8. Pricing instruments for water management and services

This chapter presents Adherents' experience with pricing instruments for water management and services, in line with the OECD Recommendation on Water. The chapter explores how Adherents set abstractions charges that reflect water scarcity; water pollution charges to incentivise pollution prevention; as well as tariffs that cover operation, maintenance and renewal costs of service provision. It highlights examples of pricing instruments accounting for the redistributive consequences and priority water uses. It also explores efforts to phase out price-distorting policy measures and general subsidies. Finally, the chapter reports valuable efforts to reduce transaction costs when designing pricing instruments.

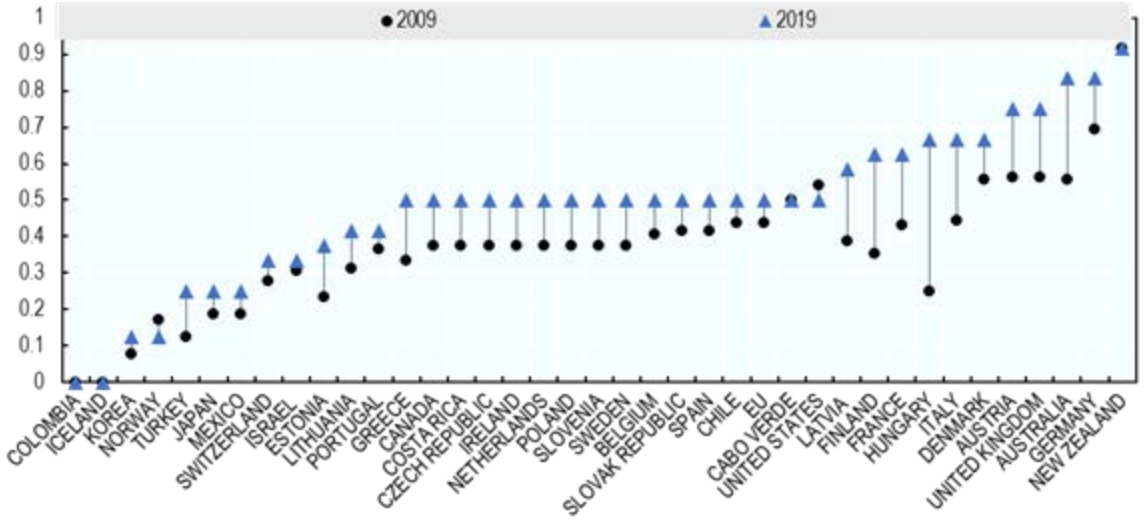
Adherents to the Recommendation are encouraged to “consider establishing pricing instruments where appropriate and applicable, in combination with other instruments (e.g. regulatory, voluntary or other economic instruments), to manage water resources (in particular water conservation), phase out negative externalities (e.g. overuse, pollution) and improve the financial sustainability of water infrastructures and water services. Economic instruments should reflect each country's social and economic conditions.” To that end, the Recommendation suggests “Adherents that consider pricing instruments to take a number of considerations into account”:

The use of economic policy instruments discussed hereafter are often combined with other instruments (e.g. regulation, information, voluntary approaches) to manage water quantity, such as water allocation regimes (section 3) and to manage water quality, such as through effluent standards (section 4).

Agriculture specificities are mentioned throughout this section, as this is an area where Adherents’ policies are less aligned to the Recommendation than with other sections, despite the importance of the sector in water use and pollution. Acknowledging that misalignment may be due to preferences not to use pricing instruments, Figure 8.1 estimated average alignment indices in 2009 and 2019 for section 8.

Figure 8.1. Average alignment of agriculture and water policies with section 8 of the Recommendation on Water

Changes from 2009 to 2019. Alignment indices range from zero to one. Higher indices indicate a better alignment.



Note: The index was adjusted to account for the fact that countries’ possible preferences not to use pricing.
Source: (Gruère, Shigemitsu and Crawford, 2020[1])

8.1. Setting abstraction charges that reflect water scarcity

Adherents to the Recommendation that are considering pricing instruments would benefit from “setting abstraction charges for surface and ground water that reflect water scarcity (i.e. environmental and resource cost) and that cover administrative costs of managing the system”.

The 2019 OECD Implementation Survey shows abstraction charges for groundwater exist that in 74 % of respondents, 74% for surface water. Abstraction charges for groundwater often apply to industrial users (in 59 % of respondents), and slightly less frequently - in 44% of respondents - to domestic uses. For surface water, abstraction charges are most frequently applied to energy producers (in 63 % of respondents) (Table 8.1). In agriculture, 17 of 38 surveyed adherents on water and agriculture policy

changes reported that they used pricing as an instrument to manage water demand, which represents a low rate but in significant progression since 2009. More detailed reviews are required to decipher whether abstraction charges are designed to signal the opportunity cost of water (as water policy instruments) or to generate a revenue (as a financing instrument).

