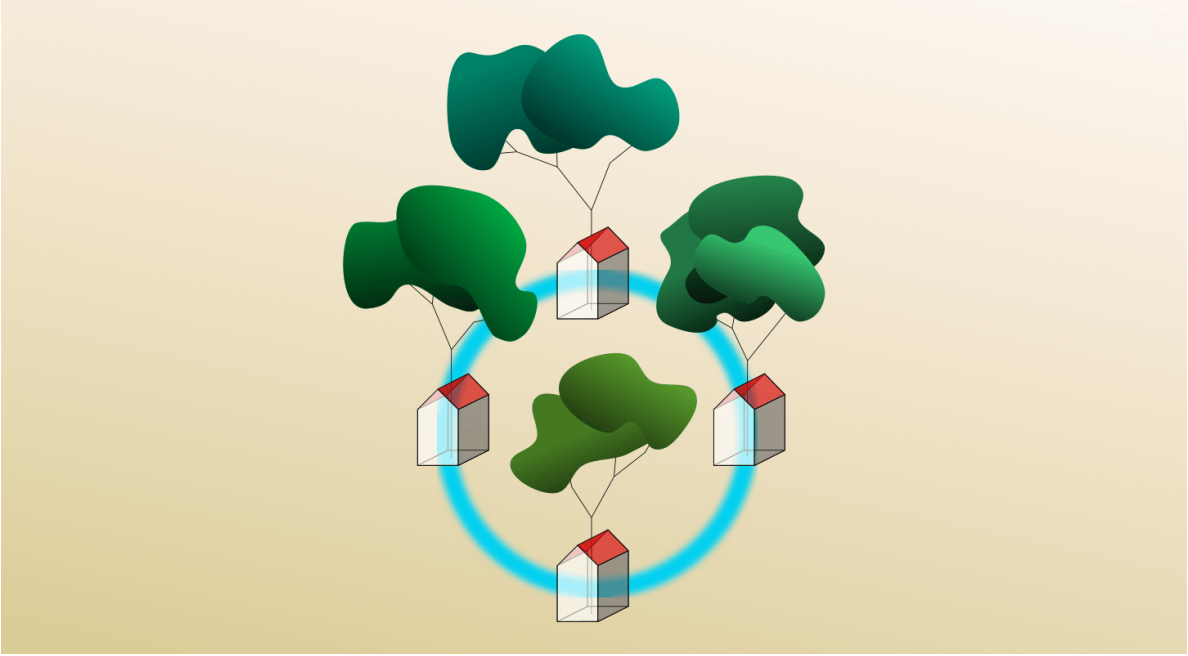
THE 2030 AGENDA AS A BLUEPRINT

The real challenges to achieve the goal of sustainable water development in Catalonia

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Illustrator: Fernando Prado

The Sustainable Development Goals (SDGs) proposed by the United Nations are an evolution of the old Millennium Development Goals. They aim to address global issues such as poverty, hunger, peace, health, education, inequality, inclusion, economic prosperity, protecting the planet, the fight against climate change, cities and territories, energy, sustainable consumption and production, and governance. Specifically, 17 goals and 169 targets were defined, along with the corresponding indicators to measure their progress.

The sixth of these goals deals with water, and seeks to ensure universal and equitable access to safe drinking water, as well as affordable sanitation and hygiene services. This, in a context that simultaneously seeks to improve the management and quality of freshwater ecosystems, environmental sustainability and economic prosperity while substantially increasing the recycling and reuse of water in safe conditions.

The SDGs focuse on improving the indicators, especially in developing countries. One-third of the world's population is still without safe drinking water, a quarter lacks access to hand-

washing facilities with soap, and almost 10% have still to defecate outdoors. These figures are extremely worrying. Beyond the severe impact on health and consequent high infant mortality rates, inadequate water resources also impair food production capacity, industrial development and tourism potential, therefore becoming a determining factor in a country's wealth.

Taking advantage of this juncture, the Government of Catalonia worked with its different ministries to define a National Plan for the Implementation of the 2030 Agenda, and created the Catalonia 2030 Alliance, a public-private partnership between actors who share the country's commitment to making the SDGs a reality. Thus, Catalonia has set itself somewhat more ambitious challenges that go beyond ensuring drinking water supply and connection to sanitation systems for the entire population, which is a goal we're already very close to achieving (although it should be noted that pushing the current 97.1% of the Catalan population with access to sanitation to the target 100% will require more than 1,000 actions at an estimated cost of around €1 billion).

