of creating legal distinctions between different types of ground water resources³⁸ and proposed an article on scope that does not distinguish between different aquifer types. Article 1 on scope provides: “The present Convention applies to uses of transboundary aquifer systems and other activities which have or are likely to have an impact on those systems and to measures of protection, preservation and management of those systems.”

If the present work is to encompass all aquifer types, this may result in the dual applicability of the new instrument and the Watercourse Convention to certain aquifers. As noted above, the Watercourse Convention applies to ground water that is part of “a system of surface waters and ground waters constituting by virtue of their physical relationship a unitary whole and normally flowing into a common terminus.”³⁹ Accordingly, to minimize confusion, the Special Rapporteur must consider the relationship of any new instrument to the Watercourse Convention and address how overlapping authorities and conflicts might be resolved. As noted above, the Special Rapporteur has indicated that should a situation of dual applicability become evident in the course of the present work, he would propose an article to address such a situation.⁴⁰

Notwithstanding the general approach, the Special Rapporteur and the ILC must consider whether the same rules actually can be applied to all aquifer types. For example, an aquifer with a stable source of recharge can be managed sustainably in that the rate of withdrawal can be gauged against the rate of recharge. In contrast, an aquifer with zero or negligible recharge rates can never be used sustainably. Any withdrawal from a non-recharging aquifer will affect the volume of water in the aquifer, and continued withdrawals eventually will exhaust the resource.⁴¹ Whether such characteristics indicate the need for different rules is still unclear and additional attention by the Special Rapporteur is expected. In addition, the Special Rapporteur may evaluate other unique aquifer types (s.a., karstic, coastal, submarine, and frozen) and whether they require specialized rules, as well as certain integral aquifer characteristics, including geothermal qualities, purification characteristics, distinct vulnerabilities, and other unique aspects.

In addition, the last sentence of Paragraph 15 of the Second Report is particularly noteworthy. This sentence suggests that the resulting agreement may be formulated as an “environmental treaty” rather than a use or resource allocation agreement. There are substantial differences in the two types of agreements, most notably that environmental treaties can give credence to the interests of third party states (i.e., states in whose territory the subject resource does not lie) and often protect natural resources regardless of any injury to a state. Given that this is the only indi-

cation in the Reports to date of an “environmental” approach, the purpose and meaning of this sentence is still unclear.

One additional point worth mention is the inclusion within Article 1 of activities, other than the uses of transboundary aquifer systems that have or are likely to have an impact on such systems. Here, the Special Rapporteur conceptualized including activities, such as industrial and agricultural activities that could contaminate the aquifer, mineral mining projects that might destroy the aquifer matrix, and forestry programs that could impact recharge of the aquifer.

PRINCIPLES APPLICABLE TO TRANSBOUNDARY AQUIFERS

In his Second Report, the Special Rapporteur asserts that “[t]here is no doubt that the most relevant existing general treaty is the 1997 [Watercourse] Convention.”⁴² While this technically may be true, it is questionable whether all of the principles proffered in the Watercourse Convention are equally applicable to all ground water resources. In fact, Members of both the Commission and the Sixth Committee expressed their considerable doubts to the suggestion that, as recommended in the Commission’s 1994 Resolution on Confined Transboundary Groundwater,⁴³ the Convention applies with only minimal changes to non-recharging aquifers.⁴⁴

Surface and ground water resources share numerous similarities that might indicate the applicability of the same management regime. Ground water, however, has some unique characteristics that must be carefully considered when contemplating an appropriate international regulatory scheme. For example, ground water is typically more vulnerable than surface water to pollution and other forms of contamination because it generally flows at much slower rates than surface water, which causes contamination and other problems to manifest at slower rates and reduces aquifers’ natural reclamation abilities. Additionally, reclamation of a polluted aquifer can be extremely difficult and expensive, if at all possible, and can render the aquifer unusable for years, decades or longer. Moreover, due to their physical location, ground water is relatively more difficult and costly to monitor than surface waters. Finally, certain aquifer types have unique characteristics, such as non-recharging aquifers, which, by definition, cannot be used sustainably, and non-recharging and frozen aquifers, which have no natural water flow.

