

Beyond the river: the benefits of cooperation on international rivers

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Abstract

International rivers can elicit cooperation or conflict. The choice between the two will in large part be determined by perceptions of their relative benefits. In this paper, we explore the dynamics that drive the choice between conflict and cooperation, and present a simple framework for examining the extent of potential benefits that could underlie these choices. The paper seeks to broaden the range of perceived benefits, as some are obvious and some are much less apparent. The framework categorizes four types of cooperative benefits. First, cooperation will enable better management of ecosystems, providing *benefits to the river*, and underpinning all other benefits that can be derived. Second, efficient, cooperative management and development of shared rivers can yield major *benefits from the river*, in increased food and energy production, for example. Third, cooperation on an international river will result in the *reduction of costs because of the river*, as tensions between co-riparian states will always be present, to a greater or lesser extent, and those tensions will generate costs. And finally, as international rivers can be catalytic agents, cooperation that yields benefits from the river and reduces costs because of the river can pave the way to much greater cooperation between states, even economic integration among states, generating *benefits beyond the river*. While each of these four types of benefits could potentially be obtained in all international river basins, the extent and relative importance of each type will vary greatly between basins, reflecting a wide range of political, geographic, economic and cultural circumstances. In some cases, the scale of benefits may not justify the costs of cooperative actions, in others the sum of benefits could be very high. The paper concludes that identifying and understanding the range of often inter-related benefits derived from the cooperative management and development of international rivers is central both to better management of the world's rivers, and to relations among the nations sharing those rivers.

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1. Introduction

Rivers¹ are extraordinary phenomena, with physical, cultural and psychological expression in human societies; they bring life and death, civilization and devastation, opportunity and risk. Managing rivers effectively has always been a goal of human societies and nation states. Under Roman law, documented in the 3rd Century Roman Digest, *aqua profluens* (flowing water) was a common good, neither public nor private, emphasizing equity and society-wide ownership. Managing rivers for the common good remains today a societal goal in countries around the world. To achieve this goal a range of instruments is being adopted: river basin organizations are bringing stakeholders together to internalize the politics of allocation, market mechanisms are widely used to rationalize the economics of allocation, and legislation is enacted and enforced to ensure the regulation of allocation. One fundamental lesson of universal experience is that a river is best managed as a basin unit, as any action in one part of the basin has impacts in another.

The management of rivers is complicated by the fact that they cross political boundaries indiscriminately. Rivers intersect or even form borders between the many different users that must share their water. River basins wholly within a nation invariably give rise to debate and discord, to a greater or lesser extent, among users with conflicting demands and management preferences. Strong national institutions can deal effectively with such differences, although in federal nations with strong state legislatures (as in the US, India or Australia) management planning of, and user disputes over, inter-state rivers often present major challenges. However, in all these cases, there remains a national legislative structure with ultimate authority. There is rarely an institution of equivalent authority, however, where rivers flow between, and disputes arise among, sovereign nations. There are about 260 rivers that cross or form international borders; their basins cover almost half of the world's land surface and include about 40% of the world's population (Wolf, 1998). As water everywhere becomes increasingly scarce relative to demand, conflicting expectations of international rivers will grow, with only limited and little-tested supra-national legal and institutional instruments available for nations to look to in order to allocate and conserve the water of the rivers that they share.

There has been much written recently in the economic, political and scientific literature about international rivers, with a sharp focus on 'water wars'. Some write of water wars, both in the past, and, more importantly, in the future. Others argue that no war in history has ever been

¹ Some clarity over terms is necessary. In this paper, freshwater flows (whether surface water or groundwater), and the lakes and wetlands which some of these flows may pass through, derive from or terminate within, are described, very loosely and evocatively, as 'rivers'. The term 'international rivers' is used in this text to refer to freshwaters whose basins are situated within the borders of more than one state. We recognize that there is a long-standing, formal debate over such terminology. Some believe that the use of the word 'international' is incorrect as it implies that the waters (as in seas) do not belong to any state, whereas only the basin states have rights to an international river. Some use 'transboundary rivers', which confuses others as many river channels form international borders without crossing them (although in these cases the river basins themselves will almost certainly be transboundary). Furthermore, transboundary rivers include those that cross intra-national (e.g. state) borders—not only international borders. Others use 'shared rivers', which is disputed by some who do not perceive the use of such waters as 'shared'. Again, others use the term 'watercourse', which is rejected by some who believe that it does not include the full extent of the hydrologic basin and all its water sources. This often heated and rarely conclusive debate serves to emphasize the importance of achieving a common understanding on the issues of 'international rivers'—an understanding best reached through recognizing the benefits of cooperation. This is the subject of this paper.

fought over water, and that international rivers tend to induce cooperation. There is a case for both positions, although, in this paper, we align ourselves with neither, and instead take a somewhat different approach.

