

Reconciling the Interests of Upstream and Downstream Riparian States in Cooperation for Ecological Protection of Transboundary Basins: The Potential Role of “Benefit-Sharing” in the Ecological Protection of Shared Water Resources

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Abstract

Upstream and downstream riparian States have traditionally relied on different rules of international water law to protect their interests. For obvious reasons, upstream States have tended to favour the principle of equitable and reasonable utilisation while downstream States invoke the duty to prevent significant transboundary harm. However, while downstream States seek to rely on ecosystem services safeguarded by upstream States, harm can flow in both directions in a watercourse with restrictions on water utilisation impacting on upstream interests. Benefit-sharing arrangements which take account of emerging conceptual methodologies for ecosystems protection can play a major role in reconciling the diverse interests of upstream and downstream States.

Keywords: international water law; benefit-sharing; ecosystems approach; e-flows; ecosystem services; payment for ecosystem services (PES) / eco-compensation

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Introduction

The 1997 United Nations Convention on the Non-Navigational Uses of International Watercourses (UNWC) finally entered into force on 17th August 2014. If we accept that the UNWC is largely a codification of generally applicable customary international law and represents a broad consensus among States on the legal framework required to facilitate inter-State cooperation concerning shared water resources, it is notable that upstream States have yet to endorse the regime set down therein. For example, all three of the States which voted against the Convention in the UN General Assembly (*i.e.* Burundi, China and Turkey), as well as several of the States which abstained (*e.g.* Bolivia, Ethiopia, Mali and Tanzania), are predominantly upstream riparians on major shared international watercourses. Many upstream States seem to consider that the Convention ‘is biased in favour of lower riparians because of its separate and specific mention of the obligation not to cause harm’ (Salman 2014), despite the compromise language employed in Article 7, which appears to subordinate this obligation to the broader principle of equitable and reasonable utilisation. On the other hand, demonstrating the scope for confusion and disagreement over this point, the perceived subordination of the “no-harm rule” is the principal reason that a number of predominantly downstream States, including Egypt, France, Pakistan and Peru, also abstained in the General Assembly vote (Salman 2014). The so-called “no-harm” rule is generally understood as operating to protect the interests of downstream States, as it is presumed that ‘it protects existing uses against impacts resulting from activities undertaken by upstream states’, while upstream States in turn tend to favour equitable and reasonable utilisation, because they often presume that ‘it provides more scope for states to utilize their share of the watercourse for activities that might affect downstream riparians’ (Salman 2014).

However, the view that the UNWC favours downstream States is based on a misunderstanding of the rules of general international water law. The cardinal rule of international water law under the UNWC and generally - the principle of equitable and reasonable utilization - is inherently flexible and quite capable of taking account of a very wide range of needs and interests of riparian States, including potential and future uses and the need to protect the entire watercourse ecosystem. In recent years, a number of co-riparian States have sought to give effect to this principle by entering into formal arrangements *inter se* for the equitable sharing of downstream benefits. This approach rests on a broad and innovative understanding of equitable and reasonable utilization, and has received a measure of endorsement from leading commentators recognising its unique potential to reconcile upstream and downstream interests (Paisley 2002; Tarlock and Wouters 2007; Sadoff and Grey 2005). Similarly, the no-harm rule is capable of addressing not only the more obvious types of harm caused to downstream States by upstream States’ utilization of shared waters, typically involving interference with existing uses downstream, but also harm caused to upstream States by downstream States, ‘by foreclosing their future uses of water through the prior use of, and the claiming of rights to such water’ (Salman 2010).

It becomes apparent, therefore, that a more sophisticated understanding of the key substantive and procedural rules of generally accepted international water law may be required in order to promote meaningful and effective cooperation between upstream and downstream co-riparian States leading to equitable and environmentally sustainable

outcomes. The emphatic emergence and ongoing development in international water law of the obligation to protect ecosystems connected to shared international watercourses and, more specifically, the continuing evolution of the closely related concepts of “environmental flows”, “ecosystem services” and “payment for ecosystem services” (PES), also referred to as “eco-compensation”, provide the conceptual and methodological frameworks to help facilitate such cooperation. For example, the ecosystem services concept can help to foster common understanding among co-riparian States regarding the nature and value of socially beneficial services provided by international watercourse ecosystems, while systems of payment for ecosystem services can provide an incentive for upstream States to forego or significantly modify the planned development or utilization of a watercourses in order to secure ecosystem services throughout the basin (McIntyre 2014).

Benefit-Sharing

Definition and Origins

As the concept of benefit-sharing is not expressly recognised under any formal legal instrument, there exists no authoritative definition. However, commentators have loosely defined the practice to include ‘any action designed to change the allocation of costs and benefits associated with cooperation’ which, in most cases, ‘will require some form of redistribution or compensation’ (Sadoff and Grey 2005). Benefit-sharing arrangements would typically involve some form of payments for benefits, or compensation for costs, associated with enhanced stewardship of a shared transboundary watercourse normally undertaken by an upstream State:

‘In some instances it might be appropriate to make payments to upstream riparians for watershed management that brings benefits downstream (e.g. reduced flooding and sediment load). 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 the stewardship’ (Sadoff and Grey 2005).

The same commentators broadly define benefits ‘to include economic, social, environmental, and political gains’ (Sadoff and Grey 2005). Therefore, in situations where the simple allocation of a quantum share of water would prove inefficient, benefit-sharing arrangements would permit riparian States to cooperate in taking a basin-wide approach in order to optimise benefits and allocate costs, by providing a framework for the equitable sharing of those benefits and costs. The availability of such arrangements could function to encourage inter-State cooperation, while also greatly enhancing the range and scope of cooperative initiatives in which States might engage, by facilitating broad issue-linkage. In addition to benefits directly connected to water resources utilisation, such as irrigated food production or hydropower generation, benefit-sharing arrangements might also take account of non-water-related benefits, such as increased trade or improved diplomatic relations.