Table 8.1. The use of abstraction charges for ground and surface water

	Groundwater					Surface water			
	Agriculture	Domestic	Industrial	Energy Production	Other	Agriculture	Industrial	Energy Production	Other
Austria	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Canada			●				●		
Chile	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Czech Republic	●	●	●	●		●	●	●	
Estonia		●	●	●		●	●	●	
Finland	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
France	●	●	●	●		●	●	●	●
Hungary	●		●	●	●	●	●	●	●
Ireland	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Israel	●						●		
Italy	●	●	●	●	●	●	●	●	●
Japan					●	n/a	n/a	n/a	n/a
Korea			●			●	●	●	●
Latvia	●	●	●			●	●	●	
Lithuania	●	●	●	●	●	●	●	●	
Luxemburg	●	●	●	●	●	●	●	●	●
Mexico		●	●	●	●		●	●	●
Netherlands	●		●		●				
Norway	n/a	n/a	n/a	n/a	n/a			●	
Portugal	●	●	●			●	●	●	●
Slovak Republic	●		●	●	●	●	●	●	●
Spain	●	●	●	●		●	●	●	
Sweden	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Turkey	●					●	●	●	
United Kingdom	●	●	●	●		●	●	●	
United States	n/a	n/a	n/a	n/a	n/a				●
Costa Rica	●	●	●		●	●	●	●	

Note: This table is based on the responses to the *Part 2 – Financing for water management* section of the questionnaire. n/a is applied for countries which answered "no" to the questions "Do abstraction charges for groundwater/surface exist in your country?".
Source: Authors, based on the 2019 OECD Survey on the Implementation of the OECD Council Recommendation on Water.

Abstraction charges for both surface and underground water are absent in only three responding Adherents, namely **Austria**, **Chile** and **Sweden**. **Austria** and **Sweden** are water-abundant Adherents, which may explain the situation. **Chile** extensively relies on market instruments to allocate water where it is most needed.

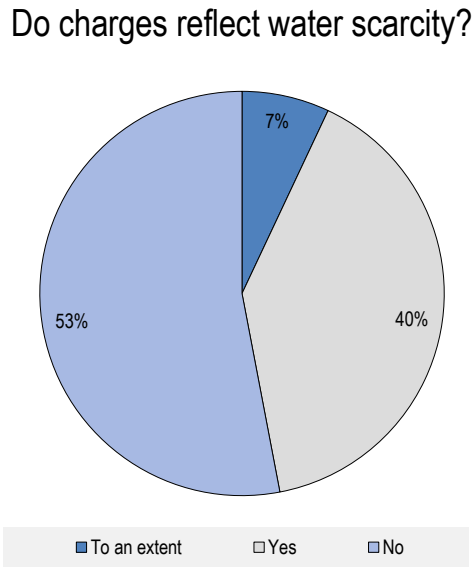
Most abstraction charges are based on the price per volume of water abstracted, with the user paying a unitary rate per cubic meter abstracted or using a two tier tariff system (fixed charge and volumetric above some level). Some charges are also fixed per hectare for agricultural abstraction, a price per megawatt-

hour for energy production or nominal license fees linked to an abstraction permit regime (see section Water allocation regimes) like in the **United Kingdom** (Gruère, Shigemitsu and Crawford, 2020[1]). Water abstraction charges are commonly managed at the sub-national level. For instance, they are set at the regional level in **Belgium**, provincial level in **Canada**, and at state level (Land) in **Germany**, at the hydrographic basin level in **France** (with a legislated national price ceiling) and by four devolved administrations in the **United Kingdom** (OECD, 2017[2]).

To reflect the geographical and temporal variations in water scarcity levels, water abstraction charges can be flexibly adapted. In **France**, the threshold under which water users are exempt from paying abstraction charges depends on the water agency, the type of resource and the scarcity of water (OECD, 2017[2]). In **Portugal**, a legislated scarcity coefficient for different river basins is being used to reflect different levels of water scarcity geographically and temporarily throughout the year (OECD, 2015[3]). Spatial and seasonal variation can be particularly important in agriculture, it was used in some ways by 30% of the Adherents responding to the survey of water and agriculture policies. For instance, in **Greece**, water pricing is differentiated by region, while in **Hungary**, pressure multipliers are applied to raise prices in groundwater bodies facing water risks.[1]

In contrast, many water abstraction charges do not differentiate varying levels of water availability. The 2015 OECD Survey of Water Resources Allocation found that abstraction charges generally do not reflect water scarcity or the opportunity cost of using water. In those cases, the costs of depleting water levels is borne by the community at large rather than targeting those that use more water during scarce times or in scarce regions. In periods of severe scarcity, pricing instruments are usually supplemented by regulatory instruments restricting certain usages, such as in **France** or **Japan** where restrictions on low-value water uses are implemented during periods of scarcity (e.g. ban on washing cars, gardening or filling in private swimming pools).

