



## **Economic instruments as tools for water management in the transition towards a green economy**

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*Green growth means fostering economic growth and development while ensuring that natural assets continue to provide the resources and environmental services on which our well-being relies. To do this it must catalyze investment and innovation which will underpin sustained growth and give rise to new economic opportunities.*

*A return to “business as usual” would be unwise and ultimately unsustainable, involving risks that could impose human costs and constraints on economic growth and development. It could result in increased water scarcity, resource bottlenecks, air and water pollution, climate change and biodiversity loss which would be irreversible; thus the need for strategies to achieve greener growth.*

OECD (2011a)

Water is an essential element in a progressive strategy of economic development. The lack of access to sufficient quantities of adequate quality water can significantly hinder growth and human development but improved water management can generate huge benefits for health, agriculture and industrial production providing an opportunity for economic growth, poor eradication and social fairness (OECD, 2011b).

But economic progress can only be sustained if population and welfare trends are decoupled from an increasing use of natural resources. The outlook for water security is not optimistic. The projections of current trends implies a 55% increase in water use between 2000 and 2050, with half of the world population living in river basins under severe water stress by 2050. Over the next 50-100 years, impacts of climate change are projected to lead to severe water shortages in semi-arid regions, and more frequent and severe floods and droughts worldwide. Moreover, water quality degradation is on the rise, resulting both from an increase in contaminants as well as from the degraded ability of water ecosystems to treat them.

### **Challenges and opportunities**

Green development has the potential to address economic, social and environmental challenges and open up new sources of growth through the following channels:

- Promoting greater efficiency in the use of water, enabling an increase the production of goods and services without further detrimental impacts on water sources, and restoration of the water environment without harming the prospect of production and consumption.
- Promoting improvements in the allocation of increasingly scarce water resources to the most beneficial uses in the economy and also in the natural environment, enabling the generation of welfare



gains both from production and consumption of goods and services in the economy and from improved environmental services.

- Fostering knowledge advances and technical development to identify new ways of addressing environmental problems.
- Creation of new markets by stimulating demand for green technologies, goods, and services as well as creating new job opportunities.
- Boosting investor confidence through greater predictability and stability around how governments plan to address major environmental issues.
- Managing water scarcity by rebalancing the equilibrium between natural and human made capital. Preserving natural capital may, for example, be preferable than costly capital investments in desalination to cope with scarcity or in expensive water treatment plants to solve pollution problems.
- Preventing imbalances in natural systems which raise the risk of more profound, abrupt, highly damaging, and potentially irreversible, impacts – as has happened to some fish stocks and as could happen with uncertain water supplies.
- Matching green growth policies and poverty reduction strategies. These include, for example, providing people access to more efficient infrastructure (e.g. in water and transport), reducing health risks associated with environmental degradation, and introducing efficient technologies that can reduce costs and increase productivity, while easing environmental pressure. Given the centrality of natural assets in low-income countries, green growth policies can reduce vulnerability to environmental risks and increase the livelihood security of the poor.

Green growth strategies need to address the following challenges:

Water is under-priced or not priced at all. In the best of the cases water prices are lower than those required to maintain the financial cost of providing the services and do not cover the capital costs associated with building the water providing facilities or its maintenance and replacement in the long run. Water prices are then far from reflecting the real opportunity cost of provisioning in terms of giving the same water to other alternative and eventually more productive uses (the resource cost) and the degradation of natural capital (or the environmental cost).

Path dependency and dominance of existing technologies and systems can make it very difficult for some new technologies to compete, establish a place in the market and scale up, which is why temporary support may be needed in certain cases. Innovation support instruments must be carefully designed to foster the emergence and uptake of efficient technologies while minimising the risk of technology lock-in, lack of competition or crowding out of private investment.

Misguided government policies, market constraints and distortions all lead to or arise from market failures, which mean there is often a gap between private returns from economic activity and the overall benefits that accrue to society. Green growth economic instruments aim to close that gap and raise returns to 'green' investment and innovation. They also aim to minimise the distributional consequences of change for the least advantaged groups of society and manage any negative economic impacts on firms while retaining incentives for improved economic performance.