All international rivers, without exception, create some degree of tension among the societies that they bind.² There are consequences of these tensions, and of the cooperative or non-cooperative responses they elicit, that can reach far ‘beyond the river’. These tensions, and their responses, are bundled with many other factors—historic, cultural, environmental and economic—that affect relations between neighboring nations. Within these bundled dynamics, international rivers can in some cases become a powerful catalyst for conflict, or a powerful catalyst for cooperation. Fully unbundling water’s role from the complex dynamics of relationships between states is not possible. Control of international rivers is inextricably entwined with economic opportunity, national security, society and culture. Water—narrowly defined—is unlikely to be or have been the sole source of any war, just as, we believe, war is unlikely to be or have been fought for any single interest or purpose. The management of shared water can be a force for peace, or a force for war, but politics—as a proxy for the full bundle of relationships, and associated tensions, that arise between states—will determine whether cooperation or conflict is chosen.

In this paper, we draw upon World Bank experience in different parts of the world and we outline a framework, which is proving relevant and useful in considering cooperation on international rivers. In setting the scene for this framework, we need to consider the nature of a river and its roles in the environment and in the economic endeavors and political relationships of human society.

2. The ubiquitous river

Rivers are a central feature of the ecology of the planet. Crustal processes build mountains and create deep basins. Rain falls, is captured in rivers, erodes mountains, and deposit sediments in lowlands, infilling basins. Rivers play a dominant role in sculpting landscapes and sustaining ecosystems. All life needs water and the presence of water gives life, within the river itself, within associated wetlands, lakes and riverine vegetation, and within the landscape sustained by the river. While the river sustains life and ecological systems, so also do these systems sustain the river, providing natural regulation of water quantity and quality.

Rivers have always been and remain a central feature of the economic environment. Human settlement has almost always been close to water, because of the essential role water plays in human life and economic endeavor. Only in the past century has technology allowed permanent human settlement far from water. It is no coincidence that many of the world’s great cities are found along the banks of rivers. Rivers provide water for drinking, for food production, for energy and for transport and have played a role in the development of human civilization—nowhere more so than in the major alluvial basins of the world, such as the Mekong, the Indus, the Euphrates and the Nile basins. People who settled in the floodplain had great opportunity to grow crops along the river, as the annual flood receded, leaving fresh silt and high water levels

²The word rival has the same root as river, derived from the riparian concept of dwellers on opposite riverbanks.

which boosted production, and to use the river as a transport route to trade that production. In fact, the need to ensure navigation along rivers provided the incentive for some of the earliest recorded institutions and agreements on international rivers. The relationship between the flow of rivers and the economy has long been recognized; the early Egyptians built Nilometers some 5000 years ago to measure the flow of the River Nile at Aswan in order to determine annual taxes for farmers.

Rivers have also, less obviously, long been a feature of the political environment. History shows us that they have played a part in defining the structure of human societies in many parts of the world and in many ways. While early societies in alluvial basins had great opportunities, they also faced great risk, for, if seasonal flood was high, or if it failed, then life was at risk. Harnessing the flood took ingenuity and physical structures (with levees, dykes and canals) requiring the organization of large numbers of people, as well as rules and institutions for water allocation. From this emerged bureaucracies, hierarchies and innovations which helped strengthen civilizations and cities.³ Societies in upland headwaters did not face the same imperatives, and historically appear to have more often been characterized by smaller, less structured social groupings. On the plains, proximity to rivers has been both a source and a reward of strength. Stronger and wealthier societies tend to live close to rivers, while weaker, poorer ones are forced away from rivers, where water is harder and more costly to obtain, and food supplies are less secure. Similarly, in the less developed parts of the world today, stronger and wealthier groups tend to live close to abundant clean water sources or water supply systems, while the poorest are forced to travel significant distances to obtain water of generally lesser quality at greater cost. Rivers are thus as closely linked with the economic and political fabric of human society as they are with the landscape.

Today's international rivers are also interwoven with the geo-political map. Many rivers have always been natural barriers and have defined boundaries (the Roman Empire reached but did not cross the Rhine and Danube rivers). Similarly, the boundaries of watersheds are borders in many parts of the world today, as they formed natural lines where there was no dispute over water. In recent times, however, the drawing of lines on maps to form borders has ignored the significance of hydrology. Africa is a case in point; lines drawn on maps in London, Paris, Berlin and Lisbon have left over 60 rivers crossing national borders, with more river basins per country and more countries per river basin in Africa than in any other continent.

