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epa Research
Climate - Water - Sustainability
Identifying pressures • Informing policy • Developing solutions

Delivering Integrated Catchment

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Comhshaol, Pobal agus Rialtas Áitiúil
Environment, Community and Local Government

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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.*

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

Our Responsibilities

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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;
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- 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.

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- National coordination and oversight of the Water Framework Directive.
- Monitoring and reporting on Bathing Water Quality.

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- 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)*.

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- Preparing Ireland's greenhouse gas inventories and projections.
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- Funding environmental research to identify pressures, inform policy and provide solutions in the areas of climate, water and sustainability.

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- 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.
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- Providing advice and guidance to industry and the public on environmental and radiological protection topics.
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- Advising Government on matters relating to radiological safety and emergency response.
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- Generating greater environmental awareness and influencing positive behavioural change by supporting businesses, communities and householders to become more resource efficient.
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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

Delivering Integrated Catchment Management through the Bottom-up Approach: A Critical Analysis

(2014-W-DS-23)

EPA Synthesis Report

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

Prepared for the Environmental Protection Agency

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Executive Summary

Managing our water is essential to support life and protect our ecosystems. Integrated catchment management (ICM) is about bringing water issues, people and organisations together at the right scale in order to achieve effective management solutions that benefit all stakeholders. It incorporates what legislation says we need to do (i.e. from the top down) with the aspirations of the community (i.e. from the bottom up). It integrates environmental, economic and social issues within a catchment into a coherent management strategy. Expert guidance can help communities to participate in the development and implementation of an agreed vision of sustainable land and water use for their catchment.

The Environmental Protection Agency (EPA)-funded project entitled "Delivering Integrated Catchment Management: A Bottom-up Approach" demonstrates the benefits of bringing water issues, people and organisations together at the right scale in order to achieve effective management solutions that benefit all stakeholders. This approach is of direct relevance to the Water Framework Directive (WFD; Directive 2000/60/EC) and, therefore, to river basin district managers and environmental regulators. The end of project report (Ballinger *et al.*, 2016) is available at http://erc.epa.ie/safer/reports. A synthesis of the results is outlined in Table ES1, in accordance with the four objectives of the project:

- to document a real-time practical example of how ICM can operate through a bottom-up approach;
- to examine Irish examples of the bottom-up approach to catchment management;
- to research international experiences of ICM;
- to utilise theory and real-life experiences to develop a guide for collaborative catchment management in Ireland.

This study examined how the ICM approach has been implemented in Ireland and abroad, while also focusing on an existing ICM approach on the River Allow in County Cork. In order to fulfil the first objective of the research, the River Allow Catchment Management Group (RACMG) was examined as a real-time practical example of bottom-up engagement with local communities and key stakeholders. The local partnership approach adopted in the RACMG is a functional and iterative process, which is constantly evolving. The approach centres principally on catchment works on the ground and stakeholder management group meetings. RACMG meetings have provided a forum for pooling stakeholder interests, knowledge, skills, resources and actions. Bringing this group together has enabled increased social, economic and political awareness of issues on the River Allow, thus ensuring the generation of maximum added value (Table ES1). The added value lies in the group's potentially long-term outcomes, resilience and lower costs of implementing catchment works.

Ten case studies from Ireland (Allow, Bantry Bay, Burren, Mulkear, Owenmore, Owenduff, Glenamoy, Lough Leane, Lough Melvin, Raised Bog Conservation) and eight case studies from abroad (UK, Netherlands, New Zealand, Australia, USA, Canada) were critically examined in accordance with project objectives 2 and

Table ES1. Application of the AEIDL (1997) framework to the IRD Duhallow Allow Catchment Management Partnership using quantitative and qualitative indicators

Bringing together		Awareness	Viewpoints	Interests	Abilities to mobilise	Know-how
Partnership approach	Community and voluntary					
	Social partners					
	Public sector and local authorities					
Allows the following to be realised		*Knowledge*	*New ideas*	*More mature projects*	*Effective implementation*	*Durability*
		Opportunities	*Innovation*	*Integration of interests*	*Better risk management*	*Ongoing review*

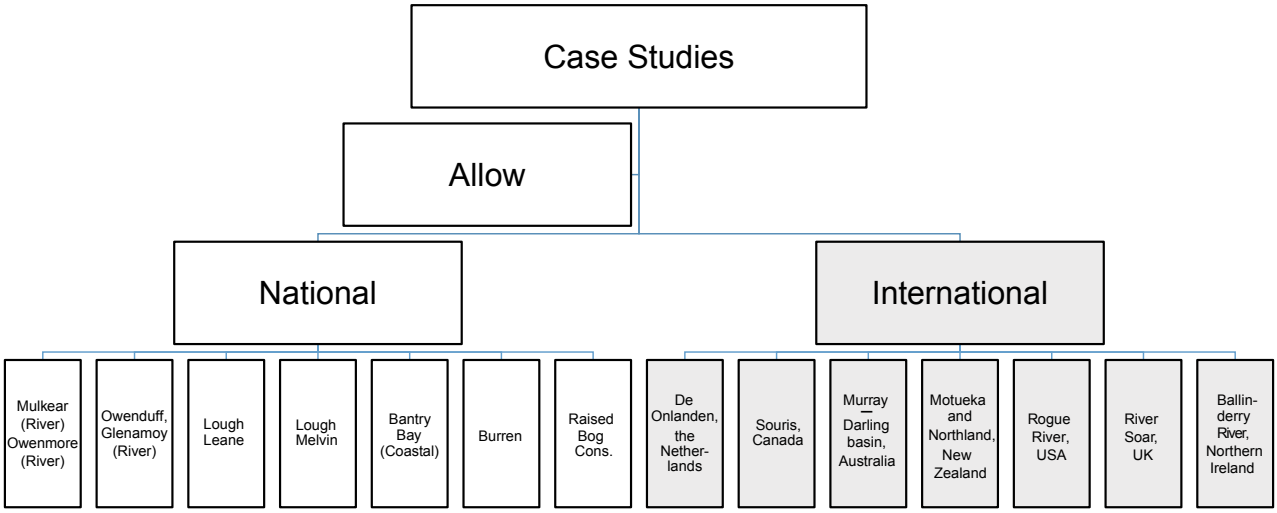

Figure ES1. National and international case studies utilised in the project.

3 (Figure ES1). Interviews were conducted with programme managers and key stakeholders. Problems, including gaps, barriers and constraints encountered in the implementation of an ICM programme, were identified, and recommendations were made to help guide the management of a collaborative catchment group. While the governance structures and objectives varied between projects, they all utilised collaborative processes within an ICM framework.

The final objective of the study, to develop a guide for collaborative catchment management in Ireland, was based on the projects reviewed and experience on the ground in the Allow catchment. Three key phases are identified in the collaborative ICM process: establishing collaborative groups, running collaborative groups, and implementing collaborative group recommendations (Figure ES2). At each phase, recommendations are made on how to complete the process. Guidance for implementing collaborative processes has been produced. However, it is important to recognise that there is no single approach to collaboration, as each process will develop in response to individual catchment circumstances.

Finally, a number of key lessons were identified. First, adequate funding should be secured before undertaking collaborative ICM projects. Resources are required to commence the collaborative process, sustain the process in the long term and, most importantly, to implement the actions in the catchment management plan. Failure to implement the plan creates resentment within the community and will hinder engagement in the future. Second, the use of creative "hooks" to engage local stakeholders is critical to ensure that a wide range of community interests are represented in the process. The most successful projects integrated both social and environmental science to meet community social needs. Third, the benefit of statutory authority-led projects is the availability of resources and technical expertise. However, statutory authorities often struggle to engage with local communities (outside traditional stakeholders). An alternative is the use of perceived "neutral brokers", such as non-governmental organisations (NGOs), river trusts or rural development companies to lead the process. This model has met with considerable success overseas. However, the success of this model requires statutory authorities to engage with and support the process. Putting co-operative and predetermined governance structures in place for their involvement with future ICM projects is essential. The recent establishment of the Local Authority Water and Communities Office will make an important contribution in this regard, and it is expected that this unit will actively support ICM groups. However, it is unclear how this will influence individual statutory authority involvement in ICM initiatives.

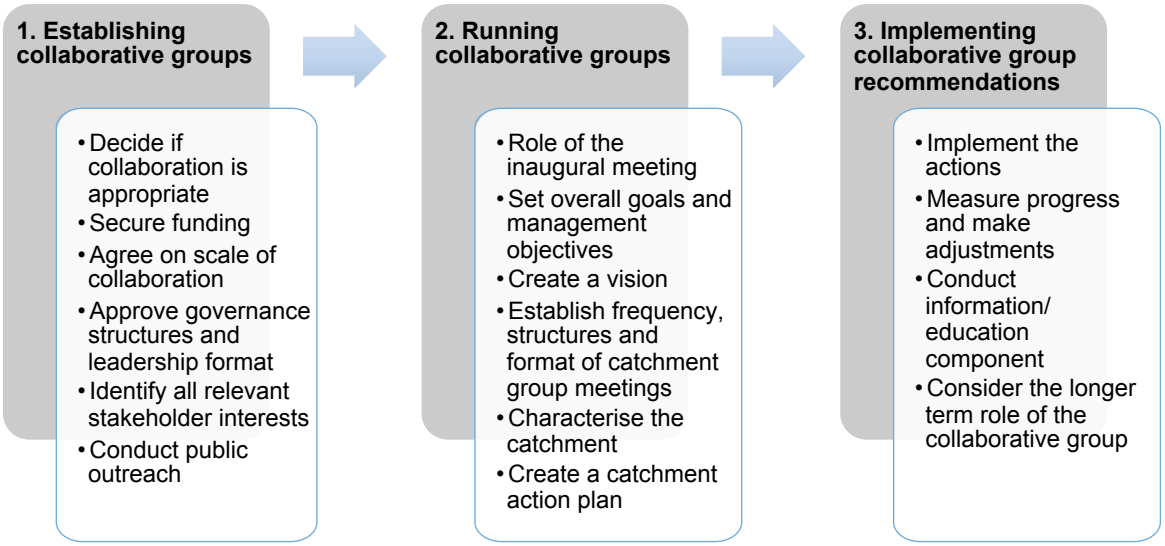

Figure ES2. Key phases of the collaborative ICM process.

