Tomasz Żylicz

The Economics of International Environmental Cooperation

Polish Studies in Economics

Edited by Ryszard Kokoszczyński

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Table of Contents

Introduction

"Nature does not respect political boundaries". This is no doubt a true statement, but its real meaning is vague. To be sure, nature cannot be appropriated by a single nation. But what are the practical consequences of this fact?

This book on international environmental cooperation confronts two points of view: natural and economic. According to the natural viewpoint, all borders – so carefully protected by us – are artificial and damage the cause of environmental protection rather than further it. On the other hand, according to the economic viewpoint, borders are necessary; they are inevitable elements of our political systems. They allow societies to enjoy stability and maintain justice. Within borders, we try to make sure that foreign citizens do not draw from our pension systems, and we pressure governments to financially and politically support companies that export products.

The co-existence of these two orders is inevitable. Yet it is worthwhile to analyse the ways in which sovereign entities – such as nation states – join forces when solving problems that cannot be solved locally, i.e. problems that call for cross-border cooperation.

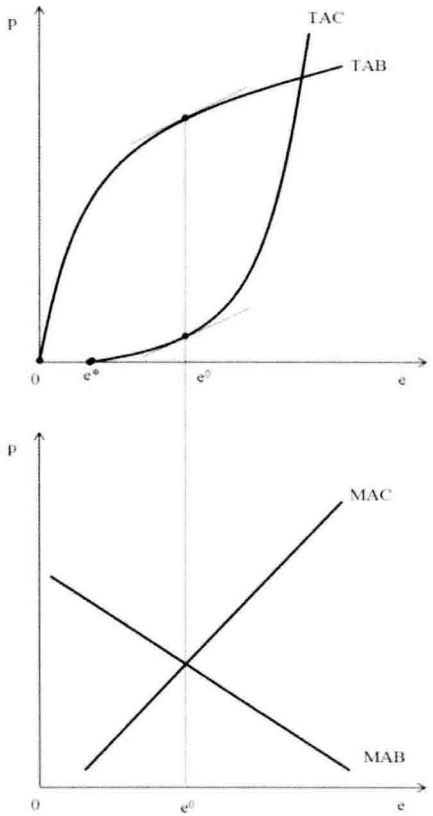
Many governments and international organizations extol the *Subsidiarity Principle*, which states that decisions should be taken at the lowest possible level that is adequate given the nature of a so-called *externality* problem. There would be little sense in asking an international organization to protect the landscape in any single given location; local authorities are capable of coping with such problems. By contrast, effective protection of the Baltic Sea requires the cooperation of the Baltic states; effective protection of the air in Europe requires the cooperation of the entire continent; and protecting the ozone layer cannot be effective unless all countries cooperate.

International environmental cooperation is therefore inevitable for solving some problems. It is necessary when local solutions are either impossible or inefficient from a global perspective. This impossibility is linked to what economic theory refers to as *public goods*. If a piece of the natural environment cannot be appropriated by a single region, then a sort of a "joint responsibility" applies. One can do something about this piece, but the outcome depends on what others do. The lack of effectiveness of climate protection measures in the absence of a global agreement to limit greenhouse gas emissions serves as the best illustration of the point in question. Likewise, solving the "acid rain" problem by erecting higher stacks is an example of a relatively inexpensive

method of lowering local sulphur and nitrogen depositions at the expense of neighbouring countries. Economists see this as a textbook externality case: overall efficiency is compromised by transferring damage from one place to another.

Economic efficiency – synonymous with maximizing a positive difference between benefits and costs – remains an important focus of economic analyses. Seen from such a point of view, international environmental cooperation is not an entirely new domain of economic inquiry. Nevertheless, what requires special attention is the asymmetry between benefits and costs perceived by sovereign states as economic agents. This asymmetry can be spotted at the local level, too. In a typical polluter-pollutee system, the former gets rid of a problem by transferring it to the latter. In a typical public good system – e.g. protecting a forest – a protecting agent finances a project from which other agents benefit; the latter may nevertheless pretend that they are not interested in protection, especially when they know that this protection is financed by somebody else, which means that they can benefit for free. In such cases, a solution can be implemented by the government that enforces what is justified by economic efficiency and/or fairness.