The practice of benefit-sharing with respect to international water resources is widely understood to have its origins in the 1961 Treaty Relating to Cooperative Development of the Water Resources of the Columbia River Basin (Columbia River Treaty) concluded between

Canada and the United States. This Treaty provided for the construction and operation of three infrastructure projects in Canada designed to maximise benefits associated with hydropower generation capacity, irrigation and flood control in the US. The Treaty also dealt with compensation payments to Canada related to those benefits enjoyed by the US. Prior to the Treaty's adoption a proposal by the US to construct the Libby Dam, which would have militated against the development of several viable hydropower sites in Canada and included a reservoir extending into Canada, provided the impetus to consider inter-State benefit-sharing on the Columbia River. The International Joint Commission (IJC), established under the 1909 Boundary Waters Treaty, facilitated these discussions, lasting many years. In order to inform negotiations, the two riparian States requested the IJC to develop a set of principles intended to govern any sharing of benefits. The agreed principles included the central requirements that an agreement 'should result in both the equitable sharing of the downstream benefits attributable to any cooperative undertakings that might take place, and an advantage to each country as compared to any alternatives that might be available to them' (IJC 1959; Paisley 2002). Thus, it appears that benefit-sharing arrangements would essentially require that the project(s) or other forms of cooperation contemplated would benefit both or all riparian States insofar as such cooperation somehow 'enlarges the pie' (Sadoff and Grey 2005).

The Columbia River example also suggests that, due to the novelty of benefit-sharing as a cooperative paradigm and the inherent complexity of the considerations and calculations involved, a sophisticated legal and institutional framework for cooperation would be required for formulating related proposals. In facilitating discussions over the detailed arrangements for the Columbia basin, the IJC established the International Columbia River Engineering Board, which in turn set up an Engineering Committee charged with 'obtaining data and analysing the situation'. This Committee continued to carry out extensive technical studies until December 1959 (Pitzer 1999; Paisley 2002). In this sense, Tarlock and Wouters compare the relative success of the Columbia River benefit-sharing regime with the problems experienced in attempts to introduce benefit-sharing in the Amu Darya and Syr Darya basins in Central Asia. These authors suggest that the lack of binding legal and competent institutional arrangements are largely to blame, pointing to 'a dysfunctional, ad hoc allocation regime, augmented by endless soft law declarations and agreements' (Tarlock and Wouters 2007). Such elaborate institutional structures are commonly associated with the general obligation of watercourse States to cooperate in the utilisation and protection of an international watercourse, one of the generally applicable rules of international water law providing a legal basis for the practice of benefit-sharing, as discussed further below.

Legal Basis: Permitted Not Required

The practice of entering into formal inter-State arrangements for the broader sharing of benefits derived from the utilisation of the water resources of an international watercourse, rather than the narrower and more simplistic practice of volumetric allocation of the available transboundary waters, has been described variously as 'a shared benefits *strategy*' (Tarlock and Wouters 2007) and as 'a *principle* of equitable sharing of downstream benefits' (Paisley 2002). It has also been argued that this practice 'has become a general principle of both

international water law and environmental law’ (Tarlock and Wouters 2007). While any lawful practice entered into by sovereign States on the basis of consensus does not require to be legitimated by reference to an established rule or principle of international law, it is still useful to investigate if such a practice is consistent with the key rules of international water resources law and, therefore, actually “lawful”. Further, it is important to examine the practice’s relationship with such rules in order better to understand the objectives, considerations and legal parameters which ought to guide States in crafting benefit-sharing arrangements. In this regard, it appears that benefit-sharing can rely for support upon all three of the key rules of general international water resources law, *i.e.* the principle of equitable and reasonable utilisation, the duty to prevent significant transboundary harm, and the general duty to cooperate in the utilisation and protection of an international watercourse.

Equitable and Reasonable Utilisation

However benefit-sharing is characterised, there can be little doubt as to the inherent legality of the practice as a means of giving practical effect to the principle of equitable and reasonable utilisation, now almost universally accepted as the cardinal and overarching rule of international water law (ILC 1994; ILC 1966). Article 5(1) of the UNWC, which sets out the principle of equitable and reasonable utilisation and is, like much of the rest of the Convention, widely regarded as indicative of customary international law (McIntyre 2007), provides that

‘Watercourse States shall in their respective territories utilize an international watercourse in an equitable and reasonable manner. In particular, an international watercourse shall be used and developed by watercourse States with a view to attaining optimal and sustainable utilization thereof *and benefits therefrom, taking into account the interests of the watercourse States concerned*, consistent with adequate protection of the watercourse.’ (Emphasis added)

The wording employed in Article 5(1) suggests that ‘customary international law anticipates the possibility that co-riparian States may either allocate transboundary water resources volumetrically, or agree to the sharing of benefits arising from shared watercourses (or possibly, both of these in concert)’ (Phillips *et al* 2006). In other words, benefit-sharing arrangements might serve to substitute for or complement arrangements for allocating a quantum share of water resources. Indeed, even those authors who refer to the practice as a ‘strategy’ are quick to explain that “shared benefits” is one of ‘[t]wo competing models of equitable utilization [to] have emerged’. When employed by co-riparian States, benefit-sharing would typically mean that ‘some nations will have to forgo the actual use of wet water but are entitled to monetary compensation for allowing other states to put the water to its most efficient use’ (Tarlock and Wouters 2007).

This understanding of benefit-sharing as a means of giving effect to the principle of equitable and reasonable utilisation highlights the practice’s general objective of achieving an *equitable* apportionment of whatever additional benefits are to be achieved by means of enhanced inter-State cooperation. Any legal understanding of what constitutes an “equitable” share is necessarily vague, flexible and context-dependent. It is clearly even more so in the case of water-related and/or non-water-related benefits than in the more straightforward case

of water quantum. Nonetheless, lawyers have some grasp of the function and application of equity in the international water law context (McIntyre 2013b; McIntyre 2007). Lawyers increasingly recognise, for example, the significance of the equitable principle of proportionality in ensuring that ‘equity as applied in international water law is more distributive in nature’ than equity as applied to other contested natural resources (McIntyre 2007; Fuentes 1996).

