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INN WATER

Promoting social innovation to renew
multi-level and cross sector water governance

D3.1 Citizen Engagement in Europe in the 21st Century

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EXECUTIVE SUMMARY

With a view to preparing the ground for the development of an enhanced methodology concerning the effective engagement of stakeholders from the public, private, research, cultural, citizen and land-owning sectors in the issue of water-based challenges at a local level, INNWATER presents a report that reflects the development of citizen engagement and participation from its roots in the social and ideological upheavals of the 1960s and 1970s to the adoption by supranational administrations of citizen engagement as a key factor in the visioning and creation of a sustainable future. INNWATER explains its definition of this essentially socio-political action, the components of society that should be involved and how technical, biological, mechanical and ecological solutions should be communicated to the co-creators of sustainable, local initiatives brought together by both traditional face-to face and digital approaches. The intended result is that the partners of INNWATER (and other contemporary and future projects) understand what the principal aims of the methodologies that they develop should be, what the consequences of their developments can be and what the basic elements of their work must be.

LIST OF FIGURES

ACRONYMS

AG	Auditors-General
AR	Augmented Reality
CBA	Cost-Benefit Analysis
CESA	Citizen Engagement and Social Accountability
COP	Conference of the Parties
CSO	Civil Society Organizations
DSPs	Digital Social Platforms
F4W	Fiware4Water
GPSA	Global Partnership for Social Accountability
HRCs	Human Rights Commissions
HYV	High Yielding Varieties
ICT	Information and communications technology
IoT	Internet of Things
NGOs	Non-Governmental Organisations
NIMBY	Not-In-My-Backyard
NPV	Negative Net Present Value
OHCHR	Office of the High Commissioner for Human Rights
OECD	Organisation for Economic Co-operation and Development
SDGs	Sustainable Development Goals
SMART	Specific, Measurable, Attainable, Realistic and Timely
UNECE	United Nations Economic Commission for Europe
WEF	Water-Energy-Food

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1. INTRODUCTION

INNWATER is primarily concerned with the issue of the governance of water. One of its principal objectives is to develop an improved approach to citizen engagement supported by digital technology which will further enhance the sustainability of domestic water and freshwater ecosystem management.

To achieve a significant advance in relation to the state-of-the-art of citizen engagement, it is necessary to understand what citizen engagement is and what citizen engagement should be. Therefore, INNWATER has undertaken an in-depth analysis of practices, principally in Europe, which have been undertaken over the last thirty years, inspired by events such as the creation of the Agenda 21 programme by the United Nations during the last decade of the 20th Century, the implementation of the Covenant of Mayors which commenced in 2008 and the importance that the recent COVID-19 pandemic had, especially with regards to the digitalisation of many engagement processes.

The result of the analysis is this publication which proposes a definition of citizen engagement. The term '*engagement*' is often misused and is more profound than that understood by many researchers and practitioners whose concept of civic participation has often been limited. Many have believed that interaction with the public undertaken through the organisation of a few informative conferences where the role of the citizen has been limited to that of a passive member of an audience, or workshops where citizens have been invited to offer their opinions on an issue in the early stages of policy preparation is engagement, when in fact, it is not. At best, such practices are simply the creation of awareness which is a noble objective but wholly unsatisfactory. During the period investigated in this report, the definition of engagement has developed rapidly. The existence of awareness produces interest and the need on the part of many, but not all, to be included or engaged in the creation, implementation and post-implementation analysis of actions, programmes and public policies. Research projects, public administration initiatives proposed by different governmental tiers and programmes suggested by citizen-based organisations have undertaken numerous engagement activities which have addressed issues as varied as local budgets, transportation, health, education, urban planning and of course environmental issues including energy, water, ecosystems and the sustainable consumption of locally produced food. What was, only a few years ago, described as the need to avert, then mitigate and now adapt to climate change, one of the most important issues of the 21st Century at a par with global conflict, mass migration, economic disparity, gender and health, (the dangers of which, many would correctly state can directly or indirectly be augmented by climate change) has resulted in the intensifying of calls for more effective and productive open government.

To advance and build on research which has already been undertaken by projects such as IMAGINE, BlueSCities, POWER or FIWARE4WATER, INNWATER has clearly defined who citizens are within a framework that the consortium has named the *Socio-Political Helix* which is composed of all the social sectors found in a local community. The local aspect is important as this report demonstrates. Municipal administrations are those who in both face-to-face and digital encounters, interact most regularly with the people who they purport to represent. It is the implementation of global strategies at a local level that produce the necessary effects required to counteract the anthropogenic crisis which society faces. The *Covenant of Mayors* was not named the Covenant of Regions or the Covenant of Nations for a reason. The term S*mart Cities* instead of Smart Provinces, Smart States or Smart Continents is further evidence

of the realisation on the part of supranational agencies responsible for defining sweeping changes to the way people presently live, that it is at the local level that progress towards sustainability will be made. The same agencies openly declare that a sustainable future is only possible if the citizens of cities, towns and villages around the World are actively involved in resolving the situation. This report will show why this is so and why the existence of socio-political trust, transparency and accountability are vital in order to ensure the completion of long-term visions. It will explain the necessity of communicating technical solutions to all citizens, it will demonstrate the socio-political value of digitalisation and it will consider how successful citizen engagement has been to date.

The intended result of this document is to equip the researchers of INNWATER and other projects, the initiators of social programmes and the creators of public policies with a clear indication and definition of the necessary components of citizen engagement, and explain, based on the careful observation of thirty years of community participation initiatives, why effective citizen engagement is more necessary now than it has ever been.

2. WHAT IS CITIZEN ENGAGEMENT?

The definition of citizen engagement itself has been and continues to be debated. At the most basic level it is '…those processes aimed at decision making, as well as agenda setting and policy making that base their activities on the consultation and involvement of stakeholders'.[1] It is the involvement of citizens in civic processes, such as community issue resolution. It should seek to involve all members of the Socio-Political Helix (See Chapter 4) participating in democratic processes, such as dialogue based on objective data, voting, petitioning, and advocacy to influence the outcome of an issue. It also includes more direct participatory activities such as neighbourhood meetings, engagement with local government, and collaborative media projects resulting in a necessary advance with regards to the issue at hand, supported by a strong capacity development programme to ensure an enhanced ability on the part of hitherto uninformed bystanders to co-create and co-implement coherent solutions to the challenges faced by the community. It cannot, as was the case all too often in the creation of the Agenda 21, be limited to attendance by members of the public to conferences or workshops, whereby occasionally, a citizen can pose a question to a local expert. Despite the claims of many elected representatives, and indeed certain academics, this is neither participation nor policy co-creation and has, moreover, in many cases, proved to be the cause of both disaffection and mistrust on the part of people who would otherwise be interested in contributing to a debate.[2] Participation demands the involvement of a '…dense network of multiple stakeholders'[3] and is beginning to constitute a mainstream approach for the undertaking of financed research activities, the promotion of human rights, the environment, the resistance to climate change and a fundamental part of decision making especially at the local and sub-national level in Europe.

As has been made clear by Jimenez *et al*, participatory processes are complex aspects of political behaviour and there does not exist one all-encompassing method which can be applied, no matter the circumstances and the idiosyncrasies of the community in question.[4] Deeply rooted socio-political habits signify that an applied methodology must be flexible enough to be effective in any specific national, sub-national or local situation. Early forms of stakeholder engagement were initiated by a generation in the Twentieth Century, that began

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to question the socio-political norms of the post-war world during the sixties and early seventies. The almost instinctive call for early forms of modern citizen engagement were closely related to the social tensions of the time, provoked by the threat of nuclear conflict in Europe, civil rights and the Vietnam War in the United States and a growing realisation in the West that what William Gaud defined as the *Green Revolution*, (the introduction of High Yielding Varieties of cereals (HYV), chemical fertilizers, agrochemicals, the further control of water supplies and increased mechanisation to increase agricultural production on a global scale) could, effectively constitute a major threat to the environment.[5]

Modern citizen engagement cannot afford to depend solely on a strong emotional response to a perceived injustice. The creation of awareness is vital, but it must lead to involvement in a process that will result in tangible change or legislative development. It requires, therefore, the provision of knowledge to inform an ample, heterogeneous social audience with distinct levels of scientific comprehension ranging from the ordinary person in the street, no matter their gender, ethnicity, salary status or age, the student, the professional stakeholder, the political decision-maker, the landowner and the specialised scientific and technical expert. Objectivity is as important as it is elusive. In the modern arena of digital information, hear-say or lies propagated by peers are presented and all-too-quickly accepted as truths. This is developing into a form of what the philosopher Kant defined as self-imposed *nonage*, i.e., the inability to use one's own understanding without another's guidance. Transparent, documented information is required to raise awareness. Awareness leads to concern, concern leads to *designed* engagement, engagement leads to social consensus and social consensus leads to political continuity.[6] To overcome Kant's *nonage* is an important step towards defending *open* as opposed to *representative* government (See Chapter 3). The strong interconnection between awareness and participation in socio-political co-creation represents a clear answer to the problems caused by the *decide and defend* approach that so many corporate and elected-representative entities adopt all too readily but which often results in a backlash of social rejection, the phenomenon of Not-In-My-Backyard (NIMBY) and an increase of mistrust in political administrations, affecting actions which may have otherwise been accepted. As Ferraro and Ellis, when discussing the issue of wind energy stated, the lack of social acceptance '…could limit the overall wind resource we are able to exploit to meet climate change targets.' They concluded that the degree of public participation is of enormous relevance but at the same time, complex, but that such issues cannot be simply addressed by community benefit funds or further consultation. On the contrary, they demanded '…a far more fundamental reform of how energy systems engage with communities and citizens.'[7]

Therefore, citizen engagement can, as was seen during the second half of the last century and continues to be observed now, be the undesigned, unplanned, instinctive and often misleading consequence of an unpopular policy being perceived to be imposed on a community, no matter its possible social, economic or environmental benefits. Engagement, in such a case is the child of a lack of engagement, of the fear of unilateral intervention by a more powerful administrative, corporate or social collective.

Designed citizen engagement can be born of ideas that have come to light at any given political level including that of the electorate, the consequence of the concerns of a local community in a bottom-top approach or indeed issues identified in a top-bottom fashion by funding administrations such as the European Commission and placed into the hands of scientific, technological and social researchers. In such circumstances, citizen engagement can be *designed*. Such approaches demand that the actions are Specific, Measurable, Attainable,

Realistic and Timely (SMART), that data is converted into action. Above all, such engagement must not be restricted to the timing of what a community may well perceive as a simple, academic experiment. The process must guarantee continuity beyond the length of a financed project and must demonstrate that it constitutes a programme of demonstrable change, agreed upon by the affected Socio-Political Helix.

