Adaptation Committee Reflection and Learning Workshop 1: Coasts

15th September 2021

CLIMATE CHANGE ADVISORY COUNCIL

Agenda

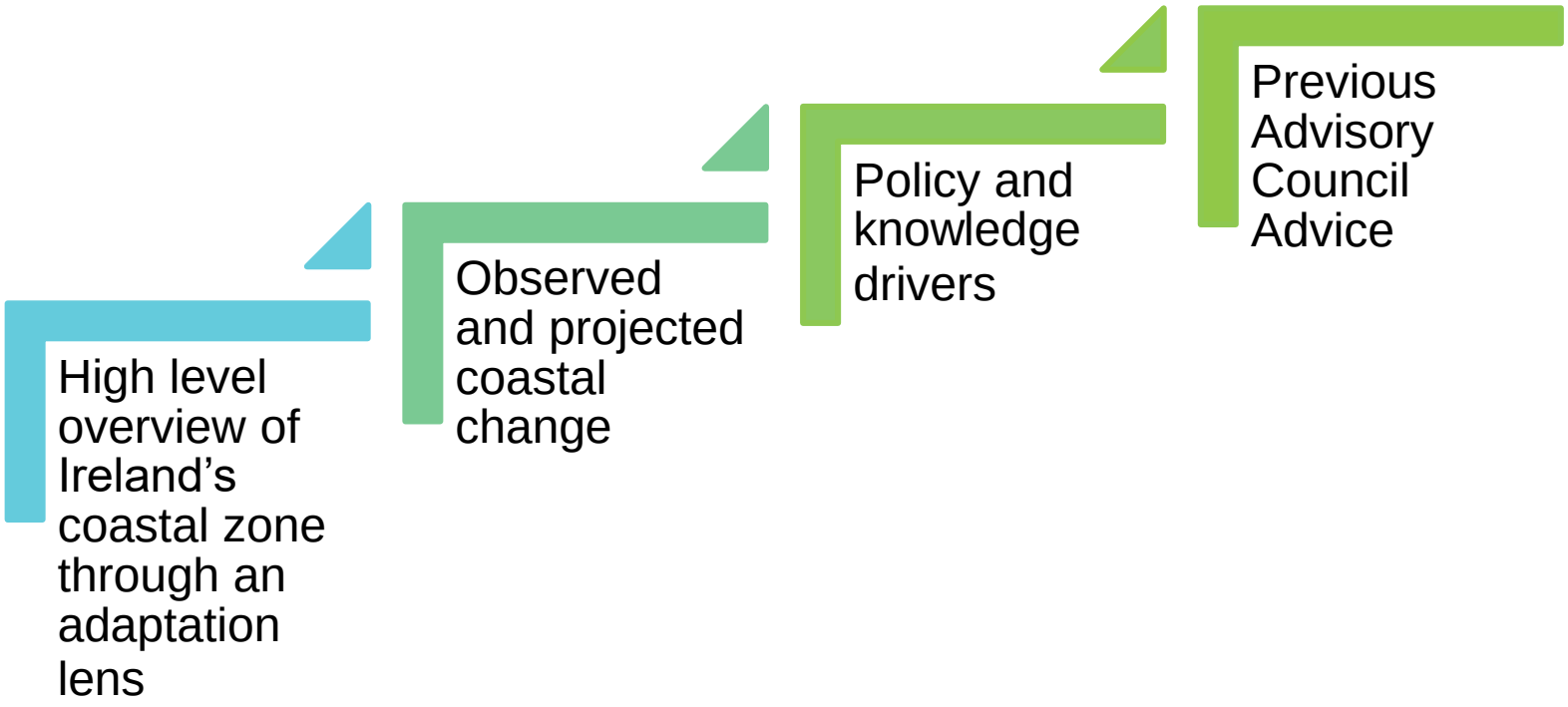
Time	Topic
10:00	Welcome – Marie Donnelly, Chair, Climate Change Advisory Council
10:05	Situating • Setting the scene – Seán O'Leary, Climate Change Advisory Council Secretariat
10:20	Analysing • Coastal Management in The Netherlands: evolutionary best practices – Engr. Tjitte Nauta, Deltares • Predicting coastal change: challenges and opportunities – Dr. Brian Kelleher, DCU • Coastal adaptation and resilience in the UK – Prof. Robert Nicholls, Tyndall Centre, UEA • Lessons for community-based adaptation in Ireland – Muireann Kelliher, Martha Farrell, Dr. Eugene Farrell, Maharees Conservation Association
11:00	Reflection • Discussion – moderated by Prof. Robert Devoy, Member, Climate Change Advisory Council Adaptation Committee
11:45	Acting • Key points and conclusions
12:00	Close of workshop

