SHARING KNOWLEDGE FOR SUSTAINABLE FISHERIES

Celtic Sea Mixed Demersal Fisheries Case study

NWWRAC presentation 18/09/13

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Developments date:

- Improving the information base
  - New assessments
  - Mixed fisheries data in the Celtic Sea
  - Improved spatial resolution
  - Broadening the historical perspective
  - Taking account of economic factors
- Developing science and advisory thinking
- Presentation to EC on GEPETO project
- Engaging with industry stakeholders

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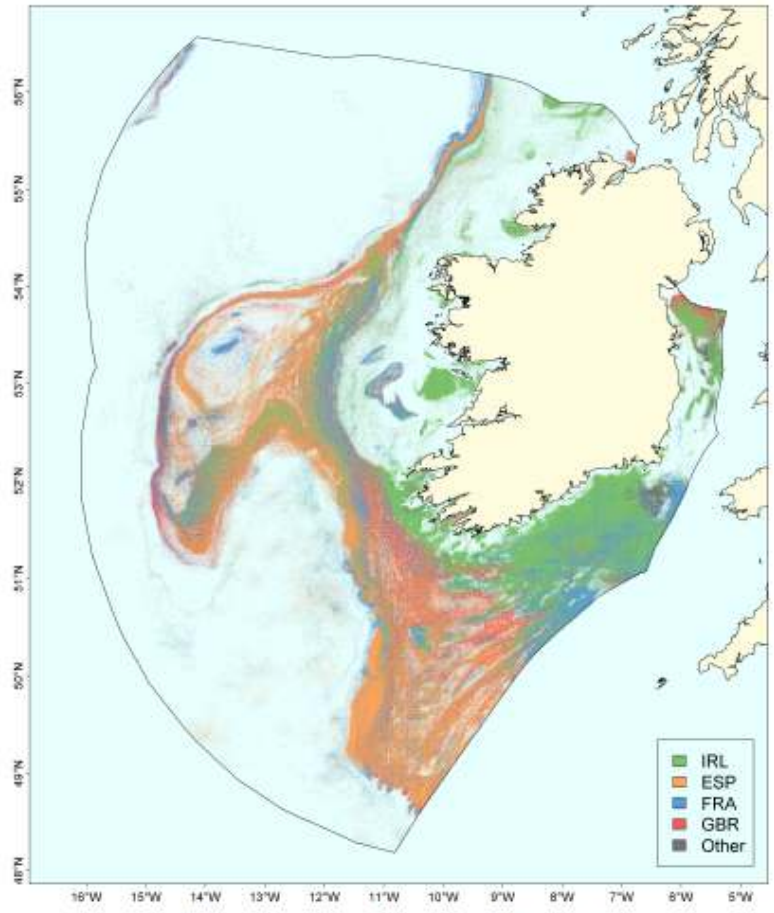
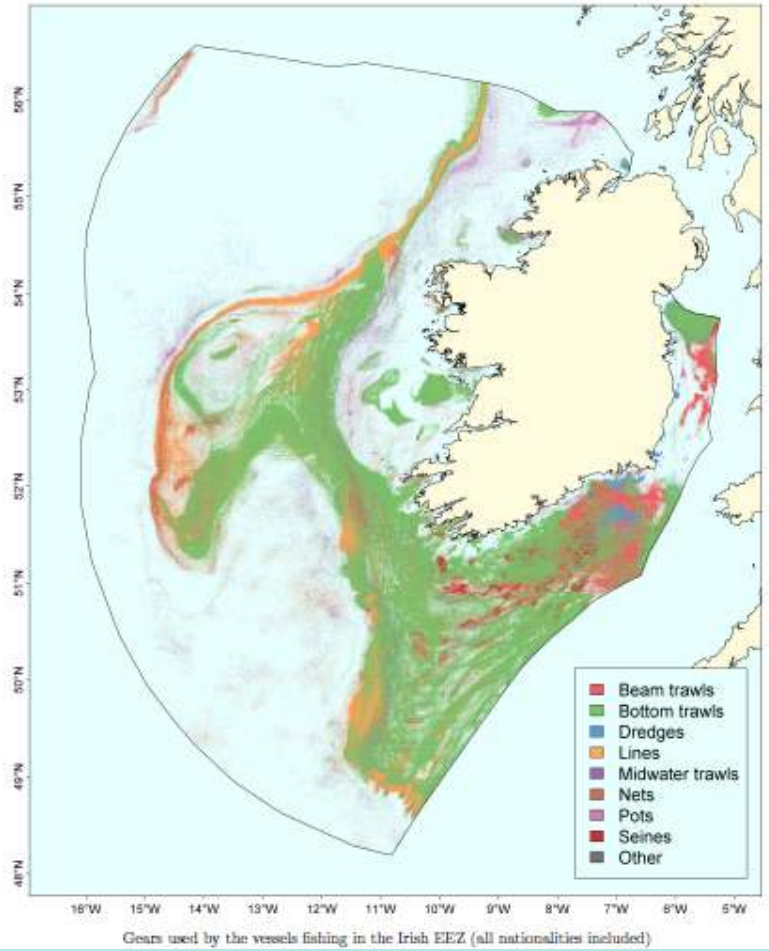


