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Cooperation on International Rivers
A Continuum for Securing and Sharing Benefits

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Abstract*: It is generally accepted that conflicting demands over international rivers will intensify. There is an active debate on whether this will lead to "water wars" or to unprecedented cooperation. Framing the debate in this manner, however, tends to cast the concept of cooperation as all-or-nothing, implying that "cooperation" is an extreme, in direct opposition to "war." This conceptual construct obscures the many practical levels of cooperation that states can undertake to their mutual advantage. It is important to recognize that it is entirely rational that states will always have a "national agenda" for a river that they share with other states, and that they will cooperate if it serves that national agenda. In practice, there can be a continuum of levels of cooperation, from simple information sharing, to joint ownership and management of infrastructure investments. Furthermore, it may not necessarily be the case that "more" cooperation reaps "more" benefits in all river basins. There are many different types of benefits that can be secured through the cooperative management of international waters, with each individual basin offering different potential cooperative benefits with different associated costs. For each international basin, the optimal mode of cooperation will depend on a mix of factors including hydrologic characteristics, the economics of cooperative investments, numbers, the relationships of riparians, and the costs of parties coming together.*

Keywords*: international rivers, cooperation, benefit sharing, water resources, river basin management*

Introduction

Rivers wind through the histories and cultures of nations in extraordinary ways. Today international rivers form an increasingly important part of the geographic, economic and political landscape of our world (freshwater flows [whether surface water or groundwater], and the lakes and wetlands that some of these flows may pass through, derive from, or terminate within are described, very loosely, in this text as "rivers." The term "international rivers" is used in the text to refer to freshwaters whose basins are situated within the borders of more than one state). About 40 percent of the world's population lives within the basins of international rivers, and, perhaps even more significantly, over 90 percent of the world's population lives within the countries that share these basins. These rivers create national expectations – both within and beyond the borders of their basins – of the benefits they can bring. As populations and economies grow, and as less contentious national water resources become more fully exploited, an increasing share of the remaining development opportunities will be on international rivers. Development of these rivers can elicit extremes of cooperation or dispute or can elicit reactions anywhere in between these extremes. Much recent literature exists on the imperative of cooperation between nations sharing international rivers, but little has been written on the practicalities of achieving it. Achieving international cooperation is always a long and complex journey, for which there is no single path and few short cuts. Instead, there are many routes that can be followed and many steps that can be taken, with various options to consider and choices to be made.

This paper explores the practicalities of achieving cooperation on international rivers, and offers a menu of options and choices to consider. (While this paper focuses on the challenges of international rivers, clear parallels may be drawn to the conflicting interests of different user groups within national river basins as well). At the heart of this framework is the potential to move from national agendas that are unilateral, to national agendas that incorporate significant cooperation, and to converge upon a shared cooperative agenda. The extent to which this will occur will be determined by each party's perception of the benefits it can secure from cooperation. Convergence towards a cooperative agenda will be facilitated by sev-

eral important and practical steps. First, the perception of the range and extent of potential benefits needs to be expanded as much as possible, from the obvious to the less apparent. Second, the distribution of benefits and benefit-sharing opportunities to redistribute the costs and benefits of cooperation need to be explored to enable the definition of a cooperative agenda that will be perceived as fair by all parties. Third, alternative modes of cooperation need to be recognized and appropriate types of cooperation identified to secure the greatest net benefits. Each of these steps is examined below.

National Agendas: Converging Toward Cooperation

Each sovereign country will have its own national agenda on an international river — this is obvious, rational, and legitimate. Thus, in a river basin shared by two states, there will be two separate national agendas. If these two agendas overlap in some way, there will be a third, cooperative agenda of some scale – from very limited to substantial. As the benefits of this cooperation are progressively identified and secured, this third agenda may grow, with the two national agendas converging into a cooperative agenda for the two nations – each of which will still view the cooperative agenda to be their national agenda. In this case, the emerging single cooperative agenda will need to provide benefits that exceed the sum of the two non-cooperative national agendas, and will thus have become the rational choice of each sovereign nation (Figure 1). Cooperation on an international river can bring many benefits that may allow the whole to be greater than the sum of the parts, in part because treating the river basin as one system allows optimized management and development (the ultimate goal of integrated water resources management).