Scene setting

Seán O'Leary MIPI,
Advisory Council
Secretariat

Adaptation Committee
Reflection and Learning
Workshop 1: Coasts

Scene setting



Ireland's coastal zone

Distinct and critical part of Ireland but **hard to define**.
See, The Coastal Atlas of Ireland, Devoy et al., 2021, CUP

"anywhere on land that lies within reach of the influence of the sea, and anywhere offshore that is affected by what happens on land, may be considered part of the coastal zone"
(Bartlett et al., 2021)

Ireland's coastal zone

- Sea-level changes have long influenced where and how people live and interact in the coastal zone (Devoy, 2021; CHERISH Project, 2019).

- A total of 1.9 million people live within 5km of the coast, representing **40% of the population** and 40,000 people live less than 100m from the coast (CSO, 2019).

- Coastal zone is subject to multiple, and often conflicting, uses, stakeholders and interests.

- Implications of socioeconomic drivers and **'coastal squeeze'** (people and coastal systems competing for diminishing land spaces). **Increasing vulnerability, exposure**.

- Our coasts and coastal communities are particularly vulnerable to the impacts of climate change (EPA, 2020).

Coastal change

- Satellite observations indicate that the sea level around Ireland has risen by approximately **2-3mm/year since the early 1990s**. Analysis of sea level data from Dublin Bay suggests a rise of approximately 1.7mm/year since 1938 which is consistent with global average rates (EPA, Marine Institute, Met Éireann, 2021).

- Changes in **ocean acidity** and **sea surface temperature** are also recorded (EPA, Met Éireann, Marine Institute, 2021).

- **Increasing wave heights** have been observed over the last 70 years in the North Atlantic with typical winter season trends of increases **up to 20cm per decade**, along with a northward displacement of storm tracks (EPA, Met Éireann, Marine Institute, 2021).

- Ireland's Status Tool on Climate Ireland for more https://www.climateireland.ie/#!/tools/statusReport

Coastal change

- IPCC (2021) identifies coastal (in addition to oceanic) Climatic Impact-Drivers that affect an element of society or ecosystems: changes in relative sea level, coastal flood and coastal erosion.

- Regardless of the level of global warming, relative sea level will rise in all European areas except the Baltic Sea, at a rate close to or exceeding global mean sea level. **Changes are projected to continue beyond 2100** (IPCC, 2021).

- Extreme sea level events will become more frequent and more intense, leading to more coastal flooding (IPCC, 2021).

- **Shorelines along sandy coasts will retreat** throughout the 21st century (IPCC, 2021).

- **Storminess effects will be further amplified by their SLR feedback linkages** to other coastal dynamics, e.g., sediments fluxes, wave heights and focus, water velocity and currents (Devoy, 2021).

Coastal change

- SLR will result in a range of increasingly significant coastal – and wider – environmental changes, many of which are already in progress. These include:
  - **accelerating coastal erosion**, particularly of our long expanses of soft-sedimentary coasts and saltwater intrusion into freshwater supplies
  - **storm-related flooding**
  - **flooding of land areas**, causing the squeeze in living spaces of coastal lands
  - changes to coastal deposition of sand and **damage to coastal defences**
  - **loss of wildlife habitat** and other environmental amenities
  - damage to critical **infrastructure** and housing and risks to wastewater infrastructure (EPA, Met Éireann, Marine Institute, 2021; Cummins et al., 2021)

- The effects of these changes will be **particularly detrimental for urbanised coasts** (Cummins et al., 2021).