Figure 8.2. Reflecting water scarcity in water charges



Source: Based on the country profiles of 27 OECD and key partner countries available here: http://www.oecd.org/fr/publications/water-resources-allocation-9789264229631-en.htm

The level of the water charge is usually different based on whether it is sourced from groundwater or surface water. Some Adherents, federal states or water basins apply unique water charge to all types of sources (**France** (Seine-Normandy), **Germany** (13 of 16 federal states) (Gruère, Shigemitsu and

Crawford, 2020[1]). Special zones, aquifer, or rivers are subject to specific rates (e.g. Water Distribution Areas in **France** or specific aquifers in the Flemish region in **Belgium** and in **Estonia**). Higher charges are often imposed on groundwater than on surface water (one exception is the **Czech Republic**) (OECD, 2017[4]).

Adherents usually differentiate the rate of abstraction charges by the type of users (e.g. agriculture, domestic, industrial, energy production). This imperfectly reflects the pressure on the resource. For instance, water used to cool thermal plants is usually returned to the river body (albeit at a higher temperature). The agricultural sector commonly benefits from lower rates or from exemptions, so does the use of potable water, such as in Flanders (Belgium) (OECD, 2017[4]).

The objective of employing abstraction charges is not always explicitly stated. However, in Baden-Württemberg, **Germany**, and in **Brazil**, the use of water abstraction charges is to incentive users to save water. In **Belgium**, **France**, **Hungary** and the **Netherlands** abstraction charge proceeds are used for environmental protection. In some cases, very specific objectives are being pursued, such as in the **Netherlands** where revenues from abstraction charges are used to finance groundwater depletion research.

8.2. Setting water pollution charges to incentivise pollution prevention

Adherents to the recommendation that are considering pricing instruments would benefit from "setting water pollution charges for surface and groundwater use and pollution or charges for wastewater discharge at a sufficient level to have a significant incentive effect to prevent and control pollution."

15 out of 26 Adherents responding to the 2019 OECD Implementation Survey have an effluent discharge tax (Table 8.2). They are levied based on either the volume discharged only, proportion exceeding a certain threshold, or also based on the effluent's pollution content (related for instance to the oxygen demand and suspended solids, nutrients, heavy metals and persistent chemicals). **Colombia** taxes discharge of total suspended solids and BOD (OECD, 2019[5]). The high level of emissions taxes set in the **Netherlands** in the 1970s helped drastically reduce total organic emissions and industrial organic emissions. Similarly, high emissions taxes have been implemented in **Germany**, the **Czech Republic** (ground and surface water), and **Slovenia**, in order to encourage behavioural change and reduce water pollution (OECD, 2017[6]).

Wastewater charges exist in most **EU member states** (e.g. Estonia, France, Italy, Netherlands and Spain). They also exist elsewhere in different forms. In **Australia**, there are fees for some water pollutants in certain catchments and charges on land-based sewage discharge in the Great Barrier Reef area. (OECD, 2019[5]). An additional tariff was set for polluting plants in **Israel** to ensure that the effluent quality is sufficiently high to be reused for irrigation purposes. Only a few, mostly EU member states, report using water pollution charges in agriculture.

Levying charges on diffuse water pollution tends to be done by using approximations for example based on acreage, number of cattle, or by taxing products responsible for the pollution (e.g. tax on fertiliser and other agricultural chemicals). A dozen Adherents put an additional price on pesticide use either through a tax, a duty or a control fee (**Australia** (Australian Capital Territory and New South Wales)[2], **Denmark, Finland, France, Italy, Mexico, Norway** and **Sweden**) (Table 8.2). Florida (**United States**) taxes imports of pollutants including pesticides. On the other hand, **Belgium** (Flanders) provides subsidies for the reduction of pesticide and fertiliser use in ornamental crops cultivation (OECD, 2019[5]).

Table 8.2. Examples of features of pollution charges in selected Adherents

Examples

Country	Levied by	Tax name	Specific tax	Tax structure
Australia	State	Water effluent charge	Volume, pollution content (types of polluants)	Per kg assessable load
Canada	Province	Charge on discharge	Volume and pollution content	Per litre or per tonne
Denmark		Diffuse source	Chemical deterrents of insects and mammals	Tax on retail price
France		Diffuse source	Pesticides	Per kg
		Water effluent charges	Households	Per m^3
Netherlands		Tax on the pollution of surface waters	BOD, COD and heavy metals, for large polluters	Per pollution unit
Sweden	Municipality	Wastewater user charges	Wastewater and drinking water	Varies by municipality; full cost charging
		Diffuse source	Pesticides	Per whole kg active constituent

Source: (OECD, 2017[7]) using the OECD database on Policy Instruments for the Environment (accessed 20/03/2016)

In some cases, downstream beneficiaries pay to regulate or preserve or restore upstream environments (e.g. flood management), as they benefit from activities made by others to reduce water consumption or pollution (i.e. payments for ecosystem services). Upstream land and water users/polluters receive compensation to provide environmental services and avoid damaging practices: in Korea users downstream of the 4 rivers compensate users upstream for constraints in abstracting and using water (OECD, 2017[4]).