Environmental economics is about striking a balance between protection costs and benefits. Under standard assumptions, this balance is reached when the marginal costs of abatement are equal to its marginal benefits. The benefits may be enjoyed by agents other than those who incur the costs. But the role of the government is to make sure that the difference between total benefits (whomever they accrue to) and the total costs (whoever pays them) is maximized, as envisaged on a figure that can be found in any textbook on environmental economics. Costs and benefits (p) are measured along the vertical axis, while the level of environmental protection (e) is measured along the horizontal one. The low level of environmental protection e^* is what can be expected if polluters are free to do whatever is most convenient for them, i.e. to avoid any costly activities. In contrast, e^0 is what maximizes the difference between total abatement benefits (TAB) and the total abatement costs (TAC). Under standard assumptions, this is where marginal abatement benefits (MAB) are equal to marginal abatement costs (MAC).



Yet in situations when environmental protection requires the cooperation of sovereign countries, there is no government that can mandate anything. And this is the core of international environmental cooperation. Theoretical analyses demonstrate that a solution can be arrived at by reducing external costs or undertaking common endeavours for the common good. But how can this be achieved? How to encourage a sovereign country to make an effort that it would not undertake spontaneously?

Some steps can be enforced by a military action. Over the last several thousand years, there have been wars aimed at forcing somebody to do something that they would have not undertaken voluntarily. Analyses exist that interpret wars fought during the last decades as wars for cheap energy. Some analysts predict that wars in the 21st century will be fought over access to fresh water. Thus, it is possible to look for environmental motives of some wars, though the actual

implementation of environmental protection usually does not require military force.

Choosing a socially justified environmental protection level requires comparing broadly understood costs and benefits. The analysis may demonstrate that what is justified for a group of countries may not be justified for a single country. The very definition of optimality implies that the surplus of net benefits of winners is higher than the deficit of net benefits of losers. Consequently, the winners can afford to compensate the losers and still be better off. This justifies international environmental cooperation supported by compensating the losers by the winners in order to jointly undertake something that is beneficial for all, which is a variant of a general principle of environmental policy in a single country where the government enforces solutions justified by a surplus of total benefits over total costs. This does not necessarily imply that winners pay compensations to losers directly. The losers may tolerate their fate because they appreciate the benefits of operating in a country where somebody else wins.

Indeed, some examples of international environmental cooperation are linked to compensations. These do not have to be direct or transparent. There are cases where a sovereign state accepts an environmental commitment which implies a net loss. In order to understand this paradox, one needs to analyse the broader context of a particular agreement and presumably discover that, at the same time, the state negotiated another agreement where it was a winner; thus, the two decisions should be studied together.

Sometimes we encounter *self-enforcing agreements*. Parties to such agreements find it more beneficial to stay rather than to move out of a respective coalition, which is how analysts explain the success of the Montreal Protocol protecting the ozone layer, or the participation of some countries in the Polish Debt-for-Environment Swap. Losses from leaving a coalition do not have to be linked to economic (or military) sanctions; they may simply be linked to losing benefits that come with participation. How to bring together a "critical mass", i.e. to collect enough participants so that the agreement becomes self-enforcing, remains an open question. This, however, depends on particular environmental problems.

There is an abundance of excellent literature on environmental economics and policy. While Baumol and Oates (1988) serves as a classical reference for policy analyses, Hanley *et al.* (2007) can be recommended as a good overview of the most salient economic aspects.

Environmental economics is often linked to natural resource economics. Many texts and courses cover both of them. Indeed their fields overlap and so

do their methods. Environmental quality is sometimes considered a natural resource, which makes one a part of the other. Despite that, many economists argue that environmental economics is about externalities, and that resource economics is about trajectories over time.

There are two broad categories of natural resources: exhaustible and renewable. The former – comprised of fossil fuels and other raw materials – includes goods whose inventories have to be depleted once people use them. The latter can be naturally reproduced over and over again if people use them reasonably. Timber is a prime example of this category. Some analysts introduce a distinct category of non-depletable resources – such as e.g. salt (NaCl) – whose supply is virtually infinite, given the demand. Economists are not concerned about such resources, since no difficult trade-offs are involved.

Of course, using natural resources may create external effects. For instance, pumping oil from a deposit that is also used by somebody else may imply an extra cost for the other agent. Likewise, catching a fish may create an external cost for other fishermen – now or in the future. To the extent that using natural resources does trigger international cooperation, it will be addressed in this book. Some of these endeavours can be analysed from the point of view of managing a raw material, but they primarily are of interest as initiatives aimed at controlling environmental quality.

