

Sustainable ocean use: An oxymoron? Not necessarily. Environmental considerations for ocean development

Integrating burgeoning ocean uses with the requirements for marine environmental protection imposed by the Law of the Sea Convention is a daunting challenge. Environment and development are still presented as at the very least competing, if not diametrically antagonistic, interests. In a competition, there must be a winner. By and large, that winner is development. However, the framing of this challenge as a competition is incorrect and counter-productive. It sets up a demonstrably false dichotomy, whose clearly deleterious consequences for the marine environment (and for the earth as a whole) lead to outcomes that are profoundly unhelpful to that very development. The concept of winning merits a fresh examination.

The Oceanology International conferences and exhibitions are part of many initiatives that present us with exciting and often visionary ideas for using the oceans in the 21st century. However, usually underpinning these ideas is an approach that – consciously or not – is fundamentally oriented towards winning. Yet, there is little or no attempt to define victory, or to avoid the victory becoming Pyrrhic, i.e., making sure that the costs associated with the victory do not so outweigh the benefits that there is, in fact, no real victory at all.

The British physicist and author, Dr CP Snow CBE (later Baron Snow), explained the three laws of thermodynamics to his students as follows:

1. You can't win.
2. You can't break even.
3. You can't get out of the game.

This version of the three laws (Sherrill, 2009) facilitates reflection on the concept of winning and sustainable ocean uses. Other than in the title of this Personal View, I have so far intentionally avoided that much-used and much-abused word 'sustainable'. I suggest that avoiding Pyrrhic victories in developing ocean uses offers a practical rule of thumb, grounded in the boundary conditions of the three laws, to assess whether an ocean use is sustainable. Quantification is needed, and a method may be found in the definition of Pyrrhic victory I have given above. The three laws mandate a redefinition of the bottom line. The need for a level playing field in this redefinition requires the active cooperation of the national government.

The cost-benefit accounting associated with the development and use of ocean resources is conducted at governmental level and requires rethinking. For every ocean use, this accounting must be accurate and comprehensive, i.e., include *all* the environmental costs. If (more usually, when) the accounting is then adjusted for political purposes, that adjustment must also be clearly and accurately specified, and its consequent costs and benefits, including to the consumer, the taxpayer and the environment, must also be comprehensively set out. The Law of the Sea Convention also addresses social costs in the

context of the marine environment, such as the effect of pollution on human health. The topic of social costs is profoundly relevant to this discussion, but space constraints prevent further discussion here.

Specifying the cost to the environment is important because the truism that nature takes no notice of politics continues to be so universally ignored that it remains worth repeating. For example, consider the adverse environmental consequences of the relentless and usually subsidised increase, for political reasons, in the destructive methods and catch limits for fish beyond scientific recommendations.

It is not fully realised how much development, including in so-called 'free market' or 'capitalist' countries, depends on direct and indirect subsidies and other generally perverse incentives from, or borne by, the public purse. The expense of remedying adverse environmental and social consequences – even on the rare occasions when remediation is possible and actually carried out – also comes from the public purse. Remedial expenses are far greater, and the adverse environmental and social consequences far longer lasting, than the original benefits ostensibly obtained from the original development. Such benefits also are not nearly as widely distributed in society, if at all, as the costs. To the best of my knowledge, no country has yet put in place a truly national accounting of environmental and social costs and benefits associated



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with any form of development, land-based or marine.

Furthermore, ocean management by countries is notoriously fragmented among many national, regional and local administrations. Yet all countries generally have one national finance and budget ministry. The oceans community in a given country is therefore represented everywhere in that country, by virtue of this national institutional fragmentation of ocean responsibilities. This could, paradoxically, be turned into a possible advantage.

The oceans community, in no small part because of the sheer physical demands of the marine medium, is much more cognisant

of the true cost-benefit relationship of ocean development than their terrestrial counterparts. The ocean is not a forgiving setting. Making mistakes at sea is usually unpleasantly rewarded. As Cornelius Tacitus wrote in ~109 CE, 'Nothing creates accidents like the sea'¹. This fact tends to focus the marine mind.

A similarly sharp focus could be brought to bear, from all the diverse sectors represented by the ocean community, on the national budget and finance ministry. The oceans community could mount a united effort to make its shared national common denominator, i.e., the budget and finance ministry, aware of the direct and indirect environmental and social costs associated with the disregard of ocean realities in development plans – including marine environmental and social realities – and in particular of the consequent demands on the public purse. Economically responsible uses of the public purse also require those uses to be environmentally and socially responsible. Sustainable use thus becomes *responsible* use, which carries a respectable pedigree of definition in all the relevant disciplines for both the sea and the land.

Engineering and technology play a crucial role in this context. Thermodynamics teaches the need to be far more creative in our interactions with the natural systems of which we are an inextricable part. Therefore, to work responsibly *in* the ocean, which for these purposes can be equated to the marine environment as envisaged by the Law of the Sea Convention, it is necessary to design *for* and *with* the ocean and its environment. This means, to give only one example, to not

simply take land-based technology and try to submerge it. This is especially necessary when that land-based technology is already rather blatantly environmentally destructive on land. Deep-sea mining, the ocean use with which I am most involved, is, alas, at present doing exactly that. I suggest that it is a major reason why deep-sea mining is encountering such growing opposition on environmental grounds.

Truly responsible ocean use requires out-of-the-box practical thinking which I associate particularly with engineers and technologists: a major part of my audience here. Recall the wise words of Dr John Craven, a highly creative ocean engineer: 'If you bring something new to the sea, the sea will bring something new to you' (2002). This is both a promise and a threat. Creative ocean-based technology and engineering in developing ocean uses can help *increase* the promise and *reduce* the threat. Thus, *sustainable* ocean use becomes *responsible* ocean use, and the oxymoron disappears.

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¹"*nihil tam capax fortuitorum quam mare*" Tacitus. The Annals 14.3 as translated in Haynes, 2016.