

Towards Integrated Water Management (TIme)

Authors: Alec Rolston, Eleanor Jennings and Suzanne Linnane



ENVIRONMENTAL PROTECTION AGENCY

The Environmental Protection Agency (EPA) is responsible for protecting and improving the environment as a valuable asset for the people of Ireland. We are committed to protecting people and the environment from the harmful effects of radiation and pollution.

The work of the EPA can be divided into three main areas:

Regulation: *We implement effective regulation and environmental compliance systems to deliver good environmental outcomes and target those who don't comply.*

Knowledge: *We provide high quality, targeted and timely environmental data, information and assessment to inform decision making at all levels.*

Advocacy: *We work with others to advocate for a clean, productive and well protected environment and for sustainable environmental behaviour.*

Our Responsibilities

Licensing

We regulate the following activities so that they do not endanger human health or harm the environment:

- waste facilities (*e.g. landfills, incinerators, waste transfer stations*);
- large scale industrial activities (*e.g. pharmaceutical, cement manufacturing, power plants*);
- intensive agriculture (*e.g. pigs, poultry*);
- the contained use and controlled release of Genetically Modified Organisms (*GMOs*);
- sources of ionising radiation (*e.g. x-ray and radiotherapy equipment, industrial sources*);
- large petrol storage facilities;
- waste water discharges;
- dumping at sea activities.

National Environmental Enforcement

- Conducting an annual programme of audits and inspections of EPA licensed facilities.
- Overseeing local authorities' environmental protection responsibilities.
- Supervising the supply of drinking water by public water suppliers.
- Working with local authorities and other agencies to tackle environmental crime by co-ordinating a national enforcement network, targeting offenders and overseeing remediation.
- Enforcing Regulations such as Waste Electrical and Electronic Equipment (WEEE), Restriction of Hazardous Substances (RoHS) and substances that deplete the ozone layer.
- Prosecuting those who flout environmental law and damage the environment.

Water Management

- Monitoring and reporting on the quality of rivers, lakes, transitional and coastal waters of Ireland and groundwaters; measuring water levels and river flows.
- National coordination and oversight of the Water Framework Directive.
- Monitoring and reporting on Bathing Water Quality.

Monitoring, Analysing and Reporting on the Environment

- Monitoring air quality and implementing the EU Clean Air for Europe (CAFÉ) Directive.
- Independent reporting to inform decision making by national and local government (*e.g. periodic reporting on the State of Ireland's Environment and Indicator Reports*).

Regulating Ireland's Greenhouse Gas Emissions

- Preparing Ireland's greenhouse gas inventories and projections.
- Implementing the Emissions Trading Directive, for over 100 of the largest producers of carbon dioxide in Ireland.

Environmental Research and Development

- Funding environmental research to identify pressures, inform policy and provide solutions in the areas of climate, water and sustainability.

Strategic Environmental Assessment

- Assessing the impact of proposed plans and programmes on the Irish environment (*e.g. major development plans*).

Radiological Protection

- Monitoring radiation levels, assessing exposure of people in Ireland to ionising radiation.
- Assisting in developing national plans for emergencies arising from nuclear accidents.
- Monitoring developments abroad relating to nuclear installations and radiological safety.
- Providing, or overseeing the provision of, specialist radiation protection services.

Guidance, Accessible Information and Education

- Providing advice and guidance to industry and the public on environmental and radiological protection topics.
- Providing timely and easily accessible environmental information to encourage public participation in environmental decision-making (*e.g. My Local Environment, Radon Maps*).
- Advising Government on matters relating to radiological safety and emergency response.
- Developing a National Hazardous Waste Management Plan to prevent and manage hazardous waste.

Awareness Raising and Behavioural Change

- Generating greater environmental awareness and influencing positive behavioural change by supporting businesses, communities and householders to become more resource efficient.
- Promoting radon testing in homes and workplaces and encouraging remediation where necessary.

Management and structure of the EPA

The EPA is managed by a full time Board, consisting of a Director General and five Directors. The work is carried out across five Offices:

- Office of Environmental Sustainability
- Office of Environmental Enforcement
- Office of Evidence and Assessment
- Office of Radiological Protection
- Office of Communications and Corporate Services

The EPA is assisted by an Advisory Committee of twelve members who meet regularly to discuss issues of concern and provide advice to the Board.

EPA Research Programme 2014–2020

Towards Integrated Water Management (TIme)

Synthesis Report

2014-W-DS-20

EPA Research Report

End of project report available for download on <http://erc.epa.ie/safer/reports>

Prepared for the Environmental Protection Agency

by

The Centre for Freshwater and Environmental Studies,
Dundalk Institute of Technology

Authors:

Alec Rolston, Eleanor Jennings and Suzanne Linnane

ENVIRONMENTAL PROTECTION AGENCY

An Ghníomhaireacht um Chaomhnú Comhshaoil
PO Box 3000, Johnstown Castle, Co. Wexford, Ireland

Telephone: +353 53 916 0600 Fax: +353 53 916 0699

Email: info@epa.ie Website: www.epa.ie

ACKNOWLEDGEMENTS

This report is published as part of the EPA Research Programme 2014–2020. The programme is financed by the Irish Government and administered by the Environmental Protection Agency, which has the statutory function of co-ordinating and promoting environmental research.

The authors would like to thank the EPA for its financial support. The authors acknowledge the valuable contribution of the project steering committee, comprising Professor Ken Irvine (UNESCO-IHE), Dr Martin McGarrigle (Consultant), Dr Serena Keane (Irish Water), Dr Dorothy Stewart (EPA), Dr Marie Archbold (EPA) and Mr Paddy Morris (EPA).

DISCLAIMER

Although every effort has been made to ensure the accuracy of the material contained in this publication, complete accuracy cannot be guaranteed. Neither the Environmental Protection Agency nor the authors accept any responsibility whatsoever for loss or damage occasioned, or claimed to have been occasioned, in part or in full, as a consequence of any person acting, or refraining from acting, as a result of a matter contained in this publication. All or part of this publication may be reproduced without further permission, providing the source is acknowledged.

The EPA Research Programme addresses the need for research in Ireland to inform policy and other stakeholders on a range of questions in relation to environmental protection. These reports are intended as contributions to the necessary debate on the protection of the environment.

EPA RESEARCH PROGRAMME 2014–2020
Published by the Environmental Protection Agency, Ireland

ISBN: 978-1-84095-651-1

August 2016

Price: Free

Online version

Project Partners

Dr Alec Rolston

Centre for Freshwater and Environmental
Studies
Dundalk Institute of Technology
Dundalk
County Louth
Ireland
Email: alec.rolston@dkit.ie

Dr Suzanne Linnane

Centre for Freshwater and Environmental
Studies
Dundalk Institute of Technology
Dundalk
County Louth
Ireland
Email: suzanne.linnane@dkit.ie

Dr Eleanor Jennings

Centre for Freshwater and Environmental
Studies
Dundalk Institute of Technology
Dundalk
County Louth
Ireland
Email: eleanor.jennings@dkit.ie

Contents

Acknowledgements	ii
Disclaimer	ii
Project Partners	iii
List of Figures and Tables	vi
Executive Summary	vii
1 Work Packages 1 and 2: Integrated Water Resources Management, Integrated Catchment Management and Community Engagement – a Review of the Literature	1
1.1 Integrated Water Resources Management	1
1.2 Integrated Catchment Management	2
1.3 Community Engagement	3
2 Work Package 3: Gap, Risk and Cost–Benefit Analyses	5
2.1 Gap Analysis	5
2.2 Risk Assessment	6
2.3 Cost–Benefit Analysis	7
3 Work Package 4: Survey of Current Opinion on Water Management and Community Engagement	9
3.1 Results	9
3.1.1 Demographics	9
3.1.2 Water and the environment	10
3.1.3 Water management and community engagement	11
3.2 Discussion	12
3.3 Conclusions	13
4 Work Package 5: Feasibility of Source Protection Planning at the Larger Catchment Scale	14
5 Water Management and Community Engagement Workshop	17
6 Conclusions	18
7 Recommendations	20
References	21
Abbreviations	24

List of Figures and Tables

Figures

Figure 3.1.	Proportion of survey respondents identifying themselves across societal groupings in the Republic of Ireland (ROI) and the UK	10
Figure 3.2.	Survey respondent awareness of the terms “integrated water resources management”, “integrated catchment management” and “community engagement” prior to undertaking the survey for overall data and for those who identified themselves as water managers, environmental professionals and members of the public	11
Figure 3.3.	Potential incentives that may increase community involvement in water management issues	12
Figure 4.1.	The process for undertaking source protection assessment at the larger catchment scale for drinking water sources of large urban areas in Ireland	15

Tables

Table 2.1.	Gaps, identified through the gap analysis process, which would need to be filled to achieve the ideal future state for water management and community engagement	6
Table 2.2.	Summary of the level of risk identified in filling or not filling the nine key gaps. Risks were assessed prior to the establishment of the Water and Communities Office	7
Table 2.3.	Priority categories for selection of key gaps for further investigation	7
Table 3.1.	Reasons for respondents’ dissatisfaction with their drinking water supply	10
Table 6.1.	How the TIME project’s five supporting objectives were achieved	18

Executive Summary

The overarching objective of the Towards Integrated Water Management (TIme) project was to connect scientists, policymakers, managers and local communities in the integrated management of Ireland's water resources, to assist in delivering improvements in environmental status, water quality and water management. This was achieved through the delivery of five work packages.

Work Packages 1 and 2 reviewed the literature regarding best practice in integrated water resources management (IWRM), integrated catchment management (ICM) and community engagement.

Work Package 3 undertook risk and cost–benefit analyses on actions required to fill nine key gaps identified as existing within (1) ICM and community engagement initiatives undertaken in Ireland to date and (2) perceived best practice as identified through Work Packages 1 and 2. The recommendations were to:

1. develop a national water management and community engagement framework to provide guidance and consistency for engagement initiatives into the future;
2. investigate priority locations for the establishment of community-managed hubs as focal points for community access to ICM information and resources;
3. develop strategic initiatives to encourage local businesses to support local water initiatives;
4. develop national ICM-focused primary and secondary school educational initiatives;
5. develop and provide support to ICM-centred citizen science initiatives;
6. increase the number and frequency of local ICM-focused initiatives with which communities can become involved;
7. undertake engagement initiatives to raise awareness of local water management issues and how local communities can be involved in mitigation and support strategies;

8. develop a framework for the appropriate monitoring and evaluation of engagement initiatives;

9. initiate a one-stop website that provides guidance and advice on ICM.

Work Package 4 undertook an online survey of current opinions on water management and community engagement in the Republic of Ireland and the UK. Despite the national and local promotion of management actions that encompass the ideals of ICM and IWRM, respondents were typically unaware of the terms “integrated water resources management” and “integrated catchment management”, but they were aware of the term “community engagement”. While 81.4% of respondents did not feel included in decisions on their water environment, 95% believed that local communities should have a say in how the water environment is managed. The local nature of engagement activities was highlighted by the fact that only 22.8% of respondents are willing to travel more than 20 km to attend such an event. The ideal frequency of such events was identified as either 6-monthly or annually in order to keep people informed on local water management issues.

Work Package 5 assessed the feasibility of applying source protection best practice at the larger catchment scale. Current source protection best practice, developed by the National Source Protection Pilot Project (NSPPP), has generally been applied to smaller catchments or sub-catchments. For larger urban areas, which rely on surface water sources for their drinking water supply, the issue of source protection is magnified by the larger scale of activities and the difficulties in implementing remedial management actions at this scale.

