



**WFEO, WCCE, FEANI, ECCE, CICPC-CECPC,
OdEPortugal, CICCIP, AICCP, IIE Spain**

DECLARATION OF MADRID

WATER, THE FUTURE THAT WE WANT

In March 2016, within the framework of an International Congress of Civil Engineering, more than 40 national and international engineering organizations signed the Declaration of Madrid, "FROM WORDS TO FACTS: CIVIL ENGINEERS, FOR THE SUSTAINABLE DEVELOPMENT GOALS AND ACTIONS FOR CLIMATE".

In this declaration, we express our commitment to:

- Promote the links of engineering with the society to which we belong, encouraging greater participation and commitment to sustainable development and action against climate change.
- Support the COP-21 Climate Agreement and the achievement of a large number of the 17 United Nations SDGs and their 169 associated targets with technologies and innovative engineering practices, seeking through the application of profitable technologies, feasible solutions based on well-founded engineering criteria and scientifically defensible climate projections, in order to reduce the rate and magnitude of climate change as well as its inevitable impact on society and its quality of life.
- Follow the Codes of Practice approved by the WFEO-World Federation of Engineering Organizations (Code of Practice for Sustainable Development and Environmental Stewardship "Think global and act local" of 2013, and the "Model Code of Practice on Principles of Climate Change Adaptation for Engineers" of 2015) developing and particularizing them to each local reality.
- Promote R & D & I projects in the fields of sustainability and climate action, in the interrelation between actions on the territory with the use and conservation of natural resources and the protection of ecosystems, and in risk management, as well as follow-up projects for corrective and compensatory

actions that will enable the incorporation of real and experimental data to future actions.

- Develop congresses, courses, conferences and meetings in which the application of the principles and commitments contained in this Declaration is promoted within the different fields of action of the Civil Engineers.
- Actively collaborate with our professional practice in achieving the following results:
 - a. GHG reduction within the different sectors through regional and local actions;
 - b. Improve climate resistance of various types of infrastructure to withstand climate impacts, and increase its reliability and lifespan in a period of more extreme weather events;
 - c. The achievement of the challenges of engineering for sustainable development, and of the United Nations SDGs that are inseparable.

Today, two years later, as a sign of this commitment, and in the context of a conference organized by the Association of Civil Engineers and the Spanish Engineering Institute, in a coordinated manner with the Ordem Engenheiros from Portugal, and within the commitment of the World Federation of Engineering Organizations - (WFEO), World Council of Civil Engineers- WCCE, European Federation of Engineering Organizations - FEANI, European Council of Civil Engineers - ECCE, Council of Civil Engineering Professional Associations of Spanish And Portuguese Speaking Countries - CICPC-CEPC, Colegio de Ingenieros de Caminos, Canales y Puertos (Spanish Council of Civil Engineers) - CICCPC and Asociación de Ingenieros de Caminos, Canales y Puertos (Spanish Association of Civil Engineers) - AICCP - to meet the challenges of engineering for climate change adaptation and mitigation solutions, we have focused on the field of water, one of the most sensitive sectors for sustainable development and the adaptation to it.

WATER FOR LIFE

Social and economic development depends on the sustainable management of our planet's natural resources. The depletion of natural resources and the negative effects of environmental degradation, including desertification, drought, soil degradation, water scarcity and loss of biodiversity, increase the difficulties faced by humanity.

In addition, our world faces the challenge of climate change and an unstoppable process of urbanization and population growth. Climate change is one of the greatest challenges of our time and its adverse effects undermine the ability of all countries to achieve sustainable development. Water, which is essential for life, is one of the sectors that requires the greatest adaptation.

On the other hand, the need to implement basic sanitation and purification infrastructures, with reuse of wastewater, poses a crucial challenge for the quality of life, public health and sustainable use of the resource.

This requires a well oriented and sustained action over time, not subject to political cycles, with the commitment of governments, professionals and society in general.

Within the framework of the 2030 Agenda for Sustainable Development of the UN, with the 17 Sustainable Development Goals (SDGs) and their 169 targets, approved by the September 2015 General Assembly, as well as the Agreements of the Conference of the Parties, COP-21 of Paris, December 2015, the undersigned engineering organizations share the challenge of promoting sustainable development and global concern for climate change, and the need to address actions in the field of water as an essential vector.

