conseil d'analyse économique
French Council of Economic Analysis

Anne Perrot[a], Arnaud Reynaud[b], Stéphane Saussier[c]

Water under pressure: how to align sustainability, fairness and investment

Les notes du conseil d'analyse économique, no. 86, January 2026

France is facing a growing water crisis, exacerbated by climate change, at a time when infrastructures are ageing: nearly one in five litres is in the networks, and given the current renewal rate, it would require more than a century and a half to modernise the entire network. Additional investments are needed to secure and modernise networks, but also more sustainable water use.

In light of these challenges, the economic model of the sector, based on the principle "water pays for water" and therefore largely dependent on sales volumes, now appears ill-suited. While a large share of the costs of water services is fixed, the structural decline in consumption, encouraged by sustainable policies, weakens their financing. A profound reform of France's water system is required. It must first aim to establish a simpler pricing, easily readable and economically efficient, relying on a higher fixed share, necessary to cover structural costs, and a variable share adjusted according to seasonal variations or resource availability, in order to send an appropriate price signal during periods of water stress.

The strategic and operational capacity of water authorities must also be strengthened, namely through the merge of water supply and sanitation services and through increased use of contractual instruments linking operators' remuneration to performance objectives.

Reforming the funding of water services also raises the question of how the effort is shared among users. This effort currently falls disproportionately on households, while agriculture and industry, despite being major consumers and sources of pollution, contribute relatively little. This reflects an imperfect application of the "polluter pays" principle and calls for a reassessment of usage fees.

However, sustainable water management cannot be limited solely to water supply and sanitation services (the "small cycle"). It must better integrate the overall functioning of the resource (the "large cycle") by promoting sustainable water use, groundwater recharge and the reuse of treated wastewater. The funding of this large cycle, which is essential for preserving ecosystems and preventing flooding, remains largely insufficient. Additional and lasting funding must be mobilised to meet biodiversity needs and rising environmental costs.

The current water crisis requires combining rapid measures with long-term structural reforms, fully integrating water into all public policies. Implementing this trajectory nevertheless requires having a social consensus around water, based on better information, a more balanced distribution of effort and strengthened solidarity towards the most vulnerable territories.

[a] Inspection générale des finances, correspondante du CAE, [b] Toulouse School of Economics, INRAE, université Toulouse Capitole, [c] IAE Paris, université Paris I Panthéon-Sorbonne

Introduction

France is experiencing increasing pressure on water resources as a result of climate change. The drought that occurred during the summers of 2022 and 2023 revealed the fragility of water supply: in 2022, more than 1,000 municipalities experienced interruptions or severe restrictions on use. In 2023, abstraction limits affected more than 80% of metropolitan territory.[1]

In this context, awareness of water scarcity drives a transition towards water conservation. The French Water Plan, announced in March 2023, sets a target of reducing abstractions by 10% by 2030. While this orientation is beneficial for the resource, it nevertheless raises an economic paradox for water services: historically, their funding is based on cost recovery, largely ensured through sales volumes. How, then, can heavy and inflexible infrastructures be financed in a context of declining consumption? This paradox is all the more acute given that the French drinking water network is ageing: around one litre out of five is lost through leaks before reaching consumers. This contradiction weakens the current economic model, which many operators and local authorities now consider to be "running out of steam".

On top of this issue tied to the small water cycle (production, distribution and sanitation) is added that of the large cycle (natural processes of water circulation between the atmosphere, oceans, soils and groundwater). The large cycle is currently underfunded: policies for flood prevention, river renaturation or winter storage suffer from chronic underinvestment. Climate change exacerbates imbalances (more violent floods, prolonged droughts) and calls for structural responses integrating water into a broader set of public policies: urban planning, agriculture, spatial planning and industry, with better articulation between the challenges of the small and large cycles.

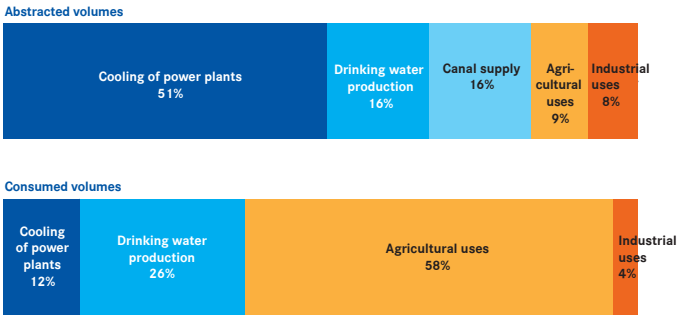
Moreover, pressure on the resource continues to grow, with a possible doubling of summer consumption in half of the territory between 2020 and 2050, exacerbating tensions between users.[2] The costs of disruptions to water supply are becoming increasingly high. Water scarcity constitutes a systemic risk for the euro economy, with one extreme drought potentially jeopardising up to 15% of regional economic output according to a study by the European Central Bank.[3]

In this Note, we analyse the structural limits of the economic model of water in France, before proposing several avenues for reform to sustainably preserve the resource while meeting investment needs.

Limits of the French water economic model

The funding of water policy is based on two fundamental principles. The first holds that users finance the expenditures related to their own use, whether collective or individual: "water pays for water". The second principle, that of "polluter pays", states that water abstraction and the polluting disfees it generates must give rise to a financial contribution proportional to the environmental impact caused. This principle is embodied through the fees paid to water agencies by all users in return for their use of, or damage to, the resource. Figure 1 illustrates this logic by presenting the distribution of abstracted and consumed water among the different users. It highlights the sectors exerting the greatest pressure on the resource. While the baseline forward-looking scenario of France Stratégie does not foresee a significant increase in total water abstractions by 2050, it shows that the strong increase in water abstractions for agriculture can only be offset by a reduction in needs for energy, directly linked to the shutdown of ageing nuclear power plants.