Rivers are thus extraordinary, multi-dimensional systems. They are ecological systems, with critical life- and landscape-sustaining functions. Cooperation on an international river could enable better management of these ecosystems, providing *benefits to the river*, and underpinning all other benefits that can be derived. Rivers are physical and economic systems, whose efficient, cooperative management and development can yield major *benefits from the river*, in increased food and energy production, for example. Rivers have political significance—particularly so when they are shared between states; non-cooperation on an international river will result in tensions between states that will always be present, to a greater or lesser extent, and those tensions will

³See Wittfogel in *Oriental Despotism* (1957). Wittfogel argued that control of water for irrigation was central to the Asian system of economic production, and had a profound impact on the organization of what he termed 'hydraulic societies'. The control of water was therefore a source of power that could be exploited by a central bureaucracy—a theory that came to be known as 'hydraulic monopoly'.

Table 1
Types of cooperation and benefits on international rivers

Type	The challenge	The opportunities
<i>Type 1: increasing benefits to the river</i>	Degraded water quality, watersheds, wetlands, and biodiversity	Improved water quality, river flow characteristics, soil conservation, biodiversity and overall sustainability
<i>Type 2: increasing benefits from the river</i>	Increasing demands for water, sub-optimal water resources management and development	Improved water resources management for hydropower and agricultural production, flood-drought management, navigation, environmental conservation, water quality and recreation
<i>Type 3: reducing costs because of the river</i>	Tense regional relations and political economy impacts	Policy shift to cooperation and development, away from dispute/conflict; from food (and energy) self-sufficiency to food (and energy) security; reduced dispute/conflict risk and military expenditure
<i>Type 4: increasing benefits beyond the river</i>	Regional fragmentation	Integration of regional infrastructure, markets and trade

generate costs; significant benefits could be derived by *reducing costs arising because of the river*. International rivers can be catalytic agents, as cooperation that yields benefits from the river and reduces costs because of the river can pave the way to much greater cooperation between states, even economic integration among states, resulting in *benefits beyond the river*. We will explore these four types of benefits, set out in Table 1, as a framework for our discussion, while recognizing that they feed into each other inextricably and that they are integrated elements of a much broader, even more complex system that cannot be unbundled.

3. The ecological river: benefits accorded ‘to the river’

Cooperation across borders in the sustainable management of a river ecosystem, according *benefits to the river*, can be a valuable and unthreatening place for international cooperation to start. Environmental management is a cornerstone of river basin management and development and can bring benefits to all river uses and users. While there is a growing debate over the ‘preferred’ ecological state of a river—from ‘pristine’ to ‘engineered’, modern river basin management typically incorporates a conscious design process to ensure a ‘healthy’ river system, however defined, which accounts in some way for the inevitable tradeoffs of river development. A healthy river is typically one with: protected watersheds, preserving soil fertility and reducing contaminant and sediment soil transport; conserved wetlands, floodplains and groundwater

recharge areas, to maintain their natural capacity to buffer river flow and water quality variations; protected aquatic and riverine terrestrial biodiversity; and controlled water abstraction and wastewater discharge, to manage river flows and water quality.

Although rivers are resilient ecological systems that can recover from natural and anthropogenic shock, growing populations and industrializing societies almost invariably cause environmental damage to rivers, by, for example, reducing flows, eroding water quality and destroying fish stocks. Organizing affirmative action to protect the river within a nation state has proved complex and is costly if left until major damage is done and remedial action is needed, as many industrial nations have discovered. The US Superfund is a case in point, where tens of billions of dollars are being invested to restore surface and ground water systems, and particularly the latter, as groundwater clean up is invariably difficult.

The challenge of the protection of international waterways is much greater still, although there are recent examples of major cooperative efforts to restore and protect shared water systems. Initiatives in the Baltic and Red seas, and in the Danube basin, all supported by the Global Environment Facility, are good examples of this, bringing 'benefits to the river'. Cooperation among the eight Rhine riparian states is another interesting example. Cooperation on the Rhine goes back over a thousand years to navigation agreements. In the mid-19th century salmon production was an important economic activity in the Rhine. Growing populations and industries led to a complete extinction of salmon in the Rhine by the 1920s—with over half of the world's chemical production occurring along the Rhine by the 1950s, when the Rhine was known as 'the sewer of Europe'. In 1987, ministers of the Rhine countries launched the Rhine Action Plan, with the symbolic goal of 'Salmon 2000'—a readily understood objective which popularized the much more complex goal of reducing chemical contaminants to a level that would bring life back to the river. Following intensive international cooperation, major investment and widespread public support, by 2000 salmon were swimming up the river as far as Mannheim to breed once more, signifying a healthy river again. Today, much wider Rhine cooperation is planned—such as in the area of flood control.