Barriers to trade and investment can place a serious break on the development and diffusion of green technologies globally. Reducing these barriers while providing effective protection and enforcement of intellectual property rights (IPRs) are essential to encourage the development and diffusion of technologies and the facilitation of foreign direct investment and licensing.

In developing economies there will be opportunities for leap-frogging to new forms of infrastructure development. Leveraging public and private financing – e.g. through public-private partnerships, a mixture of tariffs and taxes, facilitating investment by major institutional partners through reforming regulatory barriers and sound long-term policy signals, and development assistance – will be necessary given the large-scale investments required in most countries.

Ultimately, what matters for the success of a green growth strategy is a well-defined framework for action and a consistent set of economic and environmental policy criteria. A high degree of co-ordination among ministries and levels of government as well as stakeholders outside government will be required to identify a policy mix suitable to local conditions. In many cases, developing appropriate institutional capacity will be an essential condition for integrating green growth into core economic strategies and other government policies, and for ensuring a leading role for finance, economic and environment agencies.

### **Approaches**

Economic Instruments (EIs) have an essential role to play in providing the proper incentives to guarantee that human decisions concerned with water are coherent and make a real contribution to green growth. As part of a green growth strategy, EIs are means to encourage greener behaviour by all water users, to mobilise investments in capital and technology towards greener activities and to provide adequate incentives and support to green innovation.

While national circumstances will differ, putting a price on pollution or on the over-exploitation of water sources – through mechanisms such as prices or tradable permit systems – should be a central element of the policy mix. For example, by reducing demand and rewarding good behaviour, pricing mechanisms help reduce the cost of achieving a given objective and provide incentives for further efficiency gains and innovation. In addition, increased use of environmental and water scarcity taxes can play a role in green fiscal reforms offering an attractive alternative to higher taxes on labour or capital income or deep cuts in public expenditure and public debt.

Not every situation lends itself to market instruments. In certain cases, well-designed regulation, active technology-support policies and voluntary approaches may be more appropriate or an important complement to market instruments. In addition, the responsiveness of businesses and consumers to price signals can, in many situations, be strengthened through information-based measures that highlight the consequences of environmental damage caused by specific activities and the availability of cleaner alternatives.

Barriers are also important and EIs can only be successful if accompanied by a provision of the institutional changes required and a strategy to overcome the many barriers that putting a price to water might face. In other words, changing the payoffs in the economy is only part of the solution. Societies become dependent on institutions and technologies with which they are familiar. Social and economic inertia can be so strong that even quite large changes in pay-offs will not change behaviour.



A strong capability to innovate is essential to establish the capacity for breakthroughs and new patterns of production and consumption.

An economic policy instrument for water management is, by definition, an incentive or a set of incentives designed to produce a desired change in individual (and co-operative) decisions in those activities in which water services are used in the economy. They are means to the collective ends of water management.

Water is a basic input in many production processes. It is also essential for human life and for the preservation of water-related ecosystems and the biophysical flows of services they provide. Not surprisingly the specific decisions that can be targeted by EIs in water policy are pervasive and cover a wide array of situations. Among the decisions and expected targets of EIs for sustainable water management, the following can be mentioned:

