ESTABLISHING NORMS IN A KALEIDOSCOPIC WORLD

General Course on Public International Law

by

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CHAPTER IV

COMMONS AND PUBLIC GOODS

We are now entering a new epoch, the Anthropocene, in which human beings are a potent force shaping the condition and health of our planet and regional and local human environments. As noted earlier, we are facing the most significant threats to our planet in history. At the same time we are experiencing globalization, rapid change, bottom-up empowerment and top-down controls, ever shifting movements and coalitions, and new technological developments that promise great benefits and raise grave dangers. Moreover, economic inequality among peoples is stark in many places, especially within many countries, which affects our management of common resources, public goods, and other problems of common concern.

Scholars have increasingly written about global commons and/or global public goods. Often these terms are not defined and what one author might call a global commons, another might not. We begin, then, by defining a commons and a public good. A commons is generally defined as having two characteristics : others cannot be excluded from using the commons, and one's use of it potentially creates rivalry with another's use [191]. A public good shares the property of non-excludability but it is non-rivalrous in that consumption of the public good by one person does not reduce the quantity available to others. There is enough to go around, at least up to a high limit. Global public goods are those whose benefits are spread widely across space and time [192].

A. The Concepts of Commons and Public Goods in International Law

The classic and oft cited example of a common is an unfenced village common area upon which villagers can graze their sheep. Any villager

191. E. Ostrom, *Governing the Commons : The Evolution of Institutions for Collective Action,* New York, Cambridge University Press, 1990, p. 30 (referring to "common-pool resources" as resources for which it is costly to exclude potential beneficiaries). See also, F. Obeng-Odoom, "The Meaning, Prospects, and Future of the Commons : Revisiting the Legacies of Elinor Ostrom and Henry George", *American Journal of Econ. and Soc*., Vol. 75, No. 2 (March 2016), pp. 372-414.

192. W. D. Nordhaus, "Paul Samuelson and Global Public Goods", 5 May 2005 (providing excellent concise analysis).

can have access, and there are no limits on the number of sheep that can be grazed, except that at some point, the number of sheep grazing will make the area unsustainable, and all will lose the capacity to graze. Hardin has termed this "The Tragedy of the Commons" [193]. Villagers maximize their immediate short-term material benefits at the expense of long-term viability and benefits.

Jurists have referred to the high seas and to fisheries on the high seas, to the atmosphere, to the climate system, and to outer space as global commons [194]. While countries have sovereignty over their airspace, including over their territorial sea, the atmosphere is nonetheless a commons for some uses, such as for air pollutants, greenhouse gas emissions, and other uses in which no one can be excluded from access. Global commons are rivalrous in the sense that one's use of the commons could affect another's use, even if the commons would not physically disappear. Antarctica has also been labelled a global commons, since its health is central to the climate system, and for now no State can claim ownership or sovereignty over it [195].

Some have proposed that the internet is a global commons and should be treated in law as such [196]. While it is technically rivalrous in the sense that its computer networks can accommodate a finite amount of traffic, in practice such bandwidth congestion can be solved by the construction of physical infrastructure, such as fibre optic cables, more efficient protocols for routing and directing internet traffic and billing systems for usage. This means that in practice the internet need not be rivalrous. The characteristic of being non-excludable is doubtful, for States use domestic laws to block various kinds of content and destroy or disable physical infrastructure to deny access to the internet.

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193. G. Hardin, "The Tragedy of the Commons", *Science*, Vol. 162, (1968), pp. 1243 *et seq*.

194. J. Vogler, *A Global Commons : Environmental and Technological Governance,* 2nd ed., London, Wiley & Sons, 2000 (claiming oceans, Antarctica, outer space, and the atmosphere are part of the global commons) ; S. J. Buck, *The Global Commons ; An Introduction*, London, Earthscan, 1998. Courts have come to similar determinations. See *NRDC* v. *NRC*, 647 F. 2d 1345, 1348 n. 8 (DC Cir. 1981) (defining the high seas, Antarctica, and parts of the atmosphere as part of the Global Commons).

195. UNEP, "IEG of the Global Commons", http ://www.unep.org/delc/Global Commons/tabid/54404 ; C. Joyner, "Global Commons : The Oceans, Antarctica, the Atmosphere, and Outer Space", *Managing Global Issues : Lessons Learned* (P. J. Simmons and C. de Jonge Oudraat, eds.), Washington DC, Carnegie Endowment, 2001, p. 354.

