



Economic Instruments

Changing the behaviour of water users towards more sustainable practices is a necessary step in achieving water security. One way to promote such change is through economic instruments. Economic incentives involve the use of prices and other market-based measures to improve the way water is managed and used. They provide incentives to water users to use water carefully, efficiently, and in a manner consistent with the public interest. They have both positive and negative effects, rewarding users that recognise the true value of water and penalising profligate and anti-social use.

Economic instruments complement institutional, regulatory, technical and other kinds of tools used in water management. They offer some advantages over other tools: they provide incentives to change behaviour, raise revenue to help finance necessary adjustments, establish user priorities and achieve overall IWRM management objectives at least overall cost to society. That said, economic instruments are not substitutes for other tools of water governance such as monitoring, regulation and enforcement of public health and environmental standards.

Economic instruments normally work best in combination with other supporting measures: they are unlikely to be effective acting alone. The adage "the market is a good servant but a bad master" applies here. Governments must set the right legal and institutional framework, including regulation, within which individual economic agents can operate - the unfettered market will not provide this. However, properly confined and regulated, markets can produce the required adjustments very efficiently.

Markets-Based Instruments vs Command-and-Control Mechanisms

The design and implementation of public policies to deal with water scarcity and pollution have two different sets of instruments: Markets-Based Instruments (MBI) and Command-and-Control Mechanisms (C&C). Stavins (2003) defines MBI as: "regulations that encourage behavior through market signals rather than through explicit directives". Keohane and Olmstead (2016) state that MBI are part of the governments' policy options to deal with environmental problems (opposite to prescriptive regulation or command-and-control), which incorporate market principles to solve them. On the other hand, a C&C policy refers to "an environmental policy that relies on regulation (permission, prohibition, standard setting and enforcement) which mandates that actors undertake specific actions and applies sanctions if they do not comply (OECD, 2001; Kelsey, Kousky and Sims, 2008).

Even though there has been a long debate over the efficiency and effectiveness of these set of policies, both C&C and MBI serve to solve specific problems in environmental protection. As Stavins and Whitehead (1992) point out “C&C approaches tend to be more applicable in situations that involve highly localized effects and threshold damages and where concern thus focuses on the level of pollution emitted by individual sources. MBI, on the other hand, are most appropriate for problems of aggregate pollution over relatively large areas, since less control is exercised over the emissions of any specific site”.

The Economics of Water Scarcity

When talking about water scarcity, we should come to terms with the concept of Water Allocation, formally defined as “the prevailing pattern of water use and associated water infrastructure at a specific place and time” (Grafton, Garrick and Horne, 2017). As the OECD (2015) puts it, “[it] determines who is allowed to abstract water, how much can be taken and when, how much must be returned (of what quality), and the conditions associated with use”. To give a practical answer to these questions, societies adopt Water Allocation Regimes, that is, “a set of rules and norms that govern the process of establishing, distributing, enforcing and adjusting patterns of water use [rights] over time and place” (Grafton, Garrick and Horne, 2017). Even though, the allocation of water rights varies depending on norms and customs (influenced by history, culture, and environment), it usually responds to an administrative or legal procedure from a governmental authority. In such way, water rights can return to the state, under certain conditions, and be redistributed to deliver specific goals and or achieve outcomes (e.g., to guarantee minimum environmental flows). This process is known as “Water Reallocation”.

The price of water can be determined using two different institutional mechanisms. On the one hand, administrative water pricing refers to the price-setting process by a public authority, usually a service operator or regulator (ideally with some degree of independence), under considerations such as supply-related costs, opportunity and externality costs from the water use, or social goals. On the other hand, market-based pricing is based on a decentralized pricing mechanism (based on supply and demand of water) for water rights, based on land ownership, or tradable water use permits. Both mechanisms have their pros and cons; whichever is chosen will be permeated by historical, social, and political factors that will make more or less effective in setting a ‘right’ price for water (SIWI, 2016).