Benefits of Cooperation: Looking Beyond the River

A first step in motivating cooperation is to recognize the widest possible range of potential benefits that cooperation could bring. There will be no cooperation if benefits are perceived to be insufficient relative to the costs of cooperation. Benefits are broadly defined here to include economic, social, environmental, and political gains. Integrated, basin-wide water resources management is increasingly recognized as the ultimate goal for ensuring the sustainability and productivity of river systems and is a challenge in any setting, as the priorities and concerns of myriad users must be reconciled. In the context of international rivers, efforts toward integrated management cannot be made without international cooperation. The complexity and costs of international cooperation can be very great, and must be achieved in the absence of any ultimate entity with the mandate and authority to impose a solution.

A useful framework for broadening the range of recognized benefits of cooperation proposes the identification of four types of cooperative benefits (see Sadoff and Grey, 2002). The first type of benefit derives from cooperation that enables better management of ecosystems, providing benefits to the river, and underpinning all other benefits that can be derived. The second type of benefit derives from the efficient, cooperative management and development of shared rivers, yielding major benefits from the river, in increased food and energy production, for example. The third type of benefit derives from the lessening of tensions because of cooperation, resulting 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 yield a fourth type of benefit derived from greater cooperation between states, even economic integration among states, generating benefits beyond the river (Figure 2).

While each of these four types of benefits could potentially be obtained in all international river basins, the scale, feasibility, and relative importance of each type will vary greatly between basins, reflecting a wide range of political, geographic, economic, and cultural circumstances. There is no hierarchy among the four types with regard to the magnitude of potential benefits. The relative magnitude of different types of potential benefits within a par-

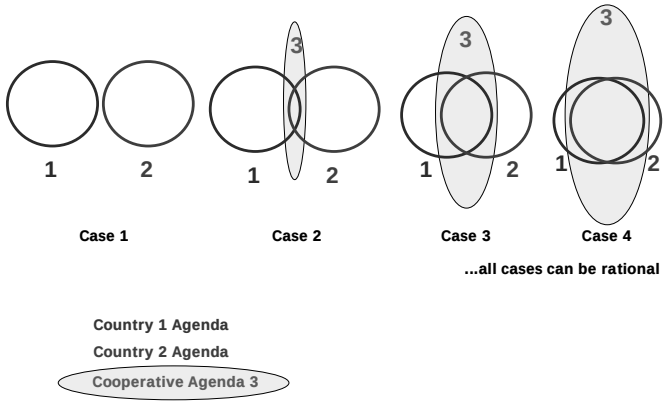

Figure 1. Converging agendas

Type	The Challenge	The Opportunities
Type 1 Increasing Benefits ***To the River***	Degraded water quality, watersheds, wetlands, & biodiversity	Improved water quality, riverflow characteristics, soil conservation, biodiversity and overall sustainability
Type 2 Increasing Benefits ***From the River***	Increasing demands for water, sub-optimal water resources management & development	Improved water resources management for hydropower & agricultural production, flood-drought management, navigation, environmental conservation, water quality & recreation
Type 3 Reducing Costs ***Because of the River***	Tense regional relations & political economy impacts	Policy shift to cooperation & development, away from dispute/conflict; from food (& energy) self-sufficiency to food (& energy) security; reduced dispute/conflict risk & military expenditure
Type 4 Increasing Benefits ***Beyond the River***	Regional fragmentation	Integration of regional infrastructure, markets & trade

Figure 2. Types of benefits of cooperation on international rivers

ticular basin will be a result of physical opportunities, costs, and the type of cooperation that is developed between riparian states. Nor is there a particular sequence in which these four types should be pursued, as, wherever initial cooperation focuses, there will be linkages with other types of cooperation. 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.

Benefit Sharing: Achieving Fair Shares

Another very challenging step in facilitating the convergence of national agendas is an analysis of the distribution of benefits from cooperation. This analysis is essential because a program of interventions designed to provide net gains for a basin as a whole will not necessarily provide net gains for each country. If significant benefits accrue in one country, while significant costs are borne by another, it is possible that a project providing net benefits on a basin-wide scale could actually generate net losses in any one country. If benefits are secured where they are generated under an optimal cooperative scenario (e.g., the most productive hydropower or irrigation sites), the distribution of benefits this creates may well be perceived as unfair by some riparians.