196. R. Fernandez, "The Last of the Global Commons", PJ Media, 29 March 2007, http ://pjmedia.com/blog/the-last-of-the-global commons. But see M. Raymond, "The Internet as a Global Commons ?", CIGI, 26 October 2012, http ://www.cigionline.org/publications/2012/10/internet-global-commons.

The term "global public goods" is sometimes used interchangeably with global commons, but as noted at the outset, the two have different characteristics and merit separate treatment [197]. A distinctive feature of global public goods is that measures are needed to produce them and to maintain them. Thus, a global commons such as the ozone layer, climate, or the atmosphere is not *per se* a global public good. A stable climate system, or an unpolluted atmosphere would be. Other examples of global public goods include global positioning systems, eradication of smallpox, control of communicable diseases such as Ebola and SARS, conservation of biological diversity, and international financial stability [198]. The distinction between a commons and a global public good has important implications for norms and obligations in public international law.

Global public goods are like other public goods. However, their distinctive characteristics is that their effects spill across national borders and exist for a significant time, even a long time. Public goods are usually not pure public goods, but rather have a private element. The status of a good as public or private may even change over time, and may be a matter of choice.

Much of the analysis relating to the global commons applies to global public goods. However, with global public goods, it is not only the use of the global public good but as Nordhaus notes, it is also the technologies for producing the public good that are important. He distinguishes three kinds of technologies [199]: additive technologies, in which the production of the public good is the sum of contributions from different actors; best-shot technologies, in which the public good is determined by the technology that produces the best outcome, such as in a cure for malaria, or the weakest-link technology, in which overall production of the public good is only as effective as the weakest link in the chain, as for example in building a dike to hold back water, or controlling SARS. The last category is of particular interest for public international law, because the production of many public goods

197. I. Kaul, P. Conceição, K. Le Goulven and R. U. Mendoza (eds.), *Providing Global Public Goods,* Oxford University Press, 2003, Executive Summary, p. 18 (published for the United Nations Development Programme).

198. See, e.g., W. D. Nordhaus, "Paul Samuelson and Global Public Goods", 5 May 2005; R. Smith *et al.*, "Communicable Disease Control: A 'Global Public Good' Perspective", *Health Policy and Planning* Vol. 19, No. 5 (2004), pp. 271-278; and M. Shirakawa, "International Financial Stability as a Public Good", Keynote Address, Bank of Japan and IMF, Tokyo (14 October 2012).

199. W. D. Nordhaus, "Paul Samuelson and Global Public Goods", 5 May 2005.

has the characteristic of weak-link technologies. For certain global public goods, every State needs to participate in order to provide them [200].

Production of global public goods generally requires co-operation and co-ordination of actions [201]. States and other actors have obligations to engage in certain behaviours or to take certain measures in addition to obligations to refrain from certain behaviours or actions. For example, to combat illegal drugs, States may agree to take certain measures domestically and to co-ordinate with other affected States in doing so. This may be captured by a doctrine of common and shared responsibility, which was recently articulated in the United Nations General Assembly report from the United Nations General Assembly-sponsored drug conference in April 2016 [202].

The category of global public goods is important for international law in a kaleidoscopic world, because many actors besides States are key to producing and maintaining global public goods. This means that our definition of relevant actors in public international law for these purposes, of the kinds of instruments that are relevant, and of the measures that must be undertaken must be broad and encompassing in scope. The production and maintenance of global public goods brings together public and private international law, and domestic and international law in order to address problems that are in themselves matters within the proposed definition of public international law. The safety and health of workers in textile manufacturing plants, who produce goods for a global supply chain, offers an example. Public goods are also matters in which pluralist legal orders could be appropriate and effective in addressing [203]. International organizations, both intergovernmental and non-governmental, can help co-ordinate necessary actions and/or help fund them.

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200. S. Barrett, *Why Cooperate? The Incentive to Supply Global Public Goods*, Oxford, Oxford University Press, 2007. Barrett cites the eradication of smallpox as an example.

201. I. Kaul, I. Grunberg and M. Stern, *Global Public Goods: International Cooperation in the 21st Century*, UNDP, New York and Oxford, Oxford University Press, 1999 (providing analysis of issues and developments in many fields).

202. United Nations General Assembly, "Our Joint Commitment to Effectively Addressing and Countering the World Drug Problem", UN doc. A/S-30/L.1 (14 April 2016), p. 2, http://www.un.org/Docs/journal/asp/ws.asp?m=A/S-30/L.1.