In poorer regions of the world, there may appear to be fewer incentives for, and therefore less interest in, the management of the ecosystems of rivers. Yet, rivers are balanced systems and upsetting this environmental balance by unmanaged development can have major social and economic impacts. As populations and pressures on land grow in less developed nations, the poorest of the poor are forced into more and more marginal lands. In river basin headwaters, these are vulnerable uplands, often with high slopes and vulnerable soils. Forests are cut down, wetlands drained and slopes are cultivated. Soils are eroded, resulting in reduced crop yields and, eventually, unsustainable livelihoods. More insidiously, groundwater recharge is reduced and levels lowered, river flows become much more flashy and downstream flood and drought impacts can be greatly enhanced. In these circumstances, watershed management can be one key to sustainable development. There are a growing number of countries where this is recognized, with funds channeled to rural people for development programs, recognizing that they act as guardians of the watersheds that feed cities and industries downstream. This is much more difficult to organize in international river basins, where upstream nations are the guardians of the watersheds for downstream nations.

Take the case of Southern Africa, where there are numerous international rivers. Drought in the early 1990s had massive economic and social impacts with, for example, a 45% decline in

agricultural production in Zimbabwe in 1992. In 2000 and 2001 flooding of the Save and Limpopo rivers also had major impacts, particularly on the poor living in the most vulnerable parts of the floodplains in Mozambique, a downstream riparian state on eight international rivers. Smallholder settlement on vulnerable headwaters upstream, coupled with recurring drought and flood, has led to serious soil erosion and altered hydrologic regimes, with impacts throughout the river basins of the region. In the case of Mozambique, managing floods and droughts requires actions in the watersheds of upstream states. Unintentionally, the settlement of vulnerable watersheds in one country, often by the very poor, can thus have major impacts on a downstream country—and often on the very poor settled in the floodplains. There can be no reasonable solution without international cooperation.

It is clear that cooperation in the management of land and water within a basin ecosystem, according *benefits to the river*, can bring benefits to all—and may even be a pre-requisite for deriving *benefits from the river*.

4. The economic river: benefits to be reaped ‘from the river’

Cooperative management of the water flowing in an international river can reap benefits *from the river*. Managing a river basin from a system-wide perspective can increase the quality, the available quantity, and the economic productivity of river flows. River basin development seeks to promote this integrated, system-wide perspective, where the full range of water use opportunities and the various inter-relationships of individual water uses can be considered. River flows and water uses can be optimized to yield, inter alia, more food, more power, and more navigational opportunities, while sustaining environmental integrity. There will often be difficult tradeoffs to be assessed between environmental conservation and river development, with these assessments best made at the basin scale. This is always difficult, even within national boundaries. In international river basins, this system-wide perspective is much more difficult to obtain, and this can only be achieved through cooperation. The gains that result from this shift in planning perspective, are the most obvious and direct economic gains to be made from the cooperative management of shared waters.

There is a widespread perception that water allocation is a zero-sum game, that water resources are finite and that one use will always preclude another. While physical water resources are, indeed, finite, the quantity of *available* water resources can be influenced by management actions. This is particularly true where rainfall is low and highly variable. Good water management practices can effectively increase the available water resources in a system by, for example, protecting watersheds to minimize erosion, maximize infiltration and extend the period of run-off; providing over-year storage to buffer rainfall variability and reserve water in abundant years that would otherwise be lost; and by locating storage in areas of the basin that minimize evaporation and environmental disruption. In semi-arid Spain, for example, effective water management practices have increased water availability from 8% of total flow to 60%. There are also many non-consumptive uses of water, such as hydropower generation, navigation and recreation. The ‘use’ of water for these purposes will not necessarily diminish the water available in the system for other uses.

Focusing on the benefits⁴ derived from the use of water in a river system, rather than the physical water itself, is another way to broaden the perspective of basin planners. The allocation of water, particularly in international systems, is often contentious. However, the underlying interest of many involved, often not recognized, is commonly not the water itself—but rather the benefits and opportunities they hope to obtain from access to that water (i.e. not cubic meters but dollars). A focus on the benefits derived from water use may provide greater scope, and hence greater flexibility, in defining cooperative management arrangements that are acceptable to all parties.

Just as good water resource management practices can increase the availability of water in a river system, integrated planning that maximizes the benefits derived from water can clearly increase the overall productivity of a river system. The positive-sum nature of international cooperation in this context is more intuitive, because of the interaction of economic activities and the integrity of the ecosystem. Basin-wide configurations of consumptive and non-consumptive water uses can be explored to optimize benefits. In some cases, potential non-consumptive benefits may exist that could provide significant additional benefits to a basin without any change in the pattern of water extractions.