Much has been discussed with regards to the ideal scenario in which to undertake citizen engagement. The OECD argued that cities, or perhaps to be more exact, municipalities of all sizes must be the key implementers of future effective socio-political initiatives through which supranational strategies designed to resolve the global issues of the 21st Century can be addressed and successfully resolved.[8] Other supranational entities including the World Bank[9] and the United Nations[10] have increasingly come to support this view. It is now accepted with relation to water, as was clearly demonstrated at the UN 2023 WATER CONFERENCE that a continual, proactive dialogue at the local level must be encouraged by the existence of tools and mechanisms to create a tangible form of engagement involving both the broadest range of municipal stakeholders and effective intercity and interregional alliances. The local approach, whereby municipalities become the vanguard of supranational strategy (the possibilities of which have been so clearly demonstrated by the European Union's Covenant of Mayors for Climate Change and Energy), also permits enhanced citizen science at a much needed *in situ* and river-basin level. The interaction between citizen engagement and citizen science is important. Citizen science implies that the layperson plays a role in the monitoring and initial identification of a challenge to be overcome. Citizen science permits activities to be conducted, in whole or in part, by volunteers who are not professional scientists. This type of research has grown significantly in recent years and is now used by researchers in many different fields of science, including biology, astronomy, geology and ecology. Citizen science can lead to a heightened demand to become more involved in policy and programme development and execution just as citizen engagement can encourage people to participate in data and idea collection.[11] What is important is that engagement, in whatever form it takes, is meaningful for the target groups.

In far too many cases, efforts to increase citizen awareness and facilitate a more tangible relationship between all the sectors of the Social-Political Helix have '…largely failed in achieving genuine engagement in policy formulation'.[12] The reasons are often complex and will be further investigated in this report but the true meaning of citizen engagement is and must be the construction of trust and accountability and the direct reward for participation.[13] Elelman and Feldman advocated that the co-creator also become the co-implementor. [14] Possible citizen roles in policy implementation may include communication to the local community and beyond, as well as that of overseer of the co-created policy's continuity in the face of the ebbs and flows of political party rivalry and the ending of mandates due to elections. Thus, citizen engagement would assume the role, in part, of creating what Spadaro *et al.* argued for when defending the need for green cities to '…enable the development of a trust-based ecosystem between citizens and the environment'.[15]

3. WHY IS CITIZEN ENGAGEMENT IMPORTANT? OPEN VERSUS REPRESENTATIVE GOVERNMENT

According to Boswell, political scientists are often wary when movements to make policymaking more rational or more democratic are promoted. They argue that perfectly reasonable ambitions such as evidence-based decision taking, long-term pre-emptive action, social collaboration, political transparency, and citizen engagement are often unattainable due to the deeply rooted *'realities, pathologies, uncertainties'* and the regularly identified egocentric behaviour that can be observed in the *real world*.[16]

Politicians, technical decision-makers, and administrators are aware of these obstacles, although they may be reticent to admit to as much in public. Nevertheless, despite what many would consider as pragmatic opposition to political reform, there are strong arguments that should encourage administrations at all levels to commence a process of a genuine revision of democratic processes. This, in part, is due to the fact that the influence of political-party interest and the decline of the trust that the general population are prepared to give to the political sector, (perceived at best as insincere and at worst, as increasingly self-serving or indeed corrupt) has led to a steady decline in public participation in elections and the enhancement of a divide between elected representatives and the voter. In other words, there is a lack of trust. The most important aspect of any policy, once approved, is that of ensuring its continuity until it has truly provided the desired results. This can only be based on trust and cooperation between all parties.[17] The principal obstacle to such continuity is political-party rivalry which at a local level can be just as vicious and single-minded as it is in any other sphere of political action. If, once approved, a policy is still being implemented when a change of local government happens, due to elections, (Once every four years in Spain and Germany, once every five years in Italy or the United Kingdom and once every six years in France) a resignation or a vote of no-confidence, it is often the case that a policy, clearly identified with the programme of one specific party, is abandoned or relegated to the archives by that party's successful rivals before having been completed. The result is wasted time, misspent public funds and perhaps most importantly a failure to address pressing water-based issues. Perhaps, most worryingly, when discussing issues related to the environment and climate change, is the resulting reluctance to undertake long-term planning in favour of short-term, tangible actions which can be visualised at the next appointment with the ballot box.

In consequence, there has been, at a supranational level, a concerted drive towards further citizen engagement, or what the OECD describe as '*the deliberative wave*' which would suggest a move towards a more open as opposed to representative form of government. Due to '*The increasing complexity of policymaking and the failure to find adequate solutions to some of humanity's most serious and pressing problems - such as climate change, health emergencies, growing inequality, conflict, and violence*'[18] different agencies, divisions, branches and units of the United Nations, the World Bank, the OECD, the WEF and the European Commission have promoted the concept of citizen engagement to permit the preparation of long-term, sustainable visions. This, in the words of the OECD, '…*is particularly true for issues that are values-based, require trade-offs, and demand long-term solutions.*'[19] There is growing evidence that, under the right conditions, meaningful forms of citizen engagement and social accountability (CESA) especially at a local level, can result in '*better governance, citizen empowerment, more positive and constructive citizen-administration relations, strengthened public service delivery, and, ultimately, enhanced development*

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effectiveness and well-being'.[20] This requires the provision of objective data, trusted by all concerned being made readily available to all stakeholders.[21] The process, which must be adaptable to the local socio-political idiosyncrasies found in the place of execution, must demonstrate, as opposed to what occurred with the *Agenda 21* programme[22], that it is sustainable so that engaged stakeholders are capable of playing a critical role in advocating and helping to make public institutions more transparent, accountable, and effective.

This demands that the promotors of such an action fully comprehend the local context of its actions in order to avoid the domination of pre-established elites at a local level.[23] Those who would defend the maintenance of representative government in its purest form, would argue correctly, that citizen engagement is not, in itself a guarantee of a democratic process but rather a collective action with its own dynamics that can prove to be as equally problematic as existing forms of decision-making. They ask to what extent does a local community have the means to take their own decisions. Such means, be it data, methodology as the result of a proven scheme of capacity development and the effective creation of a willingness to become engaged in the first place must be provided by the initiators of such an action. Citizen engagement is an exercise in behavioural change, the success of which will depend on economic, environmental, cultural, geographic, gender, social class, age, and ethnic dynamics. The employment of pre-existing *in-situ* Civil Society Organizations (CSOs) is absolutely essential to grasp the reality of the location where one would wish to undertake such an initiative.[24] Publications such as the *OECD Guidelines for Citizen Participation Processes* or *The World Bank's Strategic Framework for Mainstreaming Citizen Engagement in WBG Operations* constitute a clear message that both intermediate and final outcomes of policies will be improved by citizen engagement whilst noting that there exist *persistent challenges* to such ambitions.[25] Not the least of such challenges is the reluctance of local influential stakeholders and/or politicians to relinquish their degree of authority. This, however, must surely constitute an excellent reason to further encourage broader civil participation.

The United Nations, the World Bank, the OECD, the WEF and the European Commission, together with many other supranational, regional, national, sub-national and local entities constantly refer to the creation of public trust. Trust is the result of transparent accountability and as has been mentioned above, the work of Non-Governmental Organisations (NGOs) otherwise referred to as Civil Society Organizations (CSOs) permits citizen engagement advocates to create a bridge between those who govern and those who are governed whilst improving social accountability. The World Bank itself, to support CSOs to promote social accountability in different contexts around the World, created the Global Partnership for Social Accountability (GPSA). Based on their experience, other organisations are now looking to develop and establish approaches which will permit civil society to become more active in ensuring social accountability within the context of different national situations.[26]

Now in 2023, despite the incredulity of many political theorists and practitioners, citizen partnership is being embraced as an essential element of socio-political activity. Citizen engagement increases public knowledge concerning vital issues, acting as a counterbalance to the *nonage* (See Chapter 2) that social media has created. It enhances political life at different political levels, creating a demand for more in-depth explanations and more carefully crafted arguments in favour or against a specific action. Furthermore, it provides broad public support for decisions which in turn can overcome the challenges presented by changes in the political-party makeup of a particular administration at any given time.

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Michels pointed out in 2011, that '…*the contribution of participation to democracy differs according to the type of democratic innovations*.'[27] Whilst surveys can prove effective at highlighting an issue and encouraging public debate, referendums, and citizen engagement, if undertaken sincerely, can lead to important developments regarding public influence on policy making and subsequently, involvement in the representation of such a policy's implementation.

Nevertheless, a point of extreme interest to the INNWATER consortium is the fact that the number of participants in such exercises is often small with gender, age, social class, and ethnic groups repeatedly being underrepresented. In such a case, '*The benefits to individual democratic citizenship are far more conclusive than the benefits to democracy as a whole*'.[28] Therefore, actions such as those undertaken by the World Water Quality Alliance Social Engagement Programme under the auspices of the United Nations Environment Programme aimed at specifically identifying engagement gaps are essential if the necessary approaches are to involve a broad range of municipal inhabitants.[29]

Despite the claims of many, citizen engagement is not a modern innovation. Methods of collective deliberation, the representativeness of different social groups and a resulting influence on governmental decisions could be identified in ancient Athenian democracy and, in different forms and guided by distinct interpretations, were in existence until the development of parliamentary and/or representative democracy. What has changed is the recognition in the 21st Century that such practices must be reinstated.

4. THE HELIX OF SOCIO-POLITICAL CONSENSUS

The European Union Commissioner for Environment, Oceans and Fisheries, Virginijus Sinkevičius, in a meeting with the European Union Water Alliance in September 2020 emphasised the necessity to involve *'…all social sectors to ensure the 'Just Transition' to a green and digital economy.'*[30] This necessity has, in recent years, been recognised beyond Europe by other supranational agencies such as the United Nations, the World Bank, the World Economic Forum, the OECD, the African Ministers Council for Water and the Union for the Mediterranean[31] who have, furthermore, stressed the role of the municipality in order to ensure a dialogue between global strategists and the full spectrum of stakeholders required to ensure socio-political consensus with regards to a wide range of issues.

By identifying the municipality or local community as a key player, the aforementioned administrations are recognising the limitations of engagement with society undertaken by regional, national, or indeed, sub-national agents due to physical distance, the impossibility of engaging closely with vast populations and the perceived lack of transparency and accountability attributed to such levels of government. This attitude reflects the belief, that has become firmly established over the last two decades, that a meaningful interaction between those who initiate consolidated decision making and those affected by such processes can be best attained at a local level. During the first decade of this century, DG REGIO of the European Commission, in 2008, initiated an action which became the Covenant of Mayors[32] and subsequently, the Global Covenant of Mayors,[33] which have been capable of bringing the issues of CO_2 emissions, renewable energy production and energy efficiency to the attention of inhabitants of thousands of municipalities, thus sowing the seeds for proactive, bottom-up, decision-making processes. Working at a municipal level seeking to

engage representatives of the entire socio-political composition of a community, became, as a result, the goal for many practitioners and researchers. It is within the municipal context, extended to a cluster of communities situated within a specific river basin, that INNWATER has decided to interact with what the consortium has named the *Helix of Socio-Political Consensus*.