1 Introduction

Managing our water is essential to support life and protect our ecosystems. Integrated catchment management (ICM) is about bringing water issues, and the people and organisations that can do something about them together at the right scale to deliver effective solutions and multiple benefits. It is a targeted approach to catchment management and is a long-term process, in which each step incrementally builds upon the next. It aims to integrate environmental, economic and social issues within a catchment into a coherent management strategy. Expert guidance can help communities to participate in the development and implementation of an agreed vision of sustainable land and water use for their catchment. Co-ordinated management of water, land and related resources are promoted from the bottom up, thereby maximising benefits to the community.

This study examined how the ICM approach has been implemented in Ireland and abroad, while also focusing on an existing ICM approach on the River Allow in County Cork. The River Allow Catchment Management Group (RACMG) was examined as a real-time practical example of bottom-up engagement with local communities and key stakeholders. Ten case studies from Ireland (Allow, Bantry Bay, Burren, Mulkear, Owenmore, Owenduff, Glenamoy, Lough Leane, Lough Melvin, Raised Bog Conservation) and eight case studies from abroad (UK, Netherlands, New Zealand, Australia, USA, Canada) were critically examined. Interviews were conducted with programme managers and key stakeholders. Problems, including gaps, barriers and constraints encountered in the implementation of an ICM programme, were identified and recommendations were made to help guide the management of collaborative catchment groups. The information thus gathered will contribute towards the wider roll-out of ICM programmes in Ireland.

2 An Overview of Water Management in Ireland

The EU Water Framework Directive (WFD; Directive 2000/60/EC) governs water management in Ireland. Its regulations include a programme of measures, to be set out in river basin management plans (RBMPs), for improving water quality across catchments, and requires Member States to achieve good water quality status.

Numerous organisations in Ireland are responsible for the water environment, but there is no one body or structure with overall control. Consequently, problems arise when attempts are made to co-ordinate disparate bodies and individuals, who may have pertinent local knowledge. Another issue is that public bodies in Ireland are often associated with the role of enforcers and regulators, and may be viewed with suspicion by local people. Effective water management requires broad engagement, and this means that past grievances/negative opinions need to be put aside. Critically, stakeholders and the public have not been fully engaged in the process to date. This remains one of the core reasons why the measures contained within RBMPs have not had the desired impact on the ground and circumstantial delays have resulted in sub-basin management plans not being fully implemented under the originally planned time frame.

The WFD requires that integrated management plans be prepared at a river basin level regardless of administrative or political boundaries. Seven river basin districts cover Ireland, and one is exclusively in Northern Ireland. The first cycle of RBMPs was published in 2010, but the plans were criticised for the lack of community input during their development (SWAN, 2012). Planning is currently under way for the second cycle, which will be adopted in 2017 and will run until 2021. There has been a delay in producing the second cycle of RBMPs due to reform of the water sector in Ireland.

A new three-tier governance framework has been established to support WFD implementation in Ireland. In tier 1, a water policy advisory committee made up of government agencies has been established. In tier 2, the EPA is responsible for technical implementation, networking and reporting. The EPA has established a Catchment Science and Management Unit to work with local authorities, other public authorities, government agencies and local communities. A key focus of the EPA's work will be integrating existing knowledge from a range of disciplines with data on the pressures that are impacting water bodies in Ireland. By integrating these data, an understanding of how pressures and geology, hydrology and ecology are linked will help the EPA to develop plans and measures to improve water resources (EPA, 2015). In tier 3, the Local Authority Water and Communities Office (LAWCO) is tasked with co-ordinating public participation at the regional level. There are new obligations on local authorities to co-ordinate catchment management and public participation to deliver the RBMPs and Programmes of Measures.

In Ireland to date, the main emphasis with regard to water quality has been on inspection and compliance. This top-down approach is essential, but on its own it may not work owing to a lack of stakeholder participation. The involvement of local communities is vital, as it can result in a greater sense of ownership, or buy-in, to water quality improvement plans.

2.1 Research Objectives

The objectives of this research project were:

- to use the RACMG as a real-time practical example of how ICM can operate through a bottom-up approach, and to ascertain how the local community can be motivated to take more ownership in water management;
- to examine Irish examples of the bottom-up approach to catchment management and detail the difficulties encountered, identify solutions, and document the successes and to conduct interviews to gain the opinions of project managers and key stakeholders nationally;
- to research international experiences of ICM to discover their potential applications in an Irish context, and to conduct interviews with international catchment managers to gain an understanding of their models;
- to utilise theory and real-life experiences from international and Irish ICM projects (including the RACMG) to develop a guide for collaborative catchment management in Ireland.

3 IRD DuhallowLIFE

IRD Duhallow administers a range of governmental social inclusion and income support schemes including the Rural Social Scheme and Tús. It was the first rural development company to compete successfully for EU LIFE funding, which is a financial instrument aimed at the conservation of wildlife sites of EU importance (Natura 2000 network). The €1.9 million DuhallowLIFE project commenced in 2010, and is aimed at the conservation of freshwater pearl mussel (*Margaritifera margaritifera*), otter (*Lutra lutra*), Atlantic salmon (*Salmo salar*), kingfisher (*Alcedo atthis*) and dipper (*Cinclus cinclus*).

This project includes environmental works on a large scale including tree planting, fencing and riparian management, development and placement of nest boxes for birds, and artificial holts for otters. A large-scale invasive species eradication programme was also undertaken in tandem with a comprehensive community awareness-raising programme through workshops, educational lectures, a range of publicity material and signage, school visits, and river demonstration field trips. Monitoring of activities was carried out, often in partnership with universities. Most of the on-the-ground project actions targeted the River Allow, a sub-catchment of the River Blackwater (Igoe *et al.*, 2015).

Although agriculture presented particular problems for water and biodiversity management in the Allow, the involvement of farmers at every level in both landscape and conservation planning has been essential to the project's success to date. The RACMG presented learning opportunities for all involved. Applying the principles of ICM, DuhallowLIFE has formed partnerships with the landowners and other stakeholders in an effort to find practical solutions to conservation issues on the ground. At the request of these farmers, DuhallowLIFE worked with their partners to develop a locally led agri-environment scheme tailored to the Allow catchment (Igoe *et al.*, 2015). The qualification and quantification of "added value" of the Allow catchment management approach have allowed multiple benefits, actions and targets to be realised along the evolving route of the ICM trajectory (Table 3.1). This has enabled attendees to gain geographic and scientific knowledge of the catchment, identified opportunities and innovative ideas, and framed more effective and mature projects guaranteeing sustainability in the longer term.

Table 3.1. Application of the AEIDL (1997) framework to the IRD Duhallow Allow Catchment Management Partnership using quantitative and qualitative indicators

Bringing together		Awareness	Viewpoints	Interests	Abilities to mobilise	Know-how
IRD Duhallow - community-based rural development company with multiple stakeholders and a forum for collective action	Community forum/ civil society	6 meetings, average attendance of 30 History and folklore Changing farming and uses of the river	25 community representatives, 6 meetings, 75 person-hours Feasibility and local applicability of proposals from external bodies	Communication of views of local citizens to the management team and feedback from management Maintaining a pristine, living and vibrant countryside with active, working farms	82 school visits, 239 school biodiversity surveys, 120,000 newsletters, 48 field visits Volunteers, schools, youth clubs and societies, leisure and recreational interests	215 public sector and elected members informed, 90 people attended ICM workshop in November 2014
	Social partners (farmers, businesses and NGOs)	60 farmers, businesses and NGOs attended 6 meetings, 180 person-hours Awareness of the river's economic and service potential, given changing demands in rural economy	Advise on project feasibility, saving consultancy buy-in Project feasibility timescale, realisable actions and maximum local support	Farmers, businesses and NGOs attended 12 regional/ national meetings promoting Allow project Ensuring the profitability and viability of local farms while valuing the natural resource	Himalayan balsam removed (40 km), fencing (30 km), tree planting, nest boxes Knowledge and human capital – networks of farmers/ landowners and national bodies	90 social partners educated in ICM through attending the ICM workshop in Clarion Hotel, Cork (November 2014)
	Local authorities	30 officials, 6 meetings, 90 person-hours Demographic, planning, land use demands	1 reference to project in the Cork County Development Plan (2015–2021) 1 reference to project in the Kerry County Development Plan (2015–2021)	Conservation of water and other resources and local economic development	Approx. €42,391 in benefits in kind and for funding specific initiatives	10 local authority officials now aware of and referencing the Allow project No formal training has taken place to increase technical know-how and scientific expertise
	Statutory authorities	33 officials, 6 meetings, 99 person-hours National and EU legislation and potential policy developments	1 draft guidance document	1 seminar presented this as best practice	Approx. €94,500 catch-funding/ benefits in kind: 5 personnel benefiting	Know-how from the River Allow ICM process communicated to 2 other catchments

4 Summary of Irish Case Studies

The following section summarises the findings from 13 interviews (with nine catchment managers and four stakeholders), for 10 collaborative projects in Ireland (Table 4.1). Of those interviews, three of the interviewees (Fran Igoe, Oisin Naughten, Ruairí Ó Conchúir) were catchment managers for the Mulkear pilot and LIFE programmes. Four stakeholder interviews were also conducted on the Mulkear project (Enda Mooney, John Madden, Mike Fitzsimons, Tony Tuohey). The six remaining interviews were with individuals in a catchment manager or facilitator role. Donnacha Doody was interviewed for Lough Melvin; Alan Barr for Raised Bog Conservation; Bryan Kennedy for the Owenmore, Owenduff, and Glenamoy projects; Grace Glasgow for Lough Leane; Breeda Murphy for the Bantry Bay Charter; and Brendan Dunford for the BurrenLIFE initiative.

