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A historical perspective on water governance in the Republic of Ireland

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Abstract

This article provides a historical perspective on the evolution of water governance in the Republic of Ireland from 1950. It discusses how long-term shifts in agricultural activities, the formation of Group Water Schemes and Irish Water as a national utility and water quality concerns have influenced water resource governance and the integration of management practices. Drawing on threads from the past, the article first describes how water governance from the early 1950s focused on rural access to water, pollution control and monitoring. With the advent of the Water Framework Directive in 2003, the focus of policy and management practices has changed, with 81% of present policies mirroring Integrated Water Resources Management (IWRM) principles. However, issues such as the implementation of drinking water supply charges and equitable access to water resources remain controversial. Looking to the future, the effects of climate change, land use planning, demographic changes and international legislation are discussed as key factors influencing water policy and management in the Republic of Ireland.

Keywords: agriculture, climate change, Irish Water, Water Framework Directive, Water Services Act

1. Introduction

The governance of water resources has attracted global concern because of the pervasive risk that water crises pose to humanity (WEF, 2018; Woodhouse & Muller, 2017).

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The prospects of water crises have already led to governance reforms at the national, regional and organisational levels focusing on the environment and socioeconomic development (Romano & Akhmouch, 2019; WPG, 2021). Water crises is however not just lack of freshwater resources to meet demand and the associated urgency in ensuring that mechanisms are implemented to accommodate the impact of stress on water resources (WEF, 2016). It also involves how the resource is governed and managed to avert scarcity and potential conflicts, particularly in water-stressed areas (Vieira, 2020; WEF, 2018).

There is a broad literature base examining water governance reflecting the different schools of thought influencing its conceptualisation. These schools of thought are based on the diversity of interests and objectives of the authors regarding the development and management of water resources and services (see, e.g. Jiménez et al., 2020; Woodhouse & Muller, 2017). The Organisation for Economic Co-operation and Development (OECD), for example, defines water governance as *a range of political, institutional and administrative rules, practices and processes through which decisions are taken and implemented, stakeholders can articulate their interests and have their concerns considered, and decision-makers are held accountable for water management* (OECD, 2018). Water governance is further regarded as both a process and an outcome, defined by diverse areas of influence, that may be political, institutional and economical in context (Özerol et al., 2018). Other influencing factors may also include public participation (e.g. Jiménez et al., 2020; Wen et al., 2015), performance (e.g. Akhmouch et al., 2018; Nicholson-Sanz, 2020) and laws and policies (e.g. Bruch et al., 2020; Green et al., 2013). For Heinrichs and Rojas (2022), cultural and social values are also key factors in water governance and management decision-making processes. There has also been a growing interest in the water–energy–food nexus (e.g. Albrecht et al., 2018; Simpson & Jewitt, 2019) and inter-sectoral cooperation (e.g. Wen et al., 2015) as examples of factors influencing the definition of water governance. Water governance thus considers culture, functions, attributes and outcomes to achieve one or more desired results shaped by the interest and aspirations of different organisations and individuals (Heinrichs & Rojas, 2022; Jiménez et al., 2020).

1.1 Conceptualising water governance and management

Water governance differs from the more functional exercise of water management, and it is necessary to distinguish between the two as both terms are used in this article (Özerol et al., 2018; Pahl-Wostl, 2009). According to Keping (2018), management involves activities that ensure the effective implementation of measures to monitor and develop resources, while governance considers the interaction among stakeholders through regulatory processes to protect these resources. Good governance considers public management processes and also public interest (Keping, 2018). From the perspective of resource management, Pahl-Wostl et al. (2010) refer to water governance as the activities of a diverse set of stakeholders who formulate policies and ensure their implementation to protect water resources, while water management focuses on the technical aspects involving analyses and the development and monitoring of the formulated policies to ensure that

water resources are in a good state. Keping (2018) adds that good governance involves joint management between stakeholders and policymakers to ensure that resources are well protected. Thus, the management of resources cannot be effective except where there is adaptive and integrated resource governance (Pahl-Wostl, 2009). Considering this, it is conceivable that it takes effective governance systems to enable management practices to deliver desired outcomes for water resources. A considerable body of evidence from across Africa, Asia, Australia, Europe, Latin America and the USA points to water governance failure as a significant challenge to effective water policy design and implementation in management practices (Jiménez et al., 2020; Vieira, 2020). The Republic of Ireland is no exception as the country has experienced various socioeconomic growth and development challenges in the last decades.

In this article, we adopt a historical perspective on water governance in relation to the promulgation of various laws and policies to understand how water resources have been managed over the past seven decades. The enactment of the Water Services Acts, the rural water scheme sector and the present responsibilities of various agencies and institutions in the water sector, such as the national utility, Irish Water, are discussed. Bottom-up strategies such as community engagement, agricultural reforms and regional catchment assessments performed by institutions such as the Local Authority Waters Programme (LAWPRO) are examined. Additionally, the controversial introduction and subsequent removal of drinking water supply charges are also considered, as are the implications of climate change. The overarching aim of this article is twofold: (1) to provide a historical overview of significant occurrences in water governance and management practices in the Republic of Ireland over the last seven decades; (2) to identify the factors that have driven the policy reforms towards a more sustainable water future. A sustainable water future is predicated on the ability of the water sector to withstand climate change impacts, population growth, rise in water demand, water quality and service delivery through effective governance and management practices. Adopting a historical perspective of water governance in the Republic of Ireland also helps in defining the concept as an economic and sociopolitical pathway towards inducing water resource access, equity and quality over time through active stakeholder engagement in the management processes.

The entire article is structured as follows: following the introduction, Section 2 describes the temporary framing and research approach deepening the conceptualisation of water governance and associated management practices. An overview of water resources in the Republic of Ireland is provided in the case study description in Section 2.1. Section 3 explores the history of water governance in Ireland from the 1950s to the present day. Section 4 discusses the factors that have influenced water governance and management practices in the past and may do so in the future. The concluding remarks follow in Section 5.

2. Research approach

In recognition of the need for effective water governance and management practices for a sustainable water future (Antwi et al., 2021), this study traces the history of water

governance reforms to understand how water policy and governance have developed and changed through time. The rounds model policy approach was adopted in categorising the changes in water policies into three rounds (see Teisman, 2000). These rounds are:

- Rural era (1950–2000)
- Integration era (2003–2021)
- Future challenges (2022 onwards)

The rural era considers water governance and management prior to integrating Water Framework Directive (WFD) into Irish laws, with rural Ireland and Group Water Schemes (GWS) in focus. The integration era emphasises post-WFD, covering rural and urban Ireland with outcomes that include water access and equity, supply services, tariffs and legislations. The future challenges look at potential threats and impacts on water resources. Within each of these rounds, supporting policy and management practices are reported and major influencing factors highlighted. For instance, the analysis commences from the early 1950s when pressures on available water resources, awareness of environmental issues and concerns over water demand and quality started receiving attention (Bresnihan et al., 2021; NFGWS, 2019). Notably, the European WFD marked a change from the past (1950–2000) to the present form of water governance and associated management practices (2003–2021).