Accordingly, the applicability of surface water law to ground water resources must be examined carefully, keeping in mind the similarities and differences of surface and ground water, the relationship between the two resources, and the science of water.

NO SIGNIFICANT HARM

Under Article 7 of the Watercourse Convention, watercourse states must “take all appropriate measures to prevent the causing of significant harm to other watercourse States.”⁴⁵ While it is unclear what harm might rise to the level of “significant,” given the unique characteristics of ground water, it is questionable whether the same standard can be applied to both surface and ground water resources. In particular, when an international harm actually occurs is an ambiguous concept. Moreover, it is unclear whether an international harm must be tangible and affect another state’s ability to use the water,

whether harm can be more general and merely affect another state’s interest in the water resource, or whether harm to an aquifer can be defined in environmental terms (i.e., impact on ecosystems dependent on the aquifer, or, possibly, protect the aquifer for the sake of the aquifer).

As noted by the Special Rapporteur, the greater difficulties and costs associated with aquifer remediation, as compared to surface water, as well as the prolonged time required for remedial work, may mandate a more stringent standard than the no significant harm rule, or possibly a stricter construction of the rule.⁴⁶ For example, as suggested by some Members of the Commission and Sixth Committee, it may be reasonable to require a lower threshold for determining when “significant” harm occurs to an aquifer.⁴⁷ It also may be appropriate to require that the scope of what constitutes harm to an aquifer be defined more clearly and, possibly, to expand the scope to include an aquifer’s vulnerable areas, such as zones of natural recharge and discharge, and any hydraulic relationships with other bodies of water. Furthermore, the unique characteristics of certain aquifer types, such as non-recharging aquifers, might require yet additional standards or tailored principles that address their special circumstances.

In addition, there is the question of how best to deal with “time bomb” situations in which previously deposited contaminants, from both human as well as natural origins, threaten ground water resources. These are circumstances that have not yet resulted in harm, but which in the future may impair or otherwise impact a transboundary aquifer. In many countries, such as the former Soviet Bloc, toxic and otherwise dangerous materials were deposited underground under prior political regimes and during a time when there was little awareness or political recognition of environmental risk and precaution. Today, many of these deposits pose a significant threat to ground water resources and could be released as a result of affirmative human activities (i.e., exploitation of the threatened aquifers or activity on the land overlying the deposition), or as a result of natural conditions (i.e., changes over time in the acidity of precipitation). Since any new instrument would not be applicable *ex post facto*, it is unclear how such threats from human origins might be addressed in a new agreement. Moreover, it is unclear how risk and uncertainty of potential harm to ground water might be regulated, how situations of inaction would be addressed, whether the rules of no significant harm or any other principle could adequately or effectively address such conditions, and whether the same logic can be applied to conditions of naturally occurring contamination.

Notwithstanding the above discussion, there may be value in replacing the term “harm” with “impact.” Under international law, “harm” is generally understood in relation to a negative effect on a state actor. “Impact,” however, has a broader connotation in terms of including both negative and positive effects, and considering effects on states as well as non-state subjects, such as the environment, human health, and natural historical landmarks. Given the unique aspects of ground water resources, and especially their vulnerabilities, it may be appropriate to broaden the discussion by focusing on the impact of activities as a means to better address the unique aspects of

ground water. Such usage would comport with other international instruments, such as the UN/ECE Watercourse Convention⁴⁸ and the European Water Framework Directive,⁴⁹ and would be consistent with the Special Rapporteur's comment in his Second Report that "[t]he Special Rapporteur adopted the term 'impact' over 'adverse effect' or 'harm' ..."⁵⁰ In addition, the concept of "impact" is more accepted within the water science community.