The Economics of Pollution

Economics deals with pollution through the lens of market failure theory, particularly the concept of externalities. “An externality results when the actions of one individual (or firm) have direct, unintentional, and uncompensated effect on the well-being of other individuals or the profits of other firms” (Keohane and Olmstead, 2016). As stated in the definition, externalities are characterised by three elements. First, they have a direct effect (negative or positive) on someone’s well-being or wealth. Second, externalities arise from actions that are not intended to cause harm. And third, those who are affected do not receive a compensation from the damaging party. A classic case of negative externalities in environmental protection are watershed conflicts, where downstream water-users are affected by damaging farming practices (deforestation, use of agrochemicals, inefficient

irrigation, etc.) carried out by upstream water-users that would reduce the flow and/or the quality of water for the former.

Theoretically, economists deal with externalities in different ways. The first option is to impose a tax on the harming activity to disincentive production up to a point in which social losses are minimized, that is, an optimal level in which the polluting activity does not destroy the wealth it creates for society. In other words, society accepts pollution up to a level in which it becomes neutral in terms of wealth creation (Pareto Optimal). A second option is the use of subsidies, that is, to give a financial incentive to polluters to reduce the production up to a level in which it becomes polluting-neutral. Both options described above assumes the active role of the state either by taxing or subsidizing production. Nonetheless, the polluter and the damaged party could reach a private agreement by which the latter pays the former not to pollute, better known as payment for environmental services (PES). In this case, the payment could not be higher than the benefit the damaged party gets for maintaining or increasing the production of the good that is affected by the externality (Coase, 1960).

All three options exposed above have their own drawbacks. It is not politically feasible to impose a tax on farmer's production on the grounds of protecting the environment. They have successfully overcome the problem of collective action so that they are well organised to lobby the Executive and the Legislative and, if necessary, aligning their constituencies in times of election (Engel, Pagiola and Wunder, 2008). On the other hand, a subsidy is not considered an optimal solution. Theoretically, subsidies designed to curb individual pollution might introduce perverse incentives that paradoxically increase the level of sectorial pollution (Baumol and Oates, 1988). The Coasian solution, as the PES solution is also known, has some drawbacks. First, it assumes that the bargaining process is smooth with low transactions costs. In our example of watershed conflicts, transactions costs would translate into how easy would be for downstream and upstream water-users to organize and reach an agreement over the price of the services. This assumption might be unrealistic as collective action problems (organizing a group for a common goal when low and short-term individual gains are easy to rip off in comparison to high and long-term collective gains) are a constant for buyers and sellers. On the other hand, enforceability of an agreement might also be costly even if it is possible to do it; 'free-riding' might become common when there are competing economic activities that must be traded-off and a control mechanism is not in place (Keohane and Olmstead, 2016).

Pollution also can be tackled with legal instruments. Before using the lens of law is necessary to make a differentiation between 'point source pollution' and 'diffuse pollution'. The former is circumscribed to pollution that is discharged in a water body from a discrete or identifiable location. The latter refers to "all sources of pollution that enter waters other than from identifiable entry points" (Howarth, 2011). This distinction is important because in the case of a contamination event, the 'polluter pays principle' might be invoked to justify remediation and compensation. This principle "requires the polluter to bear the expense of preventing, controlling and cleaning up" (Grossman, 2006). Moreover, the OECD and the European Union have advocated for the application of the 'polluter pays principle'

since the 1970s as an effective tool to deal with point source pollution, however, making caveats when it is related to agriculture based on difficulties to enforce it ([Grossman, 2006](#)). A legal devise to overcome those difficulties is the application of the 'providers get principle' by which farmers are "regarded as liable for pollution and other 'negative externalities' below the standard of good agricultural practice, but as entitled to payment for provision of public goods where they exceed that standard" ([Cardwell, 2006](#)).

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