Figure 1. Distribution by use of the 32.8 billion cubic metres of freshwater abstracted and consumed (annual average 2010–2019)



Reading: Between 2010 and 2019, 32.8 billion cubic metres of freshwater were abstracted on average each year, of which 4.1 were consumed. Cooling of power plants represents 51% of abstractions and 12% of consumption.

Source: Avis du CESE (2023) : Eau potable: des enjeux qui dépassent la tarification progressive.

The distinction between abstractions and consumption is central to water management because these two indicators refer to different types of constraints. Abstractions primarily determine immediate tensions in access to the resource, particularly during low-flow periods, when large volumes mobilised (as is the case for the energy sector) can weaken supply and ecological balances, even if the water is largely returned. Conversely, consumption measures the net loss for environments and downstream uses, making it a key indicator of long-term sustainability. In this respect, agriculture poses a key challenge: while it represents a limited share of abstractions, its consumption is more than half of all sales volumes (62% of water consumption in 2020).

[1] Service de la donnée et des études statistiques (2024) : Restrictions d'eau lors des périodes de sécheresse en France métropolitaine en 2023.

[2] France Stratégie (2025) : La demande en eau : prospective territorialisée à l'horizon 2050, report.

[3] Ceglar et al. (2025) : « The European Economy Is Not Drought-Proof », *European Central Bank's blog*, May 23

The management of water is based on a decentralised model: inter-municipal authorities are responsible for organising the public water supply and sanitation service (WSSS). They may choose between direct public management or delegated management through a concession contract with a company. There is no specific regulatory authority; management relies on the contract binding the local authority and the operator. Users finance the service through their bills. Private operators are remunerated through a share of the amounts paid by users.

The tariff charged for the WSSS is based on two components: a fixed component (subscription) covering the fixed costs of the service (maintenance of networks, meter reading, customer management) and a variable component, based on sales, financing production, sewage treatment, distribution and sanitation of water. Local variations exist (progressive, social or seasonal pricing) to reconcile water conservation and accessibility.[4] The WSSS issue bills, collect payments and transfer the fees belonging to the water agencies. The six water agencies thus receive almost all of their resources in the form of fees (from the WSSS and other users) and redistribute them to finance actions for sustainable management, pollution reduction and restoration of aquatic environments. In 2023, the water agencies collected a total of €2.35 billion in revenue, of which €2.22 billion came from fees, i.e. around 94% of the total. The State sets ceilings on these fees and ensures that pricing complies with the provisions of the Environmental Code.

A dependence on sales volumes

Fixed costs represent a significant share of costs for the WSSS. They include infrastructure and equipment maintenance, staff costs and the investments required to guarantee continuity and quality of service.[5]

In France, pricing still largely relies on sales volumes. A reduction in these volumes therefore leads to a decline in revenues, thus undermining the services' ability to cover fixed costs and to invest in maintenance and renewal of infrastructure. Leak repair poses a genuine economic paradox. On the one hand, the loss of an additional cubic metre of water has a limited financial impact for the service, since most of its costs (networks, staff, equipment) are borne independently of distributed volumes. On the other hand, detecting and repairing leaks requires heavy and costly works. As a result, the cost of repair often exceeds the economic damage caused by the loss, leading to many small leaks not being tackled despite their significant cumulative impact on the resource.

Moreover, the principle of cost recovery through revenues ("water pays for water") encourages the WSSS to bill ever larger volumes in order to secure their funding, in contradiction with sustainability objectives. While WSSS already face a considerable wall of investment due to ageing infrastructure (see above), the reduction in water consumption observed in recent years (partly explained by improvements in equipment as well as growing awareness of resource scarcity) risks increasing operating costs while reducing revenues, with constant population and prices.

> **Finding 1.** The funding of water services depends very heavily on volumes sold. This model is incompatible with the objective of saving water.

Domestic users ensure most of water policy's funding

Between 2013 and 2022, France devoted on average €23.6 billion per year to water policy (0.84% of GDP). The bulk of expenditure (92%) concerns the small water cycle, while 8% is dedicated to the large cycle. This funding relies largely on users, with households accounting for €12.5 billion per year, i.e. 53% of the total[6]. Other contributors are industries (23%), farmers (9%), production activities assimilated to domestic uses (PAADU[7], 9%), and the State and local authorities (6%).

While financing of water policy largely relies on domestic users, the reform of fees introduced in 2025 marks a shift (see Box 1). Fees for domestic pollution and network modernisation are replaced by new performance-based contributions: a fee on drinking water consumption, a fee for the efficiency of water networks and a fee for the efficiency of collective sanitation systems. This reform introduces an incentive-based logic, based on sobriety, network efficiency and quality of the service provided, as well as stronger involvement of non-domestic users in the funding of water policy.

The predominant financial contribution of domestic users is not the only equity issue. Inequalities in access to water are particularly marked in overseas territories, where inhabitants may sometimes face interruptions in drinking water supply, despite abundant natural resources. These difficulties

[4] See Beuve J., Huang L., Lanvin C., Lasterra O. et Ménard C. (2026) : « Tarification et régulation de l'eau dynamiques récentes, comparaisons internationales et retours d'expériences locales », *Focus of the Conseil d'analyse économique* n° 125, January

[5] Determining the share of fixed costs remains a matter of debate. It is estimated at around 80% of total costs by water industry stakeholders: Canneva et al. (2012) : « Analyse de l'impact du plafonnement de la part fixe dans la tarification des services d'eau », Technical Report, Onema. However, other studies find much lower estimates, averaging 27%: Porcher S. (2014): "Efficiency and equity in two-part tariffs: The case of residential water rates," *Applied Economics*, 46(5), pp. 539-555. These discrepancies highlight the lack of methodological consensus and the need to better define the boundaries between fixed, semi-fixed, and variable costs in the water industry.