203. See M. Delmas-Marty, *Ordering Pluralism: A Conceptual Framework for Understanding the Transnational Legal Order,* Oxford, Hart Publishing, 2009; "Global Public Goods amidst a Plurality of Legal Orders – A Symposium", *European Journal International Law,* Vol. 23 (2014).

B. Options and Norms

We can view the Earth as a global commons, with the problem being one of how to manage it sustainably so that people today share equitably in it and so that we pass it on to future generations in as good quality and with comparable options and diversity as we received it[204]. The sustainable use of the Earth is also a global public good. Conceptually there are four options reflected in existing public international law to address commons and public goods issues. As Garrett Hardin showed with his hypothetical of sheep grazing on a commons, if we do nothing, it will lead to a tragedy of the commons, in that the commons will no longer be able to sustain sheep grazing. Similarly, if we take no actions to ensure that we use our planet sustainably, as by refusing to limit greenhouse gas emissions, then the planet may warm and change climate conditions sufficiently to produce a global tragedy of the commons. The four options are as follows : (1) to rely on a State's exercise of national sovereignty within its jurisdiction ; (2) to reach international agreements or conclude other legal instruments ; (3) to rely on economic incentives or market instruments ; or (4) to use voluntary co-operative measures and actions. We consider each in turn.

1. Privatize : national sovereignty

The Westphalian system provides for sovereignty of each State. This is conceptually analogous to privatizing the commons, in that each State has the responsibility for the area under its jurisdiction or control. One conceptual option for managing a commons is to privatize it, in the belief that if we own something we will take good care of it. Thus, a commons divided into private property parcels would arguably be used sustainably because no one would let sheep graze in excess of the number that could do so sustainably. Within certain countries, national lands have been privatized in a belief that the private owner will have a stake in the land and thus will take better care of it [205]. Internationally,

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204. E. Brown Weiss, *In Fairness to Future Generations,* Tokyo/New York, United Nations University/Transnational Publishers, 1989 ; UN Secretary-General, "Intergenerational Solidarity and the Needs of Future Generations", UN doc. A/68/322, 15 August 2013.

205. See T. L. Anderson *et al.*, Cato Institute, "How and Why to Privatize Federal Lands" 2 (1999) ("It is remarkable that the federal government actually loses money in the course of managing federal land assets estimated to be worth billions") ; R. Stroup, "Privatizing Public Lands : Market Solutions to Economic and Environmental Problems", *Public Land and Resources Law Review,* Vol. 19 (1998), pp. 79 *et seq.* ; J. Huffman,

States have assumed the role of a private property owner for the areas within their jurisdiction or control. The basic tenet of public international law has been national sovereignty over such areas. For several centuries, public international law supported an absolute exercise of national sovereignty subject only to those constraints to which States agree. A century ago, for example, certain States asserted absolute national sovereignty over fresh water, including the flow of international rivers within their territory. Under international law, they have also claimed sovereignty over the airspace above their country, including over their territorial sea, and the mineral resources, including ground water, beneath their lands.

This option of States exercising absolute national sovereignty over their lands has been tempered by bilateral and multilateral international agreements that limit the exercise of national sovereignty, which we next address. This option of national sovereignty will also remain and hold sway, but it has not been effective in warding off the transition to the new Anthropocene Epoch. States have focused on their rights in relation to others and not on their obligations to others [206]; on their own immediate benefits and local concerns without attention to long-run effects and broader concerns; on special powerful interests, whether economic or political, and not on the health and welfare of all their citizens and the integrity and resilience of their environment; and on the status quo without sufficient attention to change and to the emergence of new actors that assume roles and functions that affect their own roles and the health of the areas under their jurisdiction [207]. While States and national sovereignty will continue to exist, the option of absolute sovereignty no longer suffices to manage the global commons for the long-term, if indeed it ever did.

"The Inevitability of Private Rights in Public Lands", *Univ. of Colorado Law Review*, Vol. 65 (1993), pp. 241 *et seq.*

206. See, e.g., R. Haass, "World Order 2.0: The Case for Sovereign Obligation", *Foreign Affairs,* Vol. 96, No. 1, (January/February 2017), pp. 2 *et seq;* R. Haass, *A World in Disarray: American Foreign Policy and the Crisis of the Old Order*, New York, Penguin Press, 2016.