There are many good examples of cooperation reaping economic benefits from the river. In the case of the Senegal river, Mali, Mauritania and Senegal are cooperating to regulate river flows and generate hydropower, with a legal and institutional framework and co-owned infrastructure assets, including the Manantali dam that is located 300 km inside Mali. In another case, Lesotho and South Africa are cooperating in the construction of infrastructure on the Orange River in the Lesotho Highlands Project, providing least cost water supply to South Africa's industrial heartland and royalties to Lesotho amounting to 5% of GDP.

Major (joint or several) development, such as the construction of dams and major abstractions for irrigation, present special challenges due to the need to assess options and tradeoffs and to apply environmental and social safeguards effectively and reasonably across international borders and jurisdictions. Again, both the Senegal river and Orange river cases illustrate this, with ongoing debates on environmental issues made more complex by their international nature.

Yet, even significant gains to cooperation in a river system may not be sufficient motivation for cooperation if the distribution of those gains is, or is perceived as, inequitable. It is possible, for example, that a cooperative river management scheme which generates significant gains to the group as a whole might provide fewer benefits to one particular riparian than an alternative non-cooperative scheme. That particular riparian would therefore have little incentive to cooperate. Even if all states benefit more from cooperation than non-cooperation, the relative distribution of gains could inhibit cooperation. Concepts such as Tedd Gurr's 'relative deprivation' or William Baumol's 'envy' suggest that parties are not indifferent to the gains of others, and that some might choose to forgo their own potential gains in order to bar other parties from receiving relatively greater, or preferred, gains.⁵ In such cases, a cooperative arrangement may not be agreed without redistribution or compensation.

⁴Economic benefits here can include anything to which societies attach value.

⁵In addition to equity concerns, the spatial and political relationships between riparians may make relative gains relevant to regional development, integration and relations. Water resource management affects economic and demographic development patterns, enabling or undermining the growth of economic activities and human settlements.

An equitable benefit sharing arrangement may well require some form of redistribution or compensation. The form that compensation takes will be highly situation specific, but could involve monetary transfers, granting of rights to use water, financing of investments, or the provision of non-related goods and services. The range of benefits under discussion is also a critical issue. The broader the range of benefits under discussion, the more likely the riparians will be able to find a configuration of benefits that is mutually acceptable. While some benefits are difficult to share or compensate,⁶ in general the optimization of benefits should be more robust and more flexible than the optimization of physical water resources, because benefits tend to be more easily monetized and compensated and they have less political and psychological significance.

A body of international water law has evolved that focuses on the river as a physical system. Cooperative international management of water resources falls within a legal framework that focuses on water rights. Early principles still cited in the context of international water negotiations are those of ‘prior appropriations’ or ‘first in time—first in right’, often cited by a downstream riparian state, and that of ‘absolute sovereignty’, where water within a nation state is considered to belong to that state, often cited by an upstream state.⁷ After decades of consideration, important principles have been codified in 1997 in the ‘UN Convention for the Non-navigational Uses of Shared Watercourses’, which has yet to be ratified by a sufficient number of states to enter into force. The key principles of the Convention are those of ‘equitable utilization’, which emphasizes equity for all riparians, and ‘no significant harm’, which emphasizes protection for all riparian interests.

However, the application of these principles is fraught with difficulty and they risk opposing each other. The embrace of the first principle by many upstream states and the second by downstream states is a consequence of this. It must be recognized that both principles apply upstream and downstream equally. It is obvious that upstream users must recognize the dependence (sometimes total) on the river of downstream states and the risks of causing significant harm by reducing river flows. It is also true, though much less obvious, that downstream development can generate harm upstream by effectively foreclosing future opportunities for upstream use. Clearly upstream extraction generates externalities downstream by diminishing flows physically. On the other hand, downstream extraction can generate externalities upstream by diminishing future available flows upstream because of downstream claims of acquired rights to that water.

International water law is commonly interpreted as focusing on the allocation of water, resulting in riparian disputes being perceived as zero-sum prospects. International law provides guidance but no clear hierarchy for competing claims on shared waters. The law does provide important principles for developing a sound framework for cooperation between nations. However, there will also always be political motives for, and consequences of, non-cooperation that derive not *from the river* directly, but *because of the river*.

(footnote continued)

The growth, decline or character of nearby industrial and urban developments, for example, could have real impacts, both positive and negative, on market opportunities and environmental quality in neighboring states.

⁶For example, those benefits derived from environmental or social values may not be substitutable or easily compensated.

⁷Memorably cited by Judge Harman in 1895, in the case of the Rio Grande, shared by the US and Mexico.