Where this initial distribution of benefits from a cooperation management and development scenario is seen as unfair, benefit-sharing mechanisms can play a pivotal role in motivating cooperation. Benefit sharing can be defined as any action designed to change the allocation of costs and benefits associated with cooperation. This would include benefits of all four types (Figure 2) and all costs of cooperation. The costs of cooperation could be directly associated with the institutional or physical costs of river development and management (for example, river regulation and storage costs), or any other costs that the negotiating parties choose to include for consideration (for example, hydropower interconnection and distribution costs.) In most cases, benefit sharing will require some sort of redistribution or compensation, which will be highly situation specific.

Benefit sharing provides riparians with the flexibility to separate the physical distribution of river development (where activities are undertaken), from the economic distribution of benefits (who receives the benefits of those activities.) This allows riparians to focus firstly on generating basin-wide benefits, and secondly on sharing those benefits in a manner that is agreed as fair. Furthermore, a focus on sharing the benefits derived from the use of water, rather than the allocation of water itself, provides far greater scope for identifying mutually beneficial cooperative actions. While the allocation of water, particularly in international systems, is often contentious, the underlying interest of most riparians is to secure the benefits of water use.

To negotiate the management and development of international shared rivers, riparians can focus their negotiations on the allocation of water rights or on the distribution of benefits derived from the use of water, as shown in Table 1.

The concept of water sharing by assigning rights characterized the 20th century and remains the most widely-recognized mechanism for riparian states to engage in sharing international rivers. Today this is guided primarily by principles first established in the 1966 Helsinki Rules on the Uses of the Waters of International Rivers and then codified in the 1997 United Nations Convention on the Law of the Non-navigable Uses of International Watercourses. This growing body of international water law sets out general factors upon which "reasonable and equitable" utilization of international watercourses should be based. The factors are not prioritized, except for a clause in the UN Convention that states that "special regard" should be given to "the requirements of vital human needs." Water use will likely be optimized within individual states and not across the basin, and thus the assigning of water rights may be inefficient. Furthermore, as populations and economies grow, in many river basins there will increasingly be insufficient water to apportion "reasonably and equitably" between riparian states.

Direct payment for water is an alternative mechanism to (re-)assigning water rights which provides the buyer the opportunity to benefit from the use of water without transferring water rights. This mechanism could be used in a basin where the assignment of water rights was clear and where a cooperative scheme called for increased abstraction by one riparian. International water markets could provide a flexible mechanism for reallocating water use among riparians within an agreed compen-

Table 1. Focuses for Riparian Negotiations

Water Sharing	*Benefit Sharing*
Water sharing by assigning rights	Direct payment for water use (e.g., municipal or irrigation supplies) (rights already assigned)
	Direct payment for benefits (e.g., fisheries, watershed management) or compensation for costs (e.g., inundated land, pollution
	Purchase agreements (e.g., power, agriculture products) (benefit transfer through terms/price)
	Financing and ownership arrangements (e.g., power infrastructure) (benefit transfer through deal structure)
	Broadened bundle of benefits, including provision of unrelated goods and services and less tangible (e.g. reputation) benefits

sation structure. Such markets would allow riparians to buy and sell fixed-term water use rights that would not necessarily affect any existing water treaty rights. The price and quantity of water use rights could be decided by market forces or they could be negotiated. Agreements regarding the price of water, the volume of water to be made available, or the eligibility of buyers would all affect the distribution of benefits derived from that water.

Payments for benefits (or compensation for costs) might be made in the context of a cooperative scheme. Riparians can be compensated, for example, for land inundation as a consequence of water impoundment by another riparian. In some instances it might be appropriate to make payments to upstream riparians for watershed management that bring benefits downstream (e.g. reduced flooding and sediment loads). Thus stewardship of headwaters and watersheds might entitle upstream riparians to share some portion of the downstream benefits that their stewardship helps to facilitate, and thus share the costs of that stewardship. Seen the other way around, if they did not protect the watershed it would impose costs on downstream riparians.