4.1 Lead Organisations and Programme Implementation

All projects were a mixture of top-down and bottom-up implementation. While government agencies led all but one of the projects, there was an emphasis on bottom-up consensus-based decision-making. However, when government agencies lead a process, there is a risk that local stakeholders are not involved in the initial application stage, which can affect community buy-in. This was the case in Lough Melvin where there was little community involvement, which contrasts with the Burren initiative which was initiated by farmers in the area.

4.2 Source of Funding

For the most part, resources were provided by the lead organisation and/or through EU LIFE funding. The length of the projects ranged from 3 years (Lough Melvin) to 17 years (Mulkear) with a median length of 5 years. Typically, projects last long enough to form a collaborative group and develop a management plan, followed by plan implementation.

4.3 Staffing Levels

The highest level of staffing was five full-time staff in Lough Melvin [one at Teagasc, three at Inland Fisheries Ireland (IFI), and one at the Agri-Food and Biosciences Institute (AFBINI)]. This was followed by the Burren, with one full-time researcher during the initial phase, and four full-time staff during the agri-environmental scheme phase. DuhallowLIFE had two full-time and one part-time staff member. The Mulkear and Bantry Bay projects had two full-time staff, while the Lough Leane project had a part-time manager and a full-time monitoring officer. The remaining projects (Raised Bog, Owenmore, Owenduff and Glenamoy) had one full-time staff member.

4.4 Catchment Issues Addressed

All projects were undertaken in catchments that contained Special Areas of Conservation (SACs) or Special Protection Areas (SPAs). In the two lake projects (Loughs Melvin and Leane), eutrophication was the main issue of concern. The five river projects (Allow, Mulkear, Owenmore, Owenduff and Glenamoy) covered a more diverse set of issues including angling, invasive species, eutrophication, sedimentation, habitat restoration, public awareness and education. The Raised Bog group covered all aspects of bog ecosystem services (e.g. carbon storage, biodiversity, amenity and landscape). BurrenLIFE dealt with agricultural land management to protect unique habitats and cultural heritage. The Bantry Bay Charter covered the most diverse range of topics including angling, water quality, tourism, aquaculture, wild fisheries and public access to the bay.

4.5 Stakeholder Engagement

All projects held stakeholder meetings, usually every 2–3 months. In one case there were biannual meetings (Bantry Bay), but these were supplemented with monthly working group meetings. The working groups reported back to the larger round-table group during their biannual meetings.

Table 4.1. Summary of Irish ICM projects based on interviews and survey questionnaire

ICM project	Allow	Bantry Bay Charter	BurrenLIFE	Conservation of Raised Bogs	Mulkear	Owenmore, Owenduff and Glenamoy	Lough Leane	Lough Melvin
Lead organisation	NGO	Cork County Council	NPWS and DAFM	DAHG and NPWS	IFI	IFI	Kerry Co. Council	AFBINI, NRFB and IFI
Main funding source	EU LIFE	EU LIFE	DAFM, NPWS and EU LIFE	DAHG	EU LIFE	DAFM	EU LIFE	Interreg
Project length (years)	5 (ongoing)	4	5 (ongoing)	3	18 (ongoing)	7	6	3
Staffing	2.5	2	1 + 4	1	2	1	2	5
Main issues	Angling, invasive species, nutrients, sediment, habitat restoration, public awareness	Angling, water quality, tourism, aquaculture, wild fisheries, public access	Farm biodiversity, cultural heritage	Carbon storage, biodiversity, amenity, landscape	Angling, invasive species, nutrients, sediment, habitat restoration, public awareness	Angling, invasive species, nutrients, sediment, habitat restoration, public awareness	Eutrophication	Eutrophication
Stakeholder meetings	2–3 monthly	1–2 monthly	Quarterly	1–2 monthly	Monthly	2–3 monthly	2–3	Not answered
Main results	Catchment plan Agri-environment plan Restoration Work on invasive species Public awareness Monitoring	Catchment plan No development areas	Implemented Agri-environment plan Improved farm biodiversity Improved farm infrastructure	National Raised Bog SAC Management Plan	Catchment plan Restoration Public awareness Monitoring	Catchment plan Restoration Public awareness Access to river Monitoring	Catchment plan Infrastructure improvements Public awareness	Catchment plan Implementation of actions
Evaluation	Yes – EU LIFE	Yes – UCC	Yes – DAFM audited 10% of farms	No	Yes – EU LIFE	No	Yes – Kerry Co. Council	Not answered
Main weaknesses	Freshwater pearl mussel sub-basin plans not adopted Planning requirement for SACs and SAPs	Catchment plan not implemented	Insufficient funding Highly bureaucratic	A reactive project	Stakeholder participation	Agency participation	Lack of funds to maintain work Poor political will	Stakeholder engagement No group or local champion
Aspects that are transferrable	Novel stakeholder engagement “hooks”	Secure funding commitment in advance	Put the farmer at the centre of a local approach	Decisions supported by science	Best practice guidelines	Generic process Facilitation skills key	Very effective community group *in situ*	Agricultural best practice guidelines

AFBINI, Agri-Food and Biosciences Institute; DAFM, Department of Agriculture, Food and the Marine; DAHG, Department of Arts, Heritage and the Gaeltacht; IFI, Inland Fisheries Ireland; NGO, non-governmental organisation; NPWS, National Parks and Wildlife Service; NRFB, Northern Regional Fisheries Board; UCC, University College Cork.

All stakeholder meetings were held in the lead organisation buildings or neutral public spaces such as community halls. In most cases, a facilitator from the lead organisation would host the meeting except in Lough Leane, where Kerry County Council facilitated while a member from the stakeholder group chaired the meeting. In addition to round-table discussions, experts were invited to speak and field trips were arranged. Feedback from a number of projects (e.g. Mulkear, Allow, Burren) highlighted the importance of field trips and workshops, especially where school children were involved. Basic refreshments (hot drinks and snacks) were provided at all meetings. Meetings held during the day were good for government agencies and resulted in good turnout, but did not suit many volunteer stakeholders, particularly those who had their everyday jobs to do. To alleviate this, some projects held their meetings in the late afternoon, which increased volunteer turnout.

The level of attendance at meetings ranged from high (Allow, Mulkear, Bantry Bay and Burren) to moderate (Raised Bog, Owenmore, Owenduff, Glenamoy, Lough Melvin and Lough Leane). Generally, there was an incremental increase in participation as the projects progressed, with initial information-sharing developing into action-based planning. Out of the 10 projects, the stakeholders that were deemed to have benefited the most were anglers, conservationists, water quality professionals and government agencies (Mulkear, Allow, Owenmore, Owenduff, Glenamoy, Lough Melvin and Lough Leane). Economic considerations formed an important part of the discussion in Bantry Bay and the Burren, with the fishing industry, tourism, and farming interests deemed to have benefited the most. In the Raised Bog collaboration, conservationists and turf cutters were equally deemed to have a lot to gain or lose.

The level of stakeholder engagement varied across the board with a lot depending on individual personalities, irrespective of organisation. Anglers, conservationists and some government agencies typically had high levels of engagement, whereas industry, farmers and landowners were slower to engage. The use of creative "hooks" to encourage engagement proved particularly useful to engage these stakeholders. For example, the development of bespoke agri-environmental schemes resulted in strong support from the farming community in the Burren and the Allow catchment.

4.6 Main Results of Projects and Independent Evaluation

By the end of the collaborative process, a variety of action plans were produced for all 10 Irish projects. In addition to actions on the ground, the process of getting everyone together to discuss issues and areas of commonality proved invaluable from a community cohesion perspective.

Evaluating the effectiveness of actions on the ground remains a difficulty for many collaborative projects. Understandably, this is largely due to the limited funding available being prioritised for actions on the ground, rather than outcome monitoring. That said, projects that receive LIFE funding are subject to review, and the Bantry Bay Charter was evaluated by University College Cork. Furthermore, Kerry County Council evaluated the Lough Leane project, and the Department of Agriculture, Forestry and the Marine (DAFM) audited 10% of the farms in the Burren Farming for Conservation Programme.

