



INTERNATIONAL HYDROLOGICAL PROGRAMME

Sharing Transboundary Waters

An Integrated Assessment of Equitable Entitlement : The Legal Assessment Model

By

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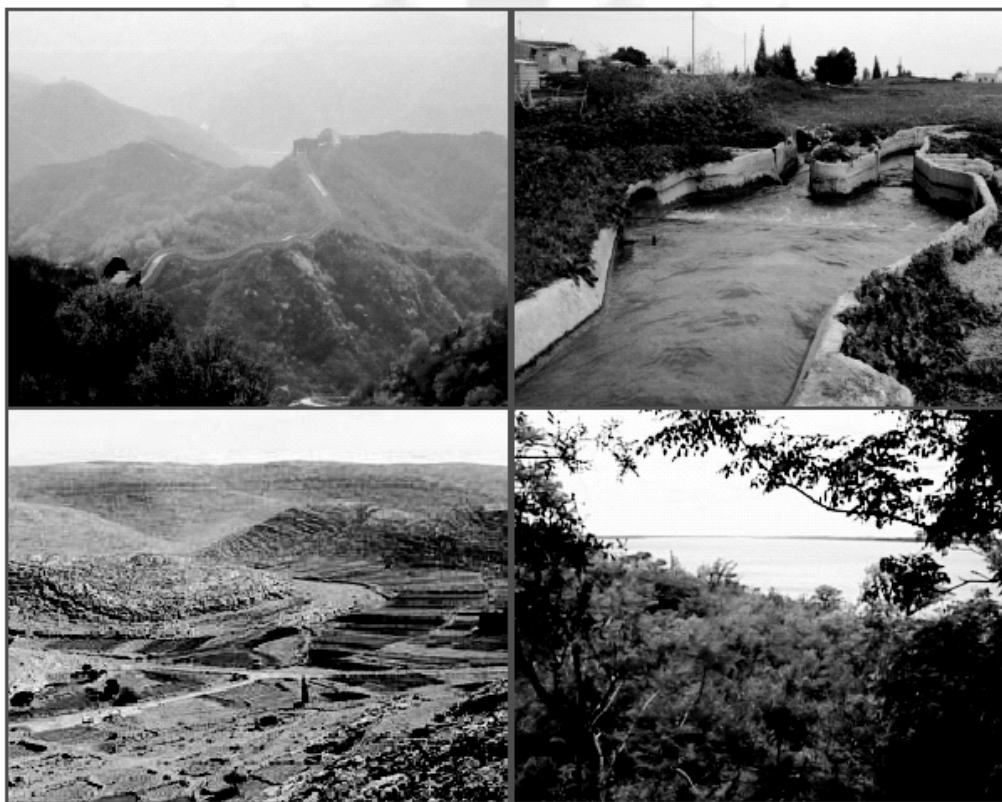
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International Water Law Research Institute

Sharing Transboundary Waters

An Integrated Assessment of Equitable Entitlement

Law • Hydrology • Economics



The Legal Assessment Model

*Transboundary Water Resources Management: Using the Law to
Develop Effective National Water Strategy*

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“This document is the output from a project funded by the UK Department for International Development (DFID) for the benefit of developing countries. The views expressed are not necessarily those of DFID.”

Director's Foreword

The UN Millennium Development Goals, rightly, call on States to take action in order to reduce by half the number of people around the world without access to drinking water and sanitation. With more than half of world's population dependent upon water shared by two or more States (and some of these nations home to the world's most poor), it is essential that national governments be equipped to determine and enforce their legal entitlements and obligations ("right to water"). This book presents a pragmatic, interdisciplinary methodology for interfacing water law and water science with the objective of assisting States to develop effective national water policies.

With the support of the UK DFID (Department for International Development) the International Water Law Research Institute (ILWRI), University of Dundee developed a Legal Assessment Model (LAM) – an operational tool that States can use to determine their "equitable and reasonable use" of transboundary (international) waters. The LAM demonstrates, in a concrete way, how water law and science need to interact in order to provide transboundary watercourse States with the guidance necessary to devise an effective national water policy. This approach, in line with the UNESCO IHP HELP programme, requires a more comprehensive understanding globally, with broad dissemination and uptake at the basin level.

The LAM is the product of many creative, talented and committed people – scientists, lawyers, economists, and other water resource experts. The in-country team leaders, Dr Fadia Diabes Murad (Palestine), Zhang Jiebin (China), and Francisco Alvaro (Mozambique) are exceptional professionals who continue to contribute to the wise management of their countries shared water resources. The expert's panel who peer reviewed the project (Dan Tarlock, Chicago-Kent Law School, Mike Acreman, Centre for Ecology and Hydrology, and Colin Green, Middlesex University) were a great pleasure to work with and provided keen insights and thoughtful contributions. The Dundee Lead team, Jeremy Meigh (CEH), Dr Sergei Vinogradov and Chris Rogers (U of Dundee), and the IWLRRI staff (Patricia Jones, Dr. Alistair Rieu-Clarke, and Andrew Allan) have achieved what we hoped for – a truly interdisciplinary effort that will meet the needs of scientists, lawyers and economists who must work with the difficult problems facing State's sharing transboundary waters. It is a work in progress – and we look forward to input from the UNESCO/IHP professionals around the world.

Thanks sincerely to the collegial and professional support and guidance offered along the way by Dr Mike Bonell (UNESCO) and Dr Jim Wallace (CEH) – "real" water scientists who actively

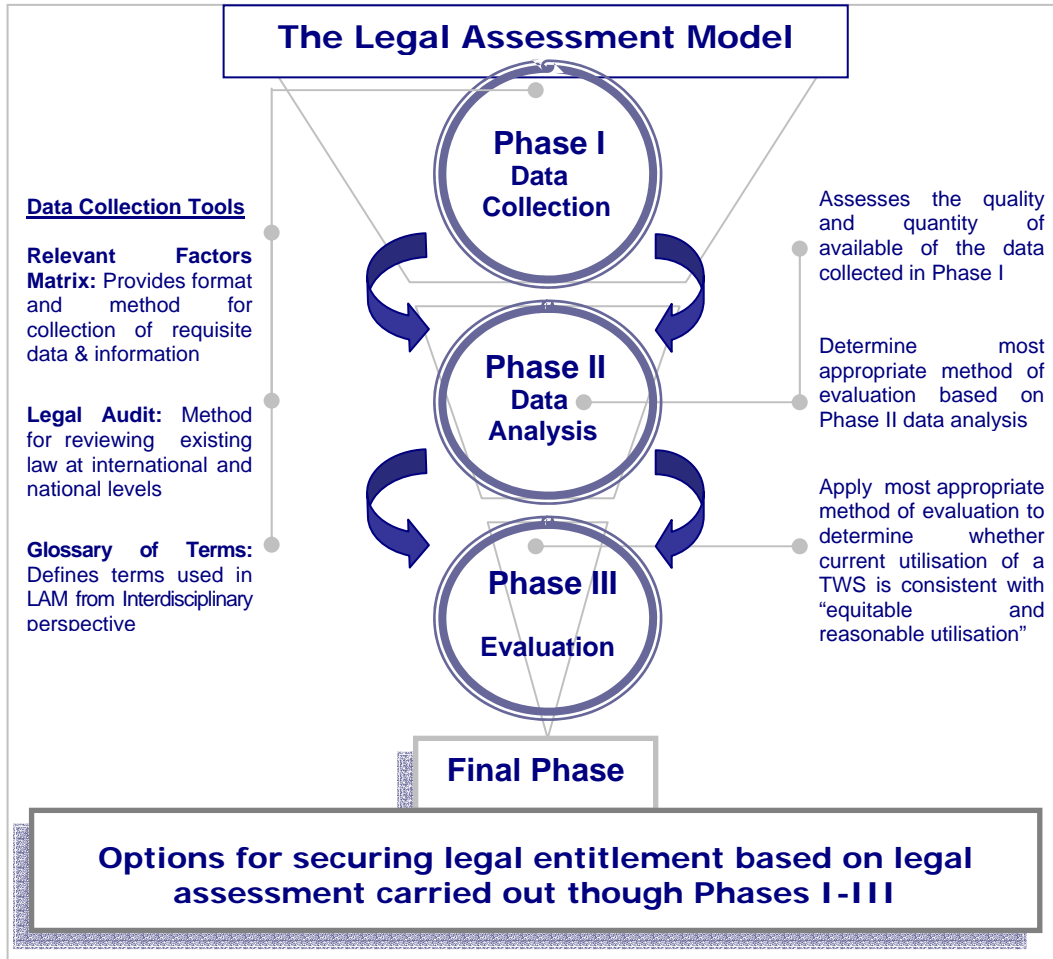
engage with water lawyers. Their ongoing commitment to “real” solutions has assisted IWLRI in many ways. I am indebted to them for this and more.

As a final note, our special thanks to University of Dundee Principal Sir Alan Langlands, who continues to support the efforts of the IWLRI. Sir Alan was instrumental in securing the commitment of the Scottish Executive for the development of an Interdisciplinary Research Centre on Water at the University of Dundee, which is just now in the process of being recognised as the first UK UNESCO Centre of Excellence in Water Law, Policy and Science.

Let us now work together to develop the "Water Law, Water Leaders" postgraduate programme, aimed at developing residual in-country capacity -- one key step aimed at ensuring "water for all".

Dr Patricia K. Wouters
Director, IWLRI
<http://www.dundee.ac.uk/iwlri>
8 March 2005, International Woman’s Day

The Legal Assessment Model: Implementation Phases (see figure and accompanying text, pg. 49 below).





International Water Law Research Institute

The Legal Assessment Model

Transboundary Water Resources Management - Using the Law to Develop Effective National Water Strategy

For further information regarding these additional materials, please refer to the website www.dundee.ac.uk/iwlrj or contact the Institute (IWLRI), on +44 (0)1382 344 451, email: waterlaw@dundee.ac.uk.

Dr Patricia Wouters
Director

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Table of Abbreviations

GoT	Glossary of Terms
GWP	Global Water Partnership
Helsinki Convention	1992 Helsinki Convention on Transboundary Rivers and Lakes
Helsinki Rules	1966 ILA Helsinki Rules
ILA	International Law Association
ILC	United Nations International Law Commission
LAM	Legal Assessment Model
LAS	Legal Audit Scheme
L/p/d	Litre per day
MoE	Method of Evaluation
RFM	Relevant Factors Matrix
TWC	Transboundary watercourse
UN	United Nations
UNECE	UN Economic Commission for Europe
UNESCO	UN Educational, Scientific and Cultural Organization
UNGA Res	UN General Assembly Resolution
UN IWC Convention	1997 UN International Watercourses Convention (Non-navigational Uses)

Executive Summary

More than 40 per cent of the world's population -- including some of the most poverty stricken -- depend upon water that originates in sources beyond their national borders. How can they be assured access to adequate water supply and sanitation if their State is subject to the activities of other sovereign entities? When a transboundary watercourse State (TWC State) uses more than its "fair" share of water or pollutes the resources located in its territory, what recourse does the adversely affected State (and its citizens) have? What are the rules of international law that govern TWC State actions and who defines and enforces them? How can a TWC State develop a national water strategy in line with its international legal rights and duties?

The principal aim of the Legal Assessment Model (LAM) is to provide a methodology for a TWC State to identify, in a systematic way, the parameters of its legal entitlements and obligations with respect to its shared freshwater resources. The LAM offers the basis for developing a strategy that ensures equitable and reasonable access to freshwater resources for all, especially the most disadvantaged.

The Legal Assessment Model (LAM) is an interdisciplinary tool that offers an objective and rigorous methodology for identifying whether or not a TWC State's actions are consistent with the rules of international law. The LAM enables a TWC State to collect and process the data required to identify and comply with its international obligations regarding the use of its shared waters, as well as providing information for the formulation and achievement of national water policy. Such information may be critical in the context of inter-state negotiations and joint basin studies, and plays a crucial role in conflict prevention.

The LAM was developed by an interdisciplinary team of legal experts, economists and hydrologists in association with the International Water Law Research Institute (IWLRI), Department of Law, University of Dundee. The selected case studies were chosen to test the model in very different circumstances -- China (upstream on the Mekong), Mozambique (downstream on the Incomati) and Palestine (shared transboundary groundwater). Different problems were encountered in each, but the primary issues related to interpretation and paucity of data, whether due to a partial or complete lack of information, or as a result of its political sensitivity. The LAM is consequently designed to be a practical tool to be used by TWC States irrespective of their position on a transboundary watercourse.

Key Points

- **International law is** a normative system of law distinct from national or domestic legal systems. Its **primary purpose** is to govern the conduct of States and provide the means with which to identify their respective rights and obligations vis-à-vis each other to ensure peaceful relations and to prevent and resolve international conflicts.

- **International water law** (also known as international watercourse law, or the international law of water resources) is a term used to identify those legal rules that regulate the use of water resources shared by two or more States.
- **The primary role of international water law** is to determine a State's "entitlement" to the benefits of the use of an international watercourse ("substantive rules") and to establish certain requirements for States' behaviour while developing the resource (including "procedural rules").
- **"Legal entitlement"** is the fundamental issue in international water law. Entitlement is a legal right to use the waters of a TWC located in the territory of a TWC State. It provides an answer to the question "*who* has a right to use *what* water". Ideally, a transboundary watercourse agreement should identify the entitlement of a State and apportion the beneficial uses of the resource among the TWC States.
- **Equitable and Reasonable Utilisation.** Most state practice, including rules of customary international law, provides that each TWC State has the right to an *equitable and reasonable use* of a TWC located in its territory. This right, however, is limited by an obligation not to act so as to prevent other TWC States from enjoying their *equitable use*.
- **Implementing Equitable and Reasonable Utilisation** The UN IWC Convention and the 1966 ILA Helsinki Rules provide some guidance on how the principle of equitable and reasonable utilisation is to be implemented -- all relevant factors must be identified and considered together and a conclusion reached on the basis of the whole.
- **State responsibility.** The **consequences** for a State that violates a rule of international law are dealt with under the rules of *State responsibility*. There are two criteria to be met if a State's conduct is to be classified as wrongful. First, it must be an action or omission attributable to the State (i.e. committed by the State apparatus: for example, its organs or officials). Second, this conduct must constitute a breach of a rule of international law. If a State is found to be liable for a breach of its international obligations, it must consult about necessary remedies for the injured State.

Special Issues related to determining "equitable and reasonable utilisation":

- **Threshold of permissible harm.** One important factor to be considered in the evaluation of equitable and reasonable use is the threshold of allowable harm – even significant harm may be permitted if the use is within the limits of the TWC State's

equitable and reasonable use. It will depend upon the particular circumstances of each case.

- **Prevention of Significant Harm – Obligation of conduct.** TWC States are under an obligation to take all appropriate measures to ensure that activities conducted under their jurisdiction do not cause significant harm to or within the territory of other TWC States. States must provide prior notification and exchange information with respect to a planned measure that might significantly harm other watercourse States.
- **Vital Human Needs.** State practice appears to support the notion that “vital human needs” (minimum individual water requirements) are always protected under the rule of equitable and reasonable use.
- **Environmental Needs.** State practice appears to support the notion that a minimum level of in-stream flow must always be maintained in order to safeguard the ecological, chemical, and physical integrity of a transboundary water resource.
- **Transboundary Groundwater.** While it appears that state practice is divided on whether or not shared confined aquifers are subject to the rule of “equitable and reasonable utilisation”, it appears that this matter requires more study and international attention. The ILC adopted a resolution recommending that the same rules that applied to international watercourses apply to shared confined aquifers – but States have not universally endorsed such an approach.
- **Institutional Mechanisms.** Joint bodies and commissions form an essential component of many modern watercourse agreements. In addition to their main function of coordinating TWC States’ efforts in developing and managing the watercourse, institutional mechanisms usually carry out dispute avoidance functions by allowing technical experts to study potentially controversial issues and make recommendations before an issue spirals into a controversy that requires formal diplomatic negotiations or third-party dispute resolution.
- **Compliance.** Reaching an agreement on the equitable and reasonable utilisation of shared watercourses is a first step in the ongoing process of interstate relations. Once the treaty has been concluded and becomes binding for the State parties, it must be “implemented” effectively. Under general international law and its fundamental rule *pacta sunt servanda* (agreements are to be kept), Parties to a treaty are under an obligation to perform it in good faith. States generally comply with their international obligations and generally implement international agreements concluded by them without serious controversies.

- **Customary international law** and most treaties envisage the possibility of a dispute and provide for the peaceful settlement of any conflicts that may arise. In the area of international water law, the emphasis is on dispute avoidance mechanisms -- mainly through procedural rules requiring consultation, cooperation and negotiation and also the use of institutional mechanisms for joint study.
- **The UN IWC Convention plays an important role.** The UN IWC Convention was adopted on 21 May 1997 by the UN General Assembly by vote of 104 States for; 3 States against (Burundi, China, and Turkey), and twenty-six abstaining. To date, it has been ratified by 12 States; there are an additional 8 signatories and is not yet in force. Regardless of when -- or whether -- the Convention enters into force, it is clear that it plays, and will continue to play, a very important role in all relations involving watercourse States and sets forth a generally accepted codification of the primary rules of customary international law in this field.
- **The LAM Methodology.** The Legal Assessment Model seeks to provide a **methodology** for achieving the task of implementing equitable and reasonable utilisation. The LAM has two components: The Data Collections Tools (DCTs) and the Method of Evaluation (MoE). See – the Legal Assessment Model Users Guide.
 - **The first LAM component, the Data Collection Tools** identify: “all relevant factors” - the Relevant Factors Matrix was developed to do this; the legal obligations – the Legal Audit Scheme is designed to provide this information; and the Glossary of Terms - to ensure consistency across the disciplines (economics, science and law).
 - **The second LAM component** entails a methodology to consider and weigh all the data: the Method of Evaluation (MoE). The interests of the TWC States must be weighed in an equitable manner against one another. One must consider not only the absolute injury caused to the neighbouring State, but also the relation of the advantage gained by the one to the injury caused to the other.
- **The LAM model is a flexible tool** applicable to up stream, downstream and transboundary groundwater and may be used to develop national water plans where a State must manage transboundary water resources. The LAM can provide legal guidance for data information and exchange agreements, for joint river basin studies, as a process for negotiating a treaty or for facilitating dispute-avoidance mechanisms, including fact-finding to prevent or resolve a dispute.

Part One:

Theoretical Foundation and Legal Background

1.1 Overview

1.1.1 Introduction: Competition over the World's Transboundary Waters – The Need to Develop a Cooperative Framework. With 40 per cent of the world's population dependent upon water shared by two or more States and the increasing demands on this diminishing precious resource, the potential for conflict over competition for shared water is readily apparent. One half of the world's population will suffer from water shortages by the year 2025, according to a recent United Nations report. The significance of the forthcoming water crisis led governments at Johannesburg to commit to reducing by "halve by 2015 the proportion of people without access to safe drinking water and basic sanitation" and to "develop integrated water resources management and efficiency plans by 2005". Governments reiterated their commitment to improved water resources management at the most recent and largest international meeting on water – the third World Water Forum, convened in March 2003 in Kyoto.

"Water is a driving force of sustainable development including environmental integrity, and the eradication of poverty and hunger, indispensable for human health and welfare. Prioritising water issues is an urgent global requirement. Each country has the primary responsibility to act. The international community as well as international and regional organizations should support this". (Ministerial Declaration, Kyoto World Water Forum, 23 March 2003, para. 1. available at <http://www.world.water-forum3.com/>).

This focus on decentralising water resources management may run counter to the basin-wide approach implicit in the current universal trend towards integrated water resources management. In the context of an international transboundary watercourse, this policy of decentralisation could lead to unilateral action at the national level. Unilateral development activities with respect to, and in competition for, increasingly scarce water resources may lead to conflicts across borders. There is always the possibility that one State's plans for development may adversely affect the use of the resource by other States. Fundamental questions arise as a result:

- How can a Transboundary Watercourse State (TWC State) determine its legal entitlement to, and respective obligations regarding the use of shared freshwater?
- Are the rights and obligations of TWC States different depending upon whether they are upstream or downstream, or if they share groundwaters?
- How can these rights and obligations be operationalised at the national level -- such that a TWC State is assured the right to use its shared freshwaters in a way that is consistent with the requirements of international law?

The potential for conflict was highlighted by UN Secretary General Kofi Annan:

“Fierce national competition over water resources has prompted fears that water issues contain the seeds of violent conflict...If all the world’s peoples work together, a secure and sustainable water future can be ours.” (UN Secretary General Kofi Annan, World Water Day 2002, 26 February 2002, Press Release SG/SM/8139, OBV/262, available at <http://www.un.org/>).

1.1.2 National Water Policy Challenges. With the recent emphasis on national governments establishing their own national water policy, it is critical that a TWC State is equipped with the tools necessary for determining its national rights and obligations regarding its shared transboundary water resources. At the national level, a TWC State faces serious challenges in assessing the quantity and quality of shared waters it is entitled to (or is obliged to share). Equally demanding is the quest to meet national development needs, while complying with its international obligations. Effective water management strategies play a key role in the achievement of food security, and more broadly, are critical in the global efforts to alleviate poverty, especially in the context of the imperatives of the newly adopted Millennium Development Goals.

1.1.3 Aim of the LAM. The aim of the Legal Assessment Model (LAM) is to provide a TWC State with a practical tool that will permit it to both systematically determine its legal entitlements and obligations related to its transboundary waters, and, to develop and implement its national water policy in accordance with its international rights and obligations. The governing rule of international water law provides that each State sharing transboundary waters is entitled (and obliged) to an equitable and reasonable share of the beneficial uses of that watercourse – an entitlement and correlative obligation that is difficult to ascertain in practice. The LAM seeks to operationalise this rule of international law, and was developed and tested through a practice-oriented and interdisciplinary approach in the context of three different scenarios: upstream (China), downstream (Mozambique) and shared groundwater (Palestine). These cases were selected given their specific locations on key international watercourses.

1.1.4 The LAM consists of two principal parts – the Data Collection Tools and the Method of Evaluation. The first part of the LAM developed through the case studies – the Data Collection Tools -- assists the TWC State in compiling all the relevant information required for a comprehensive assessment of entitlement, including information regarding the physical environment and the legal context, along with social and economic data. The second component – the Method of Evaluation -- facilitates the objective processing and analysis of this information. The LAM is designed to be interdisciplinary, to be applied by legal, economic and hydrology experts. A sub-theme of the LAM is to make international water law more accessible to water resource experts, since integrating law into water resources

management in a pragmatic, integrated way is a prevalent problem around the world.

1.1.5 The LAM has a number of applications. The LAM can be applied in a number of planning and management situations – such as a key tool in the preparation of national Poverty Reduction Strategy Plans (PRSPs). It can also form the basis for an informed formulation of national water law policy (e.g. so called -- “internal application”), or, in supporting negotiating positions with respect to treaty formulation or re-evaluation, and in the preparation of Joint International Basin studies (e.g. “external application”). The LAM is a decision-making tool, aimed at providing a fact-based, transparent, and credible assessment of the current water use situation, focused on whether or not a particular use is equitable and reasonable, and is consequently in line with international law. The LAM is intended to support decision making, not prescribe a result.

1.1.6 The Role of Water Law. This work is based on the identification and application of the primary rule of international law that governs the lawfulness

“In particular we need to pay special attention to: Establishing a world water convention and legal framework; Defining water rights and obligations; Developing the regulatory framework for globalisation, privatisation, and reduction of poverty.” Opening Address of the Third World Water Forum by Dr Abu-Zeid, *The World Water: The Way Forward in the 21st Century*, 16 March 2003.

of every TWC State’s activities: equitable and reasonable utilisation. The importance of water law in meeting global policy imperatives was recently reiterated at the Kyoto World Water Forum 2003. In the opening address, the blueprint for action identified the need for a new World Water Ethic to codify rights, privileges and obligations of individuals, communities and States and the need to develop legal frameworks as the first priority area to address global strategic needs.

1.1.7 Structure. The UNESCO/IHP Technical Paper has been structured as an **operational manual for water resource experts** at the national level. Part One comprises the Overview, the Legal Framework, and the Key Conclusions and Recommendations, aimed at supporting the application of the Legal Assessment Model, which together provide the theoretical foundation and the legal background for the LAM. The Operation Tool, the LAM and User’s Guides are found in Part Two, comprised of the Data Collection Tools, and the Method of Evaluation, with explanatory notes. A more detailed Legal study, and the research project Country Reports, together with a comprehensive Bibliography, and additional supporting research material and case studies can be found in separate volumes, available at IWLRI.

1.1.8 User’s Guide. The aim of the LAM is to provide water resource experts and decision-makers with practical tools capable of being used in formulating decisions on a TWC State’s entitlements and obligations regarding its shared waters. This paper begins with a concise description of

the relevant rules of international water law – which provide the foundation for the LAM. The operational tool – the Legal Assessment Model (set forth in Part Two) contains “User’s Guides” to permit ready application by the relevant team of water resource specialists needed to do this work -- including, but not limited to: policy-makers, hydrologists, lawyers, economists, and engineers, preferably from across government Ministries (responsible for transboundary water resources management). Relevant stakeholders should be included in the process. Notably, the country teams involved in the pilot research project were comprised of only three individuals – water resource experts in the fields of law/policy, economics and hydrology. This case study application of the LAM revealed two important lessons: (i) that the LAM could be applied with relatively limited human resources; and (ii) the critical importance that the team work together – with an attempt to achieve *true inter-disciplinarity*, as opposed to multi-disciplinary inputs.

1.1.9 Agreed Terminology. The interdisciplinary approach, which entailed working across various areas of expertise revealed an important pre-requisite for the application of the LAM -- the need to develop and agree upon a common language. This resulted in the creation of a *Glossary of Terms* as a preliminary step in the process (contained in Part Two of this Report). While some terms may explicitly be used beyond their strict meaning in the areas of law, economics or hydrology, we have endeavoured to establish a rigorous but usable list of terms that are terms of art for this particular tool. They have been used consistently throughout, but readers should refer to the Glossary of Terms to identify any differences between accepted technical definitions and the interpretations used in the report.

1.1.10 Request for Feedback: We would sincerely appreciate your feedback on the LAM. Please send your comments to the Institute at waterlaw@dundee.ac.uk.

More Information:

- United Nations Charter (entered into force 24 October 1945).
- United Nations 2002. Global Challenge, Global Opportunity. Report (13 August 2002), Secretariat of the World Summit on Sustainable Development. <http://www.johannesburgsummit.org>.
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- P. Wouters, S. Vinogradov, P. Jones, *Transforming Potential Conflict into Co-operation Potential: The Role of International Water Law* (UNESCO/IHP/WWAP Technical Documents in Hydrology/PC>CP series No. 2; Paris, 2003) *available at* <http://webworld.unesco.org/>.

1.2 The Legal Framework

1.2.1 Introduction - The Legal Report is aimed at the water professional and is intended to be accessible to non-lawyers and lawyers unfamiliar with international water law. To this end this section has been structured at three levels of detail – “**Key Points**” (for senior water management, including decision-makers); “**Need to Know**” (for water resource managers, e.g. in the Ministry responsible for water resources policy and implementation); “**More Information**” (for water lawyers or policy experts responsible for developing national water strategy in line with international water law). This part has been devised as an operational manual that sets forth the legal foundation for the LAM.

The foundation for the LAM is law: what are the rules that govern the activities of transboundary watercourse States in the use of their shared fresh water resources? The sources of international law must first be considered – i.e., treaties, custom, general principles and subsidiary sources – with a view to identifying the applicable law. This law is then examined in the context of TWC State practice.

The legal framework discussion begins with a review of the basic principles of international law and sources of international law, then examines the evolution of the international law relating to shared transboundary freshwater, including an analytical framework for understanding international water law in an operational way. The key issue addressed in this part is how the governing rule of international water law – “equitable and reasonable utilisation” - is implemented in practice with a focus on national application.

1.2.2 International Law: Background

- **Key Points**

- **What it is:** A normative system of law distinct from national or domestic legal systems.
- **Primary purpose:** to govern the conduct of States and provide the means with which to identify their respective rights and obligations vis-à-vis each other in various spheres of international relations.
- **Principal objective:** to ensure the peaceful relations of States and to prevent and resolve international conflicts and controversies.

- **Need to Know**

- Usually defined as a system of principles and rules of general application.
- Can be distinguished from domestic law in the following key ways:

- No “supra-national” authority to enforce international law, that would be similar to a domestic legal system
- International law is primarily created and enforced by States through their consent, while national law mostly concerns matters that occur within a State’s borders and is left to the sovereignty of that particular State.

- **More Information:**

- Bernhardt, R., ed., Encyclopaedia of Public International, North-Holland, 1992.
- Brownlie, I., Principles of Public International Law (6th ed.) Oxford, Oxford University Press, 2003.
- Jennings, R. & Watts, A., eds., Oppenheim’s International Law, 9th Ed., Longman Group, 1992.
- Malanczuk, P., Akehurst’s Modern Introduction to International Law, 7th Ed., 1997.

1.2.3 Sources of International Law

- **Key Points**

- **International law** incorporates the rules that have emerged and developed as a result of many centuries of interstate relations and practice.
- **Sources of law.** The rules of international law can be found in the “sources” of international law, including treaties, custom, general principles and in some cases through judicial decisions and the writings of experts “as subsidiary means”.