2.1 Case study description

The Republic of Ireland shares a land border with Northern Ireland (a part of the United Kingdom) and lies between latitude 51°N and 56°N and longitude 5°W and 11°W in western Europe (Mateus & Coonan, 2022). It is surrounded by the Atlantic Ocean, with the Celtic Sea to the south, the Saint George's Channel to the southeast and the Irish Sea to the east. The country has ample water resources, considered an essential natural asset, with an annual mean rainfall of approximately 1,225 mm (Mateus & Coonan, 2022). For the implementation of the WFD, the second River Basin Management Plan (RBMP) defined one national River Basin District (RBD) and two international RBDs (Figure 1). The national RBD covers an area of 70,273 km^2 with 46 catchment management units and 583 sub-catchments. These encompass a total of 4,842 water bodies that comprise 112 coastal water bodies, 196 transitional waters, 812 lakes, 3,192 rivers, 514 underground waters and 16 canals that support agricultural, industrial and recreational needs as well as a healthy ecosystem for aquatic life (DHLGH, 2022).

Although the percentage of groundwater bodies and coastal water bodies with satisfactory ecological water quality in the Republic of Ireland is above the European average (EPA, 2021a), there are categories of water resources at some risk of not meeting the objectives of WFD, which is to ensure that there is a sound ecological status for surface water and groundwater in Europe (Figure 2). An assessment of over 4,000 surface water and 514 groundwater bodies during 2016–2021 shows that 46% of surface water bodies are not ecologically healthy (EPA, 2020b; Trodd et al., 2021).

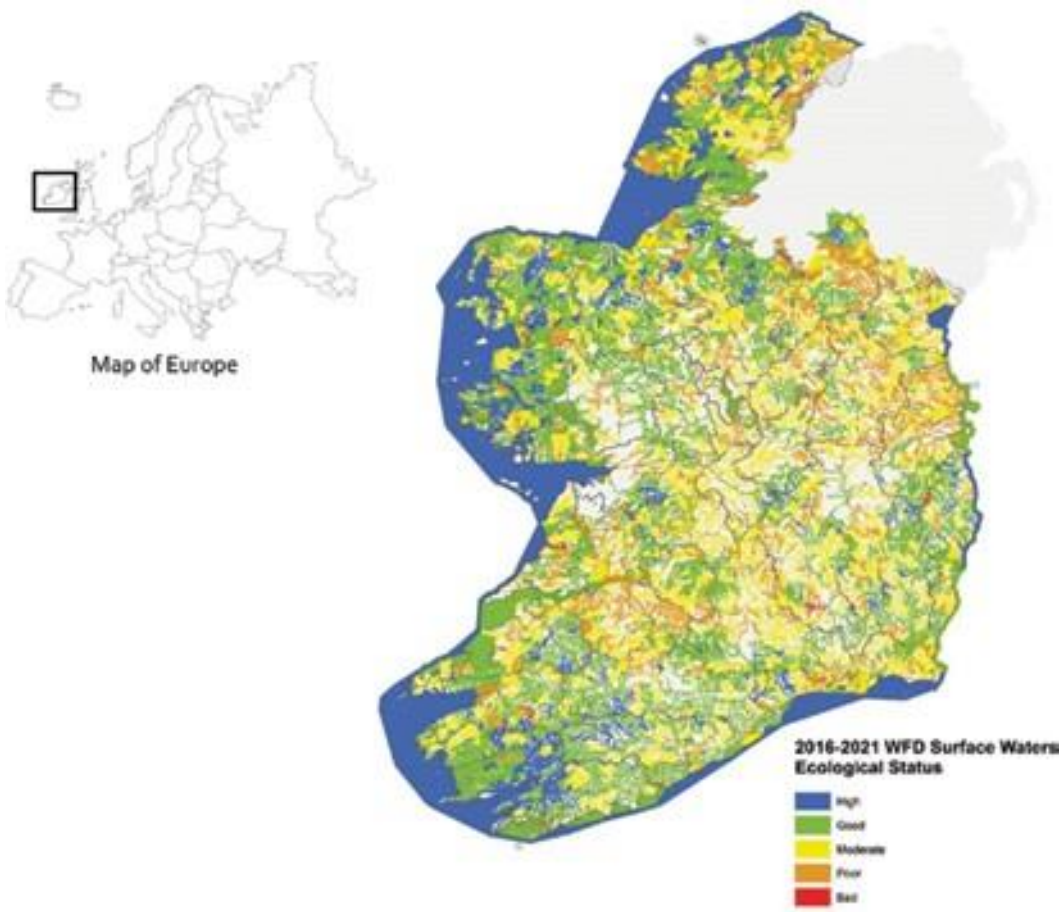

Figure 1. Map of Ireland showing surface water bodies and their ecological status. Source: Trodd et al. (2021).

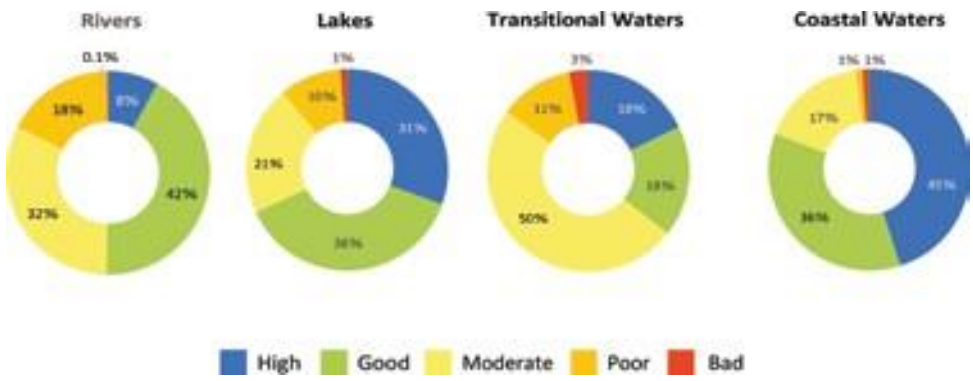

Figure 2. Distribution of risk across categories in the water sectors.
Source: Trodd et al. (2021)

At present, only 50% of rivers, 69% of lakes, 36% of transitional waters and 92% of groundwater bodies exhibit satisfactory (high or good) ecological health. The coastal waters category has the highest percentage of good or better ecological status (81%), followed by rivers (50%), lakes (69%) and transitional and coastal waters (36%), which have the worst water quality (Trodd et al., 2021). Overall, surface water quality has been declining since 2015 (EPA, 2020b). Most of the decline can be attributed to the deterioration in the inflowing river water quality owing to pollution and human disturbances. Agriculture, which is the most prevalent land use (67.6%), is responsible for about 30% of the total pollution of water resources. Other significant stressors and pressures on available resources are changes to the physical habitat conditions (hydromorphology), peat extraction and drainage. There are also industry, urban runoff, domestic and urban wastewater, poor wastewater treatment and farmyard effluents that enter watercourses (Trodd et al., 2021; Trodd & O'Boyle., 2020).

Despite these stressors, water resources in Ireland are very important to the people due to the range of ecosystems and the socioeconomic and cultural benefits they provide. Historically, Irish people followed river paths to build their settlements, with numerous myths and folklore that show great regard for water resources spanning from the Salmon of Knowledge to the holy wells of Ireland (Heritage Council, 1990). Public water service reforms have also contributed to a growing trend of active bottom-up engagement in decision-making about water resources management, water quality and service delivery in the country.