The flexible and open-textured nature of the principle of equitable and reasonable utilisation is confirmed by the non-exhaustive list of factors relevant to its determination, which normally accompanies any detailed articulation of the principle. Though the list set out in Article 6 of the UNWC doesn’t expressly include any reference to benefit-sharing, cost-sharing or the payment of compensation, this list is quite clearly intended to be open-ended and there is nothing to preclude such arrangements being taken into account in reaching or identifying an equitable accommodation of the interests of co-basin States. In support of this contention, the list included in the seminal important Helsinki Rules, the first systematic codification of international water law adopted by the International Law Association in 1966, and on which the UNWC is largely based, appears to contemplate just such arrangements. Article V(II)(10) expressly includes as a factor relevant to the determination of *a reasonable and equitable share in the beneficial uses of the waters* of an international drainage basin, ‘[t]he practicality of *compensation to one or more of the co-basin States* as a means of adjusting conflicts among uses’ (ILA 1966).

Duty to Prevent Significant Transboundary Harm

Benefit-sharing arrangements would also tend to function as a means of giving effect to the second principal substantive rule of general international water law, the duty to prevent significant transboundary harm, or the “no-harm” rule. Article 7(1) of the UNWC sets out the basic requirement, firmly established in customary international law, that ‘[w]atercourse States shall, in utilizing an international watercourse in their territories, take all appropriate measures to prevent the causing of significant harm to other watercourse States’. However, Article 7(2) elaborates further on the nature of this obligation, providing that

‘Where significant harm nevertheless is caused to another watercourse State, the State whose use causes such harm shall, in the absence of agreement to such use, *take all appropriate measures*, having due regard for the provisions of articles 5 and 6, in *consultation* with the affected State, *to eliminate and mitigate such harm* and, where appropriate, to discuss the question of *compensation*’ (emphasis added).

This authoritative formulation of the no-harm rule as applied to international watercourse, while acknowledging its close interrelationship with the principle of equitable and reasonable utilisation, envisages the possibility of a State agreeing to activities within the territory of another State that might adversely impact upon the former’s own interests, along with some form of arrangement for compensation in respect of such adverse impact.

Under the no-harm rule, the concept of harm has always been broadly understood, to include adverse impact upon a wide range of interests, including both water-related and non-water-related interests. For example, one leading commentator notes that the obligation in general international law to prevent transboundary harm is not confined to one State’s direct

use of a watercourse that causes harm to another State's use thereof, as 'activities in one state not directly related to a watercourse (e.g. deforestation) may have harmful effects in another state (e.g. flooding)' (McCaffrey 2001). Similarly, the commentary to Article X of the ILA's 1966 Helsinki Rules noted that 'an injury in the territory of a State need not be connected with that State's use of the waters' (ILA 1966). Therefore, agreed arrangements concerning the sharing of a wide range of water-related and non-water-related benefits, and intended to eliminate, mitigate or compensate for actual or potential harm to a wide range of State interests, can be regarded as effective means for the implementation of the obligation to prevent significant transboundary harm.

Environmental harm, and damage to the ecosystems of an international watercourse in particular, is one of the key types of adverse impact upon the interests of another riparian State envisaged under Article 7 of the UNWC and under customary international law (Dupuy 1991; Wolfrum 1990; Birnie and Boyle 1992). For example, Handl points out that many early treaties relating to the utilisation of international watercourses contain 'no-harm' provisions concerning the prevention and abatement of harmful transboundary pollution (Handl 1975). A formulation representative of such instruments is contained in Article X(1) of the Helsinki Rules:

'Consistent with the principle of equitable utilization of the waters of an international drainage basin, a State

- a. Must prevent any new form of water pollution or any increase in the degree of existing water pollution in an international drainage basin which would cause substantial injury in the territory of a co-basin State, and
- b. Should take all reasonable measures to abate existing water pollution in an international drainage basin to such an extent that no substantial damage is caused in the territory of a co-basin State.'

Any modern articulation of such environmental concerns would be framed sufficiently broadly to include a requirement of ecosystems protection. In this sense, Article 8 of the ILA's 2004 Berlin Rules on Water Resources Law provides, rather inclusively, that 'States shall take all appropriate measures to prevent or minimize environmental harm'. Articles 6 and 7, respectively, of the 1995 Agreement on Cooperation for the Sustainable Development of the Mekong River Basin deal with minimum flow requirements and the prevention of harmful effects. Article 2 of the 1992 UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes (UNECE Water Convention), which has recently been opened for accession to non-UNECE States, contains obligations to 'prevent, control and reduce pollution of waters causing or likely to cause transboundary impact' and to 'ensure conservation and, where necessary, restoration of ecosystems' (McIntyre 2007).

The UNWC itself contains explicit ecosystems obligations, with Article 20 providing that '[w]atercourse States shall, individually and, where appropriate, jointly, protect and preserve the ecosystems of international watercourses' (McIntyre 2004). Article 20 is supplemented by Article 21, requiring watercourse States to prevent, reduce and control pollution of an international watercourse; Article 22, requiring watercourse States to prevent the introduction of alien or new species detrimental to the watercourse ecosystem; and Article 23, requiring watercourse States to protect and preserve the marine environment. In its

articulation of ecosystem protection requirements, the UNWC reflects wider State practice and, almost certainly, the position in customary international law (McIntyre 2004). The international community's shared understanding of what ecosystems protection involves, based on sophisticated analytical and methodological concepts, such as those regarding environmental flow requirements and the evaluation of ecosystem services, is continually evolving. As a result, the normative nature and implications of ecosystem obligations under international law are becoming increasingly clear (McIntyre 2014).

With regard to benefit-sharing, Articles 20, 21 and 23 of the UNWC expressly require States to act jointly, where necessary, to achieve the objectives under each provision. The stipulation that States ought to act jointly, where appropriate, could be understood to support the use of benefit-sharing arrangements under which downstream States agree to compensate upstream States in lieu of forgone water resources development opportunities or for the adoption of measures aimed at protecting and preserving international watercourse ecosystems to the benefit of such downstream States.

Harm to the interests of watercourse States, however, does not only "travel downstream". Commentators are increasingly conscious of the fact that water utilisation by downstream States can cause harm upstream (McCaffrey 2007). This is true despite the fact that "[i]t is much less obvious, and generally not realized, that the upstream riparians can be affected, or even harmed by the foreclosure of their future uses of water, caused by the prior use, and the claiming of rights to such water by the downstream riparians" (Salman 2010). In the specific context of an examination of benefit-sharing arrangements, Sadoff and Grey acknowledge that "downstream extraction generates externalities upstream by diminishing future flows available for abstraction upstream, by virtue of perceptions of acquired rights to that water downstream" (Sadoff and Grey 2005). Salman outlines a relatively rich and diverse body of international practice which shows that States, judicial bodies and other international actors have long understood that downstream uses can establish a *fait accompli*, thereby pre-empting future upstream use and thus causing harm to the interests of upstream riparians (Salman 2010).