As a result of these issues, the NSPPP best practice source protection process was adapted for application at the larger scale to feature nine key stages within the four components of (1) catchment delineation and data requisition; (2) catchment characterisation; (3) catchment management, communications and engagement planning; and (4) monitoring, evaluation review and implementation.

Water Management and Community Engagement Workshop

Although not included as a specific work package, the delivery of a best practice workshop was a key output of the TIME project. A total of 66 delegates attended the Water Management and Community Engagement Workshop, held on 25 November 2015. The workshop aimed to increase awareness of integrated water management, ICM and community engagement; to facilitate discussion on water management and community engagement; and to encourage collaboration, partnerships and integration in the Irish water sector.

Delegates typically identified current engagement practices in Ireland as being “poor”. Adjectives such as “social”, “interesting” and “refreshing” were used to describe good engagement practices. Descriptions of bad engagement experiences used more emotive words such as “frustration”, “distressing”, “disappointment”, “traumatic” and “void”, thus identifying potential legacy issues from previous initiatives that new engagement programmes need to address.

Regardless of previous engagement initiatives, there remains a disconnect between government agencies and local communities that must be overcome to truly facilitate community-led involvement in local water management in Ireland.

While it is clear that enforcement and regulation by governing bodies will still be a requirement for water management into the future, the potential for developing local collaborative partnerships is strong. The opportunity exists for co-ordination at the national level to carefully plan and manage local resources in collaboration with communities, and to harness the goodwill that successful partnerships can produce.

Such national co-ordination must be aligned with the legislative requirements for the second round of river basin management planning. While efforts to engage have been developed through the EPA's Catchment Management Network, such engagement has focused on local authorities and other public bodies. Greater local-level participation is required to successfully implement ICM.

The following recommendations are made:

1. Implement the necessary actions to fill the nine key gaps in current water management and community engagement identified through Work Package 3.
2. Expand the Environmental Protection Agency Catchment Management Network to include community representatives.
3. Strongly promote the engagement actions to be undertaken for the second round of river basin management planning to raise awareness of and participation in the actions.
4. When undertaking source protection planning at the larger catchment scale, assess available water quality data and the risk of not meeting Water Framework Directive (WFD) objectives rather than relying solely on WFD ecological status to identify priority areas for further investigations. Making the data (currently available to all public bodies via the recent WFD Application) accessible to the general public will assist in transparency and openness between agencies and the public, while also encouraging further engagement and collaboration.

1 Work Packages 1 and 2: Integrated Water Resources Management, Integrated Catchment Management and Community Engagement – a Review of the Literature

1.1 Integrated Water Resources Management

Water is essential for all life and is important for health, spiritual needs, comfort, livelihood and the world's ecosystems. Future climate change, population growth, increased agricultural production and increased abstractions are some of the pressures acting on the availability of water on a changing planet. Within the water sector, institutional fragmentation can result in opposing management actions that fail to achieve overarching goals and that often overlook the importance of maintaining healthy freshwater ecosystems (Forslund *et al.*, 2009). For this reason, it requires an integrated approach to water management between different sectors to facilitate future action on water and sustainable development (Rahaman *et al.*, 2004), and this has been termed integrated water resources management (IWRM).

The Global Water Partnership (GWP, 2000) has defined IWRM as “a process which promotes the co-ordinated development and management of water, land and related resources, in order to maximise the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems”.

In essence, IWRM was designed to replace the traditional fragmented methods of water management with a more holistic approach that recognises the multifaceted social, economic and environmental importance of water and society (GWP, 2009). Key to the IWRM process is the recognition of freshwater as a finite and vulnerable resource that is essential to sustain human livelihoods and the natural environment, and as a public good that has social and economic value in competing uses (Foster and Ait-Kadi, 2012).

Developed at the International Conference on Water and the Environment in 1992, the Dublin Principles express a holistic, comprehensive, multidisciplinary approach to water resource problems worldwide (Solanes and Gonzalez-Villareal, 1999). They are as follows:

- Freshwater is a finite and vulnerable resource, essential to sustain life, development and the environment.
- Water development and management should be based on a participatory approach involving users, planners and policymakers at all levels.
- Women play a central part in the provision, management and safeguarding of water.
- Water has an economic value in all its competing uses and should be recognised as an economic good.

These four Dublin Principles aim to promote changes in concepts and practices that are considered fundamental to improving water resources management (GWP, 2000). The Dublin Principles led to the development of the five key concepts of IWRM:

- **Multiple uses:** water is a resource for drinking and washing but is also necessary for livelihoods.
- **Holistic management:** both the supply of and the demand for water should be considered when creating management strategies.
- **Multiple perspectives:** water is an economic, social and environmental good.
- **Participatory approach:** local communities must help make decisions about their resources.
- **Women's involvement:** the role of women in collecting, distributing and managing water must be recognised.

Although IWRM reforms tend to focus on the higher levels of scale, on policy and legislation reforms at the national levels and the establishment of river basin organisations (Butterworth *et al.*, 2010), the principles of IWRM can also be applied across a variety of scales from local to trans-national (Lenton and Muller, 2009). Despite criticisms of the IWRM process (Biswas, 2004, 2008; McDonnell, 2008; Placht, 2008; Butterworth *et al.*, 2010; Hidaka *et al.*, 2011), the overarching purpose of IWRM is to achieve ecological sustainability through the management of current water use, in a way that does not prevent future generations from obtaining the same

quality of life from the same resource, by employing the three main tenets of IWRM: integration, efficiency and equality (Placht, 2008).

The development in 2015 of global sustainable development goals, the necessity for change to implement climate change adaptation, and the recently identified challenge of motivating active ownership and engagement of the key water-dependent sectors within the water–energy–food security nexus (Hoff, 2011), led to a re-evaluation of IWRM at the 7th World Water Forum, 2015 (Smith and Clausen, 2015).

A revitalised agenda for IWRM will need structures that serve to facilitate rather than co-ordinate change, in essence making change manageable and ensuring that top-down and bottom-up actions work in concert (Smith and Clausen, 2015). A World Water Council White Paper that builds on the issues identified by Smith and Clausen (2015) will be produced following input from the 7th World Water Forum.

1.2 Integrated Catchment Management

A catchment area can be defined as all of the land that channels rainwater and groundwater into a river or stream, which then often delivers water to coastal areas (Wilkinson and Brodie, 2011). Within this geographical unit, it is possible to describe water inputs, outputs and flow levels, and to allow the impact of change in one part of the catchment to predict change in another part of the catchment (Wallace *et al.*, 2003). However, a catchment is more than the sum of its water, community and industry: catchments are complex systems with unique physical, environmental, economic and social drivers (Edeson, 2015).

The need to manage water from its source to sink and the interdependence of water uses with each other and natural processes require holistic catchment-based management (RELU, 2010). As hydrological, economic, social and environmental interdependencies occur within catchment areas, it is within this geographical unit that the integrated development and management of water resources is likely to be most successful (Donzier and Ait Kadi, 2015).

The need for a consistent, sustainable, catchment-based approach to water resource assessment is clearly defined by the EU Water Framework Directive (WFD) (2000/60/EC) (Holmes *et al.*, 2005). When catchments

are separately managed by several independent bodies, the quality of the environment tends to be degraded, whereas, by contrast, when the catchment is managed as a unit, the maximum potential of multiples uses and economy can be achieved (IHP, 2001).

Integrated catchment management (ICM) is a subset of IWRM that is based on the concept of catchments as biophysical units in which use of natural resources and ecological and water protection takes place; local community and scientific involvement is integrated; and appropriate organisational structures and policy objectives are put in place (Daly *et al.*, 2013).

Collins and Ison (2010) have proposed the contrasting view that IWRM concerns achieving equitable access to, and sustainable use of, water resources, while ICM is inclusive of land use, so all factors and events that impact on the water resources are considered.

Macleod *et al.* (2007) argued that before ICM can lead to sustainable catchment management, three changes are required:

- The legislation and policies that aim to achieve ICM must be combined with existing and future legislation and policies.
- The science that is required to support ICM and provide the evidence base also needs to be integrated across the natural and social science disciplines.
- The management of catchments should be based on integrating land management with a wide range of stakeholder requirements, with policies and with the scientific evidence base.

The implementation of the first round of river basin management (RBM) plans as part of the EU WFD (2000/60/EC) has been a big step towards integrating the management of Ireland's water resources. However, RBM plans in general have been criticised throughout Europe, not only for their prescriptive monitoring programmes and the transition from pre-WFD activities, but also regarding the limited inclusion of public participation in the planning process, resulting in typically top-down¹ approaches to RBM (Collins *et al.*, 2012).

¹ In water resource management, top-down approaches are those in which decisions are dominated by government bodies with little or no involvement of other stakeholders. Bottom-up approaches, although usually facilitated by higher level organisations, are driven by stakeholders. In the case of ICM and IWRM, local communities are strongly engaged in order to develop ownership, skill-sets and solutions to local water issues.

To date, the majority of initiatives in Ireland that have attempted to incorporate IWRM/ICM outside river basin planning have been undertaken at the individual project level rather than through an integrated national policy supported by state legislation. In 2014, the Environmental Protection Agency (EPA) formed a new unit: the Catchment Science and Management Unit. The unit uses the term “healthy catchments” as a brand to market ICM in Ireland and worked with the Department of the Environment, Community and Local Government (DECLG) until May 2016 to lay the foundation for a joined-up approach to catchment management (including both river basin planning and non-WFD programmes) at the national level. Since May 2016, the EPA Catchment Unit has been working with the Department of Housing, Planning and Local Government.

1.3 Community Engagement

The size and complex nature of water resource challenges has led governments to recognise that these issues cannot be tackled by statutory bodies alone. The idea of stakeholder engagement has now gained traction as a principle of water governance, incentivised in a broader context of a bottom-up call for open government and society (INBO, 2014). Worldwide there has been a trend towards a more inclusive bottom-up approach that fosters greater participatory involvement of stakeholders and builds bridges between government leaders and citizenry, driven by past failings of top-down approaches (Fraser *et al.*, 2006; Head, 2007; Smith, 2008; Conrad and Hilchey, 2011; OECD, 2015). Daly *et al.* (2013) identified that, while great progress has been, and is being, made on the scientific aspects of catchment management in Ireland, significant deficiencies in the areas of public participation and social learning need to be urgently addressed. As a result of the top-down approach being frequently seen to be potentially exclusive and alienating to local people, there has been a growing acceptance of bottom-up approaches that characteristically both appreciate and incorporate local people and their local knowledge, skills, needs and experiences (Smith, 2008).

The word “community” is an umbrella term that is defined and applied in a myriad of ways (Fraser, 2005), and often implies a (false and misleading) sense of identity, harmony, co-operation and inclusiveness (Head, 2007).

Community engagement is a planned process with the specific purpose of working with identified groups of people, whether they are connected by geographic location, special interest or affiliation, to address issues affecting their well-being (QDES, 2001). Effective engagement leads to decisions, delivery and evaluation of services that have been shaped by the relevant people and communities (Andersson *et al.*, 2011).

Community engagement is also known as civic engagement, citizen engagement or public participation, although recent years have seen a shift from the notion of participation to engagement (INBO, 2014). Engagement allows the time to develop ideas, options and priorities with communities, ensuring that the needs of local people are understood and acted upon (Andersson and Shahrokh, 2011) and that they are actively involved in the decision-making process (House, 1999).