3. The rural era of water governance in the Republic of Ireland

3.1. Group Water Schemes

In the early 1900s most of the Irish population lived in the countryside; however, by the 1950s, living standards had started improving, with electric and water networks established to meet the populace's needs (ESB, n.d.; Ó Gráda & O'Rourke, 2022). This reflects the water-rich nature of the Irish countryside in which farmers were responsible for managing their own water resources and city populations were supplied with free water. Given the intricate connection between access to water and development, this led to fundamental changes in the quality of life of the people, leading to pressures on available water resources, awareness of environmental issues and concerns over water demand and quality (EPA, 2022). The absence of piped water supplies and inadequate sanitation in rural areas would, however, remain until a nationwide polio outbreak in 1957, which claimed 20 lives from about 499 recorded cases and brought the issue of rural water into focus (Bance, 2013). The aftermath of the outbreak was among the key factors that triggered public discourse on water supply. From 1960 to 1971, numerous GWS sprung up across the country connecting over 58% of rural households (ESB, n.d.). The provision of a safe and reliable water supply resulted in major socioeconomic development in rural Ireland, and under the Industrial and Provident Societies Act, the wider community-owned rural

water sector adopted a cooperative mode in 1973. However, without structured state support, financial resources and active supervision, water treatment challenges and inadequate coordination and management practices affected the activities of over 200 schemes that existed by this time, serving approximately 69,000 rural households (Deane & Domhnaill, 2021; NFGWS, 2019). The general intention for forming GWS was to improve water access and equity by ensuring that many households in rural Ireland had clean drinking water. GWS were regarded as private and responsible for monitoring themselves; hence in 1996, GWS serving over 150,000 homes and rural businesses were exempted from abolishing service charges on domestic water supplies operated by local authorities. The National Federation of Group Water Schemes (NFGWS) was formed as a representative organisation for GWS in 1997 in response to the abolition of the charges and to build a sustainable and resilient rural water sector through source protection, conservation and safe drinking water supplies (NFGWS, 2019). The NFGWS influence water policy by appearing before the Joint Parliamentary Committee on Water Services alongside other bodies such as the Environmental Protection Agency (EPA), Irish Water and Department of Housing, Local Government and Heritage (a government department responsible for administering water services at the national level) to address key changes to the European Union (EU)-proposed revisions to the Drinking Water Directive of 2016 (NFGWS, 2019).

3.2. Water policy and legislation from the 1970s to 2003

The advent of GWS and growing access to water, along with water equity issues amidst water and environmental pollution, raised concerns about the need for strict water legislation between the 1950s and 1970s. The Local Government (Water Pollution) Act (1977) is one of the earliest pieces of water legislation on which the first water quality management plan (WQMP) rests, aimed at monitoring local authorities' plans and progress on water quality and services (NDP, 2007). This was introduced in response to water pollution issues and the decline in drinking water quality (EPA, 2022; NDP, 2007). Water quality monitoring was undertaken once every three years following a method based on macroinvertebrates (through the development of a Q-value method) as a quality rating system (EPA, 2022). This system was first developed in 1971 by An Foras Forbartha (re-formed as Environmental Protection Agency in 1993) and implemented across 121 rivers at 765 monitoring stations. The Q-value method provided clear evidence about the health of freshwater ecosystems in the country and declining water quality (EPA, 2022). The first WQMP offered no precise details on the functions to be performed by local authorities until the Quality of Bathing Water Regulations (1988) came into force with detailed guidelines on monitoring bathing water (Hartnett et al., 2011). Under the Environmental Protection Agency Act (1992), local authorities had the power to monitor the water quality of estuaries, oversee discharges of urban wastewater plants and publish biannual discharge reports. Further water-related legislation followed, including the Waste Management Act (1996), aimed at scrutinising the influx of hazardous waste into the environment, including water bodies, and proposed waste collection, disposal and recovery

approaches (NDP, 2007). In 1997, the Fisheries Act (1997) also came into force to enable the checking of licences and to ensure the regulation of water quality, biological activities and the aquaculture industry (NDP, 2007). In the interim, there were also amendments and statutes aimed at monitoring environmental resources, including the Industrial Pollution Control Act (Act 7 of 1992), Environmental Protection Agency Act, 1992 Statutory Instrument No. 79 (1996), Environmental Protection Agency (Licensing) (Amendment) (No. 2) Regulations Statutory Instrument No. 59 of 1995 (1996), Urban Waste Water Treatment Directive (UWWTD), Waste Management (Amendment) Act Statutory Instrument No. 165 of 1998 (2001), Waste Management (Permit) Regulations Statutory Instrument No. 185 (2000), Sewage Sludge Statutory Instrument No. 148 (1998) and Sea Pollution (Amendment) Act (1999) (DHPLG, 2018a; Hartnett et al., 2011).

These acts and amendments demonstrate reactive attempts to protect the environment as a collective good without much emphasis on water governance and management practice as a distinct endeavour. Hartnett et al. (2011) affirm this assertion and further disclose that until 1999, when the EPA undertook a review of WQMP, the 1977 Local Government Water Pollution Act was the only legislation with an improved consideration for water management. The amended Act recommended national WQMP within a framework to facilitate information flow and consider all aspects of the environment as a coherent component of policy and development (EPA, 1999). The Act also recommended that efficient management and monitoring systems be made available. Although the recommendations addressed the significant challenges experienced with WQMP at the time, there was no proposition for an improved governance and management framework or structure. This may have been due to the ready availability of water resources in the Republic of Ireland, the limited awareness of water quality and the rural–urban divide regarding water and sewerage infrastructure and services. These regulations can be regarded as appropriate for the time as they contributed to reducing domestic and industrial pollution, including discharges from wastewater plants. The responsibilities for managing water were divided between the EPA and local authorities. The EPA focused on assessing pressures on water and the aquatic environment through an individual and self-contained programme of actions, while local authorities were tasked with the implementation of legislation.

3.3. The integration era of water governance in the Republic of Ireland

3.3.1. Water Framework Directive from 2003 to 2021 The EU Parliament and Council adopted the WFD on 23 October 2000 under EC Directive 2000/EC, and its implementation took full effect in 2003 (European Union, 2000). The framework aims to achieve good ecological status for surface water and groundwater in Europe (European Union, 2000). The WFD imposes upon EU member states, such as the Republic of Ireland, the obligation to reach good ecological status for its water bodies by 2015 or, at the latest, 2027 (EEA, 2018). The obligation encompasses a multilayered appraisal of the quality of water bodies in terms of their ecological and chemical status and their ability to meet

agricultural, industrial and recreational needs and maintain the overall health of the ecosystems that support aquatic life (EEA, 2018; European Union, 2000). The framework is regarded as a revolutionary policy response to water management challenges because it regulates all water quality concerns and ensures that EU member countries comply with laid down standards and measures to protect water resources (Giakoumis & Voulvoulis, 2018). In December 2003, under the European Communities (Water Policy) Regulation 2003 (S.I 722/2003), the WFD was officially integrated into the laws of the Republic of Ireland as a benchmark for water resource governance and management practices (Hartnett et al., 2011; NDP, 2007). By 2006, the WFD monitoring programme following the European Communities (Water Policy) Regulations, 2003, had taken full effect in the country (EPA, 2021a). Despite criticisms of the WFD regarding its technical language, reliance on compliance-driven approaches, lack of meaningful stakeholder engagement, cost of implementation, and ambitious timelines and targets (see, e.g. Giakoumis & Voulvoulis, 2018), Bresnihan (2016) argues that the WFD has highlighted the ecological features of the water cycle in Europe through an integrated river basin approach. The WFD is also considered to have helped establish many functional water governance structures for member states through which over 110,000 water bodies are presently being managed to reduce pollution and prevent worsening water quality levels in the EU (2019).