8.3. Setting tariffs that cover operation, maintenance and renewal costs

Adherents to the recommendation that are considering pricing instruments would benefit from "setting tariffs or charges for water services and all other uses that cover the operation, maintenance and renewal costs of infrastructure and a progressive proportion of capital costs, where possible."

The principle of "full cost recovery" as enshrined in article 9 of the **EU** WFD provides for water supply and sanitation tariffs to cover the costs of water supply and sanitation, including operation and capital costs as well as environmental and resource costs associated with the consumption of the service (OECD, 2010[8]). More recently, sustainable cost recovery has been considered a practical and fair combination of user charges and public transfers, which requires that tariffs are affordable for each category of users and transfers are predictable, enabling the water utility to count on them to finance investment (OECD, 2010[8]).

Cost recovery is particularly low in the agriculture sector; irrigating farmers do not generally pay for the cost of water they can access. Despite progress since 2009, only nine of 39 survey respondents have full cost recovery related to both capital cost and operations and maintenance for irrigation, most of which do not have large irrigation areas (Table 8.3). In **Germany**, operation and maintenance as well as capital costs for abstraction are borne fully by operators and the federal states set different abstraction fees, some of which internalise parts of the environment and resource costs. In most cases, Adherents partially recover operation and maintenance costs and/or capital costs. For instance, cost recovery is low in the **Mexican** agricultural sector and there is no full recovery of costs related to capital cost and operations and maintenance for irrigation. Cost recovery is even less common for groundwater, although the situation differs from surface water as costs are often borne by users of individual wells.

Table 8.3. Water cost recovery in agriculture

2019

	Operations and maintenance cost recovery		
	Less than 100%		100%
Capital cost recovery	Less than 100%	Chile, Korea, Mexico, Norway, Portugal, Spain, Switzerland	Costa Rica, France[3], Italy, Japan, United States
	100%	Australia, Turkey	Austria, Denmark, Estonia, Finland, Germany, Israel, New Zealand, Sweden, United Kingdom

Notes: The cost recovery had not been assessed in Lithuania. Cabo Verde does not license surface water. No responses were given by Belgium, Colombia, Czech Republic, Iceland, and Latvia. The EU requires full cost recovery under the Water Framework Directive.
Source: (Gruère, Shigemitsu and Crawford, 2020[1])

The structure and level of tariffs and charges, which help to ensure the delivery of water services to households and businesses, varies among and within Adherents. They are usually composed of a fixed charge, which covers connection costs to the public water supply and/or sewage systems, and a volumetric rating system (if metering is available), which covers the volume of water supplied. Different tariff structures and levels will have differentiated social impacts (Leflaive and Hjort, 2020[9]). In **Australia**, water prices paid users reflect the cost of service provision and the volumes of water used, and also reflect the costs associated with natural resource management. They vary according to geographical circumstances, depending on whether the services are urban (treated water) or rural (untreated water) and the level of adherence to economic pricing principles.

The level of financial cost recovery varies from one Adherent to another – with the caveat that a full picture of how tariffs and charges cover costs of service provision is still lacking. Indeed, many OECD Adherents do not provide sufficient transparency on costs (e.g. deferred maintenance and replacements) or subsidies provided to fill the gap between the costs and revenues, making the estimation of cost recovery difficult (OECD, 2009[10]). In **New Zealand**, water charges recover costs associated with consent administration, information gathering and monitoring/supervision.

A limited number of Adherents manage to cover a progressive proportion of capital costs of infrastructure, in addition to their operation and maintenance costs. This is the case in **Austria, Denmark, Finland, New Zealand, Sweden** and the **United Kingdom.**