The *Helix* is by no means an original concept. The origins of intersectoral, city-based cooperation and mutual benefit can be traced back to Ancient Greece. The Italian City States of the Renaissance revitalised aspects of the concept which were later suppressed by the absolutism of nation states between the 17th and 19th centuries in Europe.[34] The modern approach to intersectoral collaboration was first discussed in 1995, by Henry Etzkowitz and Loet Leydesdorff when they argued the case for cross-sector collaboration between academics, researchers, industry and private interests and the components of public administrations. With the aim to reinforce innovation, the production of commercial goods and market regulation, they advocated the establishment of a mechanism in order to guarantee a balanced relationship between the three sectors. They named this '*The Triple Helix of University-Industry-Government Relations.*'[35] In 2009, Carayannis and Campbell building on the work of Etzkowitz and Leydesdorff defended the notion that the world of research must be capable of responding to the realistic demands of society in general and that the so-called Triple Helix should also incorporate the citizen, the end-user, the social group that ultimately enjoyed or suffered the consequences of decision-making within the equation. The result was the concept of the Quadruple Helix.[36]

The Quintuple Helix, first alluded to at the beginning of the past decade and reinforced by, among others, Gawlik, Elelman, Glowacka and Feldman[37] in 2018, was described as containing '*the additional input of cultural activity and environmental preoccupation and its effect on the four other helix sectors*'. Although the definition of the fifth part of the Quintuple Helix does vary depending on who is advocating its existence, the experience, for example, of the European funded project Fiware4Water (F4W),[38] by interpreting the fifth sector as being cultural and artistic stakeholders, strongly reinforced the opinion that the capacity to create emotional stimuli with regards to the environmental issue at hand is of vital importance if one is to succeed in truly engaging society as a whole. The presence of a cultural input is also strong related to the participation of the media, reflecting the concept of a 'media-based democracy' which Carayannis and Campbell first described in 2012.[39]

INNWATER proposes a sixth element to that described above. The landowner represents an identifiable sector, a sixth helix, which controls a physical space through which fluvial systems pass. In many European countries, an extremely small percentage of the population owns an enormous amount of the land, who determine the use and direct and indirect effects of that use, (for example, agriculture and forestry) as well as access to such spaces. Within a local community, the socio-economic context of land and land ownership must be understood and those who represent said sector must also be involved in any socio-political action if subsequent resistance and/or opposition to citizen-based initiatives is to be avoided. According to Kristensen, '*At the local level, the individual landowner plays a crucial role*…and…*are instrumental in securing sustainable land use—or the opposite.*'[40]

To date, landowners become involved in the preparation of local legislation, in the words of Adams and May '*to seek to influence statutory local plans to their advantage… and … by the prospect of substantial development gains.*'[41] The issue of engaging landowners is a difficult one which must be approached in a realistic, non-ideological manner. Much research would

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suggest that landowners only respond to perceived economic incentive or perhaps even more effectively, the existence of penalties, [42][43] or to actions specifically aimed at entering a dialogue regarding clearly identified issues that directly affect them. [44] The approach to landowners has been typically initiated by sub-national, national and European administrations in a top-down approach such as the Habitats Directive, Water Framework Directive and Nitrates Directive.[45]

INNWATER at the local level will study the role of the landowner and seek to incorporate representatives of the sector into the citizen engagement processes undertaken. It will seek to develop an understanding of the relationship between the Quintuple Helix and how they influence landowners' decision-making processes and strategies whilst disseminating such experiences to institutions such as the European Landowners Organization.

5. THE WEFE+H NEXUS

Water-related problems such as scarcity, access, and allocation are increasingly pressing along with other accelerating global environmental and natural resource challenges, namely excessive greenhouse gas emissions, biodiversity loss, population growth, and a global economy deeply reliant on fossil fuels. [46] [47] [48] Despite decades of efforts to tackle these systemic challenges and some progress toward raising living standards, approximately one billion people still suffer from undernourishment, almost 0.9 billion lack access to safe water, and over 1.5 billion lack modern energy access. These issues are projected to worsen by 2050, with a 50% increase in water demand, 80% in energy demand, and 60% in food demand if current trends persist.[49]

Governance and policy responses to these challenges have failed to buck the trends, often as the responses have focused on siloed approaches to tackle a problem in isolation of others while neglecting the system interplay in between. Increasingly, a recognition has emerged that governance outcomes in one area are externally influenced and affected by the drivers, institutions, decisions and actors in other areas, across multiple sectoral and scalar divides[50].

Water, for example, is not only essential for human consumption but also plays a pivotal role in maintaining environmental health, sustaining food production, and powering energy generation. Energy is indispensable for processes such as water treatment and food processing. Additionally, unsustainable agricultural practices can lead to environmental degradation, resulting in pollution of water, soil, and air, which, in turn, triggers food insecurity, spreads zoonotic diseases and contributes to antibiotic resistance. Similarly, energy production can introduce pollutants into water and air, thus negatively impacting both human and environmental health [51]. At the same time, water, energy and food production are underpinned by ecosystems and their capacity to provide such services, while climate change brings additional challenges to these interactions by affecting resource availability both in quantity and quality[52].

Consequently, a plethora of approaches that seek to incorporate systems-thinking and coordinate efforts across sectors and multiple levels of governance have emerged. For example, at the global governance level, the stated indivisible, and unified Sustainable Development Goals (SDGs) act as a global cross-sectoral coordination mechanism for steering

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sustainable development[53], encompassing not only the well-being of human populations but also the health of the ecosystems upon which we depend[54].

Along this line of thinking, a key concept that has gained prominence, is the concept of the Nexus which aims to holistically tackle challenges and recognises the intricate interdependencies among natural resources and environmental systems and seeks to ensure their protection for future generations. This holistic approach aims to reduce conflicts arising from competing resource demands through an integrated resource governance across sectors, such as agriculture, conservation, and water management, giving rise to different Nexus combinations. Proponents argue that Nexus approaches offer more cost-effective solutions compared to fragmented, "silo-based" resource policies and that by coordinating interventions and ensuring they do not harm other critical resources, this approach promotes sustainability[55].

It is, therefore, necessary to delve into the evolution of the Nexus concept, with a specific focus on stakeholder engagement in planning and decision-making processes and the scope of how citizen engagement has been understood and employed in such governance processes.

5.1. Evolution and boundaries of Nexus thinking

According to Mohtar, the Nexus concept initially emerged as a holistic approach to tackle water security challenges[56]. Over time, it became increasingly apparent that efforts to improve water security could be jeopardized by decisions made outside the sector through the intricate interconnections between water, energy, and food systems. For example, society currently allocates approximately 71% of freshwater resources for food production, 16% for energy generation, and only 14% for other purposes[57][58]. Roughly 30% of global energy production consumed within food production and supply chains[59]. Consequently, the Water-Energy-Food (WEF) framework, which had already existed under various names (e.g., sustainability triangle) for several years, was formally recognized during the Water Security Council of the World Economic Forum in 2011[60].

As research and legislation moved away from addressing only water security, energy and food security quickly entered the agenda with equal importance, and the framework began to focus on the interrelationships in the management of these resources. In this way, the domains of food and energy went from being variables in the water security equations, to being structuring elements of the Nexus framework[61][62].

The inclusion of *ecosystems* in the definition of the Water-Energy-Food (WEF) Nexus has been a gradual development over time and even today there are articles and reports that do not explicitly include ecosystems in the acronym. These semantic but sometimes substantial variations can be attributed to the disciplines conducting the studies as well as the platforms that promote the concept. In some instances, the concept of ecosystems is integrated into each of the elements of the Nexus, through the provision of water, food, energy materials and the processes that regulate climate, soil and water flows (e.g., Rasul, 2012)[63]. However, in other cases, ecosystem considerations are excluded from the analyses.

Furthermore, incorporating health into the Nexus concept is a relatively recent and ongoing development. Current models, such as the one presented by The International Water Association, adopt an approach where individuals, landscapes, and ecosystems are positioned at the core of the Nexus model, implicitly recognizing the role of health. Even more recent is the framework proposed by Nuwayhid & Mohtar[64], which stands as one of the earliest

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representations of a Nexus where health, encompassing both human and ecosystem health, is explicitly integrated into the system (Figure 1). This framework elucidates the interactions of health with the other elements within the Nexus.

At the crossroads of health and water lie agrichemicals that infiltrate irrigation water, the water table, wastewater used in irrigation, and engine cooling water. These practices result in pollution of both surface and groundwater, leading to health issues such as diarrhoea, blue baby syndrome, and chemical poisoning. In the nexus of health and energy, factors include gas emissions, electromagnetic radiation, and cooking fuels. These contribute to indoor and outdoor air pollution, climate change, and health problems such as acute and chronic respiratory ailments and cancers. Regarding the connection between food and health, the utilisation of wastewater in irrigation, agrichemicals, and food for energy production generates contaminated food, nutritionally deficient options, and food scarcity. This, in turn, leads to food poisoning and malnutrition, among health concerns[65].
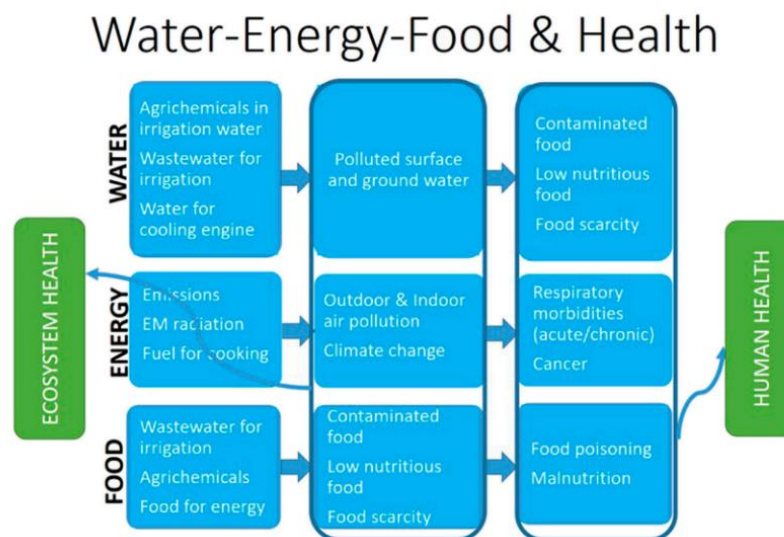

Figure 1 : Diagrammatic scheme of how health is part of the Nexus. Source: (Nuwayhid & Mohtar, 2022)

The increasing scope and evolving nature of the Nexus approach poses the question of where its conceptual boundaries end. To answer this question, it may be necessary to distinguish between Nexus thinking and Nexus action. The former refers to conceptualizing systems, their components, and relationships, while the latter involves using the Nexus concept as a framework to solve specific problems across its sectors. This distinction could also be understood as that between Nexus assessment and Nexus governance. In this way, it could be suggested that while Nexus thinking is essential to consider the whole picture and avoiding a siloed approach to solve a problem, Nexus action requires a more pragmatic definition of boundaries that are functional to the resolution of specific problems in a timely and cost-effective manner.

