

ULTFARMS D9.1

Holistic Social-Ecological Governance Framework





This project has received funding from the European Union's Horizon Europe research and innovation programme under Grant Agreement No 101093888. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.



Grant Agreement number	101093888
Project title	ULTFARMS (circUlar Low Trophic oFfshore Aquaculture in wind farms and Restoration of Marine Space)
Deliverable title	Social-ecological governance framework components
Deliverable number	D9.1
Deliverable version	30 June 2023
Contractual date of delivery	1 July 2023
Actual date of delivery	30 June
Document status	Final
Document version	Reviewed - final
Online access	Teams share
Diffusion	Within the project team
Nature of deliverable	Report from deliverable 9.1
Work Package	9
Partner responsible	WR
Contributing Partners	WR, Deltares, Submariner, HID, CTA, RBINS, OR, SAS, VLIZ, UGot, UGent, Ørsted
Author(s)	Sander van den Burg, Trond Selnes (WR); Bas Bolman (Deltares); Ivana Lukic (Submariner); Adelio Silva (HID); María Jiménez Portaz (CTA); Annaïk van Gerwen (RBINS); Urd Grandarf Bak (OR); Karen ter Braak (SAS); Ine Moulaert (VLIZ); Maria Enge (UGot); Brecht Stechele (UGent); Zeina Mouron (Ørsted)
Editor	Van den Burg, Selnes
Approved by	Alex Ziemba & Ghada El Serafy
Project Officer	Loïc Blanchard
Abstract	Deliverable 9.1 describes the approach for ULTFARMS Work Package 9, The approach builds upon the notions of multi-level and multi-actor governance to analyse different dimensions of governance; i.e. hierarchical, market, network and knowledge



	governance. The holistic character of the governance approach will emerge from a combination of document studies, stakeholder interaction and expert assessments, based on an integrated analysis of the important factors involved, i.e. technical, legal, ethical, social, economic, ecological factors. It maps the governance landscape at the pilot level, basin level and the broader societal level (task 9.2). It analyses bottlenecks and opportunities, and proposes mechanisms for good governance (task 9.3). It addresses regulations, standards and ecolabelling by screening current applicable regulations and drafting ways to comply with policy (task 9.4). Throughout the project the holistic (socio-ecologic) governance framework will be adjusted to the benefit of the further development of multi-use at sea by tackling bottlenecks and exploit opportunities.
Keywords	Multi-use, governance, multi-level governance, bottlenecks, standardisation, certification

Table of contents

List of abbreviations	5
1. Introduction	8
1.1 A brief overview of ULTFARMS.....	8
1.2 Objectives of WP9	9
1.3 An overview of the tasks.....	9
1.4 Objectives of deliverable 9.1.....	10
1.5 Reading Guide	10
2. Overall framework.....	11
2.1 Definition and dimensions of governance	11
2.2 Holistic Governance: an overview	12
2.3 What we already know about the governance of multi-use.....	14



This project has received funding from the European Union's Horizon Europe research and innovation programme under Grant Agreement No 101093888. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.



3. Task-by-task description	15
3.1 Task 9.2 Mapping of the governance landscape at the pilot level, basin level and societal level (lead SUB)	15
3.2 Task 9.3 Identification of governance bottlenecks for multi-use and resolution for pilots.....	17
3.3 Task 9.4 Regulation, Labelling, (certifications) and standards/ lead CTA	20
4. Interaction with other WPs in ULTFARMS – final remarks.....	22
References	23
Annex 1 – Glossary	25

List of Figures

Figure 1: Overview of the governance approach to multi-use at sea	13
---	----

List of Tables

Table 1: Overview of the six pilot projects of ULTFARMS	8
Table 2: Governance dimensions and the level of analysis - examples	14
Table 3: Findings from the UNITED project (Soete et al, 2021, deliverable 6.1,).....	14
Table 4: Examples of governance bottlenecks present in multi-use at sea	18
Table 5: Methodology for prioritizing identified barriers	19
Table 6: Governance dimensions and factors at work	19



Executive Summary

ULTFARMS addresses governance of multi-use at sea with an approach that connects actors, institutions and factors of importance at multiple organizational levels. We use the notion of multi-level and multi-actor governance to analyse different dimensions of governance; i.e. hierarchical, market, network and knowledge governance. The holistic character of the governance approach will emerge from a combination of literature study, stakeholder interaction and expert assessments, based on an integrated analysis of the important factors involved, i.e. technical, legal, ethical, social, economic, and ecological factors. Throughout the project the holistic (socio-ecological) governance framework will be adjusted to the benefit of further developing multi-use at sea by tackling bottlenecks and exploiting opportunities.

Deliverable 9.1 defines key concepts used in Work Package 9, the methodology for tasks 9.2, 9.3 and 9.4, describes the users/stakeholders per task, the data needs and the linkages to other WPs. It covers the development of the governance framework for multi-use in the context of European policies relevant for multi-use concepts and food production. It maps the governance landscape at the pilot level, basin level and the broader societal level (task 9.2). It contributes to the identification and resolution of bottlenecks and explores the potential of opportunities regarding governance structure and decision-making, and proposes mechanisms for good governance, helping to ensure accountability, transparency, and integrity, to support the alignment of interests and the resolution of conflicts (task 9.3). It addresses regulations, standards and ecolabelling by screening current applicable regulations and drafting ways for project results to comply with European regulations when entering the market (task 9.4).