Purchase agreements can be structured as flexible tools for benefit sharing. Purchase agreements are generally negotiated for power, but they could also be negotiated for water supply, fisheries, agricultural products, etc. The negotiated price in the purchase agreement can effectively re-allocate the benefits of water use among riparians. While each would clearly seek to be better off by the transaction if they were willing to enter into the trade, a higher agreed price would transfer proportionally more benefits to the selling riparian, while a lower agreed price would apportion more benefits to the buying riparian. Purchase agreements can enable a range of mutually-beneficial scenarios. Clearly, for example, when one riparian has water resources or hydropower capacity but insufficient national demand for water and/or power, while the other has meager water resources and hydropower capacity but significant demand, both will benefit from this trade. Purchase agreements can also provide revenue guarantees that may be required to secure financing for large-scale projects.

Financing and ownership arrangements can be used to effect benefit sharing and transfer through the structure of the deal, especially when cooperative management calls for large-scale infrastructure investments. One riparian could provide financing for another as a means of facilitating investment, and, if the financing agreement were not concluded at strictly market terms, as a means of reapportioning benefits. Joint financing of cooperative projects, possibly including equity shares, has also been a successful means of facilitating cooperation and sharing benefits, by embedding a redistribution of returns into the deal structure. Jointly-owned operating or holding companies (for example, a joint power transmission company) can provide direct financial benefits, as well as broader gains from the intensified cooperation and, potentially, the trust implicit in joint ownership and management of assets.

Bundling of broader benefits can also be a mechanism for sharing benefits. It may be difficult in some cases to find a configuration of benefits that satisfies all parties. In such cases, the broader the range of benefits under discussion, the more likely riparians will be able to find a configuration that is mutually acceptable. If, for example, it is difficult to negotiate the benefits of a hydropower investment, the bundle could be broadened to include watershed management in the area of the reservoir, and power interconnection and trade. In addition, other benefits derived from unrelated projects, such as transport infrastructure or from areas of mutual interest, such as trade, immigration, communications, and environmental protection, can be bundled with water use-related benefits. This could simplify international rivers negotiations, if the parties felt that their inclusion could produce a bundle of cooperative projects all would accept as fair. Geopolitical and diplomatic relationships, public image and reputation, international support, and even less tangible benefits, such as ethical returns within a broader community of interests, might also influence states engaged in discussions of cooperative management of shared waters. The full range of benefit-sharing mechanisms can then be brought to bear on this broader bundle of benefits in order to reach an acceptable solution.

The sharing of benefits from the utilization of an international watercourse is a new paradigm, for which there appears to be no directly relevant reference in international water law beyond the principles, factors, and norms for sharing water by the allocation of rights. Without such principles and guidelines, unguided negotiations – and very difficult multi-party negotiations in some cases – may be the only way forward. Nevertheless, the principles of "equitable and reasonable utilization" and of "no significant harm" could provide a basis upon which benefit allocations can be considered. Policy makers and negotiators need to translate these principles into practice and develop other principles and guidelines, finding practical rules and mechanisms for benefit allocation and mechanisms for redistribution and/or compensation.

A perception by all riparians that a cooperative basin management scheme which maximizes overall benefits is "fair" will be essential to motivate and sustain cooperation. While the identification and generation of cooperative benefits enlarges the "pie," a larger pie will not satisfy all riparians if their particular "slice" of the pie is not larger (either literally, or even relatively to others). If benefit allocation takes place at the natural, physical location of benefit generation in an optimal cooperative scenario (e.g., hydropower or irrigation sites) and is not considered fair or if it provides a particular riparian with a smaller share of benefits than it would receive in the absence of cooperation, benefit-sharing mechanisms may be needed to motivate cooperation. Even when cooperation could gen-

erate greater gains for all, perceived inequities in the distribution of gains may make cooperation unacceptable to some. Thus concerns over the relative strength of neighbors and trading partners can influence perceptions of fairness and can thus also be critical factors in motivating and negotiating cooperation. The redistribution of benefits will itself require cooperation, with some mechanisms requiring greater efforts than others.