[6] Salvetti M. (2024) : « Panorama du financement global de la politique de l'eau en France métropolitaine », report for le Cercle français de l'eau.

[7] PAADU include shops, hotels, restaurants, and small service establishments, comparable to households in their water usage.

Box 1. Funding water policy: who pays what, and how?

In France, water policy is funded mainly by users, according to the principles of user-pays and polluter-pays. This funding relies on a specific framework combining the price of the public water supply and sanitation service (WSSS), the fees collected by water agencies and, to a lesser extent, additional public funding. Better understanding sustainability and equity issues requires clearly distinguishing these different flows and their orders of magnitude.

Households represent the main aggregate source of funding

At national level, households account for more than 80% of revenues derived from water supply and sanitation services and associated fees.[a] This substantial contribution does not result from a particularly high unit price, but from the fact that households are numerous, systematically connected and billed on a continuous basis. Other users—industries, farmers, energy producers—contribute in a more concentrated manner, often localised in certain basins, according to their uses and the pressure they exert on the resource.

Price of water and breakdown of the bill

On average, the price of drinking water and sanitation in France stands at around €4 to €5 per cubic metre, all components included.[b] This price covers distinct realities.

– Around 75 to 80% correspond to the price of the water and sanitation service: production and distribution of drinking water, collection and treatment of wastewater, day-to-day operation, network maintenance and investments. This share finances operation, maintenance and renewal of the network and directly funds the local public service.

– Around 20 to 25% correspond to fees and taxes, foremost among which are the fees belonging to water agencies. This share is collected through the bill but transferred to the water agencies; it does not constitute any revenue for the operator. Fees represent only a few tens of cents per cubic metre, i.e. a minor share of the price paid by the user, but a significant one at aggregate level.

Fees: funding and incentives

The fees collected by water agencies represent an annual amount of around €2 to €2.5 billion.[c] These revenues are strictly earmarked for financing water policies at basin level: support to local authorities and economic actors, network modernisation, pollution reduction, protection and restoration of aquatic environments, and adaptation to climate change. Fees therefore do not finance the service provided to the user, but collective environmental objectives, within an incentive-based logic.

Differentiating collection circuits by type of user

For households, fees are included in the water bill: the water service operator collects them from the final user and then transfers them to the water agencies. For other economic users (industries, farmers, energy producers), fees are generally levied directly by the agencies, based on abstracted volumes, discharges or certain specific uses of water. Electricity production sites (thermal, nuclear or hydroelectric plants) fall within these economic users and are counted, in aggregate statistics, within the category of industrial or non-domestic users.

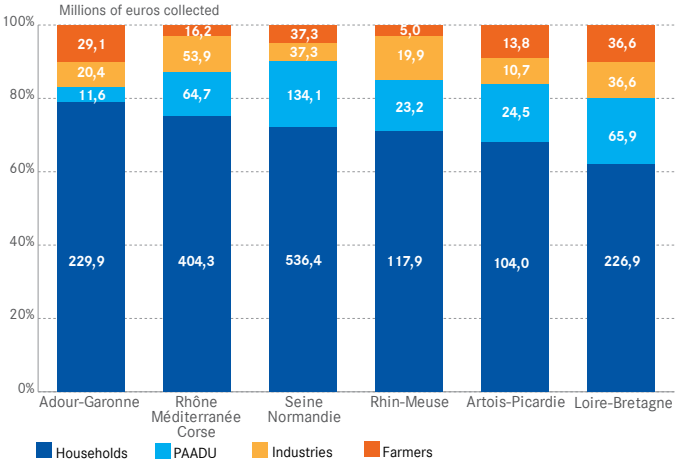
[a] CGDD, Comptes de l'environnement – Eau; Cour des comptes : La gestion quantitative de l'eau.

[b] Eau France: Le prix de l'eau

[c] Agences de l'eau, Rapports annuels – données financières consolidées.

are often linked to the dilapidation of infrastructure and chronic underinvestment. These situations contrast sharply with mainland France, where supply is more reliable. Social inequalities can be added to these territorial disparities, as vulnerable households may face water bills that weigh heavily on their expenses. In some cases, fiscal equity is also questionable. Thus, although most of water policy's funding relies on users of water services, significant territorial disparities exist. **Figure 2** shows that the share of fees collected from households varies from 63% in Loire-Bretagne to 78% in Adour-Garonne. These disparities are explained by the characteristics of territories (nature of economic activities, water resources, population, etc.) but also by the level of fees paid by the different users.

Figure 2. Fees collected by water agencies, by type of user (average 2013–2022)



Reading: Between 2013 and 2022, fees paid to the Seine-Normandie water agency amounted to €745 million on average. They mainly came from households (72%), followed by PAADU (10%), industries (5%) and farmers (5%).

Source: Salvetti M. (2024): «Panorama du financement global de la politique de l'eau en France métropolitaine», Cercle français de l'eau.

Conflicts over water use, which are becoming increasingly frequent, are often exacerbated by the perception of an inequitable allocation of the resource. In the absence of a clear and officially defined hierarchy of water uses, the necessary trade-offs in situations of water scarcity between agricultural irrigation, drinking water supply, preservation of aquatic environments and other uses are difficult, subject to exemptions or even called into question.

Finding 2. The funding of water policy is inequitable. It relies essentially on domestic users, while other sectors (for example agriculture and industry) do not contribute in proportion to their impacts. Social and territorial inequities persist.

The "polluter-pays" principle imperfectly implemented

In France, 53% of water expenditure concerns the reduction of pollution from all sources[8]. Internalising the costs of pollution is a major challenge for water policy, which faces implementation difficulties: dilution of responsibilities and the impossibility of precisely attributing diffuse pollution (for example for nitrates and pesticides).

