INTERNATIONAL WATER RESOURCES ASSOCIATION'S
1st ISLANDS WATER CONGRESS
FAROE ISLANDS - SEPTEMBER 4-6, 2024

HOSTED AND ORGANISED BY

JARÐFEINGI
Faroese Geological Survey

IWRA International Water Resources Association

IWRA's 1st ISLANDS WATER CONGRESS

Hosted by the Faroese Geological Survey (Jarðfeingi)
"Freshwater and Islands:
Administration, Collaboration, Innovation"
September 4 - 6, 2024, Tórshavn, the Faroe Islands

Final Report

by the International Water Resources Association (IWRA)

Acknowledgements

The International Water Resources Association (IWRA) would like to thank the Faroese Geological Survey (Jarðfeingi) for their invaluable contribution in hosting this event. We also extend our highest appreciation to the rapporteurs: Jayson Pinza, Justine Petrucci, Matthieu Trentesaux, Camille Turbide, and Ella Tescari.

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Please note that this report documents the presentations and discussions of the speakers. The views and recommendations do not necessarily reflect the views or recommendations of the International Water Resources Association or its other sponsors.

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Foreword

Yuanyuan Li
IWRA President

It is with great pleasure that I congratulate the success of IWRA's 1st Islands Water Congress, themed, "Freshwater and Islands: Administration, Collaboration and Innovation". This ground-breaking international water event was hosted by the Faroese Geological Survey (Jarðfeingi) and the International Water Resources Association. It marked a significant milestone in our collective effort to address the unique water challenges faced by island communities. This first Islands Congress brought together more than 150 registered participants from across 40 different countries who discussed 33 critical aspects for the future of water on islands. I wish to thank the host, the Faroese Government, for the leadership and support of Høgni Hoydal, Ministry of Foreign Affairs, Industry and Trade, and also the organiser, the Faroese Geological Survey, for their hard work. A special thanks also to IWRA's past President, Gabriel Eckstein, and the co-chairs and members of the International Scientific Committee, with support from IWRA's Executive Office and Board, for their help in putting together the Congress.

The water issues faced by islands are often more sensitive and more serious than those impacting the changing environments in other places of the world; at the same time, however, each island faces diverse and unique water issues within different contexts. Freshwater resources on islands are highly influenced by global climate change, natural hazards, and human activities. Islands, with their distinct geographical, ecological, and socio-economic characteristics, stand at the forefront of many water-related challenges which are exacerbated by climate change, but they are also at the forefront of water solutions needed for the world.

This congress serves as a platform for unprecedented collaboration, allowing us to share knowledge, exchange ideas, and forge partnerships that will drive sustainable water management practices. It shared diverse perspectives, exchanged innovations and ideas, and collectively established our common commitment for all island water issues. It discussed regulation, legislation, and policy around freshwater and holistic water management. It also opened up a conversation around the nexus between climate change and nature as well as discussing island related groundwater aspects. Here it is clear that there is a significant lack of data on how to deal with groundwater issues through innovation, be it hard or soft innovation. As this congress has shown, public engagement is the gateway to public involvement. Community involvement and education are crucial for the success of any water management strategy, and we must continue discussion ways to foster public awareness and participation.

It is exciting to see the tangible outcomes that have been achieved through this congress, notably the signing of the Memorandum of Understanding which establishes the Torshavn Dialogue on Sustainable Freshwater Management on Islands. This Memorandum will encourage parties to contribute to international policy processes, exchanges in good practices, and identify possible avenues for investment relevant to freshwater management on islands.

Finally, the establishment of the IWRA Islands Water Task Force will ensure that the legacy of this first Islands Water Congress continues and drives island interests into our main World Water Congress and future editions of the Islands Water Congress series. The Islands Water Congress Policy Report also aims to provide concrete policy recommendations to the Faroe Islands, but will also be of interest to a wider island audience. This report responds to the need and interest in the Faroe Islands related to regulation, which was identified prior to the Congress. In the future, we can contribute to taking forward global water issues and global water agendas, serving as a valuable resource for governments and stakeholders across the globe. We will keep working on these important issues together and build the momentum forward.

AT A GLANCE

196 PARTICIPANTS FROM
40 COUNTRIES

PRESENTATIONS RELATED TO
33 DIFFERENT ISLANDS AND
4 ISLANDS GROUPINGS

81 PRESENTATIONS
10 KEYNOTE SPEAKERS
15 REGULAR SESSIONS
5 SPECIAL SESSIONS
4 CREATIVE SHOWCASES
1 HIGH-LEVEL POLICY ROUNDTABLE

4 DAYS
1 DAY OF FIELD TRIPS AND
3 DAYS OF CONGRESS

"We [the islands] are going to save them [big countries]." – **Steven Myers, Minister of Environment, Energy and Climate Action, Prince Edward Island**

"Water regulation is fragmented and touches many areas like agriculture, finance, economy, and tourism. We need to work across ministries to form a cohesive front. Clear roles and responsibilities are essential for effective management." **– Manuel Sapiano, CEO, the Energy and Water Agency (EWA), Ministry of Environment, Energy and Enterprise, Malta**

"Our legislation is old and fragmented. We need comprehensive laws that cover all water use to ensure sustainable practices. Although it seems we have plenty of water in the Faroes, centralising water regulation is crucial to guarantee quality for citizens." **– Ingelín Strøm, Minister of Environment, Housing, and Labour Market Affairs, the Faroe Islands**

"People are both drivers of and the solution to major environmental challenges. When actions lack consequences, chaos is an inevitable outcome." **– Ronald Roopnarine, Senior Lecturer, University of the West Indies, Network Manager of Caribbean WaterNet, and ISC Member of IWRA's 1st Islands Water Congress**

"We can make an impact by sharing our knowledge and experience from around the world in the process of adapting to the upcoming environment." **– Andrias Klein Gregoriussen, Meteorologist, the Faroese Meteorological Office and weather presenter, the Faroese national television and radio.**

"Our approach towards water is often too anthropocentric, we should also do those efforts for the good of the stream itself…Humans don't create water, we are all blessed with what we have here." – **Dr Kamanamaikalani Beamer, Full Professor, Dana Naone Hall Endowed Chair in Hawaiian Studies, Literature, & the Environment, University of Hawai'i, Mānoa.**

"This is a landmark gathering for the sustainable management of water in island communities, where resources are limited and often highly reliable on water. IWRA will thus continue to support the island communities through a new Islands Water Task Force and participate actively in island networks. " **– Yuanyuan Li, IWRA President**

"Through the Congress, we got a dialogue started on the importance of water in the Faroes, raising awareness of how to better manage our resources sustainably." **– Óluva Reginsdóttir Eidesgaard, Co-Chair, International Scientific Community (ISC) of IWRA's 1st Islands Water Congress.**

INTRODUCTION FROM THE CO-CHAIRS OF **THE INTERNATIONAL SCIENTIFIC COMMITTEE (ISC)**

FRANCESCO SINDICO, Professor of International Environmental Law, Director, Climate Change Legal Initiative (C2LI), Co-chair of the IUCN World Commission on Environmental Law Climate Change Law Specialist Group

ÓLUVA REGINSDÓTTIR EIDESGAARD, Research geologist, Faroese Geological Survey (Jarðfeingi), Project Lead, Investigation of Groundwater Potential, Tórshavn, Faroe Islands.

Islands face increasing freshwater challenges due to climate change, amongst other factors, which need to be urgently addressed and which often require bespoke island responses. While the international community has focused on global water concerns and opportunities through the implementation of the Sustainable Development Goals and other international fora and instruments, more attention must be placed on the specific water-related issues of islands. In addition, while there is an "islandness" that brings together all islands, islands have specific characteristics that make each island different and unique. This requires tailoring and customisation of strategies and approaches. Against this background, the IWRA Islands Water Congress focused on administration, collaboration, and innovation.

"ADMINISTRATION" refers to the different processes necessary to capture, process, deliver, use and dispose of freshwater on islands. The administration of freshwater on islands presents nuances and possible differences vis-à-vis mainland approaches. The administration of freshwater may also be impacted by an island's jurisdictional setting (Sovereign Islands States vs Sub National Island Jurisdictions).

"COLLABORATION" refers to identification and bringing together of key stakeholders involved in the administration processes on islands. The administration of freshwater features a wide range of actors involved in the capture, processing, delivery, use, and disposal of freshwater. These include, but are not limited to, public and private utilities, companies, independent water providers, farmers and other stakeholders in the agriculture and aquaculture sector, the tourism sector, and also, the local island peoples and communities who rely on freshwater resources for their drinking and sanitation needs. All actors involved need to work together, often more so than in a mainland context. Collaborations can take place at a global level within international organisations or international initiatives, or at an island level, grassroots level, or amongst young islanders.

"INNOVATION" refers to novel instruments, systems and technologies that improve freshwater administration. Innovation can be framed in hard (technological) and soft (socio-economic) terms. Both are also needed to face global pressures coming from climate change and other factors. In addition, the effective administration of freshwater on islands requires island communities to have their voices heard when it comes to incorporating hard innovations into the administration of freshwater resources. Effective administration in turn requires island communities to have their visions and values understood when it comes to incorporating hard and soft innovations. In particular, there needs to be a broader understanding of the different ways in which water is valued by the island

community and by other actors, and how these values impact the use and administration of freshwater resources.

The vision of the IWRA Islands Water Congress series is to bring islanders and non-islanders together, boosting concrete action and bringing forward positive steps for the sustainability and management of Island freshwaters. Within the wider framework of administration, collaboration, and innovation, IWRA worked closely with the host island nation to identify a specific area in which the Congress could leave a tangible impact. Through a consultative process led by the Faroese Geological Survey, water regulation was identified as such specific area for the first Islands Water Congress. The Congress featured 14 regular sessions, 5 special sessions, and 4 creative showcases.

On the first day, Andrias Klein Gregoriussen, Meteorologist at the Faroese Meteorological Office, and Ronald Roopnarine, Senior Lecturer at the University of the West Indies, brought to the Congress the Faroese local context and an introduction to the Caribbean reality in the context of the ongoing climate emergency.

On Thursday, Kamanamaikalani Beamer, Professor at the University of Hawai'i, Mānoa, connected the history of Hawai'i and of its people to the context of freshwater management. Milika Sobey, Senior Technical Adviser-Coastal Ecosystems for GIZ Pacific, discussed the history of Fiji Water and how its activities are critically connected to land, people, and culture.
On the last day, a fireside chat with James Ellsmoor, CEO of Island Innovation, raised the questions of scale, finance, and the teachings from renewable energy on islands, considering especially how they could be applied in the context of freshwater management.

The Congress then featured Bjørn Holm, Manager of Tórshavn's municipal waterworks, and Mary Trudeau of Envirings Inc. and IWRA, who carried out a comparison of the operations of a municipal water service on an island city (Tórshavn) versus one in a continental setting (Ottawa, Canada).This showed that, in many cases, the challenges are not that different; however, it also highlighted significant differences in both scale and place.

The last plenary session included Tráin P. Nónklett, Historian at the Faroe Islands University, Manuel Sapiano, CEO of the Malta Energy and Water Agency, and Steven Myers, Minister of Environment, Energy, and Climate Action, Prince Edward Island. These speakers highlighted the history and reality of freshwater in the Faroe Islands, Malta, and Prince Edward Island. Their discussion was followed by a conversation between Ingelín Strøm, Faroese Minister of the Environment, Steven Myers, and Manuel Sapiano in which they discussed environmental and socio-economic challenges and opportunities linked to freshwater resources, as well as the water-energy nexus, and the role legislation can and should play in freshwater management.

In retrospection, the 1st IWRA Islands Water Congress was a huge success, with legacy and impact having both a policy and societal dimension, as detailed throughout this report.

KEY MESSAGES AND OUTCOME

Overarching Key messages from IWRA's 1st Islands Water Congress hosted by the Faroese Geological Survey (Jarðfeingi)

COLLABORATION IS ESSENTIAL

Islands share common challenges in water management. Collaboration across regions is key to overcoming these issues. Islands can lead the way, showcasing innovation with lessons that sometimes can be applied globally.

WATER MANAGEMENT IS COMPLEX

Water is not only a technical resource, but also deeply intertwined with cultural, political, and emotional factors. Effective policies need to reflect these dimensions to meet the needs of island communities.

CLIMATE RESILIENCE IS CRITICAL

Climate change poses a significant threat to island freshwater resources. Building resilience through adaptive policies and infrastructure is a priority for island communities.

THE WATER-ENERGY NEXUS IS AN OPPORTUNITY

Addressing the interconnection between water and energy is vital for the sustainability of island societies and their ecosystems. Efficient technologies and renewable energy sources must be integrated into water management strategies.

DECISION MAKING NEEDS TO BE DATA-DRIVEN

Monitoring is essential for managing groundwater and freshwater resources, but data collection should be purposeful and targeted to address specific needs and challenges. Methods of data collection should also be transparent in order to build trust and confidence in the management of freshwater.