- **Not just change in hazards.** National Planning Framework (2018) **- 1 million extra people by 2040**, 50% of future population growth in the five cities.

Array of policy and knowledge drivers

Legislation and Policy

- Climate Action and Low Carbon Development (Amendment) Act 2021
- National Adaptation Framework, Sectoral Plans and Local Strategies
- Terrestrial Planning, National Planning Framework (NPF)
- National Marine Planning Framework (NMPF)
- Maritime Area Planning legislation
- Climate Action Plan
- Natura 2000

Structures

- National Coastal Change Management Strategy Steering Group
- National Adaptation Steering Committee
- Climate Action Regional Offices (CAROs) and their specialisms
- Maritime Area Regulatory Authority (MARA)

Knowledge

- IPCC Special Report on “The Ocean and Cryosphere in a Changing Climate” (2019) and IPCC AR6 reports
- EPA 5 Year Assessment
- Irish Coastal Protection Strategy Study (ICPSS)
- Local Authority Coastal Erosion Policy and Practice Audit (2017)
- Research e.g. Building Coastal and Marine Resilience in Ireland (BCOMAR), Climate, Heritage and Environments of Reefs, Islands and Headlands (CHERISH), Aigéin, Aeráid, & athrú Atlantaigh (A4)

Coastal change

- The effects of storminess will be increasingly magnified by climate warming into the 20th century and beyond. **Storminess effects will be further amplified by their SLR feedback linkages** to other coastal dynamics, e.g., sediments fluxes, wave heights and focus, water velocity and currents (Devoy, 2021).

- SLR will result in a range of increasingly significant coastal – and wider – environmental changes, many of which are already in progress. These include:
  - **accelerating coastal erosion**, particularly of our long expanses of soft-sedimentary coasts
  - **flooding of land areas**, causing the squeeze in living spaces of coastal lands
  - **breaching of coastal defences**
  - **loss of wildlife habitat** and other environmental amenities

- The effects of these changes will be **particularly detrimental for urbanised coasts** (Cummins et al., 2021).

National Adaptation Framework (2018)

- Coastal erosion and flooding currently pose a serious risk to Ireland's coastal areas and this is particularly the case as **Ireland's major cities and key pieces of infrastructure are located on the coast.** Key impacts include inundation of coastal areas, increase in the intensity of cyclones which will result in more extreme storm activity and an increase in coastal erosion.

- Most of Ireland's **power stations, oil refineries and storage facilities** are located on the coast and are therefore vulnerable to sea level rise, storm surges and higher waves.

- Projected changes in sea level, coastal flooding and erosion, and physicochemical changes in the marine environment will have **wide-ranging implications for the Marine and Fisheries sector**.

National Adaptation Framework (2018)

- Warming waters may bring **additional opportunities**:
  - for recreation and the **tourism sector**
  - for the **fisheries sector**, as new fish species will likely move from the southerly latitudes following warmer waters
- For areas subject to coastal erosion, their managed retreat may contribute to **ecosystem health and biodiversity**.
- Achieving Resilience in the Marine/Coastal Environment is identified as a **research priority**.

National Planning Framework (2018)

- **1 million extra people by 2040**, 50% of future population growth in the five cities.

- Short section on ‘Coastal Environment and Planning For Climate Change’ in NPF, sets **National Policy Objective 41b** “in line with the collective aims of national policy regarding climate adaptation, to address the effects of sea level changes and coastal flooding and erosion and to **support the implementation of adaptation responses** in vulnerable areas.”

- As a result of climate change, sea levels and patterns of accretion and erosion are key issues **for planning and flood risk assessment**, especially in managing the ongoing development of our cities and towns. In the long term, to 2040 and beyond, climate change adaptation responses may entail the consideration of **barrage or similar technologies** to prevent inundation of lower-lying city centre areas during extreme weather events.