Nationality of the vessels fishing in the Irish EEZ (all gears included)



Gears used by the vessels fishing in the Irish EEZ (all nationalities included)

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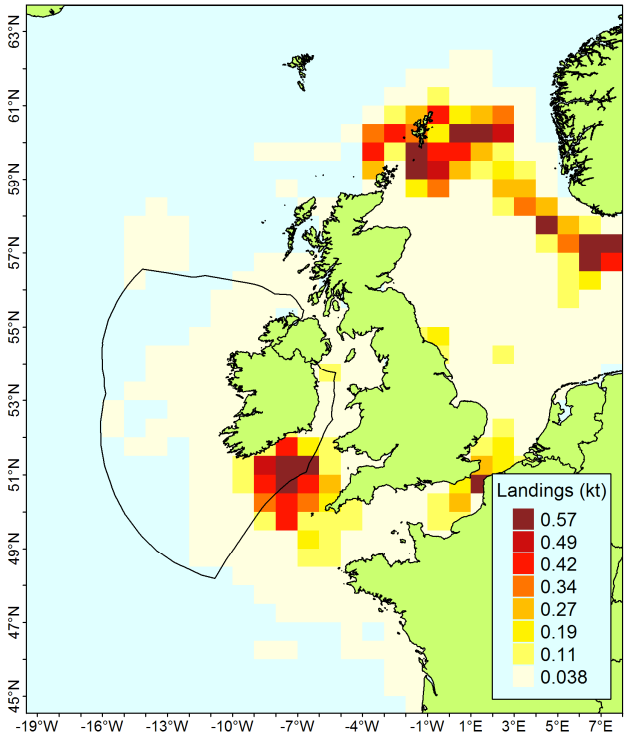
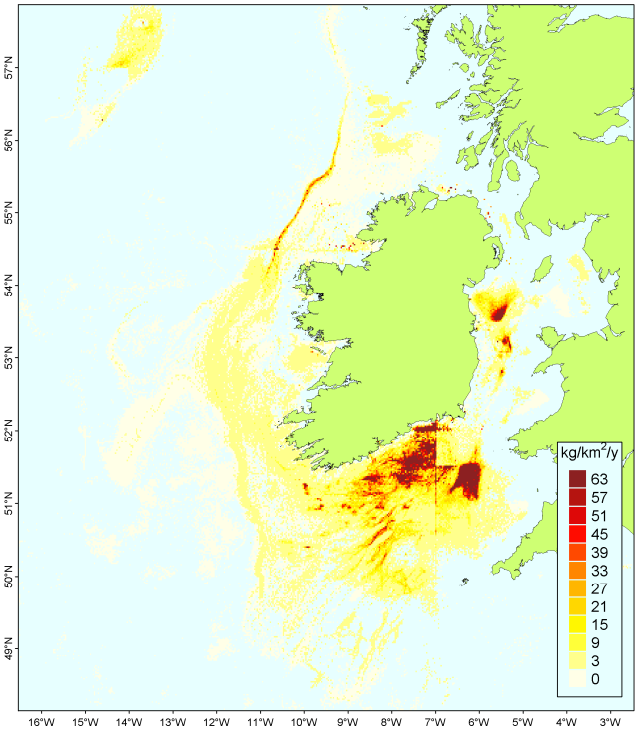
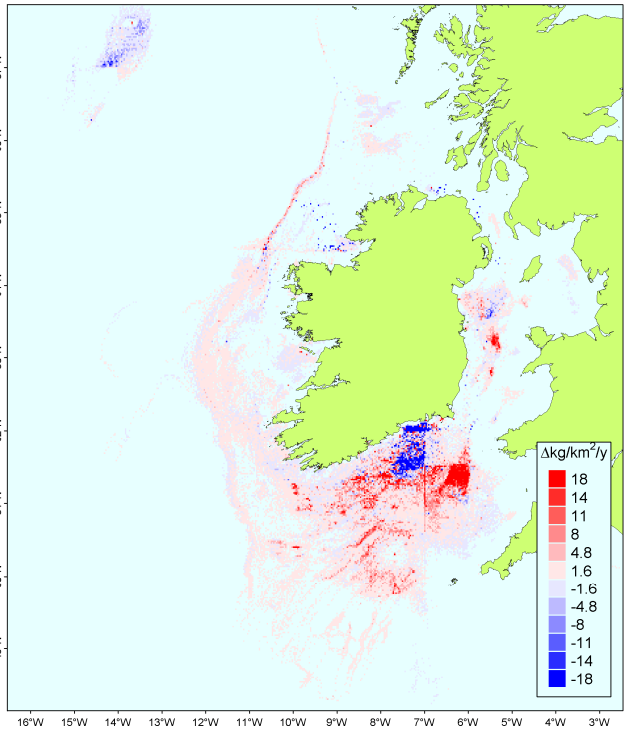
Cod in the Celtic Sea