207. D. Bethlehem, "The End of Geography: The Changing Nature of the International System and the Challenge to International Law", *European Journal of Intl. Law,* Vol. 25 (2014); A. Peters, T. Förster and L. Koechlin, "Towards Non-State Actors as Effective, Legitimate, and Accountable Standard Setters", *Non-State Actors as Standard Setters* (A. Peters *et al.*, eds.), Cambridge, Cambridge University Press, 2009, p. 492; E. Grande, "The State and Interest Groups in a Framework of Multi-Level Decision Making: The Case of the European Union", *Journal of European Public Policy*, Vol. 3, No. 3 (1996), p. 318.

2. Regulate : international agreements

The Tragedy of the Commons led to village regulation as the option to manage it sustainably. In international law, this option can be articulated as international agreements between countries, non-binding legal instruments, and even individual voluntary commitments, with varying specificity. For a global commons, international regulation is an essential option, but it requires the consent of States. Even then, it is insufficient, as discussed below.

As noted previously, the number of international agreements has increased dramatically within the last 60 years, both because the number of States has increased and because the issues needing attention have exploded in number. For environmental issues alone, by 1990, there were about 900 legal instruments, including binding agreements and significant non-binding ones, that were concerned either fully or in significant part with environmental issues [208]. By 2017, there were over 54,000 international agreements registered with the United Nations on many subjects [209]. These figures do not capture the many non-binding legal instruments that are either negotiated among private actors or that may be set by international organizations, including the United Nations, that apply directly to private actors, including multinational corporations and other businesses.

International agreements or other international legal instruments are attractive, because they set the rules of the road by which States and other actors are to behave. They represent a consensus as to what needs to be done. They have also led to concerns about a proliferation of international agreements, treaty congestion, and "green wash" among private actors.

In the context of the commons, there are two problems that international agreements need to address to be effective : avoiding the free rider problem and avoiding the so-called weakest link or pollution haven, which if weak enough or large enough could defeat the agreement's effectiveness.

Economists and political scientists have written extensively about the free rider problem [210]. For the simplest analogy, consider a shortage

208. E. Brown Weiss, P. C. Szasz and D. B. Magraw, *International Environmental Law : Basic Instruments and References,* Dobbs Ferry, NY, Transnational, 1992.

209. By 2005 there were already more than 50,000 international treaties. J. Bourque and P. de Sousa, "Making Sense of Trade Treaties", *Int'l Trade Forum,* Vol. 4 (2005), p. 30.

210. E. Ostrom, *Governing the Commons : The Evolution of Institutions for Collective Action*, New York, Cambridge University Press, 1990, pp. 27 *et seq*.

of fresh water in a city or a village. If 90 per cent of the users cut way back on their use of the water, the other 10 per cent may consider that they can use the water in wasteful ways as before, since the water crisis is now under control. Those users who have not cut back on their water usage have paid none of the costs but have received the benefit of continued water supply. They are known as "free riders". The same problem of free riders arises in a global commons, such as the protection of the stratospheric ozone layer. If most countries limit or eliminate their emissions of chemicals that deplete the ozone layer, some might continue using them, thus paying none of the costs, and still reaping the benefit of a robust ozone layer.

The "pollution haven" problem arises if a few countries with large enough internal markets stay out of an agreement and in doing so destroy the effectiveness of the actions of those who are party to the agreement. This was potentially a critical problem in the efforts to control chemicals that deplete the ozone layer, which States dealt with successfully.

International agreements address both the free rider and the weak link or pollution haven issues. The most common way to deal with both free riders and the weak link or pollution haven in international environmental law is a provision in the agreements that bans trade with a non-party to the agreement. A few examples follow, but more exist. The Montreal Protocol on Substances that Deplete the Ozone Layer provides in Article 4 that States parties must ban the import of controlled substances from a State not a party, and must not export controlled substances to them [211]. The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal provides that States parties cannot import from or export hazardous wastes to a non-party [212]. Similarly, the Convention on International Trade in Endangered Species provides that States cannot permit exports to or imports from a non-party [213]. The Montreal Protocol includes an extra

211. Montreal Protocol on Substances that Deplete the Ozone Layer, Art. 4, entered into force on 1 January 1989, *United Nations Treaty Series,* Vol. 1522, p. 3 ("each party shall ban the import of the controlled substances . . . from any State not party to this Protocol").

212. Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, Art. 4, § 5, entered into force on 5 May 1992, *United Nations Treaty Series,* Vol. 1673, p. 126 ("A Party shall not permit hazardous wastes or other wastes to be exported to a non-Party or to be imported from a non-Party").

213. Convention on International Trade in Endangered Species of Wild Fauna and Flora, Art. X, entered into force on 1 July 1975, *United Nations Treaty Series,* Vol. 993, p. 243.

penalty for a State that exports to a non-party, because it cannot deduct the amount exported in calculating its own domestic consumption of the controlled chemical, as required by the Protocol [214].