The main water challenges to face in the 21st century are:

- 85% of the population lives in arid zones and by 2030, half of the population will live in areas of high water stress.
- 750 million people do not have access to water in safe and adequate conditions
- 2.5 billion people do not have access to adequate hygiene and sanitation services
- Between 6 and 8 million people die every year due to water-related catastrophes
- 85% of wastewater is discharged without adequate pretreatment
- In 30 years there has been a 50% decrease in animal species of freshwater
- There are 600 transboundary aquifers, shared between 2-4 states.

The 2030 Agenda for Sustainable Development is an adequate instrument to address these challenges, since it contains a specific objective related to water management and sanitation, the SDG 6. In addition, there are 7 other SDGs that are directly or indirectly related to water, such as "Goal 1 –End poverty in all its forms everywhere", "Goal 2 - End hunger, achieve food security and improved nutrition and promote sustainable agriculture", "Goal 4 - Ensure inclusive and equitable and quality education", "Goal 7 – Ensure access to affordable, reliable, sustainable and modern energy for all", "Goal 11 - Make cities and human settlements inclusive, safe, resilient and sustainable" and "Goal 13 –Take urgent measures to combat climate change and its impacts"

UNESCO has defined 6 lines of action to contribute to the achievement of Goal 6:

- Disasters related to water and hydrological change
- Groundwater in a changing environment
- Water scarcity and water quality
- Water and human settlements of the future
- "Ecohydrology engineering harmony"
- Education, key to water security

In all these fields, engineering and its expert professionals have to contribute greatly.

TOWARDS A SUSTAINABLE MANAGEMENT: GOOD PRACTICES IN THE IBERIAN PENINSULA

A very important way in which countries can contribute to the achievement of the targets of the SDGs is the contribution of know-how, of what has been learned in the processes. Many of the demands of developing countries are more focused on technical assistance than on the economic contribution or the contribution of goods and raw materials.

In this sense, the treasured experience (with outstanding participation of engineering in its conception, development and application) in the Iberian Peninsula by Spain and Portugal offers international society these good practices:

- 1.- International cooperation agreement for the protection and sustainable use of the waters of the Spanish-Portuguese river basins (Albufeira Agreement, 1998), of the highest level and with normative force, which allows a sustainable development and management agreed in both countries in shared river basins, with a monitoring mechanism for their effective application and for the resolution of any controversy that may arise.
- 2.- Integrated water management by river basins.
- 3.- Planning and participatory water management, with a very important role of the users, and with the presence of all the actors involved, ensuring good governance.
- 4.- Priority of water as a natural asset and basic substratum of life, in the context of the Water Framework Directive of the European Union, adopting programs of basic measures in hydrological planning to achieve good water status, and satisfy effectively the human right to water.
- 5.- In a manner compatible with this, plan the allocation and reserve of resources for the different productive sectors, which causes a sustainable development, progress and improvement of living conditions.
- 6.- Execution of investment plans in public hydraulic works (reservoirs and large pipelines) that have allowed to multiply by four the supply of water to the demands with respect to what nature itself allows, given the great irregularity in the space and time of the peninsular water resources.
- 7.- The development of engineering and technology innovations for:
 - a) Approaching in a rigorous way the hydrological plans with resource studies and management simulation models that are new and fully tested.
 - b) Treatment of the waters for their purification, regeneration or reuse.
 - c) Incorporation of new, non-conventional resources in order to meet the demands (desalination and reuse)

d) The modernization of the urban water cycle, and the increasing introduction of SUDS (Sustainable Urban Drainage Systems)

e) Adaptation to climate change, introducing studies of the impact on the water sector and increase the resilience of the Iberian water system, both against droughts and floods, with the development of Special Plans.

Knowledge and experiences that we wish to share and make available to the international community, both at the next World Water Forum in Brasilia, and at other upcoming events.