While these issues are far from resolved, the Special Rapporteur has proposed a draft article relating to harm. The proposed Article 4, paragraph 1 provides that states in whose territory lay a transboundary aquifer must "take all appropriate measures to prevent the causing of significant harm to other aquifer system States" in the utilization of that aquifer. This paragraph is analogous to the one found in the Watercourse Convention, including with regard to the threshold issue.⁵¹ In offering this paragraph, the Special Rapporteur indicates in the commentary that an alternative for "significant" was not necessary because he believes that the threshold of "significant" harm "is a flexible and relative concept."⁵²

To supplement the protection of aquifers, however, the Special Rapporteur offers two additional paragraphs that have no counterpart in the Watercourse Convention. Paragraph 2 obligates aquifer system states to "take all appropriate measures" to ensure that their other activities (i.e., activities not related to the utilization of the aquifer), "which have or are likely to have an impact on a transboundary aquifer system," do not cause significant harm to other aquifer system states.⁵³ Paragraph 3 requires that such states "shall not impair the natural functioning of transboundary aquifer systems." While paragraph 2 builds on the provision of paragraph 1 in protecting the interests of other states, paragraph 3 presents a more progressive proposition – of protecting the aquifer in and of itself regardless of whether harm is caused to another state.

In addition, the Special Rapporteur presented a fourth paragraph addressing any harm that might nonetheless result. Analogous to Article 7(2) of the Watercourse Convention, the proposed paragraph considers measures for mitigating and compensating for such harm. It provides that where significant harm to another state occurs, "the State whose activity causes such harm shall, in the absence of agreement to such activity, take all appropriate measures in consultation with the affected State to eliminate or mitigate such harm and, where appropriate, to discuss the question of compensation."⁵⁴

EQUITABLE AND REASONABLE UTILIZATION

Under Article 5 of the Watercourse Convention, watercourse states must utilize the waters of an international watercourse in an equitable and reasonable manner.⁵⁵ This is a utilitarian concept employing a cost-benefit analysis that attempts to maximize the beneficial use of limited water resources while limiting the burdens. What is equitable and reasonable is based on a non-exhaustive list of factors identified in Article 6 of the Convention.⁵⁶ The concept of equitable utilization, however, is based on the sharing of the resource, meaning that the two countries in whose territory the aquifer lies agree that they must "share" or otherwise divide the aquifer. Given the objections of the 6th Committee and the ILC to this concept, it is questionable

whether equitable utilization would be acceptable as a principle for managing transboundary aquifers.⁵⁷

In addition, the factors listed in Article 6 of the Watercourse Convention are inadequate and incomplete as a means to assess whether a particular use of an aquifer is equitable and reasonable. Given that the list is not considered comprehensive, if the principle of equitable and reasonable utilization were applied to ground water resources, additional factors tailored to ground water resources should be added, such as: hydrogeological setting and processes; composition and makeup of the aquifer matrix; impact on the aquifer matrix, hydrostatic pressure, geothermic properties, net recharge, and water quality; and time of aquifer response to impacts.

To date, the Special Rapporteur has not proffered equitable and reasonable utilization as a principle for the use of transboundary ground water resources. In his Second Report, the Special Rapporteur indicated some hesitations with the concept and suggested that he is "not yet ready to submit a draft article on principles governing uses of aquifer systems because it is first necessary to conduct further research."⁵⁸ He has, however, inserted an empty Article 3 into the general structure under the heading "Principles governing uses of aquifer systems" (*see Annex*).

GENERAL OBLIGATION TO COOPERATE

The obligation to cooperate is a widely accepted principle under international law and is applicable to most transboundary issues.⁵⁹ It is found in Article 8 of the Watercourse Convention and requires states to cooperate "on the basis of sovereign equality, territorial integrity, mutual benefit and good faith." Paragraph 1 of the Special Rapporteur's draft Article 5 applies this obligation to aquifer system states "in order to attain appropriate utilization and adequate protection of a transboundary aquifer system." Paragraph 2 further encourages aquifer system states to develop joint mechanisms or commissions as a means "to facilitate cooperation."⁶⁰ While the obligation to cooperate is indispensable for the sound management of a transboundary aquifer, it also is essential for the realization of other principles, including equitable and reasonable utilization, notification requirements, exchange of data and information, and others.