From a water governance perspective, de Loë and Patterson[66] argue that critical thinking is required when considering boundaries of approaches to address system challenges. This is because boundaries can include spatial and organisational levels (local, national, transboundary or global), different sectors, temporal scales (timeframes of interventions),

which actors and how they are involved (participation), or even include analytical (what currently exists) to that of normative (what is desirable) considerations.

As a reflection, regardless of which and how many nexus sectors are accounted for, the principles of the concept remain the same: there are interdependencies between socio-ecological systems due to pressures and degradation drivers, and there is a rising need for better coordinated institutional interplays and actors working across them. This idea puts the concept of governance in a central place as a process for creating synergies and addressing trade-offs when dealing with complex interconnected challenges.

5.2.   The WEFE+H Nexus as a framework for good governance and citizen engagement

There are diverging views on whether governance is wholly embedded within the Nexus concept or requires additional theoretical development to strengthen the relationship[67] [68] [69]. Mohtar[70] argues that the concept of governance is strongly incorporated into the Nexus ethos and connected to it, an integrative vision of resource management that must be maintained at all levels of governance and must be based on the inclusion of all sectors of society: government, private, academic and civil society.

Other authors such as Urbinatti et al.[71] maintain that although the concept of governance has been present since the approach's inception, it carries diverse interpretations. In Nexus studies, there have been more than 20 governance-related concepts, which can be categorised into eight groups: water and basin governance, environmental and systems governance, risk and resource security governance, economic governance, global governance, urban governance, integrative and cooperative governance, and *epistemic* and transdisciplinary governance. Whether or not it has an implicit presence within the Nexus concept, the term *governance* has often been understated in Nexus studies. As a result, its precise meaning and application within this context remain underdeveloped[72].

Weitz et al.[73] propose that interpretations of governance remain consistent on at least two points across the nexus literature: the overarching governance problem is that policies are fragmented across the water, energy and food sectors, which lead to unintended consequences; and the goal is to achieve policy coherence by identifying and evaluating synergies and trade-offs, assessing and optimising policy options, and adapting governance arrangements.

However, as highlighted by several authors, the nexus literature has focused on resources over people, reflecting a technical-administrative perspective that distances it from engaging with the reality of decision-making processes for cross-sectoral coordination and policy coherence[74] [75] [76] [77]. There are gaps of nexus governance which can be improved by accounting for socio-political and cognitive factors, including who is involved in decision-making processes and the power dynamics among those actors[78]. For example, Stein et al.[79] conducts a social network analysis of a WEF nexus, finding that coordination issues between sectors are not due to disconnections, but rather the ways in which actors are embedded in various hierarchical structures.

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As the concept of governance has moved beyond traditional governmental boundaries, it involves networks of formal and informal institutions and actors with different roles, interests, and influence to address societal issues.

Within this expansive definition, stakeholder engagement, including citizen engagement, emerges as an important component of effective governance, especially for Nexus governance wherein actors may exist outside government [80] . It fosters inclusivity, transparency, local knowledge utilisation, conflict resolution, innovation, and long-term sustainability. Additionally, it ensures that decisions are both legitimate and accountable while gaining societal acceptance.

Yet, Urbinatti et al. [81] and Tye[82] highlight that while attention has been given to nexus governance arrangements in terms of institutional policies and decisions, little research has been done to connect the science to implementing nexus governance in practice. This points towards the fact that the methods employed to analyse and operationalise the Nexus often exclude participatory engagement approaches involving various stakeholders, such as citizens. Tye [83] finds that in 238 research articles on the WEF Nexus, only 27 concerned some type of stakeholder engagement and out of those, 5 related to citizen engagement.

Citizen engagement incorporates the potential to play a pivotal role within the WEFE+H Nexus approach. It serves as a bridge connecting policymakers, experts, and the communities directly influenced by resource management decisions. Citizen engagement ensures that the perspectives, needs, and concerns of local communities and stakeholders are factored into decision-making processes regarding water, energy, and food resource management[84]. The engaged local community, represented by the Socio-Political Helix (See Chapter 4) often possesses invaluable local knowledge regarding resource availability, utilisation patterns, and potential impacts. In regions characterised by intense competition for WEFE+H resources, citizen engagement could serve as a platform for resolving conflicts and achieving consensus on sustainable resource allocation[85].

6. THE IMPORTANCE OF THE SOCIAL AND POLITICAL INTEGRATION OF TECHNICAL DEVELOPMENTS

Data to Action is a process whereby raw data is collected and analysed to inform decision-making and actionable tasks by communities at a local, sub-national, national, regional and supranational level. The process involves identifying patterns or trends, making decisions and subsequently acting based on the proven results of monitoring and investigation. Data to Action can be applied to all environmentally based organisational issues or problems. There exist many scientific and technological solutions to identified environmental challenges. But such solutions must be communicated to all social strata in a clear way and such knowledge must be converted into tangible, *in situ* improvement if it is not to remain on the dusty shelf of academic theory. Technologists, scientists, and researchers representing an important part of the original '*Triple Helix of University-Industry-Government Relations*' first described in 1995 (See Chapter 4), have, therefore, an obligation to interact with all members of the socio-political helix, providing other sectors with the necessary, objective data (reflected in the requirement to ensure open accessibility). Such accessibility does not, or at least should not, simply entail the publication of peer-reviewed articles in specialist journals, the existence of which is unknown to much of the population and whose content would prove

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incomprehensible to all but the well-versed expert. Rather it obliges the scientist and technologist to become a communicator, a social partner capable of interacting with cultural agents and target citizens alike. The researcher must further depart from their comfort zone and collaborate with political stakeholders, not only when requesting funding, but far more importantly, as a means of ensuring that their work is translated into a valuable, practicable contribution to the overcoming of both environmental and non-environmental issues.

As has been observed over recent years with regards to aspects of climate change policy such as, for example, the establishment of renewable energy[86], the question of water is a scenario in which political and non-political ideology often takes precedence over scientific fact.[87] There has developed, in many situations and at different times, such as was observed during the COVID-19 pandemic, a total lack of consensus and deep distrust between the scientist and the politician[88] which has subsequently influenced general public opinion. The dialogue which would be necessary to reinstate citizen trust, that as a result is weakened, is not encouraged by the fact that the scientific and research community has often failed to maintain a proactive, open attitude towards political institutions in general[89] seeking to maintain at a significant distance the influence of such actors in the activities which the researchers wish to undertake. In 2015, Green wrote that a significant reason for such a negative attitude on the part of researchers was the contradiction between the political need for perceived *certainty* as opposed to the scientific process of recognising *probability*.[90] This situation has been further exasperated by the closed, elitist manner in which knowledge is transmitted, whereby the scientist or technologist seeks exclusively peer-group recognition as opposed to raising awareness at a broader level.

Such an attitude permits unqualified information often based on unfounded hearsay or populist opinion to abound on social media. Stakeholders claiming to be experts and sometimes supported by politicians simply because what they say fits comfortably into that politician's agenda [91] are more widely heard than the voices of experts who cannot be persuaded to translate their knowledge into a comprehensible discourse that the public could understand. Thus, one can state to a certain degree that scientists have not been contributing correctly to public policy making and above all, nor have they participated in processes which contain an important element of awareness creation and subsequent citizen engagement in an appropriate manner. As a result, public perception has often been erroneous in the extreme. For example, water-based issues such as leakage have often been totally ignored whilst the reuse of treated wastewater is still considered by many as a highly negative, politically dangerous practice[92] despite the increasing and evident effects of climate change which Europe is witnessing in recent successive summers, the perception of which, should have been reinforced by the evident and often visual decrease in freshwater resources.

Scientists are quoted by the mass media and their opinions are sought when large-scale political events such as COP are celebrated. General awareness concerning climate change has, it is true, increased dramatically. It has become a political debate, but it is equally true that science is failing to explain in a convincing manner *how* and *why* adaptation measures can and should be implemented. According to Gawlik *et al*[93] the scientific community, especially at a senior level has failed to comprehend that the role of knowledge based on objective data is a vital one within the policy development process. If such a process is to be based on public consensus and citizen engagement, then such knowledge must be accessible both physically and linguistically to all. Scientists, technologists, and social researchers must construct bridges whereby natural and physical science is successfully and above all, clearly

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linked to local societal issues. Failure to achieve this will result in the increase of the influence of unqualified social influencers creating a parallel truth based on perception and emotions.[94]

Technology must reflect the need to support social sustainability. Awareness amongst the research community regarding this aspect has risen dramatically. A cursory glance at the most recent calls for European-funded research proposals reveals an important increase not only in social scientists being invited to become involved in technical actions, but also in the presence of communicators and more broadly cultural-oriented actors including artists. As was demonstrated by the European Commission in 2023,[95] the painter, the photographer, the sculptor, the poet, the musician, and the actor are tremendously powerful tools in collaboration with whom, the scientist can provoke an emotional and longer lasting public response. This benefits not only the translation of the technical solution into an understandable and approachable concept. It is equally useful in the raising of awareness, the recruitment of citizen volunteers and citizen scientists, and can act as an effective means of informing communities of an action's progress, thus contributing to policy continuity.

Science, art, and political activity are intrinsically linked and have, throughout history, had a complicated but socially important relationship. As Oxman described in 2016,[96] engineering and design represent the transition from science to art. Art has been employed to create political, scientific, and technological propaganda and yet has also reflected the fears and social perception of science such as when it depicts new developments as a threat, described in dystopian tragedies and of course, science fiction. Science, on the other hand has contributed to the development of distinct means of artistic expression ranging from photography, the cinema, digital entertainment, or the establishment of Augmented Reality (AR). However, with regards to technology becoming more integrated into political and social measures, the role of art and its relationship with science must be of mutual respect and the desire for co-creation, together with the other sectors such as the public, the industrial and the citizen. Art can transform technological solutions into stimulating concepts, providing the knowledge that the hitherto uninformed stakeholder can both understand and be inspired by. Such an understanding bridges the gap between the scientist and the society that often finances their research, it creates a dialogue between those who require solutions and those technically capable of providing them, it converts the scientist into an active member of the Socio-Political Helix (See Chapter 4).