Modes of Cooperation: Recognizing a Continuum

A further step in promoting cooperation is to identify the various modes of cooperation that could be adopted, and determine the appropriate type of cooperative effort to achieve a particular goal. The optimal type of cooperation will vary with hydrologic and investment opportunities and with the consequent potential benefit-sharing mechanisms in each basin. In some basins, information sharing and basin-wide strategic assessments may be adequate to facilitate optimal cooperative management. In others, joint actions in river regulation, water storage, and drought and flood mitigation would yield significant net benefits. A continuum of cooperation can be conceived from unilateral action (independent, non-transparent national plans), to coordination (communication and information on national plans), to collaboration (adaptation of national plans for mutual benefits), to joint action (joint plans, management or investment) (Figure 3).

Unilateral action in a basin would mean no cooperation, not even communication or information exchange, over the management and development of the shared river. Not only do such arrangements forgo the opportunity to secure cooperative gains, but they can lead to situations where riparian countries' development and investment schemes undermine one another. The cumulative impact of these uncoordinated developments may diminish flows or degrade water quality to the point that all activities may be compromised.

Coordination is achieved through the exchange, or the cooperative gathering, of information in a basin. The exchange of hydrologic information could generate a range

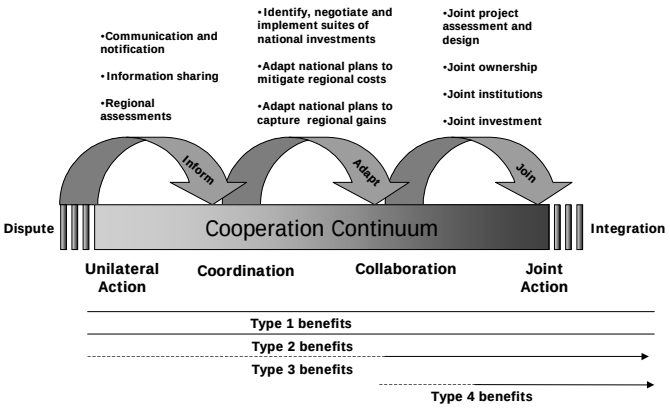

Figure 3. Types of cooperation – the Cooperative Continuum

of benefits, such as enabling improved flow forecasting and greater preparedness for floods and droughts. The exchange of information on development plans will help basin planners in different countries avoid conflicting projects, particularly where planners assess their national projects for impacts, costs, and benefits, if any, extending beyond their borders. (This raises an important point regarding the direction of the effects of development. While upstream extraction generates externalities downstream by diminishing or deteriorating flows physically, downstream extraction generates externalities upstream by diminishing future flows available for abstraction upstream, by virtue of perceptions of acquired rights to that water downstream.) Coordination on international rivers may enable nations to secure some Type 1 and 2 benefits (Figure 1) and, to some extent, Type 3 benefits, because tensions will reduce as trust grows. At this level of cooperation, regional assessments undertaken in a cooperative manner can provide a platform of information symmetry which may facilitate more intensive cooperation (further discussed below).

Collaboration results when national plans are adapted either to secure gains or to mitigate harm in another riparian country. Collaboration could generate benefits of all four types and could be achieved simply through ad hoc adaptations of ongoing plans or through agreed portfolios of national projects developed from a basin perspective. As with coordination, collaboration on international rivers may enable nations to secure direct Type 1 and 2 benefits. Benefit-sharing mechanisms may be needed to effect a redistribution of benefits that is perceived to be fair; this may further bind countries together and build trust, leveraging Type 3 benefits or even Type 4 benefits if the chosen benefit-sharing mechanism secures or redistributes broader bundles of benefits "beyond the river."

Joint action occurs when riparians act as partners in the design, investment, and implementation of international rivers development. This level of cooperation will need to be formalized by treaties. Benefit-sharing arrangements such as joint ownership and management of assets represent the greatest cooperative effort. Situations that lend themselves to this type of cooperation would include basins in which there is strong cooperation, capacity, and institutions. Joint action might include private sector engagement among co-riparian states and state-of-the-art management and investment scenarios that could optimize direct Type 1 and 2 benefits, as well as indirect Type 3 and 4 benefits. Less obviously, joint action might even be the right type of cooperation for basins in which there is little or uneven capacity, and high levels of mistrust, providing transparency, comfort, and security to affected riparians. Here, in addition to capturing the direct benefits of Types 1 and 2, joint action could be a powerful vehicle to deliver indirect Types 3 and 4 benefits.

