

Annex: Detailed Analysis of the wider impact of Ocean-based interventions and mitigation options on Sustainable Development Dimensions

Scoring framework		
Indivisible	one goal/target is inextricably linked to the achievement of another goal/target	3
Reinforcing	One goal/target directly creates conditions that lead to the achievement of another goal/target	2
Enabling	The pursuit of one goal/target enables the achievement of another goal/target	1
Consistent	A neutral relationship where one goal/target does not significantly interact with another or where interaction is neither positive nor negative	0
Constraining	The pursuit of one goal/target sets a condition or a constraint on the achievement of another.	-1
Counteracting	The pursuit of one goal/target counteracts another goal/target.	-2
Cancelling	Progress in one goal/target makes it impossible to reach another goal/target and possibly leads to a deteriorating state of the second.	-3

Likelihood	
High	☺☺☺
medium	☺☺
Low	☺

Evidence		No of papers/reports
Robust	📄📄📄📄	Above 4
Medium	📄📄	2-3
Limited	📄	1

Confidence		
High agreement	High agreement	High agreement
Limited evidence	Medium evidence	Robust Evidence
Medium agreement	Medium agreement	Medium agreement
Limited evidence	Medium evidence	Robust Evidence
Low agreement	Low agreement	Low agreement
Limited evidence	Medium evidence	Robust Evidence

Categories	Confidence symbols	Likelihood and Agreement Combination
Very High	★★★★	HA & RE
High	★★★	1) HA & ME 2) MA & RE
Medium	★★	1) ME & MA; 2) HA & LE 3) LA & RE
low	★	1) MA, LE & 2) LA & ME
Very low	★	LA & LE