As Jofre *et al* state, '*A healthy democracy is one in which citizens are actively engaged*.'[97] In order to be engaged, the citizen requires a continuous access to knowledge that will support and help shape their opinion. Scientific objectivity, (Green's notion of *probability* as opposed to often falsely created *certainty*), instead of being the cause of a distancing between the researcher and socio-political actor, becomes a proactive catalyst that would provide a guarantee of unbiased and therefore, trusted data and capacity development. Capacity development of socio-political stakeholders at a local level becomes an experience of mutual intersectoral benefit. It leads to the appearance of long-term citizen science conducted, in whole or in part, by volunteers who are not professional scientists but who can provide regular, *in situ* data, unobtainable through remote sensing. This type of research has grown significantly in recent years and is a pillar of local engagement providing an impetus to the creation of circular economies. It has been described by the World Water Quality Alliance convened by the United Nations Environment Programme as a '*solution-oriented approach to sustainable development, in which all necessary players are considered and connected, with the aim of achieving breakthrough achievements*.' [98]

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7. THE TECHNICAL AND SOCIO-POLITICAL VALUE OF DIGITALISATION

The twin transition to a digital and green economy advocated by the European Commission has, over the last four years, had a significant effect on how environmental data is collected and communicated to target audiences. At a global scale, even water sector utilities, traditionally a more conservative element as compared, for example, to their counterparts in energy or transport, have begun to embrace a transformation which would signify a transition from a data-rich to a knowledge-rich society.

Remote sensing employing satellites, asset management-risk and prioritisation, customer engagement, predictive analytics, artificial intelligence, augmented reality, virtual reality, and cybersecurity are technological advances which can only serve to enhance water management. Processes can be automated, analysis can be improved, forecasting can be optimised, and risks averted thanks to the employment of Internet of Things (IoT) technologies. Anomalies in the distribution of water can be more efficiently addressed, leakage detected in real time and conservation of resources greatly improved, whilst, because of more effective operational efficiency, revenues can be increased.[99] As the International Water association pronounced in 2019, '*No stakeholder will be left untouched by the digital transformation of the water and wastewater sector, and all will share the responsibility to step up to the challenges of the sector and secure our water resources for future generations*'.[100]

Digitalisation can be defined as a means of improving the efficiency of systems to the maximum by way of monitoring and big data analysis.[101] Digital water techniques can be applied at any point of the water life-cycle, meaning that in any given location at a local or river basin level, the interaction between water and the entity responsible for conserving and supplying it, the public sector responsible for controlling it and the end-users be they citizens or industry that require it, will be enhanced. Remote monitoring systems can provide detailed information, often in real time, concerning, nitrate values, the pH, flow rates and the temperature of fluvial systems. Metering can improve utility performance and observe the demand to determine priorities with regards to long-term management strategies.

The water sector has been slow to embrace what is defined by researchers as the fourth industrial revolution[102] or Industry 4.0,[103] whilst Rohner in 2018 stated that the water industry has been notoriously efficient at ignoring, '*concepts developed from within the economic and social sciences.*'[104] The development of Digital Water, that is, water-specific data has been slow to get underway, partly because the water sector is extremely heterogeneous. Large water companies already employ many aspects of Industry 4.0, but many smaller water utilities have resisted the need to incorporate such techniques. With regards to water, there is only a limited free market and consequently the need to innovate is considered to be less urgent. The size of a utility dictates the capacity to embrace innovation. Industrial giants such as Veolia and Aqualia are frontrunners but in Europe there are many regions whose water is supplied by far smaller concerns. In Germany, there are, for example, approximately 6,000 water supply companies.[105]

Climate change is one of the most important reasons why digital and smart-water approaches are being increasingly adopted. Water scarcity has become far more evident, especially in Southern Europe, leading utilities to require more sophisticated means of monitoring and control. The embracing of Digital water has been further encouraged due to an ostensible reduction in costs and by the fact that an important number of ICT companies from

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other sectors have begun increasingly turning their attention to the water sector which, they have noted, suffers from a shortage of manpower and skills and can thus, more evidently, benefit from increased presence automation and the existence of decision support mechanisms.[106]

The role of digitalisation in socio-political spheres and the issue of citizen engagement is as important as its capacity to facilitate more technical tasks. Digitalisation can enhance stakeholder engagement and influence end-user behaviour. It can support and be supported by citizen science, and it can provide the objective data required to revise existing legislation at all political tiers in a manner which can enhance consensus and therefore policy continuity. Digitalisation can support the need for clear communication between scientists and other non-expert stakeholders as described in Chapter 6.

The employment of websites, mobile phones and smart meter technologies can encourage and extend the proactive involvement of citizens, together with the other sectors of the Socio-Political Helix in the creation and implementation of local, sustainable actions. An important number of past European-funded projects such as SMARTH20, INTCATCH, URBANWATER, NAIADES, GROUNDTRUTH 2.0, BLUECITIES, POWER and the precursor of INNWATER, FIWARE4WATER have established and demonstrated to varying degrees the foundations for increased engagement employing digital water approaches.[107] Digitalisation enables greater transparency and an increased awareness regarding the need to protect natural resources. The Internet of Things has, in the opinion of a number of researchers, increased public demand for improved, more sustainable practices regarding water, air and soil.[108] The use of AR contributes to a broader understanding on the part of the layperson regarding issues such as pollution at source, whilst smart metering has been observed to result in a reduction in both the domestic use of water, earlier detection of leakage and a more time-effective response capacity on the part of the relevant utility. Such examples of the socio-political benefits of digitalisation demonstrate a capacity to develop what the United Nations Environment Programme described as 'a sense of common purpose' based on the 'the willingness of all sectors to participate in genuine social partnership and dialogue'. [109] The more that digital technologies themselves are co-created with all stakeholders, the more pertinent, realistic, and sustainable they become, as was demonstrated by FIWARE4WATER specifically at pilot sites in the United Kingdom, Greece and The Netherlands. (https://www.fiware4water.eu/) The European Commission itself has advocated this by clearly stating that such end-user engagement will '*guarantee a broad social awareness, acceptance and a subsequent political continuity*' whereby '*digital water technology in its role as an attractive, accessible and effective channel of communication*', employing technologies such as Digital Social Platforms (DSPs), will contribute to the improvement of both TOP-DOWN and BOTTOM-UP approaches to the management of water resources.[110]

Digital tools can extend water-based debates to a massive on-line audience. However, it is important to underline that *perception* in politics is a double-edged sword. Access to objective, scientific and technological facts is essential, and DSPs can promote and extend such access. However, the digitalisation of communication, as has already been mentioned in this document, has also resulted in a plethora of unqualified opinions often being accepted as valid, simply because they exist online. Here, once again, the role of the Socio-Political Helix at a local level is vital. Such engagement can assume the responsibility for directing the local community to the relevant and objective results of research required to answer the local challenges identified. It can act as a *perceived objective* source of information regarding local water-based issues, employing tools such as the creation of a specific website and the

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extended use of platforms such as LinkedIn, Facebook, Instagram and even X, together with mechanisms of group coordination and communication such as ZOOM, TEAMS or WEBEX. The aforementioned, European-funded project, FIWARE4WATER, obliged to adapt to the extraordinary conditions imposed by the outbreak and identification of COVID-19, was able to demonstrate that it was possible to establish a full citizen engagement programme almost entirely online but that there were also important disadvantages. Online engagement is certainly feasible and encourages those who would find in-person participation time-consuming and/or impractical. Many laypeople would consider it inconvenient to have to physically attend meetings. But the effectiveness of such an approach can depend heavily on social factors such as computer literacy, amongst, for example, ethnic minorities, the aged, rural communities, and lower economic strata. A fully digitalised, online approach can therefore be accused of, at the least, excluding important target groups, (often those most affected by water-based crises) or at worst of being elitist in the extreme. This is known as the '*digital divide*'.

It is, therefore, reasonable to state that digital socio-political actions, although capable of offering worthy support to the local identification, co-creation and implementation of water-based actions, should be combined with face-to face and more traditional methods of communication that answer sufficiently to the social and economic idiosyncrasies of a specific location, community or river basin.[111] This would appear to be supported by writers such as Seong-Jae Min who advocated in 2007, the dual approach by asserting that whereas face-to-face events permit the development of closer relationships between stakeholders, online support encourages broader participation and a greater flexibility to *when* and *how* people contribute their own thoughts to the debate. [112]

Digital Social Platforms are excellent means of attracting attention and clearly focusing the intentions of a specific action that engages the Socio-Political Helix. But the real strength of the Helix is reflected by the physical and social involvement of its members. Public confidence in local, river basin and subsequently supranational priorities is not a digital product but rather the consequence of tangible, physical, technical, social, and cultural actions on the ground. A DSP can promote and extend the effects of such an action but cannot, in isolation, produce them.[113]

8. THE ACCOUNTABILITY OF A CITIZEN ENGAGEMENT PROCESS

Accountability can be understood as an end goal, achieved through effective participation and representation, and as a means towards designing and implementing participatory efforts. Citizen engagement and public participation are primarily defined as a condition for accountability. Where citizens have the opportunity to participate and influence decisions, they have been able to use their rights to hold governments accountable and demand public scrutiny and transparency on the decisions taken. Voices and views from citizens raised through participatory processes such as public hearings, multi-stakeholder forums, or public audits, have the potential to influence and inform democratic processes. The rationale is that increased citizen involvement ensures that there is no abuse of power and elected representatives are answerable and responsible to their citizens[114].

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Power is a key element for understanding this relationship between accountability and citizen participation. Sherry Arnstein's (1969) [115] highly influential ladder of participation in democratic decision-making stresses that citizen engagement is power, and modes of participation that don't shift the balance between the powerless and powerholders are not genuine participation. For public participation to be successful, government and public institutions must give up a certain degree of the power they hold. The more the state is willing to share the responsibilities with citizens, the higher will be the quality of processes to address the need for inclusive, participatory, and representative decision-making. [116] Accountable relations are precisely interactions that challenge power asymmetries: powerholders are required to justify their actions or decisions, while right-holders are empowered to demand explanations or penalties. Thus, promoting accountable relations is vital to facilitate effective participation.

The United Nations Economic Commission for Europe (UNECE) 's "Guide to Public Participation under the Protocol on Water and Health [117]" defines accountability as one of the core principles of public participation. This concept defines a reciprocal relationship in which the duty bearers, i.e., the government need to take account of, give account to, and be held to account by the right holders, i.e., the citizens. In other words, accountability strengthens the capacity of those with obligations and empowers those with rights. The capacity to demand accountability counts as much as the ability to provide answers and enforcement. It requires the creation of a participatory space where right holders can make demands.[118] [119] It requires openness and transparency (e.g., open and clear about policies and procedures, adequate flow of information)[120], compliance, and commitments to engage with citizens, which are foundational elements of effective public participation.