It is important to recognize that this cooperation continuum is non-directive, dynamic, and iterative. The continuum is non-directive as it is not intended to suggest that

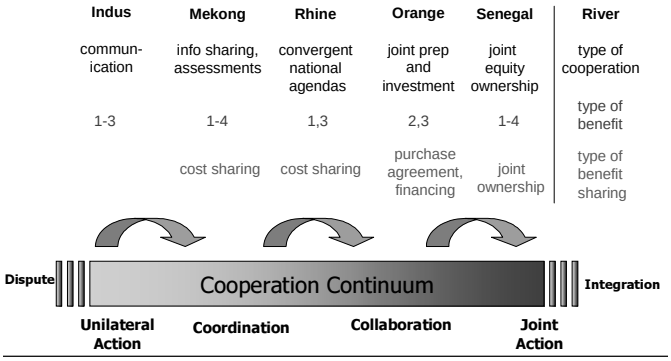

Figure 4. Types of cooperation – some examples

more cooperation is necessarily better, although it is constructed to portray increasing cooperative effort. The continuum is dynamic as there will be varying points on the continuum that are appropriate for different activities at different times, and nations may choose to adapt their activities to increase or decrease the intensity of their cooperation in response to new opportunities or developments within, or to broader events outside, the cooperative process. The continuum is iterative, because there will be repeated, discrete opportunities for cooperation, and the success of earlier cooperation, particularly in terms of realized benefits, will likely promote increasing cooperation – and vice versa.

Figure 4 illustrates different modes of cooperation in various international river basins around the world. A major challenge in each basin is to identify the right type of cooperative effort – one in which the benefits of cooperation outweigh the costs, and the process and outcome is politically and socially acceptable. For some basins, movement along the continuum may be a constructive goal over time. In other basins, different points along the continuum may be the right choice for capturing specific benefits at specific points in time. In yet other basins no cooperation, or very limited cooperation, may be rational. Riparian states will pursue cooperation only when they expect to receive greater benefits through cooperation than through unilateral action, and when they believe that benefits can be secured in a manner they perceive as feasible, cost effective, and fair.

The feasibility and cost-effectiveness of cooperation will vary enormously by basin, with the appropriate level of cooperation needed to secure cooperative benefits depending upon the combination of specific costs and potential benefits in any river system. Even rudimentary cooperation could be challenging and costly if, for example, water rights are contested, relations are strained, or capacity is low; however, the benefits of achieving such cooperation could be high. On the other hand, the cost of intensive cooperation could be modest if institutions, capacity, and relationships already exist. Thus, some basins may secure a significant share of their potential cooperative gains with low levels of cooperation, and find that further cooperative efforts are not justified. Alternatively, some basins may require sizeable up-front investments in cooperation before any significant benefits are secured. Both costs and benefits in this calculation may be subtle. Costs will include financial, institutional, and political/relational costs, and may also include the cost of unilateral opportunities (benefits) foregone. Benefits will include all four types described above, some obvious and readily assessed, and some much less apparent, incorporating non-quantifiable benefits such as international good will, regional stability, and the preservation of valuable cultural and natural assets.

Different modes of cooperative effort will create different options for benefit sharing (Figure 5), and similarly different benefit-sharing mechanisms will require different levels of cooperation. Payments for water and payments for benefits, for example, could be fairly straightforward. The establishment of water markets for iterative trading of water-use rights would require greater cooperative effort, as would purchase agreements and cooperative financing or ownership and management. Benefit-sharing mechanisms themselves thus become vehicles for cooperation and ties that bind riparians together.

The specific configuration of costs and range of benefits in a basin will determine the mode of cooperation that is called for in order to secure cooperative benefits. The challenge then is to share these benefits fairly.

Cooperative Regional Assessments: Promoting Cooperation

Cooperative Regional Assessments (CRAs) are tools specifically designed to promote cooperation on international rivers. On the one hand CRAs are rational "regional assessments" of sectors (i.e., power, agriculture) or themes (i.e., watershed management, capacity building). On the other hand CRAs are "cooperative," involving a process which brings riparian states together (potentially including government, the private sector and civil society) to reach common understanding, change perceptions, and achieve information symmetry, in order to build trust and catalyze cooperation.