Arguments citing the "prior use" or "acquired rights" doctrines as a basis for favouring existing uses over potential future uses as a matter of legal principle have largely been discredited (McIntyre 2007). This is reflected in the formulation of factors relevant to equitable and reasonable utilisation under Articles 6 and 10 of the UNWC, which attributes no inherent priority to existing uses over future uses (ILC 1994). Nonetheless, the practice of international water law demonstrates that existing uses would tend to enjoy careful consideration on the basis of other relevant factors, such as economic and social dependence, vital human needs, or the obligation to avoid causing significant harm to other watercourse States (Tanzi and Arcari 2001). Generally, for the purposes of determining a reasonable and equitable regime of utilisation of shared water resources, the difficulties inherent in reliably considering the beneficial character or adverse impacts of a future use are manifest (McIntyre 2007).

In sum, such "foreclosure" of water utilisation opportunities for upstream States can amount to harm for the purposes of the no-harm rule. This means that benefit-sharing arrangements involving some form of compensation for upstream States which forgo such opportunities for the sake of ecosystems protection would be entirely consistent with the

principle articulated in Article 7 of the UNWC, especially in light of the express reference to the possibility of compensation in Article 7(2).

Duty to Cooperate

Benefit-sharing arrangements also find legal support in the third key rule of general international water resources law, the general duty of watercourse States to cooperate in the utilisation and environmental protection of an international watercourse. This obligation is largely comprised of procedural elements, including the well-established duties to notify co-riparian States of planned projects; to consult and, where necessary, negotiate with co-riparian States where disagreements arise; and to engage in the regular exchange of relevant water-related information. The duty to cooperate is generally regarded as essential in facilitating meaningful implementation of the two key substantive obligations outlined above (McIntyre 2013a; Leb 2012; Leb 2014).

Article 8 of the UNWC, on the '[g]eneral obligation to cooperate', can be considered an authoritative indication of that norm's position in customary international law. That provision establishes that '[w]atercourse States shall cooperate on the basis of sovereign equality, territorial integrity, *mutual benefit* and good faith in order to attain *optimal utilization* and *adequate protection* of an international watercourse' (emphasis added). The emphasis on 'mutual benefit', 'optimal utilization' and 'adequate protection' suggests that benefit-sharing arrangements under which upstream States are rewarded for maintaining the ecosystem of an international watercourse fall within the scope of the cooperative initiatives envisaged. In elaborating upon the precise legal origins and meaning of Article 8, the ILC's Commentary to its 1994 Draft Articles explains that inter-State watercourse cooperation 'is an important basis for the attainment and maintenance of an equitable allocation of the *uses and benefits of the watercourse*' (ILC 1994, emphasis added). In providing an example of an instrument incorporating typical provisions on transboundary water cooperation, the ILC cites the 1964 Agreement between Poland and the USSR concerning the use of water resources in frontier waters, pointing out that

'Paragraph 3 of article 3 states that the purpose of the Agreement is to ensure cooperation between the parties in *economic, scientific and technical activities* relating to the use of water resources in frontier waters. Articles 7 and 8 of the Agreement provide for cooperation with regard, *inter alia*, to *water projects* and the regular exchange of data and information' (ILC 1994, p. 106, emphasis added).

This illustration of the obligation to cooperate seems to corroborate the understanding that cooperation under Article 8 would cover joint arrangements incorporating elements of benefit-sharing.

Consistent with the experience of the riparian States on the Columbia River basin in crafting a benefit-sharing regime, Article 8(2) of the UNWC proceeds to suggest that 'In determining the manner of such cooperation, watercourse states may consider the establishment of joint mechanisms or commissions, as deemed necessary by them, to facilitate cooperation on relevant measures and procedures in the light of experience gained through cooperation in existing joint mechanisms and commissions in various regions.'

The key function of any joint watercourse mechanism or commission is the regular and structured exchange of data and information. Such exchange is acknowledged as an absolutely critical prerequisite for the conclusion of any benefit-sharing arrangements. In this regard, Sadoff and Grey highlight the key role of Cooperative Regional Assessments (CRAs), which would ideally function ‘to reach common understanding, change perceptions, and achieve information symmetry, in order to build trust and catalyse cooperation’ (Sadoff and Grey 2005). Ultimately CRAs can ‘provide a common point of departure’ as they serve to ‘provide riparian states with the information needed to reach consensus regarding the way forward in projects of mutual interest’ (Sadoff and Grey 2005).

With the three norms examined above serving as legal foundations for benefit-sharing, this practice may be viewed as a means of ensuring their harmonised and coherent application. There is, in this sense, a close connection between the duties to cooperate and to prevent significant transboundary harm, including environmental harm, from which a need arises for States to work together to develop more sophisticated legal arrangements to compensate for harm. Adopting a broad understanding of environmental damage to include the denial of water-related ecosystem services, it is worth noting that Principle 22 of the 1972 Stockholm Declaration has long provided that:

‘States shall cooperate to develop further the international law regarding liability and compensation for the victims of pollution and other environmental damage caused by activities within the jurisdiction or control of such States to areas beyond their jurisdiction’(UNCHE 1972).

This exhortation is repeated as Principle 13 of the 1992 Rio Declaration, which further proposes that States act ‘in an expeditious and more determined manner’ in developing international law in this area (UNCED 1992). More generally, Stockholm Principle 24 states that

‘International matters concerning the protection and improvement of the environment should be handled in a cooperative spirit by all countries ... Cooperation through multilateral or bilateral arrangements or other appropriate means is essential to effectively control, prevent, reduce and eliminate adverse environmental effects resulting from activities conducted in all spheres’ (UNCHE 1972).

Such universally adopted soft-law principles can also be understood as an acknowledgement by the international community of the need for more sophisticated arrangements, within the framework of international law, for ensuring that environmental costs are fully and equitably internalised, including by means of benefit-sharing and PES / eco-compensation arrangements. In an exhaustive study categorising the various types of provisions relating to a prohibition on transboundary harm found in freshwater treaties, Fuentes includes that of ‘treaties that establish mechanisms of cooperation to deal with the problem of the environmental degradation of international rivers’. She refers to numerous examples of such provisions, including Article 2(2) of the 1994 Agreements on the Protection of the Rivers Meuse and Scheldt and Article 4 of the 1994 Convention on Cooperation for the Protection and Sustainable Use of the Danube River (Fuentes 1998).