Przeworski, Stokes, and Manin [121] in their book 'Democracy, Accountability, and Representation' highlight that citizens' control over governments can take different forms, such as their political role as voters. This is what is referred to as *political accountability*, that enables checks and balances over the power of elected representatives. However, this form of citizen influence is exerted on limited groups of elected representatives, such as parliamentarians. It does not cover government administrators and public institutions, who manage resources or ensure access to services for the public, design policies and programmes that may affect public welfare. [122] Political accountability limits citizens from effectively participating in public decision-making or holding public officials accountable for particular decisions and behaviour.[123] In the same line, Kaufman et al[124] argues that strengthening the process by which governments are elected, held accountable, and replaced is not adequate to ensure democratic legitimacy. There is a need to focus on the capacity of governments to manage resources efficiently and formulate, implement, and enforce sound policies and regulations, as well as the extent of participation of the citizens in these decision-making processes.

The perceived shortcomings of political accountability led to the emergence of the *social accountability* concept. Social accountability encompasses measures that facilitate the active participation of citizens in policy formulation and implementation, and where citizens can monitor and hold government accountable by other means than through election cycles. [125] [126]. Baez Camargo & Jacobs[127] underlines the multiplicity of social accountability tools that can be deployed to involve citizens in monitoring activities. These include community score cards, citizen report cards, participatory public expenditure tracking, participatory evaluation of local bodies, citizen based participatory monitoring of procurement and auditing, public forums, and other formal and informal mechanisms through which civil society engages with the

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decision-makers. With recognition in scholarships, social accountability is reflected in the global agendas as well. The SDG 16, includes Target 16.6 on strengthening institutions: "Develop effective, accountable and transparent institutions at all levels"; and Target 16.7: "Ensure responsive, inclusive, participatory and representative decision-making at all levels"[128].

Participatory processes can benefit from the active engagement of civic institutions such as CSOs, NGOs, community institutions like water user groups, pressure groups, and the media. Non-state entities can mediate between right holders and duty bearers and monitor the latter's actions. [129] Scholars define these channels of accountability as *Vertical accountability*, through which individuals hold state actors accountable, either directly or by delegating that role to members of civil society organisations or the media.[130] [131] [132] [133] Bovens[134] highlights that engagement of CSOs in governance processes contributes to empowering citizens to influence policies and imposing sanctions on public institutions and authorities when necessary. CSOs have played a central role in promoting citizen participation in EU processes.[135] [136]. In 2013, the EU Parliament adopted a resolution on implementing the principles of transparency, integrity, and accountability across all EU institutions which opened- the European policy making process to civil society. [137] The legal basis for CSOs' participation in EU legislation is cited in Article 11(1-3)[138], ensuring that the EU Institutions shall maintain an open, transparent and regular dialogue with representative associations and civil society. It is, however, important to note that in this process of involving CSOs as mediator, the internal governance and accountability weaknesses of CSOs must be monitored, which if not given attention may hinder the citizen engagement process. [139]

However, civil society might not always have the power and mandate to control public institutions. *Horizontal accountability* provides an additional mechanism that addresses this gap. This type of horizontal oversight system gives authority to certain state actors to demand explanations or impose penalties on other state actors on behalf of the citizens. State bodies involved in control mechanisms include the legislative and judicial branch, anti-corruption agencies and `accountability agencies' such as human rights commissions (HRCs), ombudsmen/public protectors, and auditors-general (AGs). [140] A condition for horizontal accountability to be successful is that these state actors must be willing to oversee, manage and control along with having legal authority and sufficient de facto autonomy over the other.[141]

A significant body of literature and practice contends that the sustainability and effectiveness of accountability mechanisms depend on the transparency and openness of state's internal functioning to citizen engagement. [142] [143] This led to the emergence of the concept of *Transversal or hybrid accountability*. This type of mechanism refers to the participation of citizens and civil society (actor from the "vertical" accountability relationships) in horizontal (state-to-state) processes of accountability. Transversal accountability helps overcome the limited impact of traditional civil society methods and legitimises the inclusion of citizens in government oversight functions.[144]

8.1.   Accountability framework for good governance and citizen engagement:

The most influential definitions of governance require that institutions and practices demonstrate both openness to citizen participation and accountability. Together, the two

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notions sit alongside a range of other principles that are included in claims and practices of "good governance" – the normative ideal that defines the optimal conditions of decision processes. As we have seen, the uptake of participatory methods overlaps and is intricately linked to the idea of reciprocal relationships in which stakeholders can demand and deliver accountability. In practice, this means that institutions need to demonstrate that they are aware, informed of, and reactive to the needs of citizens.

To operationalise these principles, there is a need to focus on enabling structures and processes that strengthen the overall governance of a system. As a policy instrument for governance, participation needs to be realised alongside overall institutional changes where accountability is key. Otherwise, efforts to include citizens in decisions will result in voice without influence, whereas institutional reforms without the inclusion of relevant actors will only reinforce the status quo.[145]

A fundamental step towards the integration of participation and accountability within governance practices is identifying the institutions involved within the processes, i.e., understanding the roles and responsibility of different actors in participatory processes. This answers the questions: *who is mandated to do what*? *who is accountable to whom*? ; *and how can the citizens, CSOs, policy makers, implementers/services providers hold each other to account*? [146] For example, the primary responsibility of providing provision of water services as a basic human right of the citizens lies with the state, who implements certain functions (e.g., policy, planning and budgeting, service delivery arrangements and regulation of services. [147] [148] Citizens as the users claim their rights to the water services, either by exercising their voice through elections or other political actions to make government prioritise on affordable and quality service provision, or by exerting influence directly over the service providers (formal or informal) through increased voice and participation in service delivery.[149]

The United Nations High Commissioner for Human Rights in the Human Rights and Poverty Reduction framework stresses that "Critically, rights and obligations demand accountability: unless supported by a system of accountability, they can become no more than window-dressing[150]. To illustrate this, the OHCR refers to three broad levels at which to strengthen accountability in participatory processes: i) **Responsibility and transparency**: it refers to taking responsibilities for one's own behaviour and action and clearly defining the roles and responsibilities; i) **Answerability**: refers to providing reasoned justifications and explanation for actions and decisions taken. It is defined as the obligation of one actor to provide an account and the right of those affected to get a response. iii) **Enforceability**: strengthening control mechanisms through monitoring, supporting, and enforcing compliance to ensure appropriate actions and behaviours are in place. It is a critical underlying factor shaping the performances of public institutions to be responsive to the citizens they serve.[151] [152]

In the absence of such appropriate structure and framework, citizen engagement may only be effective in holding public institutions accountable but without much benefit to the citizens. Arnstein[153] refers to these forms of participation as "illusory", since citizens are misled to believe that they are entrusted with power, whereas in reality it is ultimately limited to a public relations vehicle by powerholders. In many instances, citizens are not aware of their rights and entitlements and of the specific obligations that public officers have to fulfil.[154] This may limit their capacity to engage meaningfully. Access to clear, adequate, and timely information provides the basis for informed participation in policy processes and it can allow citizens to monitor if government goes off-track from the goals and exert pressure when needed. The clarity on roles and responsibility of different actors in the processes will also

enable citizens to utilize the horizontal and transversal or hybrid accountability models, and gather support from CSOs, and/or state actors. Another important element for effective citizen engagement is having feedback systems in place, which provide citizens with information on how their inputs have been taken into account, and what actions are taken to address the issues that were raised. Based on the discussions raised by different scholars in understanding accountability in context to citizen engagement, it can be concluded that strengthening such instruments enable citizens to transit from non-participation, through to involvement, advice, collaboration, and joint ownership and, finally, to engage in agenda-setting to ensure effectiveness and responsiveness. [155]

9. A COST-BENEFIT ANALYSIS OF CITIZEN ENGAGEMENT PROCESSES

A Cost-Benefit Analysis (CBA) is an economic methodology to support the taking of decisions. When CBA is referred to as a decision-making tool, as opposed to an aid, the statement demonstrates that the speaker is revealing one of two erroneous opinions: Firstly, that the authority and/or responsibility for a given decision can be outsourced to an expert or to a methodological approach which would denote an unwillingness on the part of the speaker to accept responsibility for a decision or indeed to make the effort required to take said decision. Alternatively, the speaker is reflecting the attitude that the expert and/or their methodology is omnipotent and can digest all relevant information including value judgements and adaptation to the input of relevant stakeholders. It is an opinion that indicates both hubris and/or disdain but more importantly an unverifiable belief in the superiority of central planners.

Therefore, a CBA is an economic method that compares the costs and benefits that would emerge during the future implementation of different scenarios that all stakeholders consider as being costs and benefits that can be converted into monetary terms. Negative Net Present Value (NPV) investments are not worth spending public financial sources on. This is the first test of sustainability. (Squeezing non-monetizable features into a CBA analysis reflects either or both above-described negative alternatives for employing CBA as a decision-making tool, instead of as a decision-making support.)

A Cost-Benefit Analysis of a citizen engagement process suggests that there are two, roughly identical implementation processes, one with, and one without citizens involvement in the creation, planning and/or implementation of a given policy (*ceteris paribus*). The differences in the two processes would have to be highlighted in economic terms and to date, such an exercise has not been undertaken.

However, there are certain parameters which can already be described. The involvement of citizens together with all stakeholders representing the Socio-Political Helix at a local level in a planning/implementation process is costly. These costs partly arise on the organisers' side as direct costs of the engagement process. Such costs can, in the opinion of some researchers, be substantial, but could be exceeded by the costs incurred by engaged persons, with regards to the time invested in acquiring knowledge, meeting other stakeholders or investigating potential changes of their adaptation pathways. Such efforts are not necessarily, nor indeed (in citizen engagement processes) not normally financially covered which can lead to stakeholder identification bias. Such bias may also be detected if participants are

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paid. These elements belong to transaction costs, meaning that the reaching of agreements involves financial costs.[156] Unrecognised and unmanaged transaction costs regarding the creation of agreements in relation to, for example, a nature-based solution, could quickly escalate compared to the gains the agreement could produce.[157] Therefore, choosing the correct method and the relevant stakeholder networks are crucial.

One must therefore ask, what the gains are that can justify the higher cost that a planning/implementation process involving socio-political helix engagement entails:

1: The avoidance of socio-political backlash and/or the Not-In-My-Backyard (NIMBY) effect[158] [159] capable of resulting in implementation delays (that indeed, could be quantified economically) if non-engaged or poorly engaged stakeholders organise themselves successfully. (See Warner, 2008[160]).

2: The development of legitimacy to provide the financial basis of the enhanced systems. For example, at the conclusion of the process, beneficiaries could pay for the services they harness from the providers of the measures. This is especially important if the financial contribution of beneficiaries is required to make the solution viable. [161] [162] The first condition of sustainability is whether the operation and maintenance cost of any development are organised in a manner so that they may be covered later.