GREATER PUBLIC AWARENESS AND ENGAGEMENT IS NEEDED

Educating the public about water conservation and the processes behind water management is crucial for fostering sustainable practices. Communities need to understand the value and cost of water resources.

INSTITUTIONAL AND REGULATORY FRAMEWORKS NEED TO BE COORDINATED

There is no one-size-fits-all model of institutional and regulatory framework. On some islands, having a strong, centralised framework law will be effective. On others, however, freshwater management can be reflected in

layers of laws and regulations. What is important is that those in charge of the laws and their implementation have the necessary political and institutional coordination.

INNOVATION CAN BE TESTED ON ISLANDS

Islands can lead the way in innovation by applying lessons from other regions and adapting them to their unique contexts. They are ideal testing grounds for sustainable solutions, but they must avoid being seen merely as "laboratories".

KNOWLEDGE NEEDS TO BE SHARED

Despite differences in geography and economy, islands can benefit from sharing knowledge and best practices, especially in areas like renewable energy and freshwater management.

RESOLUTIONS AND COMMITMENTS

- Faroe Islands and Prince Edward Island signed a **Memorandum of Understanding Establishing the Torshavn Dialogue on Sustainable Freshwater Management on Islands**. The Parties of the MoU will contribute to ongoing international processes in the field of freshwater management relevant both directly and indirectly to islands. They will exchange best practices and identify concrete actions and possible investments in the field of sustainable freshwater. Both Parties are keen to attract other islands to the MoU starting with Malta, which has already started the internal procedures to join the MoU.
- **An IWRA Islands Water Task Force** will be established to maintain engagement and collaboration among participants to the Congress Series and, through them, their island communities. It will also coordinate an island dimension into IWRA's next World Water Congress.
- **A legal expert group** composed of relevant members of the Congress ISC will continue to support and advise the Faroe Islands in their process of revising water law legislation and regulation.
- This Congress highlighted the importance of addressing economic and financial aspects of water management and involving the industry sector in future discussions and planning procedures.

OUTPUTS

One of the Congress' main outputs will be the **IWRA Islands Water Congress Policy Report,** set to be released in 2025. This report will focus on regulation and will share policy recommendations aimed at the Faroe Islands, as well as good practices coming from other islands. Ultimately, the IWRA Islands Water Congress Policy Report along with the 1st Islands Water Congress, triggered discussions towards a potential new water law in the Faroe Islands to be approved by the Parliament in late 2025 or early 2026.

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ISC Members photographed with IWRA President, Yuanyuan Li

THE INTERNATIONAL SCIENTIFIC COMMITTEE

CO-CHAIRS	
FRANCESCO SINDICO	Professor of International Environmental Law at the University of Strathclyde Law School in Glasgow, Co-chair of the IUCN World Commission on Environmental Law Climate Change Law Specialist Group, and Director of the Climate Change Litigation Initiative (C2LI).
ÓLUVA REGINSDÓTTIR EIDESGAARD	Research geologist at the Faroese Geological Survey (Jarðfeingi) in Tórshavn, Faroe Islands. Project Lead on the Investigation of Groundwater Potential in the Faroe Islands.

ISC MEMBERS

GABRIEL ECKSTEIN	Past President of the International Water Resources Association, Professor of Law at Texas A&M University, Chair ofthe Executive Council of the International Association for Water Law, and Associate Editor for the book series Brill Research Perspectives: International Water Law.
JANA ÓLAVSDÓTTIR	Research geologist at the Faroese Geological Survey (Jarðfeingi) in Tórshavn, Faroe Islands. Project leader for groundwater and geothermal energy and Member of the programme committee for research and the aid scheme for the Labour Market Campaign at the Research Council Faroe Islands.
FIROUZ GAINI	Professor in anthropology at the University of the Faroe Islands, Co-editor of Island Studies Journal and BARN (Nordic Childhood Journal), research leader of the Faculty of History and Social Sciences, and Deputy member of the board of the University of the Faroe Islands.
JILL ROBBIE	Senior Lecturer of Law at the University of Glasgow.
KATE BROWN	Leader of the Global Island Partnership, GLISPA advisor to governments, NGOS, and other organisations. Co-lead of the Local2030 Islands Network.
LAURIE BRINKLOW	Assistant Professor and Coordinator of the Master of Arts in Island Studies programme and Chair of the Institute of Island Studies at the University of Prince Edward Island in Charlottetown, Canada. President of the International Small Islands Studies Association and Iceland´s Honorary Consul to Prince Edward Island.
RONALD ROOPNARINE	Senior lecturer in the Faculty of Food and Agriculture, University of the West Indies, St. Augustine Campus (FFA, UWI) and Network Manager of Caribbean WaterNet, (Caribbean arm of CapNet UNDP).
MILIKA NAGASIMA SOBEY	Technical Adviser-Coastal Ecosystems for Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) Pacific.
STEINUNN HAUKSDÓTTIR	Director of Mapping and Exploration at ÍSOR, Iceland Geosurvey, National delegate for Iceland in EuroGeosurveys and member of Water Consultation Committee of Government Institutes. Inspectorate for the Implementation of Water Framework Directive in Iceland.
MANUEL SAPIANO	Chief Executive Officer of the Energy and Water Agency (EWA) within Malta's Ministry for the Environment, Energy and Enterprise.
GUNNHILD STORBEKKRØNNING SOLLI	Associate Professor of Law at the Norwegian University of Life Sciences (NMBU), and member of the Norwegian Regional Committees for Medical and Health Research Ethics. Serves as the chair of the board of the Norwegian Environmental Law Association.
KIM STEVE GERLACH BERGKVIST	Chemical Department Manager at the Faroese Food and Veterinary Agency.

THEMATIC **FRAMEWORK AND TOPICS**

SUBTHEME 1
ADMINISTRATION

The ISC defined "Administration" as the different processes necessary to capture, process, deliver, use and dispose of freshwater on islands.

This theme focused on:

- the concept/content of freshwater administration on islands; and
- the role of regulation in the administration of freshwater on islands.

The administration of freshwater on islands presents nuances and possible differences vis-à-vis mainland approaches. Administration of freshwater may also be impacted by an island's jurisdictional setting (Sovereign Islands States vs Sub National Island Jurisdictions). The ISC selected papers critically assessing the concept/content of freshwater administration and how it relates to islands, including those that made specific references to their jurisdictional settings.

The administration of freshwater on islands requires policy and regulation, as well. This sub-theme explored the role of regulation in bringing surface and groundwater together within a common island water administrative system. It also explored efforts of maintaining biodiversity resilience and ecosystem services, the administering of water for energy production within an island setting, and methods for dealing with the conflict between different uses of underground spaces.

This sub-theme assisted in identifying good regulatory practices from islands relevant for an effective administration of freshwater on islands.

SUBTHEME 2
COLLABORATION

The ISC defined "Collaboration" as the need to identify and bring together all stakeholders involved in the processes of the administration of freshwater on islands.

This theme sought contributions that shed light on:

- the different actors who partake in the different phases and processes that relate to the administration of freshwater on islands; and
- the need for such actors to collaborate in the administration of freshwater on islands.

The administration of freshwater on islands features a wide range of different actors involved in the capture, processing, delivery, use and disposal of freshwater. These include, but are not limited to, public and private utilities, companies, independent water providers, farmers and other stakeholders in the agriculture and aquaculture sector, the tourism sector, and above all, the local island peoples and communities who rely on freshwater resources for their drinking and sanitation needs. We welcomed contributions, case studies, spotlights, and stories about individuals and organisations who are dealing with freshwater challenges and opportunities in island environments. In particular, we encouraged personal stories of the untold heroes and champions of freshwater resources on islands.

All actors involved in the administration of freshwater on islands need to work together, often more so than in a mainland context. Collaborations can be considered at a global level within international organisations or international initiatives, or at an island level, grassroots level, and amongst young islanders. We welcomed contributions that deciphered and attempted to better understand existing networks and other forms of collaborations in the context of the administration of freshwater on islands. The overall aim should be to suggest increased forms of collaboration going forward.

SUBTHEME 3
INNOVATION

The ISC defined "Innovation" as the unique and innovative instruments, systems, and technologies that aim to improve freshwater administration. It can be framed in hard (technological) and soft (socio-economic) terms. The administration of freshwater resources on islands requires a combination of both hard and soft innovation. This theme seeks contributions on innovations which:

- improve freshwater administration; and
- better captures the value of freshwater on islands.

The effective administration of freshwater on islands requires island communities to have their voice heard when it comes to incorporating hard innovations into the administration of freshwater resources. We welcomed contributions exploring innovation in desalinisation, water and wastewater treatment and recycling, water use efficiency, hydropower, nature-based solutions, groundwater abstraction, and the WEFE nexus – water, energy, food, ecosystems nexus. We also welcomed contributions focusing on ways in which islands can best deal with climate change challenges, including increased variability in climatic conditions and sea-level rise with the heightened risks for saltwater intrusion of groundwater resources. In addition, projects aimed at increasing understanding of how to drive finance flows toward such hard innovations in a way that promotes effective administration of freshwater on islands, as well as those contributions that deepen the understanding of public participation of island peoples and communities into the administration of freshwater resources as a form of soft innovation are also welcomed.

The effective administration of freshwater on islands requires island communities to have their visions and values understood when it comes to incorporating hard and soft innovations into the administration of freshwater resources. In particular, there needs to be a broader understanding of the different ways in which water is valued by the island community and by other actors, and how these values impact the use and administration of freshwater. We welcomed contributions that explore the diverse values of water on islands, including but not limited to its economic value, cultural value, and the value of water for ecosystems.

Despite the original focus on administration, collaboration and innovation, when the ISC reviewed the abstracts submitted, four discrete themes arose:

1. Island administration
2. Climate change, nature, and nexus
3. Groundwater
4. Data, innovation, and wastewater

Whilst the first one, island administration, aligns perfectly with the original focus of the Congress, the other three can be seen as crosscutting, meaning that within them there are also elements of collaboration and innovation.

PROGRAMME

TUESDAY 3. SEPTEMBER 2024		
09.00 - 16.00	Technical Fieldtrip	Cultural Fieldtrip

WEDNESDAY 4. SEPTEMBER 2024				
THEME	Islands Administration	Climate change, nature and nexus	Groundwater Resources Management	Special Session
08.00 - 9.15	Registration and coffee			
09.15 - 10.15	OPENING CEREMONY			
10.30 - 12.00	*KEYNOTE SPEAKERS* ISLANDS AND FRESHWATER IN A CHANGING CLIMATE (KS1)			
12.00 - 13.00	*Lunch*			
13.00 - 14.30	REGULAR SESSIONS (RS)			SPECIAL SESSION (SS)
	Island Water Administration: A Nordic European View (RS1)	Climate Change and Water (RS2)	Island Groundwater Administration (RS3)	Technologies to Ensure Quality of Water Supply in Islands (SS1)
14.30 - 15.00	*Coffee Break*			
	REGULAR SESSIONS (RS)			SPECIAL SESSION (SS)
15.00 - 16.30	Island Water Administration: Mediterranean and Atlantic Region (RS4)	Saltwater Intrusion (RS5)	Groundwater and Innovation (RS6)	Freshwater and Islands: A SIDS perspective (SS2)
17.00 - 18.00	**ICEBREAKER** (Welcome reception) *Venue: Múllers Pakkhús (20 min. walking distance from Congress venue) - Click here for directions*			

THURSDAY 5. SEPTEMBER 2024				
THEME	Islands Administration	Climate Change, Nature and Nexus	Monitoring, Data and Hard Innovation	Special Session
	REGULAR SESSIONS (RS)			SPECIAL SESSIONs (SS)
9.00 - 10.30	Island Water Administration: Caribbean Region (RS7)	Water and Nature Working Together Including the Special Case of Rainwater Harvesting (RS8)	Monitoring and Data (RS9)	Faroe Island water administration (SS3) (*The session is only in faroese) 09.00 - 12.00
10.30 - 11.00	*Coffee Break*			
11.00 - 12.30	*KEYNOTE SPEAKERS* ISLAND, FRESHWATER AND CULTURE: NARRATIVES FROM THE PACIFIC (KS2)			
12.30 - 14.00	*Lunch*			
	REGULAR SESSIONS (RS)			
14.00 - 15.30	Island Water Administration: Asia/Pacific and African Region & Water / Energy / Food Nexus (RS10+11)		Hard Innovation I (RS12)	Islands, Water and Regulation (RS13)
15.30 - 16.00	*Coffee break*			
16.00 - 16.45	**Waterwalk** *(please sign up at the registration desk)*			
19.00 - 21.00	BANQUET (Location: The National Museum) ***ONLY for Full Congress registrations** Click here for directions*			

FRIDAY 6. SEPTEMBER 2024				
THEME	Islands Administration	Monitoring, Data and Hard Innovation	Special Session	
	REGULAR SESSIONS (RS)		SPECIAL SESSIONS (SS)	
09.30 - 11.00	Island Water Administration: New and Old Challenges and Opportunities (RS14)	Hard Innovation II (RS15)	IWRA Islands Water Congress Policy Report (SS4)	The Battle for the Water - Exploitation of Water for Green Hydrogen Production (SS5)
11.00 - 11.30	*Coffee break*			
11.30 - 12.10	*KEYNOTE SPEAKER* HOW TO EFFECTIVELY SHARE FRESHWATER GOOD PRACTICES (KS3)			
12.15 - 13.00	*KEYNOTE SPEAKER* ISLAND PERSPECTIVES FROM URBAN AREAS: THE CASE OF TORS DHAVN IN THE FAROE ISLANDS AND OTTAWA IN CANADA (KS4)			
13.00 - 14.00	*Lunch*			
14.00 - 15.30	*HIGH LEVEL POLICY ROUNDTABLE* FRESHWATER AND ISLANDS: THE ROLE OF REGULATION			
15.30 - 16.00	*Break*			
16.00 - 17.00	**Closing Ceremony**			

A detailed programme can be accessed here: https://islandswatercongress.org/detailed-programme

CONFERENCE HIGHLIGHTS

OPENING CEREMONY

MODERATOR

Francesco Sindico, ISC Co-chair, Professor of International Environmental Law, Director, Climate Change Legal Initiative (C2LI), and Co-chair of the IUCN World Commission on Environmental Law Climate Change Law Specialist Group

SPEAKERS

Hogni Hoydal, Minister of Foreign Affairs and Trade, Faroe Islands

Yuanyuan Li, President, International Water Resources Association

Óluva Eidesgaard, ISC Co-chair, Research geologist, Faroese Geological Survey (Jarðfeingi), Project Lead, Investigation of Groundwater Potential, Tórshavn, Faroe Islands.