- **A quantifiable reduction in the quantity of water services demanded** by a defined set of users in some economic activities at certain particular places. This is, for example, the case of incentives to reduce water demand for irrigation, household consumption or manufacturing.
- **An increase in the efficiency with which these water services are produced.** This refers to EIs designed to abate the pressures on water bodies stemming from the need to satisfy a given demand of water provision services. These tend to include incentives to promote more effective irrigation systems, investment for improving water distribution networks or replacing assets, better water transport systems, use of recycled water in manufacturing processes, etc. Within the same category some other EIs can be found with the potential to reduce the negative impact of providing the economy with waste disposal and treatment services. They include, for example, incentives for investing in more efficient effluent treatment plants, reducing pollution loads, etc.
- **A substitution of water supply sources** in order to reduce pressures on water bodies associated with the provision of a given set of water services both to production and consumption activities. This is, for example, the case of incentives which promote the substitution of alternative resources (such as recycled or desalinated water) for freshwater or shift water supply from some traditional sources to others with lower negative impacts.
- **A reduction in the impact on the structure and functional activity of water (providing) ecosystems** produced by specific economic activities. This may be the case of incentives to promote agricultural practices that increase soil conservation, reduce deforestation, minimise floodplain occupation, etc.
- **A reduction in risk exposure to extreme events such as droughts and floods** as in the case of incentives to deter land settlements in hazard zones or to promote water stress-resistant crops in drought-prone areas.

There are many different alternative EIs that depending on the economic and institutional framework can be designed and implemented in the transition to a green economy. The following table presents a general classification of the challenges presented above and the set of EIs that can be mobilised to help in its solution.

Table 1. Economic instruments for addressing green growth constraints



Green growth constraints	Policy options
Inadequate infrastructure	<ul style="list-style-type: none"> <li>• Taxes</li> <li>• Tariffs</li> <li>• Transfers</li> <li>• Public-Private Partnerships</li> </ul>
Low human and social capital and poor institutional quality	<ul style="list-style-type: none"> <li>• Taxes</li> <li>• Subsidy reform/removal</li> </ul>
Incomplete property rights, subsidies	<ul style="list-style-type: none"> <li>• Review and reform or remove</li> </ul>
Regulatory uncertainty	<ul style="list-style-type: none"> <li>• Set targets</li> <li>• Create independent governance systems</li> </ul>
Information externalities and split incentives	<ul style="list-style-type: none"> <li>• Labeling</li> <li>• Voluntary approaches</li> <li>• Subsidies</li> <li>• Technology and performance standards</li> </ul>
Environmental externalities	<ul style="list-style-type: none"> <li>• Taxes</li> <li>• Tradable permits</li> <li>• Subsidies</li> </ul>
Low returns on R&D	<ul style="list-style-type: none"> <li>• R&amp;D subsidies and tax incentives</li> <li>• Focus on general-purpose technologies</li> </ul>
Network effects	<ul style="list-style-type: none"> <li>• Strengthen competition in network industries</li> <li>• Subsidies or loan guarantees for new network projects</li> </ul>
Barriers to competition	<ul style="list-style-type: none"> <li>• Reform regulation</li> <li>• Reduce government monopoly</li> </ul>

Source: OECD (2011) Tools for delivering green growth

### Lessons from implementation

The challenge for any green growth strategy is making individual decisions coherent with the societal objectives of fostering growth, eradicating poverty and enhancing social justice while protecting water providing ecosystems. This suggests the use of incentives to promote the desired kinds of behaviour through market based mechanisms and pricing instruments. Nevertheless all EIs has advantages and disadvantages depending on the particular problem at hand, and the economic, social and institutional framework within which they are implemented.

For example, in general markets for water rights are less information demanding, more adaptable to changing circumstances and provide farmers with more stable income than water tariffs. But markets have also steep learning curves and potentially high start-up administrative and transaction costs. For this reason, water markets are more difficult to implement when compared with taxes that can be easily created within the existing institutional framework. But water prices, especially for irrigation water and for pollution loads require high monitoring and enforcement costs. Water tariffs and taxes have the potential to increase revenues to finance collective investments in protecting natural capital, fostering innovation or even the transition towards a fiscal green system, while water markets only affect revenues and expenses of those involved in water trading. The right choice of economic



instrument is therefore highly context-dependent and will be determined through the water management decision-making process.