CHALLENGES FOR ENGINEERING: PROPOSALS FOR ACTION

In the upcoming decades, which have to be decisive for adapting to climate change so that it is possible to continue increasing the levels of well-being for humanity and to take care of the Earth, our home, engineering has to make an important contribution in order to achieve the Goal 6, "Ensure availability and sustainable management of water and sanitation for all" and for this we formulate the PROPOSALS FOR ACTION that are incorporated as an annex to this declaration.

The undersigned organizations express the irrevocable commitment to promote these actions and contribute with effort and capacity to make them a reality, as soon as possible, for the benefit of our society.

And we urge all the sectors involved in the field of water, and political leaders and authorities, to contribute their actions and decision-making capacity to create the appropriate political, economic and social framework, enhancing the resources applied as well as the exchanges of knowledge and cooperative actions, that will make possible the FUTURE THAT WE WANT IN THE FIELD OF WATER.

Madrid, March 1st, 2018

ANNEX 1

PROPOSALS AND ACTIONS

1: Adaptation of infrastructure to climate change

An increase in mean sea levels is to be expected, and we must prepare for the appearance and/or increase in the intensity and frequency of extreme events, such as droughts, floods or hurricanes. It is necessary to anticipate these phenomena, try to identify and quantify them, and ensure that infrastructures are prepared for these circumstances: coastal defenses, greater capacity of reservoirs for prolonged droughts, resistance to hurricanes, etc. As is logical, the more critical an infrastructure is, the greater must be its resilience to extreme phenomena.

Actions

- Identify and quantify, as far as possible, the potential effects of climate change in Spain by geographic area.
- Introduce these effects in the infrastructure design regulations.
- Assess the resilience of existing infrastructures to foreseeable changes and phenomena.
- Identify the need for specific infrastructures.
- Prioritize and organize maintenance and adaptation actions regarding the existing infrastructures.
- Proceed to build the infrastructures that are not available today.

2: Construction and sustainable development

The professionals involved in the design, construction, operation, maintenance and, where appropriate, closure of public works, must have a clear idea of the value that society gives to environmental aspects. These criteria should be quantified as much as possible and included in all stages of the works' useful life, with special emphasis on the previous phases. On the other hand, public works have an enormous potential to contribute to the circular economy, constituting an important way of reusing waste. The aesthetic care of the works can bring its benefits beyond what its initial conception may lead one to think, making a qualitative leap regarding sustainability. The great works are incorporated into the heritage of the people and add value. Part of the rich cultural heritage of our countries is public work inherited from our ancestors: Roman aqueducts and roads; medieval bridges; channels; reservoirs. We have the obligation to value this heritage.

Actions

- To develop objective and transparent criteria to include and assess environmental aspects along with economic and social aspects in all phases of the works: design, exploitation, maintenance, and, where appropriate, demolition. The use of recycled materials is an important part of the aforementioned environmental criteria.
- To take into account, during all stages of the works, the potential for reuse from construction and demolition waste, prioritizing the use of recycled materials to the use of virgin raw material, whenever possible.
- To plan the works in such a way in order to guarantee the generation of the minimum amount of waste, facilitating the use of the waste produced. The design of the works must be done considering the ultimate destination of the same at the end of its useful life.
- To enhance R & D & I to convert by-products from other sectors into products with high added value in construction.
- To incorporate recycled materials and their characteristics into the construction standards.
- To train and educate students in technical schools about the benefits of using recycled materials and how to use them. This training work must be continuous, to involve practicing professionals and keep them updated on the advances in this field.
- To involve citizens in the definition of public works that will be built and in the criteria for choosing public works, should be a guarantee of sustainability (governance-sustainability binomial).
- To understand public works as a cultural asset of the first magnitude. A significant part of our rich heritage is public work inherited from our ancestors. It must be taught and exploited as such.

3. Hydrological planning and integrated management

Hydrological planning today should not only pursue the satisfaction of demands to allow socioeconomic development, but also should seek the achievement of good water status and protection of the public hydraulic domain, favoring the diversity of habitats and species and the empowerment of a very rich natural heritage.