Francesco Sindico, ISC Co-chair, Professor of International Environmental Law, Director, Climate Change Legal Initiative (C2LI), Co-chair, IUCN World Commission on Environmental Law Climate Change Law Specialist Group

SUMMARY

The opening ceremony marked the official start of IWRA's 1st Islands Water Congress. The speakers highlighted the critical importance of freshwater management for islands, notably in the face of increasing challenges like climate change and natural hazards. Despite being historically water-abundant, islands like the Faroe Islands are becoming more aware of the need to advance freshwater governance practices. As a result, they are stepping up to foster leadership and collaboration on best practices for islands' water. IWRA's landmark Islands Congress seeks to bring together a regional and international community of practice on islands and to create a permanent islands taskforce and International Islands Network that will be instrumental in bringing the work initiated at this conference forward. Participants come from 40 countries, with at least 33 islands represented. The opening ceremony ended with a musical performance from local artists, singing two songs in Faroese.

KEY TAKEAWAYS

- This landmark Congress brings together a community of practice on freshwater and islands. It is planned as the first of many.
- IWRA will establish a permanent islands taskforce and is advocating for the creation of an International Islands Network.
- Freshwater management is a pressing issue for many parts of the world. As such, it is an important theme to address.
- Getting the islands' perspective on groundwater management and sharing our knowledge, experiences, challenges, etc. is a goal of the congress, so that concrete actions can be taken in the near future.

HIGH LEVEL POLICY ROUNDTABLE: **FRESHWATER AND ISLANDS, THE ROLE OF REGULATION**

MODERATOR

Francesco Sindico, ISC Co-chair, Professor of International Environmental Law, Director, Climate Change Legal Initiative (C2LI), and Co-chair of the IUCN World Commission on Environmental Law Climate Change Law Specialist Group

SPEAKERS

Train Petursson Nonklett, University of the Faroe Islands

Manuel Sapiano, CEO, the Energy and Water Agency, Malta

Steven Myers, Minister of Environment, Energy and Climate Action, Prince Edward Island

Ingilin Strom, Minister of Environment, Housing, and Labour Market Affairs, the Faroe Island

SUMMARY

This panel reflected the history of freshwater management on islands, with speakers focusing on key policies, legislation, and challenges within the water-energy nexus. Speakers highlighted the need for collaboration amongst island countries in order to share best practices and knowledges. This culminated in the development of a Memorandum of Understanding between the Prince Edward Island and the Faroe Islands. The resilience of small islands was recognised, positioning them as vital testing grounds for addressing innovative solutions while also addressing water scarcity, environmental impacts, and economic opportunities. Modern, centralised legislation, transparency, and cross-sector collaboration were emphasised as essential for sustainable water management.

Tráin Petursson Nónklett explored the evolution of water usage in the Faroe Islands, tracing its journey from traditional practices to modern systems. Historically, streams served distinct purposes: Matará for drinking and cooking and Tváttá for washing clothes. To ensure water quality, regulations were established to separate clean and dirty water sources. In 1882, new regulations were introduced in Tórshavn to safeguard these water resources, reflecting an early awareness of water management. By 1900, population growth and urbanisation led to an increased demand for a more robust water system. The 1950s marked a significant turning point, with the construction of new reservoirs to meet the needs of expanding industries, particularly the fishing sector, which drove a substantial rise in water demand. Nonklett noted how cultural and technological developments have influenced perceptions and definitions of clean and dirty water over time, which have shaped contemporary water management practices in the Faroe Islands.

Manuel Sapiano highlighted the significant water challenges faced by the Maltese islands, stemming from their semi-arid climate, lack of natural rivers and lakes, and high population density. Groundwater, the primary water source, has proven insufficient to meet demands, necessitating the adoption of desalination–an energy-intensive and costly solution. By the 1980s, excessive aquifer depletion led to water rationing and the introduction of reverse osmosis desalination plants. Notably, one of the world's largest commercial-

scale reverse osmosis plants was commissioned in 1982. By 1995, the energy required for producing and distributing drinking water accounted for more than 12% of Malta's national electricity demand, primarily due to leakage issues. This prompted policymakers to implement demand management measures, including an aggressive leakage identification campaign in the 1990s. By 2000, water demand had reduced to 60% of its previous levels. Economic instruments, such as rising block tariffs, were also introduced to reinforce demand management. Significant investments were also made to optimise energy use in desalination plants and enhance wastewater treatment infrastructure. Key policy shifts have focused on improving water and energy efficiency, leak management, tariff-based incentives, and water reuse, particularly in agriculture. Sapiano also emphasised the need to engage stakeholders, educate the public, and share solutions with other islands. Such steps are critical to achieving sustainable water management and reducing demand. The role of water is not limited to SDG6 because water is cross-sectoral.

Steven Myers discussed how the Mi'kmaq (an Indigenous peoples of eastern Canada) view water as a sacred gift from the Creator and how water is deeply connected to their culture. He noted that on Prince Edward Island (PEI), there is high quality freshwater thanks to the presence of numerous ponds and wetlands. Yet, freshwater and agriculture has caused political challenges. In addition, freshwater faces challenges due to climate change which brings bigger storms, severe coastal erosion, and saltwater intrusion, population growth, and land use, threatening both agriculture and water quality. The 2021 Water Act, one of the strongest in Canada, aims to protect water resources, and is supported by a transparent real-time monitoring system. Creating the Act required a lot of political will due to misunderstandings about the nature of water protection aims. Members of the public feared water would be taken away. However, decisions were made in transparency which ultimately helped to relieve the political pressures around water.

Ingilín Strøm emphasised the critical connection between water and energy in the Faroe Islands, particularly in supporting the green transition towards renewable energy. She highlighted the essential role of water in energy production and its importance in achieving sustainability goals. On legislation, Strøm acknowledged that the Faroese legislation is outdated and fragmented. She highlighted that although it seems (we) have plenty of water in the Faroes, centralising water regulation is crucial to guaranteeing water quality for its citizens. Additionally, she noted that small islands like the Faroe Islands can serve as models for larger countries, raising awareness through events like the Islands Water Congress, which can further drive meaningful change in island communities.

KEY TAKEAWAYS

- There is strong integration of freshwater and saltwater on islands.
- Addressing the water-energy nexus is critical for securing the sustainability of water supplies.
- Water regulation is fragmented and touches on many areas, including agriculture, finance, economy, and tourism. We need to work across ministries to form a cohesive front. Clear roles and responsibilities are essential for effective management.
- Islands can demonstrate what is possible for water management solutions and offer broader avenues for application.
- Because of their smaller scale and their other unique characteristics, islands have an opportunity to collaborate and find solutions that can be more widely applicable. Small islands can pave the way for larger countries.
- Transparency is critical, and politicians must listen and create opportunities to let people speak.

KEYNOTE SESSION 1: ISLANDS AND FRESHWATER IN A CHANGING CLIMATE

MODERATOR

Óluva Eidesgaard, ISC Co-chair, Research geologist, Faroese Geological Survey (Jarðfeingi), Project Lead, Investigation of Groundwater Potential, Tórshavn, Faroe Islands

SPEAKERS

Andrias Klein Gregoriussen, Meteorologist at the Faroese Meteorological Office, Weather Presenter on the Faroese national television and radio

Ronald Roopnarine, Senior lecturer, Faculty of Food and Agriculture, University of the West Indies, St. Augustine Campus (FFA, UWI), Network Manager of Caribbean WaterNet, (Caribbean arm of CapNet UNDP).

SUMMARY

This session examined the impact of climate change on freshwater resources in island contexts.

Andrias Klein Gregoriussen presented the Faroe Islands' climate overview and the effects of climate change, both current and forecasted, on the Islands. Andrias emphasised the importance of understanding climate and climate change and planning ahead for the next generations which includes preparing for extreme weather events and sharing our experience and knowledge around the world, allowing us to adapt to future conditions in this changing climate context.

Ronald Roopnarine discussed the differences and similarities between the Caribbean and Faroe Islands, highlighting their shared vulnerabilities to climate change despite there being distinct climate conditions. Both regions face challenges in climate adaptation with the Caribbean's complexity being due to its dual-season climate and fragmented governance. Effective communication, tailored solutions, and community empowerment are key to improving climate resilience and water resource management. The need for better stakeholder engagement, clear roles and responsibilities, and the standardisation for data monitoring were emphasised by these speakers, alongside the importance of educating and empowering younger generations to drive sustainable change in the future.

KEY TAKEAWAYS

- Effective communication, is crucial for driving climate action and engaging stakeholders, both in translating technical information for policymakers and in raising public awareness.
- There is a need for clearer roles and responsibilities to be defined among organisations ("when everybody is responsible, nobody is")
- To address climate challenges, it is essential to empower young leaders, enhance community preparedness, and promote interdisciplinary collaboration.
- Water management is strongly context specific. There needs to be a focus on sustainable practices and clear governance frameworks.
- Streamlined institutional and policy frameworks from an organised governmental structure is very important, as is the existence of data and the acknowledgement of its management.
- Climate change should not be used as an excuse to hinder our way of responding to water crises. These speakers proposed three recommendations: communicate our science properly (including the climate change crises and rising water issues), try to avoid misinformation on climate change, and empower the youth and equip them with leadership skills.

KEYNOTE SESSION 2: ISLAND, FRESHWATER, AND CULTURE: NARRATIVES FROM THE PACIFIC

MODERATOR

Francesco Sindico, ISC Co-chair, Professor of International Environmental Law, Director, Climate Change Legal Initiative (C2LI), and Co-chair of the IUCN World Commission on Environmental Law Climate Change Law Specialist Group

SPEAKERS

Kamanamaikalani Beamer, Full Professor and inaugural Dana Naone Hall Endowed Chair in Hawaiian Studies, Literature, Environment at Hawai'inuiākea School of Hawaiian Knowledge (HSHK), the University of Hawai'i, Mānoa.

Milika Sobey, Technical Adviser-Coastal Ecosystems, GIZ Pacific

From left to right: Kamanamaikalani and Milika

SUMMARY

This keynote session explored the deep cultural connections between islands, freshwater, and traditional governance in the Pacific. The discussions emphasised how indigenous knowledge and cultural values shape sustainable water practices and how external pressures such as tourism, militarism, and commercial exploitation threaten these systems.

KEY TAKEAWAYS

- The importance of water as a resource has been engrained throughout many generations.
- A weak institutional framework can easily lead to mismanagement of water resources.
- Understanding the history of the sites is extremely useful in developing more holistic solutions to tackle persistent management challenges and its main sources.
- Collaboration and cultural kinship offer pathways to addressing modern challenges while preserving traditional systems.
- Empowering local communities is critical to ensuring sustainable water resource management.

Kamanamaikalani Beamer shared insights into Hawai'ian cultural values related to water, illustrating how the word "wai" (water) translates to "wealth." He highlighted innovative traditional practices, such as building fishponds and managing resources using a circular approach. However, he emphasised the challenges posed by militarism, tourism, and resource exploitation, which have disrupted these traditional systems. Hawaiians have reclaimed ownership of their freshwater resources through the Public Trust Doctrine, demonstrating the power of cultural and community-driven governance.