> The sixth SDG seeks to ensure universal and equitable access to safe drinking water and improve the management and quality of freshwater ecosystems, as well as environmental sustainability

Instead, it has laid down the following targets: optimise the operation of existing Wastewater Treatment Plants (WWTPs) to save resources and reduce the impact on receiving freshwater bodies; strengthen water saving and efficiency measures across all sectors; increase alternative sources such as reclaimed water to ensure supply, even in periods of drought; and safeguard the proper functioning of the ecosystems affected by the water cycle, protecting the ecological flows of Catalonia's rivers. In short, the aim is to take an in-depth, open and transparent look at existing alternatives that could potentially guarantee the quantity and quality of the water resources in Catalonia.

Like most developed countries, Catalonia performs well in the indicators for achieving most of the SDGs, particularly those related to the sixth goal on "water". The condition of the freshwater basins has improved dramatically in recent years, thanks largely to the installation and proper operation of more than 525 WWTPs to treat the wastewater generated in municipalities, and the effective monitoring of wastewater treatment. Catalonia has also made a significant effort to identify alternative water resources by enhancing regeneration and implementing infrastructures to capture seawater or harness rainwater, becoming something of a pioneer in setting up regeneration projects. Lastly, ecosystem criteria have been incorporated into water resource management strategies, making it possible to balance water usage with respect for the quality of the environment and the preservation of ecological flows.

There is still a long way to go, but Catalonia is guaranteed to score well in most of the indicators when the comparative statistics for SDG 6 are published, and we're jostling

shoulders with the likes of Norway, Australia and Canada for a place at the top of the world ranking. However, these indicators are highly simplified and action-oriented because they are intended to be concise, easy to communicate, limited in number and universally applicable to all countries, given the different realities and levels of development. Indeed, the SDG indicators make sense for measuring the status of developing countries, such as those in Sub-Saharan Africa or Asia, but they should not condition the policies of more developed countries. Moreover as much as these indicators might suggest commendable marks in sustainable water management, now is not the time to take our foot off the accelerator.

In fact, water management in Catalonia and other countries with excellent SDG indicators is far from sustainable, and we are relying on countries that still lack the infrastructure to manage their water cycle to do a better job than we did, or at least to do it in a more sustainable way.

We have an infrastructure that guarantees the collection, treatment and supply of drinking water to the population and collects, treats and discharges wastewater and (to some extent) rainwater into the receiving environment (with a small percentage of reuse). However, the management of the cycle is still predominantly compartmentalised, with different companies and entities managing each of the facilities individually, without taking advantage of the full potential of an integrated management process with generalised criteria. In addition, many Catalan municipalities are unable to use their groundwater for supply due to the poor quality of the aquifers that pollute the wells, primarily because of problematic agricultural practices (over-extraction and excessive fertiliser use) or the impact of purines. Our rivers are also affected by spillage from collectors during storm periods, with occasional episodes of severe pollution (in rivers and even in the streets in towns and cities) impacting water quality and the existing flora and fauna. These issues are not sufficiently reflected in the SDG indicators. As a result, they go unnoticed when the results are published, and consequently, we compare ourselves to other countries without analysing the situation in depth.

> The path to sustainability involves pushing for increasingly decentralised treatment using natural systems, where social and environmental criteria are prioritised ahead of the economy of scale

The true path to sustainability involves pushing for increasingly decentralised treatment using natural systems, where social and environmental criteria are prioritised ahead of the economy of scale offered by centralised treatment in a large infrastructure that optimises operational costs in exchange for filling the country with an underground network of pipes and water mains. This is undoubtedly the most sustainable solution for the many small municipalities yet to install a WWTP or with one that has become obsolete. We also need to radically transform agriculture and livestock in our country.

To be sustainable, we need to change the mentality and gradually replace the concept of wastewater treatment in large existing centralised WWTPs with resource recovery, incorporating technologies that not only regenerate water and generate energy but also recover nutrients such as nitrogen, phosphorus and other components diluted in wastewater. Substantial research has been carried out in this field, but the reality (and the market) is that we are still a long way from turning WWTPs into industrial resource recovery plants and adopting the principles of the circular economy at all levels. We still need to close the cycles (of water and other resources) in industry and production processes in general.

If we want to go one step further in our quest for water sustainability, we must be bold enough to transform cities, make them greener and friendlier, and involve the citizenry and society in that transformation. We need to reduce the use of paving and make it more permeable, designate overflow areas to prevent flooding, and reduce (or naturally treat) the spillage from city overflows during episodes of precipitation. Furthermore, we must promote separation at source in domestic settings to prevent the mixture of grey, black and rainwater, thus facilitating specific treatments with more concentrated currents and potentially opening the door to reuse in the same building or community.