These provisions provide an incentive to States to join the agreement, since they would otherwise be excluded from trade in the controlled items with other countries. They serve to ensure that all States share in paying the cost of the benefit they receive, for example, retention of a robust ozone layer, safe disposal of hazardous wastes, and protection of endangered species of fauna and flora. Such provisions that ban trade with non-parties, though, need to be consistent with the General Agreement on Tariffs and Trade [215]. Each of the three agreements includes language that enables trade with non-parties if the obligations of the agreement are fulfilled. However, the stringency of these provisions varies significantly [216].

The other method for protecting against a State becoming a haven that could defeat the effectiveness of the agreement is to provide for a special fund that could attract a State to join by providing assistance to the State in complying with the Convention. For example, to induce Brazil, China and India to join the Montreal Protocol, States at the first meeting of the Parties adopted the London Amendment, which provided for a substantial Montreal Protocol Fund to be available to developing countries to come into compliance with the Protocol [217]. All three States, particularly China and India, had large enough internal

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214. Montreal Protocol on Substances that Deplete the Ozone Layer, Art. 3 *(c)*, entered into force on 1 January 1989, *United Nations Treaty Series,* Vol. 1522, p. 3 ("However, beginning on 1 January 1993, any export of controlled substances to non-Parties shall not be subtracted in calculating the consumption level of the exporting Party").

215. General Agreement on Tariffs and Trade, Art. XX, concluded on 15 April 1994, *United Nations Treaty Series,* Vol. 1867, p. 187.

216. For the Montreal Protocol, the States parties must determine at a meeting that the non-party is in full compliance, an exacting bar (Article 4 (8)). For hazardous wastes, hazardous wastes can be moved and disposed of with non-parties if there are bilateral, multilateral or regional agreements or arrangements for doing so that "do not derogate from the environmentally sound management of hazardous wastes and other wastes as required by this Convention" (Article 11). Pursuant to this provision, the United States has received hazardous wastes from Canada, e.g. those containing PCBs, even though it has not ratified the Basel Convention. The Convention on International Trade in Endangered Species permits export, re-export or import from a non-party State only "if comparable documentation issued by the competent authorities in that State . . . substantially conforms to the requirements of the present Convention for permits and certificates" (Article X). This is a relatively lax requirement, since it is up to the individual State party to determine whether the documentation is comparable.

217. London Amendment to Montreal Protocol, Art. 2 (1), 29 June 1990, *United Nations Treaty Series*, Vol. 1598, p. 469.

markets that they could defeat the effectiveness of the measures in the Protocol to safeguard the ozone layer. If these countries did not phase down or eliminate the use of the controlled chemicals, then it would not matter what other States party to the Protocol did. All three States joined the Protocol after the London Amendment was agreed and the Montreal Protocol Fund established [218].

For all such measures to be effective, there needs to be effective monitoring of the trade in the controlled items, review by the States parties, transparency of the data, and systems in place to address issues of compliance with the agreement. The Montreal Protocol led the way by establishing an Implementation Committee. The Committee considers the reasons for non-compliance and has been able to tailor the remedies to these reasons. Remedies other than sanctions have been employed [219]. Other international environmental agreements have adopted this model [220]. The Montreal Protocol, in particular, has been a successful agreement in addressing a global commons issue – namely, preventing depletion of the ozone layer. This is, however, a relatively straightforward problem to address, because of the limited number of major companies producing the controlled substances, the availability of substitutes, and the confined target of the agreement.

International agreements and other international legal instruments are an essential tool for addressing all global commons issues. However, they are not sufficient. There are too many actors in a kaleidoscopic world and change is too rapid to rely only on formally articulated legal instruments by States, or even by a powerful non-governmental actor. Moreover, the administrative costs in implementing some of the agreements may be burdensome, or even unacceptable.

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218. China ratified the Protocol on 14 June 1991; Brazil ratified the Protocol on 19 March 1991; India ratified the Protocol on 19 June 1992. The London Protocol was added in 1990. *United Nations Treaty Series*, Vol. 1598, p. 469. The fund has been replenished a number of times since its enactment. For example, for the 2015-2017 triennium the budget is $507.5 million. Multilateral Fund for the Implementation of the Montreal Protocol, http://www.multilateralfund.org/default.aspx.