5. The political river: costs arising ‘because of the river’

Far-reaching gains from cooperation in international rivers may accrue as savings of the costs of non-cooperation arising *because of the river*. The control of rivers and river flows has long been—and to some extent always is in all international rivers—a source of tension and dispute; and an issue of sovereignty, strategic necessity, and national pride. Such tensions (often inextricably linked to, and perhaps even indistinguishable from, other tensions) may reach the point where they color the geo-political relationships between states within a basin and become obstacles to growth by constraining the regional political economy and diverting resources from economic development.

International cooperation can ease tensions over shared waters, and provide gains in the form of the savings that can be achieved, or the costs of non-cooperation or dispute that can be averted. These tensions and costs will always be present to some degree in all river basins; in some basins they may be insignificant, in others they may be very high and may present enormous challenges. In particular, this occurs where water quantity is the major issue—as is likely to be the case with rivers flowing through arid areas, where contesting claimants commonly (but often not correctly) perceive a zero-sum game. Good examples of such cases include the Jordan, Nile, Euphrates and Indus basins, where relations between riparian states are significantly influenced by the waters that they share and are characterized by dispute.

Tensions arising because of the river, particularly where they are acute or long-standing, can thus significantly strain broader relations between states and impact the political economy of a region. Strained international relations tend to inhibit regional integration and manifest themselves in the fragmentation of markets, infrastructure, telecommunications, transport connections, labor flows, financial systems, etc. This fragmentation compromises all of the affected economies by denying them the benefits of regional integration that are potentially extremely important, particularly for small or developing economies. In some international river basins, little flows between the basin countries except the river itself—no labor, power, transport, or trade.

Tense regional relations may encourage the adoption of policies that focus on self-sufficiency, rather than on trade and integration. In the agriculture and power sectors, for example, this could mean the promotion of food and power self-sufficiency, which emphasizes the need to produce, in-country, all the food and power the country demands, even if the cost of doing so is greater than the cost of imports. Generally it is more economically efficient to promote food and power security, which focuses on a state’s capacity to secure its food supply either through trade or production—whichever is most cost effective.

In extreme cases, tensions arising because of the river may result in diversion of strategic human resources and policy focus from economic development to security concerns related to water and a diversion of financial resources to military preparedness. If these tensions contribute to conflict, then the human and financial costs can be extremely high. While these costs because of the river are not readily seen or quantified, they can be very real and substantial, and can compound other tensions leading to higher costs still.

We have referred to the extensive debate in the literature on the specter of ‘water war’. The reality is likely to lie somewhere between those that contend that water is a source of increasing tension and a potential flashpoint for conflict, and those that argue that there has never been a

water war and that the issue is less explosive than it seems. Clearly, as water becomes increasingly scarce relative to demand there will be competing claims on its use, which may increase geopolitical tensions. Where these tensions are high, they may be one of many underlying issues that contribute to souring relationships, and catalyze conflict. It is reasonably argued that there has rarely been a ‘water war’, where water is the sole cause of conflict. However, it is probably the case that there has never been a single cause for any war, and resource conflicts—land, water, minerals—are clearly common contributory factors to many past and present (and future) conflicts.

It is difficult to unbundle the importance of shared waters in the dynamics between riparian states from other contributory factors in conflict. From our experience, water plays a significant part in a number of recent and current disputes, even conflicts, around the world, especially where climate variability and water scarcity, coupled with major transboundary flows, create high levels of perceived threats to national water security. By the same token, cooperation with regard to shared waters contributes to strengthening relations between countries, and catalyzing broader cooperation, integration and stability. It is for this reason that the debate in the literature over whether there have been or will be ‘water wars’ is misguided; shared water has always and will always be one contributory factor in determining relations between states. The challenge is for international rivers to enhance relationships through shared opportunities, contributing to the benefits of cooperation and integration *beyond the river*.

6. The catalytic river: benefits enabled ‘beyond the river’

Cooperation in the management and development of international rivers may contribute to, or even result in, political processes and institutional capacities that themselves open the door to other collective actions, enabling cross-border cooperation *beyond the river*. Increasing the benefits from the river and decreasing the costs arising because of the river enable broader economic growth and regional integration that can generate benefits even in apparently unrelated sectors. Improved river basin management can increase the productivity of a river system, which may then generate additional opportunities in other sectors through forward linkages in the economy. The easing of tensions among riparian states may also enable cooperative ventures unrelated to water that would not have been feasible under strained relations. Flows other than the river—such as improved communications and trade—may grow. Thus, progress in cooperation on shared river management can enable and catalyze benefits ‘beyond the river’, more directly through forward linkages in the economy and less directly through diminished tensions and improved relationships.