State Practice

As regards support for benefit-sharing in State practice, there exist several high-profile examples of basins illustrating benefit-sharing arrangements, whether in practice, most notably the Columbia River shared between Canada and the US, or in theory, such as the Amu Darya and Syr Darya basins in Central Asia (Tarlock and Wouters 2007). Paisley lists 8 examples of ‘international agreements which provide for the return, either in kind or in monetary form, of a share of the benefits received in a state or states as a result of acts done in another state or states’ (Paisley 2002). On this basis, he concludes that

‘These examples confirm that state practice can be invoked in support of an emerging principle of customary international law regarding the equitable sharing of downstream benefits where the act that confers the benefit on one state appears to have been done, or not done, at the request of another state’ (Paisley 2002).

It would be overstating the case, however, to argue that the practice of benefit-sharing is firmly established in international water law. Benefit-sharing as a means of achieving equitable and reasonable utilisation has been actively discussed at a number of international fora, including the 2001 Bonn International Conference on Freshwater, the 2003 3rd World Water Forum and Ministerial Conference, and the 2005 Stockholm World Water Symposium. Yet, Phillips *et al* consider that the topic is somewhat neglected by the academic community and, further, that ‘when reading the literature ... little substance is discernible beyond the catch-phrase level’ (Phillips et al, 2006). McCaffrey acknowledges that ‘it is not uncommon for some form of compensation (*e.g.* sharing electric power) to be part of an overall package of equitable apportionment of the uses and benefits of an international watercourse’. However, he cautions that this practice does not imply that modern international law recognises States as having any property in shared waters which could underlie a firm right to such compensation:

‘On the contrary, upper riparians are under an obligation not to prevent such waters from flowing to a lower riparian country. The only interference with such flow that would be permissible are those that would be equitable and reasonable in the context of the states’ fluvial relations’ (McCaffrey 2001; Paisley 2002).

Thus, while benefit-sharing arrangements are permissible under international water law, no obligation or entitlement to enter into such arrangements arises by virtue of customary international law. Any such compulsion or right, arising otherwise than by the clear and explicit consent of watercourse States, would be an intolerable interference with State sovereignty. However, in its 1957 deliberation upon the true nature of the duties imposed upon a watercourse State under international law, consistent with respect for the principle of State sovereignty, the arbitral tribunal in the *Lac Lanoux* arbitration found that any such State ‘under the rules of good faith, has an obligation to take into consideration the various interests concerned, to seek to give them every satisfaction compatible with the pursuit of its own interests and to show that it has, in this matter, a real desire to reconcile the interests of the other riparian with its own’ (Lac Lanoux 1957; McCaffrey 2007b).

This suggests that watercourse States are at least obliged to consider seriously any overture made to them regarding possible benefit-sharing arrangements.

Challenges to Benefit-Sharing

Critiquing the arguments for a shift in emphasis from water allocation to the sharing of benefits, Tarlock and Wouters articulate ‘three possible objections to this shift: unequal bargaining among states; the premature “sale” of future use opportunities; and the increased risk of aquatic ecosystem degradation’ (Tarlock and Wouters 2007). The challenge of inequality of bargaining power among co-riparian States will always be present whether States seek to allocate a share of water resources or of water-related or other benefits, even though the growing emphasis in international water law on procedural equity should function to level the playing field to a certain extent (McIntyre 2013a; McIntyre 2013b). Concluding generally that often ‘headwaters states cannot bargain equally with wealthier downstream states’, Tarlock and Wouters describe China as a notable exception on the Upper Mekong (Tarlock and Wouters 2007). Indeed, China is unlikely to negotiate “premature” benefit-sharing arrangements to its longer-term detriment. As a comparatively developed Mekong State, it is improbable in China’s case that ‘[s]hort-term monetary gains may come at the expense of foregone future uses’ (Tarlock and Wouters 2007). Rather, it is fair to assume that China possesses the resources and capacity to identify and safeguard its long-term strategic interests. Furthermore, the considerable weight given within the framework of equitable and reasonable utilisation to environmental considerations generally, and ecosystems protection in particular, should help to address concerns that benefit-sharing may present a risk to aquatic ecosystem integrity (McIntyre 2007). Such concerns should recede further with the increasing normative sophistication represented by the continuing, rapid evolution of technical concepts and methodologies to give practical effect to the so-called “ecosystems approach” to the protection of international watercourses stipulated under international water law (McIntyre 2014; McIntyre 2007).

The Emergence and Evolution of International Watercourse Ecosystems Protection Obligations

It is now beyond debate that the rules of modern international water law include a requirement for all watercourse States to protect ecosystems connected to international watercourses. Many commentators have detailed the origins and evolution of such a legal requirement (Brunnée and Toope 1994; Brunnée and Toope 1997; Tarlock 1996; McIntyre 2004; McIntyre 2007). For example, whilst conceding, perhaps somewhat conservatively, that ‘[t]here is no *specific* duty to protect aquatic ecosystems in customary international law’, Tarlock cites the earlier work of other leading authorities in support of the conclusion that ‘[t]he duty can be derived from the principle of international environmental law of State responsibility for environmental harm’ (Tarlock 2014; Caponera 1987). To this end, watercourse States are expected to adopt an ‘ecosystems approach’ to the use and protection of international basins, which requires careful consideration of possible impacts upon

ecosystem functions and services in basin development planning. According to Chapter 18 of Agenda 21,

‘water resources have to be protected, taking into account the functioning of aquatic ecosystems and the perennality of the resource, in order to satisfy and reconcile needs for water in human activities. In developing and using water resources, priority has to be given to the satisfaction of basic needs and the safeguarding of ecosystems’ (UNCED 1992b).