219. From a review of the Implementation Committee Reports, there has not been use of the sanction penalty. See, e.g., UNEP, Implementation Committee for the Montreal Protocol, UNEP/OzL.Pro/ImpComp/55/4 (28 October 2015).

220. Convention on Long-Range Transboundary Air Pollution, adopted on 13 November 1979, *United Nations Treaty Series,* Vol. 1302, p. 217; Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters, entered into force 30 October 2001, *United Nations Treaty Series,* Vol. 2161, p. 447.

3. Incentivize: economic instruments

A third option for addressing global commons issues is the use of economic instruments, such as fees attached to certain activities or quantitative limits, with the market allocating the rights to use the limited items. These are deemed attractive, because they can produce desired results more efficiently and, if properly designed, with fewer administrative costs. In the context of Hardin's Tragedy of the Commons, it would mean either setting a fee for each sheep that is to graze on the village commons or setting a limit on the number of sheep that can graze on the village common, allocating the rights to graze, and permitting those who have the rights to trade them.

In theory, the two approaches should yield the same result: only the number of sheep graze that can do so sustainably on the commons. If the fee is set correctly, the number of sheep that would graze on the commons would be the same as the number that could sustainably graze there. Permits to graze could then be allocated on some basis or by auction. However, in practice it is difficult to set a fee that produces exactly the limited number of sheep desired, in part because the information required to do so is not available.

The use of fees raises inherent problems, which legal arrangements must address. Some people can afford the fees, others cannot. Would there be special subsidized fees on equity grounds? Would the fees be graduated, so that the last few would command higher prices? If fees took the form of taxes, similar equity issues related to ability to pay, needs, et cetera, would arise.

If we were to limit the maximum number of sheep that could graze on the commons, and then allocate the number permitted among those wanting to graze sheep, how would we allocate the permits? Would they go to those who were already raising sheep, and on what basis? Proportional? On the basis of family needs or other equity considerations? Could farmers trade the rights to graze a sheep? If trading is allowed, are there any conditions required for such a trade to take place? Would those who are impoverished be tempted to trade their rights to wealthier farmers or entities, but in return be unable to find suitable means of living? Should the right to raise a sheep be done on the basis of an auction? Or perhaps a combination of an auction and giving away of entitlements, but on what basis?

We have experience in international law with such economic instruments to address global common issues, particularly climate change. The

United Nations Framework Convention on Climate Change (UNFCCC) provides for joint implementation of commitments of Annex I developed countries with countries that are not Annex I, or developing countries, which means that Annex I countries could satisfy at least part of their goals to reduce greenhouse gas emissions by taking measures to limit greenhouse gas emissions in developing or non-Annex I countries [221]. The Kyoto Protocol set specific quantified limits to emissions of greenhouse gases for Annex B countries [222]. For example, the European Union and countries within it were required to reduce emissions to 92 per cent of the base year by 2008-2012. The economic instruments come into play, because the European Union is permitted under Article 4 to consolidate all of the emissions of member States in determining whether the European Union has met the total emissions for the entire body, which means some States can emit more than their limit and others less, so long as the overall amount represents 92 per cent of the base year [223].

The Kyoto Protocol to the UNFCCC incorporates additional economic instruments. Article 4 lets developed Annex I countries engage in joint implementation among themselves, Article 12 established a Clean Development Mechanism, whereby Annex I countries could satisfy their commitments in part by reducing greenhouse gas emissions in non-Annex I countries, and Article 17 lets developed countries in Annex B to the Protocol engage in emissions trading among themselves. The last especially reflects experience in emissions trading of specific pollutants under national legislation, particularly the United States Clean Air Act [224]. It means that a State emitting less than allowed under its obligation can trade the unused emission allowances to another State that is having trouble in meeting its obligation to reduce emissions.

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221. United Nations Framework Convention on Climate Change, Art. 4 (2) *(a)*, adopted on 9 May 1992, *United Nations Treaty Series,* Vol. 1771, p. 107.

222. The countries are essentially those developed countries in Annex I of the UNFCCC. Kyoto Protocol to the United Nations Framework Convention on Climate Change, Art. 3 (1), 11 December 1997, UN doc. FCCC/CP/1997/7/Add.1 ; *International Legal Materials* Vol. 37 (1998), p. 22.

223. *Ibid.* at Art. 4 (1). This provision is similar to what the United States had instituted in the Clean Air Act. The Act established a "bubble" concept whereby emissions from a factory with several silos are measured as if there were a plastic bubble over the entire factory with a single opening for measuring emissions. 42 USC § 7411 *(a)* (2)-(3). The purpose is to treat multiple point sources as one source to make compliance more economically efficient. The United States Supreme Court upheld the EPA's bubble concept in 1984. *Chevron U.S.A., Inc.* v. *Natural Resources Defense Council*, 467 US 837 (1984).