Living in natural surroundings has been widely demonstrated to have a positive effect on a population's mental health. However, we can go further still by getting citizens to play an active role in managing urban green spaces and gardens irrigated with regenerated water to facilitate small-scale locally-grown food production and enhance neighbourhood life, training, and environmental education. More and more success stories are becoming known all over the country, such as the one in Girona's Sant Narcís district (*Menja't Sant Narcís*), a neighbourhood project supported by Girona City Council and the Catalan Institute for Water Research (ICRA). The pilot project consists of a community garden managed by entities, residents and citizens interested in making the neighbourhood more sustainable. It is a prime example of the way forward.

Citizens have also long called for more transparent management of water resources. Beyond the debate between public and private management, society wants to see a non-commercial, sustainable and democratic exploitation of a resource that has recently been recognised by the UN as a fundamental human right. The management of the urban water cycle generates a large amount of data which, when handled properly, can provide critical information to inform management decisions that benefit the citizen. Equally, however, if it falls into the wrong hands, it could pose a threat to customers/water users.

The recent COVID-19 pandemic highlighted a clear example of the potential knowledge hidden in our water. By monitoring different points in the network, scientists were able to determine the incidence of the disease in various municipalities and large city districts all over the world, anticipating outbreaks and new waves of the pandemic. The work, led in Catalonia by the Catalan Water Association (ACA), with collaboration from the ICRA, the University of Barcelona and the Eurecat Technology Centre, reminded us that by studying the epidemiology of collectors we can identify behavioural habits in different neighbourhoods and plan specific preventative health campaigns.

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On this point, it's important to stress that the proven benefits of simple hygiene measures, such as regular hand-washing with soap and water, have been far more effective in preventing the spread of COVID-19 and other more familiar diseases than any of the other campaigns employed around the world over the years, and they have also significantly improved the hygiene indicators established for the water SDGs.

Conclusions and final reflection

The United Nations Sustainable Development Goals are a powerful set of instruments purposefully intended to sound alarm bells in public perception and bring about an end to poverty, hunger and their related serious health problems. The idea is to establish a roadmap to overcome global economic, environmental and political challenges and facilitate the development, peace and prosperity of the most impoverished countries on the planet.

Catalonia, like all countries, has committed itself to this through the National Plan for the 2030 Agenda, establishing a set of actions, both internally and on a global scale by forging alliances with the international community.

With regard to the water-related SDGs, Catalonia's indicators for supply and sanitation look good (although we will not reach 100% by 2030). Moreover, we're doing our homework to improve the quality of our freshwater bodies in order to increase and diversify our available water sources (with better results for surface water than groundwater), and from the point of view of complex governance, we are steadily inching towards integrated water management.

However, if we analyse the situation in terms of sustainability, in Catalonia, as in most developed countries, we're far from achieving good indicators. In this article, I have proposed a series of highly ambitious actions, some of which may turn out to be unviable or no more sustainable, from an environmental perspective, than the current situation. But despite the cost of quantifying the benefits, I believe that as an "advanced" society, we must attempt to minimise and streamline the use of water resources in the municipal, industrial and agricultural spheres and take care of the environment for reasons other than commercial gain by exploring new management and treatment models, decentralising and separating at source, recovering instead of treating (using more resources), and promoting greener, participatory, and democratic cities.

None of these aspects were taken into account when the SDGs were defined, but I am confident they will be at the heart of the debate when the United Nations comes to assess the impact of the current seventeen goals and define new ones for 2050 (if we haven't

destroyed the planet before then). We need to demand more from developed countries while at the same time making a generous and comprehensive effort to ensure the health, peace and prosperity of the most vulnerable ones, which, primarily for political reasons, have lagged behind in their development.



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Ignasi Rodríguez-Roda is Professor of chemical engineering at the University of Girona and senior researcher for the LEQUiA-UdG research group, with almost thirty years of experience in water research and development, particularly in the field of biological wastewater treatment. A pioneer in using artificial intelligence in the environmental field, he has participated in national and international research projects on water reuse, modelling, monitoring, optimising the use of membranes for sanitation or purification, eliminating emerging pollutants, natural treatments and developing decision-making support systems to evaluate and compare alternatives based on multiple criteria. He has also led several development cooperation projects aimed at improving access to drinking water and sanitation in vulnerable communities. Furthermore, he coordinates the Master's Degree in Science and Technology of Water Resources at the University of Girona.