Milika Sobey presented Fiji's historical and current challenges with water governance. Sobey underscored weak institutional frameworks and the absence of clear policies for groundwater management and discussed the impacts of large-scale businesses and the lack of local representation in management decisions, particularly concerning bottled water production. Sobey concluded her presentation with a call for community empowerment.

KEYNOTE SESSION 3: HOW TO EFFECTIVELY SHARE FRESHWATER BEST PRACTICES

MODERATOR

Francesco Sindico, ISC Co-chair, Professor of International Environmental Law, Director, Climate Change Legal Initiative (C2LI), and Co-chair of the IUCN World Commission on Environmental Law Climate Change Law Specialist Group

SPEAKER

James Ellsmoor, CEO, Island Innovation

SUMMARY

This session featured a fireside chat with James Ellsmoor, CEO of Island Innovation, who shared his insights on freshwater management practices across islands. Drawing from his experience in renewable energy in island contexts, he emphasised the importance of informal collaborations and knowledge sharing, even among islands with diverse backgrounds. Ellsmoor highlighted several parallels in the challenges between energy and freshwater resources, noting that many islands facing water issues also encounter electricity problems. He advocated for sharing stories and expertise across regions, framing innovation as adapting lessons from one context (e.g., the Caribbean's renewable energy successes) to another (such as the Atlantic). He stressed that innovation is a two-way learning process, and he recognised the role of financing in advancing such projects.

While the term "laboratory" is often used to describe islands testing innovative ideas, James cautioned against its negative connotations. He also emphasised the unique challenges faced by subnational islands like the Faroe Islands and Azores, which lack the political mechanisms of sovereign island nations. To overcome this, he recommended involving representatives from various government levels, including local island authorities, to facilitate large-scale collaborations. Despite the difficulty of measuring the impact of informal collaborations, James underscored their value in fostering learning, inspiration, and progress.

KEY TAKEAWAYS

- Islands should actively share stories, expertise, and practices to inspire innovative solutions.
- Informal collaborations are valuable for fostering learning and inspiration.
- Subnational islands require strong representation in international projects to address unique challenges.
- Avoid referring to islands as "laboratories" or "pilots" for testing innovative ideas or projects (due to the negative connotation that these concepts carry).

KEYNOTE SESSION 4:
ISLAND PERSPECTIVES FROM URBAN AREAS: THE CASE OF TORSHAVN, FAROE ISLANDS AND OTTAWA, CANADA

SPEAKERS

Bjørn Holm, The municipality of Tórshavn, Faroe Islands

Mary Trudeau, Envirings, INC / Project Officer, IWRA

SUMMARY

The discussion highlighted shared water management challenges between Ottawa and the Faroe Islands. While both have adequate water resources, the Faroe Islands face difficulties in distributing water and balancing its uses (industry, domestic, firefighting). Presently, it relies on 16 decentralised purification plants with independent systems. Ottawa, by contrast, uses a centralised system but struggles with ageing infrastructure, inefficiencies, and low public awareness about water use and its complexity.

Bjørn Holm explained that the Faroe Islands' decentralised system reduces energy use by relying on gravity, though some areas require pumps to maintain pressure. Urbanisation and summer water scarcity presents additional challenges, particularly for salmon farms that demand large amounts of freshwater. Using alternative water sources (such as greywater or rainwater) would require separate plumbing, which would increase costs. A revitalised stream in one town which had been constructed above its original natural path now flows with treated potable water, illustrating the cost and environmental impacts of water distribution.

KEY TAKEAWAYS

- More similarities than differences were identified between the management of the urban water systems of an island and non-island.
- People in urban areas often take water availability for granted. The standard design for urban centres uses drinking-quality water for multiple purposes like flushing toilets and watering gardens. Raising public awareness about the importance of water conservation, even in areas with seemingly abundant resources, is crucial for long-term sustainability.
- People do not fully understand the processes behind tap water and the costs involved in this type of system (collection, purification, distribution, maintenance, repair, operation). It is important for people to better understand where their water comes from.
- Both Ottawa and the Faroe Islands face issues with water management; the engineering design standard for potable water systems is fundamentally inefficient (i.e., potable water is used for firefighting, toilet flushing, etc)
- Spring water is naturally clean, but drilling for groundwater extraction can lower groundwater levels, making it important to regulate extraction methods.
- Ensuring sustainable practices in water sourcing is critical, regardless of the location.

Mary Trudeau discussed Ottawa's reliable potable water system which faces challenges like water loss from ageing infrastructure, inefficiencies in fire-suppression design, and the inability of conventional purification technologies to remove emerging contaminants. Only 1% of treated water is used for drinking, and affordability concerns keep water rates low, contributing to infrastructure deficits. Ottawa's approach separates potable water, wastewater, and stormwater, with the latter often discharged untreated into water bodies, increasing environmental impact. Cultural perceptions of water abundance further complicate sustainable management efforts.

Both speakers stressed the need for improved infrastructure, public awareness, and sustainable water use to address growing challenges in their regions, despite perceptions of abundance.

IWRA ISLANDS WATER CONGRESS POLICY REPORT
SPECIAL SESSION

MODERATOR

Gabriel Eckstein, International Water Resources Association Past President, Professor of Law, Texas A&M University, Chair of the Executive Council, the International Association for Water Law, Associate Editor for the book series Brill Research Perspectives: International Water Law

SUMMARY

This session focused on gathering insights for the forthcoming IWRA Islands Water Congress Policy Report. Participants shared experiences and challenges related to groundwater management, institutionalising freshwater governance, and raising public awareness. As a way of ensuring the Congress' future legacy and action, the Policy Report will serve as an output addressed to the Faroese people as well as the international islands community. Representatives from Prince Edward Island (Canada), Jamaica, Fiji, the Canary Islands (Spain), Australia, Madagascar, Malta, Scotland, the Maldives, and the Faroe Islands contributed diverse perspectives, emphasising the importance of tailored solutions and community engagement.

KEY TAKEAWAYS

- In order to manage groundwater, you need to monitor it; however, such data needs a purpose. Not all data is necessary.
- Water is political, but water is also emotional and personal. It is hard to capture those components in policy development, but for effective water management, they need to be recognised and leveraged if we want the necessary structures in place to accurately reflect the community served (and its values). In order to efficiently raise this awareness, transparency, variety, accessibility, and trust are needed.
- Recommendations include providing an inventory of the available data and identify the subsequent gaps, creating a list of awareness tactics and practices, and for the Faroe Islands in particular, to take the Faroese context into account when developing future policies.
- Noted future and next steps: The Policy Report will be shared at the start of 2025. Participants are invited to share the report in their own communities with their unique context in mind. Participants are invited to try to bring the island perspective to the next IWRA World Water Congress in December 2025.

SPECIAL SESSION
FAROE ISLANDS WATER ADMINISTRATION

SESSION ORGANISER
Arni Petersen, the Food and Veterinary Authority

MODERATOR
Óluva R. Eidesgaard, ISC Co-chair, Research geologist, Faroese Geological Survey, Jarðfeingi; Project Lead, Investigation of Groundwater Potential, Tórshavn, Faroe Islands

SPEAKERS
Tráin P. Nónklett, the University of the Faroe Islands
Birita F. Kjærbæk, The Faroese Environment Agency
Jóngerð J. Olsen, Municipality of Runavík
Knud Simonsen, The Faroese Meteorological Office
Janus Vang, Micro, Faroese Food and Veterinary Authority
Árni Petersen, Faroese Food and Veterinary Authority
Jana Ólavsdóttir, Jarðfeingi (the Faroese Geological Survey)

SUMMARY
Tráin Nónklett discussed the history of water management in the Faroe Islands from 1900 to 2000, from the early days when streams were divided into sections for clean and wastewater, and strict regulations were in place to prevent contamination (such as keeping animals away and prohibiting people from crossing the streams). By the 1950s and 60s, wells were being established, and the government began prioritising clean water access for everyone. In the 1960s and 70s, the two largest cities faced water shortages as both the population and the fishing industry grew. By the 1980s and 90s, water treatment facilities were introduced. Today, much of the water supply is used by the expanding salmon industry.

Birita F. Kjærbæk discussed the laws regarding the protection of surface water. While current regulations allow some wastewater to be discharged into streams, efforts are underway to change this in order to better protect public health, nature, and the environment. Wastewater management plans are being updated across the country, but progress has been slow, and only a few municipalities have fully implemented the changes. These plans were supposed to be completed by 2015, but only four municipalities met the deadline, while the others are still working toward that goal. In addition, mapping of water supply systems and, in some cases, streams are being carried out. This mapping is essential for preventing future pollution and is also used to calculate and map water supply catchment areas.

Jóngerð J. Olsen discussed the mapping of the water supply for Runavík and the need to ensure water security for the villages within the municipality. She highlighted the challenges they encountered when geothermal holes were drilled in Skálafjørður, causing the village to lose its water supply due to a connection between the drilled holes and the original water source. After this incident, the municipality decided to take a more proactive approach, researching areas—especially small villages with limited

KEY TAKEAWAYS

- Improved regulation is needed to meet future population and industry demands, particularly for the land-based salmon industry.
- Better regulation and data collection on geothermal wells are essential for future research and understanding groundwater systems.
- Increased mapping of existing water supplies and catchment areas across municipalities is needed.
- Regular updates to wastewater plans are crucial, but the implementation of which remains slow due to ongoing changes and new regulations.
- Comprehensive calculations of rainwater runoff, groundwater recharge, and evaporation across the Islands are necessary for various applications.
- Several recommendations were presented such as developing new guidelines and practices for drilling geothermal boreholes, drafting a new freshwater law. The process of drafting a new Water Law has already begun and will continue to address future water management challenges.
- Additionally, it was recommended that the Water Forum be continued beyond the Congress. Originally initiated by Jarðfeingi in 2022, this forum brings together stakeholders from government, municipalities, industry, and others involved in water management. Keeping the forum active will provide a valuable platform for continuous dialogue, knowledge-sharing, and collaborative problem-solving for water-related challenges.
- Collaboration opportunities between institutes should be explored further to avoid duplication of efforts, particularly in areas like stream mapping, where joint efforts could save time and resources.
- Plans are underway to hold the next Water Forum at the end of 2024 or the beginning of 2025.

water supplies—before allowing geothermal drilling. During the Q&A session, she mentioned that under the current law, it is difficult to prevent geothermal drilling, but a new amendment to the law is expected to happen soon, which could help address this issue in the future.

Knud Simonsen presented how precipitation affects the temperature of currents around the Faroe Islands and beyond. He explained how and where rainfall is measured in the Faroes, noting that it is only done in a few locations because it requires significant manpower and manual labour, such as physically emptying buckets, which complicates data calibration and usage. There is proper measuring equipment just outside the Faroese Meteorological Station in Tórshavn, but more rain measurement equipment is needed across the country. He also presented on the ongoing work happening to ocean currents near the Faroes, discussing a future goal to integrate ocean current models, weather models, and wave models.

Janus Vang from Mikro at the Food and Veterinary Agency discussed the practical aspects of water quality in the Faroe Islands. He emphasised the need to update the drinking water law to ensure better water quality. Vang explained the parameters that are measured, the importance of having accurate standards, and what actions are taken when measurements exceed the allowable limits to ensure water safety. Municipalities are interested in monitoring the quality of drinking water, while the industry focuses on water characteristics and availability in the required quality. Additionally, Árni Petersen presented on an ongoing project addressing water supply and storage across all municipalities in the Faroe Islands.

Jana Ólavsdóttir provided an update on the status of groundwater in the Faroe Islands, focusing on a project with the Municipality of Runavík. The goal was to drill into a fracture and access relatively hot water, which was successfully achieved. The plan is to use this water system to heat the School of Glyvrar and nearby buildings. The Faroese Geological Survey is measuring as many geothermal wells as possible, recording water temperatures and the water levels in non-artesian wells. The aim of this research is to gain a better understanding of the groundwater system across the Islands, which will help in future estimates of groundwater locations and movement underground. The geothermal gradient in the Faroes is quite stable, increasing by an average of 2.5-3°C per 100 metres, but in some areas, such as Glyvrar and Kollafjørður, higher gradients have been observed. Projects are ongoing in these areas to harness this valuable water resource. Additionally, a new groundwater law was recently enacted, and under this legislation, the first 10-year licences for groundwater use have been issued.

SESSION SUMMARIES BY THEME

1 ISLAND ADMINISTRATION
2 CLIMATE CHANGE, NATURE, AND NEXUS
3 GROUNDWATER
4 DATA, INNOVATION, AND WASTEWATER

SUB-THEME 1
ISLAND ADMINISTRATION AND REGULATION

Island Water Administration: A Nordic European View

This session examined freshwater challenges faced by Nordic European islands, with a focus on climate change, geological factors, governance, and community-led solutions.