3: The development of legitimacy for the rule-based operation reflecting an important aspect identified by the OECD regarding the reasons for water governance failures, the lack of *in situ* functioning of legal systems.[163] A legitimate system is cheaper to run than a system in which money constantly needs to be spent on identifying and pursuing the cheaters.

4: The development of a legitimacy for the new rules of the game. Water governance facing climate change challenges means that new boundaries must be institutionalised location by location. Landscapes that provide the highest added value are those which are multi-purpose. The adaptation of multi-purpose landscapes requires advanced methods to assess and process information from the full spectrum of the web of ecosystem service uses.[164] [165] [166] It is an uphill struggle.[167] [168] Enabling higher overall added value given predictable circumstances is the surplus that advanced implementation processes can provide compared to specific ecosystem services concerned with a narrower spectrum of land management.

5: The above points are concerned with the improved implementation of an already selected measure, but citizen engagement may also result in an altogether more superior measure, if conducted at an earlier phase of design and/or planning.

10. A HISTORICAL REVIEW OF CITIZEN ENGAGEMENT PROCESSES IN THE 21ST CENTURY

As has already been stated in this document, the concept of citizen engagement and citizen participation is as old as the history of human civilisation and is a global ideal. Many indigenous peoples in Asia, Africa and South America have traditionally made decisions by consensus and persuasion, the pillars of citizen participation. The Medina Compact of the first Islamic State was based on a social contract whereby consent and cooperation between citizens and the governing authorities was well established. A common feature of many Muslim and especially Arabic societies throughout history is the 'shura', a form of consultative assembly encouraged

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by the Quran and which, it has been suggested, should be combined with digital technology as a way to encourage participatory governance among Muslims for local community and national purposes.[169]

In Europe, the city-state of ancient Athens from approximately 500B.C. onwards, innovated several means by which the citizen (as opposed to the slave) had the right to participate in debates, the co-creation of strategies and the taking of decisions. After the fall of the Roman Empire, in what is described as the Dark Ages, political activity succumbed to the power exercised by the those who controlled the largest military contingents, but examples of timid moves towards civic participation could be observed in certain enclaves of the Holy Roman Empire, (inspired principally by religious belief), and Renaissance Italian City-States (inspired by economic interest) although by the 17th Century, any vestige of such an approach at a municipal level had disappeared. The signing of the Magna Carta in 1215, despite the claims of numerous 18th Century writers and 19th Century British imperial propagandists, was not a move towards any form of citizen participation, being created to exclusively protect the rights of a militarily dominant nobility in England. Feudalism did slowly disappear, but only to be transformed into absolutism, as nation states replaced the more regional medieval order. The absolute monarchy was, in Europe, based on the concept of a strong individual leader of a state, the power of which, was measured by the international significance of its ruler who would seek to curtail any restraints on this extreme form of centralised government by abolishing the influence of the church, feudal lords, and medieval customary law. Absolutism first fell to the ideals of the Age of Reason when the philosophy of the enlightenment was translated into the American and French Revolutions. The latter was quickly replaced by the dictates of the First French Empire. It was at the height of Napoleon's reign, in 1804, that the Napoleonic Code was established. It was not the first legal code to be created in a European country. Others had appeared before, in Bavaria, Prussia, and Galicia. But it was the most influential and provided the basis of the law of many European and non-European countries seeking to modernise through legal reform in establishing certain rights for the individual. Europe, during the 19th and 20th centuries was witness to many forms of political system, from monarchy to dictatorship, often influenced by diverse and sometimes severe schools of political thought ranging from the extreme left to the extreme right. The appearance and development of what are now termed 'modern democracies', divided into nation and federal states have, since the end of the Second World War, become the status quo in Western Europe and beyond. It is this factor, enhanced by the political pressures in Europe and the United States that were prevalent during the 1960s, 1970s and 1980s (Civil rights, gender politics, Vietnam, the fall of the Soviet Bloc, post-industrial decline and the extension of the European Union), that has led, during the last 30 years, to a broader academic and socio-political debate regarding citizen engagement, civic participation and the benefits of open as opposed to representative government in the member states of the European Union.

10.1.   Agenda 21

In 1992, the United Nations produced the Agenda 21 at the UN Conference on Environment and Development in Rio de Janeiro. Aimed at creating a foundation for sustainability in the 21st Century, it envisaged that all tiers of government would create plans or an agenda. One of the principal aspects of the non-binding agreement was that every municipal authority should design its own plan based on the specific needs and idiosyncrasies of the city, town or village it administered. In Europe, this initiative represented an important landmark in citizen

engagement, given that, for the first time, many local governments opened a consultative process with what would now be described as the Socio-Political Helix.

The local preparations of an Agenda 21 were positive with regards to non-political participation but limited in their open-government ambitions. Public conferences, workshops and consultative sessions were organised in many towns and cities across the continent but in many cases, public participation was relegated to a passive role whilst listening to the opinions of local experts regarding one issue or another.[170] Not surprisingly, in Eastern European countries, many of whom were still anxiously adjusting to a new political reality after the fall of the Soviet Bloc, the creation and subsequent implementation of an Agenda 21 was a challenging prospect. The barriers were enhanced by difficulties encountered in establishing a multistakeholder process, a lack of financial support and an almost non-existent relationship between the researcher and the formal decision-maker.[171]

The experience of Agenda 21 was important for the subsequent debate in Europe regarding citizen engagement. Researchers were able to glean a vast amount information regarding open processes of decision-making and to identify why, in many cases, the initiative had failed to undertake a truly participative process, factors that are still relevant in 2023:

a) One of the principal problems was the fact that social and economic inequalities were prevalent. Not every member of the community was aware of Agenda 21, nor had the perceived opportunity to express oneself, due to ethnicity, gender, age, economic status or simply the time to attend an event. This resulted in an inability to engender trust in the local political system.[172]

b) Some participants were intent only on promoting their own interests and had no intention in contributing to the creation of negotiated answers to identified problems. Even worse, established political organisations were active in sending members to ensure that no results were produced or that if results did appear, they were in line with their own priorities. This continues to represent an important obstacle at a local level and as Bodin has stated, is a factor to be pre-empted by any citizen engagement initiative.[173]

c) Environmental issues were, and still are, often highly contentious and attract the attention of powerful and influential stakeholders, both corporate, social and political, whose agenda is sometimes to block or pre-empt co-creation and the participation of all other components of the Socio-Political Helix. Such situations are not limited to the creation of Agenda 21s in the late nineties but is rather a trait that has been prevalent over the following 30 years in numerous examples. Issues such as nuclear energy,[174] the location of macro-wind farms provoking the so-called *Not-In-My-Backyard* (NIMBY) effect, the repartition of water resources between sectors such as the agricultural, touristic, industrial or domestic are just some issues which can lead to the fourth observation which is:

d) That enhanced multi-stakeholder participation in decision-making processes may lead to new local issues of contention if collaboration is unable to address conflicts of interest and successfully find a middle ground for compromise.[175]

Despite the broad and often negative trends recognised and the simple fact that resulting strategies have often been long consigned to forgotten cupboards of municipal offices, Agenda 21 did clearly demonstrate that, as Langeweg argued as early as 1998, sustainable

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development will come about if supported by technological potential which is enormous, but that investment in the social system, in other words, in people, will be necessary if we are actually to employ this potential to full effect.[176]

10.2.   The Covenant of Mayors

In 2008, the European Commission initiated an action that was to have a profound effect on the issue of citizen engagement in environmental issues in Europe. The Covenant of Mayors, as its name suggests, was a pioneering bottom-up approach to address local energy and climate issues. It consisted of recruiting and supporting local governments, in different national contexts, to create municipal policies that could achieve what was then described as the 20-20-20 objective, whereby after a baseline assessment, local communities signed the covenant declaring their intention to reduce CO2 emissions by 20%, whilst increasing energy efficiency and the production of renewable energy by 20%. The initiative was based on concepts of transparency and continuity, sufficient flexibility to consider local needs and realities, objective scientific assessment of the data provided by the Commission's scientific branch, the JRC, and the promotion of public involvement at a local level and during a process of knowledge exchange between different municipalities. The Covenant, which is now called The Global Covenant of Mayors for Climate and Energy, has managed to engage 13,220 municipalities, with a total population of 1.182 billion people.[177] More importantly, with regards to the subject of this paper, the action proved to be a catalyst for the uptake of citizen engagement and local community participation across Europe and beyond.

As a result, there have been literally thousands of examples of local government initiatives, research activities and other actions answering to EU Climate Law, the EU Climate Target Plan, the EU Climate Pact, the Horizon 2020 and subsequently Horizon Europe programmes, designed to achieve the ambitions of the Paris Agreement and the European Green Deal, which have included citizen engagement as a core part of their processes. The inclusion, in technical calls for Horizon Europe over the past two years of sociologists, political scientists and anthropologists, is testimony, in part, of the recognition of supranational administrations of the importance of the engagement of the Socio-Political Helix. An early example of such a project was the INTERREG IVC project named IMAGINE. It is important in this document as it led to later experiences such the Horizon 2020 projects, BlueSCities, [178] POWER [179] and FIWARE4WATER which in turn resulted in the creation of INNWATER. The basis of the project as described by Elelman and Feldman[180] was the realisation of the part of all components of what was then called the Quadruple Helix that successful environmental policies required time to be fully implemented and should form part of a long-term vision co-created by all the members of a local community to ensure social consensus and subsequent political continuity. Eight municipalities located in Romania, Spain, Bulgaria, France, the United Kingdom, Italy, Germany and Denmark adopted locally suitable approaches to engage all parts of the community in developing a Local Energy Roadmap. The result was the proof that increased awareness provided by objective and trusted information being made openly accessible, resulted in a heightened interest and subsequent desire to become involved at all stages of the policy process including implementation. Local results from the project were not to prove impermeable to the political fluctuations and changes of mandate that would occur in the pilot sites. Subsequently, international organisations dedicated to supporting the municipal actor such as ENERGY-CITIES (which had coordinated IMAGINE) or ICLEI (an NGO representing some 1200 European local governments and local governmental associations) to name but

two, realised the importance of the presence of citizens throughout all stages of a policy including implementation whereby the hitherto-uninformed layperson becomes the spokesperson for and overseer of the policies' progress and completion. The alternative to social sectors not being involved in the implementation and post-implementation analysis of a local action is frustration and increased distrust on the part of the public.[181]

Since the initiation of the Covenant of Mayors, 15 years ago, the European Commission has been joined by other supranational entities such as the United Nations [182] the OECD[183] or the World Bank [184] in calling for more open forms of inclusive governance to ensure the achievement of environmental objectives. This call, with the more important connections that now exist between European society and the health sector and the latter with the Water-Energy-Food-Ecosystem Nexus (WEFE) because of the COVID-19 pandemic constitute a powerful move towards further accountability and transparency, improved social cohesion and improved dialogue, all factors which citizen engagement can provide or at least, contribute to.