HLPOCC ANALYSIS		HLPOCC ANALYSIS		HLPOCC ANALYSIS		HLPOCC ANALYSIS		HLPOCC ANALYSIS	
INTERACTION	NILSSON SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	INTERACTION	NILSSON SCORE	EVIDENCE	AGREEMENT	CONFIDENCE
Ocean based renewable energy	Offshore, wind, wave, tidal, floating solar	Gender equality and Women empowerment (5.1, 5.4)	Empower and promote the social, economic and political inclusion of all, irrespective of sex (10.2)	Strengthen the participation of developing countries in the institutions of global governance (16.8)	Enhance policy coherence for sustainable development. Increase availability of high-quality reliable data(17.14/17.18)	[+1]	[+1]	[+2]	[+2]
		Survey conducted by IRENA states that women represent 32% of the full-time employees of responding organisations – substantially higher than the 22% average in the global oil and gas industry. Still, in renewables, women's participation is much lower in science, technology, engineering and mathematics (STEM) jobs than in administrative jobs. With public policy support, women can garner a growing share of expanding employment in this young and dynamic sector.	Survey conducted by IRENA states that women represent 32% of the full-time employees of responding organisations – substantially higher than the 22% average in the global oil and gas industry. With public policy support, women can garner a growing share of expanding employment in this young and dynamic sector.	The use of Marine Spatial Planning and the study of the existing framework for governance and policy in other countries and the roles of the various factors influencing stakeholders' behaviour and decisions are recommended in offshore wind energy	Companies can collaborate with governments and workers to increase market penetration and uptake. There is a need to obtain sufficient and long-term data in wind resource, bathymetry, meteorological data (waves, current and tides), and seabed geology and substratum aid planning and consenting for offshore wind projects. In this context, Marine Spatial Planning (MSP) is a new way of looking at how we use the marine area and planning how best to use it into the future.				
Ocean-Based Carbon Storage	Carbon Storage in the seabed	(IRENA 2019b)	(IRENA 2019b)	(Dinh and McKeogh 2019)	(Dinh and McKeogh 2019)	[0]	[0]	[+3]	[+3]
		No direct interaction	No direct interaction	Strengthen relevant national institutions, including through international cooperation (16A)	Data, monitoring and accountability and multistakeholder partnership (17.18/17.19)				
				Tailored, fit-for-purpose policy measures will be needed to secure commercial CCS investment. Collaboration and shared experience will be critical to supporting rapid and widespread uptake of CCS technologies across the globe. This includes collaboration to facilitate technology transfer and to share project-based experience with a focus on reducing future costs. In some regions, including Europe, multi-user transport and storage infrastructure will be shared across countries and will require close co-operation across state actors as well as between industries.	Marine environment monitoring system for geological carbon storage needs to be multivariate, e.g. based on some combination of physical, chemical, acoustic and biological observations but also hierarchical. One of the purposes of the monitoring program will be to increase the quality of the baseline by adding new data. Collaboration and shared experience will be critical to supporting rapid and widespread uptake of CCS technologies across the globe. This includes collaboration to facilitate technology transfer and to share project-based experience with a focus on reducing future costs.				
				(IEA n.d.)	(Blackford et al. 2015; Borrero-Santiago et al. 2016; Hvidevoit et al. 2015; IEA n.d.)				
Transport	Domestic and International shipping	Gender equality and Women empowerment (5.1, 5.4)	Empower and promote the social, economic and political inclusion of all, irrespective of sex (10.2)	Ensure responsive, inclusive, participatory and representative decision-making (16.7)	Multi-stakeholder partnerships (17.16)	[+1]	[+1]	[+3]	[+2]
		International Maritime Organisation supports gender equality through gender specific fellowships; by facilitating access to high-level technical training for women in the maritime sector in developing countries; by creating the environment in which women are identified and selected for career development opportunities in maritime administrations, ports and maritime training institutes; and by facilitating the establishment of professional women in maritime associations, particularly in developing countries.	International Maritime Organisation supports empowers women through gender specific fellowships and by facilitating access to high-level technical training in the maritime sector in developing countries	Enforcement would be key to rule out the possibility of a low degree of compliance and to protect the competitiveness of complying ships.	By developing an extensive legislative playing field, the International Maritime Organisation (IMO) and national governments have accelerated their environmental efforts in international shipping -				
		(IMO 2019)	(IMO 2019)	(Sys et al. 2016)	(Sys et al. 2016)				
Shifting diets, Aquaculture and Fisheries	Reduction emissions from wild capture	Gender equality and Women empowerment (5.1, 5.4)	Empower and promote the social, economic and political inclusion of all, irrespective of sex (10.2)	Ensure responsive, inclusive, participatory and representative decision-making (16.7)	Multi-stakeholder partnerships (17.16)	[+1]	[+1]	[+3]	[+2]
		Responsible and sustainable fishing can lead to better conditions for women in supporting the stabilisation or even the growth of fish stocks near the coast, areas that are more easily accessed by women.	Responsible and sustainable fishing can lead to better conditions for women in supporting the stabilisation or even the growth of fish stocks near the coast, areas that are more easily accessed by women.	Support from the government is essential. In order to enact and enforce appropriate national regulations to support sustainable development in fishing vessels and the fisheries. Fishers and their communities should be encouraged to be involved in the sustainable development of the fisheries sector, including the development of sustainable fishing vessels. The government should develop an improved infrastructure, especially for the more remote areas, with the aim of supporting appropriate facilities regarding the supply chain of provisions and technical support for the technologies that are incorporated and applied to the fishing craft.	Governments should encourage the fishers and their communities to be completely involved in the sustainable development of the fisheries sector, including the development of sustainable fishing vessels. A change in fishing methods and gears can be promoted by removing environmentally harmful fuel subsidies and phasing out fuel tax exemption for fisheries, while at the same time providing financial and other incentives for alternative fishing techniques.				
		(World Wildlife Foundation, n.d.)	(World Wildlife Foundation, n.d.)	(Birmingham et al. 2015)	(Birmingham et al. 2015)				
Reduction emissions marine aquaculture		Gender equality (5.1)	Empower and promote the social, economic and political inclusion of all, irrespective of sex (10.2)	[0]	[0]	[+1, -2]	[+1, -2]	[+3]	[+2]