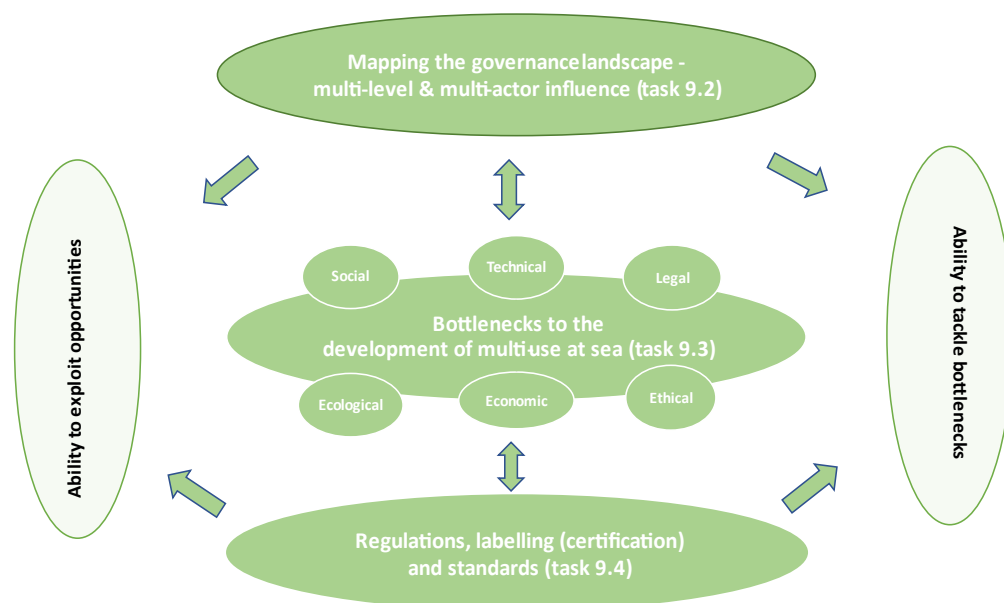


Figure 1 Overview of the governance approach of multi-use at sea



This project has received funding from the European Union's Horizon Europe research and innovation programme under Grant Agreement No 101093888. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.



List of abbreviations

Key terms for WP9

BPNS	Belgian part of the North Sea
H2020	Horizon 2020 (European Commission funding programme)
H2Ocean	Development of a Wind-Wave Power Open-Sea Platform Equipped for Hydrogen Generation with Support for Multiple Users of Energy (FP7-Ocean 2011 funded project, 2012-2014)
H&S	Health and Safety
IMTA	Integrated Multi-Trophic Aquaculture
MERMAID	Innovative Multi-purpose Off-shore Platforms: Planning, Design and Operation (FP7-Ocean 2011 funded project, 2012-2016)
MU	Multi-use
MUCL	Multi-Use Co-Location
MUPS	Multi-use platforms
MUSES	Multi-Use in European Seas (Horizon 2020 funded project, 2016-2018)
O&M	Operations and maintenance
ORECCA	Off-shore Renewable Energy Conversion platforms – Coordination Action
OWF	Offshore Wind Farm
SOMOS	Technical Standards for Safe Production of Food and Feed from marine plants and Safe Use of Ocean Space (Lloyd's Register Foundation funded project, 2016-2018)
Space@Sea	Horizon 2020 funded project, 2017-2020
TRL	Technology Readiness Level
TROPOS	Modular Multi-use Deep Water Offshore Platform Harnessing and Servicing Mediterranean, Subtropical and Tropical Marine and Maritime Resources (FP7-Ocean 2011 funded project, 2012-2015)
UNITED	Multi-Use offshore platforms demoNstrators for boosting cost-effective and Eco-friendly proDuction in sustainable marine activities (Horizon 2020 funded project, 2020-2023)
WinWind	Project funded by Dutch Topsector Energy, 2018-2020
WP	Work Package
DACS	Data Acquisition and Control Systems



This project has received funding from the European Union's Horizon Europe research and innovation programme under Grant Agreement No 101093888. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.



FAVV	Federaal Agentschap voor de Veiligheid van de Voedselketen (Federal Agency for the Safety of the Food Chain)
MTD	Maritime Technology Division
UGent	Ghent University
NSF	North Sea Farm Foundation
ARC	Aquaculture and Artemia Reference Centre
RBINS	Royal Belgian Institute of Natural Sciences
EIA	Environmental Impact Assessment
MSP	Marine Spatial Plan
MW	MegaWatt
VVM	"Vurdering af Virkninger på Miljøet" stands for <i>Environmental Impact Report</i>
EDULIS	Offshore mussel culture in wind farms project collaboration
AquaLast	within the support program "Applied Environmental Research", Grant Number FV 174
FIOV	Flandres Queen Mussel
MytiFit	Health of offshore cultivated blue mussels
NutriMat	Nutritional Material from Fouling Organisms
WINSEAFUEL	Environmental Lifecycle and Sustainability Assessment
SYMAPA	Synergy between Mariculture & Passive Fisheries
TunaDive	Seashell Dive Centre Malta
VAWT	Vertical-Axis Wind Turbine
WEC	Wave Energy Converter
AWI	Alfred-Wegener-Institut
ISEA	Integrated Socio-Economic Assessment
IMARE	Institute of Marine Engineers
BMWI	Federal Ministry of Economics and Technology
BMBF	Federal Ministry for Education and Research
SUBVE	The Senator for Environment, Construction, Transport and European Affairs
EMFF	European Maritime and Fisheries Fund
EU	European Union
DSS	Decision Support System



This project has received funding from the European Union's Horizon Europe research and innovation programme under Grant Agreement No 101093888. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.



MTD	Maritime Technology Division of UGent
UCH	Underwater Cultural Heritage
FAO	Food and Agriculture Organisation of the United Nations
OSPAR	the Oslo-Paris Commission
MSFD	Marine Strategy Framework Directive
GES	Good Environmental Status
EEZ	Exclusive Economic Zone
NPV	Net Present Values
IRENA	International Renewable Energy Agency
OOMU	Open Ocean Multi-Use project
NGO	Non-Governmental Organisation
ROV	Remote Operating Vehicle



This project has received funding from the European Union's Horizon Europe research and innovation programme under Grant Agreement No 101093888. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.



1. Introduction

1.1 A brief overview of ULTFARMS

ULTFARMS aims to move beyond the current application of Low-Trophic Aquaculture (LTA) systems with novel engineering, technical, ecological and biological processes to optimise production in harsh offshore conditions, low salinities, and their integration within Offshore Wind Farms (OWFs). ULTFARMS will be covering the whole value chain expertise for LTA production in OWFs. Co-development and co-management by research and industry realises novel designs and operations unique to offshore in six Low-Trophic Aquaculture Pilots (LTAPs) in as many OWF locations across the North and Baltic Seas.