As a result, fees targeting emitters of water-polluting substances are not always set at levels sufficient to significantly reduce pollution. As an example, the fee on plant protection products has not increased since 2019. Moreover, these fees do not cover all pollution. For instance, there is no specific fee on the use of synthetic nitrogen fertilisers by the agricultural sector. Yet nitrates remain (along with pesticides) the most frequently detected pollutants in groundwater, and France struggles to apply the Nitrates Directive. The presence of micro-pollutants (residues of medicines, cosmetics, detergents, etc.) in aquatic environments also raises growing concern due to their toxicity, persistence and bioaccumulation. These substances, which generate high depollution costs borne by local authorities, are not subject to any specific fee.

Finding 3. In the water sector, application of the polluter-pays principle is incomplete and imperfect.

A chronic lack of investment

In 2019, the average leakage rate in France stood at 19.7%.[9] Nearly one billion cubic metres of water are thus lost each year in France, equivalent to the consumption of 18 million inhabitants. France's leakage rate stays within the European average (lower than that of Belgium and Italy, but higher than that of Germany). These comparisons must, however, be nuanced: Germany's higher population density allows for higher returns on equivalent investments. Despite these contextual elements, the low rate of network renewal in France (around 0.65% per year) implies that it would take more than 150 years to fully renew water infrastructures, whereas the average lifespan of pipes is generally between 50 and 100 years. In its latest report, the Union of Water Industries and Companies estimates at €4.2 billion the investment required for proper maintenance of assets linked to water supply and sanitation, rainwater management, as well as addressing emerging qualitative and quantitative challenges.[10] Added to this are €3 billion in insurance costs linked to floods and drought, as well as €5 billion required for all water masses to reach good ecological status, in accordance with the requirements of the Water Framework Directive.

A large share of these investment needs concerns the large water cycle (preservation, restoration, risk management, knowledge, climate adaptation), which remains largely underfunded.[11]

Finding 4. Both the small cycle and the large cycle of water suffer from a considerable lack of structural investment.

Reforming of the economic model of water

Reforming the economic model of water in France can rely on several complementary levers: actions on demand to encourage greater user sobriety, actions on supply to improve performance and operational efficiency of services, and actions on governance aimed at rebalancing financial contributions to foster the emergence of a social consensus around water.

Leveraging demand by adapting water pricing

Developing incentive-based water pricing is a response to the challenges of water sobriety, social justice and resource preservation. An appropriate price signal would allow better management of the resource by encouraging more responsible behaviour and by making it possible to reach a point of balance between water supply and demand, as well as a more efficient allocation of the resource among consumers.

[8] Salvetti M. (2024), op. cit.

[9] French Office for Biodiversity (2025): Sispea Report 2023 – National data on public water and sanitation services.

[10] Salvetti M. (2022) : «Patrimoine de l'eau 2022 : État des lieux des infrastructures d'eau potable, d'assainissement collectif et des eaux pluviales en France», Report for the Union of Water Industries and Companies.

[11] Salvetti M. (2024), op. cit.

Progressive pricing

The debate in France has crystallised around progressive water pricing, frequently presented as a relevant tool to limit water waste and cover costs through mechanisms of cross-subsidies between large and small users. This approach is also supposed to strengthen equity, based on the assumption that small consumers correspond to the most underprivileged households, while larger consumers would belong to more privileged households.

Even though only 8% of water services and 2% of public sanitation services apply multi-tier pricing, various institutions have suggested resorting to progressive water pricing to encourage more sustainable consumption and strengthen equity. However, economic literature remains cautious on this issue, considering that progressive pricing does not make it possible to achieve these objectives (see **Box 2**).

Increasing the fixed share of the water tariff

From an economic standpoint, the fixed share of the water tariff should allow to cover the costs of water services independently of the volumes consumed: building and maintaining networks, wastewater treatment plants and production facilities represent largely incompressible costs, which must be shared among all users to ensure the financial viability of the service. Introducing an appropriate fixed share therefore guarantees stable revenues, independent of variations in consumption.

One might object that the variable component weakens the price signal sent to users and does not encourage them to save water. This is nevertheless a minor issue given that household consumption is weakly elastic to price changes.[12] This choice may, however, raise equity issues: as all households pay the same fixed share, small consumers are penalised. The issue also arises in territories where the proportion of holiday homes is high: some inter-municipal authorities already apply differentiated pricing, with distinct subscriptions for second homes and for professional uses of a tourist or seasonal nature.

The economic optimum consists in combining a fixed component that covers structural costs with volumetric pricing based on the marginal cost of production, in order to send consumers an effective price signal. Other instruments, distinct from water pricing, must be mobilised to guarantee social equity. In particular, this refers to targeted assistance based on declared income and household size, following the example of energy vouchers. Their implementation requires access to data held by social agencies in order to effectively target households for which the water bill represents a significant share of disposable income.[13]

In France, the fixed share (corresponding to the subscription) represents on average 13% of users' bills.[14] It is regulated, with a ceiling set at 30% of the total price including tax of a standard bill for urban municipalities, and at 40% for rural

Box 2. The not so good idea of progressive pricing

Progressive pricing corresponds to a situation in which the marginal price per cubic metre paid by a user increases as consumption rises, according to predefined tiers. Such a mechanism has several limitations. First, the link between household income and water consumption is weak: some wealthy households are also small consumers, and families with modest incomes may have high consumption. Second, implementation of progressive pricing remains difficult in collective housing without individual meters (around 50% of households). The cost of equipment must be weighed against the expected reductions in consumption, knowing that price elasticity of water consumption among domestic users is low in France.[a]

Finally, the fact that households differ in size and lifestyle makes it difficult to estimate ex ante the water consumption required to cover essential needs. No household therefore receives a correct price signal regarding the value of the resource, which undermines the objective of economic efficiency.