		Gender equality in fisheries and aquaculture can bring many potential benefits including higher fish productivity and household incomes, as well as positive nutritional outcomes. Current gender balance in aquaculture is poor. Women aquaculture workers represent a lower share of the workforce in larger, more capital-intensive and offshore operations.	Worldfish research commits and contributes to gender equality (SDG 5), including through innovative gender transformative approaches. At the same time, there is potential for Worldfish to include a focus on gender equity, to ensure that research and development interventions are inclusive, equitable in process and outcome, and meet the specific needs of different women and men.	No direct interaction	No direct interaction				
		(WorldFish, 2016)	(WorldFish, 2016)						
Shifting diets to ocean based protein		[0]	[0]	Strengthen relevant national institutions (16.6,16.7,16.a)	Multi-stakeholder partnerships (17.16)			[+3]	[+2]
		No direct interaction	No direct interaction	Governments can play a important role in incentivizing lower consumption of impactful food. One promising strategy is through education. This would require opportunities and strategies to be tailored in a target group-specific manner (consumer segmentation). Another strategy is market mechanisms that increase the price of GHG-intensive foods. Government policy would be required to mitigate any distributional impact from taxation.	While several authors still claim that "advocating for reduced meat consumption as part of healthy sustainable diets has not yet translated into policies and practices from government to support consumer behaviour change. It is evident that a variety of institutions have already started to take action and/or are preparing to do so. This includes governments in countries such as China, where the government is running a major campaign employing well-known U.S. actors such as Arnold Schwarzenegger, and Germany, where reducing meat consumption is now included in the climate goals. It also includes private companies such as IKEA and local, national and global NGOs and private foundations such as WWF (2014). (Stoll-Kleemann and Schmidt 2017)				
				(Stoll-Kleemann and Schmidt 2017; Poore and Nemecek 2018; Springmann et al. 2018)	(Stoll-Kleemann and Schmidt 2017)				
Coastal and Marine Ecosystems	Ending exploitation and allowing recovery of marine biomass	Gender equality and Women empowerment (5.1, 5.4)	Empower and promote the social, economic and political inclusion of all, irrespective of sex (10.2)	Strengthen relevant national institutions (16.6,16.7,16.a)	Multi-stakeholder partnerships (17.16)	[+2]	[+2]	[+3]	[+3]
		Increasing the participation of coastal communities in the development of coastal protected areas can enhance local governance and could facilitate participation from diverse social groups including women and marginalized coastal communities, helping reduce inequalities (SDG 10) and provides gender equality (SDG 5)	Ensuring access rights for local coastal communities can promote ocean stewardship and help combat illegal fisheries, as well as contribute to reducing inequalities within and among countries. Increasing the participation of coastal communities in the development of coastal protected areas can enhance local governance and could facilitate participation from diverse social groups including women and marginalized coastal communities, helping reduce inequalities (SDG 10) and provides gender	The Millennium Ecosystem Assessment concluded that coastal ecosystems are among the most productive, yet highly threatened, systems in the world. Effective intervention, it will be necessary to meet projected growth in fish demand without depleting wild capture fisheries, and by ensuring the sustainability in aquaculture production.	A collaborative approach by all stakeholders can help ports block illegal fishers from landing their catch and prevent illicitly caught seafood from entering the supply chain				
		(The Nippon Foundation 2017)	(The Nippon Foundation 2017; Singh et al. 2018)	(The Rockefeller Foundation 2013)	(The Pew Charitable Trusts 2018)				
Restoring and avoiding loss of vegetated coastal habitats (e.g., mangroves, seagrasses and saltmarshes)		Gender equality and Women empowerment (5.1, 5.4)	Ensure equal opportunity and reduce inequalities of outcome	Promote policies for Sustainable development(16.b)	Enhance policy coherence for sustainable development (17.14)	[+1]	[+2]	[+3]	[+2]
		Mangrove resources in many parts of the world are exploited by and particularly important to women who collect firewood, shellfish and other products. Thus, mangrove conservation and restoration is a pathway to gender equity addressing SDG 5 gender equality. Integrating social and gender dimension into restoration policy promotes effectiveness of restoration work and hence should be encouraged. Gender-responsive roles to conserving and restoring mangroves is gaining social impetus, with results that empower women and enhance gender equality. Existing initiatives that aim to support women include Mangroves for future (MFF), gender integrated management in Xuan Thuy National Park (Vietnam), Gyanana Mangrove Restoration project. Wetland conservation, management and restoration projects need to be gender sensitive recognizing the differentiated knowledge, roles, needs and vulnerabilities of men and women and contributing to empowering women in governance and decision making. For example, in Burkina Faso women play a leading role in local water committees ensuring that their needs related to water collection and management are met. In Quelimane Mozambique, recognizing that it is generally women who carry out activities related to mangroves such as firewood collection or gathering shellfish, a joint Ramsar /International Union for the Conservation of Nature (IUCN) project focused on providing women with training in mangrove planting and nursery practices.	Investment in mangrove conservation and restoration particularly within degraded coastal landscapes would help to address degradation as well as contributing to SDG 10 reduced inequalities. Healthy wetlands mitigate the risk to an estimated 5 billion people living with poor access to water by 2050	Additionally, Blue Carbon projects that follow best social and governance practices, with strong engagement of communities with donors, NGOs and governments, could provide models for achieving SDG 16 peace justice and strong institutions and SDG 17 partnerships for the goals. Safeguards are required to ensure that, for example, restoration projects do not prevent local communities from accessing marine resources	Including Blue Carbon in market-based climate policy mechanisms could result in significant funding for coastal ecosystem protection and restoration. Blue Carbon projects that follow best social and governance practices, with strong engagement of communities with donors, NGOs and governments, could provide models for achieving SDG 16 peace justice and strong institutions and SDG 17 partnerships for the goals.				
		(Friess et al 2019; Broekhoven, 2015 ; The Nippon Foundation 2017; Ramsar convention on wetlands 2018)	(Friess et al 2019; Ramsar convention on wetlands 2018)	(Friess et al 2019; McDermott et al. 2012)	(Ullman et al 2013; Friess et al 2019);				
Upscaling Macroalgae production		[0]	[0]	Promote policies for Sustainable development(16.b)	Data, monitoring and accountability (17.18/17.19)			[+3]	[+3]
				Expansion of the industry will require a more complete understanding of the scale-dependent changes to balance environmental risks and benefits. Policy would need to enable and accelerate seaweed cultivation for carbon sequestration.	Expansion of the industry will require a more complete understanding of the scale-dependent changes to balance environmental risks and benefits. Extensive trials and monitoring would be required locally before a sustainable harvesting policy could be developed				
				(Roberts et al 2012; Froehlich et al 2019)	(Campbell et al. 2019)				