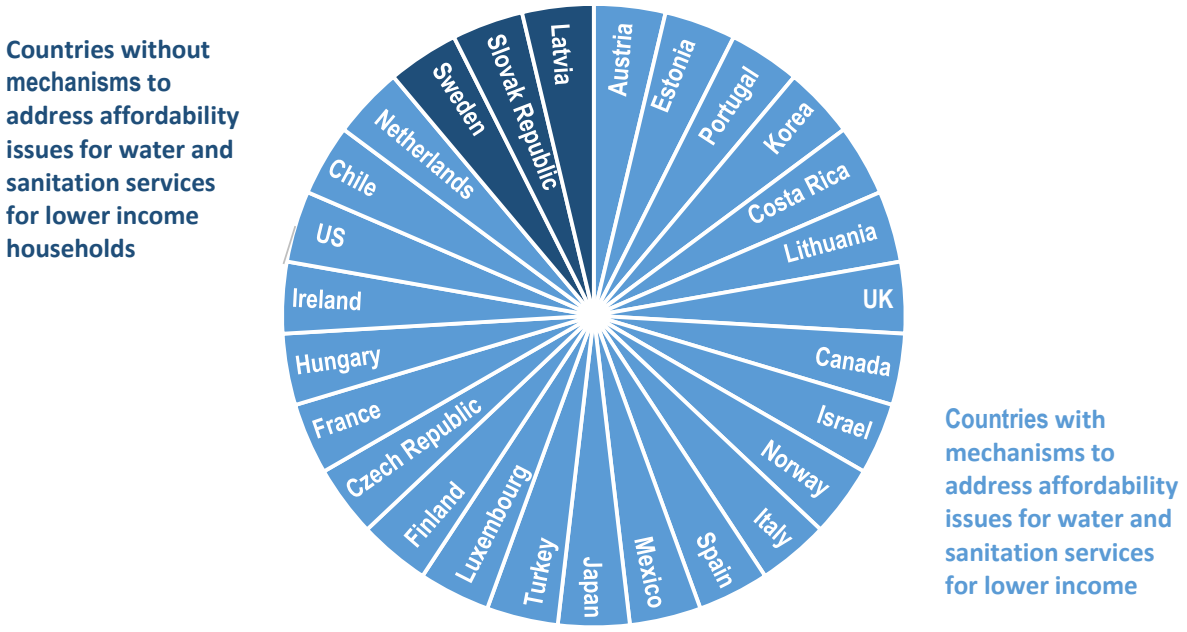
In cases where the water infrastructure costs are not covered by revenues raised through tariffs and charges, Adherents provide subsidies to fill the gap. This is the case in **Spain** where new wastewater treatment plants are partly subsidised by the EU and the central government. In **France**, the proceeds of water-related charges are recycled to subsidise investments in water services (most particularly wastewater treatment plants) at basin level.

8.4. Accounting for the redistributive consequences and priority water uses

The Adherents to the Recommendation that are considering pricing instruments should “account for redistributive consequences and priority water uses, based on affordability studies, equity for vulnerable groups and assessment of competitiveness impacts, as appropriate, taking into account the right to safe drinking water and sanitation.”

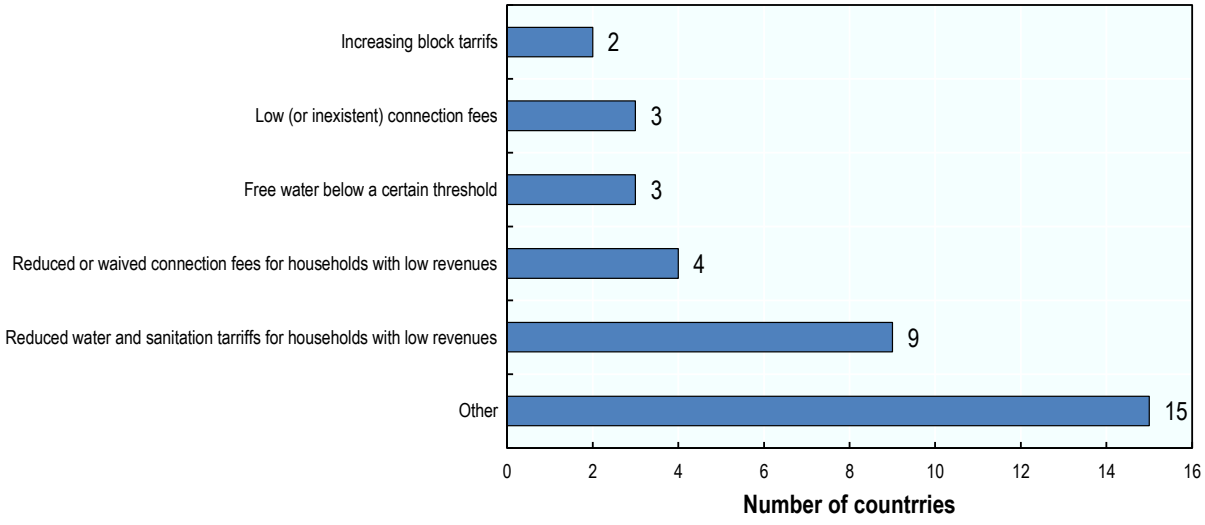
The 2019 OECD Implementation Survey revealed that 89% of respondents have measures to address affordability issues for water and sanitation services for low-income households in place (Figure 8.3). The mechanisms to address affordability issues are varied, though most Adherents seem to use reduced water and sanitation tariffs for households with low revenues (Figure 8.4).

Figure 8.3. Mechanisms to address affordability issues for water and sanitation services for low-income households



Note: Responses to the question "Does your country have mechanisms to address affordability issues for water and sanitation services for low income households?".
Source: 2019 survey on the implementation of the OECD Council Recommendation on Water; 27 responses received, including 26 Adherents.