Actions

- To develop integrated water planning and management by consensus, with sufficient regulatory support, with the application of sufficient public resources, and defending the values of the right to water, the good status of water, and a balanced socioeconomic development

- To improve the status of the surface water bodies through the actions of sanitation and purification collected in the basin plans and the control of the discharges.
- To introduce mechanisms of public-private collaboration in the measures that allow it, such as sanitation and purification, for its fastest and most effective implementation.
- To combat diffuse pollution, which is one of the main problems of contamination of surface and groundwaters throughout Europe, with coordination between administrations and collaboration with users to encourage the application of better and less harmful good practices.
- To perform river restoration activities that contribute to achieving the good status of water bodies, by improving the longitudinal and transversal connectivity of rivers and the restoration of riparian vegetation.
- To ensure the monitoring of the actions and programs of the hydrological plans in order to guarantee their effectiveness and efficiency.

4. Sustainable use and attention to water demands

The integrated, shared and sustainable management of available resources is - more than an objective desire- a necessity to adequately address the demands of water and protect our water bodies, which must be developed responsibly as a shared task between users and administrations.

Actions

- Do not exclude any source of resources to meet water demands. The basin organization or the state authority, as the case may be, must determine the provision of the most appropriate resource, compatible with the established environmental objectives. This determination must be based on analysis and rigorous processes that guarantee the technical feasibility and economic, environmental and social sustainability of the proposed solutions.
- Advance towards integrated water systems in order to increase the resilience of existing systems, allowing the supply of water to large demand units, using existing or non-existent infrastructures that are expected to be carried out, and allowing both a coordinated operation and an integrated tariff regime.
- Promote actions to improve efficiency in the use of water, monitor it, and prioritize efficiency in consumption through direct measurement by the user; establishment of efficient reference allocations; control of real consumption; reduction of returns and application of rates that reward adequate consumption and penalize excessive consumption.

- Prepare guides on "Good practices for the sustainable use of water" and encourage their application.
- Create an independent regulatory entity for water supply services that:
 - a. Will develop management indicators on project progress, quality of resources, efficiency of actions and quality of water services.
 - b. Will establish the financing and pricing criteria in accordance with the general economic-financial regime established in the Water Act and monitor their application.
 - c. Will act as "defender of the citizen" in terms of captive user of water services, know and control the response times of the water administration to citizens and report their unfulfillment.

5. Consideration and adaptation to climate change

According to the climate projections made by the Intergovernmental Panel on Climate Change (IPCC), Spain is one of the countries in the world where the impact of climate change on water resources can be greater, foreseeing reductions in water resources, as well as a possible increase in the frequency and magnitude of extreme events such as droughts and floods. This is expected to affect other geographies too.

Actions

- To deepen studies on the effects of climate change on resources, water environment, droughts and floods and water demands in order to improve their consideration in planning and to define and implement the most appropriate adaptation measures.
- To incorporate measures related to climate change into national policies, strategies and plans. The programs of measures of the hydrological plans must be consistent with the climate change scenarios, advancing in the adaptation to this phenomenon and guaranteeing the resilience of the planned infrastructures.
- To include climate change as one of the factors to be considered in the design, exploitation and management for the security of new Critical Infrastructures, and for the adaptation of the existing ones.

6. Additional efforts in R + D + i, knowledge and education improvements

The improvement in knowledge, education and R + D + i are essential requirements to improve the efficiency of public administrations and companies in the world of water. The competitiveness of companies must also rely on external economies, based on the availability of infrastructure. Therefore, the infrastructures and installations of the water sector become one of the main driving forces for the advancement of productivity and, with it, of economic growth and employment and, therefore, welfare.

Actions

- To develop joint initiatives among administrations, universities, technology and research centers and companies in order to carry out projects within the lines of innovation in the areas of Information Data, Planning, Engineering, Technologies and Water Management.
- To join forces and develop R + D + i projects that apply the available technologies and instruments (mathematical models, bill of quantities, telemetry, tele-control or remote control, remote sensing, purification treatments, generation of unconventional resources through water regeneration or desalination, among others) to improve water management.
- To establish technological innovation as a fundamental development factor.
- To improve governance, invest in institutional capacities and apply integrated, transparent and effective solutions in water management. In particular, support consortiums that carry out their work across different sectors (water, energy, food, health, industry, environment and spatial planning) and scales (local, rural/urban, regional, national and cross-border).

Madrid, March 1st, 2018