4.7 Main Weaknesses

The main issue that DuhallowLIFE faced was the planning system burden (delays in licensing, and a heavy bureaucratic burden beyond the capacity of most community groups in terms of both finance and resource capacity). The costs associated with planning permission accounted for 50% of the overall cost on some river bank remediation projects. It is the opinion of the former project manager, Dr Fran Igoe, that a more supportive planning regulatory approach is needed because the present system will likely mean that community-led catchment management will be limited in, or even precluded from, undertaking river restoration works in the future.

The project in Lough Melvin was the second initiative set up by government agencies to deal with degrading water quality in the catchment. The process would have been more successful had there been an established community group or local champion to help drive the project. To help develop community engagement, stakeholders should have been involved earlier in the process.

The Raised Bog project was reactive in that the bogs were designated SACs without consultation. This further entrenched the opposing views of turf cutters and conservationists. A lack of political will to implement

tougher measures was also an issue, as was the lack of resources to maintain bog restoration work.

Securing sufficient funding was the main problem in the Burren. Furthermore, the amount of time spent on completing bureaucratic work as a result of the SAC designation was high, paralleling the experience of DuhallowLIFE.

The lack of long-term project funding for Bantry Bay was deeply disappointing to the stakeholders who developed the charter. An enormous amount of voluntary time went into the charter with the long-term intention of incorporating it into local authority plans. While Cork County Council shared this vision, the financial crisis and a lack of support from central government meant there was no funding available for charter implementation. This has culminated in the stakeholders in Bantry Bay being reluctant to trust or invest their time in such initiatives in the future. This reinforces the lesson of securing long-term commitments before engaging in a collaborative project that raises stakeholders' expectations.

Some of the Irish projects reviewed (Mulkear Pilot, Glenamoy River, Bantry Bay and BurrenLIFE) stated that there was a lack of representation from some statutory authorities in the process. This ranged from staff changes between meetings, which proved problematic for continuity, to agencies not sending representatives at all. For the process to work, it is vital that all stakeholders are represented, particularly if the stakeholder is a competent authority. This is especially important when solutions to problems are proposed, so they can be assessed as to whether or not they are realistic and achievable, given existing policy and planning restrictions. Undoubtedly, one of the reasons that some authorities do not participate is because of resourcing issues related to the recent financial recession. The costs of participating in a collaborative process (time, resources, travel) for statutory authorities can be significant. This is especially true during the initial phase in which stakeholders share information, develop trust and agree on values and objectives for the catchment. This is compounded by the deliberative nature of the collaborative process, and the potential proliferation of many locally led groups. This is a particular issue for those authorities responsible for managing large areas. It was felt that a statutory function may be required, as otherwise some authorities will be reluctant to get involved in ICM initiatives.

Among statutory authorities, there were jurisdictional problems in deciding who had responsibility for different activities in the catchment (e.g. Bantry Bay). To date, many statutory authorities have operated independently, but the ICM approach requires authorities to work collectively. Putting co-operative and predetermined governance structures in place within statutory authorities for their involvement with future ICM projects would be beneficial.

4.8 Aspects of the Process that are Transferable

The skills and personality of the group facilitator (co-ordinator) is central to the success of the project. Where possible, the facilitator should be local and display a neutral perspective. If possible, funding to cover project formation, plan development and implementation should be secured before undertaking a collaborative process. In the initial stages, it is important to involve all stakeholders when setting the terms of reference. This will help with stakeholder buy-in to the process. To achieve widespread community engagement, it is essential to have a hook to catch stakeholders' attention: keep it relevant, keep it local.

5 Summary of International ICM Case Studies

This following section summarises the findings from seven interviews/questionnaire surveys for eight international ICM projects (Table 5.1). The interviews/questionnaires were completed by catchment managers and included Sander Dijk for De Onlanden in the Netherlands, Fred Cheverie for the Souris River in Canada and Alec Rolston for the Murray–Darling basin in Australia. Further interviews included Andrew Fenemor for the Motueka catchment in New Zealand, Natalie Blandford for the Northland Region in New Zealand, Ruth Needham for the River Soar in the UK and Mark Horton for the Ballinderry River in Northern Ireland.

5.1 Lead Organisations and Programme Implementation

Unlike Ireland, the lead organisation for the majority of projects (five out of eight) was a water trust or NGO (Rogue River, Souris River, Murray–Darling, River Soar and Ballinderry River). The exceptions were from New Zealand, where a local authority is driving collaboration in Northland and a government research institute is leading the project in Motueka, although a NGO is working with farmers to implement the catchment plan in the Motueka.

Programme implementation in all case studies was a mixture of top-down and bottom-up approaches but with an emphasis on a bottom-up perspective. Project length ranged between 2 years (ongoing) in the Soar River, to 16 years (ongoing) in the Souris River, with a median length of 6 years. In all cases (except De Onlanden and Soar River), the projects are in the catchment plan implementation stage, which can take many years to complete.

All of the international catchments contained designated areas with some level of protection, but this was not the main reason for initiating restoration works. Rather, the water bodies were located within “typical” catchments in those countries, and the projects represented a community desire to restore them.

5.2 Source of Funding

Government funding was the main contributor in all catchment projects except the Ballinderry River in Northern Ireland, where the initial pilot received funding from the environmental NGO the World Wide Fund for Nature (WWF). In addition to government funding, most projects received match funding from local authorities and industry, and they received NGO support. All projects had full-time staff, with three projects having one dedicated staff member, and four projects having two staff.

5.3 Catchment Issues Addressed

In the Netherlands, the main focus of flood mitigation was integrated with agricultural improvement, nature development and recreation. The Motueka was notable for its focus on sociocultural dimensions in integrating environmental values (e.g. water quality, ecology, angling) with aquaculture, agriculture and forestry activities at a large catchment scale. The connecting of terrestrial land–water management with marine management offshore was a unique feature of the project.

The projects on the Rogue River in the United States and the Souris River in Canada, addressed issues around water quality, invasive species, angling, habitat restoration, forestry, recreation and public education. The Rogue River project highlighted the merits of a “nested” collaborative framework to water management, with decisions at a federal level influencing actions on the ground at the community level. The Souris River is notable for the success of its bespoke agri-environmental scheme, and the ecological improvements observed in the catchment.

In the Murray–Darling basin, water trusts have mostly concentrated on securing water within a water trading scheme to rewet wetlands. As part of this process, there is a focus on invasive species, angling, water quality, fish reintroduction and community engagement. The Australian water trusts are a notable example of success in engaging and motivating the public, and substantial results have been achieved with relatively small volumes of water.

Table 5.1. Summary of international ICM projects based on interviews and survey questionnaire

	Ballinderry, Northern Ireland	River Soar, England	De Onlanden, Netherlands	Motueka, New Zealand	Murray—Darling, Australia	Northland, New Zealand	Rouge River, USA	Souris River, Canada
Lead organisation	Trust/NGO	Trust/NGO	Trust/NGO	Research Institute	Trust/NGO	Local authority	Trust/NGO	Trust/NGO
Main funding source	WWF	UK Government	Dutch Government	NZ Government	Australian Government	NZ Government	US Government	Canadian Government
Project length (years)	7	2 (ongoing)	5	12 (ongoing)	No answer	4 (ongoing)	No answer	16
Staffing	>1	1	>1	>1	No answer	2	No answer	>1
Main issues *(Common to all: Angling, water quality, sediment, invasives, nutrients)*	Habitat restoration Awareness Access	Habitat restoration Flooding Litter Community engagement	Flooding Agricultural improvement Nature reserves Recreation	Sociocultural dimensions Land–water management and marine management		Water allocation Indigenous values Habitat restoration Land–water management and marine management	Fish passage Stream flow Basin-wide co-ordination	Restoration Forestry Agriculture Beaver dams Public awareness Recreation
Stakeholder meetings	Meetings in historical buildings linked to river	1–2 annually	2–3 monthly	2–3 monthly	No answer	1–2 monthly	No answer	1–2 monthly
Main results	Helped local authorities to target their resources Improved farm management River restoration	Silt traps, wetlands on farms to trap sediment Suds schemes with schools litter picking Restoration	Catchment plan Buying out landowners Securing archaeological finds Creation of nature reserve	Catchment plan Improved water quality Research insights Greater stakeholder awareness	Rewetting dry wetlands Saving fish from extinction Greater pride in and awareness of environment	Creating a catchment plan Monitoring Farm plans Community planting days Research funding	Catchment plan Interagency co-operation Restoration Public education Monitoring Nested structure	Catchment plan Greater awareness of and pride in watershed Improved water quality Restoration More tourism
Aspects that are transferrable	Combining environmental and social sciences Creative ways to engage stakeholders	Catchment-based approach (CaBA)	Integrated approach of combining nature reserves, flood storage, agricultural improvement and recreation	Integration of environmental and social science Targeted research to support community and environmental objectives	Novel engagement techniques, e.g. fish hatcheries in schools	Clear framework to integrate community catchment plans into local authority plans	Nested collaborative governance structure Integrated environmental monitoring strategy	Generic process Agri-environmental scheme

NZ, New Zealand.

In Northland, New Zealand, community catchment groups were formed to help the regional council implement national freshwater reforms. The issues addressed include water quality, water allocation, invasive species, angling, indigenous Māori freshwater values, biodiversity enhancement and the influence of freshwater on the coastal receiving environment, especially estuaries.