224. In the Clean Air Act, utilities receive permits for how much pollution they can emit, 42 USC § 7651g *(a)* (4) (Supp. II, 1990), and allowances for specific pollutants that can be traded, 42 USC 7651b *(b)*.

The argument is that allowing trading of emissions creates an incentive for a country to limit its emissions more than otherwise because it can essentially market those emission allowances and benefit from doing so. The same level of emissions avoidance is achieved at less cost.

Just as international agreements need careful monitoring and verification, so do the economic instruments outlined here. The European Union encountered significant problems with corruption in its trading system. This points to the importance of transparency, monitoring, and verification for these instruments to work and to be effective [225].

Economic instruments, such as those outlined for dealing with climate change, have also been proposed for managing natural resources sustainably. These include quotas with marketable permits for fisheries and for forest exploitation [226]. They offer an option for implementing sustainable development goals.

In terms of the sustainable use of a commons, these instruments by themselves do not ensure that the objective will be achieved. There are many problems with implementing the instruments, monitoring transactions, and adjusting limits to respond to new evidence. They may, however, contribute to a solution if States and other actors regard them as legitimate and provisions are made to ensure that they are not misused.

4. Co-operate : voluntary measures

A fourth option is for States, or States and other actors, to voluntarily engage in co-operative behaviour to manage the commons. This differs from the other three in that these actors are not required to engage in certain behaviour but do so to maintain a common good, generally because it is in their long term interest, is morally responsible, or enhances their reputation. Especially in a kaleidoscopic world, where there are many relevant actors in addition to States, we need to focus on voluntary co-operation and a norm that facilitates this. For States this entails obligations toward others, in addition to the usual rights of national sovereignty.

225. M. Walter, "The Impact of Corruption on Climate Change : Threatening Emissions Trading Mechanisms ?", UNEP (March 2013), p. 5, http ://www.unep.org/pdf/unep-geas_march_2013.pdf.

226. R. Newell *et al.*, "Fishing Quota Markets", Resources for the Future (August 2002) ; A. Karsenty, "Economic Instruments for Tropical Forests", Centre for International Forestry Research (February 2000) ; G. Porter, "Natural Resources Subsidies, Trade and Environment : The Cases of Forests and Fisheries", Center for International Environmental Law (1996).

What, then, induces voluntary co-operative behaviour? What leads to a norm of co-operation?

One explanation is that we co-operate to achieve a good, such as sustainable management of a commons, that we could not achieve alone. In game theory, this is considered to be a positive sum game [227]. There are many examples in which States have co-operated to achieve ends that their individual efforts could not attain. These include the initial international efforts in the late 1800s to gather weather data from States in order to make weather forecasts, which no State could have done on its own [228]. This positive incentive for co-operation is important in the production of global public goods.

The opposite is that we co-operate to avoid a situation from getting worse, which is known in game theory as a decreasing sum game [229]. In the case of the sheep grazing on the global commons, this means that villagers co-operate irrespective of whether there are regulations or economic incentive, because they do not want the commons to lose its ability to sustain the grazing of sheep.

The classic dilemma of two prisoners illustrates the tragedy of the commons. In this case, two prisoners must decide during a private investigation whether to confess to a moderate crime or to accuse the other prisoner of a serious crime. The accuser is released from prison unless the other prisoner has also accused him or her of a serious crime. But if the other prisoner has made such an accusation, both prisoners receive a much heavier sentence than if they had both confessed to a moderate crime in common [230]. Neither prisoner had the opportunity to communicate with the other before having to make the decision. Research with this scenario indicates that if the prisoners knew they were going to encounter each other repeatedly, they would begin to engage in co-operative behaviour in order to reduce the length of their sentence [231].

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227. B. Spangler, "Positive-Sum, Zero-Sum, and Negative-Sum Situations", *Beyond Intractability* (G. Burgess and H. Burgess, eds.), Conflict Information Consortium, University of Colorado, Boulder (October 2003).

228. In 1873 the International Meteorological Organization was formed with the goal to exchange weather information between States. "History of IMO : World Meteorological Organization", https ://public.wmo.int/en/about-us/who-we-are/history-IMO.

229. E. Brown Weiss, "International Responses to Weather Modification", *International Organization,* Vol. 29, No. 3 (Summer 1975), pp. 805-826.