The UNECE Water Convention provides an example of a conventional instrument requiring parties, under Article 3(1)(i), to ensure that ‘sustainable water-resources management, including the application of the ecosystems approach, is promoted’. The practical requirements for such an approach, however, have until recently been largely uncertain. Other than some detailed early guidance (UNECE 1993), international practice had tended to place emphasis on procedural rules, concerning mechanisms for information exchange, early warning, and scientific and technical cooperation, rather than substantive rules. The latter norms are notoriously difficult to elaborate (McIntyre 2004).

Analysing the 1994 ILC Draft Articles upon which the UNWC was based, leading commentators have concluded that the ILC had aimed to create frameworks ‘establishing a process for the subsequent development of substantive obligations, rather than seeking to elaborate an immediate set of specific substantive rules’ (Brunnée and Toope 1994). Presciently, the same commentators argued that procedural rules act as ‘catalysts’ for the development of substantive rules:

‘The exchange and cooperative practice they generate can contribute significantly to the convergence of positions, thus allowing gradual agreement on substantive obligations and standards. At the same time, cooperative practice serves important trust-building and conflict-prevention functions’ (Brunnée and Toope 1994).

This may help to explain why recent developments in this particular area of international water law have been characterised by a proliferation of technical guidance elaborating on innovative concepts and methodologies which can aid in the effective implementation of ecosystems protection requirements. The international community has devoted considerable energy to this issue over the past 10 years or so. Convention secretariats, international non-governmental organisations, academic researchers and others active in the discourse of international environmental law have been busy producing such technical guidance (McIntyre 2014). Key conceptual methodological approaches set out in such guidance include those of environmental or ecological flows (e-flows), ecosystem services, and PES / eco-compensation.

e-flows

The concept of e-flows provides ‘a methodological approach that incorporates environmental concerns into the process of allocating water rights among different users’ (Brels et al 2008), and is absolutely central to the implementation of an ecosystems approach. This concept has been elaborated upon by bodies such as the Secretariats of the Ramsar and Biodiversity Conventions (Adams 2012), and the Global Environmental Flows Network (Forslund et al 2009), a collaborative network involving such organisations as IUCN, WWF and UNEP. The

Scientific and Technical Review Panel (STRP) established under the Ramsar Convention has also been actively engaged in the preparation of technical guidance on a range of aspects of the concept, including the ecological vulnerability of wetlands and reviews of environmental flow methodologies (Brels et al 2008).

The concept has been endorsed in international soft law instruments, notably the 2007 Brisbane Declaration, which defined the concept as ‘the quantity, timing and quantity of water flows required to sustain freshwater and estuarine ecosystems and the human livelihoods and well-being that depend on these ecosystems’ (McIntyre 2014). Commentators explain that ‘[t]he overriding objective of e-flows is to modify the magnitude and timing of flow releases from water infrastructure (e.g. dams) to restore natural or normative flow regimes that benefit downstream river reaches and their riparian ecosystems’ (LeRoy Poff and Matthews 2013). Of course, natural flow regimes might equally be maintained by the decision of an upstream State to refrain from developing water infrastructure altogether.

It seems clear that e-flow obligations are now recognised in general international water law. The adoption in 2012 by the US-Mexico International and Boundary Water Commission (IBWC) of Minute 319, amending by interpretation the 1944 United States – Mexico Water Treaty, marks the recognition by both the US and Mexico of the need to ensure certain minimum ecological flows to the Colorado Delta in Mexico, parts of which have been designated as protected wetlands under the Ramsar Convention (IBWC 2012). Minute 319 establishes a pilot programme to deliver 158,088 acre-feet (195,000 million m³) of annual water flow to the Colorado Delta in two ways - a one-time pulse flow of 105,392 and a base flow of 52,696 acre-feet per year. (Tarlock 2014; Buono and Eckstein 2014). Tarlock recognises the intrinsic link between e-flows and ecosystems obligations and views the restoration of ecological flows essential for maintenance of the Delta as ‘a de facto implementation of the ecosystem conservation mandates of the United Nations Convention on the Law of the Non-navigational Uses of International Watercourses’ (Tarlock 2014). Indeed, he regards the advocacy work of NGOs regarding the Colorado Delta after its chance revival due to ‘two wet decades in the 1980s and 1990s’ and the recent implementation of a number of *ad hoc* river restoration programmes in the US as having ‘helped to legitimate the idea that environmental flows are an integral part of many allocation regimes’ (Tarlock 2014). Describing Minute 319 as an important precedent in international environmental and water law, Tarlock explains that it provides an example of ‘a more modest, bottom-up approach to the development of law’ whereby

‘A “common law” of international environmental and water law can develop from *de facto* rather than *de jure* examples of the adoption and implementation of proposed foundational legal principles by a range of international and national or bi-national legal regimes. Minute 319 is an important example of the *de facto* development of a “common law” of international environmental and water law’ (Tarlock 2014).

Minute 319 might also be regarded as an example of the noted modern phenomenon whereby the evolution of international environmental and water law is facilitated by institutionalised treaty regimes which, ‘[u]pon their establishment, they become machineries for the making of new law and for the development of existing law in their respective areas of competence’ (Gehring 2007).

A 2013 report on basin water allocation planning, developed by a broad coalition of international actors and published by UNESCO, concludes that '[t]here is now wide recognition of importance of maintaining an appropriate flow regime to maintain the ecological health of river basins' and, consequently, that 'water allocation plans are increasing allocating water to meet instream ecological requirements' (Speed et al 2013). Even prior to recent arbitral and judicial support, commentators had observed that '[t]he need to provide environmental flows in order to conserve ecological integrity of water basins is becoming more and more important' (Aguilar and Iza 2011). Other commentators note that the e-flows concept has evolved very significantly over the last 25 years and 'has unfolded to encompass a wide range of ecological, social and economic goals' (LeRoy Poff and Matthews 2013). The same authors point out that the utility of the e-flows framework has already been tested in China (Zhang et al 2012; LeRoy Poff and Matthews 2013).