In the Dunkirk urban area, which has implemented progressive pricing since 2012, a study shows that this reform has led to sometimes unexpected reactions from users, notably due to the complexity of the tariff structure and the poor readability of the price signal. The study also highlights that progressive pricing can penalise certain categories of users, in particular large families whose higher consumption is explained by household size rather than by excessive use of water.[b] Overall, these results highlight the tension between readability, incentives, equity and budgetary balance; pricing alone being unable to effectively pursue several objectives simultaneously.

[a] Favre M. et Hardelin J. (2025) : « Le prix de l'eau: état des lieux et perspectives pour une gestion durable de la ressource », Commissariat général au développement durable, Working paper, August.

[b] Mayol A. et Porcher S. (2019) : « Tarifs discriminants et monopoles de l'eau potable: une analyse de la réaction des consommateurs face aux distorsions du signal-prix », Revue économique, 70(4), pp. 461–494.

[12] Incentives to reduce water consumption do not necessarily have to involve pricing. Wheeler et al. (2025) note that domestic demand is relatively inelastic to price because essential uses can hardly be reduced. The most effective policies rely more on information, awareness-raising and transparency, as well as on the modernisation of equipment, which is more economical and less prone to leaks; Wheeler et al. (2025): "Water pricing and markets: Principles, practices and proposals", *Applied Economic Perspectives and Policy*, 47(1), pp. 42–72. For France, econometric studies show that household water demand is very inelastic to price, with an absolute value of less than – 0.1. Reynaud A., Lanzanova D. and Markantonis V. (2015): "Modelling Household Water Demand in Europe: Insights from a Cross-Country Econometric Analysis of EU-28 Countries", *JRC Technical Report*, European Commission.

[13] The Interministerial Digital Directorate is working in partnership with the National Family Allowance Fund (CAF in French) to develop a national tool that will enable local authorities to access CAF data while ensuring the security of exchanges. It is expected to be rolled out at the end of 2025.

[14] French Office for Biodiversity (2025): op.cit.

municipalities.[15] There is therefore room for manoeuvre to adjust the economic model without exceeding regulatory thresholds.

Pricing water according to season or resource availability

To reflect the marginal cost of production, the pricing of water and sanitation may be adjusted according to the season, resource availability or intensity of demand. The opportunity cost of water evolves over the year depending on seasons and uses (watering and recreational uses in summer). As permitted by the 2006 Water and Aquatic Environments Act, seasonal pricing could be implemented in all municipalities where the balance between resource and water consumption is seasonally threatened.

Adjusting prices according to periods of high demand, similar to peak/off-peak electricity tariffs, would encourage more responsible consumption. Seasonal pricing presents limitations similar to those of progressive pricing (fine measurement of consumption by season, user accountability in collective housing). Toulouse Métropole, often cited as an example, has implemented this policy. Since June 2024, the city has been charging €4.42/m³ in summer and €2.58/m³ during the rest of the year[16]. However, no official assessment of the scheme has been published to date.[17]

Recommendation 1a. Increase the fixed portion of the tariff to cover structural costs, while maintaining a variable portion that reflects marginal costs. Introduce targeted support for low-income households to offset the potentially regressive effect of a higher fixed portion.

Recommendation 1b. Develop seasonal or modulated pricing experiments based on resource availability in order to send a more incentive-based price signal during periods of water stress.

Given the significant investments required in the coming years, the average price of water is set to increase. The average increase in water prices observed in recent years has merely reflected the inflation rate[18]. Yet investment needs are substantial: around €4.2 billion would be needed to invest in networks, including approximately €1 billion for rainwater management, a segment that is not financed by consumers. Closing this investment gap would represent an additional cost of around €0.72 per cubic metre, i.e. nearly 15% of the average price including tax per cubic metre in 2023 (€4.69/m³). For an average annual consumption of 120 m³, this would imply an additional cost of around €86 per subscriber, assuming the same subscriber base for sanitation and drinking water distribution.

Increasing the fixed share for low-income households raises the risk of a regressive impact, which measures such as a water voucher must explicitly aim to neutralise. These compensation mechanisms may take different forms: direct assistance via a water voucher, partial or total coverage of unpaid bills by the Housing Solidarity Fund, or *ad hoc* assistance provided by municipal social action centres. The aim is to reduce the bills of low-income households and prevent situations of non-payment. These mechanisms thus make it possible to preserve the objectives of social accessibility, while ensuring that the increasing structural costs of the service are covered.

Acting on supply by moving from a volume-based model to a performance-based model

The transition towards a more resilient economic model implies rethinking contractual tools, encouraging more efficient management configurations and strengthening data production and use.

Contracting on performance and comparing performance across management models

Adopting a performance-based logic implies rethinking service monitoring indicators as well as the associated steering mechanisms. It becomes relevant to reduce the dependence of private operators' revenue on sales volumes and to orient management towards clearly defined environmental and operational objectives. Thus, results achieved in terms of resource preservation, network efficiency or quality of service will constitute major indicators for service evaluation.

This transition may also be accompanied by a more explicit allocation of responsibilities and risks among the different stakeholders, as well as clarification of medium- or long-term commitments. In the specific case of public service delegations (PSD), greater involvement of the private sector in infrastructure financing could strengthen the incentive to control total costs,[19] but at the cost of greater contractual complexity and longer commitments. Regardless of the

[15] Article L. 2224-12-4 of the General Code for Local Authorities and decree of 6 August 2007 on the presentation of water tariffs, amended by the decree of 27 January 2012, *JORF* No. 0025 of 30 January 2012.

[16] See Beuve J., Huang L., Lanvin C., Lasterra O. et Ménard C. (2026) : op. cit.

[17] Observing a decrease in consumption after the introduction of seasonal pricing is not sufficient to conclude that it is effective; such pricing is generally accompanied by information campaigns, which can be just as effective as price variations.