The factors that motivate people to participate include wanting to play an active role in bettering their own lives or the environment they interact with; fulfilling social or religious obligations; feeling a need for a sense of community; and wanting financial or in-kind rewards (McCloskey *et al.*, 2011). Engagement can be presented in a wide number of different forms, and community engagement actions can vary greatly within the water environment field, from consultation in the development of management plans (Fraser *et al.*, 2006) to formal involvement in data collection and monitoring (Liu *et al.*, 2014).

The development of bottom-up, stakeholder-led catchment-based approaches to land management provides a new set of challenges to policymakers, as the priorities of groups vary according to local values and pressures (McGonigle *et al.*, 2012). Collaborative efforts that focus on representing and valuing diverse viewpoints, using knowledge from local groups to inform ideas and decisions, following democratic decision-making processes and using dynamic forms of communication are likely to be viewed favourably by participants (Tindale, 2013). However, if there is no expectation of an impact, participation is unlikely (Johnson, 2014).

While bottom-up approaches have empowered many communities and laid the foundations for the removal of governmental silos through the participatory approach, the bottom-up approach is not without its

own problematic elements and critiques (Smith, 2008). The most frequent challenges identified in implementing stakeholder engagement on the ground include the lack of clarity on the expected use of inputs from stakeholders in decision-making and implementation (leading to a consultation “fatigue”); the absence of political will and leadership; the lack of time, staff and funding; weak supportive legal frameworks; consultation “capture” from over-represented categories; resistance to change and reluctance to relinquish power; weak capacity; the lack of citizens’ concern and awareness; information asymmetry; fragmented settings; and the complexity of the issues at hand (INBO, 2014).

In Ireland, following guidance from the government (DECLG, 2014), local authorities have established the Public Participation Network (PPN): a new framework for public engagement and participation. This PPN will be the primary method through which local authorities connect with the community, and with voluntary and environmental sectors, without prejudice to other consultation processes. The aim of the structures and processes is to facilitate and enable the public and organisations to articulate a diverse range of views and interest within the local government system. The PPN provides an opportunity for the engagement of communities regarding local water resource management issues.

2 Work Package 3: Gap, Risk and Cost–Benefit Analyses

In order to understand how best practice ICM, IWRM and community engagement methodologies can be utilised in Ireland to move towards more integrated water management, a comparison of initiatives that have been implemented elsewhere against best practice methodologies was undertaken. This required the assessment of the gaps that exist between (1) ICM and community engagement initiatives undertaken to date; and (2) perceived best practice as identified in the IWRM, ICM and community engagement literature reviews undertaken through Work Packages 1 and 2.

The overarching aim of the gap analysis, was, therefore, to identify the disparities between research, policy and implementation on the ground, along with the knowledge gaps existing in relation to water users' behaviour and the economics of water provision.

The results of the gap analysis were then used to inform a risk analysis of the implications of failing to implement the key aspects of IWRM, ICM and community engagement practices in Ireland using standard risk assessment methodologies. The key gaps were prioritised according to their associated level of risk and qualitative cost–benefit analysis (CBA) was undertaken.

2.1 Gap Analysis

Gap analysis was undertaken with regard to water management and community initiatives in Ireland in order to:

- identify pathways to move from the current state of discontinuity in community engagement actions and initiatives between disparate ICM projects;
- move towards identifying an overarching national focus for community engagement in the ICM and water management realms;
- move towards an ideal future state in which Irish communities feel informed, engaged and empowered regarding water management decisions and actions.

There were five steps in this gap analysis:

- **Step 1:** identify the organisational goals of the key technical and regional agencies involved in undertaking or funding ICM initiatives in Ireland.
- **Step 2:** describe the community engagement actions undertaken by the key technical and regional agencies in Ireland.
- **Step 3:** identify and outline best practice community engagement in the water sector, with reference to the pathways required for implementation in Ireland.
- **Step 4:** identify the potential barriers that might hinder the implementation of best practice water management and community engagement strategies in Ireland.
- **Step 5:** identify and describe the key gaps existing between the present and ideal future states of water management and community engagement in Ireland.

Subsequently, nine key gaps were identified (Table 2.1). While national community engagement frameworks with a focus on water are rare globally, useful information can be drawn from other best practice engagement frameworks. In Australia, state governments have developed general community engagement frameworks, typically based on the IAP2 engagement spectrum (www.iap2.org). The state of South Australia has had significant successes through its “Better Together” strategy (<http://bettertogether.sa.gov.au/>) within which the state's principles of engagement are clearly defined and described.

Scotland has developed “National Standards for Community Engagement” (<http://www.gov.scot/Resource/Doc/94257/0084550.pdf>) with the aim of improving the experience of all involved in community engagement to achieve the highest quality of process and results.

These cases provide good examples of engagement frameworks that may be used to help develop a national water and community engagement framework in Ireland.

Table 2.1. Gaps, identified through the gap analysis process, which would need to be filled to achieve the ideal future state for water management and community engagement

Gap 1	Presence of a national water/ICM-focused community engagement framework, supported by policy, which encompasses the national framework/local delivery model to ensure consistency of engagement practices throughout Ireland
Gap 2	Community-managed hubs as focal points for community access to water management/ICM information and resources
Gap 3	Strategic initiatives which encourage local businesses to support local water management initiatives
Gap 4	National ICM-focused primary and secondary school initiatives
Gap 5	ICM-centred citizen science initiatives that focus on local water management and water quality issues
Gap 6	Local ICM-focused initiatives that communities can become involved with
Gap 7	Awareness raising of local water management issues
Gap 8	Appropriate monitoring and evaluation of engagement initiatives
Gap 9	One-stop website providing guidance and advice on ICM ^a

^a**Note: A new website, www.catchments.ie, was launched on 8 June 2016, with the aim of providing a one-stop online service for all catchment-related activity in Ireland.**

2.2 Risk Assessment

Assessing risk is a fundamental method for understanding the internal and external factors that determine the uncertainty of achieving objectives [ISO 31000 (BSI, 2009)]. Risk assessment can be undertaken for a wide range of scenarios, thus Suter (2006) stated that “technical support for decision making under uncertainty” is the only definition of risk assessment that covers its many uses.

Having identified the nine key gaps, understanding the risks of both filling and not filling these gaps is an important process in working towards more integrated water management in Ireland. Subsequently, once these risks were identified and prioritised, it was possible to undertake a qualitative assessment of the costs and benefits of implementing management actions required to fill the key gaps.

Following guidance from ISO 31010 (BSI, 2010), the consequence–probability matrix method was used to assess the risk of both filling and not filling the nine key gaps. The consequence–probability matrix is a means of combining qualitative or semi-quantitative ratings of consequence and probability to produce a level of risk or risk rating. Inputs to the consequence–probability matrix are customised scales for consequence and probability, and a matrix which combines the two. To rank risks, the user first finds the consequence descriptor that best fits the situation, then defines the probability with which those consequences will occur. The level of risk is then read from the matrix.

Using this methodology, a mean risk score was calculated for each key gap and subsequently an overall level of risk was identified for both filling and not filling each key gap (Table 2.2). Please note that risks were identified prior to the establishment of the Water and Communities Office.

Commonly identified risks associated with filling key gaps included the provision of resources (particularly funding and staff/supporting services) as well as the potential for limited community interest in involvement in certain water management actions or initiatives. Such risks have the potential to be mitigated through strong project management from the initial planning stage through to project completion (to ensure sufficient budgets and staffing/supporting services), the raising of awareness within communities to the key water management issues within the locality, and the engagement of different societal demographics to encourage interest at all levels of the community.

Risks associated with not filling key gaps essentially relate to maintaining the status quo in ICM and water resources management. A predominance of top-down governance, accompanied by a lack of local water management initiatives for communities to become involved in, is evident, despite significant community interest in the water resource and water management sectors.

From examining the level of risk identified for each of the nine key gaps (Table 2.2), those gaps that have the highest level of risk if they are not filled were prioritised for further investigation (Table 2.3).

Table 2.2. Summary of the level of risk identified in filling or not filling the nine key gaps. Risks were assessed prior to the establishment of the Water and Communities Office

Key gap	Risk level	
	Filling gap	Not filling gap
1. Lack of a national water/ICM-focused community engagement framework	Moderate	Very high
2. Lack of community-managed hubs	Moderate	High
3. Lack of strategic initiatives encouraging local businesses to support local water actions	Moderate	Moderate
4. Lack of ICM-focused primary and secondary school initiatives	Moderate–high	High
5. Lack of ICM-centred citizen science initiatives	High	Moderate
6. Lack of local ICM-focused initiatives that communities can become involved in	Moderate–high	High
7. Lack of awareness of local water management issues	Low	Moderate-high
8. Lack of appropriate monitoring and evaluation of engagement initiatives	Moderate	Very high
9. Lack of a one-stop website	Moderate	Moderate-high

2.3 Cost–Benefit Analysis

CBA can be used as part of risk evaluation whereby total expected costs are weighed against the total expected benefits in order to choose the best or most profitable option, and it is an explicit part of many risk evaluation systems [ISO 31000 (BSI, 2009)]. CBA can be used to decide between options which involve risk. These options include deciding on an input into a decision about whether or not a risk should be treated, deciding whether or not to differentiate between and decide upon the best form of risk treatment, and determining how to decide between different courses of action.

Qualitative short-term and long-term benefits and costs were identified for each of the priority categories (Table 2.3), following the methodology of the Royal Melbourne

Institute of Technology (RMIT, 2005). As a qualitative CBA methodology was used, an assessment of financial costs and benefits has not been conducted because of the difficulties in applying a market value to many of the identified costs and benefits. Prior to the implementation of any initiatives, a full assessment of likely costs will be required. With national interest in Ireland's water resources currently at an all-time high, there is an opportunity to fill these gaps and increase community involvement, awareness and empowerment, and generate goodwill.

Timeframes have not been linked to the potential filling of the nine key gaps; however, it is recommended that those placed within priority category 1 should be filled as a matter of urgency. The creation of a national framework for ICM and community engagement in

Table 2.3. Priority categories for selection of key gaps for further investigation

Key gaps	Risk of not filling
Priority category 1	
Key gap 1: Lack of a national water/ICM-focused community engagement framework Key gap 8: Lack of appropriate monitoring and evaluation of engagement initiatives	VERY HIGH
Priority category 2	
Key gap 2: Lack of community-managed hubs Key gap 4: Lack of ICM-focused primary and secondary school initiatives Key gap 6: Lack of local ICM-focused initiatives that communities can become involved in	HIGH
Priority category 3	
Key gap 7: Lack of awareness of local water management issues Key gap 9: Lack of a one-stop website	MODERATE–HIGH
Priority category 4	
Key gap 3: Lack of strategic initiatives encouraging local businesses to support local water actions Key gap 5: Lack of ICM-centred citizen science initiatives	MODERATE

association with a clear monitoring, evaluation, review and improvement process will create a platform for the development and implementation of initiatives that will contribute to filling the key gaps that were placed in lower priority categories.

A central component of moving towards more integrated water management in Ireland is, of course, the availability of resources. Commitment must be made at the highest level to support bottom-up processes that work to engage and empower local communities. The provision of three regional co-ordinators, three support staff and 12 community water officers to be stationed around the country as part of the recently established Water and Communities Office is a good initial start for bridging the current divide between national-level

water management and local communities. However, the effectiveness of these officers will be limited unless resources are provided to ensure that there are initiatives available for local communities to be involved in. Examining current funding streams and investigating alternative funding options (such as encouraging local businesses to get involved/sponsor local ICM-related activities) will be key in providing support to local communities and increasing interactions between agencies, water officers and local community groups. These resource commitments should also move beyond seeking to achieve legislation requirements (such as those outlined in the WFD) and should also focus on empowering and providing local communities with the opportunity to take ownership of their local water environment.