3.3.2. River Basin Management Planning A key component of the WFD is for EU states to prepare, revise and update RBMP within three planning cycles (2009, 2016 and 2022). However, Ireland only produced its first RBMP in 2018 after falling behind schedule in monitoring, evaluating and categorising surface water and groundwater on time as expected. The third RBMP (2022) aligns with the WFD time frame of six years per planning cycle (Antwi et al., 2021; DHPLG, 2018a). Under the first RBMP, water resources in the Republic of Ireland were grouped into eight RBDs, of which three were international river basins shared with Northern Ireland (DHPLG, 2018a). Key measures under the plan included licensing urban wastewater discharges and the implementation of the Nitrates Action Programme (Good Agricultural Practice Regulations) Amendment Regulations 2018. Although the measures resulted in progress in terms of compliance levels and reducing the impact of urban wastewater on water quality, there was insufficient progress in developing and implementing supporting measures. Taking the difficulties and failures of the first RBMP into consideration, the second plan defined a single national RBD and two international RBDs, North Western and Neagh Bann, jointly managed with officials in Northern Ireland (DHPLG, 2018a). The second RBMP process effectively involved a broad spectrum of actors in water governance and management under a three-tier governance structure. The Department of Housing, Planning, Community and Local Government was placed at the top of the tier overseeing water policy and implementation. The EPA was positioned in the second tier, holding responsibility for drafting environmental objectives, managing catchment characterisation and producing RMBP templates. LAWPRO, newly formed for the second RBMP, occupied the bottom tier, focusing on encouraging public participation, implementation and legislation enforcement (DHPLG, 2018a).

LAWPRO coordinates public engagement, consultation and participation with communities and stakeholders at the local level across all 31 local authorities, with a team of 43 local authority investigative assessment personnel who carry out scientific assessments of water bodies and drive the implementation of measures at the local level.

LAWPRO also has a community Water Development Fund with a commitment of over €360,000 per annum to support community-led water initiatives. The activities of LAWPRO are focused on close collaboration with communities in promoting water quality and management practices. Through various bottom-up approaches, LAWPRO supports river trusts. Its Blue Dot Catchments Programme and the *catchments.ie* and *watersandcommunities.ie* websites detail stories of the roles being played by community groups in promoting water quality (DHLGH, 2022; DHPLG, 2018a). The national WFD monitoring programme for 2019–2021 also provides a coherent and comprehensive national overview of the quantitative and chemical status of groundwater and the ecological and chemical status of surface waters (EPA, 2021a). The EPA carries out a surveillance monitoring and operational network to provide a comprehensive picture of the physico-chemical parameters of 259 out of 392 groundwater bodies three times a year (EPA, 2021a). There are also over 30 public institutions and bodies, including NGOs (e.g. Sustainable Water Network and Irish Environmental Network) and groups whose work and activities are towards achieving good ecological status as enshrined in the objectives of the WFD. However, the contemporary water governance structure is not without some identified challenges. Recent work by this author suggests that (a) lack of finance to broaden priority areas and ensure implementation of action plans, (b) limited access to data and information, (c) lack of appreciation of the diversity in behavioural and social values attached to water resources, (d) inadequate innovation to improve water management and service delivery and (e) gaps in the coordination and collaboration among various institutions and even within units are key gaps in the existing water governance and management structure (Antwi et al., 2021).

Despite these challenges, trust is building up among actors in the water sector with organisations such as the An Fóram Uisce, the EPA, LAWPRO and the Agricultural Sustainability Support and Advisory Programme (ASSAP) working to improve water quality, promote integrated catchment management and undertake community engagement and awareness-raising (Antwi et al., 2021). Aside from the WFD, other European and international legislation and agreements are relevant for the Republic of Ireland. Indeed, the Aarhus Convention, the UWWTD, the Drinking Water Directive and the EU 7th Environmental Action Programme serve as legal guidelines in the management and governance of water resources, while the Sustainable Development Goals serve as overriding long-term objectives. The growing emphasis on catchment management, stakeholder engagement and multidisciplinary approaches to solving the challenges in the water sector is linked to the IWRM principles of efficiency, ecological integrity and equity (Daly et al., 2016). The Planning and Development Act (2000), the Water Service Act (2013), the Water Services Act No. 29 of 2017 (2017), the Water Services Act (2018–2025) (2018) and the Water Conservation Regulations Statutory Instrument No. 527 (2008) are also examples of national legislative provisions pertaining to water governance and management (DHPLG,

2018b). While the plethora of policy and legal provisions since 2003 have clarified the overall ambitions of water governance as a route to sound ecological status for water bodies and the sustained provision of services, it has not simplified water management on the ground in the Republic of Ireland.

4. Major factors influencing water governance and management in the Republic of Ireland

4.1. Water charges, access and equity issues

Charges for drinking water supply have had a significantly divisive effect across the populace since their initial introduction in 1977 (Quinn et al., 2016). Prior to that, Irish local authorities financed water services, among others, through charges (referred to as rates) paid according to home value. Rural dwellers were also supported with grants to improve the quality of the water supply, with the locals paying flat rates to offset the cost of maintenance for wells and underwater schemes (Clinch & Pender, 2019). However, the entire approach to water services and charges for both rural and urban dwellers changed in 1977 when the Fianna Fáil party came to power with the plan to substitute these rates and charges with government support through indirect taxes and grants. This policy was reversed in 1982 under a Fine Gael-Labour Party coalition (Quinn et al., 2016). Commentary on Fianna Fáil's electoral losses included the inability of the government to recoup its investment in water services, which affected other sectors of the economy (Caroll, 2014).

Nonetheless, the re-introduction of flat-rate water charges by the Fine Gael party was viewed as double taxation by many consumers who failed to pay the charges (Clinch & Pender, 2019). In the run-up to the 1997 national elections, amidst public outcry, a decision was made to abolish charges under the Local Government Financial Provision Act 1997 (Clinch & Pender, 2019). The issue of charging for water had a major influence in the 1997, 2011 and 2016 elections, with over half of Teachta Dala (TDs, elected members of the lower house of the Oireachtas) elected to the Dail (the lower house of the Irish Parliament) in the 2016 elections being critics of water charges (McGee, 2012). For instance, the People Before Profit Alliance won two seats in the 2011 elections because of their staunch criticism of water charges (Caroll, 2014; Hearne, 2015; McGee, 2012). The abolition of domestic charges in 1997 was in effect until 2013 when direct charges for water services were re-introduced under the Water Services Act (2) (Caroll, 2014; Oireachtas, 2013). A timeline of the significant events and activities leading to the decision to end direct charges on domestic water consumption and progress made to date are presented in Table 1.