[18] French Office for Biodiversity (2025): op.cit. ; Beuve J., Huang L., Lanvin C., Lasterra O. et Ménard C. (2026) : op. cit.

[19] Hart O. (2003): "Incomplete contracts and public ownership: Remarks, and an application to public-private partnerships", *The Economic Journal*, 113(486), pp. C69-C76.

management method, this transition to performance-based systems requires a robust management framework and enhanced monitoring capabilities to establish their credibility and ensure their effectiveness.[20]

Recommendation 2. Generalise and strengthen contractual arrangements based on verifiable performance targets—such as reducing leaks, improving efficiency or service quality—on which a part of operators' remuneration is conditional.

Grouping small services together

In France, 13,071 local authorities still manage 24,188 WSSS[21], which complicates planning, limits opportunities for pooling resources and undermines the coherence of water policies. The NOTRe Act (new territorial organisation of the Republic) of 2015 initiated a process of regrouping WSSS at the inter-municipal level, transferring their competence to public establishments for inter-municipal cooperation (PEIC) with their own taxation powers.

Implementation of this law remains incomplete: the level of consolidation remains well below that observed in most European countries. For comparison purposes, there are around 40 water supply and sanitation services in Hungary, around ten in the Netherlands, 2,700 in Poland, 388 in Portugal, nearly 2,000 in Spain and around 290 in Sweden. Only Austria presents a higher level of dispersion relative to its population, with more than 7,000 operators.[22] Consolidation of services nevertheless constitutes an essential lever to rationalise governance, reduce inequalities and better control financial balances. It can also strengthen competition in tenders for delegated services by making potential takeovers more credible.[23]

Better knowledge for better regulation

Building a social consensus around water requires a shared understanding of water use and governance. This knowledge remains imperfect: the main available databases, the National Water Abstractions Database (NWAD) and the Information System on Public Water Supply and Sanitation Services (ISPWSSS), still present inconsistencies and gaps, despite recent efforts.

By way of example, the NWAD does not record abstractions below the thresholds subject to water agency fees (10,000 m^3/year, or 7,000 m^3/year in water distribution areas), and its codification of abstractions into five types of use (drinking water production, industrial use, agricultural use, canal supply and cooling of nuclear power plants) is too vague to allow detailed prospective analyses. Moreover, the distinction between abstractions during low-flow periods and outside low-flow periods has disappeared. There is no consolidated reliable information allowing intra-annual abstractions to be monitored, which limits the implementation of abstraction fees differentiated by season. The NWAD also does not contain any data on return flows, an essential indicator for assessing the sustainability of water resource management. It remains extremely difficult to link NWAD abstraction points to detailed sectoral uses. Systematic inclusion of a firm identification code (code SIRET in French) for each abstraction point would make it possible to link abstraction data to the corresponding economic activities. Interoperability of the NWAD with other databases would thus be greatly improved.

Furthermore, the French Cour des comptes has identified significant regional inconsistencies between NWAD data and those of water agencies, with problems of duplication and coding errors.[24] In a recent France Stratégie report, the authors specify that they had to reallocate almost 40% of industrial abstractions from the NWAD to other sectors (mainly energy and canals).[25]

With regard to ISPWSSS, since its creation and despite data transmission by local authorities and their competent public institutions being mandatory, many performance indicators remain unfilled for a significant share of services. Moreover, even when these indicators are available for a given year, they are not systematically reported in subsequent years for the same service, which limits the possibility of conducting robust panel analyses. It is nevertheless likely that, with the 2025 fees reform, the quality and completeness of reported data will improve, insofar as the calculation of fees will depend directly on the information entered into the ISPWSSS.

Greater quality and reliability of these data would also facilitate the implementation of systematic benchmarking between WSSS, in particular between WSSS managed directly by the public authority and those under delegated public service (DPS) contracts. These two management models rely on different economic and organisational approaches as well as incentives, whose effects on service quality, investment efficiency or financial sustainability remain insufficiently documented. This recommendation, already formulated in a previous report of the French Council of Economic Analysis

[20] See Beuve J., Huang L., Lanvin C., Lasterra O. et Ménard C. (2026) : op.cit.

[21] French Office for Biodiversity (2025): op.cit.

[22] EurEAU (2022): "The governance of water services in Europe: 2022 edition", Technical report, European Federation of National Associations of Water Services.

[23] Chong E., Saussier S. et Silverman B. S. (2015): "Water under the bridge: Determinants of franchise renewal in water provision", *The Journal of Law, Economics, and Organization*, 31, pp. i3-i39.

[24] Cour des comptes (2023) : La gestion quantitative de l'eau en période de changement climatique, Report.

[25] Arambourou et al. (2024) : "Prélèvements et consommations d'eau : quels enjeux et usages ?", *Note d'analyse* 136, France Stratégie.

concerning public procurement in general, applies to the specific case of sustainable water management.[26]

Recommendation 4. Improve the quality and completeness of data on water abstractions and services (NWAD, ISPWSSS) and use these data to develop a national benchmark for service performance (public utilities and DSP), in order to inform local authorities' choices and improve regulation of the sector.

Better integrating the small and large water cycles

Sustainable water management requires moving beyond the traditional approach focused solely on the "small cycle" to fully integrate the dynamics of the natural "large cycle" into a continuum.

Encouraging water sobriety

Optimising user practices, particularly agricultural ones, and improving storage capacities, although necessary, will remain insufficient to prevent increasing pressure on water resources. Water conservation must therefore be a key concern for public authorities.