10.3.   The COVID-19 pandemic

Citizen engagement and participation in Europe was further brought to the attention of researchers and administrators alike, although it may appear strange, by the appearance of the COVID-19 pandemic, (during which, the predecessor of INNWATER, the Horizon 2020 project FIWARE4WATER was executed). The requirement to establish different means to support citizens at such a dramatic time led to an enhanced need to provide public information and short-term actions by municipal administrations often with the support of volunteers and local entities. Many actions were implemented and campaigns organised to address local issues such as solidarity, health, culture, transport and even sport. Communication and the creation of small, local initiatives depended on both in-person and online communication. FIWARE4WATER itself, demonstrated that the creation of Local Water Forums originally designed to examine in-person citizen engagement with regards to the digital transformation of the water sector, could be undertaken almost exclusively on-line and provided proof of concept in municipalities located in the United Kingdom, The Netherlands and Greece. [185]

According to Falanga, '…*the covid-19 pandemic brought a transformative potential in this field (*Citizen participation*) that needs to be seriously addressed in the days ahead by policymakers, practitioners, and scholars*.' [186] He argued that the pandemic has conclusively demonstrated that improved transparency and citizen engagement would result in compliance to the restrictions that had been imposed and that participatory practices must always include the creation of digital platforms '*to share local information, open the access to governmental data and trigger public oversight of political decisions*.'[187]

The International Observatory on Participatory Democracy (IOPD) stated that the pandemic had highlighted the urgency for grassroots initiatives to be developed in collaboration with local governments [188] whilst the Council of Europe noting a move towards digital engagement, stated the need for effective stakeholder mapping and the use of adequate methods to engage key stakeholders from the community.[189] The covid-19 pandemic confirmed, in the opinion of Falanga, the necessity to transform and advance citizen engagement practices in order to ensure that cities would be better prepared to confront future health issues and extreme events based on consensual decisions.

Throughout, the 21st Century, it cannot be claimed that by no stretch of the imagination all approaches to citizen engagement have been successful or that citizen involvement guarantees successful policy creation. The Canadian researcher, Gaventa and his American colleague, Barrett in 2012 examined over 100 case studies of citizen engagement around the World, under different forms of political regime and concluded that 75% of the experiences observed had been socially and politically positive, strengthening a sense of citizenship and provoking administrations to be more accountable. At the same time, they described an improved inclusiveness and cohesion of the communities involved. Nevertheless, as they pointed out, '*the 25% of negative outcomes provided an important warning of the risks of engagement'*. Such negatives aspects included the fact that without due attention, citizen engagement could in fact be detrimental to certain political requirements, that positively engaged citizens do not appear automatically but are the result of careful capacity development processes and at a national scale, the perception of citizens challenging powerful interests can lead to reprisals and even, in extreme cases, to the risk of socio-economic recrimination.[190]

Nevertheless, few European researchers would now argue actively against such approaches especially with regards to issues such as climate change, the environment, education, health, and city planning. This does not mean that at a practical level, the importance of representative government has decreased. Indeed, the opposite is true, but the seeds of citizen engagement in the 21st Century have been well and truly sown.

11. CONCLUSIONS AND RECOMMENDATIONS

A European move towards more open forms of government has been maturing over the last 30 years, but since the end of the first decade of this century, the tempo has increased whilst almost simultaneously, there has been an ostensible growth of distrust and resentment towards the established forms of representative government which prevail in the nation members of the European Union and beyond. A *perceived* escalation of corruption, empty political discourses and broken pledges has led to discontent on the part of many members of European electorates, a sense of disconnection with the ruling elites or even more worryingly for the future of the European Union, a dramatic rise in populist movements based on prejudice, nationalism or the *nonage* which has proliferated over the last decade in mainstream digital platforms. Events in, for example, the United Kingdom before and after Brexit, the increasingly radical governments of countries such as Hungary or Italy and the worrying tendencies observed in the domestic political and social tendencies in countries such as Denmark, Spain or the two principal pillars of the European Union, Germany and France, are not fuelled only by extremism and a lack of political integrity. The inability or lack of willingness to address fundamental issues regarding education, public health and the environmental consequences of climate change have managed to alienate an important part of the population, especially the younger, more middle-class elements who historically, have constituted, since the early sixties onwards, both the core of those willing to and capable of questioning the *status quo* whilst also, paradoxically, forming the basis of a certain socio-political stability in European society. Indeed, economic crises that have affected the European middle class is one of the most important destabilising factors that has led to the appearance of an ever-widening gap between political representatives and the communities which they purport to serve.

With regards to the environment, the increased awareness that has resulted from initiatives such as AGENDA 21 or the COVENANT OF MAYORS (See Chapter 10) has also led to a demand for further opportunities to participate in environmental initiatives. The supranational agencies responsible for creating the Sustainable Development Goals (UN) or the ambitions of the Twin Transition (EC) have demanded greater citizen engagement on the part of public administrations at all political Tiers, as well as on the part of industry and researchers when undertaking their investigations or developing their innovations. As has been described in this paper, the reason for this supranational demand is not a populist whim to attract public support, but is a conclusion based on a vast amount of academic and non-academic examination that has demonstrated that:

1) Awareness results in interest and said interest leads to the desire to become involved. If that desire is not satisfied, then distrust and misinterpretation on the part of socio-political sectors (The Socio-Political Helix – See Chapter 5) lead to rejection and a sense of injustice.[191]

2) To satisfy the desire to become involved, it is not sufficient to incorporate layperson activity simply at the outset of an environmental initiative by means of conferences, workshops, science cafes and similar activities where said layperson has a passive role. Those who have given time to attend such events wish to express their opinions and proactively participate in the co-creation of a programme or policy. It is natural that engaged citizens then want to be included in the implementation and post activity analysis of what has been designed. This move towards a more open form of government, especially at the local level and defended by institutions such as the Joint Research Centre of the European Commission[192] and UN Habitat[193] permits one to: a) better identify local challenges and benefit from the specific knowledge of the community's inhabitants, making actions far more relevant and practicable b) create a far more positive public perception of the policy or programme in question and more importantly c) provides a means to better guarantee the completion of initiated actions by ceding responsibility for the overseeing of a programme's progress to the local community who in so doing, also become the spokespeople for the initiative as well as an excellent channel of communication with their counterparts in other municipalities.

As the Joint Research Centre states, '*In a time when facts appear increasingly uncertain, values in dispute, stakes high and decisions urgent, citizen inputs …are becoming crucial'.* [194] Therefore, it can be concluded that successful environmental policymaking demands the existence of *continuity* over the medium to long term and public *trust* which can nourish that continuity. (See Chapter 4).

As is being recognised by higher-tier political entities, such actions are more achievable at the local level where the different elements of the Socio-Political Helix can interact to a far more effective degree through a combination of both face to face and digital approaches, the latter being highlighted during the COVID-19 pandemic. (See Chapter 11). Competent citizen engagement depends on all stakeholders having free and open access to objective, reliable data provided by the relevant experts. Digitalisation of the water sector (See Chapter 7) which has been slow to appear in comparison to other elements of the WEFE+H Nexus (See Chapter 6) is an essential tool to support citizen engagement and succour engaged citizens. As Popescu has written, the employment of digital platforms, mobile applications, and online portals

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permits residents to, '*access information, share their opinions, and collaborate with other community members. These technological tools enable a wider reach, breaking down physical barriers and engaging a larger and more diverse group of citizens.*' [195] It is true that digitalisation permits the formulation of more comprehensive strategies and that it strengthens inclusivity to a certain degree, but in many parts of Europe, there are social groups such as migrants, ethnic minorities, age groups, genders and the economically deprived that still do not enjoy the same access to information nor an equal opportunity to participate. Thus, all research and non-research engagement actions should always pay special attention to this aspect, which demands an even higher level of capacity development.

Capacity development is an important aspect of engagement and should never cease to function even when, or perhaps especially when, a programme or policy is concluded. The education of stakeholders with regards to a specific subject (in the case of INNWATER, water-based issues) is vital and can be productive in establishing long-term and motivated citizen scientists. The capacity of the non-expert to monitor and observe local conditions answers a need to fill a notable data gap that has been identified by many organisations. Whilst the virtues of satellite monitoring and Earth Observation cannot be overstated, it is often difficult to accumulate and access specific, localised knowledge regarding for example, the quality of groundwater systems with regards to nutrient concentrations from diffuse and internal sources and algal biomass resulting from eutrophication. The means to identify such challenges and subsequently decide upon an adequate NBS methodology to restore systems at a local level can be much enhanced by citizen science which can simultaneously feed into and feed from citizen engagement.

Citizen science also contributes to a more finely tuned capacity to ensure *accountability*, one of the principal issues that in recent years has been put into question within socio-political spheres. As described in Chapter 9 of this document, at a national and regional level, there exist established, although not always fail-safe horizontal mechanisms to guarantee accountability. Indeed, the traditional separation of powers between the executive, the legislative and the judicial is the basic expression of that. Far more difficult to achieve, is a vertical mechanism, elections and the all-too-often subjective and highly controlled press apart, which provide effective opportunities for citizens to call their representatives to account. Citizen engagement and citizen science can help remediate horizontal accountability at a local level and enhance vertical accountability because of increased awareness and practical, hands-on experience with regards to the issue in question. To quote Popescu again, '*Citizen engagement fosters a sense of ownership and collective responsibility, nurturing a vibrant and inclusive community that actively works towards a sustainable future*'. Collective responsibility results in more transparent governance and control.

Based on the examination of relevant academic material that has been undertaken to create this document, it is necessary to restate eight basic principles:

1) At a local level, it is important to identify the key stakeholders and affected parties before initiating an engagement process.
2) Participatory initiatives whether they are promoted by administrations or civil society itself, should establish a balance between autonomy and a positive relationship with the elected, representative entities, otherwise the completion of a programme may be put into question from the onset.
3) Local citizen engagement mechanisms must truly understand and reflect the language, culture and socio-political idiosyncrasies of the location.

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4) The employment of digital communication tools is necessary for the continuity at a local level and the dissemination and replication at a national or regional level of the activities undertaken.

5) Citizens, once engaged, must be involved in the identification of problems, the development collective solutions, the provision of services and the evaluation of the practices, at no point must they feel excluded from an action, which they themselves helped to initiate.

6) Citizen engagement permits long-term planning strategies and subsequently, greater investment confidence on the part of third parties.

7) Citizen engagement is the participation of all members of the Socio-Political Helix at a local level.

8) Citizen engagement is a vital pillar of the creation of sustainable communities. Water-based activities, such as those demonstrated by INNWATER must be extended to incorporate all aspects of the WEFE+H Nexus if coherent, holistic plans executed by cities, towns and rural communities are to be successfully transformed into an improved reality for future generations.

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