The “sources” of international law

Statute of the International Court of Justice

Article 38 (1): “The Court, whose function is to decide in accordance with international law such disputes as are submitted to it, shall apply:

- a. international conventions, whether general or particular, establishing rules expressly recognized by contesting states;
- b. international custom, as evidence of a general practice accepted as law;
- c. the general principles of law recognized by civilized nations;
- d. judicial decisions and the teachings of the most highly qualified publicists of the various nations, as subsidiary means for the

- **Need to Know**

- **No hierarchy of rules.** Each of the sources of law has the same binding force. Thus, written law (e.g. treaties) have the same weight as unwritten law (e.g. customary law and general principles).
- **Customary law.** Rule of customary (unwritten) law – uniform settled practice of States, usually in the absence of formal agreements (although agreements may contain rules of customary law).

- **Treaty Law.** Treaties appear to be overtaking customary law as the primary source of international law. Treaties usually provide a more clear manifestation of the legal undertakings made by States; their norms tend to be more precise and easily accessible, and deal with questions of a highly technical nature.
- While a treaty may be known by different names – convention, agreement, protocol, charter, accord, and statute among others – **its legal nature is always the same: these instruments are binding** on the State parties and establish their respective rights and obligations, together with the “rules of the game” that govern their relations.
- **Multilateral treaties**, which are often called international conventions, are normally adopted by specially convened international conferences, usually under the auspices of the United Nations General Assembly or of specialized UN agencies. Among the most important are conventions that “codify” customary international law in particular fields of interstate relations or activities such as the law of the sea and the UN IWC Convention.
- The **1969 Vienna Convention on the Law of Treaties** codified and progressively developed the international law relating to treaties, namely the customary and other rules governing conclusion, implementation, interpretation, and termination of international agreements. In modern practice the ratification process is important as the date of signature and the date of the deposit of the “instrument of ratification” signify the moment when the State’s legal obligation is effective once the treaty has entered into force.
- **Good Faith.** The principle *pacta sunt servanda* – found both in customary law and the UN Charter – is **a fundamental rule of international law** that requires States to abide by the agreements they make. International agreements are binding and must be performed in good faith. (Article 26, Vienna Convention on the Law of Treaties)
- **In the rare instances where rules of customary law or treaty law are lacking** or inadequate, the source of international law may be *general principles* of law. These are derived from the domestic practice of the majority of legal systems around the world and generally include principles that are accepted by all, such as the prohibition of slavery, the principle of good faith, the rules relating to estoppel and proportionality.
- **As a subsidiary source of international law**, international judicial decisions and the writings of jurists may contribute to the determination of the existence of the legal rules and their content.
- **Non-legally binding instruments (often referred to as “soft law”)** – such as declarations, resolutions, and recommendations adopted by

the UN General Assembly and various international organizations and conferences – also contribute to the formation of international law, but indirectly.

- **More Information**

- United Nations Vienna Convention on the Law of Treaties, 22 May 1969, A/CONF.39/27, reprinted at 8 ILM 679 (1969), entered into force 27 January 1980.
- Anglo-Norwegian Fisheries case, ICJ Reports, 131 (1951).
- North Sea Continental Shelf case, ICJ Reports, 3 (1969).
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- Weil, P., *Towards Relative Normativity in International Law?*, 77 American Journal of International Law 413, 1983.

1.2.4 State Responsibility

- **Key Points**

- The **consequences** for a State that violates a rule of international law are dealt with under the rules of *State responsibility*.
- **There are two criteria to be met** if a State's conduct is to be classified as wrongful. First, it must be an action or omission attributable to the State (i.e. committed by the State apparatus: for example, its organs or officials, etc.). Second, this conduct must constitute a breach of a rule of international law.

- **Need to Know**

- **Remedies** Where one State has denied another State its *equitable and reasonable utilisation* of a transboundary watercourse, the former will be liable to remedy the wrongful conduct. The remedies available to the State(s) whose rights have been violated include, *inter alia*, an order for cessation of the wrongful conduct, guarantees by the State in breach of

non-repetition of the wrongful acts, satisfaction (apology, exemplary damages), restitution, and compensation.

- **More Information**

- Draft Articles on the Responsibility of States for Internationally Wrongful Acts, in Report of International Law Commission on the Work of its Fifty-third Session, U.N. GAOR, Supp. (No. 10), U.N. Doc. A/56/10, reprinted at <http://www.un.org/law/ilc>.
- Crawford, J., International Law Commission's Articles on State Responsibility, Cambridge, Cambridge University Press, 2002.

1.2.5 International Water Law: An Overview

- **Key Points**

- **International water law** (also known as international watercourse law, or the international law of water resources) is a term used to identify those legal rules that regulate the use of water resources shared by two or more countries.
- **The primary role** of international water law is to determine a State's entitlement to the benefits of the watercourse (substantive rules) and to establish certain requirements for States' behaviour while developing the resource (procedural rules).
- **Sources of Law.** The law governing international watercourses has evolved through both custom (State practice) and international treaties, and has been influenced by other "sources" of law: general principles of law, judicial decisions, and the resolutions and recommendations of international organizations.
- **Primary Rule – Equitable and reasonable utilisation.** Each TWC State is entitled to (and obligated to provide) an equitable and reasonable utilisation of the international watercourse. This correlative right and duty is determined on a case-by-case basis through a consideration of all relevant factors – including the extent of harm caused -- considered together and a conclusion reached on the basis of the whole. This rule of law is consistent with State practice and is a rule of customary international law.

- **Need to Know**

- **Fundamental principles** The development of international water law is inseparable from the development of international law in general. Such fundamental principles and basic concepts as the sovereign equality of States, non-interference in matters of exclusive national jurisdiction, responsibility for the breach of State's international obligations, and

peaceful settlement of international disputes equally apply in the area governed by international water law.

- **Historical development of international water law** The first effort to codify international customary rules over transboundary water resources was made in 1911 by the Institute of International Law (IDI), in its Declaration of Madrid entitled “International Regulation regarding the Use of International Watercourses for Purposes other than Navigation.” The IDI also adopted two additional resolutions: “On the Use of International Non-Maritime Waters” (Salzburg, September 11 1961) and “On the Pollution of Rivers and Lakes and International Law” (Athens, September 12 1979).
- **ILA Helsinki Rules 1966.** A sustained attempt to develop in a systematic way “a code of conduct” concerning transboundary water resources was made by the International Law Association (ILA), resulting in the 1966 ILA Helsinki Rules on the Uses of the Waters of International Rivers.
- **UN IWC 1997 Convention.** The ILA rules have had significant impact on the treaty practice of States that culminated in the adoption of the only universal legal instrument in this field – **the 1997 UN Convention on the Law of the Non-Navigational Uses of International Watercourses** (the UN IWC Convention), discussed below.
- **ILA Campione Consolidation 1999 / 2004 Berlin Rules.** The ILA continued to work on the law of international water resources, having adopted a range of new rules dealing with many issues -- these rules were later incorporated into a single document - the Campione Consolidation of the ILA Rules on International Water Resources. In 2004 the ILA adopted the Berlin Rules, which have been criticised by a number of publicists for not reflecting existing international water law.
- **More Information**
 - International Law Association, Report of the Fifty-Second Conference, Helsinki, 1966.
 - Wouters. P., *An Assessment of Recent Developments in International Watercourse Law through the Prism of Substantive Rules Governing Use Allocation*, 36 Nat. Resources J., 1996, 417-439.
 - Wouters, P., ed., *Selected Writings of Professor Charles C. Bourne*, Kluwer Law International, 1997.
 - Bogdanovic, S., International Law of Water Resources: Contribution of the International Law Association (1954-2000), The Hague, Kluwer Law International, 2001.
 - Tanzi, A. and M. Arcari, The United Nations Convention on the Law of International Watercourses. A Framework for Sharing, The Hague, Kluwer Law International, 2001.
 - McCaffrey, S., *The Law of International Watercourses: Non-navigational Uses*, Oxford University Press, 2001.

- P. Wouters, S. Vinogradov, P. Jones, *Transforming Potential Conflict into Co-operation Potential: The Role of International Water Law* (UNESCO / IHP/WWAP Technical Documents in Hydrology/PC>CP series No. 2; Paris, 2003) available at <http://webworld.unesco.org/>.

1.2.6 The UN IWC Convention

• Key Points

- **Relevance:** Regardless of whether or not the UN IWC Convention enters into force it is the leading universal instrument that States and international tribunals refer to (and will continue to refer to) as a model framework for the rules governing international relations over shared transboundary waters. The UN IWC Convention is considered to contain a codification of the primary rules of customary international law in the field.
- **Adopted:** 21 May 1997 by the UN General Assembly by vote of 104 States for; 3 States against (Burundi, China, and Turkey), and twenty-six abstaining. This followed 30 years of study by the International Law Commission.
- **Ratified by** 12 States; 8 additional signatories to date.
- **To enter into force:** requires 35 States to ratify or accede. (Article 36 UN IWC Convention)

UN IWC Convention

Ratified by: Finland, Hungary, Iraq, Jordan, Lebanon, Namibia, Netherlands, Norway, Qatar, South Africa, Sweden, and the Syrian Arab Republic.

Signed by: Cote d'Ivoire, Germany, Luxembourg, Paraguay, Portugal, Tunisia, Venezuela, and Yemen. (February 2005)

• Need to Know

- **International authority.** Given the multitude and the variety of international agreements dealing with water resources, it may be surprising that the only global treaty in this area was adopted fairly recently (UN IWC Convention). The initial attempt to draft a treaty of universal application to international freshwaters began in 1970, when the UN General Assembly asked its International Law Commission (ILC) to prepare a set of rules governing the non-navigational uses of international watercourses. The ILC, which consists of thirty-four international lawyers serving in their individual capacity and representing the major legal systems of the world, is a special UN organ entrusted with the codification and progressive development of international law.
- **UN Legal Committee Action.** This project went forward to the UN General Assembly and its Sixth (Legal) Committee, which provided the forum for negotiating and eventually adopting the UN IWC Convention.

That the effort to codify the international law of water resources was a challenging task is evidenced by the time it has taken to come to agreement and by the differences in legal positions that had to be reconciled.

- **Compromise Agreement.** Seemingly irreconcilable views on the nature and extent of a State's right to use transboundary water resources that had divided upstream and downstream countries in the past resurfaced during the debate. The three central issues that dominated the UN debate included:
 - a) the status of existing treaties and the effect of the Convention on future agreements;
 - b) the relationship between the principle of "equitable and reasonable utilisation," and the "no harm" rule, including environmental considerations; and,
 - c) the provisions on dispute settlement (the extent to which a framework agreement should contain compulsory provisions).
- **Analysis: Customary international law and UN IWC Convention**

The main provisions of customary international law and the UN IWC Convention are outlined here following an analytical framework designed to identify and examine the most important elements of the majority of watercourse agreements. The outline focuses on the key elements that should be addressed in every agreement:

 - scope;
 - substantive rules (obligations);
 - procedural rules (obligations);
 - institutional mechanisms;
 - dispute settlement; and
 - compliance control mechanisms.

These elements are discussed in more detail below.

- **More Information**

- Statute of the International Law Commission, 21 November 1947, UN GA Res. 174 (II), as amended.
- United Nations Convention on the Law of Non-navigational Uses of International Watercourses, 21 May 1997, New York, reprinted at 36 I.L.M. 700, 1997, available at <http://www.un.org/>.
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- McCaffrey, S., *The Law of International Watercourses*, Oxford, Oxford University Press, 2001.
- Tanzi, A. and M. Arcari, *The United Nations Convention on the Law of International Watercourses*, The Hague, Kluwer International, 2001.

1.2.7 Understanding International Water Law: Analytical Framework

Scope

- **Key Points**

- “Scope” is an important element of any agreement, and is generally identified in the initial provisions. Scope usually determines:
 - the spatial (geographical and/or hydrological parameters) limits of the agreement’s application, which usually determines the types and limits of water resources regulated by the treaty;
 - the States eligible to participate in the treaty – *Ratione Personarum*, and
 - the uses or activities governed by the agreement – *Ratione Materiae*.

- **Need to Know**

- **Legal controversies** or misunderstandings involving TWCs often result from different interpretations of the treaty provisions determining scope, owing to their ambiguity. The *River Oder* case before the World Court provides an example of where an international dispute, regarding the question of freedom of navigation, arose from an unclear definition of the scope of the jurisdiction of the Oder Commission in the 1919 Treaty of Versailles.
- **UN IWC Convention – Definition of Scope.** The scope of the UN IWC Convention is determined in Articles 1–4. The Convention applies to the non-navigational uses of international watercourses and their waters. An international watercourse is defined as a system of surface waters and related groundwaters, parts of which are situated in different States. Consistent with its role as a “**framework**”, the UN IWC Convention requires States to define the waters governed by a specific watercourse agreement.
- **Article 4 of the UN IWC Convention** provides that any “watercourse State is entitled to participate in the negotiation of and to become a party to any watercourse agreement that applies to the entire international watercourse, as well as to participate in any relevant consultations”. It also gives any TWC State, which “may be affected to a significant extent” by a proposed watercourse, agreement that only applies to a part of the watercourse the right to participate in the negotiations and enter into consultations, related to that partial agreement.

The 1995 Mekong Agreement applies to the “water and related resources of the Mekong river basin”. It also uses on one occasion the term “Mekong river system”. However, neither of the terms is defined in the document. It follows from the text that the “system” comprises at least the mainstream of the Mekong river and its tributaries, including Tonle Sap. It would, however, be more accurate if the term “lower Mekong Basin” were used as the upper riparian States – China and Myanmar – are not parties to the agreement.

- **ILA “international drainage basin”**. The International Law Association in its 1966 Helsinki Rules adopted a different approach based on the notion of an “*international drainage basin*”. A number of States were reluctant to endorse this term, which they perceived as being too broad, implicitly extending not only to

water resources but to the land mass as well.

- **International practice** demonstrates that States have adopted various and often different approaches in defining the “scope” to be covered by their water-related agreements. Basin-specific agreements are usually more precise in determining their geographical scope of application.

- **More Information**

- Case Relating to the Territorial Jurisdiction of the International Commission of the River Oder, PCIJ, Series A 23, No. 16, (1929).
- Report of the International Law Commission to the UN General Assembly, 46th Session (1994), YBILC, Vol II, part 2, 88.
- Agreement on the Co-operation for the Sustainable Development of the Mekong River Basin, 5 Apr. 1995, Chiang Rai, 34 I.L.M. 864 *available at* <http://www.mrcmekong.org/>.
- Convention on the Protection of the Rhine, 22 January 1998, Rotterdam, *available at* <http://www.dundee.ac.uk/iwlri>.
- Southern African Development Community Shared Watercourse Systems Protocol, 1995, South Africa, (*entered into force* 29 September 1998), *available at* <http://www.sadc.org/>.
- Southern African Development Community: Revised Protocol on Shared Watercourses in the Southern African Development Community, 7 August 2000, Windhoek, *available at* <http://www.sadc.org/> (*entered into force* 22 September 2003).

Substantive Rules

- **Key Points**

- “**Substantive rules**” refers to those rules of international law that establish substantive, or material, rights and obligations of TWC States *vis-à-vis* each other. One example would be the rules governing “legal entitlement”.

- **“Legal entitlement”** is the fundamental issue in international water law. Entitlement is a legal right to use the waters of a TWC located in the territory of a TWC State. It provides an answer to the question “*who* has a right to use *what* water”. Ideally, a transboundary watercourse agreement should identify the entitlement of a State and apportion the beneficial uses of the resource among the TWC States.
- **In the absence of an agreement**, customary international law provides that each TWC State has the right to an *equitable and reasonable use* of a TWC located in its territory.
- **Need to Know**
 - **Equitable and reasonable utilisation** is the primary rule of international law that governs the legality of TWC State’s relations concerning the use of their shared watercourses. The rule – recognised as a rule of customary law and consistent with treaty practice -- has its origin in State practice, having evolved, in part, from the jurisprudence of federal States.
 - **Correlative right and obligation.** This rule recognises both the TWC State’s right to reasonable and equitable and reasonable use of the TWC, and the correlative obligation not to deprive other TWC States of their right to an equitable and reasonable utilisation.
 - **Optimal utilisation.** Equitable and reasonable utilisation seeks to attain an optimal utilisation, “securing the maximum possible benefits for all watercourse States and achieving the greatest possible satisfaction of all their needs, while minimizing the detriment to, or unmet needs of, each.”
 - **Not equal shares.** The principle of equitable and reasonable use does not mean an equal allocation of the resource or equal share of its uses and benefits. The application of equitable and reasonable utilisation in a particular watercourse will not prohibit a use that causes damage unless it exceeds the limits of the using State’s equitable share of the watercourse.
 - **Evaluation of “equitable and reasonable utilisation”.** All relevant factors are to be considered together and a conclusion arrived at on the basis of the whole. The weight to be given each factor will depend upon the circumstances of the particular case, although state practice evidences strong support for protection of vital human needs and minimum in-stream flow requirements. The factors to be considered fall into two broad categories: (i) factors of a natural character (hydrographic, hydrological, climatic, ecological, and so forth), and ; (ii) economic and social factors (economic needs, population dependent on watercourse, effects of use on other watercourse States, existing and potential uses, conservation measures, and availability of alternatives). (See more detail below).
 - **UN IWC Convention** The primary substantive rules of the UN IWC Convention are found in Part II. They include the governing rule of

“equitable and reasonable utilisation” (Article 5), and the obligation to take all appropriate measures to prevent the causing of significant harm (Article 7). The non-exhaustive list of factors to be considered in a determination of entitlement is contained in Article 6.

Canada and the U.S.A., under the 1961 Columbia River Treaty, created an integrated regime of utilisation of their transboundary river through balancing the equities, and through recognition and payment for “downstream benefits”. Canada agreed to construct three major dams and reservoirs on its territory and to provide the U.S.A. with the resulting downstream benefits in the form of electricity and flood control. In return, the U.S.A. undertook to compensate Canada by paying for flood-control measures and by providing 50 percent of the additional hydropower resulting from the project. The **1998 Syr-Darya Agreement** provides for in-kind compensation in energy resources (mostly coal and gas) by downstream states to the upstream state (Kyrgyzstan) in exchange for the release of stored water and transfer of excess power generated during the growing season.

State Practice. TWC States have generally arrived at an equitable allocation of the watercourses’ uses and benefits mainly through joint study and negotiations. It may be a long and difficult process, especially because the water resources are of paramount importance for the States involved. This is reflected in cases such as that of the **Columbia River** controversy, which required twenty-five years to be finally settled. The **Mekong River** regime, evolved over fifty years with the assistance of the United Nations and external donors, and is still developing. The **Nile River** basin process, involving all basin states, envisages a long-term, in-depth joint study aimed at determining net equitable entitlements for each of them.

- **More Information**

- United Nations Convention on the Law of Non-navigational Uses of International Watercourses, 21 May 1997, 36 I.L.M. 700 (1997), *available at* <http://www.un.org> (not yet in force).
- Southern African Development Community: Revised Protocol on Shared Watercourses in the Southern African Development Community, 7 August 2000, Windhoek, *at* <http://www.asil.org/ilib/ilib0406.htm#02>, entered into force 22 September 2003.
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- Helsinki Rules on the Use of the Waters International Rivers, Report of the Forty-sixth Conference of the International Law Association held at Helsinki, 1966, at 484-532 (1967), *available at* <http://www.internationalwaterlaw.org/>.
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Procedural Rules

• Key Points

- **Procedural requirements and mechanisms** are an essential element of the majority of watercourse agreements. They provide the means through which the substantive rules are implemented and the changing watercourse regime is managed.
- **The distinction between the “substantive” and “procedural” obligations** is made mostly for analytical purposes. Thus, “procedural” obligations – such as the requirement for prior notification of planned measures – are rules that must be adhered to by all States.
- **Procedural rules establish a range of obligations:** from a general duty to cooperate to obligations concerning data and information exchange, prior notification and consultation.
- In this respect **the UN IWC Convention provides a model procedural framework**, which has been closely followed by recently adopted agreements, such as the 2000 SADC Revised Protocol or the 2002 Russian-Byelorussian Agreement on Cooperation.

The World Bank's Operational Policies “Projects on International Waterways” (OP 7.50 of June 2001) contains prior notification as a compulsory requirement and a precondition for any project financed by the World Bank. The obligation of prior notification applies equally to upstream and downstream states.

• Need to know

- International lawyers have been at odds over the issue of whether **cooperation is indeed a binding legal obligation** rather than simply a goal or a guideline for conduct. In other words, the question is: can one assert that States *must* rather than *should* cooperate, and can this obligation be imposed on States and enforced through legal means?
- **Duty to give prior notice Planned Measures.** What rules must TWC States follow when they plan “new” or expanded works on TWCs? In the UN IWC Convention's Part III “Planned Measures”, a number of procedural rules are set forth. These are to be followed by States when they seek to undertake new works. In the first instance, States must on

a regular basis exchange readily available data and information on the condition of the watercourse, in particular that of a hydrological, meteorological, hydrogeological, and ecological nature and information related to water quality, along with related forecasts (Article 9(1)). In the event of a planned measure, states are required to “exchange information and consult each other and, if necessary, negotiate on the possible effects of planned measures on the condition of an international watercourse” (Article 11).

- **Notice.** The State planning measures (i.e., works, development, changes in the hydraulic regime) has a duty to give notice in advance of works that may result in *significant adverse effects* (and not necessarily *harm*) to other States. The notice must be timely and must provide sufficient technical information to enable co-riparian States to determine if their interests will be adversely affected.
- **Prior notification is an international legal obligation** regardless of whether there is a special agreement between the initiating and the potentially affected States.
- If necessary, **additional information may be requested by the potentially affected States**, which the initiating States must provide. If the countries concerned disagree over the possible effects of the planned activities they must enter into consultations in good faith with a view at arriving at an equitable resolution of the situation.
- **Prior consent not required.** A State carrying out planned measures is not required to gain the consent of co-riparian States.
- **UN IWC Convention.** The duty to cooperate is embodied in the UN IWC Convention (Article 8) and serves as a bridge between its substantive and procedural rules.
- **Cooperation is a legal obligation** under the UN IWC Convention. The obligation takes on meaning in specific contexts: working together with co-riparians to achieve an equitable allocation of the uses and benefits; entering into consultations and negotiations in good faith concerning alterations of the regime of a watercourse. Failure to cooperate through the means set forth in the UN IWC Convention could constitute an internationally wrongful act entailing State’s responsibility.
- **Devising Procedural Rules -- Mekong Agreement.** Procedural rules and mechanisms established under the 1995 Mekong Agreement and developed further by the Mekong River Commission are an advanced

UN IWC Convention

Article 8. General obligation to cooperate

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

model: See the “Procedures for data and information exchange and sharing,” put into effect on 1 November 2001, and “Preliminary procedures for notification, prior consultation and agreement,” approved on 12 November 2002.

- **More Information**

- Mekong River Commission, Procedures for data and information exchange and sharing, 1 November 2001; Procedures for notification, prior consultation and agreement, 30 November 2003; Procedures for water use monitoring, 30 November 2003, available at <http://www.mrcmekong.org/>.
- Bourne, C., *Procedure in the development of International Drainage Basins: Notice and Exchange of Information*, 22 U. Toronto L. J. 172 (1972), in *Selected Writings of Charles C. Bourne*, The Hague, Kluwer Law International, 1997.
- Bourne, C., *Procedure in the Development of International Drainage Basins: Duty to Consult and Negotiate*, 10 Can. Y. B. Int’l L. 212 (1972), in *Selected Writings of Charles C. Bourne*, The Hague, Kluwer Law International, 1997.
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Institutional Mechanisms

- **Key Points**

- **Essential for implementation.**

International watercourse joint bodies and commissions form an essential component of many modern watercourse agreements.

- **Dispute Avoidance.** An effective joint body – either permanent or ad hoc – can

provide important opportunities for facilitating interstate cooperation and as important tools for the identification of competing interests, thus preventing disputes over shared waters. This can be achieved through appointment of technical experts to study potentially controversial issues and make recommendations before an issue spirals into a conflict that requires formal diplomatic negotiations or third-party dispute resolution.

1976 ILA Rules “Administration of International Water Resources”

Article 4

1. In order to provide for an effective international water resources administration, the agreement establishing that administration should expressly state, among other things, its objective or purpose, nature and composition, form and duration, legal status, area of operation, functions and powers, and its financial implications.

- **Need to Know**

- **Customary law.** Although the rules of customary law do not require TWC States to establish joint commissions, state practice demonstrates that the majority of international agreements, bilateral and multilateral, provide for such institutional mechanisms as a means of treaty implementation and dispute prevention.
- **UN IWC Convention.** States are encouraged to create institutional mechanisms, but not obligated to do so. The UN IWC Convention generally recommends that TWC States “consider the establishment” of joint bodies but leaves the particulars to be determined by the states themselves.
- As early as 1976, the ILA in its rules concerning “Administration of International Water Resources” (supplementary to the 1966 Helsinki Rules) called for basin states to establish an international water administration, defined as “any form of institutional or other arrangement . . . for the purpose of dealing with the conservation, development and utilisation of the waters of an international drainage basin”. The ILA viewed this as a precondition to effective implementation of the principle of equitable utilisation and prevention and settlement of disputes.
- The composition and duties of existing institutional mechanisms vary greatly. International practice demonstrates the importance of effectively functioning joint bodies. Pursuant to the global policy objectives of peace, security, and poverty alleviation, multilateral and national aid agencies support the creation and evolution of institutional mechanisms through direct aid and capacity building.

More Information

- Berlin Recommendations on Transboundary Water Management: Experience of International River and Lake Commissions”, September 1998.
- Caponera, D., National and International Water Law and Administration: Selected Writings of Dante Caponera, The Hague, Kluwer Law International, 2003.

Dispute Settlement

- **Key Points**

- Practice demonstrates that States usually implement international agreements concluded by them without serious controversies.
- An international agreement will envisage the possibility of a dispute between its parties and provide for a mechanism designed to settle them. As indicated above, efforts are normally made to settle disagreements

before they reach the level of formal disputes, mainly through procedural rules requiring consultation, cooperation and negotiation.

- **Need to Know**

- **A broad range of dispute avoidance and settlement mechanisms is available to watercourse States.** If a dispute or a disagreement arises, most international watercourse legal regimes tend to gradually elevate seeking a solution from one level of dispute settlement procedure to another: from using technical experts within a joint institution to diplomatic negotiations and, eventually, to binding resolution by an impartial third party.
- **UN Charter.** Most watercourse agreements follow the UN Charter in enjoining states to resolve their disputes, in the first instance, through negotiations and other diplomatic means. Parties are generally free to select the methods of dispute settlement that follow on from negotiations. The most common model provides for institutional mechanisms to take the lead in resolving disputes, failing which the matter moves to governments to settle.
- **UN IWC Convention.** Despite significant controversy over whether or not it was appropriate for a framework convention to contain such provisions, Article 33 of the UN IWC Convention – the compromise formula eventually incorporated in the text – offers a range of dispute resolution mechanisms. States are free to select the means to settle their differences, including negotiation, good offices, mediation, conciliation, joint watercourse institutions, and so forth. However, if these attempts fail, any State to the dispute can unilaterally invoke the compulsory fact-finding procedure provided for under Article 33.
 - **The “fact-finding” mechanism** under the UN IWC Convention resembles conciliation in that the Fact-finding Commission’s task includes providing “such recommendation as it deems appropriate for an equitable solution of the dispute”. The major difference between fact-finding and the other means of dispute settlement under the Convention is that the fact-finding procedure can be invoked by any of the parties, while recourse to mediation, conciliation, arbitration, or adjudication requires the consent of all the parties concerned.
 - **Arbitration and adjudication** are optional under the UN Charter, and the UN IWC Convention, and need the agreement of all parties to the dispute. Generally an arbitral panel is composed of three members, two nominated by the parties and a chair selected by the nominated arbitrators. Where there is more than one “party in the same interest,” the parties nominate an arbitrator jointly. The applicable law is the watercourse agreement itself and “international law”. The panel must give its decision, stating its reasons and any dissenting opinions normally within a specified

time period. The decision is final and binding unless the parties agree in advance to an appeal procedure.

- **More Information**

- Charter of the United Nations, 26 June 1945, San Francisco, *available at* <http://www.un.org/>.
- United Nations Convention on the Law of Non-navigational Uses of International Watercourses, May 21, 1997 (opened for signature 21 May 1997), *reprinted at* 36 I.L.M. 700 (1997) (not yet in force).
- Third Report on the Law of Non-navigational Uses of International Watercourses, S. M. Schwebel, UN Doc. A/CN.4/348, Y. B. I. L. C., Vol. II, Part 2, 65 (1981).
- Sixth Report on the Law of Non-navigational Uses of International Watercourses, S.C. McCaffrey, UN Doc. A/CN.4/427 and Add. 1, Y.B.I.L.C., Vol. II, Part 1, 41 (1990).
- Report of the Work of the International Law Commission on the Work of its Forty-sixth Session, UN Doc. A/49/10, Y. B. I. L. C., Vol. II, Part 2, 88, (1994).
- Wouters, P., *Universal and Regional Approaches to Resolving International Water Disputes: What Lessons Learned from State Practice?* The Permanent Court of Arbitration Peace Palace Papers, October 2002, 111-154.