Encouraging sobriety first requires collective mobilisation of all stakeholders who abstract or manage water resources. One avenue consists in promoting local contracts, committing the various users to reduced consumption targets.[27]

These contracts would set targets for reducing consumption and could include financial or regulatory incentives (bonuses, penalties, full or partial exemptions during restriction periods) to reward the results achieved.[28] Such an approach would help align economic incentives with resource conservation objectives, enhance transparency and accountability among stakeholders, and better integrate collective water management issues at the territorial level. The management of this territorial contractualisation could be entrusted to a reference public authority, which would be responsible for coordinating water conservation issues with those related to the sustainable use of water resources within a river basin.

Recommendation 5a. Implement territorial environmental contracts engaging all water stakeholders (local authorities, public and private operators, farmers, industrial actors and resource managers) around quantified water conservation targets.

The next step is to change individual behaviour by increasing the level of abstraction-based fees, which still do not adequately reflect the scarcity of the resource. The bases and amounts remain insufficient to generate a price signal capable of inducing a significant reduction in demand. In fact, this fee tends to be perceived primarily as a budgetary instrument for financing agencies rather than as an incentive lever for sustainable resource management. As proof, multiannual intervention programmes of water agencies have generally not included a significant increase in these fees for the period 2025–2030. The question of increasing them arises in particular for agricultural use: they must play an incentive role in the transition towards more water-efficient production systems. The abstraction-based fee could also be adjusted geographically to take account of local specificities and changes over time to integrate seasonal constraints. This latter dimension requires reliable information on the intra-annual distribution of water abstractions, which is not currently available.

Recommendation 5b. Encourage users to use water more sparingly by increasing the level of abstraction fees and adapting them more finely to local constraints, namely in terms of availability and seasonal needs.

The central role given to water conservation must be accompanied by better sharing of best practices with users (water savings, use of alternative water sources, water sharing) and by greater adoption of research insights and international experiences. The use of technological innovations (sensors, smart meters, digitalisation of networks, precision irrigation, etc.) is necessary, although it should be borne in mind that they are costly and that their large-scale deployment requires aid and/or the use of other incentive mechanisms.[29]

Developing water storage through groundwater recharge

When it comes to water storage, the fundamental challenge is to recharge groundwater aquifers. Indeed, 60% of drinking

[26] Saussier S. et Tirole J. (2015): "Strengthening the efficiency of public procurement", *Les Notes du Conseil d'analyse économique*, n°22, April.

[27] Territorialised contractual agreements on water conservation objectives could be similar in form to the 'Water and Climate' agreements negotiated between local stakeholders on issues of water policy and biodiversity.

[28] This type of mechanism already exists: for example, the ministerial decree of 30 June 2023 on drought restriction measures provides for exemptions for certain classified facilities that have reduced their water consumption by more than 20% since 2018 or that use at least 20% reused wastewater in their consumption. This could be extended to other economic actors.

[29] A social comparison mechanism was studied by Chabé-Ferret et al. (2019) in an agricultural context. This study shows that sending text messages to irrigating farmers indicating the water consumption of their peers reduces the consumption of the largest irrigators; Chabé-Ferret S., Le Coënt P., Reynaud A., Subervie J. and Lepercq D. (2019): "Can we nudge farmers into saving water? Evidence from a randomised experiment", *European Review of Agricultural Economics*, 46(3), pp. 393-416.

water and one third of agricultural irrigation depend on groundwater resources, which are expected to decline by 10% to 40% by 2050.[30] Approximately two-thirds of annual recharge occurs in autumn and winter, when evapotranspiration is low. Strengthening groundwater recharge, particularly in winter, for future use or environmental benefit, is therefore essential to maintaining underground water storage capacity in a context of climate change.

Preserving natural ecosystems, limiting soil artificialisation, developing nature-based solutions and adopting sustainable agricultural practices are becoming key drivers for increasing groundwater recharge. In suitable hydrogeological contexts (in terms of aquifer capacity to store resources, availability and quantity of recharge water), artificial recharge may be a complementary response to structural water shortages. The shared nature of groundwater resources must be taken into account, as the co-benefits associated with artificial recharge of an aquifer may be shared by all users, while the costs will be borne by only some of them. Cost- and benefit-sharing mechanisms need to be put in place between agricultural and industrial stakeholders, local authorities and WSSS. The territorial governance involving all users of these projects remains to be devised.

Water storage in substitution reservoirs (or mega-basins) is a subject of intense debate. Yet the volumes stored there represent only around 1% of water abstractions for irrigation. While storage plays an important role in certain basins, this model raises several issues. First, storage is often perceived as a capture of the resource for the benefit of a minority of farmers engaged in a highly water-intensive, production-oriented model. This perception is reinforced by the fact that reservoir projects are partly financed by public funds. The environmental effects of reservoirs are nevertheless criticised: significant evaporation, disruption of natural cycles, eutrophication and harm to biodiversity. In some cases, these impacts are not sufficiently assessed prior to the projects. The lack of transparency and consultation in their implementation also fuels conflicts of use, as illustrated by protests surrounding the Sainte-Soline or South Vendée projects. Conditionality of storage or of aid could be considered. It would be based on commitment contracts binding beneficiaries to changes in agricultural practices towards greater water conservation.[31]

Recommendation 6. Establish territorial governance for groundwater recharge projects that takes ecosystem needs into account. Make the development of new water storage capacities conditional to changes in practices and/or on objectives of water sobriety.

Facilitating the reuse of treated wastewater (RTW)

RTW consists in recovering water from wastewater treatment plants for new uses. First, it should be noted that the volumes of water reused reduce those discharged into the natural environment by treatment plants. They therefore cannot be counted as additional net volumes.

France lags behind other European countries in terms of RTW and, more broadly, use of non-conventional water resources: less than 1% of treated wastewater is currently reused, compared to 10% in Italy or 12% in Spain in 2023 for example. Yet potential uses exist, whether agricultural (irrigation), industrial (cooling, cleaning) or urban (watering, street cleaning). This lag is partly explained by the regulatory framework, which until 2022 imposed a fairly restrictive experimental regime on the possible uses of treated wastewater. The decrees of 10 March 2022 and 14 March 2025 clarified the conditions for RTW in France.