CRAs are essentially practical tools for identifying opportunities for regional actions, for promoting the recognition and optimization of all four types of benefits of cooperation, for analyzing the distribution of costs and benefits associated with cooperative regional programs, and for identifying benefit-sharing and institutional mechanisms for realizing these benefits. CRAs identify and provide substantive basin-wide analyses of the range of development options, and they inform the identification and selection of appropriate projects. CRAs are less detailed than, and are distinct from, project-specific impact analyses which need to be undertaken at the project level to thoroughly assess the impacts (economic, environmental, social, etc.) of individual projects on co-riparian states.

The design of individual CRAs will vary widely according to circumstance: the complexity of the basin, theme, or sector; the number of riparians and the extent of their

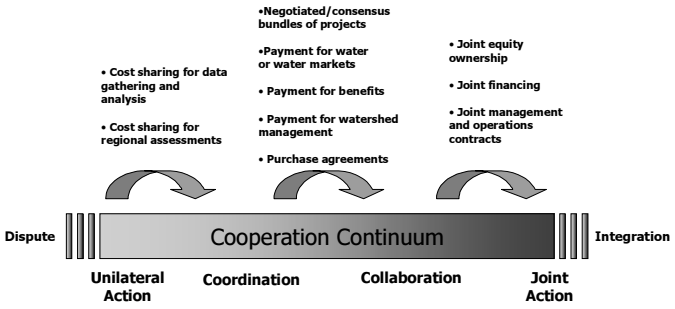

Figure 5. Benefit sharing along the continuum

cooperation; the availability of information; timeframe and funding constraints, etc. CRAs can be as simple as desk studies that reconcile national-level assessments, or they can be designed holistically on a basin-wide scale. In all cases they will bring riparian specialists together in a process that builds common understanding and relationships. CRAs need to be strategic, highlighting the broadest possible range of potential projects and benefits, and the options and choices that are available to secure and share the benefits of cooperation. CRAs will generally include:

- A *Transboundary Analysis* of the range of potential benefits of cooperation, providing a basin-wide view of the best possible river management and development opportunities (i.e. "without borders");
- A *Distributive Analysis* of the relative share of benefits and costs for each riparian nation under alternative management and development scenarios (to ensure that a program designed to maximize net gains for the basin as a whole, will also provide acceptable gains for each country individually), and exploration of the various options for sharing the costs and benefits of cooperation more equitably (i.e. "with borders"); and
- An *Institutional Analysis* of the possible modes of cooperation necessary to generate the greatest net benefits, taking account of the costs of cooperation.

CRAs are not negotiations and do not determine outcomes. Instead they explore opportunities for cooperation in an increasingly basin-wide view and they are an integral part of the process of building trust and confidence among riparian partners. The CRA can inform initial project selection and design, to enhance project efficiency, fairness, and feasibility from the perspective of all riparian states. The CRA can also provide riparian states with the information needed to reach consensus regarding the way forward in projects of mutual interest. CRAs can thus provide a common point of departure for the (essentially political) negotiations needed to agree a cooperative regional agenda.

The Dynamics of Cooperation: Reinforcing and Iterative

Good faith cooperative efforts will be self-reinforcing – cooperation will promote a willingness to cooperate. Cooperation can start anywhere, at any level of effort, in pursuit of any shared goal. In many cases it will be strategic to be pragmatic and opportunist, by focusing initial efforts on the areas where there is the greatest clarity over potential benefits and the least adaptation required from national agendas. In some cases it may instead be strategic to be visionary and bold. The dynamics of cooperation are such that progress in any area will help to develop cooperative processes, to establish relationships and institutions, and to gain momentum to facilitate more difficult undertakings. Initial hopes for achieving high levels of cooperation and large-scale comprehensive activities should not preclude efforts to secure more modest cooperative benefits, but all cooperative activities are likely to strengthen the cooperative process and create opportunities for more beneficial cooperation. Picking "low-hanging fruit" will secure the concrete benefits of cooperation – even if it is low-level cooperation – that will help motivate continued and likely increasing levels of cooperation.