Regarding the status of an obligation to maintain e-flows under international water law, it is worth referring to recent case law. In February 2013, a tribunal established under the auspices of the Permanent Court of Arbitration (PCA) to settle a dispute between Pakistan and India over shared waters in the Indus basin held that 'hydro-electric projects ... must be planned, built and operated with environmental sustainability [and minimum environmental flow in particular] in mind' (PCA 2013a). Having found that '[i]t is established that principles of international environmental law must be taken into account even when ... interpreting treaties concluded before the development of that body of law', the tribunal has established that an obligation to maintain minimum environmental flows can be read into existing water treaties (PCA 2013a). Beyond such existing treaties, the tribunal has suggested that such an obligation might also arise under 'the "principle of general international law" that States have "a duty to prevent, or at least mitigate" significant harm to the environment when pursuing large-scale construction activities' (PCA 2013a). In its Final Award in this case handed down in December 2013, the tribunal specified the precise quantum of water required to satisfy India's obligation to maintain the minimum environmental flow in the Kishenganga River (PCA 2013b). Having determined that there were no existing agricultural uses and that Pakistan had failed to provide sufficient evidence to allow future agricultural uses to be taken into account, the tribunal proceeded to consider the impact of the project on the downstream environment. It found that, in order to determine an appropriate minimum environmental flow, some form of in-depth assessment of the downstream environmental impacts was required. While the tribunal was not prepared to be overly prescriptive about the nature of such an assessment, it advised that 'for any given river project, the correct approach will depend upon the existing state of the river, the magnitude of anticipated changes, the importance of the proposed project, and the availability of time, funding and local expertise' (PCA 2013b). On this basis the tribunal concluded that a minimum flow of 12 m³ per second (cumecs) would be appropriate to preserve the ecological condition of the river. Nevertheless, taking account of additional factors, in particular the economic efficiency of the overall project, it lowered the mandated minimum flow to 9 cumecs, a level that the tribunal estimated would prevent significant environmental harm to the river whilst also providing enough water to generate sufficient power at the plant (Harrison 2014). This approach was based less on any perceived inherent legal requirement to balance ecological and economic interests, however, that on a rather rigid interpretation of the restrictive

wording of the applicable provisions of the 1960 Indus Waters Treaty, so that ‘[t]he Court’s authority is more limited and extends only to mitigating significant harm’ (PCA 2013b; Harrison 2014). In an acknowledgement of the inherent variability of the ecological situation in a river basin, and of the resulting need for adaptive ecosystems management, the tribunal noted that factors may arise in the future justifying a modification of this minimum flow and held that either party has the right to request a reconsideration of the tribunal’s decision by the Permanent Indus Commission after a period of seven years (PCA 2013b; Harrison 2014).

The International Court of Justice (ICJ) has also acknowledged the importance of environmental flows in a recent case concerning the San Juan River, shared between Costa Rica and Nicaragua (ICJ 2011). For example, in respect of Costa Rica’s concerns that dredging of the river and diversion of water ‘was creating a risk of irreparable prejudice to Costa Rica’s environment or to the flow of the San Juan River’, Judge Sepulveda-Amor noted in his Separate Opinion ‘the risks of loss of habitat and progressive erosion and changes in the groundwater aquifer beneath the wetlands’ (ICJ 2011).

The emergence of this obligation in international water law, coupled with the development of sophisticated methodologies for calculating ecological flows (Beaton and Bradford 2013), provides upstream States with an incentive to cooperate with their downstream neighbours on the ecological protection of transboundary watercourses, while also providing clarity as to the adequate level of protection expected. Such technical clarity contributes towards achieving the ‘information symmetry’ likely to be vital for an agreement to be reached on benefit-sharing arrangements (Sadoff and Grey 2005).

Ecosystem Services

The concept of ecosystem services is now very closely linked to the ecosystems approach to the protection of international watercourses (McIntyre 2014). The concept will be central to future benefit-sharing arrangements intended to secure the protection of watercourse ecosystems. Ecosystems services are the benefits that people obtain from healthy ecosystems (Pardy 2014). The concept provides a methodology for the economic and social valuation of such benefits, including non-marketable benefits of natural ecosystems and can thus permit their integration into benefit-sharing arrangements. Common understanding of the value of ecosystems was greatly assisted by the 2005 Millennium Ecosystem Assessment, which provided an essential typology of four categories of ecosystem services (Millennium Ecosystem Assessment 2005):

- Supporting services, such as soil formation and pollination;
- Provisioning services, such as food, water supply and timber;
- Regulating services, such as climate control, flood control and water quality;
- Cultural services, such as recreational uses and spiritual values.

The ecosystem services concept can play a particularly significant role in transboundary water cooperation involving benefit-sharing. Co-riparian States must communicate and agree upon equitable measures for the utilisation and protection of shared waters based upon a common understanding of their cost and benefit for each State. Generally accepted methodologies for the valuation of benefits provided by watercourse ecosystems can help to

provide ‘a common point of departure’ for negotiations over benefit-sharing (Sadoff and Grey 2005).

A great deal of highly specific guidance has emerged in recent years regarding the use of the ecosystem services concept in policy-making. This includes, for example, the World Resources Institute (WRI) guidance on methodologies for review of ecosystem services in the context of a process of impact assessment (Landsberg et al 2011) and the recent report by the Institute for European Environmental Policy and the Ramsar Secretariat on the economics of ecosystems and biodiversity for water and wetlands (Russi et al 2013). Further technical guidance has recently been issued by such bodies as the United Nations Development Programme (Alpizar and Bovarnick 2013), the United Nations Environment Programme (Brander 2013), and the European Commission (European Commission 2013). A 2008 report published by the Secretariat of the Convention on Biological Diversity includes an Annex I that examines in detail ‘ecosystem services by inland waters which can be affected by inappropriate water allocations and unsustainable water use’ (Brels et al 2008).

This level of interest has caused Rieu-Clarke and Spray to suggest that ‘[i]n this regard, water and wetland ecosystems are perhaps among the best studied of habitats in terms of ecosystem services’, and to note further that ‘[t]his linkage between the upstream provision of services ... and the downstream utilisation of services thus provided (often water-related) has now become widely recognised and can be seen to operate on very large, often transboundary scales’ (Rieu-Clarke and Spray 2013). Such ongoing elaboration of the ecosystem services concept in the context of shared waters can only serve to clarify the value to downstream States of such services provided by international watercourse ecosystems maintained by upstream States, and can thus serve to inform negotiations over possible benefit-sharing arrangements.