Before the first re-introduction of water charges in 1982, the government was the sole financier of water services. The Water Services Act (2013) recommended the imposition of water charges, the transfer of powers held by local authorities on water charges, as previously mandated under the Local Government Act 1995, and the revision of the Water Services Act 2007 to ease the financial burden on government (Oireachtas, 2013). Further reforms under Water Services Act (2013) and amendments under Act (2014) brought about

a reduction in water charges and a cap on water bills. The cap charges, however, culminated into citizens anger which led to the *Right2Water* campaign group in 2014 (Clinch & Pender, 2019; Quinn et al., 2016). The group comprised political parties such as Sinn Fein, the Workers Party and the Anti-Austerity Alliance, People Before Profit, as well as

Table 1
Timeline of significant events related to water charges in the Republic of Ireland

Year	Significant events related to water charges
1977	• Fianna Fáil government in power replaced direct charges with indirect taxes and grants.
1982	• Fine Gael-Labour Party coalition reversed indirect taxes and grants in the form of direct charges.
2010	• The conceptualisation of Irish Water and the introduction of water charges are required as part of the Troika Memorandum with Ireland for financial assistance.
2011	• The process to set up Irish Water as a state water utility commenced.
2012	• Bord Gais Éireann awarded Irish Water the contract to roll out water charges and meter installations from 2014.
2013	• Direct charges were re-introduced under Water Services Act 2013. • Irish Water established and accorded a semi-state company status under the Water Services Act 2013. • Irish Water mandate to charge for water rushed through the Dail in four hours.
2014	• Irish Water spends €85 million of its €180 million set-up fund on consultancy services while protests on water meter installations occur across major cities. • Water charges are capped at €278 for a family of four, as announced by Commission for Energy Regulations. • In October, 35,000 signed 'Right2Water' online petition. In Cork city, anti-water charge protestors occupied Cork City Council offices. Over 100,000 protestors attended the 'Right2Water' organised protest in Dublin. • By the end of October, two-thirds of households (circa 1 million) failed to register with Irish Water as required to implement the water charges. • In November, demonstrations swept across Ireland; approximately 150,000 took to the streets to protest against water charges and the overall economic situation in the country.
2015	• In January, 760,500 households (approximately 50%) registered to pay water charges out of a potential 1.5 million households. • In February, 36 candidates who supported the 'Right2Water' campaign won elections. • Over 650,000 (43%) households failed to register to pay water charges, resulting in a deadline extension to June 2015. • Over 50,000 people demonstrated in Dublin over water charges in September. • Public Water Forum is constituted as an independent consumer consultative body in developing and directly feeding into the activities of Irish Water and the interest of water consumers in relationship with the Commission for Regulation of Utilities.
2016	• 61% of households paid their bills at the end of the third water charge cycle in March, although this was less than the 2015 expectation of 80% of households from Irish Water. • In April, Minister for Health Leo Varadkar publicly stated that suspension of water charges was not in the public interest in reaction to allegations that Irish Water cancelled water bills as the 2016 election drew closer. • Fianna Fáil and Fine Gael parties agreed on a new government based on the common ground of suspending water charges in May. • The suspension of water charges in May led to a 50% revenue downturn for Irish Water in July. • In November, an expert commission on Domestic Public Water Services recommended general taxation to fund water services in Ireland.

Year	Significant events related to water charges
2017	• An estimated 20,000 people took to the streets in protest in April. A final rescindment of water charges by the lower house of the Irish Parliament came to bear with a 96 to 48 vote margin. • A refund of water charges was announced in July, leading to the issuing of 180,000 cheques issued to customers who had made payments earlier.
2018	• Plans to open charges on 'excess water usage' with effect from January 2019 announced by Irish Water in February. • In June, An Fóram Uisce (the National Water Forum) was instituted as a statutory body to promote public engagement and debate on water quality, water charges and issues affecting Irish Water customers in addition to the implementation of WFD and other roles, including the number of representatives on the forum that are consumers.
2019	• In December, the Commission for Regulations of Utilities released a report on the Irish Water plan for water charges on 'excess water usage' for January–April 2020.
2021	• Charges for excessive water usage (€1.85 per cubic meter/1,000 litres) and wastewater (€250 per year) above allowed thresholds for domestic and non-domestic customers approved by the Commission for Regulations of Utilities and announced in October by Irish Water.

unionists, community groups and other activists with a key demand to eliminate all water charges and recognise water as a human right (Clinch & Pender, 2019; Hearne, 2015). At the peak of such demands for water charges to be eliminated, the Irish economy was still grappling with the aftermath of the 2008-2009 economic recession with a series of austerity measures and fiscal consolidation programmes to reform and recapitalise the banking sector, and the entire economy in full force (Dunphy, 2017; Hearne et al., 2018). Part of the economic bailout conditions agreed upon with the *Troika*[1] was the need to introduce water charges and establish a utility company to take control of water services from the local authorities (Lenihan, 2009; Quinn et al., 2016). However, continuous protests by the *Right2Water* group and public outcry frustrated such plans, with water charges fully suspended until further review by a joint committee of the house of Oireachtas (The National Parliament). Prior to this suspension of water charges, an estimated 50% of households with installed water meters had started paying bills; and Irish Water reported it had saved over 3 billion litres of water within the first six months of meter installations in addition to the repair of over 50,000 leakages (Joh, 2015; Quinn et al., 2016). Investment in water services also increased, with about €166 million spent on water alone between 2014 and 2015 (Ervia 2015). Despite such progress, ineffective revenue collection, lack of accountability, metering installation challenges, billing disparities, and boil water notices were bottlenecks that influenced the final recommendation made by the Joint Committee of the house of Oireachtas to discontinue water charges under the Water Services Act 2014 (Quinn et al., 2016).

The Oireachtas further recommended a reversal to general taxation to cater for water expenses and further transparency on the exact amount from taxes that goes into funding water services in compliance with WFD standards (Oireachtas, 2017). After revoking the

[1] Troika is a colloquial term referring to the International Monetary Fund (IMF), European Union (EU) and European Central Bank (ECB).

water charges, the Republic of Ireland became the only EU member state where water charges for domestic consumption were not in place, except for GWS and households that use more water than the specified threshold as covered under Water Services Act 2007–2017 (Irish Water, 2021a). The issue of water charges has significantly influenced the governance and management of water resources.

4.2. The formation of Irish Water

The motivation for a single national entity to manage all water-related issues in the Republic of Ireland was borne out of the financial crisis, which forced the Irish government to seek a bailout from the Troika. Fiscal discipline and structural reforms were conditions included in the bailout package. The Irish government was mandated to cut its annual spending by €10 billion and increase yearly taxes by €5 billion to help reconfigure its financial balances (Bresnihan, 2016; Laffan, 2017). Despite being under financial surveillance from the EU, Ireland secured a 'carve-out' exemption under WFD Article 9(1). This article indicates that member states are to 'take account of the principle of recovery of water services which comprises environmental and resources cost with regards to economic analysis carried out according to Annex III following polluters pay principles' (European Union, 2000). Previous governments had held on to this article as a reason for not implementing water charges (Bresnihan, 2016); however, there were other EU-backed reform measures that Ireland could not overlook. Such measures included introducing new policy options, nationwide water metering and developing RBMP and future-proof governance strategies. Prior to the establishment of Irish Water, clear definitions of roles and responsibilities, which are fundamental in water management, were inadequate. The water sector's operational system permitted interference and was fraught with undefined obligations, unsatisfactory quality standards and constrained fiscal resources. Also, poor water service delivery and lack of return on investments were contributing reasons to the demands by the Troika for reformation in the water sector to improve the financial well-being of the country (PwC, 2011).