3 Work Package 4: Survey of Current Opinion on Water Management and Community Engagement

Internationally, water management is moving from the traditional top-down approach to more integrated initiatives with a focus on community-led action. Over the past decade in the UK, community engagement has become a core component of water management, as a result of the development of national policies such as the Catchment Based Approach (CaBa) (DEFRA, 2013) and the formation of the Rivers Trust and associated bodies. In contrast, outside the implementation of the EU WFD, the Republic of Ireland has lagged behind in attempting to instigate holistic, joined-up, catchment-level thinking. Irish IWRM and ICM initiatives have tended to be isolated, stand-alone projects of limited duration rather than part of any standardised national policy initiatives.

The disparity between Ireland and the UK in initiating joined-up, holistic catchment-level thinking that is supported by national policy identified an opportunity to assess whether or not differences in opinion on current water management and community engagement initiatives exist within and between the geographic localities.

A survey was designed to encompass a total of 37 questions within three overarching components: demography; water and the environment; and water management and community engagement. Demographic information gathered from each respondent included gender, age range, geographical location and societal grouping (e.g. water manager, member of the public, etc.). Questions on water and the environment assessed drinking water supply provision and satisfaction; frequency of visiting water bodies (identified as a stream, river, lake or canal); opinion on the environmental condition of local water bodies; the perception of pressures acting on the environmental condition of local water bodies; and opinion on the social, environmental and economic value of water bodies. Questions within the water management and community engagement section focused on participants' prior and current knowledge, and experiences of both water management and community engagement, and assessed the level of interest in attending future water-focused community events.

The survey was launched through the website www.surveymonkey.com, and was promoted through online media and targeted emails. These emails were sent to community groups (such as angling and environmental groups), the Rivers Trust, water utility companies, local authorities, and governmental and non-governmental organisations. An article promoting the survey was also featured in *Rural Water News*, the newsletter of the Irish National Federation of Group Water Schemes, which has a circulation of approximately 3000.

It is recognised that the following limitations to this survey methodology are evident:

- Online surveys can exclude individuals with no access to a computer or have literacy problems.
- The survey distribution method probably resulted in an exclusion of certain societal demographics and is therefore not fully representative of current opinion in the geographical areas surveyed.
- Targeted email distribution probably resulted in an over-representation of individuals that already have an active interest in the water environment.

The survey was open to respondents for a total of 39 days from 23 March to 30 April 2015.

3.1 Results

3.1.1 Demographics

A total of 520 responses were recorded, with the majority of respondents (79.5%) being located in the Republic of Ireland and the remainder being located in the UK.

When asked to identify their societal/professional grouping, the majority of individuals in both the Republic of Ireland and the UK identified themselves as “members of the public” [58.7% and 51.1% of respondents respectively (Figure 3.1)]. Environmental professionals and water managers were the second and third most popular groups (23.1% and 31.2% for environmental professionals; and 7.7% and 8.3% for water managers in the Republic of Ireland and the UK, respectively).

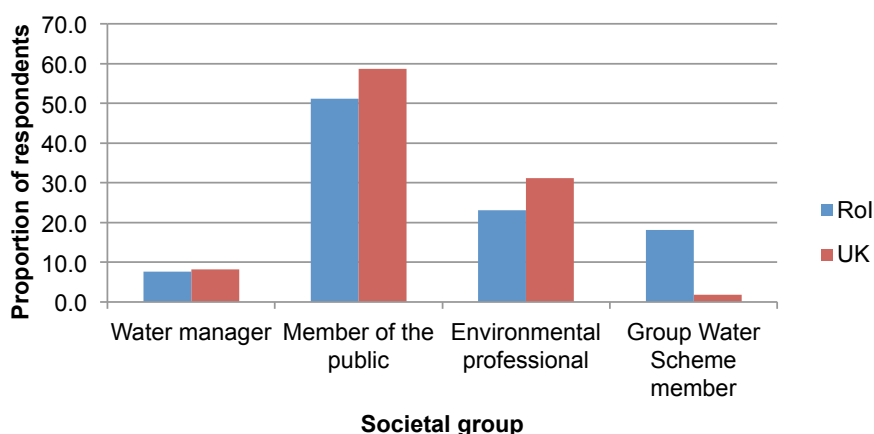


Figure 3.1. Proportion of survey respondents identifying themselves across societal groupings in the Republic of Ireland (RoI) and the UK.

Table 3.1. Reasons for respondents' dissatisfaction with their drinking water supply

Reason	Proportion of respondents (%)		
	Overall	Republic of Ireland	UK
The water does not taste good	40.7	42.9	28.6
The water does not look good	17.9	20.4	7.1
Too expensive	16.3	8.2	50
Poor supply pressure	8.9	9.2	7.1
Other	(16.3)	(19.4)	(7.1)
Hardness	8.9	8.2	7.1
Addition of fluoride	4.1	5.1	0
High chlorine levels	2.4	5.1	0
High trihalomethane levels	0.8	1.0	0

3.1.2 Water and the environment

In the Republic of Ireland, while the national water utility company, Irish Water, provided drinking water to the majority of respondents (59.2%),² one-quarter of respondents (25.4%) received their drinking water from a group water scheme, while 15.4% received their drinking water from their own private well or abstraction. This compares with 95.7% of individuals in the UK receiving their drinking water from utility companies and only 4.3% from their own private well or abstraction.

Although the majority of respondents in both the Republic of Ireland and the UK were satisfied with their drinking water supply (79.3% and 84.3%, respectively), overall, the primary reason why respondents were not

satisfied was because the water did not taste good (Table 3.1). However, there was a disparity of responses depending on geographical location, with the cost of water being the primary reason for dissatisfaction in the UK (representing 50% of responses), followed by the water not tasting good (28.6%). In the Republic of Ireland, the taste and look of the water were the two most common reasons for dissatisfaction, with the cost of water representing only 8.2% of responses.

While 31.4% of respondents identified that everyone should be responsible for looking after the environmental condition of water bodies, local authorities and state government were also identified as having such responsibility (26.3% and 17.3% of responses, respectively). Although frequently involved in initiatives that aim to improve the environmental quality of water bodies, non-governmental organisations were identified as a group that should have little such responsibility (6.2% of responses).

² Note: the national proportion of the Irish population who receive their potable water from Irish Water is 82.1% (EPA, 2015) and, therefore, this survey is an under-representation of the utility company's customer base.

3.1.3 Water management and community engagement

Overall, respondents were typically unaware of the terms “integrated water resources management” and “integrated catchment management” (64.8% and 54.2% of respondents respectively), but were aware of the term “community engagement” (71.0% of respondents) (Figure 3.2). Respondents who identified themselves as environmental professionals were generally more aware of these three terms than any other societal category. For water managers, 47.5% and 59.0% of respondents were aware of the terms “integrated water resources management” and “integrated catchment management”, respectively, compared with 64.9% and 82.5% of environmental professionals, respectively. The majority of water managers and environmental professionals were aware of the term “community engagement”, (72.1% and 93.8% of respondents, respectively). Members of the public were the group least aware of the terms “integrated water resources management” and “integrated catchment management” (17.9% and 28.6% of respondents, respectively). Again, the majority of members of the public were aware of the term “community engagement” (65.8% of respondents).

While 81.4% of respondents did not feel included in decisions about their water environment (82.6% and 77.0%

for the Republic of Ireland and the UK, respectively), an overwhelming majority (95% for both geographical locations) believed that local communities should have a say in how the water environment is managed. Despite this, only 31.7% of respondents had been invited to attend a community event regarding water issues, with events typically being organised by local community groups, including angling clubs, government agencies and non-governmental organisations.

Importantly, 61.2% of respondents from the Republic of Ireland were not aware of any community-based groups involved with local water bodies or local water issues, compared with 50% of UK respondents. Overall, 35.1% of respondents were definitely interested in attending more local events on water and water management (with no disparity between geographical locations); 54.3% were non-committal with potential attendance depending on the time, location and purpose of the event.

The most common incentives for increasing community involvement in water management issues were improved engagement regarding local water management activities, financial incentives that are invested back into local community projects, and a commitment to more water management activities in the local area (Figure 3.3). Reduced water bills was another popular

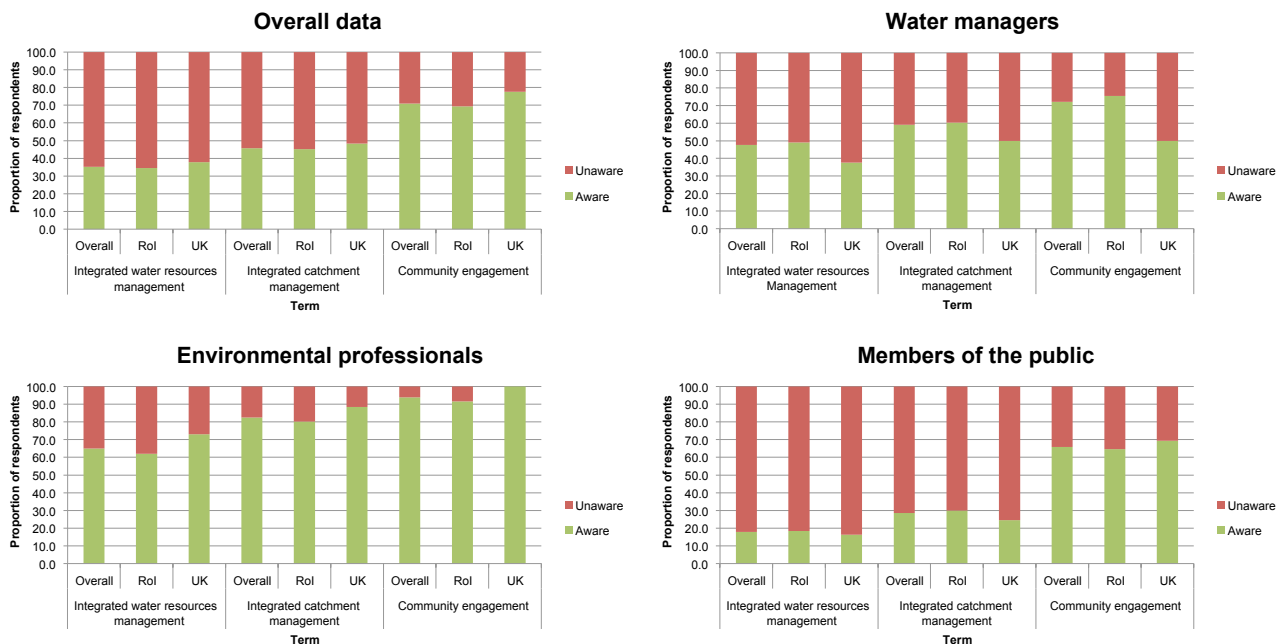


Figure 3.2. Survey respondent awareness of the terms “integrated water resources management”, “integrated catchment management” and “community engagement” prior to undertaking the survey for overall data and for those who identified themselves as water managers, environmental professionals and members of the public. RoI, Republic of Ireland.