Advisory Council Annual Reviews 1

- Previous Advisory Council Annual Reviews have considered coastal adaptation and resilience issues.
- Recognised **coastal zone as a critical environment for Ireland**.
- Coastal zone contains **extensive environmental systems**, e.g. estuaries, rivers and wetlands, which are particularly sensitive to the impacts of climate warming.
- Coasts are a sectoral gap and there is a **need to clarify responsibilities**.
- **Does not neatly fit** into the themes of the 2018 National Adaptation Framework (Natural and Cultural Capital, Critical Infrastructure, Water Resource and Flood Risk Management, Public Health).

Advisory Council Annual Reviews 2

- **No coastal adaptation plan** and current sectors do not fully address all aspects of coastal change that may be expected due to climate change [though amended Climate Act allows for joint sectoral adaptation plans].

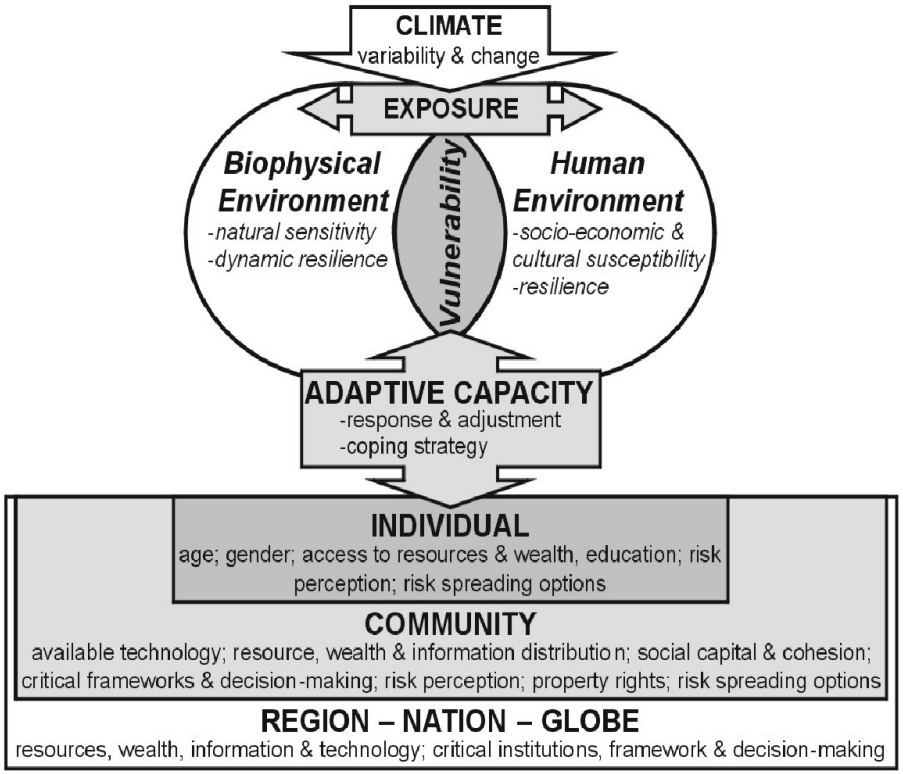
- Has been some progress in planning effectively for sea level rise and coastal erosion with the **establishment of an interdepartmental group on coastal change**.

- Coasts are a key driver for **tourism** – e.g. Galway City's Climate Adaptation Strategy discusses the pressures increased tourism may put on its coast.

- Locally led initiatives such as the Maharees Conservation Association show that, if supported, some local communities can have the capacity to lead **local adaptation responses** on these issues.

Conclusion

- **Climate change is already impacting, and will continue to impact, our coastal zone** in a variety of ways (e.g. sea level rise, storm surges, coastal dynamics).
- This will impact a significant (and growing) proportion of **Ireland's population and key infrastructure.**
- The need for **coastal adaptation** has been recognised but not implemented with sufficient urgency (we do not, for example, have a coastal adaptation plan).
- **Locally led initiatives** show potential and should be supported.



Integrated coastal vulnerability framework - Dolan and Walker, 2006