Many economists downplayed the uniqueness of the raw materials market, arguing that all markets – including labour, technology etc. – are essential for people's well-being (Olson, 1963). On the other hand, some raw materials, whose supply is concentrated in few countries, can be used strategically by the suppliers (Mikdashi, 1974). Nevertheless, it is highly doubtful whether the OPEC success can be replicated in another natural resource market. So far it has not been replicated.

Natural resource scarcity has been disturbing economists at least since Malthus (1798), who anticipated a rapid decline in growth caused by an absolute barrier. Ricardo (1817) observed that, before the Malthusian barrier is encountered, a decline in resource quality – resulting in their rising prices – will impede growth gradually. Yet Mill (1848) concluded that both the Malthusian (absolute) and Ricardian (relative) barriers to growth are successfully overcome by technological progress. This optimistic assumption allowed economists to disregard natural resources for several generations.

In the middle of the 20th century, natural resource scarcity started to concern politicians and economists once again. The US government appointed the so-called Paley Commission to study "the broader and longer range aspects of the

nation's materials problem as distinct from the immediate defense needs." Its report outlined a number of problems, but the commission did not find a sufficient evidence for major concern. Two American economists – Barnett and Morse – undertook a gigantic effort to verify the Malthus-Ricardo-Mill hypotheses against available empirical material. Overall, they found no evidence of growing resource scarcity (Barnett, Morse, 1963) and therefore no need for a specific policy in this area.

The issue has been addressed many times. At the beginning of the 21st century, Resources for the Future (RFF) – an American think tank established as a result of the Paley Commission – published its *Scarcity and Growth Revisited* report (Simpson *et al.*, 2005). The report points at environmental quality as the most cumbersome issue resulting from natural resource extraction. Thus, not scarcity as such, but rather protection of the environment should be a matter of concern for policy makers, and a focus of research for economists.

An interesting case is provided by pressures on the Chinese government to open its rare earth metal extraction to international trade. China has around a third of the world's deposits, and accounts for virtually all of their international trade presently. As a monopolist, China is accused for strategically restricting the supply of rare metals in order to elevate their price. Chinese authorities deny these accusations by pointing out that export quotas are much higher than actual trade. However, it is estimated that domestic prices are 36% below reported FOB prices (Els, 2014), which has been caused by extremely high export taxes. On the other hand, Chinese authorities argue that they aim at lower production not because of monopolistic strategies, but because of extreme environmental disruption caused by extraction. Nonetheless, as the disruption is local in scope, foreign governments are concerned about supply rather than extraction technology.

In its 2014 ruling, the WTO (2014) indicated that Chinese regulations do discriminate exports *vis à vis* domestic production. It is yet to be determined whether China will exert its political power to maintain constraints placed on its rare earth exports or will make its environmental policy export-neutral. In any event, this shows that international environmental cooperation can be linked to natural resource policy questions.

In 2011 the European Commission published its *Roadmap to a Resource Efficient Europe* (EC, 2011), which calls for lowering raw material requirements in production. While such an improvement seems inevitable, there were attempts to elaborate detailed mandatory targets and price controls. The latter would have been unfortunate. Motivated by high price volatility, price controls would

paradoxically serve against resource efficiency. Controls are supposed to lower the price if the market boosts it "too much" and to make it higher otherwise. This is to be done by adjusting taxes. Proponents of the mechanism claim that tax authorities have greater knowledge of scarcity than market agents. This, however, is disputable, and price controls would most likely serve as a mechanism shielding economic agents against the market, sending signals about resource scarcity.

Even though natural resources are a matter of concern for international bodies, environmental protection has been a much more popular motive of cooperation. Thus, we will focus on environmental rather than resource policies. Externalities serve as a reference for economic analyses of environmental cooperation problems (Mäler, 1990). In the case of global externality, one can differentiate between situations in which many sources accompany few victims, many victims accompany few sources, or – the most complicated one – the environment is a common property.

This book consists of four chapters. The first chapter reports on cases where the *Victim Pays Principle* (rather than the celebrated *Polluter Pays Principle*) seems to be adopted. Possible indirect compensations are discussed whenever the distribution of benefits and costs seems to be evidently asymmetric. In the second chapter we look at regional cooperation tied to solving problems such as Acid Rain in Europe or Baltic Sea eutrophication. Addressing global problems – mainly the ozone layer and climate, but also biodiversity – is the topic of chapter three. In particular, we contrast the success of the Vienna Convention with the failure of the Rio Convention (while the former focuses on the ozone layer, the latter focuses on climate). Chapter four looks at some cross-cutting issues, including development assistance and trade.