SIGRÚN TÓMASDÓTTIR discussed the challenges of turbidity in the Grábrókarveita drinking water utility in Iceland, highlighting how seismic activity and climate change impact water quality. The aquifer, formed by a porous lava field, naturally filters water but has struggled with unexpected turbidity issues since its commissioning. Seismic unrest in the Reykjanes Peninsula, approximately 100 km away, has intensified since 2019, with multiple earthquakes and volcanic eruptions causing turbidity spikes in the water supply. Investigations suggest that much of the turbidity originates from lake Hreðavatn, with fast flow paths preventing adequate filtration. Given that seismic activity and climate impacts are expected to persist for decades, efforts are being made to enhance water treatment through improved filtration systems, operational adjustments, and exploration of alternative water sources to ensure stable water quality.

ELIZABETH LAWSON highlighted Scotland's water sector as largely publicly managed, with around 3.3% of the population reling on private water supplies, which face increasing issues with both quality and quantity. She presented Papa Westray in Orkney as a case study of a community-managed water system, demonstrating how local knowledge, volunteer efforts, and metered water schemes can sustain small island populations. However, she stressed that such schemes require significant initial investment, operational support, and policy integration to be sustainable.

HANNE KVITSAND discussed the challenges of freshwater management in Arctic island settlements, focusing on Longyearbyen, Svalbard. The region relies on Isdammen and Gruvedalen as primary water sources. Despite voluntarily implementing the EU Water Directive, critical water infrastructure remains underrepresented in national policy discussions. Climate change is a major concern, affecting water availability and quality through permafrost thaw, changes in precipitation patterns, and the durability of summer water supplies. Additionally, societal shifts, geopolitical changes, and increasing tourism–particularly from cruise ships—pose further risks to water security.

SVEINBORG GUNNARSDÓTTIR presented findings from the characterisation of the aquifer in Straumsvík, Iceland, focusing on the saline-fresh groundwater interface. The study is part of ongoing research related to CarbFix and the Coda Terminal project, which aims to better understand groundwater dynamics in the region. Using resistivity surveys, geological modelling, and new exploration wells, the research identified key geological factors influencing groundwater quality, including mineral composition, permeability, and tectonic structures. Preliminary findings indicate that the saline-fresh interface deepens inland, but uncertainties remain regarding its depth variations.

MODERATOR

Henning Björnlund, Vice-President, IWRA, Australian National University

SPEAKERS

Sigrún Tómasdóttir, Reykjavik Energy, Iceland
Elizabeth Lawson, Newcastle University, UK
Hanne Kvitsand, SINTEF, Norway
Sveinborg H. Gunnarsdottir, ISOR, Iceland Geo Survey

KEY TAKEAWAYS

- **New water sources should be explored to mitigate the rising risks that come with climate change.**
- **Comprehensive data collection is essential for implementing effective policies and infrastructure.**
- **Arctic island water challenges should be elevated to the international stage so as to drive more meaningful investment in better infrastructure.**

SUB-THEME 1 - **ISLAND ADMINISTRATION AND REGULATION**

Island Water Administration: Mediterranean and Atlantic Region

This session explored the challenges of water administration in the Mediterranean and Atlantic islands, focusing on the complex task of meeting increasing freshwater demands amidst pressures from tourism, climate change, and limited groundwater resources.

MANUEL SAPIANO provided insights from Malta, which has the lowest per capita water availability in the EU. Despite significant progress through desalination and water efficiency measures, Malta struggles to meet demands due to limited natural resources. He also emphasised the importance of moving away from siloed governance structures toward integrated policy frameworks that harmonise regulation, operations, and decision-making. Collaborative platforms, such as a national water stakeholder table, have been established to ensure clear roles, responsibilities, and effective communication among policymakers and others.

CELSO GARCIA highlighted water supply challenges in the Balearic Islands where groundwater remains the primary source of freshwater. It is supplemented by desalination, which began in Ibiza in 1994. Tourism poses the greatest pressure on water resources, with domestic use (including tourists) accounting for 67% of consumption. Celso noted that precipitation significantly influences water management. During rainy periods, municipalities reduce groundwater pumping, allowing aquifers to recover. Despite these efforts, balancing water demands across domestic, agricultural, and recreational sectors remains a challenge.

FRANCISCO RODRIGUES shared the experience of the Azores, where groundwater provides 98% of the water used for agriculture and human consumption. The islands face issues such as saltwater intrusion into basalt aquifers, while perched aquifers benefit from high levels of precipitation. Rodrigues highlighted conflicts between institutions over water priorities, complicating governance efforts. He also noted that while the Azores benefit from abundant rainfall, proactive management of resources is critical to mitigating future challenges.

NOELIA CRUZ-PEREZ discussed the Canary Islands' vulnerability to climate change, economic crises, and high dependence on energy-intensive desalination, which accounts for a significant portion of their water supply. Groundwater provides 80% of water used, but water scarcity remains a persistent issue and one that is further exacerbated by the high water demands of tropical crops and the significant distribution losses which occur during transport. She also highlighted ongoing collaborations with Cape Verde and Madeira which facilitate knowledge exchange and foster regional cooperation. She also stressed the need for increased renewable energy use and improving the balance between public and private water ownership. Doing so would ensure sustainable and equitable access.

MODERATOR

Gunnhild Storbekkronning Solli, Associated Professor of Law, the Norwegian University of Life Sciences (NMBU)

SPEAKERS

Manuel Sapiano, CEO, Energy and Water Agency, Malta
Celso Garcia, University of the Balearic Islands
Francisco Rodrigues, University of Azores Islands, Portugal
Noelia Cruz-Perez, University of La Laguna, Spain

KEY TAKEAWAYS

- **Islands face shared issues, such as groundwater overuse, saltwater intrusion, and the energy-intensive nature of desalination. Tourism places significant additional pressures on water resources.**
- **Integrated governance frameworks and clear roles for stakeholders are essential to balancing competing water use, including agriculture, domestic needs, and tourism. Transparent communication among all actors fosters better decision-making.**
- **Islands need to adopt innovative technologies, such as water reuse, efficient desalination, and renewable energy integration, to address ongoing and unique challenges.**
- **Collaborations between islands, such as those between the Canary Islands, Cape Verde, and Madeira, enable the exchange of valuable knowledge and accelerate progress toward sustainable water management.**
- **Frameworks are needed to manage public and private water ownership, ensuring equitable access and preventing overexploitation.**

SUB-THEME 1 - **ISLAND ADMINISTRATION AND REGULATION**

Island Water Administration: Caribbean Region

This session explored the financial, governance, and infrastructural challenges of water management in the Caribbean, with a focus on innovative solutions for enhancing resilience.

ALANA MAHABIR presented research on rainwater harvesting in Trinidad, highlighting its role as a cost-effective and reliable water resource in rural communities, particularly during droughts. However, contamination from agrichemicals, Sahara dust, and faecal coliforms pose significant health risks. Many households lack proper filtration systems.

HIELARD GAELLE outlined the critical issues facing Martinique, where nearly half of the water supply is lost due to outdated infrastructure. The island has implemented the Modèle de Gestion des Resources (MGR), a comprehensive resource management model that integrates stakeholder consultation across sectors to improve water allocation. Despite these efforts, financial constraints and ageing infrastructure continue to hinder progress, with a looming risk of water shortages and rising costs being estimated by 2055.

EVA FERREIRA discussed the water management challenges in Curaçao and Saint-Martin, where desalination is the primary water source. While desalination reduces dependency on groundwater, it is expensive and energy-intensive, and its implementation often relies on Dutch governance models that fail to account for local realities. The lack of structured environmental policies further complicates the islands' ability to sustainably manage water resources.

CHRISTOPHER HUSBANDS introduced the Caribbean Water Utility Insurance Collective (CWUIC), a resilience programme designed to improve disaster preparedness for water utilities across the region. The programme combines pre and post-disaster strategies, including damage assessment, inter-island resource mobilisation, and stakeholder training. While the initiative has fostered collaboration among Caribbean nations, challenges remain in improving data quality and efficiency in disaster response planning.

MODERATOR

Ronald Roopnarine, Lecturer, Faculty of Food and Agriculture, University of the West Indies, St. Augustine Campus (FFA, UWI)

SPEAKERS

Alana Mahabir, University of the West Indies, Trinidad and Tobago
Hielard Gaelle, Martinique Water Office, Martinique
Eva Ferreira, Tomas Bata University, Czechia
Christopher Husbands, Caribbean Water Utility Insurance Collective, Cayman Islands

KEY TAKEAWAYS

- **CWUIC will leverage pooled reserves from participating utilities alongside the financial strength of the international market. It aims to retain part of the risk within participating utilities, while transferring the remaining risk to the reinsurance market.**
- **Martinique is seeking external financial support to address its resource management challenges.**
- **In Curaçao and Saint-Martin, the involvement of Dutch engineers has yet to yield significant results, as their solutions are not well-suited to local conditions. Tailored, context-specific solutions are needed.**
- **There is a critical need to raise awareness among the population about the importance of properly treating their water.**

SUB-THEME 1 - **ISLAND ADMINISTRATION AND REGULATION**

Island Water Administration: Asia/Pacific and African Region

This session examined water administration challenges in the Asia-Pacific and African regions, focusing on issues such as water scarcity, governance, infrastructure limitations, and innovative solutions for sustainable resource management.

MEI-HUAN CHEN discussed the Kinmen Islands' significant water supply challenges, which are compounded by high population density and geopolitical instability. While a pipeline from Fujian, China, now supplies 70% of the islands' water, efforts are underway to diversify water sources to ensure greater resilience. Issues such as limited reservoir capacity, salinity, and saltwater intrusion persist, while inefficient water use in agriculture exacerbates the strain on resources. The local economy's reliance on sorghum liquor production adds further complexity, as groundwater is prioritised for this industry, raising concerns about long-term sustainability. Additionally, inadequate data and monitoring systems hinder effective water management.

EDOARDO BONO shared insights from the island of Nosy Mitsio in northwest Madagascar, where rural areas lack access to safe drinking water and sanitation. A project led by H4O has successfully involved local communities in constructing water systems, setting water tariffs, and ensuring long-term sustainability through local governance and technical training. This approach, tested in Nosy Mitsio, empowers villages to take ownership of their water systems, balancing financial sustainability with equitable access. Bono emphasised the model's scalability for other remote and underserved regions, demonstrating how community involvement strengthens governance and promotes water security.

JOSHUA PETERS presented the SEAD (Stakeholder Interaction, Elicitation, Analysis, Dialogue) decision support tool, which was applied to address water impacts on finfish aquaculture in Scotland. SEAD integrates stakeholder input and quantitative data to manage uncertainties such as drought and flood risks caused by climate change. Using Bayesian networks, the tool supports informed decision-making by assessing risks and fostering dialogue among stakeholders. While SEAD does not make decisions, its adaptability allows it to address broader water-related challenges, including freshwater scarcity, saltwater intrusion, and conflicts over resource allocation.

AUDUR ÓLASDÓTTIR highlighted a pioneering geothermal energy project in Iceland's Westfjords. The village of Patreksfjordur is transitioning from an electrical district heating system, occasionally supplemented by oil, to a geothermal system using low-temperature water (25°C). This project demonstrates the potential for geothermal energy to reduce reliance on fossil fuels and electricity for heating, paving the way for similar solutions across Iceland and globally. This session also underscored the diverse challenges faced by islands and remote regions in water management, from saltwater intrusion and agricultural inefficiencies to governance and infrastructure limitations.

MODERATOR

Ganesh Pangare, Board Director, IWRA

SPEAKERS

Mei-Huan Chen, Penn State University. USA
Edoardo Bono, H4O, Italy
Joshua Peters, University of Strathclyde
Audur Ólasdóttir, ISOR, Iceland

KEY TAKEAWAYS

- **Decision support tools like SEAD help manage complex water-related challenges, incorporating input from multiple stakeholders and addressing uncertainties from climate change impacts. This approach can be applied to various sectors, including aquaculture, freshwater management, and resource allocation.**
- **Community involvement and knowledge-sharing are essential for the success of sustainable energy and water management projects. Whether in geothermal energy in Iceland or water governance in Madagascar, local ownership and collaboration can drive long-term sustainability and resilience.**

SUB-THEME 1 - **ISLAND ADMINISTRATION AND REGULATION**

Islands, Water, and Regulation

This session examined the intersection of islands, water, and regulation, exploring how freshwater governance frameworks must be adapted to address the unique challenges faced by island communities.

FRANCESCO SINDICO highlighted the critical role islands play in advocating for freshwater issues within international law. While past efforts by Small Island Developing States (SIDS) may not have always produced tangible results, they continue to inspire determination and progress. Platforms such as the UN Water Conference, the World Water Forum, and COPs related to the United Nations Framework Convention on Climate Change Conference of the Parties, United Nations Convention to Combat Desertification, and the Convention on Biological Diversity Conference, just to name a few, remain pivotal for raising awareness and fostering international collaboration. Sindico stressed that tailored advocacy is necessary to ensure integrated water resource management (IWRM) for island communities, offering hope for future progress despite ongoing challenges.