Figure 8.4. Mechanisms to address affordability issues



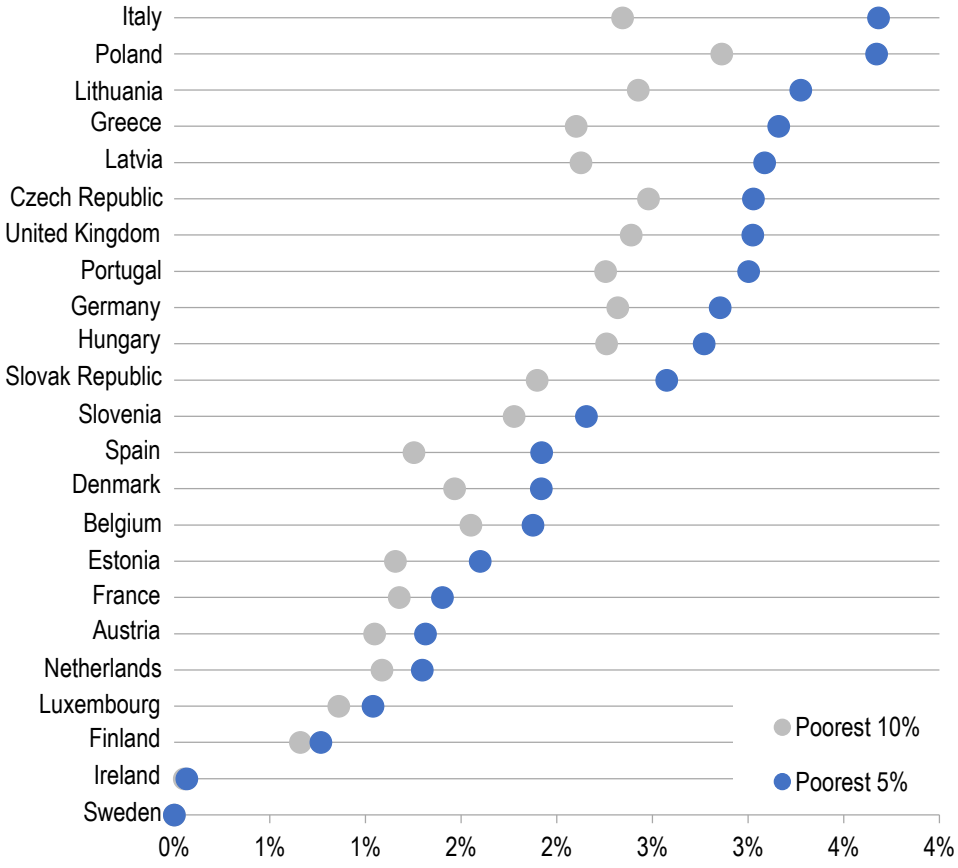
Note: Responses to the question: "How is support for low income households provided?". "Other" includes: plans from water supply companies, solutions provided on the local and municipal level and the aid via welfare system. Multiple responses were possible. Excludes responses from Latvia, Slovak Republic and Sweden.
Source: 2019 survey on the implementation of the OECD Council Recommendation on Water; 27 responses received, including 26 Adherents.

In **Chile**, targeted subsidies, which are fully funded by the central government and administered by the municipalities, support low-income households for whom the water supply and sanitation bill constitutes more than 5% of their monthly income. The subsidy covers between 25 to 85 % of their basic water and sewerage consumption (up to a certain level). In 2011, 15% of water company clients benefited from this subsidy at a cost of USD 80 million (Leflaive and Hjort, 2020[9]). In selected **French** cities (e.g. through the suburban *Syndicat des eaux d'Ile-de-France*) rebates, vouchers or lump sum transfers are provided to pay for water bills for eligible water users under the Programme "Aide Eau Solidaire" (Leflaive and Hjort, 2020[9]). In **Australia**, residential customers may access financial hardship assistance programmes provided by water utilities, which include flexible payment options, not restricting supply and deferral of debt collection for customers receiving assistance.

A study on water affordability (Figure 8.5) indicates that a vast majority of water users could afford to pay more for water supply and sanitation services. This suggests that cheap water (or tariffs that do not provide the revenues to cover operation, maintenance and renewal costs) benefit people who do not need such support, and potentially affects poor population (who are more vulnerable to low-level of service).

Figure 8.5. Share of water supply and sanitation expenditures in households' disposable income

Percentage, 2011-2015 average



Note: Lack of household expenditure data for Sweden.
Source: (OECD, 2020[11]); based on EUROSTAT (household expenditures and income data).

In **Portugal**, the economic regulator of water supply and sanitation services carried out an affordability study to identify geographically concentrated clusters of population that would fall above the affordability threshold as part of the design of its proposed tariff reform (Leflaive and Hjort, 2020[9]). It showed that

about 10.5% of Portuguese households had bills above the affordability criteria, concentrated in 60 out of 309 municipalities in the North and Tagus Valley regions. The tariff reform allows flexible solutions in different municipalities.

Box 8.1. Denmark's experience in considering price elasticity of water demand

Denmark has a long tradition for water consumption metering and consumer charges for water supply and waste water treatment. Since 1992, urban WSS tariffs in Denmark have been based on full recovery of economic and environmental costs. During the period 1993-2004, water prices increased by 54%, leading to a decrease in urban water demand from 155 to 125 litres per person per day. In 2015, average consumption per capita was as low as 106 litres per day.