International 2011



Ireland >15m 2008-2012



Ireland >15m Change 2008-2012

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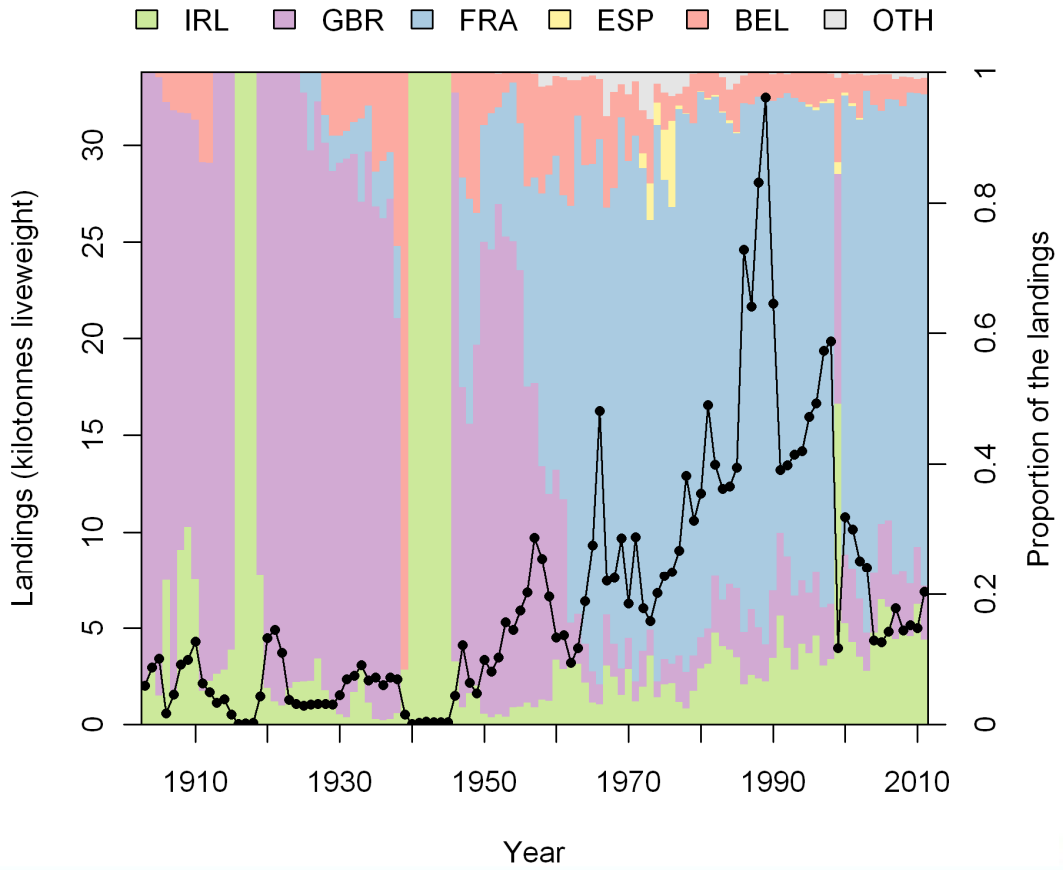
Cod in the Celtic Sea



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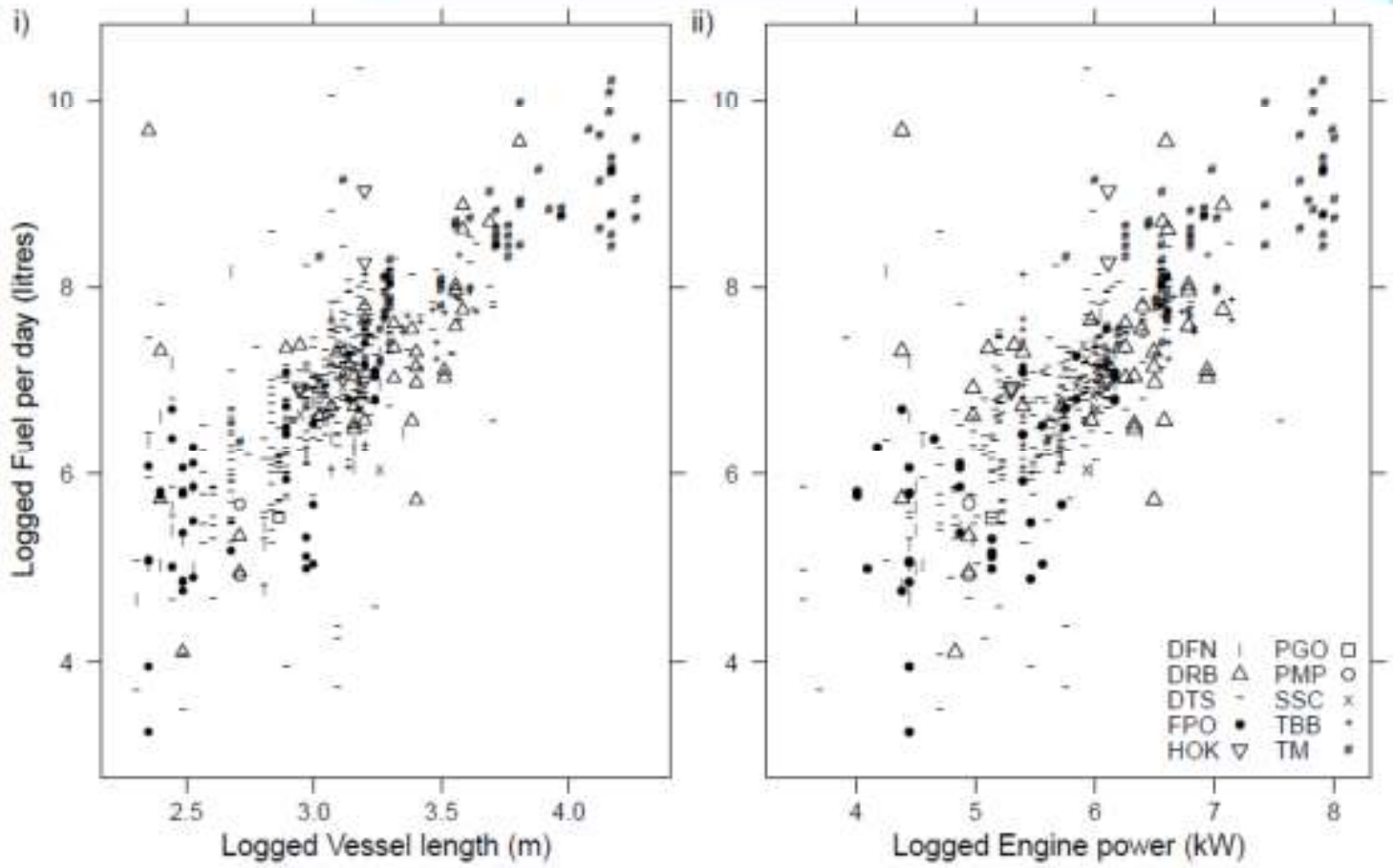