The forward linkage effects of generating benefits from the river, for example in food and energy production and trade, are relatively obvious. Agricultural surpluses may spur growth in agro-processing or trade. Enhanced hydropower production and interconnection could both expand productive opportunities and increase the profitability and competitiveness of existing power-using enterprises. This may lead to additional investments in industry or infrastructure, and strengthened trade relations. Investments, improved infrastructure networks and trade relations can in turn generate additional growth opportunities, and so on. These types of forward

linkages could be national, supporting growth and development within basin states, or international, promoting exchange, trade and interconnection among basin states.

It is less obvious that diminishing the tensions that arise because of the river will enable greater economic integration among basin riparians and help to redress the regional fragmentation that may exist as a consequence, at least in part, of tensions arising because of the river. Easing these tensions could enable cooperation among countries by diminishing formal and informal restrictions on the movement of goods, labor and finance between countries, increasing integration even in apparently unrelated sectors such as transport, telecommunications or tourism. Regional infrastructure systems can be of particular importance. The fragmentation of regional infrastructure, especially in the case of small, landlocked economies, can be a major obstacle to growth. Where cooperation on international rivers can contribute to increased integration of infrastructure systems, development impacts can be significant.

The Mekong basin, shared by Cambodia, China, Laos, Myanmar, Thailand, and Vietnam, where relationships among the riparians have been turbulent for decades, provides an interesting case. While there have not been major disputes arising over the Mekong itself (and thus relatively small costs ‘because of the river’), significant benefits have been derived ‘from the river’ through cooperative management. Sharing the Mekong’s benefits has proved to be an important stabilizing factor in the region, bringing substantial benefits ‘beyond the river’, both directly from forward linkages and indirectly from diminishing tensions. During years of conflict between Laos and Thailand, for example, Laos always provided hydroelectricity to Thailand, and Thailand always paid. Similarly, the Government of Thailand has followed an explicit strategy of increasing regional stability by creating mutual dependency and thus purchases gas from Myanmar and Malaysia and hydropower from Laos and China, in part because these are low-cost supplies and in part because they create ties that bind the countries in a web of mutual dependency.

Cooperation with regard to river systems may therefore facilitate the political processes needed to enable cooperation on other ‘systems’ within and beyond the river basin, such as labor flows, markets and infrastructure. These economic ‘systems’ may extend well beyond the river, yet tensions because of the river system can be barriers to their development. Developing and integrating these broader economic systems can make each individual economy stronger and more competitive, and more easily integrated into the global economy.

7. The cooperative river: the dynamics of multi-type benefits

The cooperative river can therefore be seen to generate benefits of multiple types, although the potential sum of these benefits in different basins will vary greatly. The first type are the benefits accorded to the river by cooperative basin-wide environmental management, the second are those benefits to be reaped from the river by cooperative development of the basin, the third are the savings that can be made by diminishing the costs of non-cooperation arising because of the river, and the fourth are broader opportunities that are catalyzed beyond the river.

The relative importance of each type of benefit, and the dynamics among the types will be unique to each basin and the states which share it, reflecting, for example, history, hydrology, economics, politics and culture. While it is likely that in all basins there will be some potential benefits of each of these types, the value of these benefits, individually and in total, will vary

significantly among river basins. These potential benefits must be weighed against the generally high costs of establishing and maintaining multi-country river basin institutions, and may not everywhere justify cooperative efforts.

Seen another way, non-cooperation will have costs in terms of foregone opportunities of each of these types. Opportunities and gains may be highly visible, or extremely subtle. Cooperation on an international river may even be a necessary (but clearly not sufficient) condition for stable international relations and trade between basin states. Thus, it is quite possible that the greatest gains associated with cooperation on international rivers will derive from apparently unrelated development that would never have been considered had tensions over shared waters remained between nations. This relationship needs to be more widely understood and recognized, to increase the incentives for cooperation on international rivers.

Some river basins have the potential to generate significant benefits of multiple types; the Nile is a good example. Ten countries share the Nile; five are among the 10 poorest countries in the world; four are landlocked; and seven are, or recently have been, involved in internal or international conflicts. All of the riparians rely to a greater or lesser extent on the waters of the Nile for their basic needs and economic growth. For some, the waters of the Nile are perceived as central to their very survival. It is not surprising, therefore, that for centuries the Nile nations have been concerned by the actions of other riparians. This has been the basis, supplemented by many other factors, for tensions between riparian states. It is clear that Type 3 costs ‘because of the river’ are high. Environmental management is also a challenge. The Nile is the world’s longest river, it covers one-tenth of Africa’s total land mass and is home to Lake Victoria, the second largest freshwater lake, and the Sudd swamps, a wetland the size of Belgium. To effectively preserve the vast Nile ecosystem and bring Type 1 benefits ‘to the river’, cooperation is needed. The potential for Type 2 economic gains ‘from the river’ are significant, for example, through the cooperative management of river flows to mitigate against endemic floods and droughts, and coordinate hydropower and agricultural production, with major opportunities to construct shared infrastructure. Finally, cooperation on the management of the river can catalyze flows other than water between the countries, by diminishing regional tensions, increasing production, and promoting broader regional integration and cooperation ‘beyond the river’, bringing Type 4 benefits. The 10 Nile riparians are currently engaged in a cooperative effort, the Nile Basin Initiative, which explicitly seeks to develop and share all four types of benefits.