These six pilots are implemented in the following areas (Table 1):

Table 1: Overview of the six pilot projects of ULTFARMS

Member state	Name of OWF	LTA production
Belgium	Belwind	Seaweed-Mussels-Oysters
The Netherlands	Borssele	Mussels
Germany	FINO2	Seaweed
Germany	FINO3	Seaweed-Mussels-Oysters
Denmark	Anholt	Seaweed-Mussels
Denmark	Samsø	Seaweed-Mussels

The ULTFARMS approach involves stakeholders from across the value chains of OWF and LTA to ensure environmentally sound, low-carbon, and safe LTA products from design to commercialisation. New cultivation structures, grow-out systems, and both nature restoration and eco-friendly design measures are advanced through the proposed work. of the Work Packages. Drawing on existing open databases and operational forecasting systems, such as CMEMS and SeaDATANET, within integrated monitoring and management platforms, such as the HiSea service platform, the planning and operation of LTAs can be effectively supported via an enhanced technical service. ULTFARMS will offer services to aquaculture producers for monitoring and minimising diseases and alien species, managing inputs, optimising sustainable production and demand management including risk analysis.

ULTFARMS addresses the governance of multi-use at sea with an approach that connects actors, institutions and factors of importance at multiple organizational levels. We use the notion of multi-level and multi-actor governance to analyse different dimensions of governance; i.e. hierarchical, market, network and knowledge governance. The holistic character of the governance approach will emerge from a combination of literature study, stakeholder interaction and expert assessments, based on an integrated analysis of the important factors involved, i.e.



This project has received funding from the European Union's Horizon Europe research and innovation programme under Grant Agreement No 101093888. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.



technical, legal, ethical, social, economic, ecological factors. Throughout the project the holistic (socio-ecologic) governance framework will be adjusted to the benefit of the further development of multi-use at sea by tackling bottlenecks and exploit opportunities.

1.2 Objectives of WPg

Work Package (WP) g covers the development of the governance framework for multi-use in the context of European policies relevant for multi-use concepts and food production. The WP maps the governance landscape at the pilot level, basin level and the broader societal level. It contributes to the identification and resolution of bottlenecks and explores the potential of opportunities regarding governance structure and decision-making. The WP addresses regulations, standards and ecolabelling by screening current applicable regulations and drafting ways for project results to comply with European regulations when entering the market.

1.3 An overview of the tasks

In WPg the following task are identified:

Setting up a holistic governance framework (task 9.1; month 1-6)

This task introduces a framework for the holistic governance approach proposed for multi-use and food production, including the alignment of interests and to policy (national and EU). This framework coordinates the tasks of WPg and ensures the feedback loops and iterative approach across task 9.2, 9.3 and 9.4.

The organisational efforts in WP2 will be used for the engagement with stakeholders and policymakers required for informing on the governance framework. Moreover, the framework will also be updated as found necessary throughout the project to fit its purpose. Eventually the framework will be used to feed into the roadmap of WP10. The outcomes of this task will be reported in Deliverable (D) 9.1.

Mapping of the governance landscape at pilot level, basin level, societal level (task 9.2; month 1-12)

This task identifies actors that influence the governance of multi-use, including government, insurance, value-chain actors and civil society actors. The mapping will be carried out at three levels (1) pilot level, (2) basin level and (3) societal level. Data is collected through a literature review, pilot leaders interviews and expert interviews (Dg.2) together with WP2. The results of this task are reported in Dg.2.

Identification of governance bottlenecks for multi-use and resolution for pilots (task 9.3; month 1-26)

Building upon Task (T) 9.2, this task identifies bottlenecks in governance that hamper the commercialisation of multi-use products. It aims to address priority bottlenecks, supporting the pilot in further development of multi-use. The task brings together the parties in focus groups to define pathways for bottleneck



This project has received funding from the European Union's Horizon Europe research and innovation programme under Grant Agreement No 101093888. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.



resolution. Data is collected through a desk study of documents on governance bottlenecks, interaction with pilot participants (discussions, interviews), expert interviews, focus groups (together with task 9.2) and a survey. The WP proposes mechanisms for good governance, helping to ensure accountability, transparency, and integrity, and support the alignment of interests and the resolution of conflicts (D9.3). The results of this task are reported in D9.3

Task 9.4: Regulation, Labelling, (certifications) and standards (task 9.4; month 6- 36)

Regulation aspects will be addressed by screening current applicable regulations and drafting ways for project results to comply with European regulations when the proposed multi-use solutions enter the market., In collaboration with WP7 and WP5, the inclusion/ use of ecolabelling and other types of certification is also planned. This task covers standardisation of multi-use demands, with the objective of checking national and international current standards and. If a gap is detected, the national and international standardisation bodies should be contacted to provide inputs for further standards development (D9.4). The results of this task are reported in D9.4.

1.4 Objectives of deliverable 9.1

This deliverable reports on the findings of Task 9.1. The deliverable aims to:

- Define key concepts used in WPg
- Describe the methodology to take in WPg (all tasks 9.2-9.4)
- Describe who the users of our results per task are (9.2-9.4)
- Identify data needs per task
- Identify stakeholders needed to be consulted, including EU level stakeholders
- Identify linkages to other WPs
- Provide a tentative description of the outputs of WPg

1.5 Reading Guide

In chapter two the overall framework is presented. Section 2.1 contains a definition of governance and also important dimensions of governance. In section 2.2 we offer an overview of the holistic governance approach based on an integrated view of the different factors involved, i.e. technical, legal, ethical, social, economic, ecological. In section 2.3. we look at what we already know about the governance of multi-use from the previous Horizon-project UNITED. Then, in chapter 3, a description follows of the other tasks involved in WPg, namely tasks 9.2, 9.3. and 9.4. A final chapter 4 describes the interaction of WPg with other WPs in the project.



This project has received funding from the European Union's Horizon Europe research and innovation programme under Grant Agreement No 101093888. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.



2. Overall framework

2.1 Definition and dimensions of governance

The development of policies and public and private regulation for multi-use at sea can be seen in light of an enduring scholarly debate on governance where (public-private) cooperation has been raised to the centre of attention rather than just a hierarchical government. The national government is no longer (if ever) the undisputed locus of power and control and collective action cannot rest solely on a recourse to the authority of the state (Stoker, 2000; Pierre and Peters, 2000; Hajer and Wagenaar, 2004). The challenge is to deal with challenges that cut across traditional and organisational boundaries and formal jurisdictions (Termeer and Nooteboom, 2014; Ansell and Torfing, 2014). For such sector-crossing issues innovation practices (and knowledge development) have emerged, bringing both public and private stakeholders into the development of future (public) services (Sørensen 2017; Fuglsang et al., 2021).