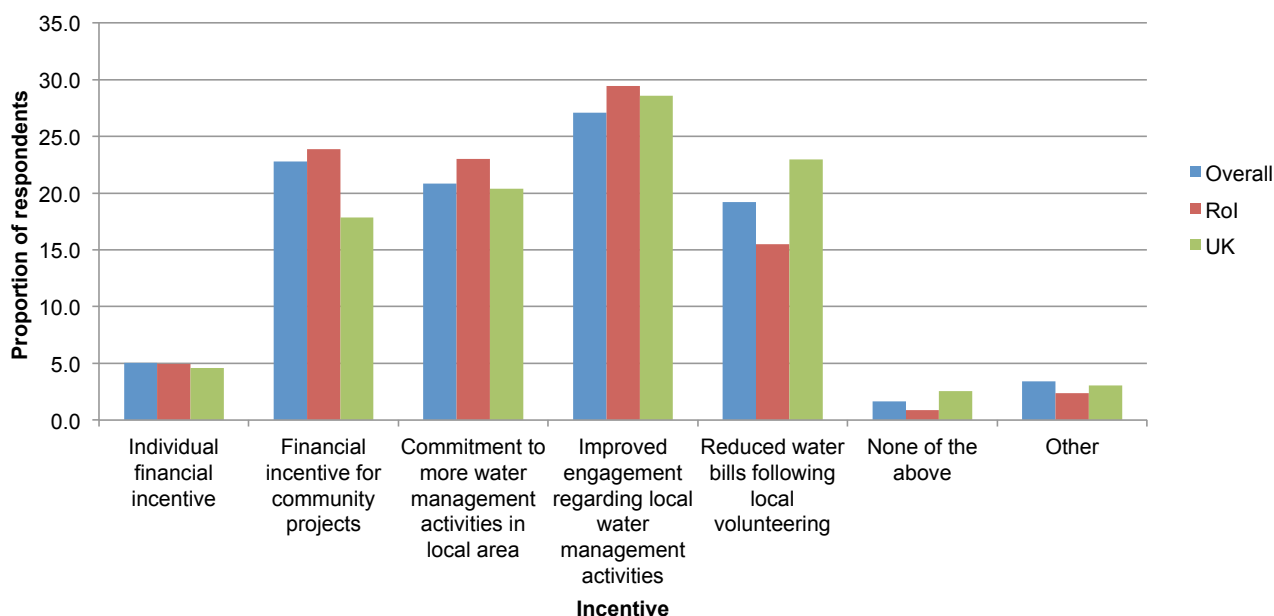


Figure 3.3. Potential incentives that may increase community involvement in water management issues.

incentive, particularly in the UK. Other incentives suggested by respondents included greater community education/awareness; improved water quality or environmental condition; greater community ownership of projects; and improved local amenities such as fencing, walkways and signage.

Community event days and public meetings in a local venue were identified as the most effective events for supplying information on water management to local communities (44.5% and 31.78% of respondents respectively). The emphasis on the local nature of these events was highlighted by only 22.8% of respondents being willing to travel more than 20 km to attend such an event, with a travel distance of 6–10 km being the most popular distance (30.6% of respondents).

3.2 Discussion

The results of this survey identify the importance of local water bodies to communities, highlighting that people value water bodies for a range of ecosystem services. Survey respondents' reasons for becoming involved in local water-related projects focused on social gains for the local community (such as increased funding and engagement for local initiatives) rather than for individual personal gain. Members of the public have previously been shown to be willing to pay to fund biodiversity conservation, depending upon whether the biodiversity outcomes were visible

and local, and whether any achievements were well publicised (Powe *et al.*, 2004).

While IWRM and ICM have both been promoted globally over the past 20 years as processes that are inclusive, holistic and encourage community involvement in water management (e.g. GWP, 2000; Medema *et al.*, 2008; Placht, 2008; Collins and Ison, 2010; Benson *et al.*, 2013; INBO, 2014; Manyanhaire and Nyaruwata, 2014), the majority of survey respondents were unaware of IWRM and ICM as water management initiatives. Despite the increasing volume of engagement activities and the progress towards bottom-up driven catchment science, Head (2007) concluded that there is little evidence that the widespread advocacy and adoption of community engagement and partnership approaches have involved substantial real power sharing. This is because governments have a tendency to retain control of funding, service contracts and regulation, and the capacity to motivate citizens to participate effectively, or create alternative forums, is a weakness in community engagement strategies (Head, 2007). The fact that 81% of the study survey respondents do not feel included in decisions regarding their water environment supports the conclusion that participation strategies in both the Republic of Ireland and the UK are yet to fully engage communities beyond the occasional one-off initiative or project. This is despite an overwhelming 95% of respondents stating that communities should be involved in decisions regarding the water environment.

The timing of the release of this survey (April 2015) coincided with the implementation of charging for water use in the Republic of Ireland following the recent establishment of the new state water utility company, Irish Water. [Note: the national proportion of the Irish population who receive their potable water from Irish Water is 82.1% (EPA, 2015) and, therefore, this survey is an under-representation of the utility company's customer base.] Significant public and political opposition to the formation of Irish Water and the formal charging of water use has resulted in water management and water resources being propelled into the national consciousness at a level never before experienced in the Republic of Ireland. However, of the 21% of people in the Republic of Ireland that were dissatisfied with their water supply, only 8.2% cited the cost of water as a reason for their dissatisfaction. This compares with the UK where of the 18.5% of respondents that were not satisfied with their water supply, 50% cited cost as a reason for their dissatisfaction. Hearne (2015) identified that the success of national-level protests against water charges in the Republic of Ireland was due to a genuine grassroots and local movement that united people's voices at a national level to become too visible to be ignored by the state government. Subsequently, price may feature as a key component of consumer water supply dissatisfaction in the Republic of Ireland in the future, although this may be delayed as a result of the agreement to suspend charging for water consumption in order to garner support for the formation of a minority government following the general election in February 2016.

3.3 Conclusions

There are seemingly few differences in opinion between survey respondents from the Republic of Ireland and the

UK, despite the different timeframes of implementation of IWRM and ICM principles within these geographic localities.

The emphasis on the local aspect of water management and community engagement was highlighted by the fact that the majority of respondents were willing to travel less than 20 km to attend an event on water management. This restriction would present difficulties for organisations and agencies looking to develop community involvement in water management, as available resources will limit the number of possible activities and may therefore restrict involvement at the local level. Careful planning of engagement activities will therefore be necessary, perhaps with a focus on regional areas that require priority water management activities as an initial step in developing community involvement in such actions at the national level.

The results of this survey identified current opinion on water management and community engagement during a period of significant interest in water issues in the Republic of Ireland. The political nuances regarding water management that are likely to develop in the near future in the Republic of Ireland, as identified by Hearne (2015), mean that the opportunity to keep water and water resource management high in the public conscious in the coming years remains strong. In the Republic of Ireland, this opportunity should be used to develop and implement a water engagement initiative that implements the national framework and local delivery model. Given appropriate resourcing, these initiatives would strongly contribute to the second round of WFD RBM planning, facilitating stronger connections between local communities and their water environment, and fostering bottom-up initiatives that empower and give ownership of local water management issues to these communities.

4 Work Package 5: Feasibility of Source Protection Planning at the Larger Catchment Scale

The protection of a drinking water source, termed “source protection”, has been recognised as a cost-effective and sustainable approach to ensure high-quality potable water supplies and to reduce the level of mechanical and chemical treatment (Linnane *et al.*, 2011). In Ireland, the methodologies for delineating drinking water protection areas differ depending on whether the drinking water source is groundwater or surface water dependent. Within the group water scheme sector, source protection investigations for groundwater-dependent sources have typically been undertaken by the Geological Survey of Ireland. For surface water-dependent sources, the National Source Protection Pilot Project (NSPPP) was established by the former National Rural Water Monitoring Committee and led by the Centre for Freshwater and Environmental Studies at Dundalk Institute of Technology. The NSPPP ran from 2005 to 2010 and evaluated the potential for community-based and low-tech approaches to restoring drinking water quality at source, as opposed to relying solely on water treatment solutions.

In 2009 in Ireland, the EPA adopted the World Health Organization’s water safety plan approach to ensure that drinking water is both “safe” and “secure”. The responsibility for the development and implementation of drinking water safety plans (DWSPs) for public water supplies rests with the water supplier, Irish Water. Irish Water have committed to prepare DWSPs for all water supply zones in Ireland, taking a whole-of-catchment approach to manage risks from source through to the tap (Irish Water, 2015). This approach requires a source protection assessment that aligns with best practice.

The best practice source protection process developed by the NSPPP has generally been applied to smaller catchments or sub-catchments. For larger urban areas, which rely on surface water sources for their drinking water supply, the issue of source protection is magnified by the larger scale of activities and the difficulties of implementing remedial management actions at this larger scale. The limitations of applying the current source protection best practice to the larger catchment scale include difficulties in identifying localised point source pollution problems that can be managed

to improve water quality; difficulties in undertaking a catchment walkover to gain an understanding of the localised pressures acting within the catchment; a reduced likelihood of engaging local communities to garner local knowledge and identify issues that may be affecting water quality; and a reduced likelihood of identifying localised effects of the physical nature of the catchment which may influence water quality.

As a result of these issues, the NSPPP best practice source protection process has been adapted for application at the larger scale to feature nine key stages within the four components of (1) catchment delineation and data requisition; (2) catchment characterisation; (3) catchment management, communications and engagement planning; and (4) monitoring, evaluation, review and implementation (Figure 4.1). Although the roles and responsibilities for implementing this revised best practice have not been identified, the process is applicable for implementation by either a single body or multiple bodies working together in a co-ordinated manner. Community engagement actions are identified within the revised best practice process, and responsibility for undertaking the actions would lie with the body or bodies undertaking the source protection process. The manner in which these engagement actions are undertaken should be identified within the community engagement planning process (component 3).

This revised process was then applied to a case study catchment, the River Fane catchment, from which Dundalk (population 37,815) abstracts its drinking water. Data on both the physical characteristics and the water quality of the Fane catchment were used to identify five priority areas within which detailed source protection assessments are recommended using the NSPPP best practice process. It is important to note that these priority areas were identified following basic analysis of easily accessible data. Further data may be available for other important parameters that could lead to a revision of the priority areas and/or identification of additional priority areas for further investigation. For example, additional pesticide monitoring data are required to (1) assess the risk of contamination of the Dundalk water supply; (2) identify areas within the Fane