REGULAR EXCHANGE OF DATA AND INFORMATION

Draft Article 6 on the regular exchange of data and information is analogous to Article 9 of the Watercourse Convention and obligates aquifer system states to regularly exchange data and information. Paragraph 1 of the article emphasizes the need for data of a "geological, hydrogeological, hydrological, meteorological and ecological nature and related to the hydrochemistry of the aquifer system, as well as related forecasts." Paragraph 3 provides that if one state requests another state to supply data and information that is not readily available, the requested state "shall employ its best efforts to comply with the request, but may condition its compliance upon payment by the requesting State of the reasonable costs of collecting and, where appropriate, processing such data or information." Under paragraph 4 of draft Article 6, aquifer system states must use their "best efforts to collect and ... process data and information in a manner which facili-

tates its utilization by the other aquifer system States to which it is communicated.”

Apart from these provisions, draft Article 6 also includes a paragraph that departs from the standard found in the Watercourse Convention. Paragraph 2 of the proposed Article provides that “[i]n the light of uncertainty about the nature and extent of some transboundary aquifer systems, aquifer system States shall employ their best efforts to collect and generate, in accordance with currently available practice and standards, individually or jointly and, where appropriate, together with or through international organizations, new data and information to more completely define the aquifer systems.” This commitment is based on the fact that data about ground water resources is often lacking, but that the fulfillment of other obligations, such as no significant harm or equitable and reasonable utilization, is dependent on the availability and production of a minimum of information.

It is noteworthy that the obligation for regular exchange of data can be misunderstood with regard to the type, quantity, and quality of data and information that must be developed and exchanged. Relevant data can range from general field observations to detailed well studies to complex flow models and satellite imaging. Due to inadequate cooperation and communications, states producing data for a transboundary aquifer often use different methodologies and procedures and sometimes focus on different aspects of the aquifer. As a result, the data produced can be incompatible and, at worse, may be useless as a means to establish baseline characteristics of the aquifer and to monitor and assess subsequent changes. Moreover, the decision of what data a state can generate often is subject to the availability of resources. Many countries, especially developing nations, face difficulties in complying with such obligations because of a lack of finances, field and laboratory equipment, and knowledgeable people capable of generating, processing, and interpreting the necessary data.

Accordingly, it may be appropriate to provide better guidelines for the type, quantity, and quality of data and information that should be generated and exchanged when dealing with transboundary aquifers. It also may be useful to include obligations to jointly develop the relevant data, or, at the very least, to harmonize the standards, methodologies and target characteristics to be assessed. Furthermore, it may be appropriate to include consideration of mechanisms to assist countries in need of data generation, processing, and interpretation of the necessary data.

RELATIONSHIP BETWEEN DIFFERENT TYPES OF USES

The Special Rapporteur’s draft Article 7 on the relationship between different kinds of uses addresses the need to balance priorities in the use of a transboundary aquifer. Paragraph 1 provides that “[i]n the absence of agreement or custom to the contrary, no use of a transboundary aquifer system enjoys inherent priority over other uses.” Notwithstanding, where different uses conflict or interfere with each other, and where no system of priorities governing those uses has been established, paragraph 2 provides that “it shall be resolved with special regard being given to the requirements of vital human needs.” While the phrase “vital human needs” may be somewhat amorphous, the same language is used in Article 10 of the Watercourse

Convention where it was applied with reference to ensuring basic levels of sustenance.⁶¹

CONCLUSION

Ground water has become an integral component of life for a majority of the world’s population and is today the most extracted natural resource. The lack of legal attention to this hidden treasure, however, has left a considerable void in the law that is now threatening numerous aquifers world wide. Given the importance of this resource to humanity and the environment, there is considerable need to further study and assess the rules and principles applicable to ground water, especially in a transboundary context.