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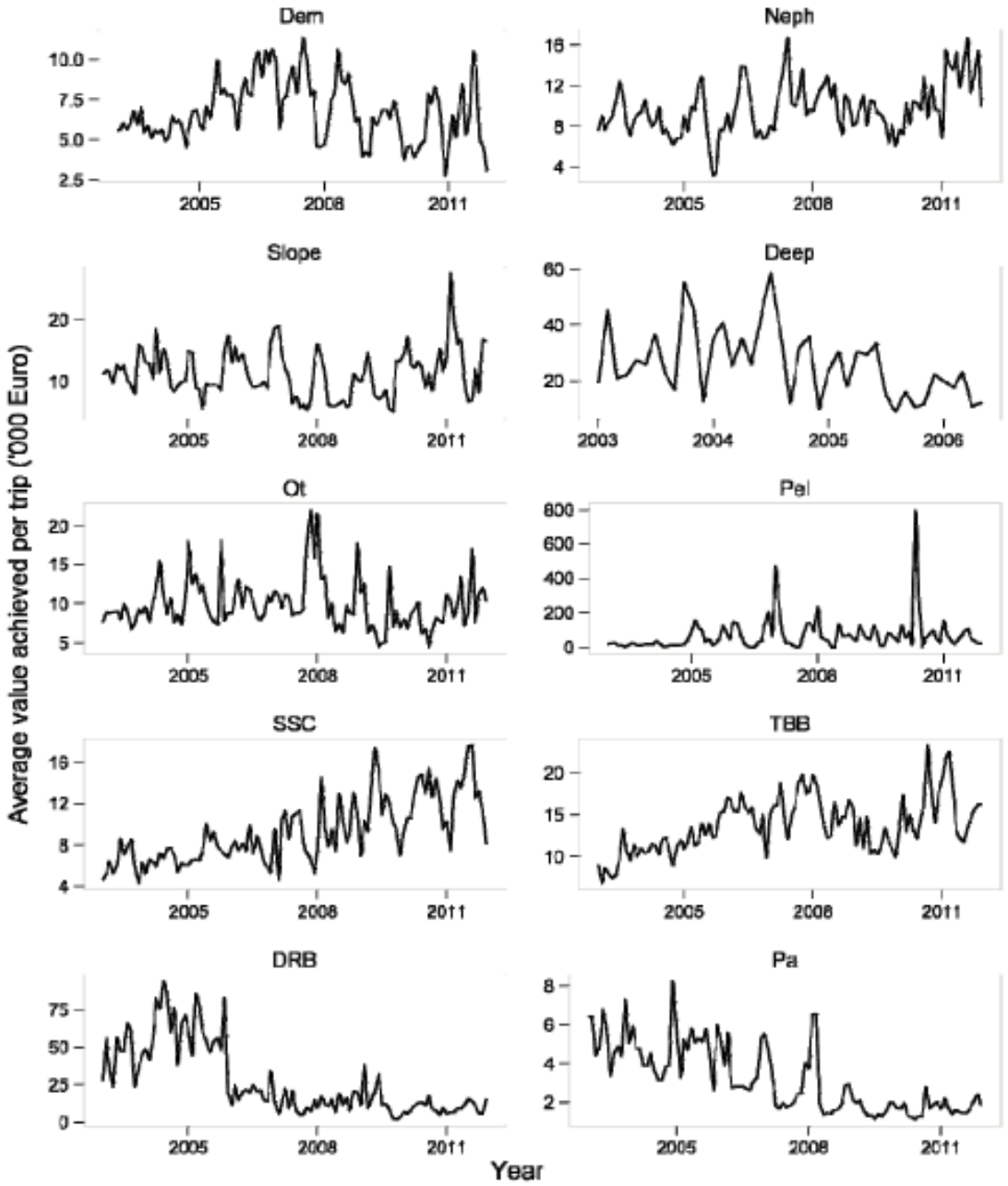
Figure 6.3. Average monthly per fishing trip value ('000 €) achieved within each of the 10 métier groups, 2003-2011.



