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Issue Brief

Deep Seabed Mining in the Arctic

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Summary

While seabed mining companies have hailed Norway's decision to open up the Arctic for seabed mining, the decision is being criticised by scientific communities, NGOs, environmental and civil society groups. Arctic states need to adopt approaches of cooperation to regulate/restrict deep seabed mining activities in the region.

Introduction

Norway's decision to open up 2,80,000 square km (1,08,000 square miles) of ocean areas between Jan Mayen Island and the Svalbard archipelago in the Arctic for exploitation of deep seabed resources has started a debate amongst global stakeholders. The decision is being hailed by seabed mining companies while global scientific communities, NGOs, environmental and civil society groups are critical. There are those who highlight that deep seabed mining will enable the growth of new industries and provide new job opportunities for the local population. This step is also being seen as a positive step to enable 'green transition'.

Rare Earth Elements (REEs) and critical minerals such as copper, lithium, cobalt, nickel and manganese play an important role in the manufacturing of wind turbines, solar panels, mobile phones, electric vehicles batteries and other related technology that enable global green transitions. Therefore, abundant availability of these resources on and beneath the Arctic seabed is seen as an opportunity from both commercial and sustainable development perspectives. Norway visualises that exploitation of these rare earth resources from the Arctic seabed would reduce its dependency on imports and open avenues for export opportunities.

Those critical of the decision note that seabed mining activity in an already fragile environment such as that of the Arctic is disastrous for the entire ecosystem.

Regulatory Mechanisms

Deep seabed resource exploration and exploitation in the high seas is regulated by the International Seabed Authority (ISA) which comprises State Parties to UNCLOS. ISA to date has approved 31 applications submitted by 22 countries and companies to undertake exploration activities in deep seabed minerals in various parts of high seas.[1] The majority of these deep-sea mineral exploration activities are occurring in an area of around 4.5 million square kilometres in the Pacific Ocean between Hawaii and Mexico, which is also known as the 'Clarion-Clipperton Zone' (CCZ).[2] Though these countries/companies are undertaking deep seabed exploration activities, no licensing of any kind for exploitation of these deep seabed minerals in the high seas have been granted so far.[3] This is because there is no existing draft resolution to regulate deep seabed mineral

[1] **"Exploration Contracts"**, International Seabed Authority, 31 January 2024.

[2] Catherine Blanchard et al, **"The Current Status of Deep-sea Mining Governance at the International Seabed Authority"**, *Marine Policy*, Vol. 147, January 2023.

[3] Dánica Coto, **"Negotiations Over Proposed Regulations for Deep-sea Mining Plod Along as Pressure Mounts"**, The Associated Press, 9 November 2023.

exploitation activities in the high seas and ISA is in a process of formalising such a regulatory mechanism.[4]

States on the other hand can undertake or allow companies to undertake seabed exploitation activities in their own respective EEZs and designated limits of continental shelfs, through conditions and procedures defined by their own state legislations. Despite this, the states granting or undertaking such activities need to comply with various ocean environmental protection measures as per Article 145 of UNCLOS and ensure that their activities do not impact the ocean ecosystem or the ecosystem of the neighbouring state. Therefore, as per this provision, some countries are undertaking and have been granting licenses to private companies to undertake seabed mineral exploitation activities within their maritime jurisdictional limits.[5]

Resource Geopolitics vs Scientific and Environmental Arguments

Proponents of deep seabed mining argue that RREs will play a significant role in bringing global energy transitions by acting as key components for the manufacturing of gadgets, devices and infrastructure to sustain this transition. Use of REEs in the batteries of electric vehicle (EV) batteries, cell phones, solar panels and other electronic devices shows that the global demand for these resources is bound to multiply manifold in near future as these have the potential to reduce global net carbon emissions.[6] REEs exist beneath the surface of earth on land as well as on or beneath the seabed. Estimates suggest that land-based REEs remain highly concentrated in only a few countries and their supply chains remain highly vulnerable to global geopolitical and geo-economic challenges.[7] Therefore, in order to become self-sufficient and ensure consistent future supplies of these resources, states are turning their focus towards the abundant quantities of REEs available under the deep seabed.