The River Soar is a new initiative and is part of the UK's Rivers Trust programme. Issues of concern include water quality, angling, habitat restoration, litter and flood mitigation. The aim is to integrate a range of policies and projects to tackle issues in both rural and urban areas of the catchment.

The Ballinderry Rivers Trust (BRT) in Northern Ireland is another Rivers Trust programme, which has concentrated on invasive species, angling, water quality, habitat restoration and awareness raising. The Trust's innovative approach to public engagement combined environmental and social science to develop community leadership and ownership of ideas in river basin management. Catchment "champions" played an integral part in the implementation of actions from the catchment plan.

5.4 Stakeholder Engagement

As in Ireland, the stakeholder meetings were held every 1–3 months, except for the River Soar, which held meetings biannually. Meetings were held in the buildings of the lead organisation, with refreshments provided. The format included guest speakers, field trips and round-table discussion. In most cases, stakeholder attendance varied and was dependent on the subject of discussion.

One commonality between the Irish and international examples is the need to have creative "hooks" to entice stakeholders to engage. One of the most successful projects for this was the BRT. They held stakeholder meetings in interesting historic buildings with a connection to the river. Furthermore, the use of art, songs and poems about the river helped parts of the community who normally would not be involved in such initiatives, to link in with the project. A similar approach was utilised in the Motueka with their Travelling River Exhibition and Watershed Talk programmes. Payments from an agri-environmental scheme successfully engaged a number of farmers in the Souris catchment. One ambitious scheme in the Netherlands to relocate farmers from flood-prone areas to more productive land elsewhere met with initial opposition, but, after working through the process, most farmers and stakeholders became enthusiastic, and were involved in a positive way.

The most engaged stakeholders internationally were local authorities, farmers and environmental groups. The hardest stakeholders to engage in the Souris catchment were parents with young children, whereas retirees were the most engaged. There were problems with poor attendance by indigenous representatives in Australia and some catchment groups in Northland, but this was not an issue in Ireland.

5.5 Main Results of Projects and Independent Evaluation

In the flood mitigation project in the Netherlands, the main outputs were the purchase of land for flooding, securing archaeologic finds, and the building of engineered structures to create a 2500 ha nature reserve capable of holding 22 million m^3 of water from upstream rivers. The project underwent an internal and external review.

In the Motueka, the main tangible action was improved water quality in the Sherry sub-catchment. Less tangible, but still of major benefit, were the research information and insights gained, plus the stakeholder awareness of all the issues at the catchment scale (including the impacts of terrestrial run-off at the coast). The project was evaluated and key research results reported in scientific publications. The success of the project led to it being one of seven demonstration catchments in the UNESCO International Hydrological Programme (IHP) Hydrology for the Environment, Life and Policy initiative.

The collaborative process is still under way in Northland, but to date the monitoring network has been significantly enhanced, farm water quality plans developed, and catchment group members have participated in community planting days. Significant research funding has been attracted from central government to facilitate freshwater policy implementation. Furthermore, catchment group members have built networks with groups that they would not have otherwise associated with, and now have a mutual understanding of the uses and values of fresh water. The end product will be a catchment management plan incorporating both policy elements and prioritised non-regulatory good

management practices. Policy elements will come into play where it can be demonstrated that parts of the catchment need to deviate from the regional picture in order to achieve local freshwater objectives. The catchment groups have conducted a baseline survey (carried out before the group-selected freshwater objectives), which will provide a comparison to a second survey, carried out after the catchment management plan is complete.

The BRT has helped the local authority to better target their resources. While some farmers respond better to regulation, the majority require only the threat of inspections. The BRT identified critical source areas and, as a neutral third party, was able to work with farmers on improving farm management without informing the regulatory authority. This built trust with farmers. Those farmers who did not improve were later caught by the regulator as part of independent compliance inspections.

The main results in the Souris catchment were the creation of a management plan and significant stream restoration, which improved water and habitat quality. This culminated in improved angling (new fishing seasons) and recreational opportunities (eco-tourism). Another achievement was the improved environmental awareness and sense of community pride in the catchment, which influenced the uptake of environmental farm plans. Two reports have evaluated the economic benefits from an ecosystem services perspective, and the project's success has been recognised with numerous awards at national, provincial and municipal levels.

5.6 Main Weaknesses

The main weakness of the De Onlanden project was the requirement to buy land parcels on a voluntary basis (i.e. no land was dispossessed). To achieve this, a higher price had to be offered, which increased the total project costs and slowed project implementation.

The Motueka project focused on research and community priorities with excellent results, but the project outcomes did not fit into the local authority's planning framework. The project could have been even more successful if it had concentrated more thoroughly on the council's resource management priorities.

The main weakness in the Northland collaboration is the time taken to fill research gaps, which is delaying the ability of catchment groups to make recommendations for management to council. The catchment groups also need certain elements of the regional plan, which is being developed concurrently, to consider whether they need to diverge from it.

Governance issues in the Souris catchment mean the entire catchment is not covered by a single regulatory authority, making it hard to implement measures like mandated buffer zones.

Like most collaborative groups, the Soar River is very reliant on the project facilitator. The project is still in the initial phases of the process, and the partnership is not yet strong enough to be sustainable in its own right. If the facilitator's role is taken away, it is likely that the project partners will go back to doing their work in an unco-ordinated way.

The lack of continuation funding in the BRT has been the biggest issue to date. While government agencies see the benefits of such initiatives, they have provided little funding. New sponsors are reluctant to fund existing programmes, and would rather have the opportunity to associate their brand with new initiatives.

5.7 Transferable Aspects of the Process

In the Netherlands, public pressure and strong political support enabled the De Onlanden project to deliver a flood protection scheme that integrated nature reserves, water storage, recreation and agricultural improvement in a relatively short period. This reinforces the need to engage the public (and hence politicians) in issues that are important to them.

The Motueka project teaches us the value of targeting environmental research to benefit local communities. The research on the relationship between farm run-off and the viability of aquaculture at the coast, helped different stakeholders take ownership of their activities. This resulted (among other things) in voluntary catchment improvement through collaborative landowner planning. The Motueka utilised art and social science to engage the wider community, and harnessed indigenous Māori paradigms within the catchment management framework. Perhaps Irish myths and folklore could be utilised to connect the community with a water body in a similar way?

The wetland rewetting projects in the Murray-Darling basin are another good example of novel ways to

engage the public. In one case study, rural communities were struggling with a crippling and prolonged drought that had dried up wetlands, putting a native fish at risk of extinction. Farmers provided sanctuaries for the fish in farm dams, while local children bred the fish at hatcheries in school. Saving a species of fish, and then releasing it back into a wetland that had been dry for 5 years was hugely positive for the community, and gave them something to celebrate in a time of economic and social hardship.

The BRT approach of combining environmental and social science to engage with a wide range of stakeholders is perhaps the most valuable transferable aspect of the RIPPLE programme. This programme states you must make it fun, and cannot have stakeholders travelling too far. The BRT experience also illustrates the ability of NGOs to facilitate voluntary, non-regulatory changes in land management practices for the purpose of improving water quality.

6 A Guide for Managing Collaborative Catchment Groups in Ireland

The following section details a proposed guide for managing collaborative ICM processes in Ireland. However, it is important to recognise that there is no single approach to collaboration. Each process will develop in response to individual circumstances. This guide lists three stages in the process: (1) establishing collaborative groups; (2) running collaborative groups; and (3) implementing collaborative group recommendations (Table 6.1). At each phase, recommendations are made on how to complete the process. The recommendations are based on the experience of IRD DuhallowLIFE (RACMG), the key learnings from the reviewed ICM projects (derived from 20 interviews/questionnaires) and theory from the literature (Corbelli, 2013; Defra, 2013; Boyden, 2015; Inman and Horton, 2015; MfE, 2015).

6.1 Phase 1: Establishing Collaborative Groups

6.1.1 Decide if collaboration is appropriate

Before undertaking a collaborative process, individuals and organisations need to share a sufficient number of common objectives and degree of motivation to make them want to work together for an extended time – the project length of case studies ranged between 2 and 17 years. Furthermore, an assessment must be made of whether a collaborative partnership focused at the catchment level is the best way to achieve these objectives.

Table 6.1. Key phases of collaborative ICM process

Key phases	Key tasks	Recommendations
Phase 1	Establishing collaborative groups	Decide if collaboration is appropriate
		Secure funding
		Agree on scale of collaboration
		Approve governance structures and leadership format
		Identify all relevant stakeholder interests
		Conduct public outreach
Phase 2	Running collaborative groups	Role of the inaugural meeting
		Set overall goals and management objectives
		Create a vision
		Establish frequency, structures and format of catchment group meetings
		Characterise the catchment
		Create a catchment action plan
Phase 3	Implementing collaborative group recommendations	Implement the actions
		Measure progress and make adjustments
		Conduct information/education component
		Consider the longer term role of the collaborative group

The Department for Environment, Food & Rural Affairs (Defra, 2013, p. 18) outlines four questions to consider before deciding whether or not a new collaborative group is necessary:

1. Do the issues that you want to address affect stakeholders in one main area of activity (e.g. public, private or voluntary sector organisations working in an area such as farming, local government, biodiversity protection and enhancement)?
2. Is the solution to the issues identified likely to require action by just one stakeholder or several stakeholders in one area of activity?
3. Are there any existing partnerships or networks whose objectives or work focus overlap with the objectives identified earlier?
4. Is there any one organisation or stakeholder (including members of the proposed catchment partnership) that has established itself as a clear leader in relation to the issues identified?