230. W. Poundstone, *Prisoner's Dilemma : John von Neumann, Game Theory, and the Puzzle of the Bomb,* New York, Doubleday, 1992. See also, A. Dixit and B. Nalebuff, "Prisoner's Dilemma", *The Concise Encyclopedia of Economics* (2008).

231. D. Kreps *et al.*, "Rational Cooperation in the Finitely Repeated Prisoners' Dilemma", *Journal of Economic Theory*, Vol. 27, No. 2 (Aug. 1982), pp. 245-252.

In the context of a global commons, it means that if States or other actors are locked together in the same commons over an extended period of time, it is in their own interests to co-operate to ensure the sustainability of the commons. The protection of the stratospheric ozone layer illustrates this principle, for States and other actors are inherently linked to the condition of the ozone layer over the lifetime of their existence.

In order to induce such co-operative behaviour, States and other actors need information about the options available, the benefits and costs, and the behaviour of the other participants. Thus, monitoring and transparency are essential, as are measures to ensure compliance with the desired/necessary behaviour [232]. While these measures may be traditional sanctions, they may also be measures that bring sunshine to the behaviour, affect reputation, or even build capacity if lack of capacity is the reason for non-compliance [233].

The goal is to avoid a tragedy of the commons, by moving States and other actors from a situation in which they are increasingly worse off to one in which they use the commons on a sustainable basis and make at least modest gains. Implicit in all of this is that States and other actors share the same values, namely that they want to conserve the commons, and let all access it for their own benefit. This is a long term value. Norms reflect such values, and the legal arrangements reflect these norms.

In a kaleidoscopic world, voluntary co-operative measures are essential, both to keep pace with change, and to accommodate the many different and fluctuating groups of actors. States need such measures, because they cannot rely on a timely basis only upon formal regulatory instruments. This means that we need to focus on identifying global, regional, and local commons, understanding the relationship between them, and fostering common values in how we use and protect them. The moral dimension is an imperative.

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232. E. Ostrom and H. Nagendra, "Polycentric Governance of Multifunctional Forested Landscapes", *Int'l Journal of the Commons,* Vol. 6, No. 2 (2012), pp. 104-133. See also E. Brown Weiss, "Conclusions", in *Commitment and Compliance : The Role of Non-Binding Norms in the International Legal System* (D. Shelton, ed.), New York, Oxford University Press, 2003 (focusing on the importance of measures to facilitate compliance by States with non-binding agreements).

233. H. Jacobson and E. Brown Weiss, "Assessing the Record and Designing Strategies to Engage Countries", in *Engaging Countries : Strengthening Compliance with Environmental Accords*, MIT Press, 1998, pp. 511 *et seq*.

C. Concluding Observations

The Westphalian system by itself is inadequate to address global commons or global public goods problems. It does not ensure that we can manage the global commons or lesser commons effectively to sustain them for others to access and benefit from. Nor does it ensure the collective actions necessary to produce global public goods. A study on Global Public Goods published by the United Nations Development Programme identified three critical weaknesses in the current arrangements for providing global public goods : jurisdictional gaps between national policy-making and international needs ; participation gaps in which actors other than States, namely civil society and the private sector, participate on the fringes, though such actors are needed to secure global public goods ; and incentive gaps for States and other actors to comply with international agreements [234].

This means that for international law to be an effective instrument in maintaining the integrity of commons and producing global public goods, the conception of public international law will need to expand to encompass relevant domestic laws, to integrate actors beyond States, and to provide incentives other than traditional aid measures. Collective actions embodied in law, non-binding legal instruments, and voluntary commitments are needed to secure even the most basic public goods within and among countries and to address our commons issues. This will require appropriate norms shared by the many different actors.

The concept of community interest is especially relevant, for it speaks to the common interest of a class of people living in a community. In international law, it embraces shared interests of those in the international community, which may be a global community or a more limited international one [235]. The concept can provide a normative basis for substantive measures to address problems of global commons and global public goods. This is explored in the chapters on specific norms and obligations in a kaleidoscopic world in the Anthropocene.

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234. I. Kaul, I. Grunberg and M. A. Stern, *Global Public Goods : International Cooperation in the 21st Century,* Oxford, Oxford University Press, 1999, pp. xxv *et seq*.

235. For a multifaceted analysis of the concept, see U. Fastenrath *et al*. (eds.), *From Bilateralism to Community Interest*, Oxford, Oxford University Press, 2011 (Festschrift dedicated to Bruno Simma).