Following scholars like Stoker (2000, Termeer and Nooteboom (2014), Ansell and Torfing (2014), governance is then more than just rules and laws. Governance covers all of the processes of governing, whether undertaken by the government, market actors or networks and whether through the laws, norms, power or language of an organised society (Bevir, 2012). Knowledge plays a key role in governing resource management, climate change, biodiversity and competing land use claims (Soma et al., 2016). These are also matters of great concern for multi-use at sea.

In this context, the development of multi-use at sea is within Ultfarms an approach centred around co-creation processes among researchers, practitioners, and policymakers. Ultfarms is a project covering how to join forces to enhance the understanding of the many factors of interest in multi-use at sea: technical, ethical/legal, economic, ecological and social. For the purpose of the analysis in WP9, four dimensions of governance are distinguished by the researchers in WP9, which are defined the paragraphs/ table below. The two first ones; i.e. hierarchical and market governance, are the most common ways of making a distinction but it is too limited to rely on this dichotomy alone.¹ Network governance focuses on how to highlight collaboration on qualitative matters as know-how, technological capability and innovation. To that we add Knowledge Governance² as a term that allows us to focus on more distinct matters of information flows and learning (Soma et al 2016; Mol, 2008). In practice, the four modes or dimensions of governance co-exist, and as such influence each other.

¹ For a brief introduction, see: <https://governinginfomobility weblog.tudelft.nl/2-3-three-governance-modes-hierarchy-market-network/>

² In this deliverable the terms knowledge governance and informational governance are regarded as synonymous



This project has received funding from the European Union's Horizon Europe research and innovation programme under Grant Agreement No 101093888. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.



Hierarchical governance: Hierarchical governance rests on the assumption that it is possible to realize coordination based on power relations, on ordination and subordination. In essence, hierarchical governance is about top-down steering. The classical bureaucratic organization is the prototype of hierarchical governance (Van Buuren & Eshuis, 2010)

Market governance: Market governance is based upon the economic principles of the interplay between the demands of consumers and the supply of producers. It coordinates through the invisible hand of the price-based system of exchange between self-interested actors (e.g. Williamson, 1985). Within the public domain, market principles are used to formulate incentives that safeguard the proper working of imperfect markets. In some cases, governments provide a market for goods with specific merit aspects which are not produced by the common market (Van Buuren & Eshuis, 2010; Williamson, 1985).

Network governance: Network governance refers to the interdependence of the (many) actors that are involved in planning and governing issues in modern societies. These actors represent a range of interests and perceptions on the problems at stake, as well as on the preferred solutions. Network governance assumes that policy is developed and implemented in networks of organizations. These networks emerge and continue to exist because actors cannot reach their objectives without each other (Edelenbosch and Teisman, 2008; Klijn and Teisman, 2003).

Knowledge governance: Knowledge governance addresses two interrelated processes: (1) new forms of governing through information, and (2) transformative changes in governance institutions due to the new information flows appearing in the Information Age (Soma et al., 2016).³

2.2 Holistic Governance: an overview

The holistic character of the approach in WP9 is based on an integrated analysis of the governance. The literature review, stakeholder interaction and expert assessments of WP9 will contribute to the development of a holistic governance approach and integrated analysis of the governance dimensions identified in section 2.1. Central tasks (described further in chapter 3) are a) mapping the governance landscape with multi-level and multi-actor influences of the many actors involved (task 9.2). Task 9.3 will identify bottlenecks to the development of multi-use at sea by looking at a broad set of factors at play; i.e. social, technical, legal, ethical, economic, ecological.

We address regulation aspects (like demands in permits) by screening current applicable regulations and drafting ways for project results to comply with European regulations when entering the market. Also the role of ecolabelling and other types of certifications will be included. In the analysis, standardization of both

³ See also the glossary in Annex 1.

current national and international standards is a part of the study. Problematic standards will be defined and discussed with national and international standardization bodies, to further develop/improve current standards (Dg.4).

Ultimately, we address ways in which bottlenecks can be tackled and opportunities can be exploited, as shown in figure 1.

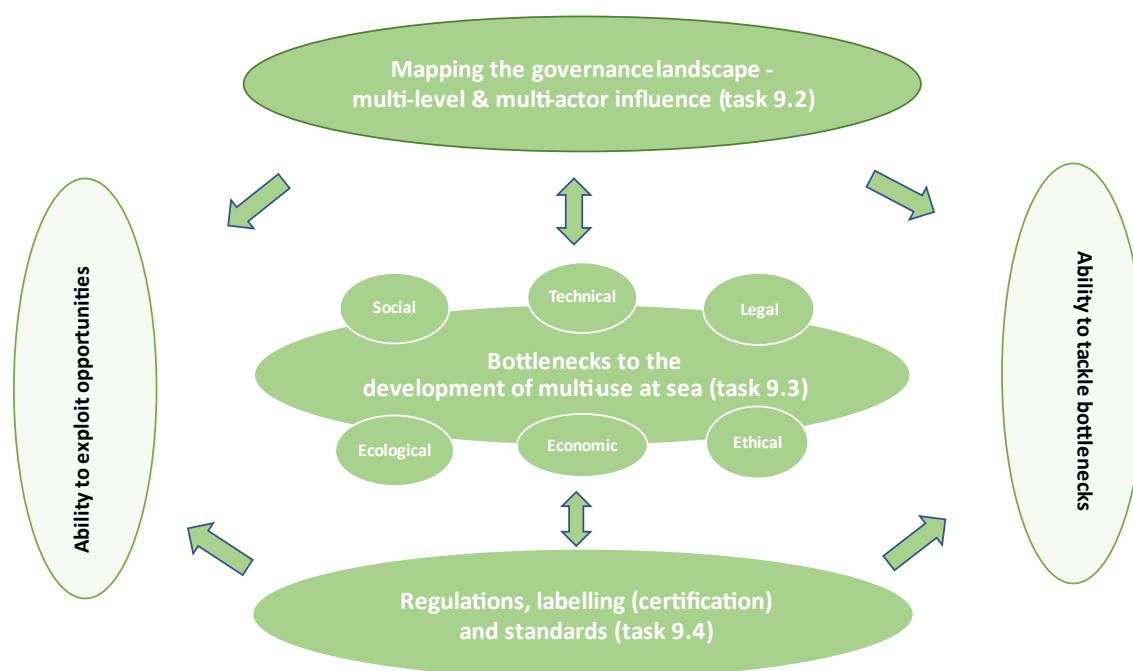


Figure 1: Overview of the governance approach to multi-use at sea.