If the answer to any of these questions is "yes", then a collaborative group may not be the most efficient approach to dealing with this issue. An alternative approach may be to encourage the organisation already tackling the issue to collaborate with others when needed, or to encourage an established network to include the issue in its work.

6.1.2 Secure funding

Perhaps the greatest challenge to implementing a collaborative process is the availability of funding. Resources are required to (1) commence the process; (2) sustain the process in the long term until a catchment plan is produced; (3) implement the actions identified in the catchment plan; and (4) monitor the outcomes of plan implementation. Ideally, a sustained financial commitment would be secured before the project starts.

There are a number of potential funding streams available to ICM projects in Ireland. EU funds were utilised in the River Allow through the INTERREG and LIFE programmes. Potential future ICM projects could look to the many programmes available from the EU. In addition, LEADER funding could be utilised to establish ICM projects. This is currently being explored by LAWCO. The new LEADER programme offers opportunities for the development of local economies in both the rural and urban environments, underpinned by good management of water and its related biodiversity. Doing this in an effective manner will challenge community groups, as this is an evolving area that requires specialist expertise. However, assistance could be provided by LAWCO through technical advice and by demonstrating ways in which rural development companies can become more than just funders, by taking proactive roles in strategic planning and co-ordinating stakeholders with an interest in sustainable water management. In addition, rural development companies and partnerships are well positioned to leverage other schemes (e.g. the Rural Social Scheme and the Tús Initiative) to carry out large-scale programmes such as invasive species control.

6.1.3 Agree on scale of collaboration

Another question worth considering is at which catchment scale collaborative groups should be operating. In large catchments such as the Shannon or Munster Blackwater, an appropriate approach could include a "nested" ICM structure in which multiple groups operate within their own sub-catchments but meet and share experiences in conference-type settings. For example, in the Munster Blackwater there may be sub-catchment groups (e.g. Allow, Awbeg, Bride, Araglin, Finnow, Funshion) which, in addition to taking care of their local river, also work in a co-ordinated way to improve overall water quality in the Munster Blackwater.

6.1.4 Approve governance structures and leadership format

There is no standard formula for the structure of collaborative groups. Sometimes the chair is elected by the group, or the chair can be independent of the group. While chairs are not universally used, most groups have one or more facilitators (sometimes called co-ordinators). Facilitators are usually staff from the lead organisation, but they can also be consultants drafted in to facilitate meetings. It takes specialised skills and experience to design and co-ordinate a functional catchment management group. In some cases, it may be necessary to invest in these specialised skills in order to develop a culture of collaboration within a group. A catchment group leader must be able to facilitate and co-ordinate the process in addition to having

a good technical understanding of the issues in the catchment.

6.1.5 Identify all relevant stakeholder interests

To build partnerships you need to identify key stakeholders, which include relevant statutory authorities [e.g. local authorities, IFI, Teagasc, the Office of Public Works (OPW), National Parks and Wildlife Service, etc.] and local communities (landowners, local businesses, elected representatives, recreational users, etc.). A stakeholder analysis can help with establishing who should be involved in the process.

The following questions listed in Defra (2013, p. 24) can provide the initial structure for this analysis:

Identifying relevant stakeholders

Who are the organisations and groups, or kinds of people, who:

- are likely to be interested in getting actively involved, either to help shape strategy and create a plan, or to get involved with delivering projects or initiatives;
- will benefit from improvements in the catchment environment;
- are already working to improve it;
- are contributing to the problems;
- have legal responsibilities relevant to the catchment's water environment;
- work, live or play on or near the water?

Thinking about how to involve stakeholders

For each of these organisations or groups, or kinds of people:

- Does their interest form part of their "day job", or is this something that they do outside work?
- Is this organisation/group likely to be interested in a whole catchment approach or just in some geographical areas/some issues?
- What do you already know about their views and activities?
- What else would be useful to find out about them?

Organising this information visually can help with deciding which stakeholders need to be most involved, or involved in particular ways. This can be done using simple white boarding/post-it notes, or in a more structured way via methods such as the Ketso Toolkit (http://www.ketso.com/).

6.1.6 Conduct public outreach

Once stakeholders that need to be involved, but are not currently participating, are identified, they need to be enticed to engage. To do this it is important to make the process relevant to each stakeholder, and seek to involve people on their own terms, i.e. by using creative "hooks" to engage stakeholders. As stated by Boyden (2015, p. 25), engagement need not necessarily be restricted to the primary topic of water (although this will be sufficient for many), but may extend to include topics that may indirectly promote concern for a local aquatic resource. Such topics include local history and songs and poems associated with the river. Other topics could include nature studies (birds, plants, fish), and art and photography that reflect a connection with the aquatic environment. A number of projects (Allow, Burren, Souris) developed bespoke agri-environmental schemes to encourage farmers and landowners to get involved.

6.2 Phase 2: Running Collaborative Groups

6.2.1 Role of the inaugural meeting

In the inaugural catchment group meeting it is important to clarify the nature of the collaborative process: to clearly define what the issues are and the outcomes expected. It might be wise to train participants on how collaborative processes work, especially if it is intended to feed into local authority planning. It is important to state who the group will report to, and what decision-making powers (both formal or informal) the group has. It is good practice to put this information in the terms of reference (or other such document), as it will provide a reference point for the group as it works through the collaborative process (MfE, 2015).

6.2.2 Set overall goals and management objectives

The group will need to decide what the issues are and why they are important. This involves understanding the economic, social and institutional relationships in the catchment.

The following questions are designed to help groups understand how they each see the catchment and what is important in it (Defra, 2013, p. 20):

- Where are the main places that people live and work?
- What are the main economic activities?
- What other plans and strategies are relevant to water in this catchment? What is their purpose and what are they expected to produce? What scale are they (river stretch, sub-catchment, whole catchment, wider area)? Who developed them and who owns them? Are there any gaps or overlaps?
- Who is already working to improve the water/local river environment? What are they doing? What is the history of catchment management?
- What has been done previously? Did it work or not work, and why?
- Is there anything else you need to know about the context of the work?

6.2.3 Create a vision

Defra (2013, p. 21) describes a catchment vision (or mission statement) as a short aspirational description of what the catchment group would like to achieve in the mid- to long-term future. Having a vision helps a catchment group communicate what its work is about, and it provides a basis for choosing actions that are transparent to members, stakeholders and people living and working in the catchment.

Ultimately, a catchment vision should incorporate what is important to the community (e.g. better access, cleaner water, more wildlife, etc.), what legislation says we need to do [i.e. WFD, Habitats Directive (92/43/EEC), Floods Directive (2007/60/EC), Nitrates Directive (91/676/EEC), etc.], and the aspirations of the stakeholders in the catchment management group (e.g. improved agricultural output, better fishing, etc.). A reason for defining a catchment vision is to put the day-to-day work into a strategic context to ensure that it contributes to the longer term goals of the partnership.

6.2.4 Establish frequency, structures and format of catchment group meetings

Catchment meetings should be held frequently to maintain momentum. Of the collaborative projects investigated, all held meetings 1–3 monthly. The River Soar in the UK, and the Bantry Bay Charter were the only groups that had biannual meetings, but in Bantry Bay smaller working groups met more frequently (once or twice a month). Most meetings were held in the premises of the lead organisation, or in politically neutral public buildings such as community halls. The timing of meetings can have a big influence on stakeholder turnout. Meetings during the day generally suit statutory authorities and some NGOs, while meetings held in the late afternoon, or early evening, tend to work better for community volunteers.

Research by Alec Rolston, as part of the "Towards Integrated Water Management" project (https://www.dkit.ie/centre-freshwater-environmental-studies/research-projects/lake-catchment-management/towards-integrated-water-management-time-project), identified that stakeholders are typically unwilling to travel more than 20 km to attend an event. To check whether stakeholders from across the entire catchment were attending, the BRT had attendants plant a flag on a map showing where they had travelled from. This identified an area of the catchment where no one was attending, which led to a future meeting being held in that area.

All collaborative groups had invited guest speakers followed by group discussion. Field trips and information days were very popular, especially when they involved schoolchildren.

When holding stakeholder meetings, it is important to avoid technical jargon and provide a range of information from high-level summary documents to technical reports. It is also important to ensure that invited guest speakers communicate using clear language. One common approach to dealing with technical information is to create smaller working groups from within the wider stakeholder group. These working groups consider the technical information and report back to the main group using plain language. Another option is to hold special sessions with participants having difficulty understanding certain information. Refreshments (e.g. hot drinks and snacks) were provided in all the catchment projects investigated. This is particularly important where volunteers are involved.

Participation is resource intensive (e.g. driving to and attending meetings, field trips, hiring a facilitator, providing technical information). Collaborative processes typically involve large contributions of volunteer effort. If possible, the lead organisation should consider providing volunteers with some kind of remuneration or reimbursement. This encourages volunteers to engage more and regularly turn up to meetings. It also demonstrates that their contribution is valued as much as that of paid employees. If remuneration or reimbursements are not possible, then the lead organisation should consider longer term objectives, such as improving quality of life in the community or improving the local environment, as indirect payment.

Lastly, collaborative processes are often long term and can take years rather than months to complete. For this reason, membership within the group is likely to change through time. Therefore, it is considered good practice to have a succession strategy in place, which can be outlined in the terms of reference (or other similar document).