The work of the Commission and the Special Rapporteur is a major and long overdue undertaking, which, it is hoped, will result in guidelines and principles that are not only politically sound and judicious, but also scientifically sensible. In order to achieve this goal, as well as the mandate of the ILC to codify and progressively develop international law, the Commission and Special Rapporteur must continue to address numerous and complicated issues related to transboundary aquifers.

In particular, the applicability of surface water law to ground water resources must be examined carefully, keeping in mind the similarities and differences of surface and ground water, the relationship between the two resources, and the science of water. Greater attention also must be focused on the particular qualities of ground water – e.g., rate of flow, susceptibility to pollution, availability or absence of recharge, geothermal characteristics – and on whether those qualities warrant stricter application of existing international water law to ground water resources, whether additional standards are needed, or whether a completely different regulatory and management regime is appropriate.⁶² For example, specific guidelines or rules may be necessary to address: land-based activities in or around an aquifer’s recharge and discharge zones that could impact the aquifer; activities related to a hydraulically connected surface body of water that can affect an aquifer (and *visa versa*); artificial recharge of aquifers; unique aquifer types, such as non-recharging, karstic, coastal, submarine, and frozen aquifers. In addition, given the dynamics and vulnerabilities of aquifers, monitoring is a critical component of the assessment, protection, and preservation of transboundary aquifers. Accordingly, a duty to monitor, as well as the specifics of this obligation, should be included within the new instrument. The Special Rapporteur has indicated in Part IV of the draft articles that such an article is forthcoming. Furthermore, consideration must be given to reconciling any overlap and conflict that may occur between the Watercourse Convention and the new instrument.

To date, the Special Rapporteur has presented six proposed articles, as well as relevant scientific information, in order to provoke discussion, promote a better understanding of the problems of ground water, and encourage the codification and formulation of appropriate principles of law by the ILC. The Special Rapporteur is expected to submit his Third Report on the subject in the spring of 2005 at the fifty-seventh session of the Commission. That Report is expected to present further research and analysis, additional articles, and examples of relevant state practice related to transboundary aquifers.



ANNEX

DRAFT CONVENTION ON THE LAW OF TRANSBOUNDARY AQUIFER SYSTEMS

Adapted from Chusei Yamada, Second report on shared natural resources: transboundary groundwaters
U.N. Doc. A/CN.4/539 (2004)

Part I. Introduction

Article 1 Scope of the present Convention

The present Convention applies to uses of transboundary aquifer systems and other activities which have or are likely to have an impact on those systems and to measures of protection, preservation and management of those systems.

Article 2 Use of terms

For the purposes of the present Convention:

- (a) "Aquifer" means a permeable water-bearing rock formation capable of yielding exploitable quantities of water;
- (b) "Aquifer system" means an aquifer or a series of aquifers, each associated with specific rock formations, that are hydraulically connected;
- (c) "Transboundary aquifer system" means an aquifer system, parts of which are situated in different States;
- (d) "Aquifer system State" means a State Party to the present Convention in whose territory any part of a transboundary aquifer system is situated.

Part II. General principles

Article 3 Principles governing uses of aquifer systems

[Draft to be proposed later]

Article 4 Obligation not to cause harm

1. Aquifer system States shall, in utilizing a transboundary aquifer system in their territories, take all appropriate measures to prevent the causing of significant harm to other aquifer system States.
2. Aquifer system States shall, in undertaking other activities in their territories which have or are likely to have an impact on a transboundary aquifer system, take all appropriate measures to prevent the causing of significant harm through that system to other aquifer system States.
3. Aquifer system States shall not impair the natural functioning of transboundary aquifer systems.
4. Where significant harm nevertheless is caused to another aquifer system State, the State whose activity causes such harm shall, in the absence of agreement to such activity, take all appropriate measures in consultation with the affected State to eliminate or mitigate such harm and, where appropriate, to discuss the question of compensation.