Implementation and Compliance

- **Key Points**

- **Implementation.** Reaching an agreement is in itself not the conclusion of the process. Once the treaty has been concluded and becomes binding for the parties, it must be “implemented”.
- **Good Faith.** Under general international law and its fundamental rule *pacta sunt servanda*, State parties to a treaty are under an obligation to perform it in good faith.
- **Implementation** can be measured in terms of the extent to which a state’s activities achieve the goals and objectives of the treaty regime. The character and nature of these activities are determined by the nature of the states’ obligations under the treaty.

1999 London Protocol on Water and Health

Article 15. Review of Compliance

The Parties shall review the compliance of the Parties with the provisions of this Protocol on the basis of the reviews and assessments...Multilateral arrangements of a non-confrontational, non-judicial and consultative nature for reviewing compliance shall be established by the Parties...These arrangements shall allow for appropriate public involvement.

- **Need to Know**

- **Implementation of framework agreements**, which usually contain general obligations, has great relevance for transboundary waters, where early commitment to cooperation is essential, but where the practical details of cooperative arrangements require time and further negotiation.
- **"Supplemental" agreements**, often in the form of protocols, can be developed later as information becomes available and mutual trust on the part of the parties grows. These subsidiary agreements may address specific needs such as quality standards, cost allocation, and benefit sharing.
- **A failure to implement a treaty**, or to *comply* with its provisions, is a serious political and legal issue. It can lead to conflict and undermine the foundation of the agreement. Traditional international law deals with the issue of *non-compliance* through the law of state responsibility, which may be counterproductive to further cooperation.
- The material breach of a treaty by one party may entitle other parties to suspend or terminate the treaty in whole or in part. However, this may not always be to the benefit of a wronged Party interested in achieving the treaty's objectives. This was demonstrated in the Danube (Gabčíkovo–Nagymaros) case, where Slovakia insisted on the implementation of the 1977 treaty notwithstanding Hungary's unilateral termination.
- **Non-compliance.** In most cases non-compliance is not the result of a wilful act, but a consequence of ambiguous treaty provisions or, more often, the lack of capacity and resources to properly implement it.
- **Compliance Control.** Ensuring compliance through non-adversarial and non-judicial measures – compliance assurance (verification and control) systems or mechanisms – are sets of rules and procedures aimed at assessing, regulating, and ensuring compliance.
- **Effective compliance mechanisms.** The cornerstones of a successful compliance strategy include:
 - agreed baseline (benchmark) provisions
 - an agreed compliance review procedure, including an institutional mechanism with a mandate to monitor compliance
 - a system of measures (incentives and disincentives) facilitating proper performance and discouraging non-compliance.
 - Public access to information, and equal access to justice are also considered important elements of a compliance regime.

- **Dispute prevention.** It is advisable that watercourse states consider including compliance assurance mechanisms in their agreements as an additional tool of dispute prevention.
- **More information**
 - UN ECE Geneva Strategy and Framework Report for Monitoring Compliance with Agreements on Transboundary Waters, MP.WAT/2000/5, 17 December 1999, Geneva (P. Wouters).

1.2.8 LAM – A Methodology for Implementing Equitable and Reasonable Utilisation

- **Key Points**
 - **Guidance for implementation.** The UN IWC Convention and the 1966 ILA Helsinki Rules provide guidance on how the principle of equitable and reasonable utilisation is to be implemented -- all relevant factors must be identified and considered together.

Article V, Commentary, 1966 Helsinki Rules

“...Under the rules set forth “all the relevant factors” must be considered. An exhaustive list of factors cannot readily be compiled, for there would likely be others applicable to particular cases. Stated somewhat more generally, the factor-analysis approach seeks primarily to determine whether (i) the various uses are compatible; (ii) any of the uses is essential to human life, (iii) the uses are socially and economically valuable, (iv) other resources are available, (v) any of the uses is “existing” within the meaning of Article VIII, (vi) it is feasible to modify competing uses in order to accommodate all to some degree, (vii) financial contributions by one or more of the interested basin States for the construction of works could result in the accommodation of competing uses, (viii) the burden could be adjusted by the payment of compensation to one or more of the co-basin States, and (ix) overall efficiency of water utilisation could be improved in order to increase the amount of available water. In short no factor has a fixed weight nor will all factors be relevant in all cases. Each factor is given such weight as it merits relative to all the other factors. And no factor occupies a position of pre-eminence per se with respect to any other factor. Further, to be relevant, a factor must aid in the determination or satisfaction of the social and economic needs of the co-basin states.”

- **Methodology.** The Legal Assessment Model seeks to provide a methodology for achieving the task of implementing equitable and reasonable utilisation. (See Part Two – the LAM Tool and Users Guide).
 - **The first LAM exercise** identifies, “all relevant factors” - the **Relevant Factors Matrix** was developed to do this, and the legal rights and obligations, through the completion of the Legal Audit Scheme.

- **The second LAM exercise** entails a methodology to consider and weigh all factors: the interests of the TWC States in the basin must be weighed in an equitable manner against one another. The consideration must include not only ascertaining the absolute injury caused by the use to the neighbouring State, but also the relation of the advantage gained by the use to the injury caused to the other State's uses.

- **Need to know**

- **Objectives and results.** The principle of equitable and reasonable utilisation is at once a “means” and an “end”. It is the overall objective to be achieved and also provides guidance on the means to achieve that objective.
- **Priority of Uses and Special Factors.** In deciding what is equitable and reasonable, questions may arise as to which uses are *allowable* under international law and *whether any particular use or uses should have a priority over other uses*. It is generally accepted that, “in the absence of agreement or custom to the contrary, no use of an international watercourse enjoys inherent priority over other uses”.
- **Harmful uses – one factor.** The UN IWC Convention recognises the potential for a use to cause harm and TWC States are required to consult to see whether *ad hoc* adjustments should be made to a use that is causing **significant** harm in order to eliminate or reduce the harm; and whether compensation should be paid to those suffering the harm. “The consultations must be conducted in the light of the particular circumstances and would include...such factors as the extent to which adjustments are economically viable, the extent to which the injured State would also derive benefits from the activity in question such as a share of hydroelectric power being generated, flood control, improved navigation, and so forth. In this connection the payment of compensation is expressly recognized as a means of balancing the equities in appropriate cases”.
- **Burden of proof.** The Commentary to the ILC 1994 draft article 7 gives guidance. The burden of proof for establishing that a particular use is equitable and reasonable lies with the State whose use of the watercourse is causing significant harm.
- **Special Problems.** In today's context, the implementation of equitable and reasonable

Burden of Proof. "The plaintiff state starts with the presumptive rule in its favour that every State is bound to use the waters of rivers flowing within its territory in such a manner as will not cause substantial injury to a co-riparian State. Having proved such substantial injury, the burden then will be upon the defendant State to establish an appropriate defence, except in those cases where damage results from extra-hazardous pollution and liability is strict. This burden falls on the defendant State by implication from its exclusive sovereign jurisdiction over waters flowing within its territory".
Article 7, 1994 ILC Report.

utilisation is complicated by further considerations, such as:

- How to ensure vital human needs and vital environmental needs are identified and met?
- How to involve civil society in the overall process?
- How to meet global policy objectives for poverty alleviation and sustainable development?
- How to meet the Millennium Development Goals and government commitments made at Johannesburg and Kyoto?

- **More Information**

- Report of the International Law Commission to the UN General Assembly, 46th Session (1994), YBILC, Vol II, part 2, 88, available at <http://www.dundee.ac.uk/iwlr>.
- *Commentary*, the Helsinki Rules on the Use of the Waters International Rivers, Report of the Forty-sixth Conference of the International Law Association held at Helsinki, 1966, at 484-532 (1967), available at <http://www.dundee.ac.uk/iwlr>.
- P. Jones, "Allocating Transboundary Water Resources: Procedural Problems and Solutions", unpublished PhD Thesis, U of Dundee (2005).

1.2.9 Vital Human Needs

- **Key Points**

- The fundamental question that arises in connection with the issue of vital human needs is: "Are minimum individual water requirements protected under the rule of equitable and reasonable use?" State practice would appear to answer this in the affirmative.

- **Need to Know**

What are "vital human needs"? The UN IWC Convention was the first water-related treaty that introduced the term "vital human needs" in its Article 10. The Statement of Understanding attached to the Convention defines the term "vital human needs" as "sufficient water to sustain human life" -- "both drinking water and water required for the production of food in order to prevent starvation". It is reasonable to assume, based on the Statement of Understanding and the ordinary meaning of the words, that what is intended by the term "vital human needs" is only the most essential needs in order to prevent death from dehydration or starvation.

- **The 2002 General Comment on the right to water** attached to the 1966 UN International Covenant on Economic, Social and Cultural Rights adopts a wider approach than the UN IWC Convention. It uses the term "personal and domestic uses" rather than "vital human needs". "Personal and domestic uses" are described as ordinarily including:

- Drinking – “water consumption through beverages and foodstuffs”;
 - Personal sanitation – “disposal of human excreta”;
 - Washing of clothes;
 - Food preparation – “includes food hygiene and preparation of foodstuffs”;
 - Personal and household hygiene – “personal cleanliness and hygiene of the household environment”.
 - **How are vital human needs protected?** Article 10(2) of the UN IWC Convention provides that:

“In the event of a conflict between uses of an international watercourse, it shall be resolved with reference to Articles 5 and 7, with special regard being given to the requirements of vital human needs”.
 - The use of the term “special regard” in Article 10(2) introduces a presumption that water to meet vital human needs will, in almost all circumstances, take precedence over other uses.
 - Various attempts have been made to quantify the amount of water required per person per day. Gleick suggests a figure of 50 litres per person per day (l/p/d). Falkenmark and Widstrand suggest 100 litres per person per day (l/p/d) as a minimum threshold for personal use.
 - **Human rights and the right to water.** There are three key global instruments related to human rights: the 1948 Universal Declaration of Human Rights, the 1966 International Covenant on Civil and Political Rights, and the 1966 International Covenant on Economic, Social and Cultural Rights (ICESCR). There are regional human rights instruments that contain similar provisions.
 - Two provisions of the ICESCR -- Article 11 on the right to an adequate standard of living and Article 12 on the right to the highest attainable standard of physical and mental health -- are the most relevant.
 - **The Right to Water.** The Committee on Economic, Social and Cultural Rights adopted the General Comment on the Right to Water on 26 November 2002 in order to provide greater interpretative clarity as to the intent, meaning and content of the Covenant.
 - **Precedence over other uses** The right to water appears to take precedence over all other water needs. Considering that the right to water, “entitles everyone to sufficient, safe, acceptable, physically accessible and affordable water for personal and domestic uses”, it would seem that what is envisaged under the General Comment is broader than the interpretation of “vital human needs” under Article 10 of the UN IWC Convention.
- **More Information**

- Universal Declaration on Human Rights, Dec. 10, 1948, UN G.A. Res. 217A (III), U.N. Doc A/810 at 71 (1948) at <http://www.un.org/Overview/rights.html>.
- International Covenant on Civil and Political Rights, UN G.A. Res. 2200A (XXI), 21 U.N. GAOR Supp. (No. 16) at 52, U.N. Doc. A/6316 (1966), 999 U.N.T.S. 171, *entered into force* March 23, 1976.
- International Covenant on Economic, Social and Cultural Rights, G.A. res. 2200A (XXI), 21 U.N.GAOR Supp. (No. 16) at 49, U.N. Doc. A/6316 (1966), 993 U.N.T.S. 3, *entered into force* Jan. 3, 1976.
- UN Doc.E/C 12/2002/11, General Comment No. 15, The Right to Water, International Covenant on Economic, Social and Cultural Rights, Committee on Economic, Social and Cultural Rights, 29th Session, 26 November 2002, at <http://www.dundee.ac.uk/law/iwlri>
- Office of the High Commissioner for Human Rights, “The Committee on Economic, Social and Cultural Rights”, Fact Sheet No. 16 (Rev. 1), *available at* http://193.194.138.190/html/menu3/b/a_cescr.htm.
- Constitution of the Republic of South Africa, as adopted on 8 May 1996 and amended on 11 October 1996 by the Constitutional Assembly, Act 108 of 1996 at www.polity.org.za/govdocs/legislation/1993/constit0.html.
- Gleick, P., Basic Water Requirements for Human activities: Meeting Basic Needs,” 21 Water International 83, 1996.
- Falkenmark, M. & C. Widstrandt, “Population and Water Resources: a Delicate Balance”, 47 Population Bulletin, Population Reference Bureau, Washington DC, 1992.
- McCaffrey, S.C., “A Human Right to Water: Domestic and International Implications”, 5 Geo. Int’l Env’tl. L. Rev. 1, 1992.

1.2.10 Environmental Needs

- **Key Points**

- **Environmental needs** is the recognition that a minimum level of flow must be maintained in order to safeguard the ecological, chemical, and physical integrity of a transboundary water resource.

The Inco-Maputo Agreement requires its parties to “*take all measures to protect and preserve the ecosystems of the Incomati and Maputo watercourses*” (Article 6). The Agreement elaborates further on this provision by providing details concerning flow regimes (Article 9). Criteria for the agreed flow regime, include, *inter alia*, “the need to ensure water of sufficient quantity with acceptable quality to sustain the watercourse and their associated ecosystems”.

- **Need to Know**

- The level of environmental stream flows that are legally protected will depend on the application of the rule of equitable and reasonable use, and the facts and circumstances of a particular case. Consistent with the notion of environmental flows the ILC commentary goes on to explain that, “[t]ogether, protection and

preservation of aquatic ecosystems help to ensure their continued viability as life support systems, thus providing an essential basis for sustainable development.”

- **UN IWC Convention** contains no express reference to the need to maintain environmental flows, however it does oblige States to “protect and preserve the ecosystems of international watercourses”. It can be argued that safeguarding the ecological, chemical, and physical integrity of a freshwater system by maintaining at least minimum level of flow is a necessary prerequisite to protecting and preserving an ecosystem.
- **Obligation to protect.** The ILC commentary to the UN IWC Convention ties the obligation to protect and preserve contained in Article 20 with the rule of equitable and reasonable utilisation in Article 5. The obligation to “protect” the ecosystem of international watercourses is therefore, “a specific application of the requirement contained in Article 5 that watercourse States are to use and develop an international watercourse *in a manner that is consistent with adequate protection thereof* [emphasis added]”.
- **“Adequate protection”**, is conservation, security and abatement of water-related disease, but also measures of “control” in the technical hydrological sense of the term, such as those taken to regulate flow, to control floods, pollution and erosion, to mitigate drought and to control saline intrusion”. The ILC commentary explains that the obligation to protect ecosystems “requires that watercourse States shield the ecosystems from *a significant threat of harm* [emphasis added],” endorsing a precautionary approach to the protection of freshwater ecosystems.
- **More Information**
 - World Commission on Dams, Dams and Development – A new framework for decision-making, Nov. 16, 2000, *available at* <<http://www.dams.org/report/>>.
 - Agenda 21: A Programme of Action for Sustainable Development, June 12, 1992, UN Doc. A/Conf/151/26/Rev. 1.
 - Plan of Implementation, World Summit on Sustainable Development, Sep. 4, 2002, *available at* <<http://www.dundee.ac.uk/law/iwlr/>>.
 - IUCN, Draft International Covenant on Environment and Development, Environmental Policy and Law Paper No. 31 Rev, *at* <www.iucn.org/themes/law/pdffdocuments/EPLP31ENsecond.pdf>.
 - Rieu-Clarke, A., International Law and Sustainable Development: Lessons from the Law of International Watercourses, Water Law and Policy Series - IWA Publishing, 2005.

1.2.11 Transboundary Groundwater

- **Key Points**

- Despite transboundary groundwater resources having been recognised and increasingly relied upon, as a critical source of water, the formation of international legal principles and rules governing their use is not settled, primarily due to the principle of sovereignty. States are reluctant to conclude obligatory arrangements regarding their shared groundwater resources.
- There are two types of groundwater resources under legal regimes: groundwater “related” to surface waters and “unrelated” groundwater, lacking a connection with surface waters. There is general agreement that those substantive and procedural rules of international law that are applicable to transboundary surface waters apply equally to groundwaters that are connected to surface waters within a specific international watercourse system.

- **Need to Know**

- On the other hand, the legal status of transboundary “confined”, or non-renewable aquifers, which have no physical connection with the surface water, is less clear. There is still a great deal of uncertainty as to what legal rules should govern the exploitation of these water resources. State practice with respect to confined aquifers has not been consistent and their utilisation and management by the countries that share them has been *ad hoc*.

ILC Resolution on Confined Aquifers

*“The International Law Commission,
 “Having completed its consideration of the topic ‘The law of the non-navigational uses of international watercourses’,
 “Having considered in that context groundwater which is related to an international watercourses,
 “Recognizing that confined groundwater, that is groundwater not related to an international watercourse, is also a natural resource of vital importance for sustaining life, health and the integrity of ecosystems,
 “Recognizing also the need for continuing efforts to elaborate rules pertaining to confined transboundary groundwater,
 “Considering its view that the principles contained in its draft articles on the law of the non-navigational uses of international watercourses may be applied to transboundary confined groundwater,
 “1. Commends States to be guided by the principles contained in the draft articles on the law of the non-navigational uses of international watercourses, where appropriate, in regulating transboundary groundwater;
 Official Records of the General Assembly, Forty-ninth Session, Supplement No. 10, (A/49/10), chap. III.D.*

- It has been suggested that groundwater resources should be considered in a holistic manner, necessitating the utilisation of a basic hydrological unit rather than the international watercourse concept, which is seen to limit itself to the water itself rather than to the environment in and about the groundwater resources.
- Owing to the physical characteristics of groundwater (relatively slow rate of recharge and self-purification), the management and regulation

of groundwater resources must focus on two critical issues: pollution and depletion.

- **ILC.** In 1994, the ILC completed its draft articles on the law of the non-navigational uses of international watercourses together with a “Resolution on Confined Transboundary Groundwater”, but this was not adopted by the UN General Assembly as part of the UN IWC Convention.
 - **ILC Study of Confined Aquifers** The ILC has decided recently to undertake a special study of the legal rules applicable to shared natural resources such as confined aquifers. It has been suggested that the legal principles and procedures applicable to shared surface water resources also be applied to confined aquifers, including: the duty to cooperate, equitable and reasonable utilisation, prevention of significant harm, exchange of data and information, and dispute settlement procedures.
 - **ILA Groundwater rules** The ILA adopted the Seoul Rules on International Groundwaters (the “Seoul Rules”), which extended the concept of an “international drainage basin” to the aquifers intersected by the boundary between two or more States, regardless of whether they contribute to, or receive water from, surface waters (Art. 2). The ILA suggests that all the relevant provisions of the 1966 Helsinki Rules, including the principle of equitable and reasonable utilisation, should apply to “confined” aquifers as well.
- **More Information**
 - *Official Records of the General Assembly, Forty-ninth Session, Supplement No. 10, (A/49/10), chap. III.D.*
 - Report of the Fifty-fifth Session of the International Law Commission, Shared Natural Resources: First Report on Outlines, C. Yamada, Special Rapporteur, A/CN.4/533, 30 April 2003, available at <http://www.un.org>.
 - International Law Association, Report of the Sixty Second Conference, Seoul, 1986, available in S. Bogdanovic, *International Law of Water Resources - Contributions of the International Law Association (1954-2000)*, Kluwer Law International, 2001.
 - Rosenstock, R., UN ILC Reports, UN Doc. A/CN.4/451, and UN Doc. A/CN.4/462.
 - Report of the Fifty-third Session of the International Law Commission, 200, UN Doc. A/57/10, 2002.
 - Hayton R., and A. Utton, *International Groundwaters: The Bellagio Draft Treaty*, 29 *Natural Resources J.* 663, 1989.
 - Diabes Murad, F., *New Legal Framework for Managing the World's Shared Groundwaters: Case Study from the Middle East*, *Water Law and Policy Series - IWA Publishing*, 2005.
 - Hayton, R.D., “*The Law of International Aquifers*”, 22 *Natural Resources Journal* 71, 1982.

- McCaffrey, S., “*International Groundwater Law: Evolution and Context*”, in S. Salman (ed.), *Groundwater: Legal and Policy Prospects*, World Bank Technical Paper No. 456, Washington, 1999.
- Barberis, J., *International Groundwater Resources Law*, FAO Legislative Study No. 40, 36, 1986.

1.3 Conclusions and Recommendations

Conclusions. The LAM is a work in progress, with many lessons having been learned, and with a number of new applications to be attempted, especially if the maximum potential is to be fully realised. A number of key findings from the three case studies applying the LAM could be helpful in broader applications. In the first instance, it became clear that the potential benefits of the LAM could best be realised at the basin-level and that the model therefore requires testing at that level. *Such an exercise would illustrate how implementation of the LAM could result in cooperative frameworks involving shared transboundary waters.* Furthermore, in order to meet the overall objective of effective implementation, it was apparent that the LAM could benefit from application at the governmental level, with input across sectors. The central importance of the following elements was of particular note:

1.3.1 Interdisciplinarity. Determining legal entitlement and obligations of a TWC State requires an interdisciplinary approach, which is facilitated through the application of the LAM. This emphasises the need for the LAM to be applied at the governmental level in such a way that all relevant ministries and departments are involved. This will ensure that a fully integrated method is adopted, resulting in corresponding increases in the overall understanding of the impact of all relevant factors. The LAM actively encourages collaborative action on the part of disparate government entities.

1.3.2 Data Collection and Verification. The experience of the country teams using the LAM illustrated that there is a remarkable amount of relevant data available in the public domain. Despite this, the problems associated with data are numerous. The case study experience may be generalised to data collection and verification in other basins. The case study country teams all encountered difficulties to some degree as a result of the quality of data and this manifested itself in three broad, but inter-related ways:

Inconsistency of data. There are a number of reasons for inconsistent data, including:

- mismatch between national and regional strategy and planning timelines. This can be compounded by the complete lack of adequate planning, although the reasons for this may be due to economic or political realities.
- inconsistency between administrative and basin boundaries.
- collecting data from various reports compiled at different times.

Absence of data. Data might be unavailable because it has never been compiled, or because of its unavailability due to political considerations (as in the Palestine and China case studies). In Mozambique, the problem of lack of data was particularly acute as a result of the civil war which had destroyed the monitoring networks necessary for data collection. Data that had been compiled pursuant to the Joint Incomati Basin Study was restricted in order to avoid compromising ongoing negotiations. The inadequacy of the monitoring network was also a

factor in China due to the remoteness of the basin in question, a fact that was compounded by the constraint that official national data cannot be publicised, except in accordance with Chinese national laws. Political and military conditions in Palestine made the collection of primary data not possible. In each country study, the teams suffered from an almost complete lack of environmental data, although the reasons for this differed in each case.

Lack of current data. Data was found to be out of date simply because recent studies had not been done – this might be because the economic climate had not allowed it or because of problems with the monitoring network itself. However, it may also be that data becomes outdated because of the rapidity of change in the basin. This is particularly true in Mozambique with respect to social factors – for example, the impact of HIV/AIDS have caused social crisis that may not be reflected in the collated data.

These problems become particularly acute when applied to the basin as a whole, as verification of data is more difficult, especially when no basin-wide agreement is in place that provides for information transfer. Issues of verifiability can arise at the national level too – in Palestine, for example, questions arose regarding the reliance on “official” Israeli data, which may or may not be verifiable. The political context can impact the application of the LAM.

The central conclusion however, is that it is important to attempt to collect all the required data, to clearly disclose all problems or obstacles and to justify the decisions taken where there may be problems. Transparency and full disclosure are indispensable – full disclosure of the process of data collection is as essential as the actual data collected.

1.3.3 Generic application of LAM. The case studies demonstrated that the LAM is capable of application by a TWC located upstream, downstream and by States that share groundwater. Although the relative importance of the relevant factors may be different in each case, the baseline data required appears to be similar. In the first instance, the application of the LAM by a TWC State can illuminate gaps in data that should be included further planning studies in order to allow the TWC State to fulfil its international obligations. Further, this information could provide an agenda for negotiations on a co-operation agreement for data information and exchange at the basin level.

1.3.4 Key Implications of Findings. The four key implications of the initial findings are as follows:

- i. **Close monitoring.** The need for close monitoring during implementation the collection of data utilising the Data Collection Tools;

- ii. **Continued research and development.** The need for continued research and development in the refining of the LAM and in particular the Method of Evaluation, as the articulating mechanism of the LAM;
- iii. **Operationalising Interdisciplinarity.** The need for focused and ongoing efforts to operationalise the interdisciplinary approach in this project;
- iv. **Support for National Water Strategy.** The need to consider how the new information obtained through the LAM might effectively be used by a TWC State in the development of its national water strategy. Efforts must be made to ensure that the impact of such strategies have the maximum possible impact on poverty reduction and conflict avoidance. A training module could be developed to assist with uptake and monitoring of uptake.

1.3.5 The Way Forward

Primary Questions for Future Application. The LAM should evolve as a tool capable of assisting a TWC State in identifying its entitlement and obligations regarding the development and use of its transboundary freshwaters at the national and international levels. However, this is the first step in a process aimed at facilitating the development of a national water policy that addresses the needs of the poor. **Three questions** arise from the application of the LAM in the three case studies:

- i. How can the new information provided by the LAM be utilised effectively at the national level in the development of a national water policy / strategy / law?
- ii. Can the LAM be utilised in other contexts (i.e. testing it in other case studies at the national level)?
- iii. Can the LAM be applied basin-wide with a view to developing a cooperative framework (e.g. Aral Sea, Mekong, Nile, Zambezi)?

Applying the LAM at the basin, national and local levels – Good Governance and Participation of Stakeholders

In order to gain the full benefits of this model, it is suggested that research should be carried out to further develop the LAM application at the basin, national and local levels. The proposed research would focus on two aspects:

- i. testing the LAM in other case studies, including at the basin-level; and
- ii. identifying how the LAM could be most effectively used at the national level.

Follow-on research at the basin level applying the LAM would result in a more rigorous testing of the model. A critical identification and assessment of the national water policy / law making strategy would be required. This would

present the opportunity to develop a methodology for including the LAM information into the national water strategic process.

Further research should focus on stakeholders (considered at the micro-level), particularly the poor. The aim would be to:

- i. develop a methodology for ensuring stakeholder involvement in national and international water policy-making; and
- ii. target the administrative procedures and legal allocation frameworks that ensure access to water by the poor.

For example, we may consider devising a Public Participation Code of Practice that would offer individual users an effective voice in the national water policy-making process (a bottom up approach). The legal rights requiring public participation are now increasingly articulated in international and national instruments, but the means to effectively implement these rights are not adequate. The focus would be on implementation.

It is the overall aim to connect the national water policy / strategy process for a TWC State at the macro (transboundary / international) and micro (individual stakeholder) levels in a coherent, pragmatic and legally enforceable package.

Part Two:

Operational Tool The Legal Assessment Model and User's Guides

2. The LAM Tool and User's Guides

Glossary of Terms	Page 51
Legal Audit Scheme	Page 58
Relevant Factors Matrix	Page 77
Method of Evaluation	Page 118
Legal Options	Page 126

The Legal Assessment Model and User's Guide. The purpose of this part is to provide details of the Legal Assessment Model (LAM), a comprehensive explanation to the LAM itself, including guidance on its implementation. For those interested primarily in the application of the LAM, this part will provide the essence of the model and the means for its application.

Overview. Broadly, the **Legal Assessment Model (LAM)** is a tool that enables a TWC State to systematically identify, collect and analyse data related to its use of a TWC, and to use this data as the basis for negotiations with other basin States and ensure adherence with international obligations. This is accomplished through the use of the following:

- the **Data Collection Tools**
 - Glossary of Terms (GoT)
 - Legal Audit Scheme (LAS)
 - Relevant Factors Matrix (RFM); and
- the **Method of Evaluation (MoE).**

Purpose. The purpose of the LAM is to assist a TWC State to identify its legal entitlements and obligations regarding the use of its shared transboundary waters. This will allow it to better develop a national water policy that is in harmony with these rights and duties. It will also help a TWC State to improve its position for negotiations with other basin States for water cooperation and sharing arrangements.

Given the close relationship between poverty alleviation and improvements in water and sanitation services, the LAM provides an invaluable tool for drawing up Poverty Reduction Strategy Papers. In the context of TWCs, plans for improvements with respect to water availability and provision of sanitation services cannot be finalised until the water entitlement available to a TWC State has been ascertained. The LAM facilitates the latter, the result being that poverty alleviation measures will be made more practicable because they will be based on the resources legally available to the TWC State, thereby avoiding potential sources of conflict with other TWC States.

Methodology. The methodology to develop the LAM included three comparative case studies, research on the applicable law, data collection, data processing, weighing the factors and legal options analysis.

Applicable Law. The first stage in the development of the LAM was to identify the relevant rules of law that applied. The analytical framework derives from law: identify the applicable law and apply that to the case studies. The governing rule of international law -- that each TWC State is entitled to an equitable and reasonable use of its shared transboundary waters -- is thus at the core of the LAM.