6.2.5 Characterise the catchment

Catchment characterisation is a multi-disciplinary task that involves a wide range of stakeholders. Getting access to basic data is a critical task. A variety of datasets is required, many of which are not currently captured or accessible in a centralised system. In recognition of this issue, the EPA developed a WFD application that provides a single point of access for catchment data. The application is accessible through the EDEN external link (http://www.epa.ie/water/watmg/wfd/wfdapp/), and is available to the EPA's staff and EPA-funded researchers, as well as staff in public authorities and other government agencies. The EPA's Geoportal site (http://gis.epa.ie/) allows the public to freely download data required for catchment characterisation. In addition, the advent of a new user-friendly public website (https://www.catchments.ie/) brings scientific information to the public at a local scale and is intended to be used by the public, policymakers and communities alike. Another initiative by Ordnance Survey Ireland is GeoHive, which provides access to publicly available spatial data (http://www.geohive.ie/).

Once the data has been gathered, it is good practice to make a catchment inventory, to identify whether or not there are data gaps and collect additional data if necessary. This might include investigative monitoring such as catchment profiling or microbial source tracking. Technical expertise is required to analyse the data, which is best undertaken using appropriate software, e.g. ArcGIS, MS Excel or statistical analysis software, such as SPSS.

Before starting to collect data, or deciding how to analyse and interpret information as evidence, Defra (2013, p. 36) suggests that catchment groups consider the following questions:

- What do you need information for (e.g. for mapping issues, deciding on priorities, monitoring change, knowing who else to engage, etc.)?
- What evidence/data do you already hold (e.g. on invasive species spread, water quality data, etc.)? This will help the collaborative group understand where there are gaps in knowledge and prioritise projects.
- How will you use the information?
- What are the challenges for obtaining information?
- What are the challenges for managing information collectively?
- How will you make sense of it together (e.g. work together to work out what it means, resolve any uncertainty or disagreement about what the information is telling you)?
- How will you deal with any issues arising in terms of difficulties in sharing data across organisations, holding data in different formats, "interpreting" technical data so it is understandable to less specialist stakeholders?
- How will you ensure that any data you produce will be credible to others?

6.2.6 Create a catchment action plan

Linking local communities, farmers and businesses in order to make things happen on the ground with regional and national plans and policies is a critical part of the implementation process. For this reason, it is essential to have representatives from all statutory authorities in collaborative groups to ensure that proposed actions in catchment plans are legal and practical to implement. This is a two-way issue: those promoting national and regional strategies need to communicate effectively with local communities about catchment issues to ensure that stakeholders really are engaged; and those local communities need to have their aspirations recognised and incorporated into strategy by policymakers in order for them to have influence in decisions that affect them.

Once all stakeholders agree on the shared vision, the catchment action plan (or other such recommendations) can be developed. If the stakeholder group is large, then it may be advisable to form an action working group made up of participants who have expressed an interest in developing an action plan. Once the action group is formed, it is best to use workshops to record the number of actions required to fulfil the shared visions, and then prioritise these actions based on importance and achievability. Many groups managed to develop a catchment plan and prioritise actions within 12 months. However, relationships take time to develop and if a partnership is new and is dealing with contentious issues, it is advisable to allocate 1–2 years for this phase.

Most ICM projects are limited by available funding so, understandably, the majority of resources are spent on implementing actions on the ground. However, it is desirable that monitoring be allocated a specific proportion of the ICM budget, although in practice this is often the first category cut from the budget. It should be noted, however, that by identifying problems early so corrective actions can be taken, monitoring can actually save money in the long term. In addition, monitoring of one project can provide valuable information, which if disseminated properly, can save money and lead to greater success in other projects.

One way to spread the cost of monitoring is to develop a co-ordinated monitoring strategy between all stakeholders. Monitoring data collected by government agencies can be complemented by information collected by individuals, trusts, community groups and NGOs, i.e. citizen science. It is important to utilise scientific expertise within the stakeholder group to ensure that data is collected and validated using scientifically robust methods. It is critical to align methodologies for data collection between government agencies and other stakeholders for data quality and reporting reasons.

6.3 Phase 3: Implementing Collaborative Group Recommendations

6.3.1 Implement the actions

A tremendous amount of time and energy will go into developing a catchment plan. It is critical that the recommendations are implemented in good faith and in accordance with the terms of reference (or other such document). If this is not done, then it will create a culture of distrust, which will impact on any future community engagement initiatives relating to resource management issues. The best protection against this is to ensure that the implementation is dealt with very clearly in the terms of reference.

The following process will help in developing the work plan for each action in the catchment plan (adapted from Inman and Horton, 2015, p. 172):

- What are the steps that should be taken to get the action started?
- Who are the people and organisations that may need to be involved in delivering the action (list)?
- What is the time frame for delivery?
- What is the measurable outcome?
- Who will lead the delivery of the action?
- How will the action be monitored?

Should the plan be handed over to another party for implementation (often government agencies), then there is a risk that some actions may not be implemented as originally planned. To help mitigate against this, the BRT RIPPLE project utilised working groups led by action “champions” to implement the measures in the action plan. The champions were volunteers from the collaborative group who adopted action(s), and led working groups supported by the RIPPLE project co-ordinator to deliver these actions. The reasoning behind this approach is that both the development of the plan and the delivery of the actions is community led, which ensures full ownership of the plan by local people. This helps to maintain momentum and brings the benefits of local expertise and knowledge to the delivery of the plan.

Once action champions have been selected, there is a need to identify the technical and financial assistance required. RIPPLE set up a workshop in which action champions met government agencies and organisations that could help facilitate action implementation. This culminated in a “speed dating” event at which champions rotated around the various service providers present to secure commitments via “promise slips”, which were mapped on a display board. Many of the promises related to setting up subsequent meetings with appropriate people, which opened up lines of communication between many of those involved (Inman and Horton, 2015).

6.3.2 Measure progress and make adjustments

It is good practice to establish a detailed operating plan to monitor the implementation of the actions in the catchment plan. In many cases, monitoring will be based on process indicators rather than quantifiable outcome indicators. This is generally for pragmatic reasons relating to available resources.

6.3.3 Conduct information/education component

The success of the project will be heavily influenced by the level of community and political support. The best way to gain this is to have an effective communication strategy. This raises the project's profile and generates interest at both a local and a national scale.

6.3.4 Consider the longer term role of the collaborative group

It may be useful to clarify what the ongoing role (if any) will be for the collaborative group. As some of the actions in the catchment plan will take years to implement, it is likely that the engagement between stakeholder groups will continue, whether the group retains its official status or not. A lot of time and effort goes into building social capital within the group, and this can be utilised for future community engagement by government agencies, e.g. the Rivers Trust in the UK.

7 Summary of Key Points

The requirements of the WFD has led to the formation of a new three-tier governance framework. The new WFD governance structure invites public participation at the regional level (tier 3) via LAWCO. It would also be beneficial to incorporate public participation at the national level (tier 1) in relation to policy development. Getting a critical number of key actors representing powerful environmental, agricultural and industrial interests to work collaboratively to identify and achieve shared goals is especially relevant given the conflicting demands of the WFD and the agricultural development targets of the Food Harvest 2020 and Food Wise 2025 strategies (https://www.agriculture.gov.ie/agri-foodindustry/).

The costs associated with this nested (or tiered) collaborative approach are greater than the costs of collaboration at the local level alone. This is due to new committees being formed that take time, staff and resources to implement. However, in the long term, this would allow for a coherent governance structure and operational management.

Clearly, the establishment of a relationship between community-driven ICM initiatives and statutory authorities is critical to success. While the community can provide enthusiasm and a means to complete works on the ground, statutory authorities can provide the technical and scientific assistance to ensure that this work is targeted. This ensures value for money and effort. Statutory authority involvement in the River Allow ICM process has been very positive and the number of attendees from state agencies at the catchment meetings has been consistently high. However, this research has identified that improvements could be made regarding implementation and ownership of actions. There are a number of difficulties for local authorities according to the County and City Management Association's report *Business Case for Local Authority National Water Framework Directive Office* (CCMA, n.d.). This document explains, for example, that existing expertise within local authorities is generally applied to regulatory compliance and that there is a lack of resources to go beyond this approach. In addition, local authority environmental awareness officers are mainly focused in the waste area and have little expertise in water quality. Water education and awareness activity is predominantly focused on drinking and bathing water, with little or no activity in the water pollution/protection area, except for particular messages around septic tanks. Local authority expertise in public engagement is located within community sections, which have no expertise in the water area. This results in a lack of co-ordination in the water quality area, which, in turn, has an effect on local authorities taking responsibility for actions in the ICM process. It remains to be seen how the new LAWCO will influence individual local authority involvement in ICM initiatives.

8 Conclusion

An ICM approach is increasingly seen, nationally and internationally, as essential for the sustainable use of our land and water resources. For Ireland to implement ICM and achieve the objectives in the WFD, a governmental (top-down) approach should be coupled with community-driven (bottom-up) actions. For this to occur, stakeholder engagement and collaborative working must sit at the heart of an ICM framework.

This study examined various bottom-up approaches to water management both in Ireland and abroad with a view to identifying and/or developing a system that might work best in an Irish setting. Guidance for implementing collaborative processes has been produced, and the following key lessons have been identified.