As per the estimates of Nauru Ocean Resources Inc. (NORI), which is a subsidiary of Canada based 'The Metals Company', the Clipperton Zone contains a "combined

[4] Ryan Murdock, **"Deep Sea Mining and the Green Transition"**, *Harvard International Review*, 16 October 2023.

[5] Kathryn A. Miller et Al, **"An Overview of Seabed Mining Including the Current State of Development, Environmental Impacts, and Knowledge Gaps"**, *Frontiers in Marine Science*, Vol. 4, 10 January 2018, p. 9.

[6] Daisy Chung, Ernest Scheyder and Clare Trainor, **"The Promise and Risks of Deep-sea Mining"**, Reuters, 16 November 2023.

[7] Manoranjan Srivastava, **"India's Deep Sea Mining Endeavours: A Search for Climate Solutions in Deep Waters"**, Issue Brief, Manohar Parrikar Institute for Defence Studies and Analyses (MP-IDSA), 27 September 2023.

seafloor inferred resource estimate of 909 million tonnes of wet polymetallic nodules".[8] Assessments point that CCZ accounts for over three times the amount of cobalt, almost two times the amount of nickel and as much manganese as all global land-based reserves, combined.[9] As the global demands for nickel and cobalt due to their increasing role in the manufacture of batteries to sustain electric transitions is expected to rise, states are eager to harness the vast potential of these polymetallic nodules lying on or beneath the ocean sea-floor.

To support deep seabed mining, some peer-reviewed research publications even highlight that the solid waste generation from land-based ores is much higher whereas the extraction of minerals from seafloor polymetallic nodules is environmentally more sustainable and can significantly reduce harmful impacts of mining on land.[10] Similar research papers further points out that extraction of metals required for batteries from seafloor nodules could reduce the lifecycle climate change impacts by up to 90 per cent, compared to extraction of these metals from land ores.[11]

On the other hand, scientific and environmental communities opposing deep seabed mining refute these studies by labelling these as 'false dichotomies' aimed to justify the vested interest of selective states and companies that seek to dominate seabed mining. Scientific research published in other peer-reviewed journals warns that seabed mining can cause 'serious and irreversible environmental damages' to ocean ecosystems. These studies warn that seabed mining would result in the removal and destruction of sensitive and poorly known seafloor habitats and species.[12]

Researches argue that the processes involved in undertaking seabed mining would result in the generation of large quantities of seafloor dust and toxic sediment plumes that would damage or have severe impact on known/unknown deep-sea flora and fauna.[13] Further, increase in the limits of 'noise' and 'light' as a result of increased industrial activity would severely impact the behavioural, communication and migration pattern of aquatic species and have implications for deep seabed microbial

[8] **"43-101 Technical Report for the NORI Clarion – Clipperton Zone Project, Pacific Ocean"**, Deep Green, The Metals Company, 24 September 2018.

[9] **"Inflation Reduction Act Clean Vehicle Credit"**, The Metals Company, August 2022.

[10] Daina Paulikas et al., **"Deep-sea Nodules Versus Land Ores"**, *Journal of Industrial Ecology*, Vol. 26, No. 6, December 2022.

[11] Daina Paulikas et al., **"Life Cycle Climate Change Impacts of Producing Battery Metals from Land Ores Versus Deep-sea Polymetallic Nodules"**, *Journal of Cleaner Production*, Vol. 275, 1 December 2020.

[12] Aline Jaeckel et Al, **"Deep Seabed Mining Lacks Social Legitimacy"**, *npj Ocean Sustainability*, Vol. 2, 9 February 2023; Bernd Christiansen, Anneke Denda and Sabine Christiansen, **"Potential Effects of Deep Seabed Mining on Pelagic and Benthopelagic Biota"**, *Marine Policy*, Vol. 114, April 2020.