Article 5 General obligation to cooperate

1. Aquifer system States shall cooperate on the basis of sovereign equality, territorial integrity, mutual benefit and good faith in order to attain appropriate utilization and adequate protection of a transboundary aquifer system.
2. In determining the manner of such cooperation, aquifer system States are encouraged to establish joint mechanisms or commissions, as deemed necessary by them, to facilitate cooperation on relevant measures and procedures in the light of experience gained through cooperation in existing joint mechanisms and commissions in various regions.

Article 6 Regular exchange of data and information

1. Pursuant to article 5, aquifer system States shall, on a regular basis, exchange readily available data and information on the condition of the transboundary aquifer system, in particular that of a geological, hydrogeological, hydrological, meteorological and ecological nature and related to the hydrochemistry of the aquifer system, as well as related forecasts.
2. In the light of uncertainty about the nature and extent of some transboundary aquifer systems, aquifer system States shall employ their best efforts to collect and generate, in accordance with currently available practice and standards, individually or jointly and, where appropriate, together with or through international organizations, new data and information to more completely define the aquifer systems.
3. If an aquifer system State is requested by another aquifer system State to provide data and information that is not readily available, it shall employ its best efforts to comply with the request, but may condition its compliance upon payment by the requesting State of the reasonable costs of collecting and, where appropriate, processing such data or information.
4. Aquifer system States shall employ their best efforts to collect and, where appropriate, to process data and information in a manner which facilitates its utilization by the other aquifer system States to which it is communicated.

Article 7 Relationship between different kinds of uses

1. In the absence of agreement or custom to the contrary, no use of a transboundary aquifer system enjoys inherent priority over other uses.
2. In the event of a conflict between uses of a transboundary aquifer system, it shall be resolved with special regard being given to the requirements of vital human needs.