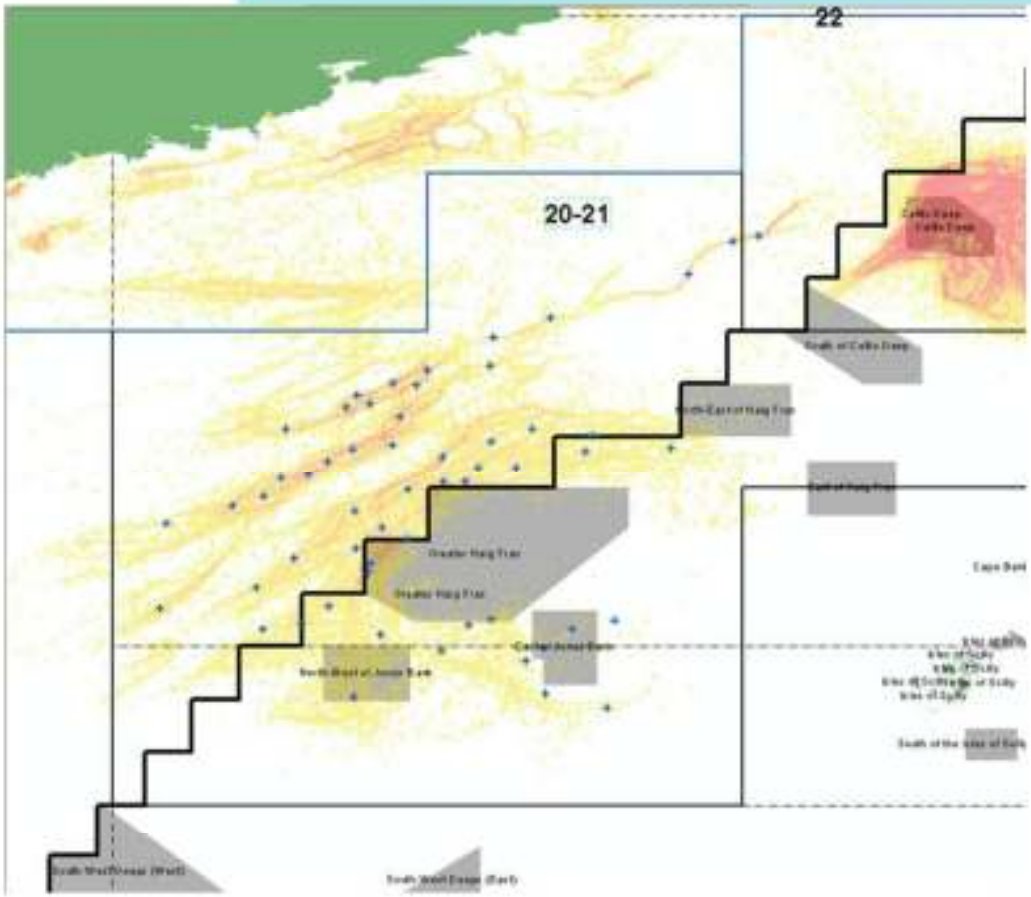


Figure 6.5 Proposed UK- Marine conservation zones (MCZs) requiring special conservation or closed to VIIfg.

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Ideas for a multispecies plan using F-cube matrix approach

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Outline

- What is Fcube?
- Example application
- Celtic Sea setup
- Celtic Sea requirements

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F

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Fcube
Fleets & **F**isheries **F**orecast

- Developed by Ulrich et al. (2011) for North Sea
- Uses *stock-dependent fleet effort* to evaluate catch scenarios
- Data requirements:
  - Catch by species, fleet and métier
  - Effort by species, fleet and métier
  - Assessments/proxies by species