[13] Daisy Chung, Ernest Scheyder and Clare Trainor, **"The Promise and Risks of Deep-sea Mining"**, n. 6.

activity that could impact the growth of deep-sea fauna, thus disturbing the entire ocean ecosystem.[14]

It is further important to highlight that there exist serious research gaps from multiple perspectives in understanding the possible impacts of deep seabed mining. Scientific research highlights that out of the vast majority of the global deep seabed area, only a fraction of it has been scientifically studied so far.[15] Due to this, a vast number of species or organisms present in this region remain undiscovered and completely unknown to mankind. Scientific research published in March 2023 found 5,142 new unnamed species in the CCZ.[16] Their findings further demonstrate that out of the known species, only six have been found in other parts of the ocean. Therefore, strong scientific arguments prevail that if states/companies go ahead with deep seabed mining activities without undertaking adequate scientific research and biological discoveries at these ocean depths, many of the unknown species and organisms could be permanently lost without their discoveries.

Seabed Mining in the Arctic

The Arctic region presents one of the most fragile ecosystems of the globe and is already witnessing the severe impacts of global warming at a rate four times the average normal. Norway's parliamentary decision in support of allowing Arctic seabed mining,[17] could open a new 'Pandora Box' in the Arctic from not only environmental but also geopolitical perspectives.

First, as discussed above, there remains a serious research gap in terms of scientifically studying the deep seabed spaces from biological, geological and anthropogenic perspectives. Scope for undertaking such scientific research activities in the 'Arctic's deep seabed spaces' was negligible in the past[18] Ongoing and emerging extreme climatic conditions, high financial cost factors associated in undertaking scientific activities in Arctic seabed, limited cooperation between states and the geopolitical challenges in the region makes it further difficult for regional and global states to undertake large joint scientific research projects on Arctic seabed.

[14] Lisa A. Levin et al., **"Defining 'Serious Harm' to the Marine Environment in the Context of Deep-seabed Mining"**, *Marine Policy*, Vol. 74, December 2016.

[15] Kathryn A. Miller et al, **"An Overview of Seabed Mining Including the Current State of Development, Environmental Impacts, and Knowledge Gaps"**, *Frontiers in Marine Science*, Vol. 4, 10 January 2018.

[16] Muriel Rabone et al, **"How Many Metazoan Species Live in the World's Lrgest Mineral Exploration Region?"**, *Current Biology*, Vol. 33, No. 2, 25 May 2023.

[17] Victoria Klesty, **"Norway Parliament Votes in Favour of Seabed Mining, As Expected"**, *Reuters*, 9 January 2024.

[18] Song-Can Chen et al, **"Microbial Diversity and Oil Biodegradation Potential of Northern Barents Sea Sediments"**, *Journal of Environmental Sciences*, 26 December 2023.

Therefore, Norway's decision to mine Arctic deep seabed without undertaking these considerations into account could be extremely disastrous for the entire Arctic Ocean ecosystem.

Second, Norway's 'proposed Arctic deep seabed area' could trigger ecological and geopolitical challenges. It is important to note that the part of the area approved by Norwegian parliament for seabed mining falls under Norway's extended continental shelfs granted to it as per the 2009 recommendations of the Commission on the Limits of Continental Shelf (CLCS). The other major chunk of this proposed area overlaps with Norway's own established Jay Mayen and Svalbard Fisheries Protection Zones (refer Figure 1).[19] Arctic deep seabed mining activity in these regions would have severe environmental implications on regional fisheries and marine life. These activities in the region would not only have implications for Norway's designated fisheries protection areas, but also in the large adjoining Arctic Sea areas.

Third, as per the 1920 Spitsbergen Treaty, Norway and other State Parties to the treaty are in disagreement regarding maritime rights in areas beyond territorial waters around Svalbard. The treaty though recognises Norway's sovereignty over Svalbard while it simultaneously provides equal rights and opportunities to high contracting parties to carry out economic activities, fishing, mining, hunting, shipping, and scientific installations.[20] The Norwegian government argues that the equal rights of clause of fishing and mining for state parties do not apply in the areas beyond the territorial waters of Svalbard, whereas states like Iceland, UK and several EU countries strongly object and disagree to this Norwegian position.[21]

Norway's decision to undertake deep seabed mining in these areas could ignite geopolitical differences amongst allied partners and other states in the region that could further escalate geopolitical tensions in the Arctic. Further, there remain equal possibilities that other State Parties to the treaty in the future could consider undertaking similar activities within the territorial waters of Svalbard. Any such move would be difficult to counter and could lead to geopolitical competition amongst states.