The figure above will be used to develop tables that support tasks 9.2 and 9.3. The boxes with 'social/ technical/ legal/ ecological/ economic/ ethical' are factors that will be analysed in WP9.



This project has received funding from the European Union's Horizon Europe research and innovation programme under Grant Agreement No 101093888. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.



Table 2, which will support Task 9.2, is filled with hypothetical examples based on the governance dimensions and levels of analysis. The table includes three levels of analyses: i) the pilot level itself; ii) the sea basin level and iii) the broader societal level.

Table 2: Governance dimensions and the level of analysis - examples

Governance dimensions	Pilot level	Basin level	Societal level
Hierarchical Governance	Permits	EU regulations (MSP)	EU regulations, SDG
Market Governance	Insurance, subsidies, investment programs	Market rules	Market rules
Network Governance	Collaboration in the pilot	Community of Practice (CoP); platform	Focus groups, international collaboration
Knowledge Governance	UNITED; ULTFARMS	Research, knowledge and ideas exchange and ideas:	Research, knowledge and ideas exchange and ideas

2.3 What we already know about the governance of multi-use

Multi-use at sea is a rather new concept and practice. This section highlights some findings from the previous project UNITED. Table 3 shows results from UNITED (Soete et al, 2021, deliverable 6.1.)

Table 3: Findings from the UNITED project (Soete et al, 2021, deliverable 6.1.)

Governance dimensions	Pilot level	Basin level	Societal level
Hierarchical Governance	Strict security regulation discourages multi-use Lack of established licensing procedures for MUP Unclear responsibilities	Unclear and fragmented regulations for multi-use	Unclear and fragmented regulations for multi-useMUP
Market Governance	Insurance, subsidies, investment programs	Uncertain business opportunity due to ambiguous or lacking rules (for example: uncertainty regarding	Uncertain business opportunity due to ambiguous or lacking rules (for example: uncertainty regarding how to proceed to



This project has received funding from the European Union's Horizon Europe research and innovation programme under Grant Agreement No 101093888. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.



		how to proceed to decommissioning)	one company decommissioning stage and another do not know how to proceed)
Network Governance	Collaboration in the pilot Separate EIA processes for each hybrid technology Lack of guidance for cumulative environmental effects	Lack of border-crossing cooperation Lack of dialogue between public institutions	Lack of border-crossing cooperation
Knowledge Governance	Lack of established safety assessment tools for MUP	Lack of established safety assessment tools for MUP	Lack of established safety assessment tools for MUP

3. Task-by-task description

3.1 Task 9.2 Mapping of the governance landscape at the pilot level, basin level and societal level (lead SUB)

Objective

This task aims to identify relevant actors and their actions that influence the governance of multi-use at sea. These actors work in governments, insurance companies, civil society and the blue chains (which will be specified later in task 9.2). Mapping of these actors/ stakeholders will be conducted at three levels of analysis (1) the pilot level, (2) the basin level and (3) the societal level.

Target audience

The target audience for Task 9.2 is the project team and stakeholders involved in multi-use governance. This includes government officials, insurance representatives, various actors across the value-chain, and civil society members who have a vested interest in understanding and influencing the governance of multi-use practices. The task aims to provide important insights and information to assist decision-making processes and policy development.



This project has received funding from the European Union's Horizon Europe research and innovation programme under Grant Agreement No 101093888. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.



Methodology

The methodology for Task 9.2 involves a comprehensive approach to gather data and insights on the governance of multi-use practices. The following methods are employed for the execution of Task 9.2:

- a) Literature review: Conducting a review of existing literature, research papers, reports, and relevant documents from past multi-use projects to gain an understanding of the current state of multi-use governance. This helps in identifying key actors and their roles within the multi-use governance framework on different levels – pilot, sea basin, and societal level.
- b) Pilot interviews: Engaging in interviews with pilot members involved in multi-use projects. These (semi-structured) interviews aim to gather firsthand experiences, challenges, and perspectives of the pilots regarding governance issues. This qualitative approach provides valuable insights into the practical aspects of multi-use governance.
- c) Expert interviews: Conducting interviews with subject-matter experts who possess deep knowledge and expertise in the field of ocean governance. These interviews help in gaining expert opinions, recommendations, and additional insights that contribute to a comprehensive understanding of the governance landscape.
- d) Collaboration with project members involved in WP2 Stakeholder Engagement: The project members working on Task 9.2 work in close collaboration with those working on Work Package 2 (WP2) on Stakeholder Engagement. This collaboration ensures that the interview process aligns with the stakeholder engagement activities. It also facilitates the integration of stakeholder perspectives and engagement in the governance mapping process.

Data needs

The data needs for Task 9.2 include:

- a) Relevant literature and documents related to multi-use and relevant maritime governance, including policy documents, research papers, and reports from past projects.
- b) Pilot-level data, which includes insights from ULTFARMS pilots. This data helps identify governance challenges, successes, and practical implications.
- c) Expert-level data obtained through interviews with subject-matter experts. These interviews are expected to provide valuable expert opinions and recommendations on multi-use governance.

Interaction with other WPs

Task 9.2 interacts with other Work Packages (WPs) within the project to ensure a holistic approach to multi-use governance. Specifically, it collaborates with WP2 (Stakeholder Engagement) to align data collection methods and integrate stakeholder perspectives. Additionally, the outputs from Task 9.2 inform the work



This project has received funding from the European Union's Horizon Europe research and innovation programme under Grant Agreement No 101093888. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.



of other WPs, such as WP10 (Roadmap to Upscaling), by providing insights into the governance landscape and identifying key actors influencing multi-use practices.