Data Collection Tools. The second step was to establish a systematic approach for implementing this rule of law in practice – so that a TWC State could determine on its own what the legal requirements are and develop its water strategy accordingly. It was determined that an interdisciplinary approach to data collection and analysis was required. This led to the design of specific **Data Collection Tools**, unique to the LAM. These consist of:

- (i) Glossary of Terms (GoT) – the common language of the assessment
- (ii) Legal Audit Scheme (LAS) – to establish the legal context
- (iii) Relevant Factors Matrix (RFM) – to collect data on “all relevant factors”

Together, these tools provide a systematic approach to collect the data necessary to evaluate the status of a TWC State’s use of its shared transboundary waters in relation to international law.

Method of Evaluation. In order to mobilise this data, the LAM includes the Method of Evaluation (MoE) specifically to assist a TWC State to identify whether or not the existing or proposed use of the watercourse is “equitable and reasonable”. The LAM then offers Legal Options that arise from the findings.

Four Phases. The LAM is designed for use by any TWC State, regardless of whether it is upstream, downstream or shares groundwater. In essence, the process seeks to ensure that States “think and act systematically and consistently” in assessing their entitlement to their use of shared international watercourses. The LAM is administered in four phases:

Phase I: Defining Scope – a first snapshot of the legal, economic, hydrological and policy situation that sets the stage for the more detailed work.

Phase II: Data Collection – systematic collection of data establishing the legal rights and duties and all factors relevant to the watercourse through application of the **Data Collection Tools**.

Phase III: Evaluation – using the **Method of Evaluation** to determine whether or not the existing or planned use is equitable and reasonable.

Phase IV: Options to Ensure Equitable Entitlement – identifying the legal options available for ensuring equitable entitlement.

Relevant data is collected in Phases I and II before being analysed in Phases III and IV. Phases I and II serve to establish the baseline (legal, economic, hydrological, social, political), while Phases III and IV identify policy options

(i.e. is the use equitable and reasonable and, if not, what options are available?).

Preliminary Step. Before embarking on the implementation of the LAM, it is recommended that a TWC State should:

- (i) review the entire contents of the LAM, in order to fully appreciate the nature of the work that is required, and
- (ii) examine the circumstances that have precipitated the use of the LAM. This might be because a TWC State wishes to renegotiate a water resource-related agreement with another basin state, or because a TWC State wishes to undertake a new or augment an existing use. It may also be as a result of a need to evaluate the current uses of a TWC by other basin states.

Triggering Event. A “triggering event” may exist acting as a catalyst for initiating the LAM process. The LAM is designed for practical application. The assessment of what qualifies as an “equitable and reasonable utilisation” is (and must be) a dynamic process, and as circumstances change in basin States, so the determination of whether a TWC State’s use of the waters of a TWC will change. By undertaking the work involved in the LAM, a TWC State is not setting its position immutably, such that it never has to evaluate its utilisation again. By using the LAM once, a TWC State will put in place information and reporting networks that will facilitate easier analysis in the future.

Interdisciplinary approach. Aside from requiring the collection of very specific data, the LAM requires the integration of hydrology, economics, science and law at all stages of the process. The type of information to be collected and the process of data collection itself demand a methodology that is practical, and most importantly, one that complies with the requirements of international water law. This methodology has the potential to facilitate transboundary water cooperation and will have genuine relevance to, and application in the resolution of water-related conflicts. While the LAM is designed for use at the national level by a TWC State, it is necessary to consider the TWC basin as a whole. Thus, the range of data collected should include all TWC States, if possible.

Legal Foundation. As indicated above, the most significant element of the process, with regards to the avoidance of international disputes, is law. The proposed methodology demands that policy decisions be critically evaluated against legal requirements. In this way a consistent approach among States is assured when assessing legal entitlements regarding their respective and proposed uses of a transboundary watercourse. A uniform approach is essential if conflicts between States over the allocation of the waters of TWCs are to be avoided. Cooperative frameworks and management arrangements may be more easily established where both sides agree on the data and the basic method of assessment required in the particular case. Adherence to international law lends objective credibility to the methodology, thereby removing the possibility of bias and increasing the chances of international

acceptance. This will reduce the opportunity for States to mask political decisions behind “objectivity” – the data and method of evaluation must be justified and credible. With the adoption of a basin-wide approach, where possible, abuse can be minimised.

Pragmatic Working Tool. The LAM is expected to provide a working tool that informs a State’s decisions regarding its national policy and any changes necessary to bring about compliance with its international obligations. The value added by this methodology lies in the systematic approach that it offers with respect to the application of the relevant factors, in addition to the particular emphasis given to the law.

Phase I: Defining Scope - Setting the Initial Context.

The first phase of the work involves a brief (i.e. an overview of a few pages) but important **scoping exercise** aimed at setting the context for the more detailed exercises that follow. At this stage the TWC State should identify the key legal, economic, hydrological and political issues related to its concerns over the use of the shared transboundary waters. The following is an indicative list of questions that should be answered during this phase:

- What waters? (identify and describe the TWC)
- What other States? (identify the parties that actually or potentially may share the water resources)
- Are there existing legal agreements that apply? (identify the legal constraints / framework)
- What are the most important interests to the TWC State? (what factors are most relevant?)
- How important is this watercourse for the TWC State? (put the exercise into a national context)

Set the Context. Responding to these types of questions sets the stage for the more detailed work that follows. It should also inform the future process – i.e. the time, planning, and resource requirements necessary to proceed further. It is important from the outset to involve an interdisciplinary team so that all interests are represented. The production of and reliance upon an agreed Glossary of Terms is one important means of minimizing the scope for misunderstanding.

Consider the Method of Evaluation (MoE). It is also important that the TWC consider the MoE at this scoping stage. This serves to illuminate and influence the information collected as part of the LAS and the RFM. By looking at the issues that must be addressed, and tailoring the data to find the answers to these questions, the achievement of a credible assessment of equitable and reasonable utilisation is more certain. The international legal rule of equitable and reasonable use therefore suffuses the entire process.

Phase II: Data Collection - Using the Data Collection Tools.

Having established the extent of the waters under investigation, the next task is to collect the required information. Phase II of the work involves employing the Data Collection Tools.

The **Glossary of Terms (GoT)** provides the common language, which should be agreed to by the investigating team before data collection commences. The **Legal Audit Scheme (LAS)** ensures that the legal context relevant to the exercise is systematically collated and analysed. The **Relevant Factors Matrix (RFM)** is a tool that enables the collection of the hydrological, social and economic data necessary to be considered in the evaluation of “equitable and reasonable utilisation”. The User’s Guide for the RFM provides information on the meaning, process and possible problems and solutions related to the collection of the data. It should be noted that this matrix covers a wide range of data relating to the basin that has been described in Phase I above. Since this information may reside in other States its availability and quality may vary. It is therefore essential that not only should the information that has been collected be recorded, but that the *method* by which it has been collected be described so that its relative reliability and comparability may be assessed. The accuracy and comprehensiveness of data is immensely important in establishing credibility and objectivity, and may highlight shortcomings in a State’s administration and management of its water resources. The extent of compliance with the requirements of the RFM may serve as a means to assess the data produced in other basin States.

It should be pointed out that a number of factors may limit the data that can be collected in practice:

- lack of resources available for the identification and measurement of the required information;
- Access to data deemed sensitive by governments;
- political and security problems may restrict access to data;
- the sources of information, and corresponding networks, may have been destroyed or rendered useless as a result of war or natural disaster.

These problems are likely to affect the poorest nations disproportionately.

In many cases, reliance will have to be made on information that has been collected for some other purpose. To institute a special exercise to collect data specifically for this task would considerably increase the data collection costs. It may be that the nature of the data collection, or the data itself, does not readily lend itself to easy interpretation. Stringent efforts should be made from the outset, and throughout the exercise, to ensure that the data collected is of the highest quality available in the circumstances, thereby avoiding having to revisit the data in an effort to improve its usefulness.

Phase III: Evaluation - Using the Method of Evaluation.

The **MoE** provides the means to evaluate the data collected using the LAS and the RFM in such a way as to determine whether or not the existing or proposed uses are within the legal parameters of “equitable and reasonable use”. The MoE comprises a series of steps, which need to be completed before one can be confident that the outcomes will be robust and defensible under the principles of international water law. The method of evaluation

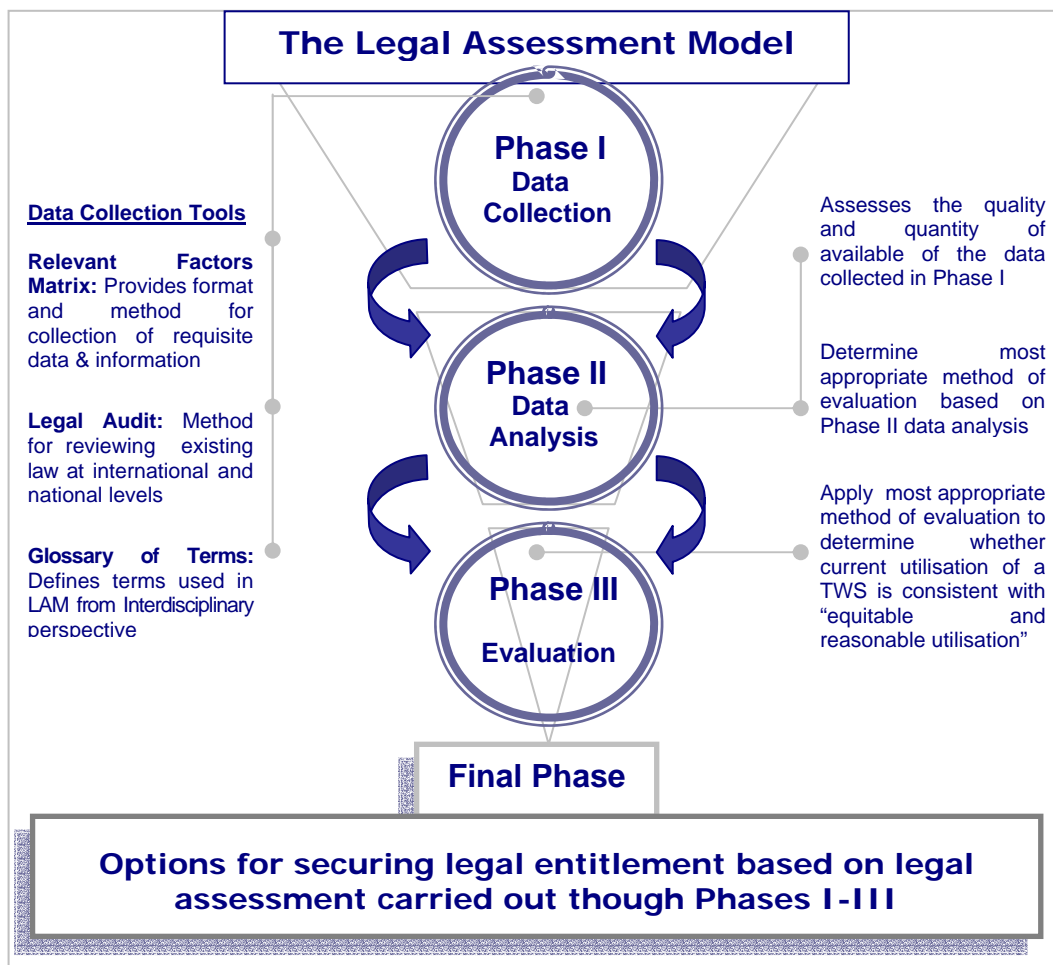
describes the whole of this process and all of the separate steps that need to be undertaken before the requirements of the methodology are fulfilled. The process is informed by the approach adopted in the ILA Helsinki Rules and the UN Watercourses Convention, namely: *“The weight to be given to each factor is to be determined by its importance in comparison with that of other relevant factors. In determining what is a reasonable and equitable use, all relevant factors are to be considered together and a conclusion reached on the basis of the whole.”* Details of this phase are given in section 7 below, where the approach adopted by each of the case studies is also presented. It is assumed from the outset that any exercise involving allocation must be considered to be a dynamic process, incorporating flexibility to reflect the fact that conditions will change over time.

Phase IV: (Legal) Options - How to Ensure Equitable Entitlement.

Once a TWC State has determined on the basis of the above process that an existing or proposed use is or is not equitable and reasonable (note - this determination is not binding on other TWC States), there are a number of actions that it might consider to protect its equitable entitlement. These options cover a broad spectrum and may range from unilateral development (for example, where the use is clearly equitable and reasonable) to dispute settlement measures, such as arbitration or adjudication (where the Parties cannot reach agreement and a dispute arises over the existing or proposed use, which may or may not be equitable or reasonable). The Method of Evaluation is structured so as to be an interactive model that will provide an indication of the legal parameters of the use under consideration – whether it is or is not equitable and reasonable.

No Existing Agreements. Where there are no existing agreements on water sharing, such as the case in the Palestine and China case studies, a TWC State will appreciate from its application of the LAM that legal options do exist: for example – consultations, negotiations and exchange of information. In the event of potential disputes, the Parties can agree to go to a third party for dispute resolution, such as fact-finding, conciliation, mediation, or adjudication. What is most important to realise is the existence of options, which can be made less adversarial when approached through an agreed framework. The LAM provides such a framework for identifying and sharing information, most of which can be objectively assessed and agreed in advance, thus facilitating cooperative solutions.

Implementing the LAM. The next section examines more closely each of the tools used in Phases II and III of the LAM exercise, namely the Data Collection Tools and the Method of Evaluation. It concludes with a discussion of Phase IV – Options for Ensuring Equitable Entitlement. The diagram below summarises how the LAM operates, and demonstrates the key phases.



The Data Collection Tools. This part considers **Phase II** of the LAM application. The **Data Collection Tools** (DCTs) are employed to collect specific data that will be used in the overall assessment of whether or not an existing or proposed use is lawful – i.e. “equitable and reasonable”. Having completed Phase I, which establishes the key issues to be addressed in this part of the exercise, Phase II attempts to ensure the systematic collection of all data – legal, hydrological, economic and social -- related to the transboundary watercourse. The exercise requires that the TWC State collects as much data about the TWC at the national AND basin level as possible. This could prove difficult, but the Data Collection Tools permit some flexibility where problems arise – provided that the decisions taken as a result are transparent and justified. The next sections discuss the DCTs – the Glossary of Terms, the Relevant Factors Matrix and the Legal Audit Scheme.

2.1 The Glossary of Terms

Overview. The Glossary of Terms should be developed to establish a common language across the disciplines involved in the LAM process. It became clear that lawyers, economists and hydrologists either have a different understanding and interpretation of some common terms central to the process or often require further explanation of certain terms. The Glossary below was compiled from terms used by water resource experts and should be considered “terms of art” for the LAM as applied in the three case studies. The GoT will change for each LAM process. The LAM team should develop and revise the GoT during the process. Each key term used in the LAM should be defined. There are some terms in the Glossary below that have legal significance and should be defined but not excluded from a LAM GoT, such as “beneficial uses.” The LAM team should use the GoT included here as a starting point – a check list – and add to the definitions or add to the terms defined. For example, ecosystem services should be defined for the specific water resources – i.e., flood plain services, or fishery habitat.

Glossary of Terms

Aquifer: Any subsurface geological formation, such as a layer or layers of rock or other geological strata of sufficient porosity and permeability, which contains water and from which it may be extracted in appreciable quantities. Water that is in the upper zone of the soil is not included.

Basic Human Needs: synonymous with *vital human needs*.

Beneficial use: A use that is generally recognised as economically and socially valuable. A beneficial use need not be the most productive use to which the water may be put, nor need it utilize the most efficient methods known to ensure maximum utilisation. Beneficial use excludes unnecessary waste, which is to be determined on a case-by-case basis given the circumstances of the watercourse, the users and the uses. The beneficial uses of a TWC may include water consumption for domestic purposes, irrigation, mining, industrial and municipal uses, hydroelectric generation, navigation, fishing, discharge of wastes, access to the stream for the purposes of recreation and tourism, and protection from erosion, among others.

Catchment: The area of land bounded by the watershed limits from which water flows, or would flow, into a common terminus (normally a sea, lake or aquifer). The expression *would flow* is used, because the catchment may include areas of land for which the topography is such that water would theoretically flow, even if it does not actually do so at present. This situation most often occurs in arid areas. The catchment is also referred to as the catchment basin, drainage area, or *drainage basin*.

Confined aquifer: An aquifer without any link to the interconnected system of waters that makes up the *watercourse*, as defined below. Confined aquifer does not receive any perceptible replenishment from

surface water or other groundwater. This definition differs from that in normal hydrogeological usage, where a confined aquifer is one that is constrained by an impermeable layer on its upper side and which usually does receive significant amounts of recharge.

Confined groundwater: Groundwater that is in a *confined aquifer*. It is also known as fossil groundwater.

Conflict of use: A situation where all the reasonable and beneficial uses of TWC States on a particular watercourse exceed the available supply in terms of quantity or quality. International law requires that adjustments or accommodations based on equity be made to preserve each TWC States' equality of right (see *equitable and reasonable utilisation*). This is usually achieved through an agreement.

Conservation: Action or activity aimed at preventing unnecessary waste of water resources, incorporating measures in future plans to avert possible waste, or refraining from action that might result in unnecessary waste. It may mean the conservation of water through impoundment to preserve floodwaters for later use, or demand reduction measures. In general usage, the term is employed synonymously with eco-system protection, but this is not the meaning used here.

Consumptive use: Any use of water in which it is abstracted without being returned to the watercourse and thus reducing the total quantity of water in the watercourse. Examples include consumption of water for domestic, industrial or irrigation purposes. However, such types of use may include a component of a *non-consumptive use*, since some of the water that is abstracted may be returned to the watercourse via a sewage or drainage system as a return flow. Such a process may impact unfavourably on water quality.

Convention: One of different designations (names) of an international instrument (international agreement), usually of a multilateral character, which creates legally binding rules (rights and obligations) for the States participating in it.

Customary international law (International custom): Certain "unwritten" rules generally accepted by States as legally binding; a general practice of States accepted as law. Customary rules of international law may be "codified" in a multilateral convention, such as the UN IWC Convention. However, these rules are legally binding for all States regardless of whether they are parties to such a "codification" treaty or not. Those customary rules which govern the conduct of TWC States vis-à-vis each other include: the principle of equitable and reasonable utilisation, the duty to give notice of a planned measure (use) that may cause significant adverse effects, the duty to take measures aimed at preventing significant harm to or within the territory of another TWC State, the duty to cooperate, the duty to peacefully settle international disputes.

Declaration: A non-binding instrument, usually adopted by an international organisation or a conference, which has a nature of recommendation but which may contain certain legal rules and serve as evidence of customary law.

Development: Any type of a project or programme undertaken to obtain benefits from a watercourse or to increase the benefits that are already being derived.

Drainage basin: see *catchment*.

Duties: see *Rights and duties*.

Ecosystem services: A range of functions fulfilled by the aquatic and related terrestrial ecosystems of a watercourse while they remain in a more or less natural state. They can be of many different types, and the benefits may include economic as well as social, cultural and religious ones.

Entitlement: A legal right (see *Rights and duties*).

Environmental needs: Water of sufficient quantity and quality necessary to preserve and protect the ecosystem and maintain the ecological integrity of the TWC. Adequate in-stream flow requirement is synonymous with environmental needs. The UN IWC Convention requires the parties to use and develop an international watercourse in a manner that is consistent with adequate protection thereof (Arts. 5 and 20). It requires that watercourse States take measures to protect the ecosystems of international watercourses from pollution or other harm or damage.

The obligation to "preserve" the ecosystems of international watercourses, while similar to that of protection, applies in particular to freshwater ecosystems that are in a pristine or unspoiled condition. It requires that these ecosystems be protected in such a way as to maintain them as much as possible in their natural state, so that they continue to provide their unique *ecosystem services*.

Together, protection and preservation of aquatic ecosystems help to ensure their continued viability as life support systems, thus providing an essential basis for *sustainable development*.

Equitable and reasonable utilisation (use): The fundamental principle of international water law entitling a TWC State to an equitable and reasonable share of the uses and benefits of a watercourse and creating the correlative obligation not to deprive other TWC States of their respective right. Factors that may be used to identify an equitable and reasonable use are summarised in the Relevant Factors Matrix.

Groundwater: All water, which is found below the surface of the ground, in the saturation zone, aquifers, and the structures containing deep "fossil waters".

Harm (damage): Any detrimental consequence of a human activity such as *inter alia*:

- loss of life or personal injury;
- loss or injury to property;
- the costs of reasonable measures to prevent or minimize such loss or injury;
- environmental harm, including the costs of reasonable measures to prevent or minimize such harm, and the costs of reasonable measures of reinstatement or restoration of the environment actually undertaken or to be undertaken.

Under customary law, a TWC State has a duty to take all reasonable measures to prevent causing *significant harm* to another TWC State or States. “Significant harm” is determined on a case by case basis.

Impact: Changes or effects caused in one place by the use of water in another place. Impacts can occur both within and beyond the jurisdiction of a TWC State. They include both beneficial and adverse changes, and they include all types of possible effects, both physical changes in terms of quantity and quality of water, and social and economic changes. Normally impacts occur downstream as a result of water use upstream, but impacts in the reverse direction are also possible.

In-stream flow: see *environmental needs*.

International law: A system of legal principles and rules of general application dealing with the conduct of States and of international organisations and with their relations *inter se*, as well as with some of their relations with individuals or juridical persons (corporations, other private legal entities).

International water law (International law of water resources): A relatively autonomous part (“branch”) of international law governing relations and conduct of States regarding utilisation, management and protection of transboundary water resources.

Non-consumptive use: Any use of water which differs from *consumptive use* in that it does not alter the quantity of water in the watercourse, but may alter the seasonal or inter-annual patterns of flow or the quality of the water, which may impact on *ecosystem services*. Examples include navigation, hydroelectric power generation, commercial and pleasure fisheries, in-stream and out-of-stream recreation, dispersal and dilution of waste products. Some of these uses may have an element of consumption, such as water losses as a result of evaporation of the impounded water in a reservoir.

Planned Measures: New projects or programmes of a major or minor nature, or any change in existing uses of the waters of a TWC. Under customary international law, a TWC State planning to implement

measures, which may have a significant adverse effect upon other TWC States, must provide them with timely notification.

Pollution: The direct or indirect introduction, as a result of human activity, of substances or heat into the water, land or air, which may be harmful to human health or the quality of aquatic ecosystems or related terrestrial ecosystems, which result in damage to material property, or which impair or interfere with amenities and other legitimate uses of the environment.

Principle of international law: A legally binding rule of a general character establishing certain rights and/or obligations of States and governing their conduct in a particular area of international relations.

Procedural rules of international water law: Legally binding rules of international customary law or an international treaty, which require a TWC State to undertake certain actions aimed at implementing its substantive obligations. Procedural rules establish a range of obligations: from a general duty to cooperate to obligations concerning data and information exchange, prior notification and consultations. One example of the procedural obligation of a TWC State is a duty to enter into consultations with another TWC State concerning a planned measure that may cause significant adverse effects to or within the territory of the latter.

Protocol: One of the different designations (names) of an international legally binding instrument that is governed by international law and has all the characteristics commonly attributed to a treaty. In modern treaty practice protocols are used as subsidiary instruments to amend, supplement or concretise more general international agreements such as “framework” conventions. A protocol may be concluded to deal with a distinct area of interest or for a specific purpose. One example is the SADC Protocols on shared watercourses linked to the SADC Treaty, the framework instrument. Another is the 1999 London Protocol on Water and Health supplementary to the 1992 Helsinki Convention on the Protection and Use of Transboundary Watercourses and International Lakes.

Rights and duties: A *right*, in the context of international water law, is a claim to a share of a resource or a process, which must be honoured by a State which carries a correlative duty to not affect the rights of other States. It is the inherent power to act, a privilege or an interest protected by law. A *duty* requires a certain action or the abstention from an act. A legal *obligation* is synonymous with a legal duty. A legal **entitlement** is synonymous with a legal right.

Reasonable use: A reasonable use may include domestic and municipal uses, irrigation, industrial uses, hydroelectric power generation, navigation, commercial and pleasure fisheries, in-stream and out-of-stream recreation, dispersal and dilution of waste products. A reasonable use is limited by the reasonable use of the other riparians on the watercourse. Conflicts are resolved through an analysis of the relevant economic, hydrologic and legal factors. Factors that affect the determination of reasonable use may

include: purpose of use, suitability to the watercourse or lake, the economic and social value of the use, the extent and amount of harm caused, practicality of avoiding harm, practicality of adjusting all uses to allow for each State's equitable use, the protection of existing values, the justice of requiring the user to bear loss of the use.

Significant harm: The real impairment of a use, established by objective evidence. For harm to be qualified as significant it must not be trivial in nature but it need not rise to the level of being substantial. Significant harm is determined on a case by case basis.

Sources of international law: The various forms of legally binding international rules. The Statute of the International Court of Justice (Art. 38) identifies the following sources of international law, which the Court is to apply in resolving disputes between States:

- international *conventions*, whether general or particular, establishing rules expressly recognised by contesting States;
- *international custom*, as evidence of a general practice accepted as law;
- the general principles of law recognised by civilised nations;
- judicial decisions, and the teachings of the most highly qualified publicists of the various nations, as subsidiary means for the determination of rules of law.

Substantive rules of international water law: Legally binding rules of international customary law or an international treaty that create, define, and regulate rights and duties of TWC States vis-à-vis each other. *Equitable and reasonable utilisation* is a substantive international legal rule.

Transboundary watercourse (TWC): A *watercourse* that extends over the territory of more than one State.

Transboundary watercourse State (TWC State): a State in whose territory part of a transboundary watercourse is situated. *State* in international law is synonymous with nation or country.

Vital human needs: Drinking water sufficient to sustain human life and water required for the production of food in order to prevent starvation. The quantity and quality of water needed to sustain human life. This definition is based on the UN IWC Convention, and is the one used here. In its common usage in the water sector, the term does not include water “for the production of food in order to prevent starvation”.

Watercourse: The system of surface waters and groundwaters constituting by virtue of their physical relationship a unitary whole and normally flowing into a common terminus, such as sea, lake or aquifer (based on the definition under Art. 2 of the UN IWC Convention). The distinction from the hydrological concepts of the *catchment* or *drainage basin* is that the watercourse excludes the land surface where this cannot

be considered to be part of “the system of waters”. Thus a hill slope on which there are no discernible streams or aquifers is not part of the watercourse, but it may be part of the catchment or drainage basin according to the definition of those terms given above. The phrase *common terminus* is used in order to reflect modern hydrological understanding of the complexity of the movement of water. It also is used to eliminate cases where, for example, a canal connects two separate drainage basins; as a matter of common sense and practical judgement, the basin in that case remains separate unitary wholes.

Water services: All services that provide the following facilities for households, public institutions or any other users:

- abstraction, impounding, storage, treatment and distribution of surface water or groundwater; and / or
- waste-water collection and treatment with subsequent discharge into surface or groundwater.

Water use: All *water services* together with any other anthropogenic activity for the purpose of extracting benefits from the water resource utilisation.

2.2 The Legal Audit Scheme and User's Guide

Overview. The Legal Audit Scheme (LAS) provides a framework that allows a TWC State to systematically identify its rights and obligations with respect to a TWC, under all relevant legal instruments and customs. It establishes the legal context, detailing all instruments that may affect existing or planned uses of a TWC. In addition, the LAS will also allow national practice to be benchmarked against relevant international obligations, and where data is available, may also measure compliance by other TWC States on the same TWC. The methodology here is not based on any particular model but reflects a generic approach best suited to assessing the overall legal context.

The Legal Audit Scheme. The Legal Audit Scheme shown in the table below identifies the data that must be collected and analysed. Please note that the list of instruments referred to is not intended to be exhaustive, and that a comprehensive list of all relevant instruments should be prepared as part of the completion of the LAS. The Table below sets forth an inventory of what information a TWC State should collect in order to determine the current status of its legal rights and obligations. It includes a snapshot of the international and national laws that govern shared water resources. Thus, the final column refers to "national compliance" – which is the national legislation in place in support of the international legal obligations. A full explanation and guidance for the completion of the LAS are elaborated in the text following the LAS Table. It is suggested that the completed Table be included in the LAS report as a summary guide to the accompanying explanatory text attached to the relevant section of the Table.