[19] **"Norway's Decision to Move Forward With Commercial Deep-Sea Mining Must Be Opposed to Avoid 'Irrevocable Damage'"**, Environmental Justice Foundation, 5 December 2023.

[20] **"The Svalbard Treaty"**, 9 February 1920.

[21] Robin Churchill and Geir Ulfstein, **"The Disputed Maritime Zones Around Svalbard"**, Changes in the Arctic Environment and the Law of the Sea, Panel IX, Martinus Nijhoff Publisher, 3 October 2011.

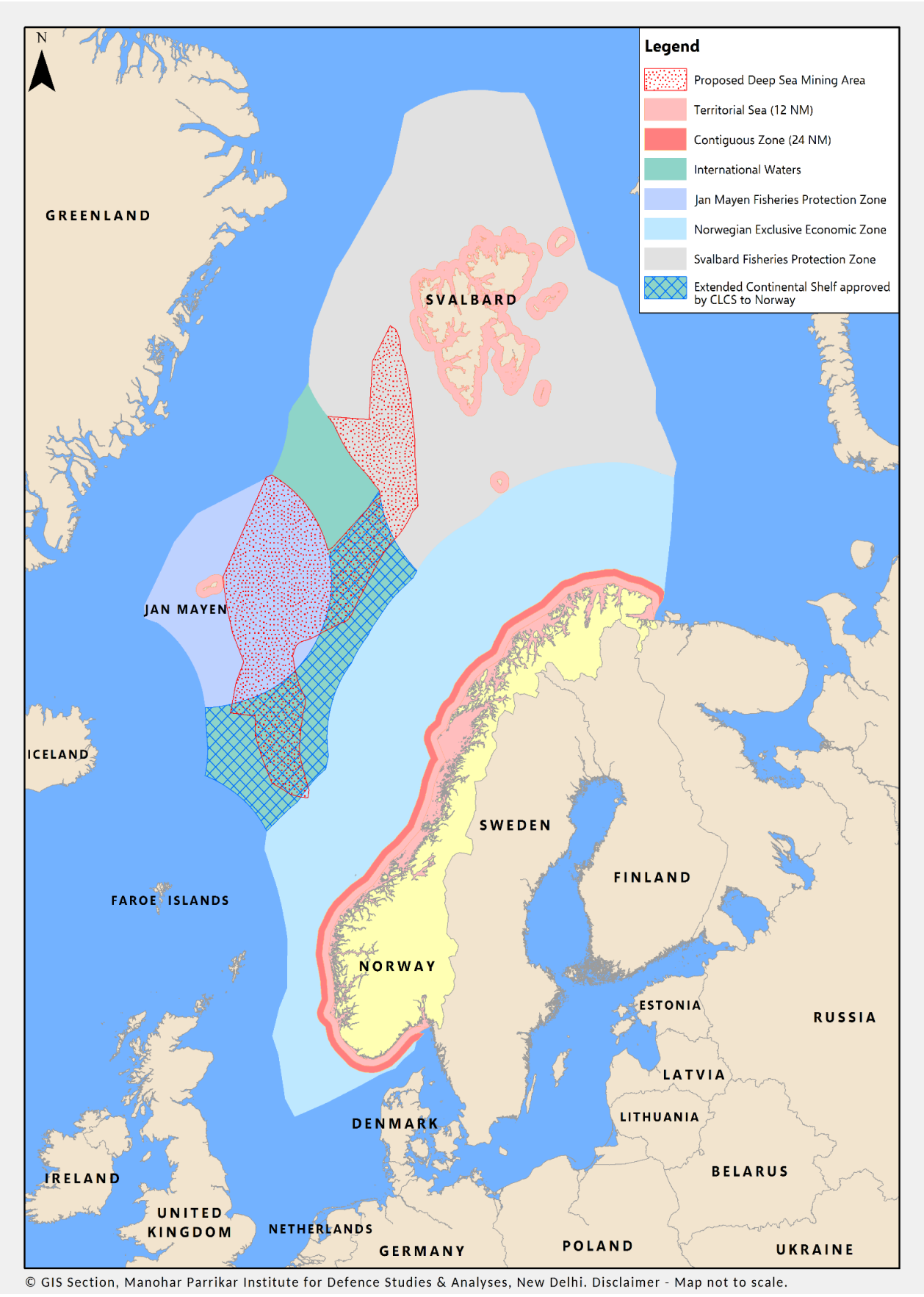

Figure 1: *Map showing deep seabed mining activity area approved by Norwegian parliament in the Arctic*