Output

The output of Task 9.2 is a comprehensive governance mapping of multi-use practices at three levels: the pilot level, sea basin level, and societal level. The mapping identifies and analyses the actors influencing multi-use governance, including government entities, insurance representatives, actors along the value-chain, and civil society. The output includes insights gathered through a literature review, interviews of pilot study participants, and expert interviews. These insights help in understanding the current governance framework, and providing recommendations for improved governance strategies in multi-use practices. The output can serve as a valuable resource for decision-making processes, policy development, and stakeholder engagement within the multi-use initiatives.

3.2 Task 9.3 Identification of governance bottlenecks for multi-use and resolution for pilots

Objectives

Building upon T9.2, this task (T9.3) identifies bottlenecks in governance that hamper the commercialisation of multi-use products. It aims to address priority bottlenecks, supporting the pilot in further development of multi-use.

Target audience

The results of Task 9.3 support decision-makers at various levels (pilot, basin and beyond) with insights into experienced bottlenecks and possible pathways to resolve them.

Data needed

The following data is needed to execute this task:

- Insight into the current governance landscape (from Task 9.2)
- Insight into experienced bottlenecks from pilot leads and others
- A discussion on, and solutions, to prioritised barriers

Methodology

The task brings together the parties in focus groups to define pathways for bottleneck resolution. Prior to this, data is collected through desk study of literature on governance bottlenecks, interaction between the different pilot studies, expert interviews and focus groups (T9.2) and a survey.

Task 9.3 proposes mechanisms for good governance, helping to ensure accountability, transparency, and integrity, and support the alignment of interests and the resolution of conflicts (D9.3). The results of this task are reported in D9.3



Step 1: Identify bottlenecks with the pilots

This step aims to identify the governance bottlenecks to the implementation of multi-use. Starting point is the literature (including literature from UNITED (UNITED, 2023)) and structured/ semi-structured/ informal interviews with pilot leads.

These findings will help inform what needs to be included in the survey. The results of the survey will be shared with the wider stakeholders at the pilot level, basin level and societal level.

Bottlenecks will be categorised into the following 5 types of bottlenecks (see Table 4).

Table 4: Examples of governance bottlenecks present in multi-use at sea

Factors	Pilot X with hypothetical examples of barriers to multi-use
Technical	Equipment breaks down under offshore conditions
Legal/ethical	No clear procedure for permitting multi-use
Economic	High insurance costs
Ecological	High environmental impact of multi-use
Social	Resistance from the public Lack of cooperation between multi-use operators Asks for a different mindset

Step 2: Prioritisation of bottlenecks

The identified barriers for multi-use will be prioritized using the RACER methodology (Giraud et al., 2017). The barriers will be scored between 0 (lowest) and 5 (highest) based on the following criteria:

- Relevancy: the degree to which the identified barrier is relevant for multi-use governance and the commercialization of multi-use products
- Acceptance: the degree to which the identified barrier is accepted by major stakeholders, academia, and policymakers.
- Credibility: the degree to which the identified barrier is transparent, easy to interpret and understand by the target audience.
- Easiness: the degree to which data/information on the identified barrier is available in open public databases
- Robustness: the degree to which data/information on the identified barrier is reliable, and updated regularly and consistently.



Table 5: Methodology for prioritizing identified barriers

	Source	Relevancy Score 0 – 5	Acceptance Score 0 – 5	Credibility Score 0 – 5	Easiness Score 0 – 5	Robustness Score 0 – 5	Average score
Barrier 1							
Barrier 2							
Barrier 3							
Barrier n							

Two groups of ULTFARM experts will independently from each other conduct the scoring (Table 5). Similarities and differences will be discussed and agreement will be sought. The researchers will review the scoring results and the researchers then also conduct an analysis of a link with principles of Good Governance (Grip, 2017). These 'good governance principles' include accountability, transparency, and integrity, while also supporting the alignment of interests and the resolution of conflicts.

Step 3: Recommendations to resolve bottlenecks

In the last step, we formulate recommendations for holistic multi-use governance solutions that contribute to resolve bottlenecks in governance. Table 6 shows areas of possible action.

Table 6: Governance dimensions and factors at work

Governance dimensions/ factors of importance	Technical	Legal/ethical	Economic	Ecological	Social
Hierarchical Governance	Technical demands for installations, operation, maintenance, decommissioning	Permits, legal demands security etc	Fiscal rules	Legal demands (nature protection)	Commitment to citizens, transparency
Market Governance	Supply and demand	Certification	Subsidies, investments	Subsidies, investments	Social corporate responsibility
Network Governance	Usability	Mutual agreements	Shared resources	Joint views on ecosystem effects	New mindset through social interaction
Knowledge Governance	Innovation	Best practises	Deal with trade-offs & synergies	Research	New mindset through information sharing



This project has received funding from the European Union's Horizon Europe research and innovation programme under Grant Agreement No 101093888. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.



In this step, focus groups with relevant stakeholders will be organised to discuss bottlenecks and pathways for resolving them. The aim is to organise (appr. 2hr) online focus groups, one per pilot and one at the EU level.

Interaction with other WPs

Task 9.3 interacts most directly with WP2 on stakeholder engagement. But it informs (and will be informed), and interacts also with WP1, Coordination & Ethics; WP7 Environmental Sustainability Assessment; WP10, Roadmap to Innovation and Upscaling and WP11 on Dissemination and Communication.

3.3 Task 9.4 Regulation, Labelling, (certifications) and standards/lead CTA

Objectives

The main objective will be to review current national and international standards, labelling and other regulations related to the potential products to be sourced during the project. If a gap is identified, national and international standardisation bodies will be asked to provide input for further standards development.

Target audience

All stakeholders are involved in the process of contributing to the development of a governance framework for multiple-use approaches and food production. Thus, policy makers such as government agencies related to the affected sectors, consumers and value chain actors are some key targets to be considered at three different levels: pilot level, basin level and societal level. The specific views for each pilot will be taken into account in the methodological process and in the definition of expected results. In addition, future regulation and permitting of large-scale offshore farms will be supported by improved analytical methods to better inform investors, financing institutions, insurance agencies and, in particular, regulators. This would enhance stakeholder understanding and support informed decisions to harmonise and synchronise related regulations across the EU.