Fcube: 4 data steps

Example: for species *A*, fleet *FL1*, métier *M1*

1. **Partial *Fs***

$$F_{A,FL1,M1} = F_A \, C_{A,FL1,M1} / C_A$$

2. **Catchabilities**

$$q_{A,FL1,M1} = F_{A,FL1,M1} / E_{FL1,M1}$$

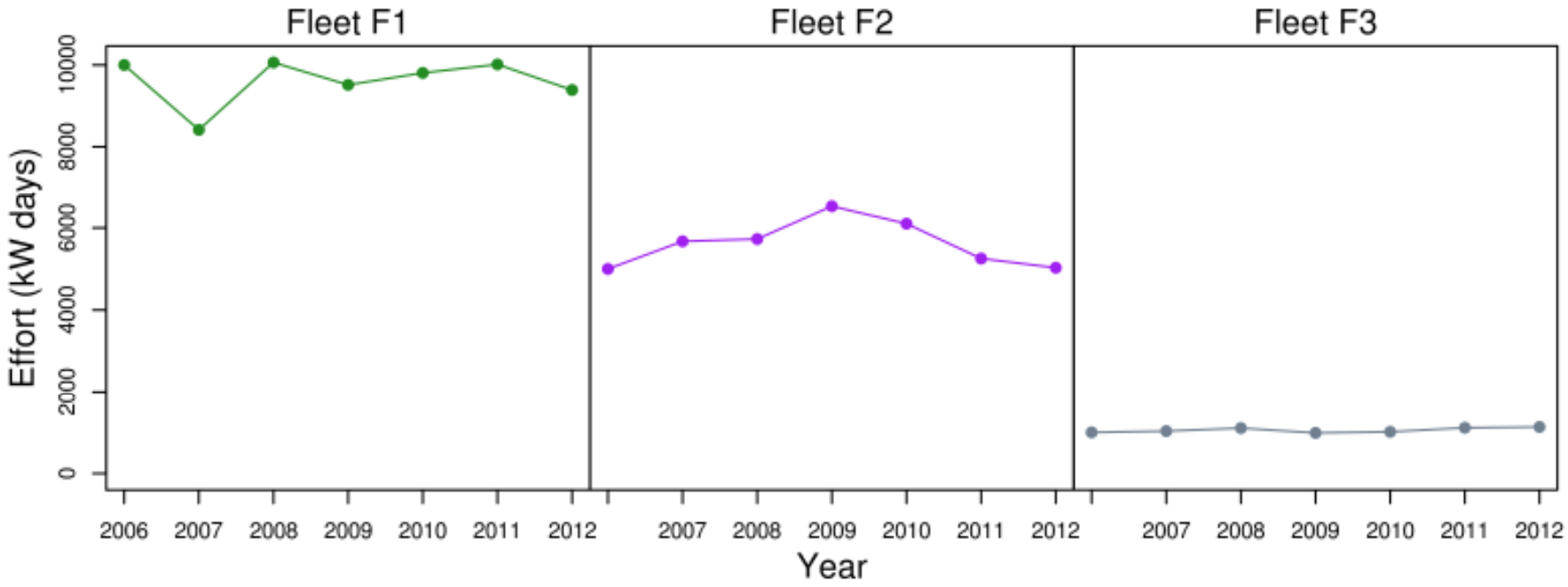
3. **Effort share by métier**

$$\text{Effshare}_{FL1,M1} = E_{FL1,M1} / E_{FL1}$$

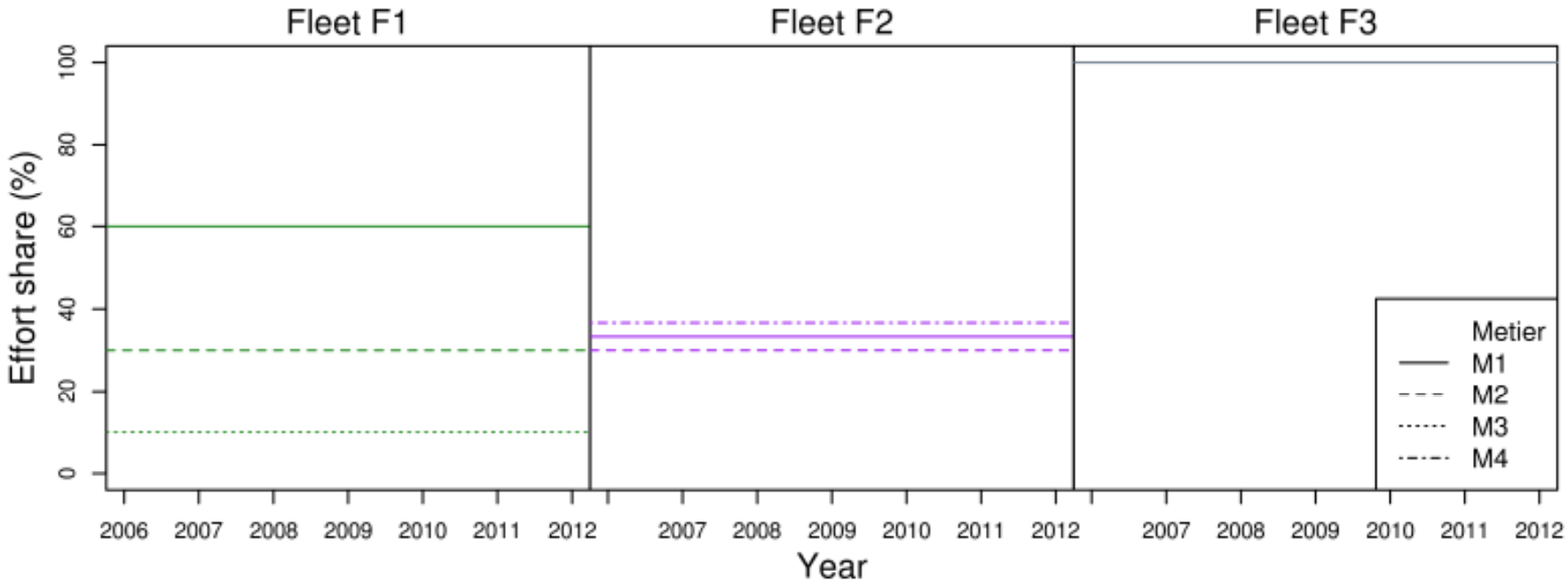
4. **Fleet-specific catchability**

$$q_{A,FL1} = \Sigma_M (q_{A,FL1,M} \, \text{Effshare}_{FL1,M})$$

Example total effort by fleet



Example effort share by fleet



Fcube: 2 TAC steps

Given F_{target} and corresponding TAC for species *A* in next year (Y+1)

