

SEABED MINING: RETENTION OF AN OVERALL PERSPECTIVE

In the global debate about potential benefits and disadvantages of seabed mining for phosphates and other minerals, many arguments have been thrown to and fro. Companies wishing to pursue seabed mining are quick to state that they are promoting socio-economic development and the enhancement of food production on land. The underlying motive of profit-making is seldom mentioned. Those opposing seabed mining tend to highlight the dangers of damage to marine ecosystems and to renewable resources, especially fisheries. The need for additional sources of minerals, are not mentioned. Intense and sometimes emotionally-based argument tends to obscure overall perspectives. What perspectives are relevant if the physical, chemical and biological processes governing sustainable functioning of marine ecosystems (and of the renewable resources they hold), are to remain intact?

Four key aspects need to be kept in mind. *Firstly*, an exponentially growing global human population is in need of reliable and sustainable sources of minerals. *Secondly*, without a very careful weighing up of priorities, harvesting of minerals should not be at the expense of existing economically important activity. *Thirdly*, it is of paramount importance that additional industrial activity is not allowed, if it is at the expense of renewable food resources upon which the ultimate survival of an expanding global human population is dependent. *Fourthly*, more attention needs to be given to curbing wasteful use of non-renewable mineral and other resources. The possibilities of recycling, rather than a continual search for additional resources, needs urgent attention if further environmental degradation is to be avoided. As survival is such an important component of the equation, short-term profit-making should not be a priority.

It must be understood and accepted that the seabed is not simply a stratified layer of sediments from which phosphates and other minerals can be extracted. It is a complex interacting physical, chemical and biological system, the equilibrium of which has evolved over a period far exceeding human capability of exploiting marine resources. Disturbance of this finely balanced system can have wide-ranging consequences:

- Benthic organisms living in the sediments of the seabed are not components of a closed sub-surface ecological system. They interact continuously with those of the water column above it and represent a vital food source for fish, crustaceans and other forms of marine life. In fact, the sub-surface benthic communities underpin all bottom, mid-water and pelagic fisheries.
- At the same time sub-surface organisms are totally dependent on organic material which, as detritus, deposits on the seabed from overlying waters, and on essential nutrients diffusing into the seafloor.
- Irrespective of whether humanly induced disturbance is through seabed mining or any other form of activity, extreme care is required not to disturb an interactive and inter-dependant ecological system in which the living communities of the seabed and those of the water column, exist in a state of equilibrium. Heed needs to be taken of the following:
 - (a) The danger of direct disturbance of the benthic, sub-surface communities through any form of large-scale dredging.
 - (b) The danger of disturbance and displacement of fish and other free-swimming organisms of the water column through physical intrusion, noise, pollution or any other factor.
 - (c) The danger of releasing plumes of finer sediment fractions into the water column which will remain in suspension for prolonged periods, thereby reducing light penetration through the water column. Such reduction of light intensity and/or murkiness will inhibit the movement and feeding mechanisms of a wide range of free-swimming and bottom-living life forms, including fish, molluscs and crustaceans.
 - (d) When it eventually settles, blanketing of the seafloor by such fine sediment inhibits the vital free exchange of material across the sediment/seawater interface.
 - (e) The danger of disturbance of all-important phyto- and zooplankton communities through reduction of light penetration in the water column. Plankton represents the fundamental food source for virtually all other forms of life in the sea. Furthermore, phytoplankton fulfils the vital function of absorbing CO₂ from the atmosphere and releasing O₂ back into the air.

- (f) The danger of mechanical disturbance mobilising toxic elements which are either concentrated naturally in sediments, or pollutants of atmospheric and/or terrestrial origin, which might have been lying dormant in seabed sediments.

It is neither claimed nor asserted that seabed mining will unleash all the potential negative environmental effects outlined above. However, in contrast to gas and oil-wells on the seabed (which hold their own set of hazards), seabed mining cannot be restricted to limited individual localities, but demands the cutting of large swaths through seabed environments. The hazards inherent to seabed mining are therefore multi-pronged threatening not only trawl and other fisheries, but the equilibrium of the entire marine realm. This is the reason for the extreme reluctance of countries such as Australia and New Zealand to allow seabed mining off their own shores.

What is ironic, is that companies who have been denied the right to mine the seabed in the waters of their own countries, now wish to operate in other, in their eyes remote, areas where sound overall marine resource management is of little concern to them. While such companies are quick to give assurances that negative environmental consequences can be contained, these assurances are hardly plausible when considered in the light of perspectives such as those touched upon above. What is underplayed most, is the high risk of seabed mining to established fisheries which contribute meaningfully to the economy and welfare of the countries concerned. Hence the scepticism towards the overtures of foreign seabed mining concerns, both in Namibia and in South Africa.

Claims that exploration rights will be subjected to thorough Environmental Impact Assessment (EIA) procedures, are therefore also met with scepticism. What is of fundamental importance in the context of seabed mining proposals, is open and proper quantification of the scope of the mining intended. That means clear delineation of the areas to be mined, not just during the exploration phase, but during the entire period of exploitation. Such openness requires the divulging of details of the nature of the seabed in the entire targeted area, objective assessment of oceanographic and other environmental conditions in the proposed mining area, methods of primary processing at sea and any marine dumping of unwanted materials from such processing, methods of transporting large volumes of mined sediments to the shore, methods of offloading and storing such sediment onshore, methods of processing the material on land and the subsequent fate of effluents therefrom, the nature of the final product, details of intended local and export markets, and means of transporting the processed mining products there. It is not good enough to state blandly that the phosphates taken from the seabed will enhance the agricultural potential of the country concerned.

The environmental, socio-economic and socio-political implications of seabed mining, both in the sea and on land, are clearly enormous. This is the reason why the precautionary principle is being imposed so strictly in countries such as Australia and New Zealand and why there is so much international concern about the issue. The assumption that government sanction can be obtained on the basis of simplistic assurances that the environmental impacts can be contained and that substantial socio-economic benefits will be generated (even if it is at the expense of other economically important activities such as commercial fishing), does not hold water.

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