Data needed

Different types of data will be required:

- Data from the pilots on the expected Key Exploitation Results (KERs).
- Data related to the assessment of the environmental footprint in terms of green productivity, as this will have a direct impact on eco-labelling and certification.



This project has received funding from the European Union's Horizon Europe research and innovation programme under Grant Agreement No 101093888. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.



- Current applicable regulations, labels and standards at national and European Union level.

Methodology

First, an in-depth review of regulations, labelling and standards applied to the ULTFARMS sectors will be carried out at different levels according to the KERs defined in WP5. In the study we use a co-creation workshop involving key stakeholders such as fisheries representatives, renewable energy operators, policy makers, etc. A general description of regulations, labelling and standards will also be shared in order to have a collective understanding of the concepts used. Tools such as a Miró panel and Mentimeter will be used to gather information from all stakeholders to identify possible barriers, risks and best practices.

The development and application of this framework in the context of the ULTFARMS project needs to be done as an iterative approach, encompassing concepts such as environmental governance and regulations for commercialisation, including the mapping of governance structures to ensure feedback loops. The mapping will be done at three levels: (1) pilot level, (2) basin level and (3) societal level.

1. At the pilot level, the analysis focuses on the formal and informal "rules of the game" that multiple-use developers have to deal with, including standards, regulations and requirements formulated by insurers, certifiers and others.
2. At the basin level, the Marine Strategy Framework Directive and the Maritime Spatial Planning Directive and others would influence the governance framework.
3. At the societal level, the task analyses the consistency of multi-use with the objectives of the European Green Deal and Missions, the Farm to Fork Strategy for a fair, healthy and environmentally friendly food system, the EU Bio-economy Strategy, the DG MARE Communication on a new approach for a sustainable blue economy and the Guidelines for a sustainable and competitive EU aquaculture.

Interaction with other WPs

There will be a direct interaction with WP5, as it is directly related to the exploitation and commercialisation of the project results. It is also expected to interact with WP7, which focuses on environmental sustainability assessment, as eco-labelling and major related certifications will be included. The possibility of an



alternative certification label will be explored, and this task will be closely linked to WP9.

Outputs

All results of this task will be included in Deliverable 9.4. This document will include, analyse and consider regulations and standards for the commercial production of the project's KERs. A reassessment of the current regulatory aspects for the project results in order to comply with European regulations when entering the market will be a key deliverable, as well as practical recommendations for the pilots.

4. Interaction with other WPs in ULTFARMS – final remarks

The specific needs of input from one WP to another will emerge and possibly change throughout the project. For now we mention a few main interactions.

WPs and pilots feeding into WP9

- The pilots share insights on governance bottlenecks in Task 9.3.
- WP2 shares results from expert interviews and focus groups with Task 9.1 (holistic governance framework), Task 9.2 (Mapping of the governance landscape) and Task 9.3 (governance bottlenecks).

WP9 feeding into other WPs and pilots

- Task 9.1 (holistic governance framework) and Task 9.2 (Mapping of the governance landscape) provide semi-structured questions and answers for expert interviews and focus groups as part of WP2 (Multi-Stakeholder & Citizen Engagements)
- Task 9.3 (governance bottlenecks) asks all pilots for input on governance bottlenecks
- The results of Task 9.3 (governance bottlenecks) feed into all pilots
- The results of Task 9.3 (governance bottlenecks) feed into all tasks of WP 8 (Replicability, knowledge and technology transfer)
- The results of Task 9.3 (governance bottlenecks) and Task 9.4 (Regulation, Labelling, (certifications) and standards) feed into Task 5.2 (Business modelling and commercialisation planning) and Task 5.4 (Economic analysis and financial viability)
- Key insights of WP9 feed into WP10 (Roadmap to Innovation and Upscaling). Specifically, Task 10.1 (Review the state-of-the-art recommendations &



This project has received funding from the European Union's Horizon Europe research and innovation programme under Grant Agreement No 101093888. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.



challenges), Task 10.2 Innovations' overcoming of challenges, risks and barriers) and Task 10.5 (integrated roadmap)

- Key insights of WP9 feed into WP11 (Dissemination & Communication), specifically Task 11.4 (Joint action for maximised impact)

References

Ansell, C., and J. Torfing. 2015. "How Does Collaborative Governance Scale?" *Policy & Politics* 43. (3): 315–329. doi:10.1332/030557315X14353344872935.

Bevir, Mark (2004). Governance and Interpretation: What are the Implications of Postfoundationalism? In *Public Administration*. First published: 12 August 2004 <https://doi.org/10.1111/j.0033-3298.2004.00409>.

Edelenbosch, J. and G.R. Teisman (2008). Public private partnership, on the edge of project and process management. Insights from Dutch practice; the Sijtwende spatial development project. In *Environment and planning C: Government and policy* 2008 vol. 26, 614-626.

Folke, C., Hahn, T., Olsson, P., & Norberg, J. (2005). Adaptive governance of social-ecological systems. *Annu. Rev. Environ. Resour.*, 30, 441-473.

Fuglsang, Lars, Anne Vorre, Hansen, Ines Mergel, and Maria Taivalsaari Røhnebæk. 2021. Living Labs for Public Sector Innovation: An Integrative Literature Review. *Administrative Sciences* 11: 58. <https://doi.org/10.3390/admsci11020058>.

Giraud, J., Lafitte, A. and Fosse, J. (2017). Blue economy; economic activities and sustainable development. *Plan Bleu. Notes* 34. Valbonne, France.

Grip, K. (2017). International marine environmental governance: A review. *Ambio* 2017, 46:413–427. DOI 10.1007/s13280-016-0847-9.

Hajer, Maarten A. and Hendrik Wagenaar (eds.) (2003), *Deliberative Policy Analysis. Understanding Governance in the Network Society*, Cambridge University Press.