FLORE VAVOURAKIS emphasised that effective water regulations must reflect the unique realities of island contexts. Generic solutions designed for mainland areas often fail to address the specific needs of islands. She underscored the importance of incorporating tools such as decentralised water technologies, alongside fostering interdisciplinary dialogue between regulators, industry, and island communities. She also cautioned against overly abstract discussions of freshwater, arguing instead for context-specific solutions that account for each island's unique social, cultural, and geographical characteristics. The recurring debate over whether water should be managed as private, public, or communal property further highlights the need for regulations tailored to local realities.

GABRIEL ECKSTEIN discussed groundwater regulations across ten jurisdictions, comparing ownership frameworks in Argentina, Chile, China, Costa Rica, Italy, the Netherlands, Kenya, South Africa, and the U.S. states of California and Texas. The discussion revealed stark contrasts in approaches to groundwater ownership. For example, Texas allows landowners to claim ownership of groundwater beneath their property, enabling its transfer. In contrast, most jurisdictions recognise groundwater as a public resource, with ownership vested in the state or public when in nature. Countries like South Africa and the Netherlands prohibit private ownership altogether. Eckstein highlighted how regulatory approaches are shaped by each jurisdiction's unique histories, cultures, and legal traditions, underscoring the complexity of creating universally applicable frameworks.

KAWENA ELKINGTON provided a historical perspective on water management in Hawai'i, tracing its development from the 19th century. Aquifers, replenished daily by rainfall, were historically governed by laws rooted in cultural traditions and the principle of equitable water sharing. Elkington referenced the concept of Kaneikawaiola, the personification of freshwater, which symbolises water as a shared and life-sustaining resource. By 1840, natural resources were considered public property, managed by the king as a trustee. This was followed by the establishment of the Commission of Private Ways and Water Rights in 1860 to oversee equitable water distribution. Further developments, such as the 1876 Forest Act to protect critical water sources and the 1884 legislation requiring well capping to prevent water wastage, demonstrated Hawai'i's early recognition of the need for sustainable water management practices.

MODERATOR

Jill Robbie, Senior Lecturer of Law, the University of Glasgow

SPEAKERS

Francesco Sindico, University of Strathclyde Law School, Glasgow
Flore Vavourakis, KU Leuven, Belgium
Gabriel Eckstein, Texas A&M University, IWRA Past-President
Kawena Elkington, University of Hawaii

KEY TAKEAWAYS

- **Islands need to prioritise and advocate for their freshwater agenda using global platforms that can address pressing challenges.**
- **Regulations must align with the realities of island contexts, recognising their unique geographic, social, and economic circumstances.**
- **Groundwater ownership varies widely across jurisdictions and is shaped by distinct histories, legal systems, and cultural values; this demonstrates the need for context-specific governance frameworks.**

SUB-THEME 1 - **ISLAND ADMINISTRATION AND REGULATION**

Island Water Administration: New and Old Challenges and Opportunities

This session examined both past and current challenges and opportunities in island water administration, with case studies drawn from Prince Edward Island (PEI), Singapore, Scotland, and the Faroe Islands.

JOSHUA MACFAYDEN presented research on Prince Edward Island where historical land-use changes have impacted water flows and infrastructure. Using orthographic maps and aerial imagery, his team examined coastal developments and agricultural shifts over the past 50–75 years, driven largely by tourism. He introduced the Sustainable Agriculture and Water Use for PEI project, which uses digital tools and machine learning to evaluate sustainability decision-making and trade-offs. The work builds on Elinor Ostrom's principles of resource management, emphasising the importance of historical analysis in understanding contemporary water challenges.

HENG KIAN LIEW discussed water management in Singapore, where frugal innovation is central to overcoming freshwater challenges. He argued that regardless of size or geography, islands face the same fundamental water problems of scarcity or excess. Governance, technology, and local-level solutions are essential for addressing these challenges. Liew highlighted innovative approaches, such as rainwater harvesting for non-drinking purposes, floating infrastructures, artificial aquifers, and the Super Well Point system, a cost-effective water pump variant. He stressed that simple, nature-inspired solutions can deliver immediate benefits, especially where large-scale technologies are otherwise impractical.

ELIZABETH LAWSON shared findings from a five-year programme on decentralised water technologies in Scotland. The project emerged from community concerns about water scarcity, encompassing both quantity and quality issues. While 97% of the Scottish population relies on public water supplies managed by Scottish Water, 3% depend on private supplies, which are often unreliable and of variable quality. Many private supplies rely on pumps, leaving communities vulnerable to electricity outages. Lawson's team worked with affected communities, using mobile journalism (Mo-Jo) techniques to document their experiences. The resulting film and digital storytelling tools aim to raise awareness among the public as well as among decision-makers about the realities of water access in Scotland.

ARNI PETERSEN discussed water administration in the Faroe Islands, a self-governing nation under the Kingdom of Denmark. Despite abundant freshwater resources, challenges include, weeks of no rainfall, or pollution from heavy rainfall, oil spills, power outages, and an ageing water infrastructure. Historically, municipalities were not legally required to provide clean water to citizens, though most did. Recent legal developments, including an executive order on spring water aligned with EU directives, have strengthened regulations. Water use in the Faroe Islands is exceptionally high, averaging 694 litres per person per day, compared to 135 litres in Copenhagen. This overuse stems from a lack of direct water fees, as services are covered through general taxes. Petersen stressed the need for improved governance and public awareness to address these inefficiencies.

MODERATOR

Firouz Gaini, Professor in anthropology, University of the Faroe Islands, Co-editor of Island Studies Journal, BARN (Nordic Childhood Journal), and co-editor of the volume Gender and Island Communities (Routledge 2020), Research Leader of the Faculty of History and Social Sciences, Deputy Member of the Board of the University of the Faroe Islands.

SPEAKERS

Joshua MacFayden, University of Prince Edward Island, Canada
Heng Kian Liew. Liew Strategics, Singapore
Elizabeth Lawson, Newcastle University, UK
Arni Petersen, Faroese Food and Veterinary Authority, Faroe Islands

KEY TAKEAWAYS

- **Water-rich island countries, like Scotland and the Faroe Islands, also face water supply issues.**
- **Freshwater management on islands requires tailored governance and innovation to address challenges, such as scarcity, pollution, and overuse.**
- **Frugal innovation holds strong potential for delivering simple, cost-effective water solutions at local levels, particularly in resource-limited contexts.**
- **Land-use changes impact water resources over time, highlighting the importance of historical analysis and sustainable planning.**
- **Decentralised water systems face vulnerabilities, particularly in remote areas where private supplies are dependent on unreliable infrastructure and electricity.**
- **Water pricing influences consumption behaviours, as seen in the Faroe Islands, where free access has led to significant overuse. Introducing appropriate water fees could promote efficiency and sustainability.**

SUB-THEME 2
CLIMATE CHANGE, NATURE AND NEXUS

This session explored freshwater management challenges in islands through the lens of climate change, focusing on technical, programmatic, and legal aspects.

GUNNHILD STORBEKKRØNNING SOLLI examined climate change impacts in the Nordic region. She presented an analytical framework for managing water resources, emphasising planning, measures, monitoring, and evaluation. Legal tools such as water licenses play a critical role in regulating water use, but these instruments must be carefully designed to enable flexibility for climate adaptation. She also stressed the importance of bridging the gap between high-level government planning and local implementation, suggesting time-limited licenses and regular revisions to enhance adaptability.

TESS DAVIDS AND ALBERTO QUINTAVALLA focused on the integration of water law into climate adaptation efforts within the European Union. They highlighted key regulations, including the EU Water Reuse Regulation, which prioritises local resilience and low environmental impact but only applies to wastewater reuse for agricultural irrigation. Additionally, the Urban Wastewater Treatment Directive intersects with reuse regulation but lacks coordinated implementation across the EU. The speakers noted that, while frameworks like the Water Framework Directive provide broad guidance, they lack specificity, particularly for water reuse applications. Malta was presented as an example where greywater recycling is gaining traction for domestic and commercial purposes, but the absence of a clear water hierarchy remains a challenge.

FRANCESCO SINDICO raised questions about the relationship between islands and their mainland counterparts, particularly when islands are geographically or politically isolated. He argued that trust and collaboration between mainland policymakers and island communities are critical to overcoming implementation challenges. Policies designed at a higher governmental level often fail to reflect the granular realities of island settings, where limited data and capacity can hinder effective action.

MODERATOR

Gabriel Eckstein, Immediate Past President, IWRA, Professor of Law, Texas A&M University, Chair of the Executive Council, the International Association for Water Law

SPEAKERS

Gunnhild Storbekkrønning Solli, Norwegian University of Life Sciences, Ås, Norway
Tess Davids, Deltares, Delft, Netherlands
Alberto Quintavalla, Erasmus University, Rotterdam, Netherlands
Francesco Sindico, University of Strathclyde Law School, Glasgow

KEY TAKEAWAYS

- **High-level policies often fail to reflect island realities, making implementation difficult due to a lack of context-specific approaches.**
- **Granular data limitations and capacity gaps in island settings can hinder the ability to pinpoint exact challenges faced by island communities.**
- **Legal tools, such as water licenses, must be flexible and adaptable to evolving climate conditions, with mechanisms for regular revision and time limits.**
- **Building trust between mainland policymakers and island communities can transform policy implementation into collaborative, locally driven efforts.**
- **Islands must be included in climate adaptation strategies, recognising their disproportionate vulnerability and unique needs.**
- **Taking into account the history and specificity of islands when implementing legislation is crucial and a suggested recommendation.**

SUB-THEME 2 - **CLIMATE CHANGE, NATURE AND NEXUS**

Saltwater Intrusion

The session explored the challenges and risks associated with coastal groundwater management and environmental accountability.

NICOLE LEROUX emphasised that Coastal groundwater, vital for 40% of the global population living near coastlines, is influenced by both land and oceanic processes. Monitoring saltwater intrusion is challenging and often limited by the difficulty of conducting large-scale, detailed analyses. Effective management is crucial, as demonstrated by a case study in Nova Scotia, which faces complex geology and the highest projected sea level rise in Canada.

FINNBOGI ÓSKARSSON highlighted that increased salinity in Icelandic groundwater is likely due to seawater inflow. This poses risks, such as reservoir cooling, scale formation, and corrosion, especially in geothermal systems. Monitoring and reducing production have been key responses to mitigate these changes.

EVA FERREIRA highlighted that greenwashing occurs when companies appear environmentally responsible but lack transparency and responsiveness. To improve environmental accountability in water supply, companies should create accessible communication channels, regularly publish clear environmental reports, and involve the public in monitoring efforts. Citizens must demand more information, as companies often neglect proper resource allocation for environmental management. Future studies should compare practices across different countries to enhance global environmental accountability.

MODERATOR

Kim Bergkvist, Chemical Department Manager, Faroese Food and Veterinary Agency

SPEAKERS

Nicole LeRoux, Dalhousie, Canada
Finnbogi Óskarsson, ISOR, Iceland
Eva Ferreira, University of São Paulo, Brazil

KEY TAKEAWAYS

- **Effective management and monitoring of coastal groundwater are crucial due to the risks posed by seawater infiltration, such as reservoir cooling, scale formation, and corrosion in systems like geothermal energy, as exemplified by the challenges faced in Iceland and Nova Scotia.**
- **It has been recommended that to enhance environmental accountability we must ensure transparency through clear communication, regular reporting, and public involvement in monitoring procedures.**

SUB-THEME 2 - **CLIMATE CHANGE, NATURE AND NEXUS**

Water and Nature Working Together including the Special Case of Rainwater Harvesting

This session explored how water and nature can work together to address freshwater challenges, particularly in island contexts, with an emphasis on rainwater harvesting (RWH), nature-based solutions, and traditional water management practices.

MARY TRUDEAU discussed the decline of aquatic biodiversity in urban freshwater ecosystems due to urbanisation, climate change, and invasive species, using empirical studies from Toronto as an example. Over the past 42 years, urbanisation has increased runoff by 45%, accelerating flow rates and disrupting fish populations. Trudeau explained how "urban stream syndrome" complicates flow predictability and flood risks, particularly in urbanised watersheds. Current stormwater management practices overlook flow acceleration, presenting a critical gap in understanding and mitigation. She noted that in island contexts cultural norms and public appreciation for unique aquatic species could encourage stronger support for sustainable urban drainage systems.

PUA SOUZA shared insights from Hawai'i, where traditional water management is deeply embedded in the cultural and governance systems. The Hawai'ian word "WAI" (freshwater) reflects the central role of water in the local economy and community. Souza described KAILAI'AINA, a governance system inspired by the water cycle, and MAKAHIKI, a wet-season practice reinforcing relationships and redistributing resources. These principles form the foundation of Hawai'i's circular economy, promoting environmental kinship and regenerative processes. However, modern challenges such as tourism, military activities, and housing pressures threaten this balance. Souza called for collaboration in adapting these ancestral systems for contemporary needs while still preserving their spirit and cultural values.