Summary of Legal Audit Scheme

Legal Instrument	Status	Parties	Summary of Relevant Provisions	Effect on TWC State	National Compliance
1.1 Global Instruments					
UN Charter and related instruments			Mandatory jurisdiction of the International Court of Justice?		
1997 UN IWC Convention (International Watercourses Convention)			<ul style="list-style-type: none"> ▪ Scope ▪ Substantive rules ▪ Procedural rules ▪ Institutional mechanisms ▪ Dispute settlement 		<ul style="list-style-type: none"> ▪ Framework for allocation ▪ Framework for Quality Management ▪ Ecosystem protection ▪ Transboundary waters ▪ Governance and Dispute Settlement
Other Relevant Global Agreements, such as: <ul style="list-style-type: none"> ▪ 1971 Ramsar Convention on Wetlands of International Importance ▪ 1972 Convention for the Protection of the World Cultural and Natural Heritage ▪ 1992 Convention on Biological Diversity ▪ 1994 Convention to Combat Desertification 			Provisions relevant to the existing or planned utilisation of a particular TWC		<ul style="list-style-type: none"> ▪ Framework for allocation ▪ Framework for Quality Management ▪ Ecosystem protection ▪ Transboundary waters ▪ Governance and Dispute Settlement

Summary of Legal Audit Scheme (cont'd)

Legal Instrument	Status	Parties	Summary of Relevant Provisions	Effect on TWC State	National Compliance
1.2 Regional or Sub-regional Instruments					
<p>Water Resource-Related Instruments, including:</p> <ul style="list-style-type: none"> ▪ 1992 UN ECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes ▪ 1992 Agreement on Cooperation in the Area of Joint Management, Utilisation and Protection of Interstate Water Resources [Central Asia] ▪ 2000 Revised Protocol on the Shared Watercourses in the Southern African Development Community ▪ EU Directive 2000/60/EC establishing a framework for Community action in the field of water policy 			<ul style="list-style-type: none"> ▪ Scope ▪ Substantive rules ▪ Procedural rules ▪ Institutional mechanisms ▪ Dispute avoidance, settlement, and compliance verification 		<ul style="list-style-type: none"> ▪ Framework for allocation ▪ Framework for Quality Management ▪ Ecosystem protection ▪ Transboundary waters ▪ Governance and Dispute Settlement

Summary of Legal Audit Scheme

Legal Instrument	Status	Parties	Summary of Relevant Provisions	Effect on TWC State	National Compliance
1.2 Regional or Sub-regional Instruments (continued)					
<p>Other Relevant Regional Instruments concerning:</p> <ul style="list-style-type: none"> ▪ Cooperation in environmental matters (general), e.g.: <ul style="list-style-type: none"> ➢ 1974 Nordic Convention on the Protection of the Environment. ▪ Environmental impact assessment, e.g.: <ul style="list-style-type: none"> ➢ 1991 UN ECE Convention on Environmental Impact Assessment in a Transboundary Context; ▪ Prevention of marine pollution from land-based sources, e.g.: <ul style="list-style-type: none"> ➢ 1996 Protocol on Pollution from Land-Based Sources and Activities to the 1995 Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean ▪ Responsibility and liability for environmental damage, e.g. <ul style="list-style-type: none"> ➢ 1993 Council of Europe Convention on Civil Liability for Damage Resulting from Activities Dangerous to the Environment ▪ Public participation, access to environmental information and environmental justice, including: <ul style="list-style-type: none"> ➢ 1998 UN ECE Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters 			Provisions relevant to the existing or planned utilisation of a particular TWC		<ul style="list-style-type: none"> ▪ Framework for allocation ▪ Framework for Quality Management ▪ Ecosystem protection ▪ Transboundary waters ▪ Governance and Dispute Settlement

Legal Instrument	Status	Parties	Summary of Relevant Provisions	Effect on TWC State	National Compliance
1.3 Watercourse or Basin-Specific Instruments					
Specific Watercourse Agreements, for example: <ul style="list-style-type: none"> ▪ 1995 Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin; ▪ 2002 Tripartite Interim Agreement between Mozambique, South Africa and Swaziland for Cooperation on the Protection and Sustainable Utilisation of the Water Resources of the Incomati and Maputo Watercourses 			<ul style="list-style-type: none"> ▪ Scope ▪ Substantive rules ▪ Procedural rules ▪ Institutional mechanisms ▪ Dispute avoidance, settlement, and compliance verification 		<ul style="list-style-type: none"> ▪ Framework for allocation ▪ Framework for Quality Management ▪ Ecosystem protection ▪ Transboundary waters ▪ Governance and Dispute Settlement
1.4 Bilateral Instruments					
Bilateral Watercourse Agreement, for example: <ul style="list-style-type: none"> ▪ 2002 Agreement between Russia and Belarus on Cooperation in the Field of Protection and Rational Use of Transboundary Waters 			<ul style="list-style-type: none"> ▪ Scope ▪ Substantive rules ▪ Procedural rules ▪ Institutional mechanisms ▪ Dispute avoidance, settlement, and compliance verification 		<ul style="list-style-type: none"> ▪ Framework for allocation ▪ Framework for Quality Management ▪ Ecosystem protection ▪ Transboundary waters ▪ Governance and Dispute Settlement
Other Relevant Bilateral Instruments, for example concerning: <ul style="list-style-type: none"> ▪ Boundaries ▪ boundary waters, ▪ friendship and co-operation, ▪ dispute resolution, ▪ environment, ▪ public participation 			<ul style="list-style-type: none"> ▪ Provisions relevant to existing or planned utilisation of a transboundary watercourse 		<ul style="list-style-type: none"> ▪ Framework for allocation ▪ Framework for Quality Management ▪ Ecosystem protection ▪ Transboundary waters ▪ Governance and Dispute Settlement

Legal Instrument	Status	Parties	Summary of Relevant Provisions	Effect on TWC State	National Compliance
1.5 Customary International law					
Including, for example: <ul style="list-style-type: none"> ▪ Duty to Cooperate; ▪ Duty to resolve disputes peacefully 					<ul style="list-style-type: none"> ▪ Framework for allocation ▪ Framework for Quality Management ▪ Ecosystem protection ▪ Transboundary waters ▪ Governance and Dispute Settlement

Legal Audit Scheme (LAS) User's Guide

The Legal Audit Scheme (LAS) seeks to identify all those provisions in relevant legal instruments that may affect existing or planned uses of a TWC. The table has been ordered in such a way as to show the applicable law from the widest perspective to the narrowest, proceeding from global instruments to local regulation. The way each type of legal instrument is treated in the LAS varies according to its origin, and the LAS therefore identifies the appropriate parts of each type that will apply to existing or planned TWC uses.

Legal Instruments – General considerations.

In order to establish the relevance of a particular instrument and assess its impact, the following questions must be addressed, reflecting the columns of the above table:

Types of Legal instruments included. Broadly, all relevant legally binding documents of a normative nature should be included. Under international law this applies primarily to international agreements, which can exist in a variety of different forms: treaty, convention, protocol, charter, statute, etc. A more detailed assessment of the instruments listed in the LAS table is provided below.

Unilateral declarations, binding decisions of international organisations and international judicial or arbitral rulings relevant to a particular TWC or a TWC State should also be reflected, as well as certain non-binding but important instruments such as guidelines, codes of practice, recommendations and standards.

Status. This addresses the issue of whether or not a particular instrument is of any effect in a given TWC State. International legal instruments have full legal effect only when they come into force for that TWC State. The moment of entry into force depends on the nature of the agreement and is determined in the treaty itself or by agreement of the negotiating states:

- *Bilateral agreements* usually enter into force upon signature or upon exchange of the instruments of ratification (if the latter is required by the terms of the instrument).
- *Multilateral agreements* normally require ratification (or approval or accession) by a specified number of States. Consequently, a multilateral treaty ratified by a particular State may still not be in force for that State and other contracting parties.

Please note that the information entered into the “Legal Instrument” column of the LAS should include the following in addition to the name of the instrument:

- the date of signature (conclusion or adoption) of the instrument by TWC States;
- date of ratification (approval, acceptance or accession);
- date of its entry into force i) *generally*; and
 - ii) *specifically* for the TWC State in question.

Parties. With respect to international legal instruments, these are the States that have consented to be bound by a treaty and with respect to which the treaty is in force. The term “party” is normally distinguished from the term “contracting State”, which is usually applied to a State that has consented to be bound by a treaty, even if the treaty has yet to enter into force. There are several ways in which such consent can be expressed. They include: signature; exchange of instruments constituting a treaty; ratification, acceptance, approval or accession; or any other means if so agreed.

Note: The information included in the LAS should include details of the TWC States party to the instrument in question as well as other TWC contracting States for which the instrument is not yet in force.

Summary of relevant provisions should provide an overview of those provisions contained in the relevant legal instruments that affect the use of the shared waters.

Note: The minimum information required must contain a summary of the relevant instrument; where the instrument is not primarily water-resource related, those articles and provisions pertinent to the TWC should be enumerated.

The relevant provisions of international legal instruments should be analysed within the following framework:

- **Scope** (which may also be referred to in documents as “territorial application”) – an important element of any agreement, the scope is generally identified in the first few provisions of an agreement. The scope of an agreement usually determines the geographical (and/or hydrological or hydrographical) limits of its application by defining both the water resources governed by it and those States eligible to participate. It may also define the types of uses or activities regulated by the agreement – for example, in the UN IWC Convention, its scope is defined in Article 2 as being limited to systems of surface waters and groundwaters parts of which are situated in different states, and relates only to non-navigational uses of those waters (Art. 1).
- **Substantive rules** – encompass those provisions of international legal instruments that establish the material rights

and obligations of the parties vis-à-vis each other. The rules determine what the TWC State must do or not do in order to achieve the purpose and objectives of the agreement. International law often distinguishes between “obligations of conduct” and “obligations of result”. The first demands that a State act in conformity with a particular standard of conduct. The second, however, usually requires a State to undertake certain actions in order to realize the aims of an agreement. Obligations of result may also include obligations that prevent the occurrence of a given event. “Framework” international agreements mostly impose obligations of conduct, thus establishing the parameters of lawful, or permissible, behaviour by the parties. Obligations of result on the other hand, are primarily a feature of more specific instruments aimed at achieving concrete goals, such as attaining water quality objectives, eliminating or reducing pollution, and allocating agreed volumes of water or benefits of water utilisation between the parties.

The substantive rules of an agreement may be contained in a dedicated provision, entitled, for example, “General Principles” (as is the case in Art. 3.7 (a), of the 2000 SADC Revised Protocol on Shared Watercourses), but in some cases may be more diffuse. The principal substantive rules of the UN IWC Convention include the fundamental principle of “equitable and reasonable utilisation”, an obligation not to cause significant harm and an obligation to protect international watercourses and their ecosystems.

- **Procedural rules** – These are an essential element of many watercourse agreements. They provide the means through which the substantive rules are implemented. The distinction between the “substantive” and “procedural” obligations is made mostly for analytical purposes to better understand the treaty structure and requirements. This does not mean that “procedural” obligations are less binding than “substantive” obligations. Procedural rules encompass a range of obligations: from a general duty to cooperate, to obligations concerning data and information exchange, prior notification and consultation. The UN IWC Convention provides a model procedural framework, which has been closely followed in recently adopted watercourse agreements.
- **Institutional mechanisms** are a relatively common feature of legal instruments established in order to manage a TWC, and normally involve setting up a body to implement, to varying degrees, a particular instrument. The primary function of such a body is to facilitate cooperation between the TWC States and to coordinate their efforts in developing and managing the TWC but they may also fulfil a number of other roles. These include:

- providing a means of dispute avoidance and resolution;
- collection and exchange of hydrological, technical and other data;
- formulation and co-ordination of water management and protection plans and activities;
- construction, control, maintenance and operation of waterworks;
- control of one or more beneficial uses;
- control of harmful effects;
- regulation of the flow; and
- coordination of emergency measures.

The territorial competence of these institutions will be governed by the terms of the agreement, and will normally relate to the territorial Scope of that instrument.

An institutional mechanism may take the form of a permanent joint body, a joint commission convened on a regular basis, or the instrument may simply require regular meetings of national representatives. The composition, functions and powers of institutional mechanisms vary greatly – it may have merely an advisory or coordinating role, but may also have executive, policy-making, regulatory and dispute settlement functions.

On the basis of the above, the information that should be contained in this section of the LAS should include:

- objective or purpose;
 - nature and composition;
 - form;
 - duration (ad-hoc, permanent);
 - legal status;
 - area of operation;
 - functions and powers; and
 - financial implications.
- **Means of dispute resolution** – Procedures for dispute resolution will be governed either by the terms of general international law, or by the provisions of a particular legal instrument. These set out the procedures that a TWC State must follow, or may invoke, in the event of a dispute with another TWC State or States. Such disputes may include situations where the application or interpretation of the provisions of the instrument is at issue. It should be noted that legal instruments may seek to pre-empt conflict by incorporating dispute avoidance measures, such as consultation.

The means of dispute resolution encompass a range of mechanisms, which the parties use to settle their

disagreements. Article 33 of the UN Charter contains an extensive but not exhaustive list of dispute settlement techniques available to States. They can be divided into two broad categories: diplomatic and legal means. Diplomatic means are those procedures where the parties retain control over the dispute insofar as they may accept or reject a proposed settlement (consultation, negotiation, fact-finding, inquiry, mediation, conciliation). Legal means (adjudication) normally result in legally binding decisions for the parties to the dispute (arbitration and judicial settlement).

It may also be possible to have recourse to regional arrangements and international organisations (such as joint bodies and river commissions) as a means of dispute settlement. However, the legal consequences of any decision taken by the institution will depend on the treaty establishing it.

The dispute resolution procedures may also be compulsory, which can be invoked unilaterally at the request of any party to the dispute, and non-compulsory, which require consent of both parties to the dispute. The UN Watercourses Convention provides for compulsory fact-finding procedure, which bridges the gap between purely diplomatic means, entirely dependent upon the discretion of the parties to the dispute, and binding third-party dispute resolution. It should be noted that compulsory procedure, may not necessarily lead to a binding decision, as is the case with the fact-finding commission which is provided for under the IWC Convention.

- **Means of compliance verification and control.** This consists of a set of rules and procedures aimed at monitoring, assessing and facilitating compliance with international legal instruments. These measures may be taken individually or through special mechanisms (e.g., Meeting of the Parties, joint commissions), and may include reporting procedures and reviews or evaluations of implementation status.

Effect on TWC State.

This section should focus primarily on ascertaining the actual legal, economic and technical implications of a legal instrument for an individual TWC State. It is envisaged that the main emphasis will be on those provisions that either enable a TWC State to exercise certain rights with respect to the utilisation of a TWC, impose constraints and limitations on such utilisation, or provide for other measures aimed at achieving the objectives of the treaty regime. Specifically, this section should identify:

- what implementing national measures (legislative, administrative, financial, technical, scientific) have been or must be undertaken in order to meet the treaty obligations;

- what national authorities or agencies of the TWC State have been or must be made responsible for implementing the treaty obligations as well as expected national measures.

National Compliance.

The “effects” section of the LAS above focuses on the requirements that international legal instruments demand of TWC States, however a TWC State must also be able to assess its actual compliance with those instruments if it is to accurately determine its use in relations to its entitlement. In some cases, it may be possible to identify a specific national instrument designed to implement a particular international legal instrument (for example, the Human Rights Act 1998 in the United Kingdom). In most cases, however, this will not be possible, and TWC States will be compelled to look at a much broader set of national legal instruments and documentation in order to assess overall compliance. For these purposes, national legal instruments include not just codes and legislation, but, in some cases, policy documents, technical guidance from regulatory bodies, agreements between constituent parts of a federal state, and case law. “National custom” is not included here, and will be dealt with in the Relevant Factors Matrix.

It may be helpful to complete this section of the LAS within the following framework (in all cases, the information that should be included is that which has significant relevance to the utilisation and management of the TWC in question):

- Framework for allocation of water use – this will include provisions relating to ownership and entitlement; allocation and reallocation processes; and control and access.
- Framework for quality management – water quality management is influenced by a number of different areas of law and administration, including: pollution control; land use control; the extent of monitoring networks; water conservation measures; and the allocation of institutional responsibilities with respect to regulatory bodies and service providers.
- Ecosystem protection – indications of the extent to which ecosystems are protected will be found in the role that the ecosystem plays in the water use allocation process, and by the degree of water conservation measures implemented. Legislation protecting species and habitat will also have an impact in this area, in addition to the quality management infrastructure mentioned above.
- Transboundary waters – in order for international legal instruments to be implemented at the national level, there must be operational interfaces in place – this will consist of proper

allocation of responsibilities, powers and jurisdiction between relevant bodies along with appropriate incorporation of international obligations in the water use allocation process.

- Governance and Dispute Settlement – this broad category incorporates provisions relating to compliance and enforcement; access to justice; transparency; accountability; and public participation in decision-making processes. The issue of gender imbalances in decision-making processes should also be addressed here (see also the RFM on Social use). As regards dispute settlement, it should be indicated if any sub-national jurisdictions exercise legal control over the TWC.

Key Legal Instruments. The LAS table refers to a number of specific international legal instruments. The section below provides further detail regarding the impact of these instruments, using the classifications adopted in the table. A separate row of the table should be completed for each instrument.

Global (Universal) instruments is a category of international agreements that address issues of common concern for the international community as a whole. They are normally open to participation by all States. These universal agreements may directly or indirectly affect the legal rights and obligations of a TWC State with respect to a TWC.

The following, and possibly other global international instruments may have significant bearing on the nature of the TWC States' rights and obligations vis-à-vis each other with respect to the protection and utilisation of shared freshwaters and related natural resources (biota, land, ecosystems, etc.).

- UN Charter and the Statute of the International Court of Justice - The key information that must be obtained is whether the TWC States and other co-riparians have agreed to the general compulsory jurisdiction of the International Court of Justice, and what reservations are in effect, if any.
- 1997 UN Convention on the Non-Navigational Uses of International Watercourses (signed in New York) is the only universal instrument that establishes a coherent legal framework governing States' activities concerning utilisation of the water resources of international watercourses. Although it is not yet in force, the UN IWC Convention codified certain fundamental rules of the law of international watercourses, which can be considered as *customary rules* of international law binding for all States regardless of their participation in this treaty. Additionally, the fact of its signing or ratification by a particular TWC State is of legal significance for this State.

- 1971 Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar) was adopted for the purpose of the conservation of wetlands and their flora and fauna. The Parties are required to designate suitable wetlands within their territories, which may incorporate static or flowing water of adjacent riparian and coastal zones, for inclusion in the List of Wetlands of International Importance. The Parties are responsible for the conservation and wise use of listed wetlands in their territories and must consult each other about implementing their obligations especially in the case of a wetland extending over the territories of more than one Party or where they share a water system.
- 1972 Convention for the Protection of the World Cultural and Natural Heritage (Paris) has as its primary objective protection of the “natural heritage”, which includes, among other things, natural features, physiographical formations, habitats, natural sites and precisely delineated natural areas of “outstanding universal value”. The parties have a duty to identify, protect, present and transmit the natural heritage to future generations, as well as to endeavour to include its protection in their planning. They are also under an obligation not to take any deliberate measures, which might directly or indirectly damage natural heritage.
- 1992 Convention on Biological Diversity (Rio de Janeiro) is designed to protect and promote “sustainable use” of the earth’s biodiversity, which is defined as variability among living organisms from all sources including *aquatic ecosystems*, and the ecological complexes of which they are part. The Convention reiterates the parties’ “sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction” (Art. 3). The parties have a duty to integrate the conservation and sustainable use of biological diversity into relevant plans and policies (Art. 6); to identify processes and activities which are likely to have significant adverse impacts on the conservation and sustainable use of biodiversity (Art. 7); to ensure *environmental impact assessment* of its proposed projects and activities that are likely to have significant adverse effects on biodiversity, including notification, exchange of information and consultation on such activities (Art. 14); and have a range of obligations in relation to *in situ* conservation, which is one of the most important rules of the Convention (Art. 8).
- 1994 Convention to Combat Desertification (Paris) is aimed at resolving problems associated with desertification and droughts, particularly in the arid, semi-arid and dry humid areas.

“Desertification” is defined as land degradation resulting from various factors, while “combating” it includes activities aimed at:

- (i) prevention or reduction of land degradation;
- (ii) rehabilitation of partly degraded land, and
- (iii) reclamation of desertified land.

The Convention reaffirms the right of the parties to pursue their own developmental and environmental policies and acknowledges the need to take “appropriate action” against desertification and drought. Four annexes to the Convention cover Africa, Latin America and the Caribbean, Asia, and the Northern Mediterranean.

Regional or sub-regional instruments are those international agreements that apply to a certain group of states usually belonging to an identifiable geographical region or part of it. These may include agreements of a general nature, such as international treaties establishing the European Union, the Southern African Development Community, or any other regional economic integration or cooperation framework.

These general instruments may be of relevance to the issue of transboundary water resources. In particular, they may contain provisions establishing obligations in the area of environmental protection, or provide for compulsory means of dispute resolution among and between its parties, thus having an effect on the nature of the parties’ rights and obligations concerning shared TWCs. These instruments have been divided into those specifically related to water resources and those that are otherwise relevant.

Regional water resource-related instruments are those international agreements whose specific purpose is to promote *regional* cooperation in the protection and sustainable and equitable utilisation of transboundary watercourses in a particular geographical area. The following represent some examples of this kind of regional instrument:

- 1992 UN ECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Helsinki) is a ‘framework’ instrument adopted under the auspices of the United Nations Economic Commission for Europe and open to States which are members or have consultative status with the UN ECE, which include mostly European countries and some countries of Central Asia, and the former SU republics. The parties are to take all appropriate measures to prevent, reduce and control transboundary pollution; to use transboundary waters in a “reasonable and equitable” manner which conforms to “ecologically sound and rational water management”; and to

achieve conservation and restoration of ecosystems (Art. 2). Pollution prevention, reduction and control measures should be taken at sources and should not result in transfer of pollution to other sectors of the environment. The parties to the Convention belonging to a specific catchment area or part of it (the “Riparian Parties”) are required to enter into bilateral and multilateral agreements in order to define their mutual relations and conduct regarding the prevention, control and reduction of transboundary impacts.

- 1992 Agreement on Cooperation in the Area of Joint Management, Utilisation and Protection of Interstate Water Resources (Tashkent) is a sub-regional ‘framework’ instrument concluded by the five Central Asian States (former republics of the SU) of the Aral Sea basin. It established general principles of cooperation with regard to the protection and rational use of “interstate” water resources and created an appropriate institutional mechanism.
- 2000 Revised Protocol on the Shared Watercourses in the Southern African Development Community (Windhoek) is a ‘framework’ instrument concluded by the States members of the SADC establishing general principles and rules of conduct regarding protection and utilisation of “shared watercourse systems”, and replaces the original 1995 Protocol. The new instrument is more comprehensive and detailed in terms of its substantive provisions and procedural rules.
- 2000 European Union Water Framework Directive is a binding legal instrument adopted by the European Parliament and the Council for the purpose of protecting inland surface and ground waters, as well as transitional and coastal waters, located either wholly or partly within the area of the European Community. The Directive provides for the creation of river basin districts, which may include international river basins. Where a river basin extends beyond the territory of the EC, its members are to “establish appropriate coordination” with the relevant non-member States, with the aim of achieving the objectives of the Directive.

Other relevant regional instruments – this category primarily includes agreements that deal with matters that may be of relevance to the utilisation and protection of a particular TWC. The subject matter of these instruments may concern, for example:

- *General cooperation in environmental matters* (e.g., 1974 Nordic Convention on the Protection of the Environment, Stockholm)

- *Environmental impact assessment* (e.g., 1991 UN ECE Convention on Environmental Impact Assessment in a Transboundary Context, Espoo)
- *Prevention of marine pollution from land-based sources* (e.g., 1996 Protocol for the Protection of the Mediterranean Sea Against Pollution from Land-Based Sources and Activities, Siracusa, to the 1995 Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean, Barcelona)
- *Responsibility and liability for environmental damage* (e.g., 1993 Council of Europe Convention on Civil Liability for Damage Resulting from Activities Dangerous to the Environment, Lugano)
- *Public participation, access to environmental information and environmental justice* (e.g., 1998 UN ECE Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters, Århus).

Watercourse or basin-specific instruments are those international, usually multilateral, agreements that govern utilisation and/or protection of a specific transboundary watercourse or part of it. Examples include:

- 1978 Treaty for Amazonian Cooperation
- 1994 Convention on Cooperation for the Protection and Sustainable Use of the Danube River
- 1995 Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin
- 1987 Agreement on the Action Plan for the Environmentally Sound Management of the Common Zambezi River System
- 1998 Convention on the Protection of the Rhine
- 2002 Tripartite Interim Agreement between Mozambique, South Africa and Swaziland for Co-Operation on the Protection and Sustainable Utilisation of the Water Resources of the Incomati and Maputo Watercourses

Note: These instruments are of relevance only to States belonging to the respective river basin or part of it. In cases where not all TWC States participate in a particular watercourse-related instrument, the latter may be of relevance to non-parties belonging to the same TWC or part of it, as implementation of the agreement may affect their legal rights with respect to the TWC.

Bilateral Instruments are those agreements that bind only two, usually neighbouring, States. They may include watercourse-related agreements as well as others that may be of relevance to the utilisation of a specific TWC. It should be noted that the list of potential instruments having legal effect with respect to the TWC

State and the TWC in question, should be comprehensively surveyed. The relevant provisions that give rise to rights and obligations under these instruments should be identified and summarised in the LAS.

Bilateral watercourse-related instruments. Examples of bilateral water-related treaties are numerous. Some bilateral agreements may have a “*framework*” character establishing certain general legal rights and obligations, and creating institutional mechanisms of cooperation for transboundary or ‘frontier’ waters (such as the 1956 Treaty between Hungary and Austria Concerning the Regulation of Water Economy Questions in the Frontier Region). A bilateral agreement or a number of agreements may be concluded to:

- govern all transboundary waters shared between the two States (e.g., 1909 Boundary Waters Treaty between USA and Great Britain (Canada); and the 2002 Agreement between Russia and Belarus on Cooperation in the Field of Protection and Rational Use of Transboundary Waters),
- govern an entire TWC (e.g., 1961 Indus Waters Treaty between India and Pakistan),
- govern a section of the TWC (e.g., 1996 Treaty between Bangladesh and India on Sharing of the Ganga/Ganges Waters at Farakka),
- regulate different activities on a specific TWC (such as a series of agreements between France and Switzerland concerning Lake Lemman), or
- to implement certain joint projects (such as the 1977 Treaty between Hungary and Czechoslovakia concerning construction of a system of locks on the Danube).

Note: These instruments are primarily important for the States parties. However, although bilateral agreements do not create legal obligations for any other State, they may be of relevance to other States belonging to the same TWC, as their implementation may affect or have certain bearing on the other States’ activities and legal rights with respect to the TWC.

Secondly, while conducting the Legal Audit of instruments directly relevant to a specific TWC, the State in question must be aware of the terms of similar agreements concluded by it with respect to other TWCs, in order to avoid or be cognizant of potential contradictions between the provisions of the different agreements.

Other relevant bilateral instruments are those non-watercourse related agreements that may contain provisions relevant to the TWC. Treaties of friendship and co-operation may contain compulsory dispute resolution provisions, which may apply to possible disputes concerning a TWC. Some Peace

treaties (such as the 1994 Treaty of Peace between Israel and Jordan) may directly govern interstate relations regarding transboundary waters. Obligations (such as a duty not to cause transboundary harm, non-discrimination, exchange of information, consultations, prior notification) arising under bilateral environmental agreements may have effect on the use of the TWC. Boundary treaties, the primary purpose of which is to delineate interstate boundaries, also deal with the waters that are crossed or constitute an international boundary (for instance, the 1973 Agreement between Czechoslovakia and the USSR on the regime of state frontier and cooperation in frontier questions). Boundary treaties may create institutional mechanisms with jurisdiction over the TWC.

Customary International Law applies in the absence of a specific instrument applicable to a particular TWC. The TWC State has obligations under customary international law if the TWC State is not a party to an instrument that contains provisions that are more specific than the customary international law on the matter. For example, where the TWC State is not a Party to the 1969 Vienna Convention on the Law of Treaties, customary international law of treaties will still apply to any instrument in effect governing the TWC unless the instrument contains specific provisions for the interpretation and termination of the instrument, among other matters. Under international law, the customary rules that apply to TWCs and TWC States are:

- equitable and reasonable utilisation,
- the duty to give notice of a planned measure (use) that may cause significant adverse effects on other TWC States,
- the duty not to cause significant harm to the territory of another TWC State,
- the duty to co-operate,
- the duty to solve disputes peacefully, and
- the customary rules relating to the formation, coming into force, interpretation, and termination of international agreements.

The Legal Audit should make clear which rules of customary international law should, in the opinion of a given TWC State, apply to a particular TWC in the absence of a specific agreement.

2.3 The Relevant Factors Matrix and User's Guide

Overview. The purpose of the Relevant Factors Matrix (RFM) is to provide a framework for collecting and processing the data, which defines and forms the basis of the LAM exercise. The RFM details the range of factors relevant to assessing a TWC State's entitlement to the uses of the waters of a TWC, and specifies the information required with respect to each factor. These factors can then be weighed against each other, according to the importance accorded to each by a TWC State. In determining what is a reasonable and equitable use, all relevant factors are to be considered together and a conclusion reached on the basis of the whole.

The RFM has been designed and developed on the basis of the two principal documents of international law relating to TWCs – the *Helsinki Rules on the Uses of the Waters of International Rivers* (International Law Association, Helsinki, 1966) and the *Convention on the Law of the Non-Navigational Uses of International Watercourses* (UN IWC Convention - United Nations, New York, 1997). However, it differs from both sources in a number of ways. The factors are set out below. They are grouped into six broad categories, each of which contain one or more components. Briefly, the categories are the following:

- **Category 1 (“What?”)** sets out the physical context, covering the physical or natural characteristics of the TWC;
- **Category 2 (“Who?”)** details the population in the area dependent on the TWC;
- **Category 3 (“What Uses?”)** identifies the demands on or the uses of the TWC and the economic and other benefits related to such uses;
- **Category 4 (“What Impacts?”)** identifies the consequences of the uses, both within a nation and the effects of use in one State on others;
- **Category 5 (“What Options?”)** requires consideration of the comparative efficiency of uses and of alternative uses, both in terms of alternative sources of water and broader alternatives that may yield similar benefits; and
- **Category 6** is reserved for additional factors that might be considered to be relevant in a particular situation.