Keane, J. (2009). *Civil Society, Definitions and Approaches*. Retrieved on 3 May 2023 from: https://www.johnkeane.net/wp-content/uploads/2009/01/jk_civil_sciety_definitions_encyclopedia.pdf

Klijn, E. and Teisman, G.R. (2003). Institutional and strategic barriers to public private partnerships: an analysis of Dutch cases. In: *Public money and management*, July 2003.

Kooiman, J. (2003) *Governing as Governance*. London: Sage.

MoI, A.P.J., 2008. *Environmental Reform in the Information Age – The Contours of Informational Governance*. Cambridge University Press, New York.

Pierre, J. (ed) (2000), *Debating Governance. Authority, Steering and Democracy*, Oxford University Press, New York.



This project has received funding from the European Union's Horizon Europe research and innovation programme under Grant Agreement No 101093888. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.



Pierre, J., & Peters, G. (2000). *Governance, Politics and the State*. Basingstoke: Macmillan.

Porter, Michael E. (1985). *Competitive Advantage: Creating and Sustaining Superior Performance*. New York.: Simon and Schuster. ISBN 9781416595847. Retrieved 9 September 2013.

Schupp, M. F., Bocci, M., Depellegrin, D., Kafas, A., Kyriazi, Z., Lukic, I., ... & Buck, B. H. (2019). Toward a common understanding of ocean multi-use. *Frontiers in Marine Science*, 165.

Soete, Anemoon, Frank Maes, Trond Selnes, Maarten Visscher, Sander van den Burg (2021). Inventory of legal and insurance aspects, risk and risk management options and the wider governance context of risk management. Deliverable 6.1. Work Package 6 Legal, Policy and Governance United.

Soma, Katrine, Catrien J.A.M. Termeer, Paul Opdam (2016). Informational governance – A systematic literature review of governance for sustainability in the Information Age. In *Environmental Science & Policy* 56 (2016) 89–99.

Stoker, Gerry (2000), Introduction, in Stoker, Gerry (ed.), *The New Politics of British Local Governance*, ESRC Local Governance Programme, Macmillan Press LTD, Great Britain.

Sørensen, Eva (2017). Political innovations: innovations in political institutions, processes and outputs. In *Public Management Review*, 2017, 19:1, 1-19.

Termeer, C.J.A.M. & Nooteboom, S.G. (2014). Innovative leadership through networks. In C Ansell & J Torfing (Eds.), *Public Innovation through collaboration and design* (Routledge Critical Studies in Public Management) (pp. 1-25). Routledge. <http://www.routledge.com/books/details/9780415858595/>

UNITED. (2023, January 24). *Publications - UNITED project*. Retrieved from <https://www.h2020united.eu/publications>

Van Buuren, M. W. van, & Eshuis, J. (2010) Knowledge governance: complementing hierarchies, networks and markets?, In 't Veld, R. J. (ed.) *Knowledge democracy - consequences for science, politics and media*, Springer: Heidelberg: 283-297.

Van Tatenhove, J. (2011). Integrated marine governance: questions of legitimacy. *Mast*, 10(1), 87-113.

Wenger, E. (1999). *Communities of practice: Learning, meaning, and identity*. Cambridge university press.

Williamson, O. (1985) *The economic institutions of capitalism*, Free Press, New York.



This project has received funding from the European Union's Horizon Europe research and innovation programme under Grant Agreement No 101093888. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.



Annex 1 – Glossary

Concept	Definition	Source
Civil society	A term that both describes and anticipates a complex and dynamic ensemble of legally protected nongovernmental institutions that tend to be nonviolent, self-organizing, self-reflexive, and permanently in tension, both with each other and with the governmental institutions that "frame," constrict and enable their activities.	Keane, 2009
Community of Practice	Groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly.	Wenger, 1999
Hierarchical governance	Hierarchical governance rests on the assumption that it is possible to realize coordination based on power relations, on ordination and subordination. In essence, hierarchical governance is about top-down steering. The classical bureaucratic organization is the prototype of hierarchical governance.	Van Buuren & Eshuis, 2010
Holistic social-ecological governance	Social-ecological governance refers to the structures and processes that enable societies to manage their interactions with ecosystems, while also accounting for the social and economic factors that shape those interactions	Derived from Folke et al., 2005
Knowledge governance	Knowledge governance addresses two interrelated processes: (1) new forms of governing through information, and (2) transformative changes in governance institutions due to the new information flows appearing in the Information Age.	Soma et al., 2016



Marine governance	The sharing of policy-making competencies in a system of negotiation between nested governmental institutions at several levels (international, (supra) national, sub-national) on the one hand and state actors, market parties and civil society organisations of different maritime activities on the other to govern activities at sea and their consequences	Van Tatenhove, 2011
Market governance	Market governance is based upon the economic principles of the interplay between the demands of consumers and the supply of producers. It coordinates through the invisible hand of the price-based system of exchange between self-interested actors (e.g. Williamson, 1985). Within the public domain, market principles are used to formulate incentives that safeguard the proper working of imperfect markets. In some cases, governments provide a market for goods with specific merit aspects which are not produced by the common market.	Van Buuren & Eshuis, 2010 Williamson, 1985
Multi-use	Ocean multi-use is the joint use of resources in close geographic proximity by either a single user or multiple users. It is an umbrella term that covers a multitude of use combinations in the marine realm and represents a radical change from the concept of exclusive resource rights to the inclusive sharing of resources and space by one or more users.	Schupp et al., 2019
Network governance	Network governance refers to the interdependence of the (many) actors that are involved in planning	Edelenbosch and Teisman, 2008



This project has received funding from the European Union's Horizon Europe research and innovation programme under Grant Agreement No 101093888. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.



	and governing issues in modern societies. These actors represent a range of interests and perceptions on the problems at stake, as well as on the preferred solutions. Network governance assumes that policy is developed and implemented in networks of organizations. These networks emerge and continue to exist because actors cannot reach their objectives without each other.	Klijn and Teisman, 2003
Self-governance	Self-governance is a form of governance in which 'the capacity of societal entities to govern themselves autonomously' is the central coordinative principle. In self-governance actors make voluntary agreements. Here we see it as a part of network governance.	Kooiman, 2003 Van Buuren & Eshuis, 2010
Value chain	A set of activities that a business carries out to create value for its customers.	Porter, 1985