Price Waterhouse Coopers (PwC), the professional services firm offering a range of services across tax, advisory and audit, was hired to advise on the best model for managing the water sector in Ireland. They published their report in 2011, recommending the establishment of Irish Water as a self-financing water utility company, similar to practices in South Africa, Scotland, the Netherlands, Germany and France (Bresnihan, 2016). Irish Water took over the responsibility for managing water services from 34 local authorities as a single public utility company. On 27 July 2013, Irish Water was formally established under the Water Services Act 2013 as a semi-state-owned utility subject to the planning, regulation and financial scrutiny within Irish laws and that of European legislation (Irish Water, 2018). Upon its creation, Irish Water was attached to Ervia- another state-owned multi-utility that delivers gas and fibre services to learn from its financial robustness and experiences in management and services delivery (Ervia, 2015). It is anticipated that Irish

Water will achieve full autonomy from both Ervia and the central government, and attain the status of a fully-fledged national utility company by 2023. This transition is expected to result in cost savings of approximately €70 million per year (Bardon, 2018).

Currently, Irish Water manages 790 water treatment plants across 1,173 abstraction points made up of 70% of groundwater and 30% of surface water, serving about 83% of the population through public water supply schemes. The utility further manages over 88,000 km of water and wastewater pipes, about 7,000 individual assets and supplies over 1.7 billion litres of water daily (Gallen & O'Donoghue, 2018; Irish Water, 2021b). Nevertheless, the utility's average age of water infrastructure is also about 65–85 years, which is above the EU average of 36 years, with over 43% of treated drinking water lost through leakages (Irish Water, 2020). Although much is still to be done, the formation of Irish Water and its current role in water services have shaped water governance and management practices by improving transparency in operations, adherence to quality standards and resolving water supply fragmentation among local authorities. The utility is also considering the introduction of water charges (Irish Water, 2021a). Although attempts to introduce water charges are still complex and sensitive because of its sociopolitical ramifications, different surveys have shown consumers' willingness to pay water charges (Collins, 2015; Dwyer, 2019). Such evidence, together with effective and efficient public engagement and the political will to implement charges, may lead to the introduction of domestic water charges in the future by Irish Water (2021a). Also, mechanisms to encourage and facilitate domestic water conservation measures that focus on technology, water efficiency labelling, water conservation incentives, education and awareness campaigns remain to be explored fully. Additionally, the high inflation rate due to the ongoing war in Ukraine and the slow COVID-19 pandemic recovery will affect the political will to introduce water charges as the general cost of living keeps rising.

4.3. Agricultural activities

The historical and economic importance of agriculture in relation to other industries is associated with this sector being the largest contributor to declining water quality over time (DHPLG, 2018a) (Figure 3). About 4.93 million of the total 7.04 million hectares of land in the Republic of Ireland is used for agriculture, with the sector currently employing about 163,600 people, with over 137,500 farms that produce more than €8.2 billion in output (CSO, 2021b; DAFM, 2021). According to the Department of Agriculture, Food and the Marine, in 2020, the Republic of Ireland's food and agrifood products were exported to over 180 markets worldwide and were valued at €14.2 billion, a 60% increase from €8.9 billion in 2010 due to increase in the dairy sector (DAFM, 2021). Recent water quality reports show that almost half of river bodies (43%) in the Republic of Ireland, a quarter of groundwater (24%) and one-fifth of estuarine and coastal water bodies (22.2%) have excessive nitrogen levels coming from intense agricultural activities (Trodd et al., 2021). Nearly half of the lakes (33%) and river sites (30%) also have unsatisfactory nitrate and phosphorus concentrations from agricultural activities, mainly in the northeast and

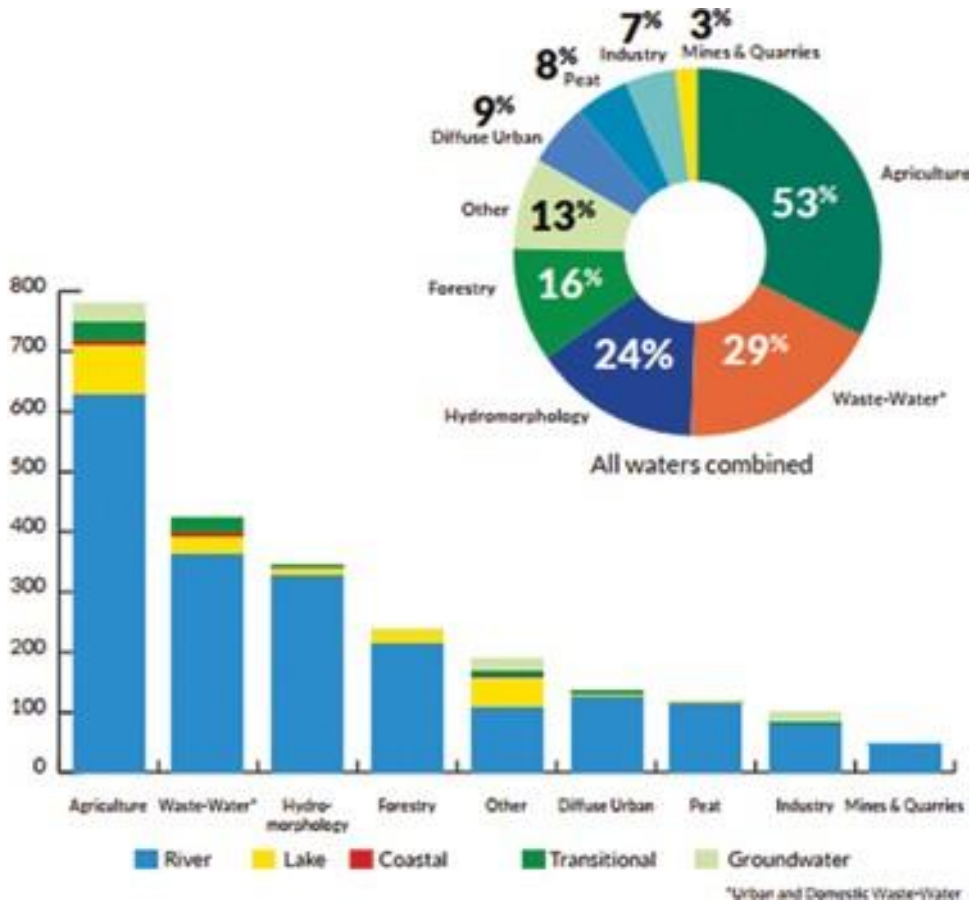

Figure 3. Significant pressures on Ireland's aquatic environment.
Source: DHPLG (2018a)

southeast of the country (Trodd et al., 2021). Previous studies from 2013 to 2019 revealed that about 34% of river sites and 54% of lakes had unsatisfactory phosphate concentrations, while over a fifth (22%) of groundwater sites had high (>25 mg/l NO_3) nitrate concentrations, with three sites exceeding the drinking water standard (50 mg/l NO_3) (Trodd & O'Boyle 2020). Total dissolved inorganic nitrogen (DIN) concentrations within the same period were found to be unsatisfactorily high in 22% of estuarine and coastal water bodies (Trodd & O'Boyle 2020).