The RFM is structured within the following framework:

- **Column 1** contains the categories listed above and the constituent components of each;
- **Column 2** provides some comments and sets forth very briefly the type of data needed for each category;
- **Column 3** is included to record the sources of the data, the methodologies utilised in gathering the data and the assumptions used in the process. It is also intended to incorporate discussion of the difficulties or problems encountered and the solutions employed to overcome them. These are essential steps in ensuring that the

process is a transparent one in which the determination of each factor is shown to be supported by justified methods.

Along with the matrix, a **User's Guide** is provided in order to explain in more detail:

- the meaning of the terms;
- the data that should be collected and included, and how it should be used; and
- the problems or difficulties that may be encountered and how they might be overcome.

Planning. Providing the answers to all the questions raised in the matrix is a major undertaking. Firstly, it should be noted that the assumption underlying the RFM is that a team of suitably qualified experts will carry out the task of collection and compilation of the relevant information. Secondly, reflecting the fact that TWC States may have differing reasons for undertaking the exercise, it is essential that the purpose and parameters of the exercise should be identified from the outset. It may be that a TWC State wishes to use the information as a basis for negotiations with another basin State; or that it is responding to a request by another TWC State. It may also be the case that there is an agreement governing the use of the relevant TWC in place, and that a TWC State wishes to re-evaluate its rights and obligations under that agreement against the international law benchmark. There may be a focus on a particular issue – for example water quality problems, or water management. Each of these may affect the way that data is collected, and budgetary allocations may mean that more funds are allocated to certain parts of this exercise. The aim must always be to ensure that the best data possible is achieved within the available budget, and this relies on appropriate planning from the outset. The requirements of the Method of Evaluation should also be carefully digested before commencement of the data collection process so that the maximum benefit may be obtained from the process as a whole. Where objective international benchmarks for minimum standards are available, these should be identified at the outset and incorporated in the exercise.

It should be borne in mind that the approach taken here is a unilateral one. The LAM is designed to allow a TWC State to develop its negotiating position with respect to its own entitlement to the resources of a particular TWC. The data collected may be compared against appropriate international benchmarks. In order for a comparison to be made with the positions in other basin states, data from these other TWC States will have to be obtained. Such data may not be readily available, or may be accessible only in abbreviated form, and it may not be possible to assess the rigorousness of the collection process.

It is suggested that the RFM Table be filled in summary form. It will introduce the explanatory text in the RFM section of the LAM report.

The Relevant Factors Matrix. The following Table illustrates the approach that should be taken in completing the RFM, and the structure that should be adopted.

RELEVANT FACTORS MATRIX

Categories and constituent components	Comments & data required to assess each component	Data sources, methodology, assumptions, problems & solutions*	
1. “What?” The physical (natural) characteristics of the TWC	Geographic	Geographical context	
	Hydrographic	Extent of drainage basin or aquifer in the TWC State	
	Hydrological	<ul style="list-style-type: none"> ▪ Mean water availability: <ul style="list-style-type: none"> ○ surface water ○ ground water ▪ Variability of the resources ▪ Water quality ▪ Contribution of water to the TWC by each TWC State ▪ Hydrological aspects of climate change 	
	Climatic	Climate change and potential impacts	
	Ecological / Environmental	Environmental services and goods	
2. “Who?” The population dependent on the TWC	Present population	<ul style="list-style-type: none"> ▪ Populations in the study TWC State and in the other TWC States (generally and within the TWC basin) ▪ Distribution of population ▪ Livestock 	
	Projected population	<ul style="list-style-type: none"> ▪ Growth and migration of population 	
3. “What Uses?” Uses served by the TWC	Existing uses	<ul style="list-style-type: none"> ▪ Uses by sector: consumptive and non-consumptive uses ▪ Assessment of uses 	
	Potential uses	<ul style="list-style-type: none"> ▪ “Natural” or planned? ▪ Identify type of use, and rationale ▪ Have feasibility studies been carried out? ▪ Identify and locate use on TWC ▪ Consumptive or non-consumptive? ▪ How much water will be used? ▪ Seasonal variations? 	
	Extent of “Vital human needs”	<ul style="list-style-type: none"> ▪ Determine quantity / quality required for sanitation, drinking, bathing and cooking ▪ Determine quantity / quality required for subsistence food production 	
	Existing structure of use	Show quantity / quality of use of individual user groups (e.g. industry, agriculture) in statistical format	
	Dependence of the economy on these activities	<ul style="list-style-type: none"> ▪ Population dependent on these economic activities ▪ Share of GDP, tax revenues, employment, foreign exchange earnings 	

RELEVANT FACTORS MATRIX (continued)

Categories and constituent components		Comments & data required to assess each component	Data sources, methodology, assumptions, problems & solutions*
	Social use	<ul style="list-style-type: none"> ▪ Human development index ▪ Customary uses ▪ Gender uses 	
	Ecological/environmental use	<ul style="list-style-type: none"> ▪ Water needed to maintain ecosystem functioning or support recovery of degraded ecosystem ▪ Population dependent on the ecosystem 	
4. “<u>What Impacts?</u>” Effects of a water use on other TWC States	Impacts of existing and potential uses	<ul style="list-style-type: none"> ▪ Types of impacts (beneficial and adverse impacts; transboundary and national effects) ▪ Assessment of physical impacts (changes in physical characteristics - quantity, quality) ▪ Determination of social and economic impacts 	
5. “<u>What Options?</u>” Efficiency of and alternatives to the use of the TWC	Specific (comparative efficiency of use)	<ul style="list-style-type: none"> ▪ Consumptive use (present and projected) ▪ Non-consumptive use 	
	Broad (alternatives to use)	<ul style="list-style-type: none"> ▪ Alternative sources of water for existing or planned uses ▪ Alternatives to using water (which provide similar benefits) 	
6. Other relevant factors			

* Column 3 to be completed by the TWC State during its application of the LAM. This is used to validate the data and identify any problems. Each of the case study country reports completed by China, Mozambique and Palestine in the research project that developed the LAM completed this column. Their work demonstrates the importance of collecting this information.

The RFM User's Guide

These Guidance Notes are provided to assist in the collection and assessment of the data needed for completion of the RFM. For each of the categories, the notes seek to:

- Explain the meaning of the terms used. Some of the generic terms have not been included here, as these may be found in the **Glossary of Terms**.
- Describe the type of data needed for each component, and how the data is to be used. Indications are provided as to the possible sources of the data, the methodologies and assumptions that could be used for assessing the data, and the need for justification of these methodologies and assumptions.
- Identify some of the problems or difficulties that might be encountered, and how they might be resolved.
- Finally, to address relevant legal issues arising with respect to a particular component.

It should be emphasised that these notes can provide only general guidance and recommendations for typical situations. Particular TWCs may demand tailored approaches requiring adaptation and modification of the RFM to reflect the individual characteristics of the TWC. The methodologies selected should follow, as far as possible, internationally recognized standards and practices in the relevant field. The approach taken is to assess each component in turn, providing details of its meaning, the process to be followed in obtaining the relevant data, and finally indicating any potential problems with associated solutions if available. The absence of one of these with regard to a particular component is to be highlighted.

Relevant Factors Matrix

Category One: “What?” – the physical (natural) characteristics of the TWC

Geographic

Meaning: General description of the physical and social geography of a TWC basin.

Process: This should include the following:

- A description of the general situation of the TWC both within the TWC State and in the context of the basin as a whole;
- Details of whether the TWC is comprised of surface water or groundwater, or a combination of the two;
- Details of the location of the TWC State on the TWC - upstream, downstream, or both;
- A description of the TWC within the context of the water balance and availability of the particular TWC State. For instance, it may be one of the most important or the only significant TWC for that State, or it may be of a relatively minor significance because the TWC State has many other sources of water (which themselves may or may not be transboundary).

An example of this may be seen in the case of Palestine. The case study demonstrated that groundwater is almost the only source of water, except for very small quantities obtained through rainwater harvesting.

- A brief general overview of the geography of the TWC in terms of its scale and the abundance or otherwise of water resources, topography, vegetation, land use and population.

Problems and Solutions: No particular problems identified in our case studies.

Legal Issues: How is the watercourse defined in the relevant legal

instruments?

Hydrographic

Meaning: This consists of a description of the extent of the TWC in the territory of each TWC State. The extent of the TWC is taken to be the same as the area of the drainage basin or catchment (see **Glossary of Terms**). It is normally expressed in terms of the proportion of the TWC, in relation to the area of the portion of the basin that occurs in the TWC State.

Process: Measurements can be taken from maps at scales appropriate to the size of the basin.

Surface water:

It is recommended that the area determined by the topographic divide should be used as a standard.

Groundwater:

The extent of the TWC is interpreted to mean the extent of the aquifer, whether confined or not, in each TWC State. Its assessment will depend on the availability of geological and hydrogeological maps or reports and studies of the hydrogeology of the area.

Problems and Solutions: In arid areas the basin boundary as determined from the topographic divide may be substantially larger than the area of land that actually contributes flow, and this can result in very different estimates of basin area. However, the topographic divide should be preferred. Uncertainty in the basin boundary can also arise when the division between basins is in an area of very flat topography. This can usually be resolved by working on larger scale maps for the difficult areas.

In some cases, accurate and large-scale maps, adequate reports, studies or other sources of information may not be available, and this will inevitably limit the level of accuracy possible in assessing the extent of ground water resources. The definition of the extent of the aquifer as used here is also limited by the practicability of its exploitation. For instance, in some areas water bearing strata may be so deep underground that they could not practicably be used to supply water; such areas would not be included as part of the extent of the aquifer.

Legal Issues: The international law of transboundary water resources is generally concerned with the regulation of surface and ground waters themselves, and occasionally the entire

drainage basin area as a whole (see for example, art. 3 of the 1997 UN IWC Convention, where “TWCs” are 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”). However, the broader drainage basin approach may be important insofar as land uses in the basin affect the TWC itself, especially with respect to pollution, and in the context of groundwater regulation. This will be analysed in greater detail in Category 3 (“What Uses?”) below. In the *Palestine Case Study*, the entire recharge and discharge areas of the aquifers were considered, and data were collected covering the entire area, largely corresponding to the drainage basin concept.

Hydrological

Meaning: Hydrology is taken to include both surface water and groundwater. A number of different aspects need to be examined in order to assess this component properly:

- A. Mean water availability (A.1 Surface Water; A.2 Ground water);
- B. Variability of the resources;
- C. Water quality;
- D. Contribution of water to the TWC by each TWC State;
- E. Potential hydrological climate change impacts

Each of these will be examined in greater detail in sub-paragraphs A-E below.

Process: With respect to both surface and ground waters, a wide range of hydrological techniques – modelling and estimation methods – of varying levels of sophistication are available to resolve data problems and derive the estimates needed. This document is not the place to discuss these matters in detail. The most important point to be noted is that the methods selected should be widely recognized as being appropriate to the particular circumstances. The choice of methodology should be justifiable and the methods should be applied in such a way that all the underlying steps can be reproduced and checked by outside observers. The methodology should be outlined in Column 3 of the RFM.

It is imperative that the data used in assessing the availability of water (whether surface or ground) covers as long a period as possible. Care must be taken to ensure that the period used does not reflect flows observed in

abnormally dry or wet periods, as this may result in an inequitable result.

Problems and Solutions: No particular problems identified in our case studies.

Legal Issues: The issue of whether or not a particular modelling and estimation technique adopted by a TWC State is acceptable is both a technical *and* a legal question. In the event that two different models yielding different figures are chosen by the TWC States, an assessment will be made of the merits of the sources, methodology and application of the techniques employed. Column 3 of the Relevant Factors Matrix will highlight potential problems with data.

Case law in the U.S.A. indicates that it may be more important to examine the forecasted / projected “dependable” annual flows, rather than mean annual flows. In hydrological usage, dependable flows are flows which, based on the analysis of historic data, can be expected to occur with a certain defined degree of reliability (or probability) – they may be more relevant than mean flows in cases where the regime is variable or there is little storage. It may be the case that quality considerations will influence the final calculations (see also below regarding variability and quality respectively). It may also be relevant to include details of how monitoring is done in a particular TWC State as these techniques may be compared in order to determine whether they are sufficiently rigorous to be relied upon (*Colorado v. New Mexico*, 1983).

A.1 Mean water availability – surface water

Meaning: These are the long-term mean flows that are derived from the territory of the TWC State itself, as well as any that flow into the TWC State from upstream TWC States or flow out into downstream TWC States.

Process: As far as possible the flow values should be derived from observed data at river flow gauging stations. Quality control procedures should be applied to the data to ensure that they are of adequate accuracy, following recognized procedures such as the World Meteorological Organization guidelines.

The flows should be calculated as monthly values with long-term annual mean figures derived from these. The

mean figures should be based on records that are as long as possible, with 30 years being the generally accepted minimum, although shorter periods may often have to be used.

Water availability normally refers to the natural flow conditions of the basin. In most cases there are alterations to the natural conditions, which are reflected in the observed data, and they may vary during the period of observation. The impact of the various alterations to the natural pattern of flows (for example: dams and diversions of water; return flows from irrigation or other abstractions; canalisation of river channels; changes in land use and vegetation cover in the basin; and climate change) should be assessed as far as this is possible, especially when there have been major changes, and this information should then be used to assess the flows that would have occurred under natural conditions. The impacts are dealt with in detail below, and the information collected there can be applied here. In the Mozambique Case Study, the natural flow was significantly reduced by the operation of dams upstream by South Africa and Swaziland. During dry periods, there was no water flowing in the river to Mozambique.

**Problems
and
Solutions:**

Observation stations are rarely located in such a way as to provide precisely the information needed to determine the flow contribution of an individual country. Estimation procedures will often be required as part of the determination of flows for the required locations.

Estimation procedures may be needed if observations are of short duration such that they are not considered to be representative of long-term average conditions.

Lack of relevant data is a widespread problem, as indicated in the attached case studies. It may be necessary to estimate flows at one location on a main river based on observations at other locations. In addition, there will usually be several smaller parts of the basin for which flows may need to be estimated and with respect to which there are no data. This is particularly a problem when the main river forms the border between two TWC States. In this case there may be a large number of tributaries for which flows have to be estimated with little or no data. It may also be the case, as occurred in the Palestine Case Study, that data collection and verification is impractical due to political problems. In this instance, the best available data were used, with high reliance on secondary (mainly Israeli) sources.

A.2 Mean water availability – groundwater

Meaning: In most cases, mean water availability for groundwater is taken to be the long-term safe yield that may be extracted from the aquifer. The safe yield is the amount of water, which can, on average, be extracted indefinitely without depleting the storage of the aquifer. This is equivalent to the average rate of recharge or replenishment of the aquifer from surface water.

Process: The rate of recharge is often not uniform over the extent of the aquifer. This means, that for a particular territory, the water availability defined by the extent of the aquifer may differ from that defined by the rate of recharge (although the two are the same when the entire aquifer is treated as one), and it may be important to distinguish these two aspects.

Problems and Solutions: Groundwater estimation techniques are generally relatively uncertain, and there may be a shortage of data and mapping on which to base the studies. It may often be necessary to apply a range of different approaches to derive a reasonably robust estimate. In the *Palestine Case Study*, given the multitude of conflicting data available, the data used was derived from the Interim Agreement.

Groundwater can also sometimes be found in confined aquifers (e.g. those that are not part of the “TWC system”, see Glossary of Terms). These do not have any significant recharge, and so they have to be treated separately.

B. Variability of the resources

Meaning: This encompasses seasonal and inter-annual variability.

Surface water:

Seasonal variability can usually be described by the average amount of variation between the wet season and the dry season.

The inter-annual variability is the amount of variation of the annual flows over a long series of data, described, for instance, by the coefficient of variation of annual flows, as well as by the highest and lowest annual flows ever recorded.

Groundwater:

These resources are often treated as invariant with time,

and they are in any case usually much less variable than surface water. However, there are cases where the variation is significant, and this should therefore be assessed in the same way as with surface water.

The variability of the resources is relevant because the greater the variation over time, the less practicable it is to make effective use of the resource.

Process: As previously noted (sub-para. A. above), river flows should be assessed over a long time in series of monthly flows. This should provide sufficient information to describe the variability. Assessment of seasonal variability is an important factor as it may be that TWC States require water for different purposes at different times.

Problems and Solutions: Global warming may have an impact and should be considered.

Regional forecasts should be incorporated into modelling scenarios.

C. Water quality

Meaning: The quality of the water is important since this can determine whether or not water that is physically available can actually be used for a specific purpose. In particular, this may have a significant impact on vital human needs.

Water quality is taken to include the chemical and biological characteristics as well as sediment loads, whether of natural or anthropogenic origin. In the European Union, surface water quality is also taken to include ecological quality. Ground water in the EU context must adhere to chemical and quantitative criteria (EU Water Framework Directive, 2000).

Process: Where direct water quality observations are available these can be used to make an assessment of the status in relation to widely recognized guidelines such as those of the World Health Organization (WHO, 1993-98).

Sometimes water quality for particular reaches or parts of a TWC has been characterised into a number of broad classes, following national or local standards, and this would also provide the information needed. However, in many cases very few data are available.

There may be links between particular pollutants and certain water uses. Identification of the relevant uses and

their respective impacts is dealt with in greater detail below.

Problems and Solutions: In many cases few data on water quality are available. Consideration of the types of industrial installations, irrigation systems and large centres of population near the watercourse, combined with the availability of sewage treatment facilities, could however be used to provide a preliminary indication of the likely water quality status.

Legal Issues: Legally, there is a general consensus that TWC States have a duty to avoid causing significant harm to neighbours as a result of pollution. However, the standard of care to be achieved by TWC States, and the extent of acceptable harm remain open to interpretation based on the facts of each case. The quality of water available to TWC States will influence the question of the dependable supply of useable water, and is inextricably linked to the uses made of the basin, especially upstream. Water quality may also be linked to the measurement of any harm suffered. See for further treatment of this issue.

D. Contribution of water to the TWC by each TWC State

Meaning: Generally the assessment of mean water availability in comparison to the same assessment for all the other TWC States in the basin would be sufficient to describe this.

Process: The most comprehensive way of obtaining this information is by undertaking a basin-wide study, which identifies both the sources and the losses of water across the entire basin.

Problems and Solutions: This assessment is not always entirely straightforward, because the idea of the contribution to the TWC relies on the implicit assumption that the sum of all the individual contributions would be equal to the total resource of the basin. However, this is not necessarily so. Where rivers flow through arid areas or where there are major swamps and wetlands, losses tend to occur, with the result that the total flow at the outlet of the basin could be considerably less than the sum of the contributions. There is no defined technique for dealing with this problem, but its possibility should be borne in mind.

Legal Issues: A TWC State has the right to equitably utilise the resources of the TWC. A TWC State's contribution to the flow of the TWC is not a limitation on its use. Many downstream TWC States do not contribute substantially to

the flow but, nonetheless, have a right to utilise the resources. In the *Mozambique Case Study*, Mozambique contributes 4% of the flow to the Incomati. However, it is almost completely dependent on transboundary waters, which include the Incomati. The factor of contribution is merely one consideration among many. It should be noted that seniority of use does not always mean priority of use.

E. Hydrological aspects of climate change

Meaning: Although often assumed to be so, the physical and natural characteristics of a basin cannot be treated as static. In particular, it is likely that climate change due to global warming will bring about significant changes. This component consists of a description of the future physical or natural characteristics of a TWC as it is predicted under models anticipating the effects of climate change.

Process: Where possible similar approaches should be carried out to assess the potential future water resources situation of the basin. Essentially, this involves linking the outputs from some of the accepted Global Climate Models to hydrological models to produce estimates of river flows under a variety of scenarios.

A number of studies have been carried out examining the impacts of climate change on water resources; see, for instance, the reports of the Intergovernmental Panel on Climate Change (IPCC, 2001).

This is a complex and time-consuming procedure, and furthermore, the results are highly uncertain, tending to indicate a very wide range of possible future conditions for a particular basin. It is hoped that as the models improve, a greater degree of certainty in future hydrological impacts may become available.

Problems and Solutions: Given present knowledge, this exercise will often not provide information that is directly useful to the problem of assessing of equitable and reasonable utilisation. Rather, it must be borne in mind that the evaluation should be considered as a dynamic process that needs to be reviewed and revised at suitable intervals.

Legal Issues: The possible impact of climate change on the physical characteristics of a TWC is likely to mean that the assessment of equitable and reasonable utilisation will change over time.

Climatic

Meaning: The broad climate type for the TWC should be identified, along with the long-term mean monthly rainfall. Potential evaporation rates should also be determined.

Process: Observed data are available almost everywhere to enable this to be done, although data paucity may still be experienced (see guidance above in relation to the case studies). Assessment of the climatic factor does not necessarily require a detailed study of the climate of the area, although climatic variations within individual TWC States may also be pertinent for the evaluation of the efficiency of particular uses within that TWC State. For example, in the U.S.A., in *Nebraska v. Wyoming*, the fact that the aridity and physical environment varied throughout the length of the North Platte River was a powerful factor affecting the extent and nature of the irrigation systems implemented in the relevant states.

Seasonal and inter-annual variability of the precipitation should be identified.

Where long, reliable records are available, trends in climate patterns should be indicated. If there are consistent trends, then these need to be distinguished from other sources of impacts between countries (see impacts below).

Problems and Solutions: No particular problems identified in our case studies.

A. Climate change

Meaning: To identify climate changes predicted through modelling techniques. This information will inform many other factors, including hydrological changes to the TWC (as above), potential population movements and developments (below), and their vital needs (also identified below).

Subject to the problems identified in this table, this will be a pivotal consideration in projecting future uses and impacts (below).

Process: Assessment of climate change currently relies on use of Global Climate Models (see for instance IPCC, 2001).

Problems and Solutions: See above for information regarding the considerations to be taken into account in the interpretation and use of climate change models.

Ecological/Environmental

Meaning: The inclusion of this component is based on the idea that there are environmental goods and services, which are provided by the aquatic and related ecosystems of the TWC.

Wetlands are often treated as the most valuable and relevant of these ecosystems. These consist of a wide variety of types, some examples being: swamps; swamp forests; riverine wetlands; lakes and lake edges; flood plains; mangroves; estuaries; and the near-shore zone.

Process: Ideally a baseline survey and assessment identifying the important aquatic ecosystems and their status would be used to assess the benefits from the environmental goods and services they provide (see “uses” below).

Full studies are not usually available, but in most cases reports, planning studies and government or other agencies hold some information, which would enable an assessment to be done to at least a minimum level. From this outline information, a preliminary idea of the types of benefits derived from environmental goods and services may be obtained.

In order for environmental goods and services to be available, the ecosystems must be maintained at appropriate levels of health, and assessments of the amounts of water required for this are needed. In the more sophisticated approaches now starting to be used in some countries, this entails more than simply using the definition of minimum river flows. It may also include:

- the specification of the seasonal patterns of flow;
- consideration of the requirements in drought years as compared to normal years; and
- the maintenance of floods to conserve wetlands.

However, in the majority of cases there has been no adequate assessment of the amounts of water required. Nevertheless, until such studies become available, it will still be essential to make some allowance for environmental water needs. It may perhaps be possible to

make comparisons with other locations where assessment of environmental flows has been carried out, or to canvass opinion of environmental experts on appropriate values.

In the absence of the above, arbitrary assumptions that a certain percentage of the flow is needed for environmental functioning are sometimes made. The approach should be noted in Column 3. Until better and more widespread studies have been made this will remain a difficult issue for which there are no obvious answers.

**Problems
and
Solutions:**

In cases where baseline studies are available, they provide the information needed. Often, as was the case in all three of the case studies in the research project, no detailed surveys and studies were available, but it is still important to identify these issues. This might consist of only a description of where the important systems are and what they are used for. In cases of degraded ecosystems, increased flows may be required for recovery of the system (e.g. the Colorado River delta in the U.S.).

Relevant Factors Matrix

Category Two: “Who?” – the population dependent on the TWC

Present population

Meaning: Analysis of the current population of a TWC State in a TWC basin. This will also have implications for the uses of the TWC detailed below. The vital needs of this population will be of particular importance in assessing whether or not the TWC State is using an equitable and reasonable share of the TWC resources. In the absence of information to the contrary, it must be assumed for these purposes that the population of a particular TWC basin is reliant on the water from that TWC.

Process: The extent to which the present population can be adequately measured directly from census data depends on how recently the last census was conducted and how closely the administrative units used in the census coincide with the physical boundaries of the basin within the TWC State.

In the likely event that the administrative boundaries do not correspond with the basin itself, there may well be a need to apportion population to the basin from the census count. Where this is done some explanation of the basis for the apportionment should be given. Usually one will start from the smallest unit of aggregation to assemble the population for the basin. Where the most recent census was conducted more than ten years previously some adjustment will need to be made for the natural change in the population over the period. These will be inferred from the birth and death rates given in the most recent census or other estimates. In the *China Case Study*, statistical yearbook figures for basin counties were used to give approximate basin figures, but disparities between administrative and basin boundaries meant that accurate basin-specific statistics could not be obtained.

Problems and Solutions: Most problems arise through the imperfections of census data. Where a census has been held recently and there is reason to be confident of the data provided, there are a variety of techniques to reconcile the data with the need to estimate the population of the basin and its distribution. Where the data is older and less reliable, the initial task will be to try to update the census information to provide higher quality estimates, before these can be reconciled

with the basin.

Projected population

Meaning: Predicting population densities and locations (usually ten and twenty years forward).

Process: This will be to a large extent dependent upon a number of elements, for example:

- Projected climate change, and correlative effects on the location of industry, agriculture and water availability (as above);
- Historical birth and death rates as shown in recent censuses. It may be necessary to allow for increases or decreases in these rates, depending on historical trends and on projections of how they might change over time due to changing social and economic conditions (e.g., lower birth rates found as societies become more industrialised and achieve improved standards of living);
- Government development plans for the region. Proposed developments necessitating large population increases should be identified if the development will have a disproportionate effect on the use of available water resources; and
- Events that have one-off impacts on population levels, along with reactions to these events. For example, in Mozambique, the war caused both displacement and resettlement of parts of the population, and in some cases, significant local fatalities. Additionally, the impact of AIDS on population projections must be taken into account in many countries.

A particular complication will result from population migration. Areas where the economy is relatively successful will tend to receive additional migrants, whereas populations in depressed areas tend to be affected by emigration. Estimates of migration will influence estimates of projected populations and the basis of the estimates should be explained in Column 3.

Problems and Solutions: Predictions of these types are complex – with regard to migration, for example, it may be that this occurs as a result of a planned government development, in which

case is predictable to a large extent. However, it may also be the case that migration follows water, where the hydrology has shifted as a result of climate change or over-use. Estimates should always be justified, and assumptions noted in Column 3 to allow transparent analysis.

Relevant Factors Matrix

Category Three: “What Uses” – Uses served by the TWC

Meaning: This factor identifies the demands on or the uses of the TWC, and the economic and other benefits that flow from the uses.

Process: The first step is to identify the uses themselves, both existing and potential, and then to consider the benefits derived from them. The existing and potential uses are the first two components, but certain types of use – meeting “vital human needs”, social use, and ecological or environmental use – are considered as special uses and are also treated individually.

The different variables assessed in this component include:

- A. Existing Uses (A.1 Existing uses by sector – consumptive and non-consumptive; A.2 Assessment of existing uses);
- B. Potential Uses;
- C. Extent of Vital Human Needs;
- D. Existing Structure of Use;
- E. Dependency of the Economy;
- F. Social Use;
- G. Ecological/Environmental Use.

Problems and Solutions: Uses of the water from the TWC might take place away from the river basin and these uses need to be included in the identified uses. In other cases the water might provide services whose greatest value lies away from the place of use. An example of the latter is the use of the river for transportation, where the main benefits might be located upstream and downstream. It is important in this section that all such uses are identified and included in the inventory.

Legal Issues: The uses to which water resources from a TWC are put to are crucial in determining whether a TWC State is utilizing the resource equitably and reasonably. An inventory of uses must therefore be prepared. No single use has preference over another, but will be examined in light of the other components in the RFM. However, as is shown in below, vital human needs must be given special regard, as for example under the UN IWC Convention.

A. Existing uses

Meaning: Each water use in each sector should be identified, and the locations of the uses should be determined. Generally, country-wide totals for particular uses are not sufficient. Rather, the locations of particular uses need to be defined in relation to the geography and hydrology of the TWC basin. This is because the benefits and the impacts of uses vary depending on the setting in which they occur.

Process: A fundamental distinction must be made here between actual uses, and rights to use. Only actual uses are appropriate for consideration, even though a particular industrial or agricultural user, for example, has the right to use more but has either not taken advantage of the full entitlement, or has failed to use the full entitlement for a number of years. Actual uses must be **beneficial uses** (see Glossary of Terms), if they are to be considered for the purposes of this component. For planning purposes both “wet” and “paper” water may be relevant and should be considered.

TWC States should identify existing uses from the outset. A decision will have to be made as to which developments have reached such an advanced stage of planning that they cannot be regarded as potential developments; these should be included as existing uses. This determination will also assess which uses can no longer be regarded as existing uses as a result of disuse. The difference between existing uses and potential uses, and the potential relationship between the two, should be noted.