NOELIA GARCIA-RODRIGUEZ presented a case study on groundwater management in the island of La Palma in the Canary Islands where water scarcity has led to the widespread drilling of water galleries, resulting in the reduction of natural spring flows. A proposed solution is hydraulic closure, a nature-based solution (NBS) that involves constructing concrete walls within galleries to mimic volcanic dikes and regulate groundwater flow. This approach transforms galleries into underground reservoirs, helping to restore spring flow and conserve aquifers. While legal frameworks support hydraulic closure, progress remains slow, with only 17% implemented. Garcia-Rodriguez stressed the need to address the social, economic, and political factors influencing groundwater management, particularly as water resources remain under private control.

CHRISTINA NATALIA TITSARI AND REHEMA KOMBA discussed the potential of rainwater harvesting (RWH) as a solution to water scarcity on small islands like Ameland in the Netherlands, which face pressures from tourism and climate change. Their study assessed the practicability, viability, and sustainability of RWH systems, highlighting their ability to reduce water demand, enhance resilience, and promote self-sufficiency. Stakeholder workshops and feasibility studies found RWH systems to be economically viable, with a payback period of just 2.3 years. Collaboration with local expertise and user-friendly systems were identified as critical to community acceptance and long-term success. This case study provides a replicable model for other small islands looking to implement RWH systems and to improve water circularity.

MODERATOR

Laurie Brinklow, Assistant Professor, Co-ordinator of the Master of Arts in Island Studies Programme, Chair of the Institute of Island Studies, University of Prince Edward Island, Canada

SPEAKERS

Mary Trudeau, Envirings INC, Canada
Pua Souza, University of Hawai´i at Manoa, USA
Noelia Garcia-Rodriguez, ISTUR, Spain
Christina Natalia Titsari & Rehema Komba, Groningen University, Netherlands

KEY TAKEAWAYS

- **Climate change and urbanisation intensify water challenges, requiring innovative solutions like RWH and nature-based infrastructure.**
- **Collaboration and community involvement are essential for successful water management systems; they ensure local ownership, maintenance, and long-term sustainability.**
- **Lessons from small islands and traditional practices can guide adaptive water management strategies globally.**
- **Bridging knowledge and action through flexible policies, improved governance, and innovative technologies will be key to addressing water management challenges in a changing climate.**

SUB-THEME 3
GROUNDWATER

Island Groundwater Administration

This session focused on groundwater administration in island contexts, with case studies from the Faroe Islands and Iceland.

ÓLUVA EIDESGAARD presented findings from the Faroe Islands, where groundwater resource potential was investigated through isotope analyses. The study determined that groundwater in the region is entirely meteoric in origin, with most samples indicating a young age due to rapid recharge. Older groundwater samples were associated with tunnel waters and water in shallow geothermal borehole systems, as identified through tritium isotope analyses. Notably, no per- and polyfluoroalkyl substances (PFAS) were detected. pH levels were observed to rise with temperature, attributed to the dissolution of basalt. These insights contribute to a better understanding of the origin, quality, and recharge dynamics of the groundwater in the Faroe Islands.

DAGUR SIGURÐARSON discussed the impact of planned industrial developments on freshwater resources in Iceland, particularly in the Reykjanes Peninsula. Using groundwater models, Sigurðarson's team evaluated the optimal pumping rates for fish farms to minimise the risk of saltwater intrusion, a critical concern in coastal aquifers. With additional industries such as carbon capture and storage, electro-fuel production, and transformer stations being proposed, he underscored the importance of implementing strong regulatory frameworks for safeguarding freshwater lenses from overuse and contamination.

TINNA JÓNSDÓTTIR highlighted Iceland's groundwater licensing system, where her group oversees the issuance of permits for groundwater use. Jónsdóttir emphasised the importance of maintaining flexibility in licensing frameworks so as to adapt to changing conditions. Monitoring is conducted through a combination of audits–both in-person visits and published reports–which has proven effective in ensuring compliance. The system continues to evolve to address the dynamic challenges associated with groundwater management.

MODERATOR

Steinunn Hauksdóttir, Director of Mapping and Exploration, ÍSOR, Iceland Geosurvey

SPEAKERS

Óluva Eidesgaard, Jarðfeingi (the Faroese Geological Survey), Faroe Islands
Dagur Sigurðarson, ISOR, Iceland
Tinna Jónsdóttir, The National Energy Authority, Iceland

KEY TAKEAWAYS

- **Analysing the groundwater quality can provide insight into the groundwater age, origin, and recharge rates. Such information is useful for understanding groundwater resource potential.**
- **Freshwater lenses are easily under threat with industrialisation; hence regulations are necessary.**
- **Licensing for groundwater use should be flexible, and audit results should be used to inform licensing decisions.**
- **Groundwater management in island contexts is multidimensional (geological, hydrological, political, social, etc.)**

SUB-THEME 3 - **GROUNDWATER ISLAND, GROUNDWATER ADMINISTRATION**

Groundwater and Innovation

This session explored innovative approaches to groundwater management, focusing on the identification of natural factors affecting groundwater quality, securing groundwater supplies, and assessing its potential for alternative uses.

GEOFFREY MARSHALL presented a managed aquifer recharge (MAR) project aimed at improving groundwater supply in Kingston, Jamaica. This technique involves purifying recharge water using vegetation beds to ensure water quality before it enters aquifers. The implementation of MAR has significantly enhanced the water supply in Kingston, offering a practical solution for addressing water scarcity while still maintaining environmental standards.

TESS DAVIDS introduced an innovative saltwater pumping technique designed to protect freshwater lenses. By strategically pumping saltwater between the sea and the freshwater lens, the approach shifts hydraulic pressure, promoting the expansion of the freshwater lens. Tess noted that this method can be effectively combined with MAR to mitigate the risk of saltwater intrusion in coastal aquifers, providing a dual approach to securing freshwater resources.

JANA ÓLAVSDÓTTIR demonstrated the potential of utilising geothermal groundwater for heating and drinking purposes in the Faroe Islands. A case study at a school in Glyvrar analysed temperature profiles and geothermal gradients to assess the feasibility of an open-loop heating system. The results indicated that geothermal water could heat buildings while also serving as a potable water source for approximately 100 households, showcasing the dual-purpose potential of geothermal groundwater in island contexts.

SIGURÐUR KRISTINSSON shared findings from the Reykjanes Peninsula in Iceland, where seismic and volcanic activities were found to coincide with changes in groundwater temperature and salinity. These fluctuations appear to result from land shifts and magma injections, highlighting the influence of natural geological processes on groundwater quality. Kristinsson emphasised the need for continued monitoring to understand and mitigate such impacts, especially in regions prone to seismic activity.

MODERATOR

Óluva Eidesgaard, ISC Co-chair, Research geologist, Faroese Geological Survey (Jarðfeingi), Project Lead, Investigation of Groundwater Potential, Tórshavn, Faroe Islands

SPEAKERS

Geoffrey Marshall, Water Resources Authority of Jamaica, Jamaica
Tess Davids, Wageningen University, Netherlands
Jana Ólavsdóttir, Jardfeingi (the Faroese Geological Survey), Faroe Islands
Sigurður Kristinsson, ISOR, Iceland

KEY TAKEAWAYS

- **Managed Aquifer Recharge (MAR) can effectively increase groundwater supply when adapted to local geological conditions and paired with natural purification methods.**
- **Saltwater pumping is a valuable tool for mitigating saltwater intrusion and can complement MAR techniques for protecting freshwater lenses in coastal areas.**
- **Geothermal groundwater has significant potential for dual usage, providing heating for buildings while also serving as a potable water supply.**
- **Seismic and volcanic activities can influence groundwater quality by altering temperature and salinity; this warrants continued monitoring and investigation in geologically active areas.**

SUB-THEME 4
DATA, INNOVATION AND WASTEWATER

Monitoring and Data

The session explored cutting-edge approaches to improving water management through machine learning, optimised treatment systems, and erosion control. Discussions highlighted the importance of making machine learning models interpretable to bridge communication gaps with non-technical stakeholders.

According to **HORÁCIO PÉREZ-SÁNCHEZ**, good fitting in machine learning (ML) models is not sufficient. He highlighted the importance of interpretability of ML predictions, especially when communicating this to non-technical stakeholders. Therefore, his team highlighted language models to address this problem.

LEGEAI ZOE presented her team's multi-criteria decision tool in selecting the best treatment wetland systems in insular urban areas (applied in the Caribbean region). As these were validated under various climate conditions, the tool can be used by any water resource manager in cities to maximise the treatment while minimising costs in their area.

BARRET KURYLYK stressed that erosion also interacts with the evolution of saltwater intrusion especially on small islands. It reduces the recharge area needed to maintain the freshwater lens. His team's field (geophysical) data and analytical solutions showed that topography is a crucial parameter in determining the saltwater intrusion's extent. Therefore, mitigating saltwater intrusion entails protecting the coastlines from erosion.

MODERATOR

Manuel Sapiano, CEO, Energy and Water Agency, Government of Malta

SPEAKERS

Horácio Pérez-Sánchez, UCAM, Spain
Legeai Zoe, INRAE, France
Barret Kurylyk, Dalhousie University, Canada

KEY TAKEAWAYS

- **Interpretability of ML models is crucial to make the model outputs more understandable and sensible to non-technical stakeholders.**
- **Designing the best treatment design systems for urban water can be optimized using multi-criteria decision tools.**
- **Erosion (and thus topography) is a crucial factor that determines the extent of saltwater intrusion.**

SUB-THEME 4 - **DATA, INNOVATION AND WASTEWATER**

Hard Innovation I

The session explored innovative wastewater management solutions tailored for island communities. Presentations highlighted cutting-edge technologies aimed at reducing the environmental impact of wastewater treatment, including automated septic tank heating to mitigate methane emissions, decentralised liquid-on-a-sewer systems, and packed-bed textile treatment for rural areas.

BAPTISTE POURSAT and his team established an automated technology that reduces the carbon dioxide emission from wastewater in septic tanks in the islands of Barra & Vatersay, Iona, Jura, and Arran in Scotland. This is to consider the high global warming potential of wastewater infrastructures. Their technology involves heating the septic tank (from biofilters with air and water heat pumps) at homes to allow the methane to dissipate.

SIMON TJISMA discussed that islands can provide learning opportunities for better water management. His team implemented the bottom-up approach on three Frisian Islands in the Netherlands, including mobile games (that Simon's team developed) that are strategised to encourage youth involvement. By involving the children, they can influence their parents, and thus the good habits can spread to more people (i.e., from household- to island-scale approach).

HOLDA CROCKER introduced the liquid-on-a-sewer technology, which pumps only the liquid portion in the treatment stage every 2 to 3 years. The solid is collected separately every 10 to 12 years. This applies to a decentralised infrastructure system, which is composed of a tank and a horsepower pump for each home (with intermittent runs and upgraded solar power). This system, already applied in Oregon, can ideally be implemented in dispersed (rural) communities, and difficult terrains (e.g., hilly areas) on islands. With the liquid-on-a-sewer system, the cost of operating a conventional treatment system is reduced. Crocker also introduced the packed-bed textile treatment technology, where the effluent water is sprayed in recirculation tanks. The textile fabric is lightweight enough for easy usage. These systems are very efficient and the treatment results in completely odourless and clear water.

GAËLLE HIELARD introduced her team's nature-based wastewater management system (artificial wetlands) in various Caribbean islands (CARIBSAN). They utilised tropical vegetation to hold the soil and prevent further clogging (but not to absorb the pollutants). The clarifier is made up of less concrete and less electronics. Their nature-based technology is way more effective (greater than 95% treatment rate) than conventional treatment systems and takes advantage of just gravity for water flow. It is easier to implement and manage, requiring fewer human resources, and is thus more cost-effective. It can also easily be accepted by the public due to its easy integration within the landscape.

MODERATOR

Jana Ólavsdóttir, Research Geologist, Jardfeingi (the Faroese Geological Survey), Faroe Islands, Project Lead for Groundwater and Geothermal Energy

SPEAKERS

Baptiste Poursat (on behalf of William Sloan), University of Glasgow
Simon Tjisma, Province of Frylan, Netherlands
Holda Crocker, Orenco Water, USA
Gaëlle Hielard, Martinique Water Office, Martinique

KEY TAKEAWAYS

- **Islands present opportunities for learning about water management even for people from the mainland.**
- **The global warming potential of wastewater treatment in cities is high; thus, its potential greenhouse emissions must be addressed.**
- **There are various ways that wastewater infrastructures can be efficiently employed (and highly accepted by the public) with as little energy usage. They can also be nature-based.**

SUB-THEME 4 - **DATA, INNOVATION AND WASTEWATER**

Hard Innovation II

The session explored innovative approaches to water resource management, focusing on precipitation analysis, isotope hydrology, water quality monitoring, and groundwater modelling. The discussions highlighted the use of geospatial analysis to estimate rainfall distribution and watershed characteristics, offering insights into freshwater availability in island environments.