1. **Fleet-specific *F***

   $F_{A,FL1,Y+1} = F_{A,target}$ $\text{QuotaShare}_{A,FL1}$

2. **Stock-dependent fleet effort (**key**)**

   $E_{A,FL1,Y+1} = F_{A,FL1,Y+1}/q_{A,FL1}$

Stock-dependent fleet effort (kWdays)

Level of effort required to realize TAC share for that species

Species	Fleet 1	Fleet 2	Fleet 3
A	4695	2514	566
B	2347	1257	-
C	-	2514	566
D	-	2011	453

Choices/rules

How to set the effort level?

Species	Fleet 1	Fleet 2	Fleet 3
A	4695	2514	566
B	2347	1257	-
C	-	2514	566
D	-	2011	453

Maximum effort

Set fleet effort to that required to realize all quotas

Species	Fleet 1	Fleet 2	Fleet 3
A	4695	2514	566
B	4695	2514	-
C	-	2514	566
D	-	2514	566

Minimum effort

Set fleet effort to that required to realize quota for least-effort-required species

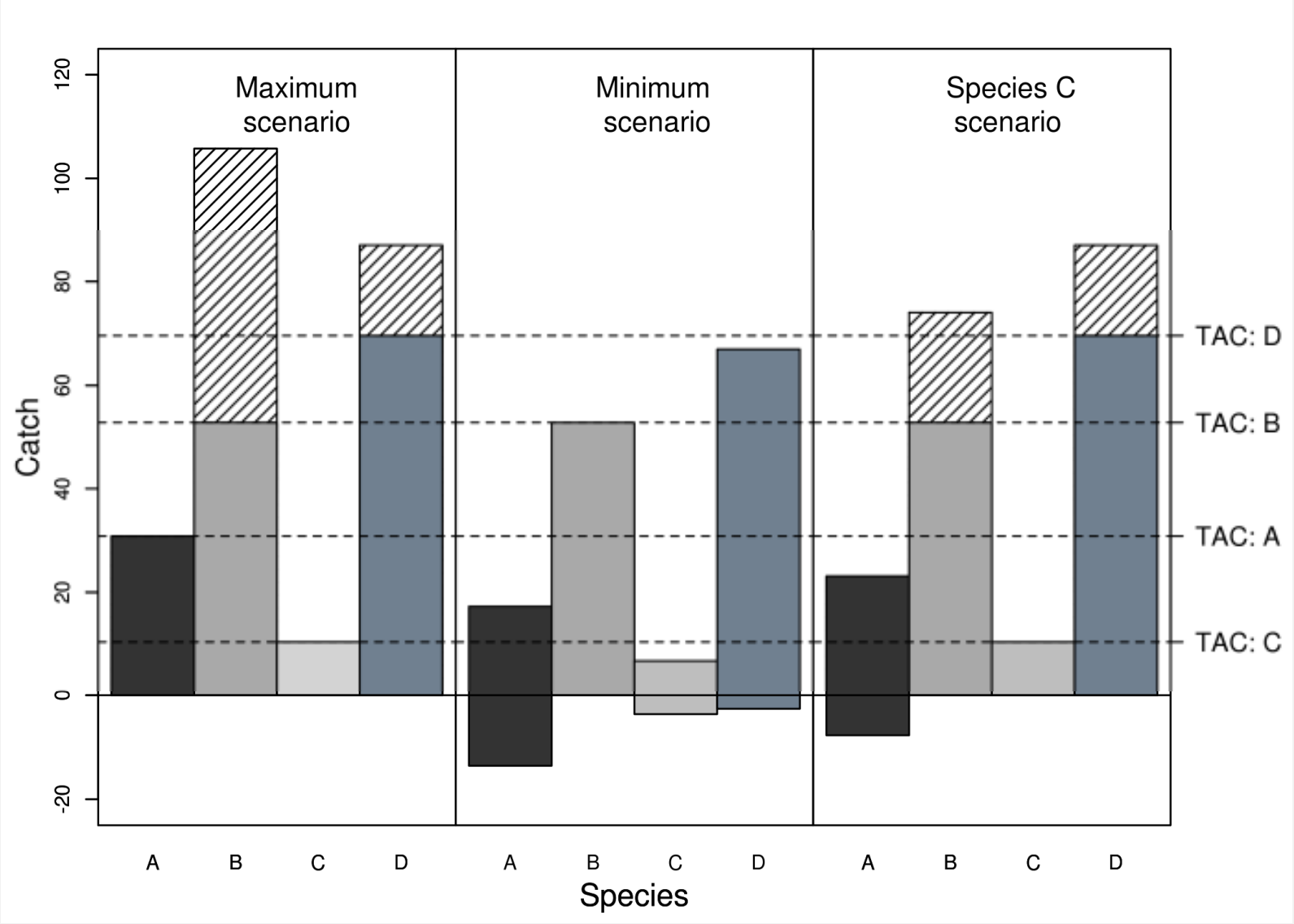
Species	Fleet 1	Fleet 2	Fleet 3
A	2347	1257	453
B	2347	1257	-
C	-	1257	453
D	-	1257	453

