

24. 06. 2020

The State of Marine Sciences in Israel: Thoughts and Vision

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I am a Marine Ecology Professor (emeritus) at Tel Aviv University and a member of the Marine Sciences Steering Committee, nominated by the Israel Academy of Sciences. The thoughts, opinion, and proposal stated below stem from many years of my scientific activity, mainly in coral-reef ecology (>50 years), and from my close acquaintance with many fields of Marine Sciences and International Marine Institutions. Here, I present my views for an open discussion among members of the Committee.

What are the marine fields of research we should encourage for future support? "A jack of all trades is a master of none!"

In a nutshell: We need to strengthen established fields in marine research that currently exhibit proven international excellence, rather than recommend the establishment of fields that are lacking at present, or the expansion of those that are poorly represented in Israel, both of which are also extremely costly.

Although identifying the wide array of marine research fields that are missing in Israel or need strengthening – and consequently encouraging their support – is a logical direction, recommending, this could lead to channeling the majority of the future budget for Marine Sciences in Israel towards this direction.

I unequivocally believe and recommend that our focus should be on enhancing both those Israeli marine science fields with **proven scientific excellence on an international scale, as well as those new and potentially promising fields that are affordable by Israeli standards**, rather than exploring extremely costly directions. Thus, for example, **deep-sea research** (discussed in our Committee), although undoubtedly an important field, would require an **inflated budget that Israel simply cannot afford!** Moreover, a literature review of this field clearly indicates that we have a narrow and meager scientific contribution in this field. The associated huge cost of prioritizing this field may not translate into cutting-edge research and definitely to a low scientific benefit/cost ratio. **The obvious consequences of such a recommendation would be dire!** Such an approach would **competitively exclude** the existing highly diverse and successful scientific fields in Israel, as well as endanger the training of new generations of marine scientists.

Being a small country with obvious limited financial resources, we cannot compete scientifically in deep-sea research with huge institutions such as the Woods-Hole Oceanographic Institute, Scripps Research Institute, or the like, which receive ongoing support from large and affluent countries (e.g. the G7 countries and China). The infrastructure for deep-sea research (e.g. vessels, ship time, large ROVs and other extremely expensive equipment/items) should come from international collaborations of the Israeli researchers, rather than constituting a specific ("colored") VATAT budget.

To reiterate: "A jack of all trades is a master of none!" Deep-sea research is indeed important and should continue, but since the budget is limited, it should not come at the expense of those established

marine fields with recognized international excellence, and which require relatively modest budgets. I strongly believe that we should encourage and financially strengthen those specific research areas (to be identified by the Committee) in which the Israeli Marine Sciences can function and successfully compete on a global scale.

Vision: Establishing the long over-due Mediterranean Inter-University Institute for Marine Sciences (MIUI).

Israel is a small country with limited financial abilities that can be directed towards higher education and scientific research. Nevertheless, Israeli science, as a whole, has significantly contributed to many scientific breakthroughs on a global scale (e.g., the relatively high number of Israeli Nobel Prize winners). Unfortunately, the Marine Sciences in Israel have not developed to what might be expected from this important field, due to both historical reasons and the attitude of the present-day decision-makers to the Environmental Sciences as a whole. Unfortunately, the Ministry for Environmental Protection is among the government's lowest-key offices. Despite the disadvantages we face, there is clear evidence of our international reputation for excellence in our field. This is largely due to the vision of those pioneers among the Israeli Marine Sciences community who established in the early 1960s the Interuniversity Institute for Marine Sciences in Eilat (IUI-Eilat). I consider the **IUI-Eilat** to be the best example of Israel's international front-line scientific standing in Red Sea research; and, in short, as **the "jewel-in-the-crown" of Marine Institutes in Israel**. In contrast, the Mediterranean Sea along the Israeli coastline has been relatively poorly studied by the Israeli community of marine scientists.

The Mediterranean's biological uniqueness, strategic and economic importance to Israel, as well as the recent environmental issues echoed in the media (e.g. oil, gas, desalination plants, power plants, artificial islands, marinas, marine biotechnology –a source for new biologically active materials, marine agriculture, and marine trade increasing pollution hazards), are well recognized. Notably, the Mediterranean Sea is considered as a “European Sea” and throughout the FP5-7 programs, as well as HORIZON 2020, the Israeli East Mediterranean coast has played an increasing role in collaborative projects. This is also clearly demonstrated in the EU's future multi-billion funding agendas. **Establishing the long over-due Mediterranean Inter-University Institute for Marine Sciences (MIUI), similar to the IUI-Eilat, is both timely and imperative.** It has solid scientific benefits, on both the national and international levels, as well as political ones.

Based on my close association and knowledge of the IUI-activity since its establishment in 1968, I recommend that the administrative organization and all academic procedures of the MIUI will follow, in the main, those of the IUI-Eilat (details to be discussed in the Committee). One significant difference, however, to the protocol at the IUI-Eilat, is that the **Scientific Director** of MIUI will be elected/nominated **on a rotation basis from among the universities in Israel** (unlike the problematic situation in IUI-Eilat, in which the Director is exclusively from the Hebrew University, Jerusalem). **An Inter-University Management Committee of the MIUI will be composed of VATAT's nominees.** The MIUI should be open to all academic and technical personnel from established institutes of higher education in Israel and graduate students who will **receive their formal degrees from their home-institutes.**

An **appropriate and steady annual budget** is required in order to materialize this vision. The MIUI should be equipped with state-of-the-art equipment that will be available to all marine scientists in Israel (e.g. wet laboratories with running seawater tables and aquaria; isotopic and geochemical analysis lab, molecular lab, ROV, AUV, EM, Histology lab, etc.) to be identified and recommended by the Committee. On a national scale, **such a central facility will be economically efficient** as the expensive marine instruments and facilities will be shared among all universities and will not need to be purchased separately by individual scientists or schools (in contrast to the situation today). Furthermore, together with the IUI-Eilat, such an infrastructure will provide a **solid platform for the training and education of future generations of Israeli marine scientists**, and highlight the field of Marine Sciences in Israel in a significant, broader, and more influential way than its present status.

Location of the MIUI:

An ideal location for the MIUI is at Michmoret, Ruppin's School of Marine Sciences and Marine Environment (i.e. a geographic location close to most of the universities and research institutes in Israel; an existing, newly-built modern marine research-building; proximity to the sea, harbor, running seawater facilities, etc.). Thus, there is no need of constructing a new physical building. Given that Ruppin's administration recognizes the advantages of this proposal to its own development, as well as to advancing Marine Sciences in Israel a whole, the logistical and administrative arrangements to execute this proposal should be done between VATAT and Ruppin's administration in consultation with the MIUI nominated Committee.

MIUI vs. IUI-Eilat:

I do not see this proposal as impeding the development of the IUI-Eilat. On the contrary: I believe that establishing the MIUI will highlight the Israeli Marine Sciences worldwide within a wider and more influential context.

Importantly: This proposal is conditional upon the continuation of Vatat's financial support to IUI-Eilat. Moreover, in view of the proven excellence of IUI-Eilat, its annual budget should be substantially increased!