While drinking water quality in public water supplies is relatively high following treatment, the continuous presence of nutrients and issues with pesticide and microbial contamination in some supplies remain. This counteracts efforts to improve water quality and the overall attainment of the required WFD standards, thereby necessitating further policy changes and actions in the country towards protecting water bodies (EPA, 2020a). As a result, there is a consideration for a new ten-year strategy to address the adverse

effects that agriculture poses on water quality and biodiversity (EPA, 2020b). There is also consideration under the national climate action plan to reduce emissions between 22% and 30% by 2030 through the intensification of organic farming and improvement in carbon footprint and the genetics of herds (DECC, 2021). The Agriculture and Food Development Authority (Teagasc) Climate Action Strategy (2022–2030) also aims to accelerate the adoption of new technologies and production systems for farmers to increase profitability and reduce greenhouse gas emissions from the agricultural sector in 2030 by 25% (Teagasc, 2022). An ASSAP has also been instituted with 30 farm sustainability advisers who work with farmers to identify problems and implement appropriate measures to avert agricultural pollution (ASSAP, 2019). As a system of subsidies and support programmes for agriculture, the EU Common Agricultural Policy (CAP) has been undergoing reforms to set new requirements for farmers to encourage responsible pesticide usage and probable non-chemical weed control methods in farming (EPA, 2020b). The Republic of Ireland has also signed up for the EU Biodiversity Strategy for 2030, which aims to protect and restore ecosystems through organic farming, reduce pesticide usage by 50% and plant three billion trees by 2030. The strategy also includes halting the decline in pollinators and aligning with the developments in CAP (EPA, 2020b). The Nitrates Directive (91/676/EEC) also focuses on protecting water quality by reducing pollution from agricultural sources. This Directive forms part of efforts by the Republic of Ireland towards improving water quality, with the entire country regarded as a vulnerable nitrate zone (EPA, 2020b). In order to implement this Directive and other environmental policies, a series of Good Agricultural Practice for Protection of Waters Regulations have been implemented since 2008 (e.g. Statutory Instrument No. 605 of 2017). These include the inspection of farms and the imposition of penalties for non-compliance with phosphorus and nitrate. Although the enforcement of these regulations has not been effective, the significant impact of the agricultural sector on water quality has been receiving further attention under the National Biodiversity Action Plan 2017–2021, which seeks, among other goals, to promote best agricultural practices to the benefit of the environment (DECC, 2021). More so, not all farmers are polluting their waters and while work is still required to tackle non-compliance on phosphorus and nitrate, it is expected that under the European Green Deal, a range of actions to tackle climate, biodiversity, water resources and natural heritage and environmental emissions challenges will be prescribed to compel farmers to take actions that can turn the challenges into opportunities.

4.4. Future challenges

4.4.1. The effect of climate change Climate change is altering weather patterns with severe implications for food production, water availability and biodiversity globally, and the Republic of Ireland is no exception. Prior studies have suggested that the crux of climate change in the Republic of Ireland will be observed through water resources availability and quality, with extreme meteorological and agricultural drought and increased variability in the freshwater ecosystem being some of the direct effects of climate change

on water resources (DHPLG, 2019; García et al., 2021; IPCC, 2021; O'Driscoll et al., 2018). Projections of temperature and rainfall by Met Éireann (the national weather agency for the Republic of Ireland) suggest that the Republic of Ireland will witness an increase of between 1°C and 2.4°C in mean annual temperatures by mid-century with the largest increases in the east of the country (EPA, 2020b). There will also be about a 20% decrease in summer rainfall by 2050 and 35% increase in dry periods, and 25–44 cm sea level rise by 2080 (DCHG, 2019). Other climatological features such as precipitation, wind, variability in river flows, groundwater recharge, wetland inundation, aquatic habitats and biodiversity are also projected to change (DCHG, 2019; Mateus & Coonan, 2022). These impacts, mainly around the midlands regions and the east and southeast of the country where the largest of the population lives and where the best agricultural lands are, will consequently lead to competing demands for water resources for domestic usage and agricultural and industrial purposes (DECC, 2021; Mateus & Coonan, 2022). A rise in sea water levels will also have a severe environmental and socioeconomic impact on the population located along the coastal lines of major cities such as Cork, Waterford and Galway.

Nonetheless, the aftermath of many discussions on climate change has not yet manifested in intended implementation or mitigation programmes. Until the Climate Change Sectoral Adaptation Plan of the Water Quality and Water Services Infrastructure was published in 2019, no policy document had fully conceptualised climate change and water resources as a specific sector. Climate change and water resources were discussed sporadically as subsets of other plans and actions (see, e.g. DCCAE, 2018; DECC, 2021; DHPLG, 2018b; Irish Water, 2021b). The Adaptation Plan currently outlines adaptive measures to build resilience in response to climate change impacts on water resources and related socioeconomic effects (DHPLG, 2019). Procedural guidance on assessments required by WFD on how plans and programmes may be integrated into Strategic Environmental Assessment is also under consideration through Strategic Environmental Assessment Guidelines for Regional Assemblies and Planning Authorities. The National Climate Change Risk Assessment has also adopted a tiered assessment approach to capture the range of climate-driven risks on water resources (DHPLG, 2019). Since 2019, climate action is being strengthened through a new governance structure and Climate Action and Low Carbon Development (Amendment) Act 2021, which aims at supporting climate neutrality by 2050 and a 51% reduction in emissions by 2030 (DECC, 2021). Indeed, the anticipated impact of climate change on water resources is a driving force in policy and water governance reform, as evident in the new National Water Resources Plan by Irish Water, the Biodiversity Climate Change Sectoral Adaptation Plan and Climate Action Plan and efforts to conserve water during periods such as drought (Antwi et al., 2022; DCHG, 2019; DECC, 2021; Irish Water, 2020). The efficacy of such efforts in achieving real change in water management practices and building resilience in the water sector in the Republic of Ireland remain to be seen in the coming years.

4.4.2. Demographic and land use changes as emerging threats The Republic of Ireland currently joins Sweden, Malta, Denmark, Luxembourg and Cyprus as an EU country set to experience higher population growth by 2070 (European Union, 2020). The Irish population has grown from 4.9 million in 2019 to 5 million in 2021—the highest growth rate since 1851. By 2051, the population is projected to reach over 6.5 million (CSO, 2020). The majority of the population (84%) receive their drinking water from Irish Water, the remaining from private wells and small private supplies or various GWS (Cotterill & Melville-Shreeve, 2021). The high population growth amidst rising average domestic water consumption, water supply leakages and ageing water infrastructures has impacted efficient water supply and delivery. At the end of 2020, over 1 million people were dependent upon 46 vulnerable water supplies, while approximately 15,500 consumers were on boil water notices for over a month within the same year (EPA, 2021b).