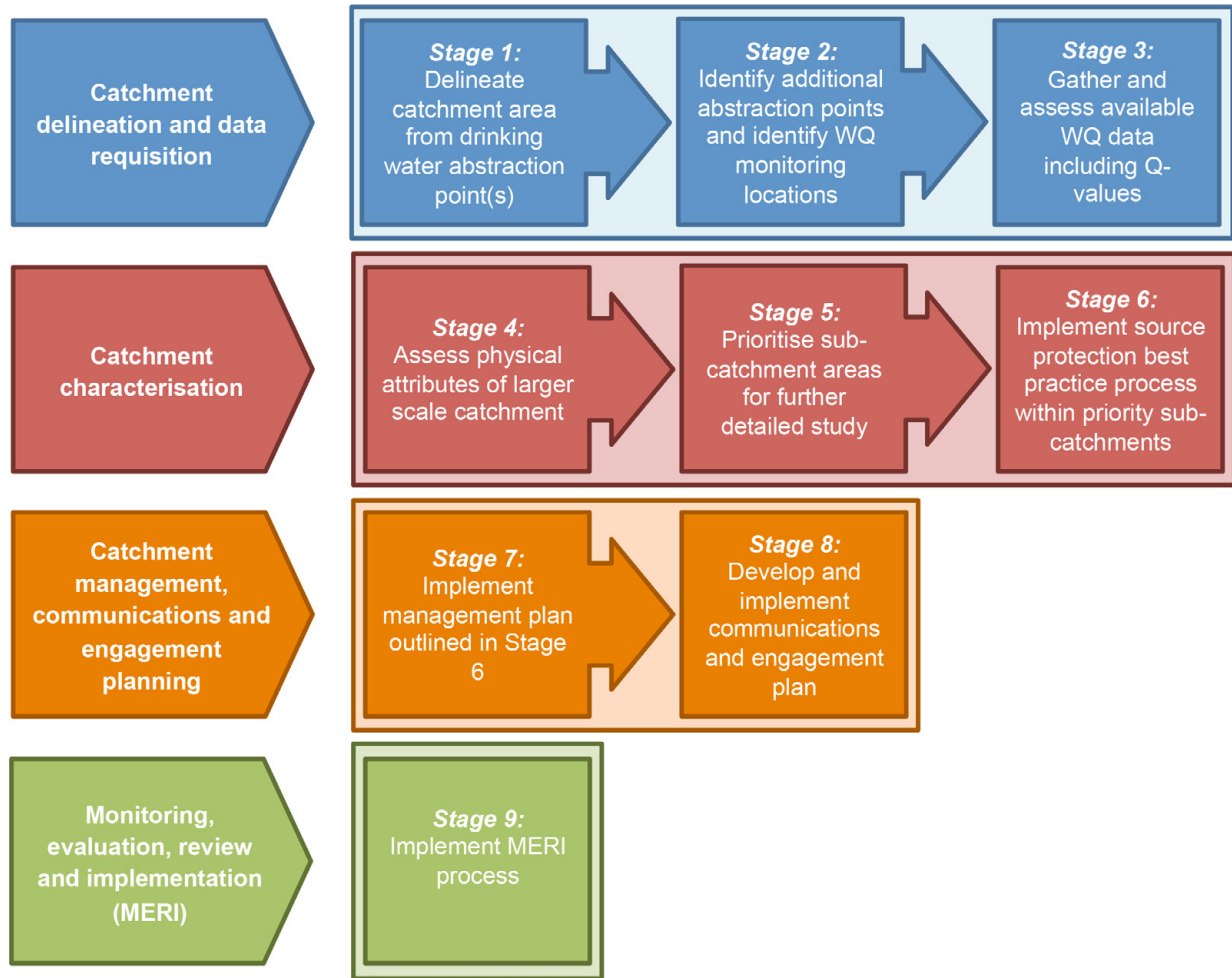


Figure 4.1. The process for undertaking source protection assessment at the larger catchment scale for drinking water sources of large urban areas in Ireland. WQ, water quality.

catchment where 2-methyl-4-chlorophenoxyacetic acid (MCPA) and other pesticide usage is highest; and (3) ensure targeted communication about the sustainable use of pesticides to appropriate communities. While the identification of these priority areas is key to implementing best practice source protection assessment at the larger catchment scale, the engagement of local communities is vital to garner local knowledge, develop partnerships, disseminate information and implement management recommendations. Currently, water quality and trend and distance to threshold data are available to all public bodies via the recently developed WFD Application (App). For true transparency and to encourage engagement, these data should be made accessible to the general public.

The level of involvement of the local community in implementing the management actions identified within the sub-catchment source protection assessment will

be dependent on the management actions and communication actions recommended in the assessment. However, eight bottom-up approaches have been identified whereby communities can act on and lead specific source protection management actions:

- disseminating the source protection management actions;
- holding a community water-themed event day;
- working together to address specific management issues;
- engaging the local authority;
- developing a local school awareness programme;
- organising a local water-focused community group;
- connecting with other organisations such as local angling groups, Tidy Towns, local group water schemes or local environmental non-governmental organisations, or academic institutions;
- becoming involved in the new local authority PPNs.

In order for these eight bottom-up approaches to be effective, there needs to be greater co-ordination between the regulatory organisations that have a role in source protection. An integrated approach between stakeholders, such as the EPA, Irish Water, local

authorities, the National Federation of Group Water Schemes, Teagasc and Coillte, has the potential to provide guidance and best practice for undertaking source protection and improving local community involvement.

5 Water Management and Community Engagement Workshop

A total of 66 delegates attended the Water Management and Community Engagement Workshop held at the Crown Plaza Hotel, Dundalk, County Louth, Ireland, on 25 November 2015. The workshop aimed to increase awareness of integrated water management, ICM and community engagement in Ireland, to facilitate discussion on water management and community engagement, and to encourage collaboration, partnerships and integration in the Irish water sector.

The morning session of the workshop consisted of talks from invited speakers who addressed issues of water management, catchment management and community engagement across international, national and local scales. The afternoon session introduced the World Cafe concept, and in small groups delegates were asked to address key topics on water management and community engagement.

Delegates stated that their main priority for attending the workshop was to learn more about engagement practices for local water management. Although the majority (61.7%) of delegates had previously initiated or undertaken a community engagement activity, only 54.3% stated that they were confident in organising such an event. Following the delivery of the workshop, 58.6% of delegates reported that they were more confident about undertaking an engagement event. The workshop improved the understanding of water management and community engagement for nearly all (96.4%) participants. The most valued aspects of the workshop were the on-the-ground examples of successful community engagement projects, along with the

opportunity to network and discuss water management and community engagement with other delegates.

Current engagement practices in Ireland were typically identified as being “poor”. When describing good engagement experiences, delegates used adjectives such as “social”, “interesting” and “refreshing”. Descriptions of bad engagement experiences were much more emotive, with the use of words such as “frustration”, “distressing”, “disappointment”, “traumatic” and “void”, thus identifying potential legacy issues from previous initiatives that new engagement programmes need to address.

Key barriers to improving engagement processes in the water sector in Ireland identified by delegates included time, dealing with community apathy, encouraging individuals to take responsibility, limited resources including funding, and overcoming community trust issues.

Regardless of previous engagement initiatives, there remains a disconnect between government agencies and local communities that needs to be overcome to truly facilitate community-led involvement in local water management in Ireland. With increased awareness of best practice as presented at this workshop, participants identified an increased confidence in facilitating engagement events and a greater understanding of key issues involved in engaging communities in local water management. There is an opportunity to harness the current high level of public interest in water to move local community-led involvement in water management to the fore of the water sector in Ireland.

6 Conclusions

The overarching objective of this Towards Integrated Water Management (TIme) project was “to connect science, policy, managers and local communities for the integrated management of Ireland’s water resources”. This has been achieved through the development of the TIme project over the course of 2015, culminating in the organisation of the Water Management and Community Engagement Workshop, held on 25 November 2015. One of the limitations of the workshop was the poor attendance of community groups currently involved in local water management activities, despite active promotion of the workshop and open invitations to community groups to attend. This limited attendance highlights one of the key barriers to undertaking community engagement events: representatives of local communities are typically volunteers who have busy

work and social lives and, consequently, confirming attendance at events can be difficult, particularly when costs frequently come from an individual’s own pocket. Any future workshops or events looking to include community representation should consider actively funding community attendance to ensure such representation.

The overarching project objective was underpinned by five supporting objectives and details as to how these objectives were achieved are shown in Table 6.1.

While multiple projects within Ireland have undertaken significant levels of community engagement, there remains disjointed guidance on engagement activities at the national level, with a typical focus on achieving legislative targets rather than truly integrating the management of Ireland’s water resources.

Table 6.1. How the TIme project’s five supporting objectives were achieved

Supporting objective	How supporting objective was achieved
To provide guidance on current international best-practice for the delivery of IWRM and ICM in Ireland from 2015 onwards	<p>Identification of national and international best practice through WP 1 and 2: literature reviews</p> <p>Identification of nine key gaps and subsequent risk assessment and CBA through WP 3</p> <p>Understanding current opinion on water management and community engagement through WP 4: survey</p> <p>Adapting best practice source protection processes to the larger catchment scale through WP 5</p> <p>Facilitating the Water Management and Community Engagement Workshop which showcased international and national best practice</p>
To provide guidance on current international best practice for community engagement with a focus on water management from 2015 onwards	As for supporting objective 1
To assess current understanding and opinion on IWRM and ICM	<p>Conducting a survey on current opinion on water management and community engagement (WP 4)</p> <p>Assessing delegate pre- and post-workshop opinion and feedback</p>
To assess the feasibility of current best practice source protection planning on the larger catchment scale	Adapting best practice source protection processes to the larger catchment scale through WP 5
To communicate the importance of IWRM, ICM and community engagement in Ireland to academics, water managers and local communities	<p>Facilitating the Water Management and Community Engagement Workshop</p> <p>Establishing the project web page, and Facebook and Twitter accounts</p> <p>Promotion of the project through social media, <i>Rural Water News</i> (circulation approximately 3000) and the 2015 Rural Water Conference</p>

WP, Work Package.

Given the importance of water and the aquatic environment in the everyday lives of the people of Ireland, promoting local involvement in water management is key to empowering local communities and moving towards developing partnerships with governing authorities rather than the historical view of enforcement and regulation. While it is clear that enforcement and regulation will still be a requirement for water management into the future, the potential for developing local collaborative partnerships is strong. However, an increase in the number and frequency of local water-focused initiatives for people to become involved in is vital to improving the participation, engagement and empowerment of local communities.

Ireland is in a position to learn from the development of local empowerment in local water resource management through successful international initiatives, such as Landcare in Australia, and the Rivers Trust in the UK (currently, the UK Rivers Trust model is being explored for application in Ireland). Such initiatives provide educational and training opportunities as well as the potential for local communities to develop strong ownership of their local landscapes. This is achieved through collaboration and partnership with governing agencies, water utility companies, local businesses

and non-governmental organisations. However, co-ordination and forward planning at the national level is essential in order to secure successful outcomes and ensure a positive legacy for the management of local water resources into the future.

Recent storm-induced flooding in Ireland has highlighted the concerns of the population with regard to the management of water under an uncertain future climate. These latest floods, in addition to the high-profile subjects of charging for water usage and the provision of potable water for Dublin from the River Shannon, thrusts water and its management high into the public consciousness. The opportunity exists for co-ordination at the national level in order to carefully plan and manage local resources in collaboration and partnership, and to harness the goodwill that successful partnerships can produce.

Such national co-ordination must be aligned with the legislative requirements for the second round of RBM planning. While efforts of engagement have been developed through the EPA's Catchment Management Network, such engagement has focused on local authorities and public bodies. Greater participation at the local level is required to succeed in the implementation of ICM.

7 Recommendations

The following recommendations are made by the TIME project with the aim of achieving a more co-ordinated and integrated approach to water management and community engagement in Ireland:

- Implement the necessary actions to fill the nine key gaps in current water management and community engagement identified through this report:
 - develop a national water management and community engagement framework to provide guidance and consistency for engagement initiatives into the future;
 - investigate priority locations for the establishment of community-managed hubs as focal points for community access to ICM information and resources;
 - develop strategic initiatives to encourage local businesses to support local water management actions;
 - develop national ICM-focused primary and secondary school educational initiatives;
 - develop and provide support to ICM-centred citizen science initiatives;
 - increase the number and frequency of local ICM-focused initiatives that communities can become involved with;
- undertake engagement initiatives to raise awareness of local water management issues and how local communities can be involved in mitigation and support strategies;
- develop a framework for the appropriate monitoring and evaluation of engagement initiatives;
- develop and maintain a one-stop website to provide guidance and advice on ICM.³
- Expand the EPA Catchment Management Network concept to include and engage community representatives.
- Strongly promote the engagement actions to be undertaken for the second round of RBM planning to raise awareness of and participation in the actions.
- When undertaking source protection planning at the larger catchment scale, assess available water quality data and the risk of not meeting WFD objectives rather than relying solely on WFD ecological status to identify priority areas for further investigations. Making the data available through the recent WFD App (currently available to all public bodies) accessible to the general public will assist in transparency and openness between agencies and the public while also encouraging further engagement and collaboration.