It is important to separate the inventory of uses from their valuation. The inventory of uses is a factual list, which should be complete, accurate and unambiguous. It is also desirable that the physical location of each use is identified since in some cases it will be necessary to compare this with the hydrological data to understand the structure of uses that are being supported by the watercourse.

Problems and Solutions: No particular problems identified in our case studies.

A.1 Existing uses by sector: consumptive and non-consumptive uses

Meaning: Uses should be determined according to the main economic sectors.

Process: The following sectoral uses should be considered as a basis:

- Domestic;
- Agriculture (irrigation and livestock);
- Industry,
- Hydro power, and
- Navigation.

Others should be added as needed.

Further sub-categories within these sectors may also be useful, for example: aquaculture, tourism, recreation, and wildlife use (in game parks).

Many of the uses mentioned above are generally considered as **consumptive** uses. It is important that **non-consumptive** uses are also included.

These two categories are not always totally distinct. For instance, consumptive uses are often taken to be the gross water requirements necessary for a particular purpose, but some of the water that is abstracted may in fact be returned to the TWC. This is the case, for example, in many industrial processes and in domestic supplies in which consumers are connected to a water-borne sewage system. In such cases, that portion of the water that is actually consumed must be distinguished from the return flows.

Conversely, hydroelectric power generation is usually considered as a non-consumptive use, but in cases where storage is provided to regulate the flow, there may be a loss of water through evaporation. Thus, there may be an element of a consumptive use associated with power generation, which is otherwise non-consumptive. As a consequence of this grey area between **consumptive** and **non-consumptive** uses, return flows should as far as possible be indicated, along with relevant rates of return, both quantity and quality, so that genuine consumption rates can be ascertained.

Problems and Solutions: No particular problems identified in our case studies.

A.2 Assessment of existing uses

Meaning: Existing use must be determined not only in terms of the benefits or products, but more particularly, in terms of the quantities of water required for each use.

Process: As a first step, the gross quantities need to be estimated in terms of average annual amounts. It is also necessary to determine the seasonal patterns and inter-annual variation in use in the same way as for the hydrological component of the RFM. For uses that are entirely non-consumptive, it is not the quantity of water to be abstracted that is significant, but the seasonal pattern of the quantities that should remain in the river that must be assessed. This will be of particular importance with respect to uses such as navigation, aquaculture and recreation.

In some cases there may be measured data on the quantities of use, or such data may be found in a variety of planning and operational reports. However in the likely absence of such data, the amounts of water will have to be estimated in a more indirect way. This may be illustrated by examining the major user groups:

Domestic consumption:

This may be determined by combining information on population in specific locations with estimates of per capita consumption and losses in delivery of the water. Per capita domestic consumption may be determined from surveys, which relate water use to socio-economic status or other factors, and surveys may also be available of typical percentage losses in the supply system.

Irrigation:

In many countries irrigation is the major consumptive use. Where the quantities of water used are not systematically recorded, estimations can be based on data relating to the types and areas of the different crops grown, the planting cycles employed, the means of transmission of water, and the irrigation techniques applied. Standard techniques can then be followed to determine the water use of particular crops given the location of the area: see for instance, Doorenbos and Pruitt (1977). Estimating the losses in transmission and application of the water requires a deeper knowledge of the particular irrigation system being considered.

Industrial Use:

Significant individual users of water such as electric power generation and paper mills or textile mills should be identified and volume of use measured. In some cases

water may be returned to the system after use (for example, for cooling). In such cases, the consumptive use element should be differentiated from the non-consumptive use, and any changes in water quality resulting from the return flows should be measured. This will usually require the collection of point source data from the plant. Where this is not available (or not collected) it may be inferred from similar plants of similar size in other locations. Many countries will have industrial census data that will identify the location of major industrial users. Alternatively, this data may be held by the local administrative unit, which deals with economic development.

Details of storage uses should also be provided. This will have a significant impact on the mean water availability, and it may be the case that certain uses are only possible as a result of such storage. Efforts should be made to show losses through storage, as evaporation rates which are deemed to be excessive may be regarded as a factor in establishing whether a use is equitable and reasonable.

**Problems
and
Solutions:**

Where no suitable surveys have been done with regard to domestic water consumption, a possible approach is to make comparisons to other areas or communities of a similar character for which such data do exist. Similarly, a comparative approach may be adopted with respect to irrigation consumption rates when data are inadequate. The methodology used should be noted in Column 3.

B. Potential uses

Meaning: Potential use must be determined in terms of the projected benefits, and the quantities of water required for each use.

Process: The considerations discussed above for the determination of existing uses apply equally to potential uses.

Very broadly, there are two types of potential use:

- those that result from “natural” or inevitable growth (due to population increase, for instance); and
- those that are due to planned developments, such as dams or large-scale irrigation or industrial expansion.

The consideration of potential uses should always distinguish between these two. It should be noted however, that as international law places a duty upon TWC States to cooperate, intimation of both types of development should be made to other TWC States.

For planned measures, however, a key additional point is to decide which developments should and which should not be considered as potential uses.

In most countries plans for industrial and economic expansion exist at a variety of levels. Plans can be of a range of types; some may be very specific and detailed, while at the other extreme, they may not amount to more than a general objective, for example industrial expansion. The process by which development projects finally become reality almost always pass through a series of phases:

- First, there are pre-feasibility or project identification studies in which a wide range of options are considered and ranked at a preliminary level.
- Secondly, feasibility studies are carried out in which the identified projects are subject to full analyses of all the relevant variables, including not only technical feasibility but also examination of the socio-economic, environmental and financial implications (thus, a large-scale irrigation development would have to consider not only the availability of adequate water supplies and land suitability, but also the availability of labour, markets for the produce and land tenure, among many other aspects).
- Lastly, when a project has been shown to be feasible at this second level it then proceeds to detailed engineering design, construction and finally operation.

It is proposed that potential uses should only be included if they relate to developments which have been accepted as feasible i.e., a feasibility study has been undertaken and the results accepted. This is taken to mean that these potential uses are genuinely intended to be carried out. The level of the project development has legal implications: a feasible project accepted for construction will be carried out. A possible project, or an optional project, does not have the same legal standing. Optional projects will not constitute part of a TWC State's entitlement. Such uses should not be included in this section as they may distort the determination of equitable and reasonable use – or the true extent of a TWC State's entitlement.

The potential uses included here may compete with or be complementary to other potential uses in other geographic

areas within the TWC State. In some cases it would be helpful to have an assessment as to how these planned developments, taken to the feasibility stage as discussed above, relate to developments in other areas. This would give an additional insight into the likelihood or realism of these proposals.

For example, the feasibility of an additional power station (either hydroelectric or thermal) might be considered, but whether or not the power station is built will depend upon the demand for additional electricity supplies being realised. This additional demand for electricity might arise from industrial or other developments taking place within another area of the country and should not be confined just to the river basin under investigation. This assessment of alternatives is examined in greater detail in the section on impacts below.

**Problems
and
Solutions:**

In some countries the planning process may be more opaque and the distinction between projects that have been formally taken through a feasibility study process and those that have not may be less explicit. In such cases there may have to be some flexibility in accepting projects that have been clearly identified, even if they have not been subject to a formal feasibility study. This will rarely affect major single uses but may be true for smaller projects and activities.

Legal Issues:

At this juncture it is essential to point out that existing uses may have an implied priority over potential uses. The relative importance attached to both in international law is uncertain, but analogous U.S. cases show that established uses are usually treated preferentially because “the harm that may result from disrupting established uses is typically certain and immediate, whereas the potential benefits from a proposed diversion may be speculative and remote” (*Colorado v. New Mexico* 1983, 547). It is important to note, however, that U.S. law does not always adopt state water law as the basis for equitable apportionment. By analogy, this may mean that a TWC State’s municipal (internal) law will have not role in an entitlement determination.

It may be the case that potential uses of the type indicated above, which have passed the ‘feasibility’ stage, are affected by an equitable allocation, although financial compensation may be made as a result. In *Connecticut v. Massachusetts*, a power station which was due to be built downstream could only go ahead on a reduced basis as a result of the Court’s apportionment determination. In order

to maintain the equitability of the decision, the upstream state was required to pay proportional compensation in the event that the smaller plant was actually built. The compensation in this case performs the function of achieving equitable and reasonable utilisation for both parties, such as “to provide the maximum benefit to each basin State from the uses of the waters with the minimum detriment to each” (Commentary to Art. 4 of the ILA 1966 Helsinki Rules).

C. Extent of “Vital human needs”

Meaning: Although varying definitions of the term “vital human needs” have been suggested, the meaning given to it here includes water sufficient to sustain human life and water required for the production of food in order to prevent starvation (see **Glossary of Terms**). This is slightly broader than the definition provided in the General Comment on the Right to Water: “the water supply for each person must be sufficient and continuous for personal and domestic uses”, whereby “personal and domestic uses” include drinking, personal sanitation, washing of clothes, food preparation, personal and household hygiene.

Process: The amount of water necessary to satisfy vital human needs may vary depending on the climatic and physical characteristics of the TWC basin and the social and economic conditions in the TWC State. The minimum basic water requirement (the minimum threshold for personal use) has been generally estimated within the range from 50 litres per person per day (l/p/d) (Gleick, 1996) to 100 l/p/d (Falkenmark and Widstrand, 1992). The basic water requirement includes water need for drinking (5 l/p/d), sanitation (20-30 l/p/d), bathing (15-30 l/p/d), and cooking and kitchen (10-30 l/p/d).

The *Palastine Case Study* demonstrated that at present purely domestic use in Israel is 290 l/p/d. According to the Study estimates, this is a much-exaggerated per capita need, and 125 l/p/d for both Israelis and Palestinians seemed to be a more realistic figure.

As a general rule, the figure 50-100 l/p/d (depending on the climatic and social conditions in the TWC State) should be used, with an additional allowance for the water needed for the “production of food in order to prevent starvation.” This will be relevant in rural areas where the population are dependent on subsistence agriculture and where there is insufficient rainfall to grow the crops without irrigation.

For these cases, a certain minimum amount of food requirement per person should be determined. The irrigation water requirement for these crops should be assessed in the same ways as discussed above (under existing uses). On the other hand, in areas where rainfall is sufficient and food crops can be obtained from rain fed agriculture the per capita demand to satisfy *vital human needs* is expected to be lower.

A comparable assessment would have to be made for areas where people are dependent on livestock rather than crops for their basic subsistence.

Qualitative aspects of the water supplied must also be taken into account. The quality of the water must be “free from micro-organisms, chemical substances and radiological hazards that constitute a threat to a person’s health” (General Comment, 2002).

An important proviso to bear in mind is that per capita figures will only provide a basic indication of the quantity of water required to meet *vital human needs*. The actual amount of water of sufficient quantity and quality required may vary depending on variables such as climatic conditions and access to resources. Moreover, precise per capita figures will be difficult to determine in areas where migration is a normal and persistent aspect of life, and population numbers therefore vary from year to year. It should also be borne in mind that the vital human needs of particular groups within a basin population may not be satisfied – this may apply especially to women and indigenous groups (see social uses, below).

Problems and Solutions:

In some instances current uses for pure domestic purposes either exceed the vital human needs (in the case of Israel 290 l/p/d) or is much less (as in the case of Palestine, 50-70 l/p/d). In the *Palestine Case Study* it is recommended that as both the Israelis and Palestinians live under the same conditions, their vital human needs should be considered to be the same. A proposal of 125 l/p/d was used as a suggested reasonable standard in that case study.

D. Existing structure of use

Meaning: The purpose of this section is to identify the structure of uses and to relate these uses to their economic and social consequences.

Process: The difference between the information presented above

and that given here is in the way the information is presented and subsequently used.

Here the information should be presented in a format similar to the way in which the national accounts are assembled, using the broad categories described in the tables for Gross Domestic Product.

There is an established United Nations format for this that is widely followed, although some national offices of statistics may have minor local variations. These are unlikely to be significant in the present exercise and so national practice can be followed for convenience. Statistics for the consumption (use) of water should be related to the economic categories of use, using the smallest level of aggregation available. This will identify actual use of agriculture, industry, public utilities, etc. The ability to do this accurately will be constrained by the availability of information. Precise information will usually be available for major users but inferences will need to be made for smaller users. The input for the table should identify whether the data results from direct measurement or from a process of estimation. Where it is estimated the basis for the estimate should be given in Column 3.

E. Dependence of the economy on these activities

- Meaning:** This component aims to identify the contribution of the uses identified above to the economy and society of a TWC State.
- Process:** This will normally be achieved by using as many of the following measures as possible:
- The contribution to gross national product from each identified use;
 - The contribution to export earnings from each identified use;
 - The contribution to tax revenues (both national and local) from each identified use; and
 - The contribution to employment from each identified use.
- Problems and Solutions:** Historical data should be used, if available, to indicate how, and in which sectors, changes have taken place. This may be connected to external factors that have a bearing on determining equitable and reasonable use. For example, in the *Palestine Case Study*, a fall in the contribution of the agriculture sector is linked to restrictions

in well licensing by Israel.

F. Social use

Meaning: Uses that may not have statistically identified direct economic benefit are indicated in this component.

Process: This will include such indicators for the TWC State concerned as:

- Gender use. This will be closely linked with the issue of governance addressed in the LAS (see above), and could be used to assess the importance of gender as it relates to water use. For example, it may be the case that water and land allocation mechanisms, or water management decision-making processes, disenfranchise women.

This component is likely to be useful primarily in a comparative context, but may include such indicators as:

- Human Development Index
- Life expectancy

Problems and Solutions: Indicators such as this may exist only at the national level, or the administrative areas covered are not easily compatible with the basin boundaries. Similar techniques as are recommended with respect to determining the dependent population (above) should be utilised in estimating the figures that apply with respect to the particular TWC. It may also be possible that no such data is available, as in the China Case Study.

G. Ecological/environmental use

Meaning: Ecological or environmental use is regarded as a special class of use beyond the in-stream flow requirements required to maintain the watercourse. As a separate element in this factor, it can be defined as the water needed to provide the ecological and environmental services catalogued above, and to maintain the TWC ecosystems at an appropriate level.

Process: The beneficial products and functions may include:

- building materials and food;
- grazing for wildlife and stock;
- habitat for the breeding and growth of fish and

- waterfowl;
- importance for biodiversity and habitat for endangered species;
- major role in improving water quality by retaining sediment, nutrients and toxic compounds;
- flood amelioration;
- climate stabilisation;
- tourism and leisure opportunities;
- landscape value; and
- cultural significance.

These needs may be seasonal (e.g. fish require certain flows at certain times to survive) and may not always be required every year.

The ecological and environmental services that are derived from water use will need to be valued to enable them to be compared with other uses for benefits that derive from the use. The valuation of ecological and environmental services is especially difficult and sometimes controversial. Nevertheless, if the whole range of uses is to be compared on some consistent basis some a monetary value should be assigned to the ecological and environmental services.

There is the further consideration that ecological and environmental services will contribute both directly and indirectly to the livelihoods of some individuals. Much of the literature is directed towards the valuation of environmental damage rather than the valuation of environmental benefits, however there are some methodologies proposed that might be used to solve this problem, such as contingent valuation, which is widely used in the USA. (See Pearce and Moran, 1994; Pearce and Turner, 1990).

**Problems
and
Solutions:**

There is clearly a difference of view with respect to the desirability of attributing monetary values to ecological and environmental services, although these services need to be weighed along with other factors. Recent developments in ecological economics have suggested a variety of approaches to these problems, although the solutions remain controversial. This does suggest that alternatives to cost-benefit analysis should be considered, especially in cases where ecological and environmental services are especially important.

Legal Issues:

It is important that a methodology for the valuation is chosen and explained carefully and that it is consistent with the method assessing the net benefits of other uses of

water. In the legal arena, moves have been made in a number of States, for example in South Africa and in the European Union, to protect aquatic ecosystems by maintaining an environmental reserve or demanding that ecological targets are met, irrespective of the “values” of the ecological services.

Relevant Factors Matrix

Category Four: “What Impacts?” – effects of water use on other TWC States

Impacts of existing and potential uses

Meaning: Impact is the effect, either positive or negative, which a use of the waters of the TWC has on the other uses or the TWC itself.

This factor is discussed in three broad categories:

- A. Types of impacts;
- B. Assessment of physical impacts; and
- C. Determination of social and economic impacts.

Process: Primarily the focus should be on determining the *transboundary impact*, that is, the effect that a use or uses in one TWC State have on the other TWC States in the basin. However, certain consideration should also be given to impacts within national boundaries. The impacts of both existing and potential uses must be examined, and there should be a clear distinction between the two. The impacts of potential uses should be explicitly identified and separated from the impacts of the existing uses. The evidence of actual harm or beneficial effects should be clear and convincing. It is essential that the projected impacts of potential uses be shown to be *likely rather than merely speculative*.

A. Types of impacts

Meaning: There is a need to assess a variety of impacts. There may be direct impacts on the physical environment, the economic situation, along with social consequences. There may also be indirect or secondary impacts on each of these elements. These will arise from both existing and potential uses. All of these must be clearly identified and measured as far as possible.

Process: Firstly, the changes, in terms of quantity and quality, in the physical characteristics of the TWC should be examined. Following this, the economic and social impacts deriving from these changes must be assessed. Looking at the physical characteristics, changes in the following factors are relevant:

- quantity and depth of water;

- flow regime: that is, the patterns of seasonal and inter-annual variation;
- occurrence of floods and droughts (naturally caused impact);
- water quality and sediment load;
- biodiversity;
- ecological and environmental goods and services;
- aquatic weeds;
- fish breeding and productivity.

Not all of these may be significant in every case, and there may be other aspects not on the list, which should be included. Normally, changes upstream have impacts downstream, but it should be remembered that the reverse is also possible. For instance, the backwater from dams causes an upstream change, and dams may block the movement of migratory fish.

Secondly, each of the impacts from existing and potential uses will also have economic, social and demographic consequences. These will arise from changes in the pattern of economic activity, which will in turn affect the standard of living, poverty, and the distribution of and changes in population.

Each of these variables are discussed further below.

B. Assessment of physical impacts

Meaning: This component assesses the physical effects of particular uses on the physical geography of another TWC, and on their impact on other uses of that TWC, whether human, economic, environmental or social.

Process: In some small basins it may sometimes be sufficient to assess the impacts through a simple study. However, in many cases a modelling study requiring a substantial amount of information will be needed. The scale of the study will depend on the impacts being assessed. If they are limited to only hydrological changes – as might be needed, for example, if the impact of an upstream dam on the water availability downstream were in question – then standard hydrological modelling tools can be applied. This becomes more demanding and requires more data (which may not always be available) as basin size increases. If, on the other hand, it is necessary to determine the impacts of flow regime changes and pollution on downstream ecosystems or fish yields, more complex studies will be required, and the tools needed to perform them might have to be specially developed.

The consideration of impacts is complicated by the fact that the observed data may reflect the influence of existing impacts rather than the natural situation, and the impacts may not have been constant over the period of data observation (See above in relation to natural flow).

In this situation, modelling studies would be needed to first assess the natural conditions in the basin (the baseline condition). Examination of the existing and potential impacts, in order to estimate the variation from the baseline, can then be attempted. A similar problem is presented by the presence of trends in climate (and consequently in water resources) during the period of data observation, and it is important that these effects are identified and distinguished from other sources of impact.

**Problems
and
Solutions:**

No particular problems identified in the case studies.

Legal Issues:

Normally, the types of changes resulting in impacts that should be considered with respect to the utilisation of a TWC are development projects such as dams and diversions. However, a further complication is that changes in land use (for example, deforestation, terracing, urbanisation) have impacts on water resources, and in some cases the effects could be significant. The extent of such impacts is not fully known; they are difficult to determine to any degree of certainty.

If the terms of the UN IWC Convention are applied literally, such impacts do not have to be considered, as they do not directly result from the uses of the TWC itself. However, the provisions relating to water quality discussed above concerning the general duty to prevent significant harm to other TWC States should be kept in mind. It can be envisaged that major changes in land use might, in certain circumstances, be thought to have significant impacts, and these could become a point of dispute between TWC States.

The standard of *significant harm* is similar to the “substantial injury” approach adopted in the 1966 ILA Helsinki Rules. This does not necessarily mean that levels of harm below this level must be tolerated. It may be, for example, that a number of sectors are harmed in a minor way by a particular upstream development, but that if the cumulative effects are assessed, significant harm is seen to be suffered. This was illustrated in the U.S. case, *New*

Jersey v. New York. It is essential that injury is actual rather than potential.

Whether an injury is of sufficient magnitude to have legal implications will be assessed on the basis of the other factors in the RFM – In such a case possible compensation by the TWC State to the affected TWC State might restore the equitable and reasonable balance.

C. Determination of social and economic impacts

Meaning: Determination of social and economic impacts will be measured through changes in the pattern of economic activity and the consequential impact on society in terms of the standard of living of the supported population. It should be noted that populations often migrate in response to relative changes in economic conditions and these demographic movements will also need to be recorded (see above).

Process: These impacts may be of two broad types:

- First, a use of the water upstream may deny access to downstream users of the water. This may simply be a denial of a quantity of water (either permanently or temporarily) or it may be a change in the quality of water. A specific but simple example of this kind of impact would be a downstream reduction in fish catch resulting from either diminished volume or quality of water. Industrial uses might also be impeded if water quantity or quality falls.
- Second, water may or may not be transferable between TWCs but economic activity may be transferred. For example, if water was being used for power generation, it may be possible for that power station to close but an electricity supply to be maintained through the construction of a new power station. This might be in the same location but using different technology or in a different location using the same technology and transferring the electric power by cable. If the outcome is to move the power station to a new location, it will reduce employment and economic activity at the original location and transfer it to the new location. This transfer of incomes and employment will have an impact on relative economic activity, reducing it at one location and increasing it at the other. This issue will be discussed further below.

Problems The task here is to identify and quantify the changes that

**and
Solutions:**

arise from the changes in the pattern of use. As described in the examples, the aim is to measure the economic consequences of particular patterns of use in terms of providing, food, employment, incomes, etc. These will then have secondary effects in the ability to sustain populations and or affect the level of well-being of those populations. It is important to be able to identify and measure these secondary impacts.

In some cases the loss of economic activity will make it difficult for populations in that location to remain viable. In other cases the additional economic activity will improve economic and social conditions. There are a number of issues here that relate to existing policies affecting the water sector, which might introduce distortions into prices, costs and other information for analysis. These include the existence of subsidies and/or technologies to encourage or force conservation of water. Water pricing measures, such as marginal cost pricing, which are based on criteria other than market-based prices will also need to be accounted for accurately. It is important that the existence of such policies is recorded and, where possible, full and appropriate account is taken of their existence.

Relevant Factors Matrix

Category Five: “What Options?” – efficiency of and alternatives to the use of TWC

Specific (comparative efficiency of use)

- Meaning:** Completion of the preceding sections will have identified uses of the TWC that produce various outcomes in terms of goods and services: agricultural output and foodstuffs; industrial goods such as paper and textiles; and utility services such as power generation, and water supply. Most of these goods and services could be produced at other locations and the resulting products imported into the TWC basin to meet the needs of the population. In this context it is necessary to consider where the most efficient location to produce these goods and services is located.
- Process:** It may be a better use of the scarce water resources to shift the economic activity to another geographic location, where it will rely on water from another source. The economic goods and services delivered from the use of the water would then be imported. This evaluation requires information about the costs (financial, environmental and social) of producing the goods and services at all feasible geographic locations.
- It may also be the case that water for existing uses can be found in other locations and brought to the location. An obvious example would be the import of water for drinking and personal use, which could be available from bottled or piped sources. Examination of the feasibility of such schemes requires information on the alternative scenarios.
- Problems and Solutions:** The major difficulty here will be to identify the specific alternative locations and activities. It is probably necessary to restrict the examination to cases which have already been identified and where feasibility studies have been conducted. Otherwise the costs of collecting the necessary information are likely to be prohibitive.
- Legal Issues:** Alternative sources of water will be an important factor in law, as this will have a direct bearing on the question of whether or not injury has actually taken place (see “impacts” above for further information on the importance of actual harm). With regard to potential development, it will also be taken into consideration when assessing whether or not a proposed development is the best option

available.

Broad (alternatives to use)

- Meaning:** This section should identify possible general activities that would result in changed patterns of water usage (usually with the objective of reducing consumption). Initial ideas here would be wide ranging and not valued. For example, it may be possible to switch power generation from thermal or hydro to gas, or to re-locate the power plants to a different location.
- Process:** The information envisaged as needing to be included under this heading would normally be found in any general 5 or 10 year plan for economic development (either regional or national).
- Problems and Solutions:** Again this will need to be restricted to tangible examples that have been objectively considered in the context of the planning process. Consideration may have been given to suitable locations for future economic development – power generation, industry, residential housing, agriculture, etc. it is necessary to relate any such developments to their impacts on water use. Economic activity is sometimes relatively more mobile than water availability.

Relevant Factors Matrix

Category Six: Other Relevant Factors

This additional category provides a “catch-all” enumeration of variables relating to situations where it is determined that certain “other relevant factors” need to be considered in the particular case. In the *Commentaries on the Helsinki Rules on the Uses of the Waters of International Rivers* (International Law Association, Helsinki, 1996) it is stated that “... to be relevant, a factor must aid in the determination or satisfaction of the social and economic needs of the co-basin TWC States”. This is helpful in defining whether or not an additional factor is in fact relevant. However, we would extend this definition to include factors that are of relevance to environmental needs, in addition to social and economic needs.

2.4 Evaluation of Data -- The Method of Evaluation

Overview. The **Method of Evaluation** is a *process* that moves the LAM into **Phase III** of its operation: where the data collected in the RFM is evaluated in order to determine whether the existing or proposed use is equitable and reasonable. In order for the LAM to produce the best result, it is important that the TWC State consider issues related to the Method of Evaluation from the outset of the entire process (See the questions listed in Scoping Exercise in **Phase I**). The research for the LAM revealed that the approach to assessing the data can be guided by that used in the ILA Helsinki Rules and the UN IWC Convention, namely: *“The weight to be given to each factor is to be determined by its importance in comparison with that of other relevant factors. In determining what is a reasonable and equitable use, all relevant factors are to be considered together and a conclusion reached on the basis of the whole.”*

Purpose. The purpose of the Method of Evaluation is to provide a means through which the data collected in **Phase II** can be employed by a TWC State to determine whether or not its use of a TWC (including or excluding proposed uses, as required) is in line with its international legal entitlements and obligations. This will then allow a TWC to assess its legal options.

Methodology. The **Method of Evaluation** aims to resolve the following fundamental issue: is the current utilisation or specific use of the TWC by the TWC State equitable and reasonable? How is this determined? The Method of Evaluation involves a critical line of questioning, employed to maximise the impact of the data collected, which, in turn, drives the determination of whether or not the current utilisation of a particular TWC qualifies as “equitable and reasonable”. The Method of Evaluation may require additional expertise depending on the technique(s) that are selected to evaluate the data. Examples taken from the case studies are explained below.

The Questions. These are the questions that a TWC State will answer using the collected data in its assessment of whether or not the use under consideration can be considered to be equitable and reasonable.

a) Applicable Rules of International Law? Use the **Legal Audit Scheme** to determine what rules of international law (scope, substantive rules, procedural rules, institutional mechanisms, dispute settlement) govern the relations for this TWC State e.g. customary international law or regional / basin-wide / bilateral agreements. This will establish the starting point for identifying the mechanisms available to move toward an operationalisation of equitable and reasonable use. In the case studies, the rules that govern each of the TWC States are different. China’s use of the Mekong is governed primarily by rules of customary international law, although it has recently entered into a cooperation agreement for exchange of information. It is important to note also that there is a multi-party agreement that governs the lower Mekong (Cambodia, Laos, Vietnam and Thailand). In the case of Mozambique, the SADC regime, including the 2000 Revised Protocol

and the recently concluded Interim Agreement on the Incomati and Maputo provide a comprehensive legal framework. Thus, any consideration of new or increased uses of the Incomati must be considered in the context of that framework – although the governing rule, as agreed by the Parties in those instruments, remains “equitable and reasonable use”.

For Palestine, the legal situation is entirely different from the others, in three distinct ways. Firstly, Palestine is not formally considered to be a State, thus raising the question: what rules of international law apply to such an entity? Secondly, a Declaration of Principles was agreed to by the Parties – what status does this have and what rules does it contain? Thirdly, the resource dealt with is groundwater and the issue that arises is whether or not this is covered by the same rules of international law that apply to transboundary watercourses. Each of these questions was dealt with in more detail in the research, available upon request from IWLRI.

b) What Quality of Data? Since the outcome will depend on the quality and quantity of data, a preliminary question is whether the data collected is adequate (under the Legal Audit Scheme and under the Relevant Factors Matrix) for the purposes it is needed for? For example a high quantity and quality of data will lend itself to more sophisticated forms of analysis; lower quantities and qualities of information will require cruder forms of analysis (see List of Techniques, below). Additional efforts may be required to improve data collection, depending on the techniques selected for data assessment. Where shortcomings in the data are identified, these should be addressed as best as possible. Resolving the question of how the data collected in Phase II should be evaluated will be the first task in this part.

Those using the data will need to understand the method of analysis being used. It is potentially risky, even with a good information set, to rely on very sophisticated forms of analysis if the policy makers who are using the output of the analysis do not understand its strengths and weaknesses.