Payment for Ecosystem Services (PES) / Eco-Compensation

The current active discourse on ecosystem services is usually accompanied by discussion of the potential role of systems of payment for ecosystem services, or “eco-compensation”. Key international actors, such as the IUCN (IUCN 2006) and the UNECE (UNECE 2009), have provided guidance on how such payment systems might work, with the latter explaining that

‘Such financing mechanisms operate at many levels, between and within countries, from and to governments, the private sector and local communities. Payment for ecosystem services (PES) is an innovative tool for rewarding ecosystem managers for their sustainable management practices, which increase ecosystem resilience’ (UNECE 2009).

However, the concept of PES / eco-compensation is not yet highly developed in the practice of international water law. One authority notes that this area ‘is still emerging and frankly not well explored by the legal scholarship’, before identifying, among the key issues remaining to be addressed by policy-makers, the basis for payments, the parties to whom payments should be made, the services for which payments should be available and the amounts to be paid (Benjamin 2013). Similarly, Rieu-Clarke and Spray caution that ‘pitfalls may be identified when considering the linkages between ecosystem services, law and transboundary freshwaters’ and recognise ‘the need for further research through case studies at the

transboundary basin level' (Rieu-Clarke and Spray 2013). Having regard to existing experience of benefit-sharing arrangements, Paisley readily concedes that '[t]he identification of these benefits can be difficult, and precise calculations complex' (Paisley 2002).

Despite the availability of a wide variety of possible modes of cooperation arranged along a 'continuum' of benefit-sharing, ranging from unilateral action through coordination and collaboration to joint action (Sadoff and Grey 2005), commentators agree that '[i]n most cases, benefit sharing will require some sort of redistribution or compensation, which will be highly situation specific' (Sadoff and Grey 2005; Tarlock and Wouters 2007; Paisley 2002).

PES / Eco-Compensation in lieu of Ecological Benefits

In the context of enhanced cooperation over shared international water resources, Sadoff and Grey characterise the potential benefits to be shared as falling into four categories: environmental, economic, political and catalytic (Sadoff and Grey 2002; Phillips et al, 2006). Similarly, in a later comprehensive study of the practice of benefit-sharing, Phillips *et al* identify three specific categories of benefits, *i.e.* those arising in the security sphere, in the economic sphere and in the environmental sphere. As regards the environmental sphere, they point out that 'a strong case can be made for the maintenance of some form of ecosystem integrity, either to sustain essential ecological goods and services on which human livelihoods are dependent, or to enable those ecosystems to function as sinks in a sustainable manner' (Phillips et al, 2006). Indeed, these same authorities explain that 'issue-linkage can take place to the extent that a common currency is developed, through which benefit-sharing can start to emerge' (Phillips et al, 2006). In the environmental sphere, the emergence of the ecosystems approach to the utilisation and management of international watercourses, and the continuing development of related conceptual tools, help to provide just such a common currency. Such conceptual tools include, *inter alia*, the ecosystem services concept as 'a methodology for the economic and social valuation of natural ecosystems' (McIntyre 2014), and the e-flows concept as 'a methodological approach that incorporates environmental concerns into the process of allocating water rights among different users' (Brels et al 2008). As noted above, Tarlock and Wouters highlight three challenges presented by what they regard as a shift in emphasis in recent years, intended to 'temper unilateral use', from quantum allocation of water to the sharing of benefits among riparian States, including: 'unequal bargaining power among states; the premature "sale" of future use options and the increased risk of aquatic ecosystem degradation' (Tarlock and Wouters 2007). These authors elaborate further on their third concern, pointing out that inter-State cooperation on both the Columbia basin and the Amu and Syr Darya basins has resulted in environmental disasters of one kind or another. Tarlock and Wouters go on to note that benefit-sharing appears to function largely to achieve the inter-State consensus required to facilitate the development of hydropower projects, despite the undisputed environmental impacts of such projects and the prospect that climate change will make many major international watercourses 'even less reliable for economically feasible large hydropower projects, and their waters more precious for other uses' (Tarlock and Wouters 2007).

However, where the benefit to be optimised, and in lieu of which compensation would be owed to an upstream State, is that of ecological integrity, and/or the ecosystem services

accruing from a functioning riverine ecosystem, such problems could be avoided or significantly ameliorated. The same authors identify three possible benefits that can flow from benefit-sharing: (1) better ecosystem management, (2) rivers services such as hydroelectric power, and (3) the achievement of regional water security through cost-sharing rather than inefficient duplicate development'. They then conclude, on the basis of State practice to date, that 'only the second claimed benefit, hydroelectric power production, defines the current practice of benefit sharing' (Tarlock and Wouters 2007). Nevertheless, there is no legal impediment preventing co-riparian States from adopting a more expansive and eco-centric view of the shared benefits accruing from development opportunities forgone or environmental measures undertaken by an upstream State. In fact, such an approach is ever more likely to be considered consistent with the rapidly emerging ecosystems obligations of basin States, such as the obligation to maintain environmental flows identified in the recent *Kishenganga Arbitration*. Moreover, due to profound changes in our understanding of ecosystem benefits, exemplified by the 2005 Millennium Ecosystem Assessment, it is today ever more likely that riparian States might consider the maintenance of a watercourse's ecological integrity as the 'most efficient use' of the shared waters in question, a key aim and justification of benefit-sharing arrangements (Tarlock and Wouters 2007).

At the same time, the difficult task of crafting complex benefit-sharing arrangements focused on ecosystem protection, including arrangements to compensate the upstream States concerned, might now be more possible than before due to the sophisticated tools and methodologies emerging under the "ecosystems approach" to transboundary water management. Without common understanding fostered by widely accepted methodologies for identifying minimum environmental flows, evaluating ecosystems services and calculating appropriate compensation payments for those ensuring the continued provision of such services, the inter-State agreement required for effective ecological benefit-sharing would simply not be possible.

Conclusion

The entire history of international water resources law, or at least that of modern attempts to codify and clarify this field of law dating back to the 1960s, can be understood as a search for means of reconciling the sharp differences of opinion between, and thus of ameliorating the potential for water-related conflict among, upstream and downstream co-riparian States (Bourne 2001; Wouters *et al* 2005; Tarlock and Wouters 2007). The possibility of entering into benefit-sharing arrangements, along with the recent emergence and continuing development of such methodological concepts as e-flows, ecosystem services and PES / eco-compensation, offer an unprecedented opportunity to achieve mutually beneficial and ecologically sound cooperation between upstream and downstream States.

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