³ Note: A new website, www.catchments.ie, was launched on 8 June 2016, with the aim of providing a one-stop online service for all catchment-related activity in Ireland.

References

- Andersson, E. and Shahrokh, T., 2011. *Not Another Consultation! Making Community Engagement Informal and Fun*. Report by Involve for the UK Local Government Improvement and Development's Healthy Communities Programme. Available online: <http://www.involve.org.uk/wp-content/uploads/2011/09/Not-Another-Consultation.pdf> (accessed 19 May 2015).
- Andersson, E., Fennell, E. and Shahrokh, T., 2011. *Making the Case for Public Engagement. How to Demonstrate the Value of Consumer Input*. Report by Involve for Consumer Focus. Available online: <http://www.involve.org.uk/wp-content/uploads/2011/07/Making-the-Case-for-Public-Engagement.pdf> (accessed 19 May 2015).
- Benson, D., Jordan, A., Cook, H. *et al.*, 2013. Collaborative environmental governance: are watershed partnerships swimming or are they sinking? *Land Use Policy* 30: 748–757.
- Biswas, A.K., 2004. Integrated water resources management: a reassessment. *Water International* 29: 248–256.
- Biswas, A.K., 2008. Integrated water resources management: is it working? *Water Resources Development* 24: 5–22.
- BSI (British Standards Institute), 2009. ISO 31000: Risk Management – Principles and Guidelines. BSI, London.
- BSI (British Standards Institute), 2010. ISO 31010: Risk Management – Risk Assessment Techniques. BSI, London.
- Butterworth, J., Warner, J., Moriarty, P. *et al.*, 2010. Finding practical approaches to integrated water resources management. *Water Alternatives* 3: 68–81.
- Collins, K.B. and Ison, R.L., 2010. Trusting emergence: some experiences of learning about integrated catchment science with the Environment Agency of England and Wales. *Water Resources Management* 24: 669–688.
- Collins, A., Ohandja, D-G., Hoare, D. *et al.*, 2012. Implementing the Water Framework Directive: a transition from established monitoring networks in England and Wales. *Environmental Science and Policy* 17: 49–61.
- Conrad, C.C. and Hilchey, K.G., 2011. A review of citizen science and community-based environmental monitoring: issues and opportunities. *Environmental Monitoring and Assessment* 176: 272–291.
- Daly, D., Archbald, M., and Deakin, J., 2013. Water Framework Directive implementation and integrated catchment management. Where are we now? Where are we going? An EPA view. Paper presented at the Irish National Hydrology Conference.
- DECLG (Department of the Environment, Community and Local Government), 2014. *Working Group Report on Citizen Engagement with Local Government*. Report to the Minister for the Environment, Community and Local Government, Ireland. Available online: <http://www.environ.ie/en/Publications/Community/CommunityVoluntarySupports/FileDownload,36779,en.pdf> (accessed 21 May 2015).
- DEFRA (Department for Environment, Food & Rural Affairs), 2013. *Catchment Based Approach: Improving the Quality of our Water Environment*. DEFRA, London, UK.
- Donzier, J-F. and Ait Kadi, M., 2015. Foreword. In Brachet, C., Thalmeinerova, D. and Magnier, J. (eds). *The Handbook for Management and Restoration of Aquatic Ecosystems in River and Lake Basins*. Handbook produced for the International Network of Basin Organisations and the Global Water Partnership.
- Edeson, G. 2015. Updating integrated catchment management to improve the climate resilience of water-dependent communities. *Water Journal* 2015: 61–65.
- EPA (Environmental Protection Agency), 2015. *Drinking water report 2013*. EPA, Johnstown Castle, Ireland.
- Forslund, A., Renöfält, B.M., Barchesi, S. *et al.*, 2009. *Securing Water for Ecosystems and Human Well-being: the Importance of Environmental Flows*. Swedish Water House, Stockholm International Water Institute, Stockholm.
- Foster, S. and Ait-Kadi, M., 2012. Integrated water resources management (IWRM): how does groundwater fit in? *Hydrogeology Journal* 20: 415–418.
- Fraser, H., 2005. Four different approaches to community participation. *Community Development Journal* 40: 286–300.
- Fraser, E.D.G., Dougill, A.J., Mabee, W.E. *et al.*, 2006. Bottom up and top down: analysis of participatory processes for sustainability indicator identification as a pathway to community empowerment and sustainable environmental management. *Journal of Environmental Management* 78: 114–127.

- GWP (Global Water Partnership), 2000. *Integrated Water Resources Management*. Global Water Partnership Technical Advisory Committee Background Paper. GWP, Stockholm.
- GWP (Global Water Partnership), 2009. *A Handbook for Integrated Water Resources Management in Basins*. The Global Water Partnership in association with the International Network of Basin Organisations. GWP, Stockholm.
- Head, B.W., 2007. Community engagement: participation on whose terms? *Australian Journal of Political Science* 42: 441–454.
- Hearne, R., 2015. *The Irish Water War, Austerity and the 'Risen people'. An Analysis of Participant Opinions, Social and Political Impacts and Transformative Potential of the Irish Anti Water-charges Movement*. Available online: https://www.maynoothuniversity.ie/sites/default/files/assets/document/TheIrishWaterwar_0.pdf (accessed 9 October 2015).
- Hidaka, C.E., Jasperse, J., Kolar, H.R. *et al.*, 2011. Collaboration platforms in smarter water management. *IBM Journal of Research and Development* 55: 14:1–14:11.
- Hoff, H., 2011. *Understanding the Nexus*. Background paper for the Bonn2011 Conference: The Water, Energy and Food Nexus. Stockholm Environment Institute, Stockholm.
- Holmes, M.G.R., Young, A.R., Goodwin, T.H. *et al.*, 2005. A catchment-based water resource decision support tool for the United Kingdom. *Environmental Modelling and Software* 20: 197–202.
- House, M.A., 1999. Citizen participation in water management. *Water Science and Technology* 40: 125–130.
- IHP (International Hydrological Programme), 2001. *The Design and Implementation Strategy of the HELP Initiative*. International Hydrological Programme Technical Document in Hydrology Number 44. United Nations Educational, Scientific and Cultural Organization (UNESCO), Paris.
- INBO (International Network of Basin Organizations), 2014. *Stakeholder Engagement for Inclusive Water Governance*. INB, Paris.
- Irish Water, 2015. *Water Services Strategic Plan. A Plan for the Future of Water Services*. Available online: http://www.water.ie/docs/WSSP_Final.pdf (accessed 15 February 2016).
- Johnson, C., 2014. *Public Engagement, Not Just About the Public*. Involve: Sustainable Engagement, London, UK. Available online: <http://www.involve.org.uk/wp-content/uploads/2014/10/Public-engagement-not-just-about-the-public.pdf> (accessed 19 May 2015).
- Lenton, R.L. and Muller, M., 2009. *Integrated Water Resources Management in Practice: Better Water Management for Development*. Earthscan, London.
- Linnane, S., Jordan, S., McCarthy, V. *et al.*, 2011. *National Source Protection Pilot Project at Churchill and Oram Group Water Scheme County Monaghan*. Final Report 2005–2010. National Rural Water Services Committee.
- Liu, H.-Y., Kobernus, M., Broday, D. *et al.*, 2014. A conceptual approach to a citizens' observatory – supporting community-based environmental governance. *Environmental Health* 13: 107.
- Macleod, C.J.A., Scholefield, D. and Haygarth, P.M., 2007. Integration for sustainable catchment management. *Science of the Total Environment* 373: 591–602.
- Manyanhaire, I.O. and Nyaruwata, L., 2014. Interrogating the applicability of the Integrated Water Resources Management (IWRM) model. *Environment and Natural Resources Research* 4: 130–141.
- McCloskey, D.J., McDonald, M.A., Cook, J. *et al.*, 2011. Community engagement: Definitions and organising concepts from the literature. In *Principles of Community Engagement, Second Edition*. National Institute of Health, Bethesda, MD.
- McDonnell, R.A., 2008. Challenges for integrated water resources management: how do we provide the knowledge to support truly integrated thinking? *International Journal of Water Resources Development* 24: 131–143.
- McGonigle, D.F., Harris, R.C., McCamphill, C. *et al.*, 2012. Towards a more strategic approach to research to support catchment-based policy approaches to mitigate agricultural water pollution: a UK case-study. *Environmental Science and Policy* 24: 4–14.
- Medema, W., McIntosh, B.S. and Jeffrey, P.J., 2008. From premise to practice: a critical assessment of integrated water resources management and adaptive management approaches in the water sector. *Ecology and Society* 13: 29–44.
- OECD (Organisation for Economic Co-operation and Development), 2015. *OECD Principles on Water Governance*. Directorate for Public Governance and Territorial Development. Available online: <http://www.oecd.org/gov/regional-policy/OECD-Principles-on-Water-Governance-brochure.pdf> (accessed 8 June 2015).
- Placht, M., 2008. Integrated water resource management: incorporating integration, equity and efficiency to achieve sustainability. *International Development, Environment and Sustainability* 3: 3. Available online: http://fletcher.tufts.edu/~media/Fletcher/Microsites/CIERP/Ideas/3_ideas/PlachtMaria_IWRM.pdf (accessed 15 June 2016).

- Powe, N.A., Wadsworth, W.A., Garrod, G.D. *et al.*, 2004. Putting action into biodiversity planning: assessing preferences towards funding. *Journal of Environmental Planning and Management* 47: 287–301.
- QDES (Queensland Department of Emergency Services), 2001. *Charter for Community Engagement*. Community Engagement Unit, Strategic and Executive Services, Queensland Department of Emergency Services, Queensland, Australia.
- Rahaman, M.M., Varis, O. and Kajander, T., 2004. EU Water Framework Directive vs. integrated water resources management: the seven mismatches. *Water Resources Development*. 4: 565–575.
- RELU (Rural Economy and Land Use), 2010. *Catchment Management for the Protection of Water Resources*. Rural Economy and Land Use Project, Newcastle University, Newcastle, UK.
- RMIT (Royal Melbourne Institute of Technology), 2005. *Evaluation of the Stronger Families and Communities Strategy 2000–2004: Qualitative Cost Benefit Analysis*. RMIT University. Available online: <http://mams.rmit.edu.au/phhpu3ty2nm5.pdf> (accessed 4 September 2015).
- Smith, J.L., 2008. A critical appreciation of the “bottom-up” approach to sustainable water management: embracing complexity rather than desirability. *Local Environment* 13: 353–366.
- Smith, M. and Clausen, T.J., 2015. *Integrated Water Resource Management: A New Way Forward*. A discussion paper for the World Water Council Task Force on IWRM.
- Solanes, M. and Gonzalez-Villareal, F., 1999. *The Dublin Principles for Water as Reflected in a Comparative Assessment of Institutional and Legal Arrangements for Integrated Water Resources Management*. TAC Background Paper Number 3. The Global Water Partnership.
- Suter, G.W., 2006. *Ecological Risk Assessment*. Second Edition, CRC Press, London, UK.
- Tindale, S., 2013. Understanding a collaborative approach to catchment-based water quality management in the UK: a study of the lower River Wear pilot. Masters by Research, Durham University, Durham.
- Wallace, J.S., Acreman, M.C. and Sullivan, C.A., 2003. The sharing of water between society and ecosystems: from conflict to catchment-based co-management. *Philosophical Transactions of the Royal Society of London B: Biological Sciences* 358: 2011–2026.
- Wilkinson, C. and Brodie, J., 2011. *Catchment Management and Coral Reef Conservation: a Practical Guide for Coastal Resource Managers to Reduce Damage from Catchment Areas Based on Best Practice Case Studies*. Global Reef Monitoring Network and Reef and Rainforest Research Centre, Townsville, Australia.