Part III. Activities affecting other States

Impact assessment
Exchange of information
Consultation and negotiation

Part V. Miscellaneous provisions

Part VI. Settlement of disputes

Part VII. Final clauses

ENDNOTES: Protecting A Hidden Treasure

- ¹ See R. Hayton & A.E. Utton, *Transboundary Ground Waters: The Bellagio Draft Treaty*, 29 NAT. RESOURCES J. 663, 663, 674 (1989).
- ² J.W. Dellapenna, *The Evolving International Law of Transnational Aquifers*, in MANAGEMENT OF SHARED GROUND WATER RESOURCES: AN ISRAELI-PALESTINIAN CASE WITH AN INTERNATIONAL PERSPECTIVE 209, 212 (Eran Feitelson et al. eds., 2001).
- ³ WATER FOR PEOPLE, WATER FOR LIFE, The United Nations World Water Development Report 78 (2003).
- ⁴ *Id.* at 78-80.
- ⁵ See E. Almássy & Zs. Busás, U.N./E.C.E. TASK FORCE ON MONITORING & ASSESSMENT, GUIDELINES ON TRANSBOUNDARY GROUND WATER MONITORING, VOLUME I: INVENTORY OF TRANSBOUNDARY GROUND WATERS at 21, U.N. Sales No. 9036952743 (1999).
- ⁶ See Stefano Burchi, *National Regulation for Groundwater: Options, Issues and Best Practices*, in GROUNDWATER: LEGAL AND POLICY PERSPECTIVES, PROCEEDINGS OF A WORLD BANK SEMINAR 55 (Salman M.A. Salman ed., 1999).
- ⁷ See Dellapenna, *supra* note 2, at 209; WORLD RESOURCES INSTITUTE, UNITED NATIONS ENVIRONMENTAL PROGRAMME, UNITED NATIONS DEVELOPMENT PROGRAMME, WORLD RESOURCES 1992-93: A GUIDE TO THE GLOBAL ENVIRONMENT at 160-61 (1992).
- ⁸ Population Reference Bureau, *Human Population: Fundamentals of Growth Population Growth and Distribution*, available at http://www.prb.org/Content/NavigationMenu/PRB/Educators/Human_Population/Population_Growth/Population_Growth.htm (last visited 11/05/04).
- ⁹ See WATER FOR PEOPLE, *supra* note 3, at 78.
- ¹⁰ See G. Eckstein & Y. Eckstein, *A Hydrogeological Approach to Transboundary Ground Water Resources and International Law*, 19 Amer. Univ. Int'l L.R. 201, 222 (2003); see also A.E. Utton, *The Development of International Groundwater Law*, 22 Nat. Res. J. 95, 98 (1982).
- ¹¹ See Arrangement on the Protection, Utilization, and Recharge of the Franko-Swiss Genevese Aquifer, Sept. 1977 Fr.-Switz., available at <http://www.internationalwaterlaw.org> (last visited 11-15-04).
- ¹² Convention on the Non-Navigational Uses of International Watercourses, G.A. Res. 51/229, U.N. GAOR, 51st Sess., U.N. Doc. A/RES/51/229 (1997) [hereinafter *Watercourse Convention*].
- ¹³ *Id.* at Article 2, *emphasis added*.
- ¹⁴ *Id.* at Article 2.
- ¹⁵ See generally G. Eckstein, *A Hydrogeological Perspective of the Status of Ground Water Resources Under the UN Watercourse Convention*, __ Columbia J. Env'tl Law __ (2004 *forthcoming*).
- ¹⁶ Article 36(1) of the *Watercourse Convention* requires 35 ratifications for the treaty to enter into force. As of November 2004, only twelve states had ratified the Convention: Finland, Hungary, Iraq, Jordan, Lebanon, Namibia, the Netherlands, Norway, Qatar, South Africa, Sweden, and Syria. Another eight states had signed the document but not yet ratified it: Côte d'Ivoire, Germany, Luxembourg, Paraguay, Portugal, Tunisia, Venezuela, and Yemen.
- ¹⁷ *Report of the Commission to the General Assembly on the Work of its Fifty-Fourth Session, Summary of the Commission at its Fifty Fourth Session*, A/57/10, Suppl. 10, Ch. II, p. 19, §20.
- ¹⁸ C. Yamada, *Second report on shared natural resources: transboundary groundwaters*, U.N. Doc. A/CN.4/539 (2004) [hereinafter *Yamada Second Report*], ¶ 5.
- ¹⁹ *Id.* ¶ 2-4.
- ²⁰ *Id.* ¶ 4.
- ²¹ *Id.*
- ²² C. Yamada, *Addendum to Shared Natural Resources: First report on Outlines*, U.N. Doc. A/CN.4/533/Add.1 (2003) [hereinafter *Yamada Addendum to First Report*], ¶ 13.