Largely across catchments in midlands and the west part of Ireland, García et al. (2021) reveal that land use changes have significantly affected water quality and the biological status of lakes and other water bodies. The challenges that land use and demographic changes pose to the water sector, coupled with intense agricultural activities and climate change threats on water quantity and reliability, have triggered recommendations for water conservation to be included in various water policy principles. Indeed, this led An Fóram Uisce to launch a framework to improve domestic water conservation, discourage wastage and improve conservation amidst climate uncertainty, especially as witnessed in the hydrological and meteorological droughts of 2018 and 2020, which resulted in limited rainfall, higher temperatures, rise in water demand and a water conservation order to conserve water and control water usage (Antwi et al., 2022; Cotterill & Melville-Shreeve, 2021). Infrastructural development, rural water programmes and leakage reduction programmes have also received massive investments to augment supply, while management reforms to address the pressures that water demand poses to supply are also occurring (DHPLG, 2018a). Water table management is also required as part of optimal land use strategy for the future due to sequestration on agricultural land, afforestation levels and emissions from drained peat grasslands (Teagasc, 2022).

Demographic growth also has an impact on land use planning, for example, increasing housing development and driving policy reforms both now and into the future. Hence, an alignment and integration of planning systems for effective and efficient water management and increased compatibility between planned growth and environmental sustainability will require keen consideration to ensure that development planning does not cause deterioration of water quality. Public consultation for the third RBMP has recognised such needs and is drafting planning guidelines that will provide planning authorities with tools to determine development plans and their impact on water bodies (DHLGH, 2022). This is set to ensure that there are best practices for sustainable water quality management for all development and that relevant development plans are consistent with the RBMP and the requirements of the WFD to avert deterioration in surface water and groundwater status.

5. Concluding remarks

A 70-year history of the rich availability of water in the Republic of Ireland contrasts with the future challenges to supply occasioned by climate change impacts and anticipated long-term shifts in demographic characteristics. A review of the historical context of water governance highlights how central government funding and reliance on prescriptive regulations to control pollution were the basis of Ireland's environmental and water policies in the 1970s (Table 2). The various regulations mandated local authorities to act but offered no specific guidance on how WQMPs were to be carried out. However, these regulations were appropriate for the time and contributed to a reduction in domestic and industrial pollution, including discharges from wastewater plants. In 1997, the NFGWS was formed as an umbrella body for all GWS to build a sustainable and resilient rural water sector through source protection, conservation and safe drinking water supplies (NFGWS, 2019). GWS are responsible for supplying water to about 6% of the Irish population. The controversy of water charges, from 1977 onwards, has been a significant factor in policy reforms and management strategies regarding water, with ongoing efforts to realign focus on implementing water charges and ensuring equitable access to water for all now led by Irish Water.

This article further highlights that the adoption of the WFD and related statutory laws and regulations has brought a remarkable shift in water governance and management practice in the Republic of Ireland since 2003 by introducing a comprehensive framework

Table 2
Water policy and governance evolution

Rounds	Policy context	Institutions and management practices	Major influencing factors
Rural era (1950–2003)	GWS WQMP	NFGWS formed as an umbrella body for GWS for rural Ireland Local authorities with primary responsibility for the provision of urban public water and wastewater services through coordination with EPA	• Water charges, access and equity • Pollution and declining water quality
Integration era (2003–2021)	WFD and numerous supportive water sector policies such as the Aarhus Convention, the Nitrate Directive, the Water Conservation Regulations	Catchment-centred approach under RBMP Irish Water as state utility mandated with water and wastewater services operations Catchment assessment roles by the Local Water Authorities Programme Stakeholder engagement by Water Forum	• Intense agricultural activities and reforms
Future challenges (2022–)	WFD, Climate Action Plans and increased integration of IWRM	Irish Water in charge of water and wastewater services. Strong alignment with the principles of IWRM, applied at river basin scale	• Climate change effect such as drought • Demographic changes and land use changes

for drinking water source protection using a catchment-centred approach. The shift is intensifying presently because of the continuous decline in water quality from intense agricultural activities and demographic changes coupled with land use planning as a latent enabler (Table 2). The implementation of the RBMPs, the CAP, the Nitrates Directive (91/676/EEC), Climate Action Plan and the Biodiversity Action Plan 2017–2021 aims to improve water quality through a reduction in various pollutants.

The various reforms in water governance and management practices show attempts towards meeting the objectives of various environmental sustainability initiatives to maximise the socioeconomic benefits of water resources in Ireland. The Central Statistical Office affirms this observation and further reveals that the degree of integrated management in various water policies in the Republic of Ireland stood at 81% in 2020, with most management instruments and decision-making tools relying on IWRM principles of efficiency, ecological integrity and equity (CSO, 2021a). The alignment towards IWRM is helping the transformation from the old top-down water management approaches to an evolving and coherent strategy that embraces stakeholders' participation in water management. The Republic of Ireland has also declared the entire national territory a vulnerable nitrate zone under the Nitrates Directive (2000/60/EC). The Nitrate Directive is a key instrument under the WFD to protect water resources against pollution from agricultural practices. Institutions such as LAWPRO have also been carrying out public engagement sessions on a phased basis to promote the implementation of mitigation measures aimed at improving water quality, including CAP. Nonetheless, CAP as a policy alone is insufficient to prevent the growing pressures from agricultural activities. A holistic approach that involves the establishment of effective and accountable initiatives that will deliver not only environmental targets but also on-farm efficiencies and market access through collaborative engagement across the agricultural sector with respect to source protection and climate change adaptation plans is also indispensable (DECC, 2021; EPA, 2020b).

In drawing the threads together from the rural to the integrated era, including the future challenges (Table 2), the complexity of factors driving water governance and management practice in the Republic of Ireland becomes evident. Improved efforts are required from all actors in the water sector to build resilience and accelerate actions towards achieving good ecological status for all water resources in the Republic of Ireland. To achieve this, improved information flow among various institutions in the water sector, funding availability and water policy coherence are needed to enhance data sharing, promote trust, and increase efficiency and the timely implementation of various action plans (Antwi et al., 2021).

Overall, the historical insights from this article contribute to a deeper understanding of water governance and management in the Republic of Ireland and provide a context for future policy formulation and implementation. Looking into the future, it is evident that the impact of climate change will constrain available water resources for domestic and agricultural use. Demographic and land use changes and planning would also severely impact water resource usage and distribution while demand increases due to population

growth. More so, policy reform and implementation challenges and their effect on policy interventions such as water conservation measures, water quality and service delivery and charges could strain public support for effective water governance and management practices.

Given the multifaceted and interdependent relationship between water, climate change, agriculture, biodiversity and the perceptions and values the public place on water resources, future policy formulation and implementation should be cross-sectoral in nature. The policy formulation and implementation processes should strive for a balance between socioeconomic and environmental factors that impact water resources and active public engagement to improve water quality, availability and service delivery. This should include community representatives, business interests; local authorities; property owners; farmers; and young people as stakeholders in water governance with the idea of increasing equity of access to water and improvement in water quality. This should ensure that most stakeholders will have a voice in decision-making on water-related policies and will help towards developing a sustainable and equitable water future. Effective agricultural reforms and pursuance to reduce the sector's impact on water resources will be required to improve water quality and reduce emissions. Water governance and management practices also need to be calibrated continuously to the IWRM approach to improve catchment engagements, public awareness on water management and meet present and future water needs.

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