The average Danish family now pays 1.6% of their annual income in WSS charges. From the water bill paid by consumers, approximately 50% goes to the wastewater companies, 30% to the government and close to 20% to drinking water utilities.

A strong guiding principle for the financing of WSS services in Denmark is that supply policy and social policy should not be mixed. Thus, there is no social tariff, and affordability of water and waste water services is ensured via income support through Danish social policy.

Source: (Leflaive and Hjort, 2020[9])

8.5. Phasing out price-distorting policy measures and general subsidies

Adherents to the recommendation "that are considering pricing instruments would benefit from phasing out price-distorting policy measures and general subsidies that affect water availability, quality and demand, to the extent possible, taking into account broader public policies and priorities."

A range of measures and subsidies contribute to financing water and the management of water resources. Their impact on water demand and availability should be assessed, as some, under certain conditions, can have harmful impact on water availability, quality and demand (Table 8.4).

Table 8.4. Examples of subsidies in water services and water resources management

Transfer mechanism	Example
Direct transfers of funds	Capital investment subsidies for water supply and sanitation providers
Foregone tax revenue	Environmental pollution charges that do not cover the cost of pollution, as well as special reductions or exemptions
Foregone user charge revenue	Water supply and sanitation tariffs that do not cover the cost of service provision; lack of abstraction charges; reduced electricity tariffs for irrigation pumps
Transfer of risk to government	Government compensation to households and firms for property damage due to water-related disasters
Induced transfers	Cross-subsidies for water supply and sanitation services (industrial vs. household tariffs)
Economic advantage due to unequal regulation or policy	Different regulations or charges for industry discharging pollutants to sewer systems or directly to water bodies

Note: This is not an exhaustive list.
Source: adapted from (EAP Task Force, 2013[12]).

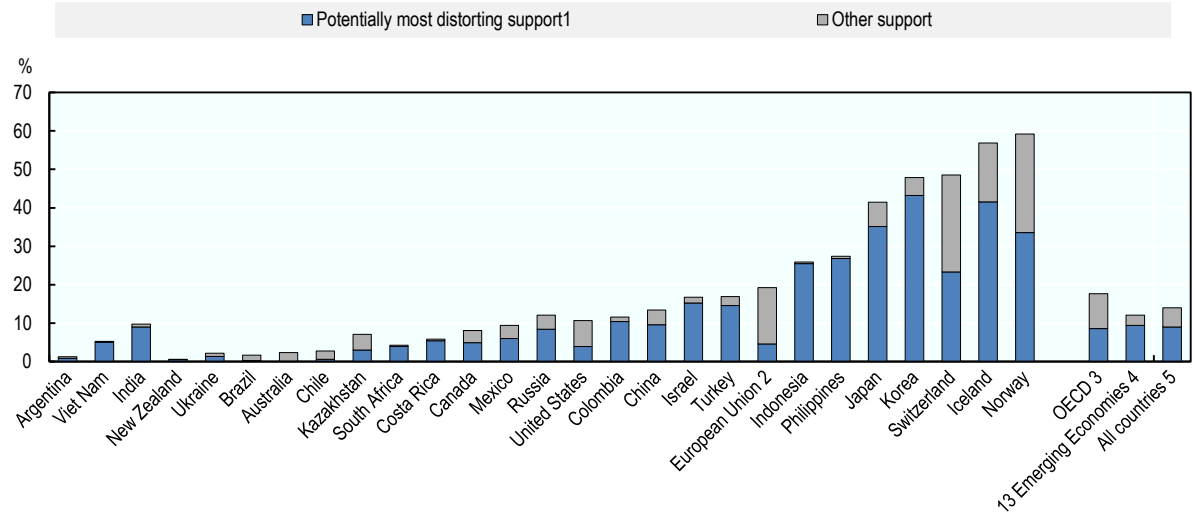
Sectoral policies can play an important role in incentivising water use. This is the case of agriculture, a sector that is still subject to high level of support in Adherents, with producer support estimates amounting to 18.5% of gross farm receipt or USD 235 billion/year in 2016-18 (OECD, 2019[13]). Certain type of

agricultural support that encourages input use or production without environmental or resource constraints directly or indirectly via measures inflating prices, can impact water quality and water quantity, among other environmental impacts (Henderson and Lankoski, 2019[14]) (DeBoe, 2020[15]) (Gruère and Le Boëdec, 2019[16]) (OECD, 2020[17]).

This includes subsidies for inputs like fertilizers without constraints, but also subsidies encouraging the production of specific commodities and most importantly a wide range of measures that inflate producer prices for specific commodities higher than necessary. Supporting certain production type will encourage farmers to stay in production regardless of water conditions, and of environmental impacts. As shown in Figure 8.6, even if this type of support - identified as potentially most distorting measures - were reduced significantly the past twenty years, it still represents a large share of agriculture support in a number of OECD Adherents. At the same time, governments support directly for irrigation (Figure 8.7), which may or may not harm water, has been declining significantly in Adherents (Gruère and Le Boëdec, 2019[16]).