Fourth, most of the Arctic states have made their formal submissions before CLCS for claiming extended continental shelfs in the Arctic. Some of these claims have been granted by CLCS to the respective states while the decision on others remains pending. Despite CLCS decision making, there exists challenges with regard to overlapping claims of states of their extended continental shelf in the Arctic. Norway's call for exploiting REEs in its extended continental shelf would make the competition between these states over their extended continental shelf claims fiercer. Further, any new discoveries of REEs in these overlapping areas would leave little scope for cooperation between states and would rather result in competition among states to dominate these resources.

Fifth, deliberate acts of states for unilaterally claiming areas in international waters beyond their designated continental shelfs, to harness the potentials of REE and other critical minerals could raise complexities of greater future geopolitical risks in the Arctic. The recent United States unilateral claim over an area in the Arctic near the Bearing Sea[22] (without even ratifying UNCLOS and without making any scientific submission to prove its claims before CLCS) depicts future aggressive behaviours of state to dominate new potential spaces of geo-economic importance. Similar measures from other dominant players in the region could challenge existing international rules-based order that might have repercussions in other parts of the world.

Finally, the human dimension and the future socio-ecological impact of undertaking seabed mining activities in the Arctic deep seabed remain unknown. Apart from the existing knowledge gaps in scientific research, there also exist significant research gaps in studying the social-ecological impacts of Arctic seabed mining activities on indigenous communities and known/unknown polar species. Though the Norwegian parliament has called for enforcing strict environmental procedures and practices while granting access to companies for engaging in deep seabed mining activities in the Arctic, how seriously such measures would be followed in the future preview of larger geo-economic interests' states/companies remains debatable.

A Way Forward

Deep Seabed Mining has serious implications for global ocean ecosystems. Undertaking deep seabed mining in the Arctic region could further intensify its impact since the region remains scientifically unexplored and is already witnessing

[22] Liam Denning, **"US Joins the Arctic Race to the Bottom (of the Sea)"**, Bloomberg, 4 January 2024.

severe impacts of climate change. Despite global resistance,[23] Norway's decision to proceed forward with deep sea mining activities in the Arctic demonstrates future realities of state's decision-making on these issues. As global states call for transitioning towards cleaner and greener technologies, a race to dominate REEs that lie on or beneath deep seabed is inevitable in the near future.

It is important for the states and global civil societies to critically analyse if moving forward with deep seabed mining activities in the Arctic remains a viable option for making the planet actually greener, or this could further unleash irreversible damages to entire global ecosystems. In the Arctic region, where global scientific cooperation is already facing severe strains of regional geopolitics, the possibilities of undertaking combined scientific research to study the possible implications of seabed mining activities from multiple perspectives seem bleak.

The ISA in 2023 has already surpassed its 'two-year countdown' timeline, triggered by Nauru Ocean Resources Inc. (subsidiary of 'The Metals Company' of Canada) for finalising the exploitation framework for deep seabed mining.[24] As the pressure mounts further and the Metals Company prepares to submit its formal application for the exploitation contracts in CCZ before ISA post ISA's 29th Session in March 2024, hopes still remain high that the seabed authority comes up with stricter regulatory mechanisms for undertaking deep seabed exploitation in international waters. Similarly, the Arctic states need to adopt regional approaches of cooperation to strictly regulate/restrict deep seabed mining activities in the region. Such approaches could only be configured through mutual consensus for which despite geopolitical rivalries, impartial revival of scientific and academic cooperation either directly or via existing mechanisms such as the Arctic Council could be possible ways forward.

[23] Catherine Hercus, **"Deep Sea Mining Faces a Sea of Opposition"**, *Canadian Mining Journal*, 9 November 2023.

[24] Elizabeth Claire Alberts, **"Deep-sea Mining Rules Delayed Two More Years; Mining Start Remains Unclear"**, *Mongabay*, 25 July 2023.

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