Abbreviations

App	Application
CBA	Cost–benefit analysis
DWSP	Drinking water safety plan
EPA	Environmental Protection Agency
ICM	Integrated catchment management
IWRM	Integrated water resources management
NSPPP	National Source Protection Pilot Project
PPN	Public Participation Network
RBM	River basin management
TIME	Towards Integrated Water Management
WFD	Water Framework Directive

AN GHNÍOMHAIREACHT UM CHAOMHNÚ COMHSHAOIL

Tá an Gníomhaireacht um Chaomhnú Comhshaoil (GCC) freagrach as an gcomhshaoil a chaomhnú agus a fheabhsú mar shócmhainn luachmhar do mhuintir na hÉireann. Táimid tiomanta do dhaoine agus don chomhshaoil a chosaint ó éifeachtaí diobhálacha na radaíochta agus an truaillithe.

Is féidir obair na Gníomhaireachta a roinnt ina trí phríomhréimse:

Rialú: Déanaimid córais éifeachtacha rialaithe agus comhlionta comhshaoil a chur i bhfeidhm chun torthaí maithe comhshaoil a sholáthar agus chun diriú orthu siúd nach gcloíonn leis na córais sin.

Eolas: Soláthraimid sonraí, faisnéis agus measúnú comhshaoil atá ar ardchaighdeán, spriocdhírthe agus tráthúil chun bonn eolais a chur faoin gcimnteoireacht ar gach leibhéal.

Tacaíocht: Bímid ag saothrú i gcomhar le grúpaí eile chun tacú le comhshaoil atá glan, táirgiúil agus cosanta go maith, agus le hiompar a chuirfidh le comhshaoil inbhuanaithe.

Ár bhFreagrachtaí

Ceadúnú

Déanaimid na gníomhaíochtaí seo a leanas a rialú ionas nach ndéanann siad dochar do shláinte an phobail ná don chomhshaoil:

- saoráidí dramhaíola (*m.sh. láithreáin líonta talún, loisceoirí, stáisiúin aistrithe dramhaíola*);
- gníomhaíochtaí tionsclaíocha ar scála mór (*m.sh. déantúsaíocht cógaisíochta, déantúsaíocht stroighne, stáisiúin chumhachta*);
- an diantalmhaíocht (*m.sh. muca, éanlaith*);
- úsáid shrianta agus scaoileadh rialaithe Orgánach Géinmhodhnaithe (*OGM*);
- foinsí radaíochta ianúcháin (*m.sh. trealamh x-gha agus radaiteiripe, foinsí tionsclaíocha*);
- áiseanna móra stórála peitрил;
- scardadh dramhuisce;
- gníomhaíochtaí dumpála ar farraige.

Forfheidhmiú Náisiúnta i leith Cúrsaí Comhshaoil

- Clár náisiúnta iniúchtaí agus cigireachtaí a dhéanamh gach bliain ar shaoráidí a bhfuil ceadúnas ón nGníomhaireacht acu.
- Maoirseacht a dhéanamh ar fhreagrachtaí cosanta comhshaoil na n-údarás áitiúil.
- Caighdeán an uisce óil, arna sholáthar ag soláthraithe uisce phoiblí, a mhaoirsiú.
- Obair le húdaráis áitiúla agus le gníomhaireachtaí eile chun dul i ngleic le coireanna comhshaoil trí chomhordú a dhéanamh ar líonra forfheidhmiúcháin náisiúnta, trí dhíriú ar chiontóirí, agus trí mhaoirsiú a dhéanamh ar leasúchán.
- Cur i bhfeidhm rialachán ar nós na Rialachán um Dhramhthrealamh Leictreach agus Leictreonach (DTLL), um Shrian ar Shubstaintí Guaiseacha agus na Rialachán um rialú ar shubstaintí a ídionn an ciseal ózóin.
- An dlí a chur orthu siúd a bhriseann dlí an chomhshaoil agus a dhéanann dochar don chomhshaoil.

Bainistíocht Uisce

- Monatóireacht agus tuairisciú a dhéanamh ar cháilíocht aibhneacha, lochanna, uisce idirchriosacha agus cósta na hÉireann, agus screamhuisc; leibhéil uisce agus sruthanna aibhneacha a thomhas.
- Comhordú náisiúnta agus maoirsiú a dhéanamh ar an gCreat-Treoir Uisce.
- Monatóireacht agus tuairisciú a dhéanamh ar Cháilíocht an Uisce Snámha.

Monatóireacht, Anailís agus Tuairisciú ar an gComhshaoil

- Monatóireacht a dhéanamh ar cháilíocht an aeir agus Treoir an AE maidir le hAer Glan don Eoraip (CAFÉ) a chur chun feidhme.
- Tuairisciú neamhspleách le cabhrú le cinnteoireacht an rialtais náisiúnta agus na n-údarás áitiúil (*m.sh. tuairisciú tréimhsiúil ar staid Chomhshaoil na hÉireann agus Tuarascálacha ar Tháscairí*).

Rialú Astaíochtaí na nGás Ceaptha Teasa in Éirinn

- Fardail agus réamh-mheastacháin na hÉireann maidir le gáis cheaptha teasa a ullmhú.
- An Treoir maidir le Trádáil Astaíochtaí a chur chun feidhme i gcomhair breis agus 100 de na táirgeoirí dé-ocsaíde carbóin is mó in Éirinn.

Taighde agus Forbairt Comhshaoil

- Taighde comhshaoil a chistiú chun brúnna a shainnaint, bonn eolais a chur faoi bheartais, agus réitigh a sholáthar i réimsí na haeráide, an uisce agus na hinbhuanaitheachta.

Measúnacht Straitéiseach Timpeallachta

- Measúnacht a dhéanamh ar thionchar pleananna agus clár beartaithe ar an gcomhshaoil in Éirinn (*m.sh. mórfheananna forbartha*).

Cosaint Raideolaíoch

- Monatóireacht a dhéanamh ar leibhéil radaíochta, measúnacht a dhéanamh ar nochtaid mhuintir na hÉireann don radaíocht ianúcháin.
- Cabhrú le pleananna náisiúnta a fhorbairt le haghaidh éigeandálaí ag eascairt as taismí núicléacha.
- Monatóireacht a dhéanamh ar fhorbairtí thar lear a bhaineann le saoráidí núicléacha agus leis an tsábháilteacht raideolaíochta.
- Sainseirbhísí cosanta ar an radaíocht a sholáthar, nó maoirsiú a dhéanamh ar sholáthar na seirbhísí sin.

Treoir, Faisnéis Inrochtana agus Oideachas

- Comhairle agus treoir a chur ar fáil d'earnáil na tionsclaíochta agus don phobal maidir le hábhair a bhaineann le caomhnú an chomhshaoil agus leis an gcosaint raideolaíoch.
- Faisnéis thráthúil ar an gcomhshaoil ar a bhfuil fáil éasca a chur ar fáil chun rannpháirtíocht an phobail a spreagadh sa chinnteoireacht i ndáil leis an gcomhshaoil (*m.sh. Timpeall an Tí, léarscáileanna radóin*).
- Comhairle a chur ar fáil don Rialtas maidir le hábhair a bhaineann leis an tsábháilteacht raideolaíoch agus le cúrsaí práinnfhreagartha.
- Plean Náisiúnta Bainistíochta Dramhaíola Guaisí a fhorbairt chun dramhail ghuaiseach a chosc agus a bhainistiú.

Múscailt Feasachta agus Athrú Iompraíochta

- Feasacht chomhshaoil níos fearr a ghiniúint agus dul i bhfeidhm ar athrú iompraíochta dearfach trí thacú le gnóthais, le pobail agus le teaghlaigh a bheith níos éifeachtúla ar acmhainní.
- Tástáil le haghaidh radóin a chur chun cinn i dtithe agus in ionaid oibre, agus gníomhartha leasúcháin a spreagadh nuair is gá.

Bainistíocht agus struchtúr na Gníomhaireachta um Chaomhnú Comhshaoil

Tá an ghníomhaíocht á bainistiú ag Bord Iánamseartha, ar a bhfuil Ard-Stiúrthóir agus cúigear Stiúrthóirí. Déantar an obair ar fud cúig cinn d'Oifigí:

- An Oifig um Inmharthanacht Comhshaoil
- An Oifig Forfheidhmithe i leith cúrsaí Comhshaoil
- An Oifig um Fianaise is Measúnú
- An Oifig um Cosaint Raideolaíoch
- An Oifig Cumarsáide agus Seirbhísí Corparáideacha

Tá Coiste Comhairleach ag an nGníomhaireacht le cabhrú léi. Tá dáréag comhaltai air agus tagann siad le chéile go rialta le plé a dhéanamh ar ábhair inniú agus le comhairle a chur ar an mBord.

Towards Integrated Water Management (TIme)



Authors: Alec Rolston, Eleanor Jennings and Suzanne Linnane

Identifying Pressures

An opportunity exists for coordination at the national level to carefully plan and manage local resources in collaboration and partnership with communities and to harness the goodwill that successful partnerships can produce.

This research has examined international best practice in Integrated Water Resources Management, Integrated Catchment Management (ICM) and community engagement to identify key gaps that exist in water-focussed community engagement initiatives in Ireland.

A survey assessing current opinion in water management and community engagement undertaken in April 2015 identified that 81 % of respondents did not feel included in decisions about their water environment. However, an overwhelming 95 % of respondents stated that local communities should have a say in how the water environment is managed.

Informing Policy

This research has identified the risks and qualitative costs and benefits associated with both filling and not filling the key gaps in current water management and community engagement processes. These results will inform water-related engagement practices in Ireland, particularly in regard to the second round of River Basin Management Planning for national implementation of the EU Water Framework Directive.

In addition, a process has been developed for protecting the drinking water sources of larger urban areas in larger catchments in order to identify priority areas where both management actions and community engagement initiatives can be implemented.

Developing Solutions

This research has identified clear avenues about ways governing bodies in Ireland can engage and empower local communities in water-related management actions, leading to a more integrated water-focussed society in Ireland. These solutions include:

1. Developing a national water management and community engagement framework to provide guidance and consistency for engagement initiatives into the future.
2. Investigating priority locations for the establishment of community-managed hubs as focal points for community access to ICM information and resources.
3. Developing strategic initiatives to encourage local businesses to support local water management actions.
4. Developing national ICM-focussed primary and secondary school educational initiatives.
5. Developing and providing support to ICM-centred citizen science initiatives.
6. Increasing the number and frequency of local ICM-focussed initiatives that communities can become involved with.
7. Undertaking engagement initiatives to raise awareness of local water management issues and how local communities can be involved in mitigation and support strategies.
8. Developing a framework for the appropriate monitoring and evaluation of engagement initiatives.
9. Initiating a one-stop website which provides guidance and advice on ICM.