1. The Victim Pays Principle?

This is not a joke. Environmental analysts have long been familiar with the *Polluter Pays Principle*. Virtually all governments declare this principle as the cornerstone of their environmental policies. Defined by the OECD in 1972, it says that the polluter is responsible for whatever harm the pollution imposes (Barde, 1992). Quite often it turns out that it is difficult to identify a polluter, and the principle has to be compromised, but at least in its narrower form – stating that the polluter is responsible for meeting whatever environmental requirements are imposed by authorities (redefined by the OECD in 1974) – it has been almost universally accepted. Even though the *Polluter Pays Principle* has been broadly considered the cornerstone of environmental policy, the OECD (1981) admitted that it does not necessarily apply to transboundary problems.

The Coase (1960) theorem looks at the *Polluter Pays Principle* as a non-obligatory condition to achieve economic efficiency in environmental policy. Indeed, there is a sort of symmetry between those who generate externalities and those who are affected. It can well be conceived that the victim pays the polluter a compensation for scaling the pollution down to a socially justified level. Even though media and public opinion do not accept such a result, this is sometimes how environmental policies are carried out. Government subsidies to sewage treatment plants are a prime example of this sort.

As a rule, however, solving an environmental problem implies that the polluter is implicated in one way or another. The solution rests on the assumption that there is an agent authorised to enforce what turns out to be justified on economic grounds. In relations between sovereign countries there is no such an agent. The United Nations is a group of sovereign states and key decisions are supposed to be agreed upon by everybody. Even in the European Union, where the Commission (playing the role of a supra-national government) is given a fair degree of power, many decisions are to be taken unanimously. Thus, international environmental cooperation cannot replicate modalities applied in national environmental policies.

1.1 The Rhine Treaty

In 1986 a catastrophic fire in the Basel-based chemical giant Sandoz reversed the process of bringing life back to the Rhine river. Later analyses suggest that the mess which accompanied the rescue action gave opportunities for many other chemical companies to discharge their troublesome inventories as well. Hence,

Sandoz is not the only party guilty of the disaster. What is important is that the Basel fire brought the long process of the Rhine clean-up to a stop.

The Rhine is one of the best known European rivers. According to its length, its rank is 11th, but it is almost as international as the Danube. Before it enters the Netherlands, it flows through Switzerland, Germany and France. Its drainage basin overlaps with Austria and Luxemburg (as well as – marginally – with Belgium and Italy). Therefore many countries affect the quality of its water. International protection of the river was initiated as early as in 1815 (at the Vienna Congress), but more substantial cooperation was triggered by the Bern Convention in 1963, and by two 1976 agreements dealing with Chemical and Salt (Chloride) pollution (Frijters and Leentvaar, 2003).

Originally, it seemed impossible that the Rhine – with its gigantic flow (on average more than 2000 m^3/s in its lower part) – could be contaminated. Nevertheless, by the end of the 19th century, it succumbed as a result of industrialisation of its drainage basin. Concentration of dissolved oxygen kept falling until the 1970s. Destroyed river habitats were later restored. Cadmium contamination was eliminated as late as the 1980s. Also the efficiency of nitrogen and phosphorus abatement in sewage treatment plants was improved significantly as late as the 1980s.

Concentration of chlorides, discharged mainly from French mines, was rising until the 1970s. In principle it was regulated by the 1976 agreement, but progress was slow. A more effective control resulted from the Salt Treaty signed in 1991, which protected the Netherlands from water that not only was not potable, but was also unsuitable for agricultural uses. The Dutch were the party most interested in solving the problem, though they were not responsible for the river contamination. According to the *Polluter Pays Principle*, the Dutch could have expected that the protection would be paid by other parties. Yet this has not happened.

The costs of reducing chlorides in the Rhine river were to be financed by the Saline Funds, whose budget was several tens of million euros per year. Contributions to the Fund came from the polluting countries: Switzerland (6%), France (30%), and Germany (30%), and from the Netherlands as well (34%). Hence, the victim was supposed to pay more than any of the polluters individually. Budgets of other Rhine conventions – definitely lower than the Saline Fund – take the Netherlands as their main contributor.

Economists who see the *Polluter Pays Principle* as the cornerstone of any reasonable environmental policy can challenge such solutions. Perhaps many Dutch citizens look at the Rhine with disgust and do not see a reason to pay for