First, adequate funding should be secured before undertaking collaborative ICM projects. Resources are required to commence the collaborative process, sustain the process in the long term and, most importantly, to implement the actions in the catchment management plan. Failure to implement the plan creates resentment within the community and will hinder engagement in the future.

Second, the use of creative “hooks” to engage local stakeholders is critical to ensure that a wide range of community interests are represented in the process. The most successful projects integrated both social and environmental science to meet community social needs.

Third, the benefit of statutory authority-led projects is the availability of resources and technical expertise. However, statutory authorities often struggle to engage with local communities. An alternative is the use of perceived “neutral brokers”, such as NGOs, local partnerships or river trusts to lead the process. This model has met with considerable success overseas. However, the success of this model requires all of the relevant statutory authorities to meaningfully engage with and support the process. Putting co-operative and predetermined governance structures in place for their involvement with future ICM projects is essential. The recent establishment of LAWCO will be an important contributor in this regard, and it is expected that this unit will actively support ICM groups. However, it is unclear how this will influence individual statutory authority involvement in ICM initiatives.

References

AEIDL (European Association for Information on Local Development), 1997. *Innovation and Rural Development*. Rural Observatory Dossier No 2/1997. Published on behalf of the Directorate-General for Agriculture and Rural Development of the European Commission. AEIDL, Brussels.

Ballinger, J., O'Doherty, T., Igoe, F. *et al*., 2016. *Delivering Integrated Catchment Management through the Bottom-up Approach: A Critical Analysis*. End of Project Report. Environmental Protection Agency (EPA), Johnstown Castle, Ireland.

Boyden, M., 2015. *Public Engagement in Integrated Catchment Management: StreamScapes Recommendations*. Environmental Protection Agency (EPA), Johnstown Castle, Ireland.

CaBA (Catchment Based Approach), 2015. "Upstream Thinking". Available online: http://www.catchment-basedapproach.org/best-practice/upstream-thinking (accessed 5 October 2015).

CCMA (County and City Management Association), (n.d.). *Business Case for Local Authority National Water Framework Directive Office*. CCMA, Dublin, Ireland.

Corbelli, D., 2013. *Evaluation of the Catchment Based Approach – Pilot Stage (Final Evaluation Report)*. Prepared for the Department for Environment, Food & Rural Affairs (Defra) by Cascade Consulting, Manchester.

Defra (Department for Environment, Food & Rural Affairs), 2013. *Guide to Collaborative Catchment Management*. Defra, London. Available online: http://ccmhub.net/wp-content/uploads/2012/10/The-Guide.pdf

EPA (Environmental Protection Agency), 2015. *Integrated Catchment Management*. EPA, Johnstown Castle, Ireland. Available online: http://www.epa.ie/water/watmg/icm/#.Vr3RN7SLSUk (accessed 23 October 2015).

Igoe, F., Murphy, K., Phelan, P.J. *et al.,* 2015. *Farmers are Stakeholders Too! A Bottom Up Approach to Catchment Management in a Predominantly Agricultural Catchment in Duhallow, North Cork*. Farmland Conservation with 2020 Vision. Teagasc, Wexford, Ireland.

Inman, A. and Horton, M., 2015. The WWF RIPPLE Project (Rivers Involving People, Places and Leading by Example), Ulster, Northern Ireland. In Smith, L., Porter, K., Hiscock, K. *et al*. (eds), *Catchment and River Basin Management: Integrating Science and Governance*. Routledge, London, pp.158–182.

MfE (Ministry for the Environment), 2015. *Reforming How We Manage Fresh Water*. MfE, Wellington, New Zealand. Available online: http://www.mfe.govt.nz/

SWAN (Sustainable Water Network), 2012. *Getting it Right or Getting it Right? Ticking Boxes vs. Delivering Genuine Public Participation in Water Management in Ireland.* SWAN presentation to the Joint Meeting of the Task Force on Public Participation in Decision-making of the Aarhus Convention and the Meeting of the Parties to the Protocol on Water and Health. Available online: http://www.unece.org/fileadmin/DAM/env/pp/ppdm/Presentations/3.SWAN_backgroundpaper_Tickingboxes_v_genuine_participation_watermanagement_Ireland.pdf (accessed 16 August 2016).

Abbreviations

AFBINI	Agri-Food and Biosciences Institute
BRT	Ballinderry Rivers Trust
CaBA	Catchment-based approach
DAFM	Department of Agriculture, Forestry and the Marine
DAHG	Department of Arts, Heritage and the Gaeltacht
Defra	Department for Environment, Food & Rural Affairs
EPA	Environmental Protection Agency
ICM	Integrated catchment management
IFI	Inland Fisheries Ireland
IHP	International Hydrological Programme
LAWCO	Local Authority Water and Communities Office
NGO	Non-governmental organisation
NRFB	Northern Regional Fisheries Board
OPW	Office of Public Works
RACMG	River Allow Catchment Management Group
RBMP	River basin management plan
SAC	Special Area of Conservation
SPA	Special Protection Area
UCC	University College Cork
WFD	Water Framework Directive
WWF	World Wild Fund for Nature

AN GHNÍOMHAIREACHT UM CHAOMHNÚ COMHSHAOIL
Tá an Ghníomhaireacht um Chaomhnú Comhshaoil (GCC) freagrach as an gcomhshaol a chaomhnú agus a fheabhsú mar shócmhainn luachmhar do mhuintir na hÉireann. Táimid tiomanta do dhaoine agus don chomhshaol a chosaint ó éifeachtaí díobhálacha na radaíochta agus an truaillithe.

Is féidir obair na Gníomhaireachta a roinnt ina trí phríomhréimse:

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

Eolas: *Soláthraímid sonraí, faisnéis agus measúnú comhshaoil atá ar ardchaighdeán, spriocdhírithe agus tráthúil chun bonn eolais a chur faoin gcinnteoireacht ar gach leibhéal.*

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

Ár bhFreagrachtaí

Ceadúnú
Déanaimid na gníomhaíochtaí seo a leanas a rialú ionas nach ndéanann siad dochar do shláinte an phobail ná don chomhshaol:
- 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 peitril;
- 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 ídíonn an ciseal ózóin.
- An dlí a chur orthu siúd a bhriseann dlí an chomhshaoil agus a dhéanann dochar don chomhshaol.

Bainistíocht Uisce
- Monatóireacht agus tuairisciú a dhéanamh ar cháilíocht aibhneacha, lochanna, uiscí idirchriosacha agus cósta na hÉireann, agus screamhuiscí; 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 gComhshaol
- 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 Chomhshaol 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 shainaithint, 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 gcomhshaol in Éirinn *(m.sh. mórphleananna forbartha)*.

Cosaint Raideolaíoch
- Monatóireacht a dhéanamh ar leibhéil radaíochta, measúnacht a dhéanamh ar nochtadh 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 gcomhshaol ar a bhfuil fáil éasca a chur ar fáil chun rannpháirtíocht an phobail a spreagadh sa chinnteoireacht i ndáil leis an gcomhshaol *(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 dramhaíl 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 lánaimseartha, 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 comhaltaí air agus tagann siad le chéile go rialta le plé a dhéanamh ar ábhair imní agus le comhairle a chur ar an mBord.

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Delivering Integrated Catchment Management through the Bottom-up Approach: A Critical Analysis

Authors: John Ballinger, Travis O'Doherty, Fran Igoe, Catherine Dalton, Brendan O'Keeffe and Bryan Riney

Identifying pressures

Managing our water is essential to support life and protect our ecosystems. Integrated Catchment Management (ICM) is about bringing water issues, people, and organisations together at the right scale in order to achieve effective management solutions which benefit all stakeholders. It incorporates what legislation says we need to do (i.e. from the top down), with the aspirations of the community (i.e. from the bottom-up). It integrates environmental, economic and social issues within a catchment into a coherent management strategy. Expert guidance can help communities to participate in the development, and implementation of an agreed vision of sustainable land and water use for their catchment. This research conducted interviews with programme managers and other key stakeholders from eighteen ICM projects. Problems, including gaps, barriers and constraints encountered in the implementation of an ICM programme are identified, and recommendations are made to help guide the management of a collaborative catchment group. The information thus gathered, contributes to the wider rollout of ICM projects in Ireland.

Informing policy

Under the European Union's Water Framework Directive, Member States are required to take a holistic approach to the management of water bodies, and to encourage the involvement of interested parties and non-governmental organisations in water quality issues. They must facilitate access to the information for the preparation of River Basin Management Plans (RBMPs). The first cycle RBMPs were published in 2010, but were criticised for the lack of community engagement during their development. Planning is currently underway for the second cycle which will be adopted in 2017 and run until 2021. The main deliverable from this research project is a guidance document which can help communities to participate in the development, and implementation, of an agreed vision of sustainable land and water use for their catchment.

Developing Solutions

The River Allow Catchment Management Group (RACMG) was examined as a real time practical example of bottom-up engagement with local communities and key stakeholders. Ten case studies from Ireland (Allow, Bantry Bay, Burren, Mulkear, Owenmore, Owenduff, Glenamoy, Lough Leane, Lough Melvin, Raised bog Conservation), and eight case studies from abroad (UK, Netherlands, New Zealand, Australia, USA, Canada) were critically examined. Interviews were conducted with programme managers and key stakeholders. Three key phases were identified in the collaborative ICM process; 1) establishing collaborative groups, 2) running collaborative groups, and 3) implementing collaborative group recommendations. At each phase recommendations are made on how to complete the process.

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