Species-centric effort

Set fleet effort to that required to realize quota for a specific species (e.g., species C)

Species	Fleet 1	Fleet 2	Fleet 3
A	2347	2514	566
B	2347	2514	-
C	-	2514	566
D	-	2514	566

Choice implications for total catch



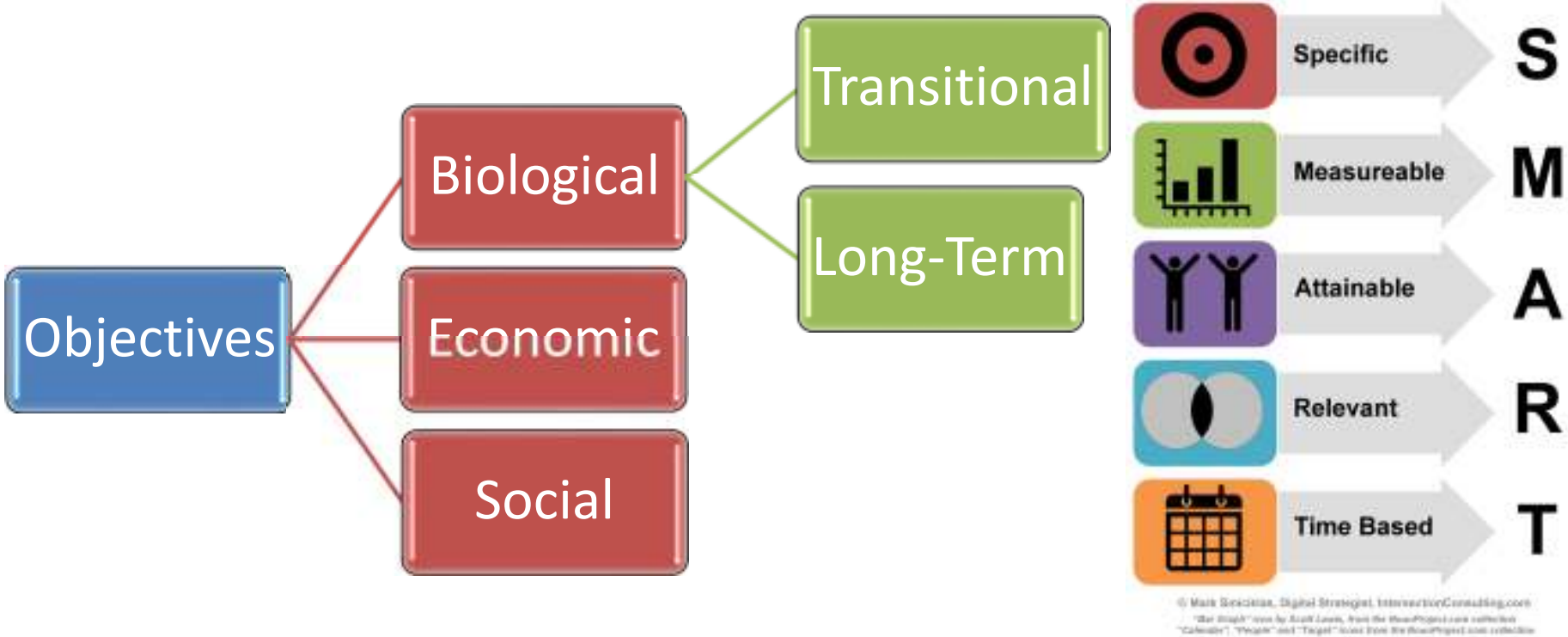
Celtic Sea application steps

- Data requirements:
  - By nation fleet definitions
  - Métier definitions (Davie and Lordan, 2009)
  - Catch by species, fleet and métier
  - Effort by species, fleet and métier
- Assessments/proxies by species:
  - Total number of species of interest
  - Proportion assessed
  - Projection/proxy methods for unassessed
- Additional considerations:
  - Fleet-specific retrictions (choice/rule exceptions)
  - …

Summary

- Fcube allows the implications of single-species TACs in a mixed fishery to be understood
- Can help identify choke-species
- Highlights trade-offs in overshot or conversely foregone yields under a given plan
- Could (with due care) be cast in economic terms
- Optimization to avoid over and under-shooting by way of fleet dynamics and selectivity
- Need to get baseline version up and running first though

2011 - NWWRAC Celtic Sea MP



REVISED_NWWRAC_Framework_Objectives_CS_Mixed_Fisheries_MP_Nov2011.pdf

Challenges ahead:

- Aligning CSLTMP to “Discard Plans”, MSY, regionalisation.
- Applying the Fcube model in the Celtic Sea
- Developing on findings
- Developing and MSE Targets & Framework
  - Management Strategy Evaluation
  - Multi-species MSY targets
- Communicating results & uncertainties
- Addressing Implementation & governance issues