Figure 6 illustrates some of the dynamics of cooperation. At each stage of a program of development on an international river, there will be opportunities for cooperation, and cooperation at any stage will promote the capacity and willingness for future cooperation. Cooperation can start at the analytic stage, for example using CRAs to identify potential benefits. Riparians can together explore the range of potential cooperative projects and benefits, and the distribution of those benefits. Alternatively, cooperation can begin with negotiations, when national agendas are disclosed and opportunities are explored to adapt or bundle projects in a cooperative manner, or to redistribute costs and benefits. Cooperation can even begin with coordination at the stage of project implementation, with information sharing and communication, which may lead to further collaboration, if appropriate.

These dynamics are in part a reflection of the iterative nature of cooperation on international rivers. Rivers will remain, water needs will grow, non-cooperation will become increasingly threatening, and cooperation will become increasingly important. All interactions on international rivers are therefore undertaken in an iterative context – it is assumed that in the future similar interactions will occur and that current actions will inform and affect future decisions. Thus current good faith cooperation should promote future good faith cooperation.

The dynamics are also a reflection of the changes both in perceptions and realities that result from cooperative experiences. The experience of successful cooperation can yield concrete benefits and build trust and relationships. This changes perceptions with regard to the potential benefits of cooperation, and to the feasibility of working cooperatively with co-riparians. Realities may also change as cooperation progresses. As opportunities are identified, as precedents, institutions, and relationships are established to facilitate cooperation, the real costs and benefits of cooperation will change.

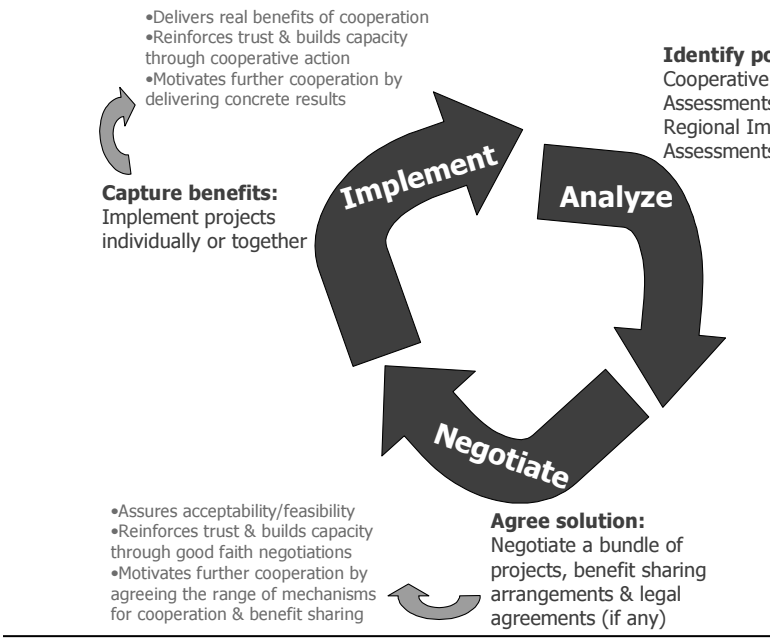

Figure 6. The dynamics of cooperation – iterative and reinforcing

Conclusions

In all international river basins, there are likely to be benefits to be derived from a move from unilateral national agendas to some mode of riparian cooperation. The extent to which national agendas will converge toward a shared, cooperative agenda will be a consequence of the perceptions of benefits that cooperation will bring. The full breadth of cooperative benefits should therefore be explored, as should the distribution of benefits and potential for alternative benefit-sharing scenarios. Riparian cooperation in pursuit of these benefits can, and should, take many forms. The continuum presented in this paper offers a menu of cooperative options that may assist riparians in determining the right modes of cooperation for activities within their basin. This continuum is not static, but conceived as iterative, adaptive, and dynamic. For some basins, movement along the continuum may be a constructive goal over time. In other basins, different points along the continuum may be the right choice for capturing specific gains. The continuum is also not intended to be directive or normative in any way; it is not the case that greater cooperation is necessarily "better" or will reap greater net gains. The uniqueness of each international basin will offer a different set of potential cooperative benefits, calling for different modes of cooperation and a different set of cooperative and benefit-sharing mechanisms.

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References

Sadoff, C.W. and D. Grey. 2002. "Beyond the river: the benefits of cooperation on international rivers." *Water Policy* 4, No. 5: 389-403.