Weighing the Importance of Uses. A TWC State must determine what uses are of most importance to it. In order for a number of the evaluation techniques detailed below to operate, all uses of a TWC must be ranked. This process will involve taking the data collected under Category 3 of the Relevant Factors Matrix so that a list of all uses can be drawn up, including any potential uses. The ranking of uses will therefore include a breakdown of all vital human needs, environmental uses and sectoral uses such as agriculture and industry. It may be that this information is available from state-level planning and development strategy documents. However, it may also be the case that an evaluation technique may be used to assist in determining ranking – e.g. the AHP technique detailed below.

It is important to recognise that the following sections may provide conclusions in themselves. A number of the evaluation techniques available will identify a preferred alternative from a number of options. Such techniques do not necessarily lend themselves easily to providing the answers to the question set.

Techniques for Data Evaluation. A number of recognised techniques exist which will assist States in evaluating the data obtained from the Data Collection Tools. Each is suited to particular circumstances, depending on the question being asked and the information available, and is unlikely to be universally applicable. Indicative examples of these techniques are detailed below. The intention here is to facilitate the processing of all relevant data, in its entirety, to enable the questions in the following section to be addressed. It may be the case that the data does not need to be processed in order for particular questions to be asked – e.g. are vital human needs being met, as this will be a question of fact, when the data collected under Category 3 of the Relevant Factors Matrix are compared against international standards. If this is the case, the user may proceed directly to the next questions.

Please note that this list is not intended to be exhaustive – other appropriate techniques may be used as long as the methodologies are justified and clear. In an international negotiation, there may also be the added requirement that the Parties agree to the methodology to be used.

- **Cost-benefit analysis:** The direct and indirect benefits of the uses derived from a watercourse are weighed against the direct and indirect costs of those uses, each having a specific monetary value attached to it. The advantages of the procedure are that it is fairly simple to employ and the results are easy to understand. Difficulties arise in application, however, when the value set used does not adequately reflect the costs or benefits. This is most likely to arise when many relevant values are administered by the State or other agency rather than set by international standards and/or when there are significant non-monetary costs and benefits arising through the project, for example through ecological or environmental impacts. Although there are well established techniques to deal with these circumstances where they arise, there remains controversy surrounding the extent to which they adequately resolve the issue and this has given rise to a search for other solutions.

It has commensurate limitations in its use – the weight allocated to a particular use is subjective, and the simplicity of the evaluation mean that definitive solutions may be difficult to achieve. Problems may also be found in attaching a financial value to indirect costs and benefits, such as ecological degradation.

Example: The Mekong River Commission makes use of cost benefit analysis in the context of identifying stakeholders who

should participate in decision making with regard to the programmes of the Commission and to specific projects. In doing so, it takes account of all economic impacts as well as social, environmental and cultural costs.

- **Mathematical programming / Modelling:** Modelling techniques allow analysis of allocations and flows in synthetic, though theoretically possible, scenarios. Information regarding the physical geography and hydrology of a basin, along with water utilisation details (both existing and potential), can be put into such models. This information is then processed within the model in order to formulate projected availability data. The inputs can be altered to reflect alternative priorities, so that future water availability can be projected for a large number of different circumstances. The element of chance is always present, as the models can never anticipate every permutation, and must rely on past historic data as the basis, but may be valuable tools in assessing the best of a number of alternative scenarios.

Many different types of model exist, all with differing levels of sophistication. Many rely on the availability of comprehensive data, and in its absence, the more complicated models will not be applicable. Significant levels of expertise are required to apply the models and interpreting the results. All parties should agree on the model itself, the values to be input, the weight to be attached to each variable, and the methodology to be adopted.

Examples: In the *China case study* a mathematical model was used to demonstrate two separate approaches – the Limited Sovereignty and the Ecological Benefits approaches. Using each of these the team demonstrated that the proposed hydro-electric dam development on the Mekong (Lancang Jiang) is equitable and reasonable, given a consideration of all relevant factors. Modelling is used by the Mekong River Commission in assisting riparians in utilising the Mekong River Agreement.

In the Incomati-Maputo agreement between Mozambique, South Africa and Swaziland, the Water Resources Yield Model was used to analyse the water availability in order to ascertain whether there was enough water in the system to meet the needs of all three riparians. The priorities of all parties were incorporated into the model to ensure that these were met in the agreed interim flow regime.

- **Multi-criteria analysis:** This technique scores a number of alternatives against the objectives that the exercise is attempting to meet. It is relatively transparent and can accommodate inter-disciplinary criteria. However, it demands technical inputs, and is appropriate only where the quality of the data is high.

Example: In the *China case study*, the conclusion drawn is that the Analytic Hierarchy Process and the Multiple-Objective Decision Making techniques are appropriate for the Mekong (Lancang-Jiang) basin. Both are examples of multi-criteria analysis, and are further defined as follows.

- **Analytic Hierarchy Process (AHP):** The Analytic Hierarchy Process (AHP) is a mathematical technique for multi-criteria decision making [Saaty 1980, 1990, 1994]. It enables policy makers and water resources managers to make decisions involving many kinds of concerns including planning, setting priorities, selecting the best among a number of alternatives, and allocating resources. AHP is an analytical tool, supported by simple mathematics that enables the user to explicitly rank tangible and intangible factors against each other for the purpose of resolving conflict or setting priorities. The process has been formalized by Saaty and used in a wide variety of problem areas. The process involves structuring a problem from a primary objective to secondary levels of objectives. Once these hierarchies have been established, a pair-wise comparison matrix of each element within each level is constructed. Analysts can weigh each element against the other elements within each level. Every level is related to the levels above and below it, and the entire scheme is tied together mathematically. The result is a clear priority statement.
- **Multiple-Objective Decision-Making (MDM).** Multiple-Objective Decision-Making (MDM) provides approaches to making decisions in complex situations where more than one decision objective should be considered. It is a structured approach for ranking alternatives in a decision making process based on a set of objectives. It is particularly well suited for the decisions that involve multiple conflicting objectives. The generic stages of MDM include: defining the objectives, specifying the alternatives, weighting the objectives, selecting and applying an algorithm for ranking the alternatives, and then choosing an optimal alternative. A large variety of algorithms and techniques can be employed in the completion of these stages. There are different ways to weight the objectives and rank the alternatives. They vary in terms of their computational complexity and ability to handle qualitative and/or quantitative data.
- **Game theory.** Given a set of alternatives, a payoff matrix can be built representing the different outcomes of the alternatives according to the different criteria. At this stage, a range of criteria can be applied, such as “minmin”, “minmax”, or “Laplace criterion” in order to select the best alternative. However, the technique may be overly simplistic to be applied broadly to the determination of equitable and reasonable utilisation, and it does not identify the alternatives to be used.
- **Fuzzy Expert systems.** Expert systems are based on the “If...Then” rules. These rules represent the knowledge of experts and can be used in order to solve a specific problem. The “If...Then” rules guide and

direct the decision making process. An “If...Then” rule has two components: the first component represents the conditions or arguments whereas the second one represents the outcome. The technique is problematic, though, insofar as it is technical and relies on experts to apply it. This will also be dependent on the quality of the data produced, as indicated above.

Example. An example of such a rule might be: **If** conditions x, y and z are satisfied, **Then** the watercourse is being used in an equitable and reasonable way.

Legal Questions: How to Determine Equitable and Reasonable. This part of the Method of Evaluation takes the TWC State through a list of indicative questions that assist it in evaluating whether or not its use of the TWC is equitable and reasonable. This part provides the essential interface between the evaluated data and the assessment of a TWC State’s legal options.

Each of the Primary Questions should be addressed. The answer to each will determine whether or not an inequitable use exists or will exist. It may be that there are other mitigating or influential factors involved. If it is assumed that the results of this process are to be used in a negotiation scenario, these will be an inherent part of the negotiations. Such factors may include conservation efforts, the extent of water management infrastructure, condition of monitoring networks and damage limitation efforts.

PRIMARY QUESTIONS:	ANSWER?	
	YES?	NO?
Are legal obligations under international, regional, basin or bilateral watercourse agreements being met?	The use meets international obligations.	The State is in breach of its international obligations, and may be responsible under international law.
Are vital human needs being met? Will they continue to be met in the event of planned developments, climate change and development policy? ¹	Use may be equitable.	Use may be inequitable.
Are necessary environmental / ecosystem needs being met?	Use may be equitable.	Use may be inequitable.
Based on the hydrological data and consumption rates, is the amount of available water sufficient to provide for all	Use may be equitable.	Use may be inequitable.

¹ A State must make a decision as to the criteria used in determining the quantum of water needed for basic human needs. Some commentators recommend a Minimum Water Requirement standard. The TWC State should also assess its vital human needs against an international benchmark.

uses at the times it is needed? Will they continue to be met in the event of planned developments, climate change and development policy?		
Is Significant Harm being caused to another TWC State's use of water; or to the TWC State by another State's use of water?	Use may be inequitable.	Use may be equitable.
Has the TWC State taken "all appropriate measures" to prevent significant harm?	Use may be equitable.	Use may be inequitable.
Do the benefits of the use causing significant harm outweigh the harm caused?	Use may be equitable.	Use may be inequitable.
Will Significant Harm be caused to another TWC State by the proposed use; or to the TWC State by another State's proposed use?	Proposed use may be inequitable.	Proposed use may be equitable.
Has TWC State taken "all appropriate measures" to prevent significant harm from the proposed use?	Proposed use may be equitable.	Proposed use may be inequitable.
Is development of new use restricted due to quantity of water used elsewhere in the TWC?	Proposed use may be inequitable.	Use may be equitable.

The TWC State position: Equitable and Reasonable?

The Method of Evaluation has provided the opportunity to review and analyse all of the information collected in the Legal Audit Scheme (LAS) and the Relevant Factors Matrix (RFM). Application of the Method of Evaluation requires the choice of appropriate techniques to undertake the data analysis in an appropriate way, given the objectives of the exercise, the quantity and quality of the information, and the technical abilities of the analysts. The results from the application of the Method of Evaluation will inform Phase IV – the Options available to a TWC State seeking to have its equitable and reasonable use implemented.

The following Figure provides an overview of the Method of Evaluation.

Method of Evaluation

Total water resource (Factor 1 of RFM)

Is water allocated under existing legal arrangement (LAS)? Quantity? If yes

Water to meet vital human needs (Factors 2, 3 RFM)

Water to ensure continued viability of aquatic ecosystems as life support systems (Factor 3 RFM)

Use(s) within TWC State (Factor 2-6, RFM)	Use(s) outwith TWC State (Factor 2-6, RFM)
Industrial Agriculture Navigation Hydropower [Use in priority]	Industrial Agriculture Navigation Hydropower

1. Are legal obligations being met?

2. Are vital human needs being met?
3. Are vital ecosystem needs being met?

4. Are all uses met?

YES

TWC State use(s) inequitable

Presumption that other TWC State(s) uses are inequitable (see legal report)

NO

METHOD OF EVALUATION
Apply techniques for evaluation to answer key questions

- Are TWC State reasonable uses equitable?
- Are there potential significant adverse effects?

Uses exceed available resources (Conflicts of Use)

Proceed with national planning
Co-operation
Exchange of Data
Consult on changes in use
Give notice of planned use
Reach agreement on use

Options for ensuring equitable entitlement
Consultation
Negotiation
Dispute Resolution

2.5 Phase IV: Implementing Equitable and Reasonable Utilisation: Legal Options

Scenarios

Once a TWC State has completed the exercise of ascertaining whether or not the existing or planned use or uses of a particular TWC meet the criteria of equitable and reasonable utilisation, it is in a position to determine how to move forward with its national water policy and plans involving the water resources of the TWC. This primarily concerns the modalities of the future conduct of the TWC State and its relationship with other States sharing the same transboundary water resources. It is primarily in the context of interstate relations that the issue of “Legal Options” will be discussed.

The range of legal options that are at the disposal of a TWC State is sufficiently wide and the choice will depend upon the outcome of the exercise, or, to put it differently, on the responses resulting from the Method of Evaluation. As the following summary will demonstrate, the legal options available to a TWC State are, firstly, linked to the different scenarios which may occur as a result of the existing or planned uses. Secondly, the options will be determined by the fact of whether or not the TWC State in question has specific legal rights or obligations vis-à-vis other TWC States stemming from an international agreement in force.

Scenario 1: Existing use (uses) meets the criteria of equitable and reasonable utilisation.²

In such a case the TWC State may continue its use of the water resources on a “business as usual” basis. The TWC State will not be legally obligated to undertake any actions vis-à-vis other TWC States. However, even in this situation it is advisable for the TWC States sharing the same watercourse to endeavour to achieve a certain degree of cooperation, through, for example, regular exchange of available information.

Note: Existing use may continue provided that other TWC States explicitly or implicitly agree with the underlying assumption that it is equitable and reasonable. In case of a disagreement on the nature of the uses, the States concerned should enter into consultations.

Scenario 2: Existing use (uses) meets the criteria of equitable and reasonable utilisation but causes significant harm to another TWC State (States).

In this situation, the TWC State is, in principle, entitled to continue its existing use. However, in case of a dispute, the TWC State will have to

² It must be emphasised that the underlying proposition in this and the following scenarios is based on a TWC State’s unilateral determination and assumptions and may not reflect the views and positions of other TWC States concerned.

bear the burden of proof that its use is equitable and reasonable. Additionally, it is still required to take all appropriate measures to prevent, eliminate or mitigate significant harm to other TWC States. The TWC State causing such harm will have to enter into consultations with other States to discuss the situation and, where appropriate, to consider the question of compensation.

Scenario 3: Existing use (uses) does not meet the criteria of equitable and reasonable utilisation.

In such a case the choice of legal options open to the TWC State exercising such uses will depend primarily on whether there is a conflict of use with another TWC State or States.

In the absence of the conflict of uses between the TWC States concerned, the existing use, even “inequitable” as such, may still continue. If another TWC State for whatever reasons (e.g., availability of water resources from other sources, lack of demand due to insufficient economic development) does not use water and does not object against the TWC State in question using more than its hypothetically “fair” share of water, the latter is under no obligation to limit its existing uses. However, it has to be prepared for a situation where the demands for water in another TWC State will increase and that State will require “its” share of water, which may lead to a conflict between existing uses in one State and planned uses in another. Thus, it would be advisable for the TWC State in question, while still enjoying its current “inequitable” use, to foresee the possibility of eventually decreasing of its share of water resources and to envisage necessary adaptive measures in its national water policy and development plans.

On the other hand, if the existing use of the water by the TWC State is both “inequitable” and is in conflict with existing uses of other TWC States, the former is under a legal obligation to reduce its utilisation of the water resource. It has an option, however, to enter into negotiations with the other TWC States concerned in order to find a mutually acceptable arrangement, such as, for example, payment of compensation (monetary or in kind) for the use of water in excess of its “equitable share”. The refusal or unwillingness either to change (reduce) the existing use or to enter into negotiations with a view to achieve an equitable result may be construed as a breach of its international legal obligations.

Scenario 4: Legal obligations under existing agreements, including water or benefit sharing arrangements, are being met.

The TWC State may continue its use of the water resources on a “business as usual” basis.

Scenario 5: Legal obligations under existing agreements, including water or benefit sharing arrangements, are not being met.

The TWC State is required to comply with its international commitments. According to general international law and the principle *pacta sunt servanda* a State party to a treaty is under an obligation to perform it in good faith. Its refusal to do that will constitute an internationally wrongful act, engaging the responsibility of the TWC State.

However, the failure to comply may not necessarily be the result of a wilful act. It may also arise from other reasons such as the lack of technical capacity and financial resources to properly implement the treaty. Significant changes or unforeseen circumstances, which may occur in the case of severe floods, droughts, or changing natural conditions, may also cause non compliance. In this situation the TWC State is expected to inform other States parties of its inability to comply with its treaty obligations, explain the reasons, and, if necessary, enter into consultations (negotiations) with a view to remedy the situation (e.g. to seek assistance in the treaty implementation, to make ad hoc amendments to the agreed regime or to adapt it to changing conditions). This could be done through a joint institutional mechanism, if one is established by the treaty, and if it has a mandate to respond to natural and human-related changes in shared water resources.

Scenario 6: Planned measures (uses) meet the criteria of equitable and reasonable utilisation.

In such a case, the TWC State may authorise or proceed with the implementation of the planned measures, unless (a) these measures will have “significant adverse effect” upon other TWC States (see below), and (b) there is a treaty in force requiring prior notification and/or consultations with other TWC States in all cases.

Note: There are special requirements for prior notification of projects to be financed by the World Bank.³

Scenario 7: Planned measures (uses) meet the criteria of equitable and reasonable utilisation but may have a “significant adverse effect” on other TWC States.

In such a case, the TWC State in question is under an obligation to provide prior notification to the other TWC States, which may be potentially affected by the project. The notification should be timely and should be accompanied by available technical data and information, including the results of any Environmental Impact Assessment (EIA) that would allow the notified States to evaluate the possible effects of the planned measures. Additional available information should also be provided at the request of the notified States.

³ See paragraphs 4-7, Projects on International Waterways, World Bank Operational Policies, OP 7.50, June 2001.

The notified States should be given sufficient time in order to study and evaluate the possible effects. During this period, the notifying State must refrain from implementing the planned measures. It is generally expected that the notified States should respond within a reasonable period of time. If the response is positive or if there is no response, this would normally signify the acquiescence of the notified States. In such a case, the TWC State may proceed with the planned measures.

If, on the other hand, the notified States disagree with the planned measures on the grounds that they do not meet the criteria of equitable and reasonable utilisation or that they may cause significant harm, the TWC State and the notified States should enter into consultations and, if necessary, negotiations, with a view to arriving at an equitable resolution of the situation.

During the period of consultations (negotiations) the TWC State planning the new activities is expected to refrain from implementing them, especially if so requested by the other States, provided that such consultations (negotiations) are conducted in good faith and not for the purpose of delaying the planned measures.

The failure to reach an agreement by the TWS States concerned in no way means that the TWC State planning new uses is prevented from implementing its planned measures. It still has a right to go ahead with the project, based on the overall assessment of whether or not it qualifies as “equitable and reasonable” – which, in the case of disagreement, or a dispute, may have to be resolved by a third party (see below). If it appears that the use is not equitable and reasonable, or that the planned measure might cause significant harm, the TWC State undertaking such a measure may be held liable for the breach of its international obligations, and/or may be required to pay compensation.

Note: The procedure of prior notification is triggered by the criterion of possible “significant adverse effect”. The threshold established by this standard is lower than that of “significant harm”.

Scenario 8: Planned measures (uses) do not meet the criteria of equitable and reasonable utilisation.

In such a case, the TWC State should, as a rule, refrain from authorising or implementing the planned measures. Another option available to this State is to notify other potentially affected States and to enter into negotiations with a view to reaching a mutually acceptable arrangement, possibly by compensating other States for the use of water in excess of its “equitable share”.

Where a dispute arises, the TWC States concerned must resolve it by peaceful means. Following is a summary of the legal options available

to the TWC State. Each of these should be considered, and the choice of how to proceed will depend upon a number of variables.

Means of International Dispute Resolution

Negotiations and Consultations

Negotiation is the means of dispute resolution most often employed by States when trying to resolve any international conflict, including those over transboundary water resources. Depending on the issues at stake and the number of States involved, negotiation can take different forms, from bilateral talks and diplomatic correspondence to an international conference. It can be used at all stages of the dispute.

Formal diplomatic negotiations are sometimes preceded by the meetings of experts or by consultations, which usually involve the exchange of views and information. Consultation is normally an ad hoc procedure, but it also can be provided for in the watercourse agreement, either within an institutional mechanism or as a bilateral dispute prevention and resolution tool. Consultations are usually envisaged with regard to planned measures that may affect the interests of other watercourse States.

“Prior consultations” allow the parties concerned to jointly discuss and evaluate the impact of the proposed activity on their uses of shared water resources. As a mechanism of conflict prevention, consultation creates an opportunity for project adjustment and accommodation before plans proceed. The UN IWC Convention contains more than a dozen provisions that recommend consultations.

However, negotiation may not always be the most effective way of resolving disputes, especially where the parties are unequal. One party may deny that a dispute exists, advance unreasonable claims, or drag its feet. Parties may have uneven bargaining powers or unequal legal and technical expertise in the matters involved. In such cases impartial third-party involvement may be the only viable solution. Negotiations are considered merely as the first step usually taken by States to resolve their dispute. If negotiations fail or if the parties are unable to enter into negotiations altogether, other means of dispute settlement are available to them, and all are based on the involvement of a neutral third party.

Good Offices and Mediation. A third party offering good offices to the conflicting TWC States acts a ‘go-between’ in order to persuade them to enter into negotiations. Neutral States, joint bodies, and international organizations, as well as individuals, can offer good offices. Once the negotiations have started, the functions of good offices are usually deemed to be completed.

Mediation, as compared with good offices, is a step towards more active third-party participation in the search of a solution to the dispute. The preliminary agreement of the conflicting States to mediation is not mandatory; but without

their consent mediation will never be successful. It is not unusual for the mediator not only to facilitate the discussion but also to suggest terms of settlement. The boundaries between good offices, mediation, and conciliation are sometimes blurred, and one procedure can often lead to another.

Inquiry and Fact-finding. Many international disputes arise from disagreements on questions of fact. Inquiry and fact-finding are procedures specifically designed to produce an impartial finding of disputed facts. The ILC study of legal issues concerning dispute prevention and resolution established that fact-finding, as a course of action, will frequently resolve a dispute before any binding process is necessary. Fact-finding, or inquiry, allows States to refer questions to a panel of experts for impartial third-party investigation of factual or technical matters before diplomatic negotiations are undertaken.

Examining issues initially at the technical level often within the framework of joint institutions (made up of the representatives of TWC States) is advantageous because experts in the field are reporting and making recommendations, minimizing the potential adverse political considerations.

The UN IWC Convention has no binding dispute resolution mechanisms (such as arbitration and adjudication, which are optional), but does provide for a compulsory fact-finding procedure, which can be invoked at the request of any State party to the Convention, following failed negotiations (Article 33).

Conciliation. In conciliation, an impartial third party is requested by the conflicting States to help them resolve the dispute by examining the facts and suggesting the terms of a settlement likely to be acceptable to them. Thus conciliation may combine elements of mediation and inquiry. However conciliation is a more formal procedure, usually performed by a commission of the representatives of the parties to the dispute as well as independent nationals of other States. A sole conciliator may also carry out conciliation. The conciliator seeks to establish objectively the facts and applicable law in a dispute through independent investigation. The fact finding is followed by reporting the findings and making recommendations to the parties, who may accept the recommendations or chose another form of dispute settlement. There are a number of models of conciliation that States may adapt to their particular circumstances, including that proposed in the ILA 1966 Helsinki Rules. (Article XXXIII and Annex, 1966 Helsinki Rules. Annex, Model Rules for the Constitution of the Conciliation Commission for the Settlement of a Dispute). The fact-finding procedure contained in the UN IWC Convention is close to a conciliation process, since it provides for the rendering of a recommended solution to the dispute.

Institutional Mechanisms. Transboundary water controversies and disputes are often resolved under the auspices of various international organizations and bodies, such as river basin commissions established by multilateral or bilateral agreements. State practice in the area of international watercourses demonstrates that States consider Institutional Mechanisms a necessary part of the joint management of transboundary waters.

Arbitration and Adjudication. Compared with all other means of dispute resolution involving an impartial third party, arbitration and adjudication are regarded as the “legal” – as compared with “diplomatic” – means of settlement. However, arbitration differs from adjudication in many respects, the former being a more flexible procedure where all the crucial issues of substance and process are left to the discretion of the parties.

- **Arbitration** requires the prior consent of each party to the dispute. This is usually done through a special agreement between the parties – a compromis – unless there exists an international (multilateral or bilateral) agreement in force binding on the parties to the dispute that provides for compulsory arbitration. Having agreed to submit their dispute to arbitration, the parties to the process have a considerable degree of choice concerning the seat and the composition of the arbitral panel, the procedure to be followed, and the questions to be addressed by the tribunal, among other matters. Generally, each party appoints their respective arbitrator, and these two then select a third arbitrator agreed to by the parties and sometimes called “an umpire”. The arbitral decisions are taken by majority vote, unless the parties have agreed to refer their dispute to a sole arbitrator. The decision, which can be kept confidential, is binding on the parties who, however, can agree on an appeal procedure prior to arbitration.

Traditionally, binding settlement procedures are to be resorted to after all other means of dispute resolution have failed. Most of the present day watercourse agreements provide for arbitration as a means of dispute settlement, either as an optional mechanism (the UN IWC Convention) or as a compulsory procedure for disputes, which the parties have failed to resolve by other means (the 1998 Rhine Convention).

- **Adjudication.** Another option available to the parties to a watercourse dispute is to submit it to adjudication by a standing judicial body: an international court. This method differs from other means of dispute settlement in that neither the composition of the court nor its rules and procedures are under the discretion of the conflicting States. The decisions of international courts are binding for the parties to the dispute.

International practice over the last three decades demonstrates an increasing popularity of international courts as a means of last resort. Along with the most prominent judicial body, the International Court of Justice (ICJ) in The Hague, there exist quite a number of special courts as well as regional courts, like the European Court of Justice or the SADC Tribunal.

The ICJ, which is also called “the World Court,” is the principal juridical organ of the United Nations. Only States may be parties to disputes brought before the Court. Their consent to appear before the Court may be obtained in a number of ways. First, this can be done by a special agreement between the parties to a dispute. Second, if the disputing States are parties to an already existing international treaty that provides

for compulsory adjudication by the Court, this could constitute the basis for consent to adjudicate, should other means of settlement have been exhausted. A third basis for consent exists where the disputing States have, by unilateral declaration, accepted compulsory jurisdiction of the Court independently of each other (Article 36(2), Statute of the ICJ).

The Statute of the ICJ allows for parties to a dispute to participate in the establishment of a special chamber to hear their case. The parties are consulted on the number of judges and ad hoc members of the chamber. Special Chambers have been used to settle boundary and territory questions, analogous to cases involving an entitlement.

Conclusions

International practice has developed an assortment of dispute resolution instruments and techniques, which have been used by States with various degrees of success. None of these means is unconditionally suitable for all cases and situations. Each has its advantages and flaws. In many instances diplomatic negotiations are seen as the primary option and the obvious starting point of conflict resolution. However, failure to enter into or resolve the matter through negotiations may make third-party resolution the only available option. The choice then is between formal binding dispute settlement mechanisms (arbitration and adjudication) and non-litigious methods. As the complexity of the dispute resolution mechanism employed increases, the process becomes less dependent on the will and control of the parties to the dispute. The level of confidentiality may also considerably diminish. Arbitration and adjudication are also regarded as more expensive and time-consuming than other methods of dispute settlement. On the other hand, they may be the only way out if all other means fail and if the alternative is a stalemate that will result in an unnecessary prolongation of international tension.

One of the most important functions of international law is to manage and resolve actual or potential conflicts peacefully through the use of available dispute settlement mechanisms and techniques. A range of such means – from negotiation, to mediation, arbitration, and adjudication – have been resorted to in resolving past water disputes. States are free to select their own mechanisms for dispute settlement, and practice demonstrates a willingness to use the range of available options. The attitude of TWC States towards different means of conflict resolution varies for reasons of cultural and historical traditions.

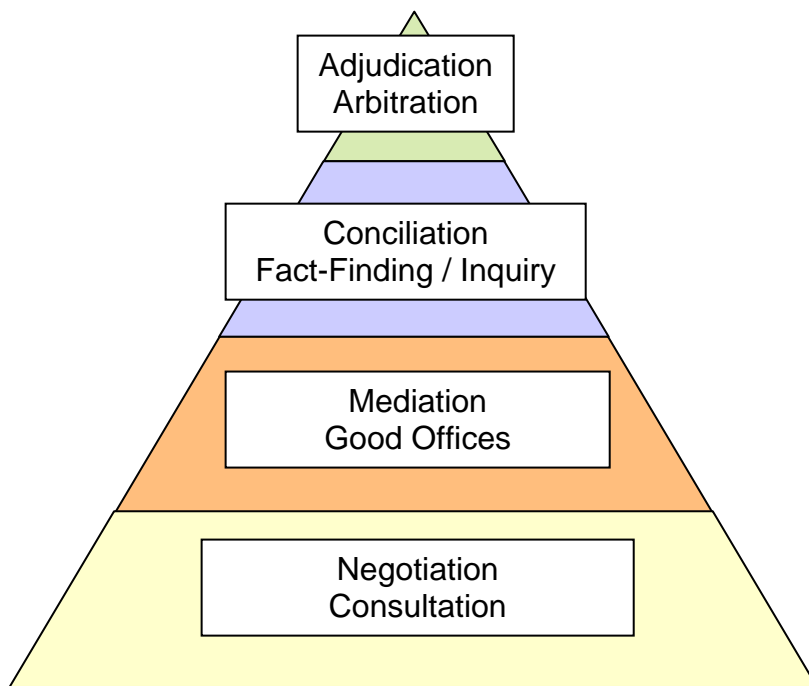


Figure: *Dispute settlement mechanisms*

Unilateral actions that breach the rule of equitable and reasonable utilisation are subject to the normal rules of state responsibility and its consequences. The overall aim of the LAM is to identify the means available to ensure equitable entitlement for each TWC State. The overall objective is to find a way forward that promotes cooperative frameworks for the use of transboundary waters.

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