Green growth strategies will inevitably result in the call for subsidising green sectors and environmental activities. This is the case for investments in infrastructures to guarantee water security and to facilitate the reallocation of water resources across space and among different economic activities. Subsidies may be appropriate in some circumstances, for example when enforcement or alternative instruments are difficult, economies of scale or market size effects are high and when the subsidy programme can be designed in relatively simple way, for a limited period and with minimal side effects. Nevertheless, in contrast to prices and market based mechanisms, subsidies need to be considered only as transitional instruments in order to foster a desired change for example to substitute current water using techniques and speed up technology diffusion, to compensate potential losers in the job market, or to mobilise the amount of resources required by infrastructures when coordination, network and scale economies are important.

The ideal EI would be that which can effectively generate behaviour change towards more efficient water use, which is stringent enough to encourage innovation, is stable enough to give security to investors, is compatible with legal and institutional frameworks, is politically acceptable, and is implementable at a low monitoring and enforcement cost. Real examples are far from this ideal and the selection implies many tradeoffs that would need to be considered in the collective decision making process.

In choosing the economic incentive to be implemented in any case, attention must be given to the whole implementation process. Introducing EIs in the water management arena entails a long and adaptive social learning process. Starting small and scaling up is more advisable than implementing a fully fledged incentive system from the beginning. The same can be said with respect to overcoming the main barriers that impede the application of EIs. For example, small increases in water tariffs when accompanied by the use of extra revenues to improve the quality and coverage of water services can contribute to a successful strategy for overcoming the still significant cultural and political barriers to pricing water.

The role of EIs needs to be understood in the context of water development. EIs play an important role in overcoming the barriers for building up the infrastructures for water development when there are significant economies of scale involved, coordination problems among water rich and water scarce regions or uncertainties about the long-term benefits of heavy capital investments. For example, in South Africa water storage, transport and distribution infrastructures are considered the main means to achieve water security and cope with the uneven distribution of water across the territory. Properly managed water infrastructures are expected to provide the flexibility required to allocate water to its most productive use and to adapt water supply and demand. New EIs to manage water demand and promote the reallocation of water use rights, including prices and markets, are being considered as part of a new water development strategy. Marginal pricing and full cost recovery are concepts which are easier to accept in countries where the main objectives of water development are water security and efficiency (as in Australia or Israel) rather than social justice, poverty reduction or supporting the transition of the economy (as happens in South Africa). The prospect for EIs needs to be understood in the context of the country's water development.



In Israel, a combination of increasing block tariffs, excess water use fines, production levies, tariffs to finance artificial recharge, subsidies for well rehabilitation, long term commitments for purchasing water produced by new sources and a close to full cost recovery water price system has proved to be a successful policy reform for addressing severe water scarcity and providing adaptive mechanisms for coping with drought. Water prices and their role can only be understood in the context of an IWRM system and in the context of the different role that water has played in economic development. In Israel, this has shifted from an initial stage where the dominant objective was food and water security to the present when environmental sustainability is a paramount concern.

Consistent policy actions can result in the successful implementation of different EIs making for example water trading the best alternative in some places (as in the Murray-Darling basin in Australia) and command and control and prices in others (as in the case of Israel). The framework conditions and the political process are more important than the instrument itself in explaining the success or failure of each case. This might also explain that why EIs may deliver benefits for the green economy even when their implementation fails. For example, in the case of the over-consumption tax in Israel (which ultimately failed), the initiative helped raise public awareness and discussion of water challenges which can assist in the search for better social responses.

The Murray-Darling basin in Australia illustrates that persistent government policy action to define property rights of water and to combine incentives, markets and regulations are a means to enhance water security, sustain economic progress and improve the environment. Water markets are but one important ingredient in the whole water management system. The success of EIs is also dependent on advances in political leadership, water governance and effective stakeholder involvement, all of which are important not only for convincing those who may benefit from water markets but also for managing potential conflicts. In this respect, good quality, transparent information may support social dialogue and the involvement of those who are threatened by the change process.

## References

OECD (2011.a) Towards Green Growth. Paris.

OECD (2011.b) Benefits of Investing in Water and Sanitation, an OECD Perspective. Paris.

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