- ²³ It is interesting to note that it is unlikely that the reverse relationship – an aquifer that lies across a political border and is hydraulically connected to a purely domestic river – also is subject to the Convention. See Eckstein & Eckstein, *supra* note 10, at 241.
- ²⁴ *Yamada Addendum to First Report*, *supra* note 22, ¶ 13.
- ²⁵ *Id.*
- ²⁶ See Eckstein, *supra* note 15.
- ²⁷ *Yamada Second Report*, *supra* note 18, ¶ 14.
- ²⁸ *Id.* ¶ 12.
- ²⁹ *Id.* ¶ 16.
- ³⁰ *Id.*
- ³¹ *Yamada Addendum to First Report*, *supra* note 22; C. Yamada, *Addendum to Second report on shared natural resources: transboundary groundwaters*, U.N. Doc. A/CN.4/539/Add.1 (2004).
- ³² The experts advisory group is organized under the auspices of UNESCO's International Hydrological Programme. The present author has the pleasure of participating on this advisory group.
- ³³ *Watercourse Convention*, *supra* note 12, at Article 1(1) on Scope.
- ³⁴ *Yamada Second Report*, *supra* note 18, ¶ 17.
- ³⁵ See e.g., C.W. Fetter, *APPLIED HYDROGEOLOGY* 110 (3d ed. 1994); M. Price, *INTRODUCING GROUND WATER* 9 (1996).
- ³⁶ C. Yamada, *Shared Natural Resources: First report on Outlines*, U.N. Doc. A/CN.4/533/ (2003) [hereinafter *Yamada First Report*], ¶ 19.
- ³⁷ *Id.* ¶ 22.
- ³⁸ *Yamada Second Report*, *supra* note 18, ¶ 14.
- ³⁹ *Watercourse Convention*, *supra* note 12, at Article 2.
- ⁴⁰ *Id.*
- ⁴¹ See Eckstein & Eckstein, *supra* note 10, at 215-216, 249.
- ⁴² *Yamada Second Report*, *supra* note 18, ¶ 7.
- ⁴³ *Resolution on Confined Transboundary Groundwater*, 2 Y.B. Int'l L. Comm'n 135, U.N. Doc. A/CN.4SER.A/1994/Add.1 (Part 2).
- ⁴⁴ *Yamada Second Report*, *supra* note 18, ¶ 7.
- ⁴⁵ *Watercourse Convention*, *supra* note 12, at Article 7(1).
- ⁴⁶ *Yamada First Report*, *supra* note 36, ¶ 40.
- ⁴⁷ *Yamada Second Report*, *supra* note 18, ¶ 25.
- ⁴⁸ UN/ECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes, done at Helsinki, 17 March 1992, 31 I.L.M. 1312 (1992), available at <http://www.InternationalWaterLaw.org> (last visited 11-18-04).
- ⁴⁹ Directive of the European Parliament and of the Council 2000/EC/60 Establishing a Framework for Community Action in the Field of Water Policy, available at <http://www.InternationalWaterLaw.org> (last visited 11-18-04).
- ⁵⁰ *Id.* ¶ 15.
- ⁵¹ *Watercourse Convention*, *supra* note 12, at Article 7(1).
- ⁵² *Yamada Second Report*, *supra* note 18, ¶ 25.
- ⁵³ *Id.* ¶ 24.
- ⁵⁴ *Id.*
- ⁵⁵ *Watercourse Convention*, *supra* note 12, at Article 5.
- ⁵⁶ These include: (a) Geographic, hydrographic, hydrological, climatic, ecological and other factors of a natural character; (b) The social and economic needs of the watercourse States concerned; (c) The population dependent on the watercourse in each watercourse State; (d) The effects of the use or uses of the watercourses in one watercourse State on other watercourse States; (e) Existing and potential uses of the watercourse; (f) Conservation, protection, development and economy of use of the water resources of the watercourse and the costs of measures taken to that effect; (g) The availability of alternatives, of comparable value, to a particular planned or existing use. *Watercourse Convention*, *supra* note 12, at Article 6.
- ⁵⁷ See *supra* note 19-21 and accompanying text.
- ⁵⁸ *Yamada Second Report*, *supra* note 18, ¶ 21.
- ⁵⁹ See generally, *Report of the Commission to the General Assembly on the Work of its Forty-Sixth Session, The Law of the Non-Navigational Uses of International Watercourses*, U.N. Doc. A/49/10, reprinted in II Y.B. INT'L L. COMM'N 88, 106-107, Commentary to Article 8, U.N. Doc. A/CN.4/SER.A/1994/Add.1 (Part 2) [hereinafter *Forty-Sixth Session Report*].
- ⁶⁰ *Id.* ¶ 29.
- ⁶¹ *Forty-Sixth Session Report*, *supra* note 59, at 110, Commentary (4) to Article 10.
- ⁶² S. McCaffrey, *THE LAW OF INTERNATIONAL WATERCOURSES: NON-NAVIGATIONAL USES* 430-31, 433 (2001).