Although research in this field is very active in France,[32] RTW projects remain few in number and often modest in size.[33] A national survey identified 419 RTW projects in France between 2017 and 2020, of which 136 were already implemented, with average volumes of around 20,000 m³ per year per project. In 2024, only 21 RTW projects were commissioned in France, and the target of 1,000 projects (for 300 million m³) by 2027 is unlikely to be reached.

High initial investment costs combined with high operating costs (around 10% of investment) hinder the deployment of RTW projects. Strengthened financial support from the State, via water agencies, specific funds for water conservation or loan mechanisms, remains necessary, until RTW costs are covered by its users. Users making significant use of treated wastewater could, in return, benefit from reduced use restrictions in the event of drought.

Recommendation 7. Massively develop reuse of treated wastewater by mobilising aid and incentive mechanisms, with the aim of moving closer to the reuse rates observed in Spain or Italy.

Financing the large water cycle and the needs of aquatic environments

As mentioned above, it is necessary to strengthen the means of action devoted to the large water cycle in order to better integrate the challenges of preserving aquatic environments.

[30] France Stratégie (2025) : op. cit.

[31] The conditionality of aid from water agencies for the achievement of certain objectives already exists. Some agencies make the granting of aid for drinking water and sanitation services conditional on minimum prices (€2/m3 including tax for water or sanitation in the case of the Adour-Garonne agency).

[32] See, for example, the Water Occitanie project focused on water reuse.

[33] Locqueville B., Seffray E., Debrieu-Levrat C., Guéry B. et Simon-Delavelle F. (2023) : Faciliter le recours aux eaux non conventionnelles, Rapport de mission flash, CGAAER, IGAS, IGEDD.

Dedicated funding for projects in favour of biodiversity has yet to be put in place.

Water agencies were built on the principle "water pays for water". However, since 2016 and the law on the restoration of biodiversity, nature and landscapes, water also pays for biodiversity. Financing actions in favour of biodiversity and the preservation of aquatic environments cannot rely solely on the resources of water agencies, which mainly stem from users of the small water cycle.

A relevant level of intervention could be that of local authorities, whose activities have moved from a focus on the small water cycle to integrating issues relating to the large cycle. The necessary developments require significant investment. Long-term, low-interest loans from the Banque des territoires, which aim to support local authorities' investments in the water sector, are a complementary tool to the aid provided by water agencies (Aqua Loans).[34] However, they remain little used by local authorities, with only 4% of loans relating to sustainable water management issues. Beyond the difficulty that elected representatives may have in committing their local authorities to long-term projects (between 40 and 60 years), the current strategy of financing visible and amortisable infrastructure could be adapted to the specificities of investments in the wider water cycle.

Recommendation 8. Secure funding for measures to restore aquatic environments and prevent water-related risks by mobilising additional funding, namely through increased use of long-term loans from the Banque des territoires.

Building a social consensus around water

Moving towards greater equity between users and sectors

Today, households provide most of the funding for water policy, while agriculture and industry, despite being major consumers, benefit from reduced fees that are sometimes disproportionate to abstracted volumes or to the pressure they exert on the natural environment. Full application of the polluter-pays principle, combined with adjusting the fees based on use and sustainability, would allow the burden to be more evenly distributed among actors.

Territorial inequalities must also be better corrected. Rural, mountainous or overseas territories face difficulties in terms of access, quality or continuity of the water service. A system of national solidarity, anchored in water agencies and a dedicated fund, would help compensate for structural imbalances. Water equity thus becomes a condition of social justice as much as a lever for support for the ecological transition.

Finally, the structural decline in sales volumes and the legitimate objectives of water conservation may cause difficulties for WSSS, particularly in rural or fragile municipalities. This induces a form of territorial injustice: local authorities with limited budgetary margins struggle to invest in networks or maintain quality services.

Better taking territorial specificities into account

The territorialisation of water policies—consisting in adapting abstraction ceilings, drought-period restrictions and investments to the ecological and socio-economic situation of each basin—appears fundamental in a context of climate change. It is also an essential element of public policy acceptability: insofar as climate change affects French territories differently, it requires calibrating water management policies as closely as possible to river basins and sub-basins. To this end, it is necessary to rely on tools such as water management and development schemes (SAGE in French) and local water commissions, which are capable of arbitrating between agricultural, industrial, energy-related and domestic uses.

Recommendation 9. Move towards greater equity between users, sectors and territories by rebalancing their respective financial contributions, better integrating territorial disparities into water policies, and strengthening solidarity mechanisms made necessary by climate change.

The water emergency now calls for a profound reform of the economic management of water, whether in terms of regulatory instruments or financing models. The WSSS model is weakened by the expected growth in agricultural consumption and by the associated negative externalities (along with those of industrial uses). Some proposals—such as improving cost transparency, optimising tariff incentives or supporting reuse of treated wastewater—can be implemented rapidly and produce short-term effects. Others, more structural in nature, such as redefining the sharing between uses or fully integrating the water cycle into public policies, will require more time, the establishment of societal consensus and sustained investment.

[34] The Banque des Territoires has allocated a total budget of €4 billion to its water programme between now and 2028.

Les Notes du Conseil d'analyse économique
ISSN 2273-8525

Publisher Xavier Jaravel
Editor Augustin Vicard
Production Hélène Spoladore

Press Contact Hélène Spoladore
helene.spoladore@cae-eco.fr
Tél. : 01 42 75 77 47 – 07 88 87 55 44

20 avenue de Ségur 75007 Paris – Téléphone : 01 42 75 76 84 – @CAEinfo www.cae-eco.fr