Table 2 explores the dynamics of cooperation on international rivers. The incentives for cooperation suggest *why* cooperation takes place, often due to concerns over problems, such as climate (and associated river flow) variability or recognition of opportunities, such as economic potentials. The catalysts for cooperation suggest *how* cooperation is fostered and promoted, often through improved communications and dialogue at many different levels. The linkages show the dynamics between the different types of cooperation, and to some extent suggest *when* cooperation of each type may take place. The linkages between types of cooperation suggest that making a start in environmental (Type 1) or direct economic cooperation (Type 2) can lead to growing political (Type 3) and indirect economic cooperation (Type 4)—or vice versa. The dynamics between types might be positive or negative. For example, while Type 3 cooperation may help further advance Type 1 and Type 2 cooperation, setbacks in Type 3 relations may impede cooperation of Types 1 and 2.

Table 2
Dynamics of cooperation on international rivers

Type	Incentives	Catalysts	Linkages
<i>Type 1 (environmental): increasing benefits to the river</i>	Concerns over river flows (including flood and drought) and pollution Ecosystem sustainability	Public awareness Joint environmental diagnostic analysis	Type 1 actions underpin sustainable Type 2 and 4 development Type 1 action builds Type 3 trust (inaction fuels Type 3 tensions)
<i>Type 2 (direct economic): increasing benefits from the river</i>	Recognized economic growth and business opportunities High variability of river flows, giving unreliable supplies and flood and drought risk Growing water scarcity	Joint analysis of optimized river development Fora for engagement of key actors (e.g. water and power industries, farmers, agri-business) Identification of win-win investments	Type 2 actions motivate Type 1 joint stewardship of resources Type 2 actions ease Type 3 tensions (unilateral actions fuel Type 3 tensions) Type 2 actions may generate production surpluses (agriculture, power) for Type 4 integration
<i>Type 3 (political): reducing costs because of the river</i>	Concern for improved international relations and peace given increasing water demands Need to ensure long-term river flows and benefits from flows Recognition of opportunities lost by policy focus on non-cooperation	Improved communications (infrastructure, telecoms, media, etc) Specific political dialogue (possibly mediated) Broader regional/global political initiatives and agreements	Type 3 gains facilitated by Type 1 actions that build trust Type 3 dialogue and engagement promoted by Type 2 actions and shared benefits (unilateral actions to capture benefits will increase tensions) Type 3 gains enable further Type 1 and 2 actions and Type 4 opportunities
<i>Type 4 (indirect economic): benefits increasing beyond the river</i>	Recognized gains from economic cooperation (particularly for small and /or landlocked economies)	Broad analysis of economic cooperation barriers and opportunities Civil society and private sector exchange Broader regional/global economic initiatives and agreements	Type 4 gains sustained by Type 1 actions Type 4 opportunities arise from tradable surpluses generated by Type 2 actions Type 4 integration enabled by Type 3 gains in policy shift to regional cooperation, lowering barriers to trade and communication

8. Conclusions

We have proposed in this paper an analytic framework describing four types of benefits (environmental, direct economic, political and indirect economic) from cooperation on international rivers. While there is enormous variation among the numerous international rivers of the world, we submit that costs of non-cooperation, and benefits of cooperation of all four types will manifest in all international river systems, to a greater or lesser extent. However, although these types of cooperation can be recognized, they are closely interwoven with each other. Furthermore, cooperation—and non-cooperation—between states on international rivers feeds into, and is fed by, a much broader bundle of international relations, from which it cannot be isolated. Thus conflict is unlikely to result over international rivers alone, but international rivers can be one significant cause of conflict. Similarly, joint management of international rivers will not be the sole area of cooperation between states, but it can be a significant catalyst for peace and economic integration.

The international rivers of the world are coming under growing pressure from increasing water demand and water quality deterioration. It is important to understand what the benefits of cooperation on international rivers may be, why cooperation may occur and how it may be fostered. Greater cooperation on an international river will lead to better management and development of the river itself, and, in many cases, it may also promote economic integration and regional security, beyond the river.

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