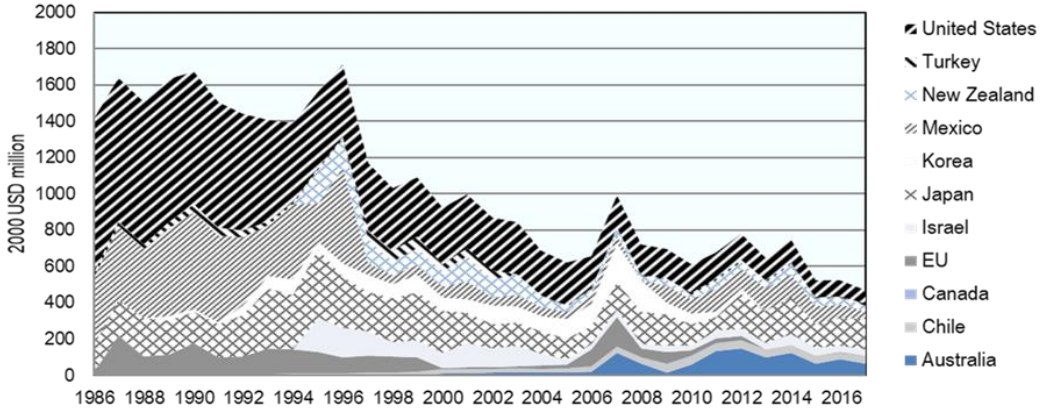
Figure 8.6. Agriculture support in percentage of gross farm receipts

By country, share of gross farm receipts, 2017-19



Notes: Countries are ranked according to the %PSE levels. Negative market price support is not shown. 1) Positive market price support, support based on output payments and on the unconstrained use of variable inputs. 2) EU28. 3) The OECD total does not include the non-OECD EU Member States. 4) The 13 Emerging Economies include Argentina, Brazil, China, Colombia (now an OECD member), Costa Rica, India, Indonesia, Kazakhstan, the Philippines, Russian Federation, South Africa, Ukraine and Viet Nam. 5) The All countries total includes all OECD countries, non-OECD EU Member States, and the Emerging Economies.
Source: OECD (2020), "Producer and Consumer Support Estimates", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-pcse-data-en in (OECD, 2020[17]).

Figure 8.7. Irrigation related producer support estimates (1986-2016)



Note: Countries without support for irrigation are excluded.
Source: OECD (2019), "Producer and Consumer Support Estimates", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-pcse-data-en.

8.6. Transaction costs

Adherents to the Recommendation "that are considering pricing instruments would benefit from considering transaction costs, including administrative costs, when designing pricing instruments and revenue management schemes."

Different pricing instruments for water management services will generate a range of transaction costs to estimate, implement, administer and levy the instrument. These costs can be disproportionate to the benefit expected from the instrument.

This is clearly illustrated by discussions on the costs and benefits of metering household consumption for water tariffs. (Reynaud et al., 2016[18]) state that while domestic users commonly are found to be sensitive to prices, the elasticity of water use to price changes is, in most cases, relatively small. As a consequence, in absence of significant tariff increases, metering household water consumption will generally not affect water uses and water bills. Meters can still be used to detect leakage, and this can be done through block or district metering. Metering at household level can be disproportionately costly to support sophisticated tariff structures, which have little impact on water use (Leflaive and Hjort, 2020[9]). Such a discussion was particularly vibrant in **Ireland** when Irish Water endeavoured to roll out systematic metering at household level in the context of a reform of financing strategy for water supply and sanitation services.

Similar discussions apply to the design of responses to affordability issues. The most appropriate responses usually combine a capacity to target households most in need of support; synergies with water conservation measures; and low transaction costs, building on existing data and social programmes. More detailed analyses are required to document how Adherent consider (and minimise) transaction costs when designing water pricing schemes and related measures to address affordability issues.

New sources of data, digitalisation and other technologies can reduce transaction costs. Under the National Water Initiative, **Australia** is pursuing to minimise transaction costs on water trades, including through good information flows in the market and compatible entitlement, registry, regulatory and other arrangements across jurisdictions (OECD, 2019[19]).

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Notes

[1] 2019 OECD Survey on water and agriculture policy changes (Gruère, Shigemitsu and Crawford, 2020[1])

[2] Australian Capital Territory: Pesticides and Polychlorinated biphenyls (PCBs) emissions to water from sewage treatment plants -- more than 10,000 ML per year + New South Wales: Pesticide and PCB emissions to water

[3] Full cost recovery for agricultural use in France, including environmental costs (overseas departments included) is estimated to more than 60%. This low level is mainly explained by the estimated amount linked to environmental degradation compensated by other water users or not compensated altogether. Without taking into account environmental costs, this recovery rate goes back to 90% (this result includes the cost of collective services, private costs and financial transfers between the different categories of users). This estimate made in 2019 is the first to have been conducted both at the basin level and at the national level.