SISSAL ERENBJERG estimated the local rainfall amounts in the Faroe Islands using GIS. Her team delineated the basaltic watersheds, determined the Strahler order of rivers, and interpolated the annual rainfall using geostatistics throughout the Faroese archipelago. Their findings show that the archipelago's southern part has relatively less rain than the rest of the archipelago.

YULIYA VYSTAVNA elaborated on the importance of isotope hydrology in water resource management in small island developing states (SIDS). She emphasised that isotopes are the "fingerprints" of water, which indicates the origin and also the hydrological processes it underwent (e.g., evaporation, precipitation, etc.). Using isotopes, the age of water can be determined, which can also provide an idea of how long these waters can be replenished after consumption. Isotopes can also reflect the presence of connectivity between surface water and groundwater. These insights are useful for more tailored water management in SIDS.

ALASDAIR CLARK presented his team's low-cost technology, which involves a sensor (nanoscale taste buds) and which can detect the overall chemical signature of water (like "fingerprints"). This technology involves the changing of colours based on different groups of chemicals present in the liquid and the printing of these molecules. It can provide a general picture of the water quality in drinking water, and these sensors can detect geosmin and per- and polyfluoroalkyl substances (PFAS).

JAYSON PINZA showed that, even without accessible groundwater level data, the impact of dewatering by a mining company on a nearby community in the Philippines can still be determined using models. He used the analytic element method (a groundwater flow modelling technique) whose parameter dataset comes from the company's technical reports. His results showed that the mine dewatering activities (open-pit and underground) could have potentially lowered the community's groundwater levels by a few meters.

MODERATOR

Kim Bergkvist, Chemical Department Manager, the Faroese Food- and Veterinary Agency

SPEAKERS

Sissal Erenbjerg, FIRUM, Faroe Islands
Yuliya Vystavna, Int. Atomic Energy Agency, Austria
Alasdair Clark, University of Glasgow, UK
Jayson Pinza, Advocates of Science and Technology for the People, Philippines

KEY TAKEAWAYS

- **Characterising the precipitation in island watersheds can indicate how much freshwater can be discharged from rivers (for the Faroese context).**
- **Isotopes reflect the age of water and potential groundwater-surface water connections, which are important in water resource management.**
- **Determining the overall hydrochemical signatures, even using low-cost sensors, can provide a good picture of the drinking water quality.**
- **Models can be employed to assess the potential impacts of over-extraction/dewatering from certain industries on groundwater levels of nearby communities.**

SPECIAL SESSION SUMMARIES

Technologies To Ensure Quality of Water Supply in Islands

This session focused on water quality, discussing the challenges of wastewater contamination from urban, agricultural, and hospital sources, as well as the limitations of traditional treatment methods, like ozonation, in removing persistent pharmaceutical residues.

DROR AVISAR highlighted that wastewater, particularly from urban, agricultural, and hospital sources, is a major contaminant of water resources. Traditional direct and indirect based ozone AOP is insufficient for persistent compound degradation and or mineralisation. An upgraded and more efficient AOP technologies are needed.

BAPTISTE POURSAT emphasised how improving water quality monitoring in decentralised systems is essential for addressing potential failures. Examples of such advancements include nanosensors for detecting organic micropollutants and volatile organic compounds (VOCs) for monitoring septic tanks.

KATY ROODENKO shared how optimising wastewater treatment can be achieved by implementing inline analysis of nitrogen compounds using Infrared (IR) spectroscopy, which helps reduce energy consumption and improve process control. Despite its cost, IR spectroscopy provides powerful tools for efficient wastewater management and energy reduction.

JIN KANG highlighted how AI-driven multispectral imaging (from satellite images) can accurately identify and analyse water bodies, assessing their size and temperature. This technology can also be used to analyse water quality (e.g. salinity, and contaminants) more efficiently (with the colour of the water bodies).

NATAN SHAKED discussed the Interferometric phase microscopy (IPM) and how it offers a high-contrast imaging technique for water inspection, allowing detection of microorganisms, plastics, and metal nanoparticles by capturing phase information and using photothermal effects to detect changes in temperature and vibrations.

ZEEV ZALEVSKY highlighted how Fiber-based sensors, combined with machine learning and optical imaging, can detect and locate water pipe leaks by measuring nano-vibrations and amplitude variations, with potential for urban application and chemical detection.

MODERATOR

Katy Roodenko, Max-IR Laboratories | Israel Gannot, Tel-Aviv University

SPEAKERS

Dror Avisar, Tel-Aviv University
Baptiste Poursat, University of Glasgow
Katy Roodenko, Max-IR Labs
Jin U. Kang, Johns Hopkins University
Natan Shaked, Tel-Aviv University
Zeev Zalevsky, Bar-Ilan University

KEY TAKEAWAYS

- **Upgrading water treatment and monitoring technologies is crucial as traditional methods, like ozone AOP, struggle to degrade persistent contaminants. Advancements like nanosensors, AI-driven multispectral imaging, and IR spectroscopy offer more effective solutions for detecting and managing pollutants in both centralised and decentralised systems, also ensuring better water quality and efficiency.**

- **Integrating innovative imaging and sensing technologies, like interferometric phase microscopy (IPM) and fiber-based sensors with machine learning, can significantly enhance water inspection and leakage detection. These tools not only improve the identification of contaminants and structural issues but can also contribute to optimising resource management and energy use in water systems.**

Freshwater and Islands: A SIDS Perspective

This session discussed issues surrounding water management in Small Island Developing States (SIDS), emphasising the similarities among some of the challenges they are facing regarding sustainability, management, and governance over time. They emphasised that solutions should fit different local contexts, and that there is no "cut and paste", or one- size fits all strategy for water management across small islands. Some practical experiences and initiatives were discussed using a wide variety of island case studies, covering individual islands and regions.

ATISHMA LAL discussed the integration of water management into Pacific SIDS Nationally Determined Contributions (NDCs) and the evolution of water policy in Fiji. She highlighted the fragmented nature of water governance in many Pacific SIDS, where national water policies are either lacking or poorly coordinated. Including water in NDCs provides an opportunity to align water management with climate commitments, offering pseudo-policy guidance for the sector. She also examined Fiji's National Water Resources Management and Sanitation Policy (NWRMSP), tracing its evolution from early conflicts over groundwater extraction in the 1990s to multiple policy iterations shaped by government agencies, international actors, and shifting governance priorities. While Fiji has made progress, challenges such as political transitions, bureaucratic turnover, and capacity constraints have slowed policy implementation. The NWRMSP is now undergoing final consultations, with approval expected by 2024.

ASSELA PATHIRANA discussed the unique vulnerabilities of SIDS, emphasising their economic, environmental, and financial challenges. He highlighted that while many SIDS are not the poorest nations, their high costs and limited access to affordable financing make them particularly fragile. Factors such as non-diverse markets, unsustainable debt, and climate change exacerbate their challenges, creating a «Catch-22» where their relative income disqualifies them from lower-cost financial aid despite their high vulnerability. He also introduced initiatives like the IHE Delft SIDS Programme, which supports research, scholarships, and co-learning efforts tailored to SIDS' specific needs. Assela stressed that conventional development solutions cannot simply be copied and applied to SIDS, as their unique characteristics require tailored approaches.

HELEN BARBOSA discussed the challenges of balancing commercial objectives with equitable water service delivery in Santa Cruz, Cabo Verde. Her study focused on how commercialisation manifests in practice. She highlighted service differentiation within the same water utility. Despite both urban and low-income areas receiving water through in-house connections, infrastructure differences such as pipe sizes, valve types, reservoir capacity, and water quality control result in unequal service levels.

DANNIELLE TOWNSEND discussed the vulnerability of Kingston, Jamaica's domestic water supply to climate change and the potential role of alternative water sources. She highlighted the projected decline in rainfall and streamflow, with reductions of up to 50% by 2030 and further shifts by 2050. She also explored rainwater harvesting as a decentralised alternative, noting its feasibility for non-potable use and its potential to supplement conventional water sources. However, she emphasised that its effectiveness will diminish over time due to climate variability.

ADAM MUBEEN discussed capacity development in the water sector of SIDS, focusing on the co-creation of a SIDS-focused Massive Open Online Course (MOOC). He emphasised the importance of tailoring educational programmes to address the unique challenges of small islands, covering topics such as hydrology, water supply, wastewater management, governance, and flood control. The initiative has engaged participants from 30 countries, with contributions from graduates and experts in reviewing course materials, testing content, and delivering guest lectures. Mubeen highlighted that co-learning and collaboration are essential for strengthening water sector expertise in SIDS

MODERATOR

Adam Mubeen, IHE Delft, Netherlands

SPEAKERS

Assela Pathirana, IHE Delft, Netherlands
Atishma Lal, IHE Delft, Netherlands
Helen Barbosa, Sodertorns University, Sweden
Dannielle Townsend, IHE Delft, Netherlands
Adam Mubeen, IHE Delft, Netherlands

KEY TAKEAWAYS

- **SIDS are facing multiple common challenges, including "islandness" but also unsustainable debt levels, inadequate and not-fit-for-purpose infrastructure and lack of economic diversification.**
- **Integrating water into National Determined Contributions (NDCs) allows countries to prioritise actions that enhance internal resource mobilisation that leads to improvements in sustainability, resilience and liability.**
- **If well-designed and managed, solutions like rainwater harvesting, desalination can contribute to enhancing water supply sector.**
- **Although well promoted, commercialisation principles in the water utilities pose a great challenge to universal access to water.**

The Battle for the Water - Exploitation of Water for Green Hydrogen Production

This session discussed the potential of green hydrogen for enabling a clean energy transition, particularly for islands. Green hydrogen is seen as crucial for reducing carbon emissions in heavy industries and transport, like aviation and shipping.

KÁRI MORTENSEN discussed how the Faroe Islands, known for fisheries and exporting salmon, require significant energy for these activities. To meet this energy demand, especially in the maritime sector, there is a need for 800MW of additional wind energy, with offshore wind being the most viable option. Hydrogen, as a renewable energy carrier, is a key focus, as is ammonia production. Given the surplus water from reservoirs, the waters capacity of Torshavn is sufficient to support ammonia production.

CLAUS NICKELSEN discussed how Power-to-X projects in Denmark struggle with sourcing water for green hydrogen production. Drinking-quality groundwater is scarce due to pollution and climate change effects, such as flooding. Green hydrogen production requires pure water for electrolysis, where renewable energy splits water into hydrogen and oxygen. While freshwater is commonly used, there is an increasing interest in using desalinated seawater. Large PtX projects in Denmark are expected to use treated wastewater, processed into ultrapure water. Treating alternative water sources, including processed wastewater and seawater, is challenging due to concentrated pollutants and hidden metals. However, emerging technologies are making wastewater a viable and sustainable option for efficient electrolysis. Using treated wastewater could help meet growing energy demands while reducing environmental impact.

KEVIN MOTHERWAY highlighted how green hydrogen is produced in Ireland using only one demonstration plant. The plant is located in Cork with a 1 MW installed capacity. The green hydrogen will supply a local festival with green energy to demonstrate its potential. It's important, however, that local authorities and regulators are involved in the early implementation stages of green hydrogen, so that they can better understand the regulatory requirements and standards needed to guarantee a safe production. Pure water is key for large industries to operate securely and efficiently.

MODERATOR

Ditte Stiler, Nordic Energy Research

SPEAKERS

- Kári Mortensen, Faroese Environment Agency
- Claus Nickelsen, NIRAS, Denmark
- Kevin Motherway, Atlantic Seaboard South CARO, Ireland

KEY TAKEAWAYS

- **Green hydrogen production faces challenges with water sourcing, requiring pure water for electrolysis. This creates a demand for alternatives like desalinated seawater and treated wastewater.**
- **Islands like the Faroe Islands need additional renewable energy, such as offshore wind, to support hydrogen production for energy-demanding sectors like fishing and maritime.**
- **Collaboration with regulators, demonstrative projects, and community engagement initiatives are crucial for building public trust and ensuring the success of green hydrogen projects.**

CONCLUSION

IWRA's 1st Islands Water Congress addressed the unique freshwater challenges faced by island communities around the globe. By fostering collaboration, innovation, and knowledge exchange, the Congress laid a strong foundation for sustainable water management practices tailored to the distinct needs and contributions of islands. The Congress provided tangible outcomes, such as the Torshavn Dialogue on Sustainable Freshwater Management on Islands, plans for an IWRA Islands Water Task Force, and the ongoing formulation of a new Faroese water law, reflecting the event's immediate impact and enduring legacy.

As the first of its kind, the International Water Resources Association has set a precedent for future Congress gatherings, the next one expected in 2026. This continuity will ensure that the momentum generated at the inaugural Islands Water Congress is carried forward to enable island communities to share progress, refine their strategies, form partnerships, and collectively tackle emerging water related challenges and embrace existing and future opportunities.

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Thank You

Thank you to all partners, stakeholders, and participants for making the **1st Islands Water Congress** a resounding Success!