



## Large marine ecosystems training and capacity development



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### ABSTRACT

In this LME Commentary we outline best practices and challenges in education and training as essential elements of the Large Marine Ecosystems (LME) approach at the convergence of science and policy. Case studies are outlined for the Baltic Sea, Bay of Bengal, Western Indian Ocean and Celtic Sea - Biscay.

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### 1. Introduction by Gotthilf Hempel

In this LME Commentary we shall outline best practices and challenges in education and training as essential elements of the LME approach at the convergence of science and policy.

#### 1.1. What kind of capacity is needed?

Various types of experts are needed for the recovery and sustainable development of coastal ocean resources. +Scientists covering a broad range of natural and social sciences. +Communicators at the interfaces of science to society and politics. +Administrators for the implementation and governance of ecosystem-based management. They have to take into account the scientific advice as well as the societal and political needs and constraints. In this brief introduction I will focus selectively on the formation of human capacity in the natural and social sciences sectors.

#### 1.2. The TEMA concept for capacity building

In the 1960s the newly established Intergovernmental Oceanographic Commission (IOC) of UNESCO realised the great need of developing countries (and not only of those) for establishing their own marine science capacity. Under the acronym TEMA (training, education, mutual assistance) we developed concepts and action plans for capacity building in those countries along four lines: (1) Higher Education at local universities and at universities overseas through the provision of fellowships and lecturers, (2) Specific training in methods and techniques through short-term courses on a regional or

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global scale and – with a wider scope-through learning by doing in joint research projects and research cruises, (3) Communication through conferences, workshops etc., publications and electronic media.

Mutual assistance meant mainly the provision of scientific and technical advisors and of research vessels, instruments and books.

Along those lines we established in Germany the Center for Tropical Marine Ecology (ZMT) in Bremen. It may serve to elucidate various aspects of TEMA

### 1.3. The ZMT as a center for TEMA

In the 1980s, German scientists had shown a growing interest in research related to tropical ecosystems, their exploitation and conservation. However, German expertise in those fields was insufficient. So we prepared a blue-print for an institute for tropical marine ecosystem research in its broadest sense including also socio-economic aspects. Three major objectives were identified: (1) Education and training of German and foreign students, (2) Longterm Research projects in partnership with institutions in the tropics, (3) Coordination of German research activities in tropical coastal waters including participation in major international projects.

Teaching started in 1991 with special courses of one to two weeks mostly on ecological methods. They were held in Bremen and at partner universities abroad. Later on, Bremen University and ZMT introduced a two years masters course on tropical aquatic ecology including its human dimensions for foreign and German students alike. The course in English named *International Studies of Tropical Marine Ecology* (ISATEC) starts with one year of class work in Bremen followed by one semester at a partner university in a tropical or subtropical country, and by a final semester for writing the MSc thesis in Bremen.

About 250 students have graduated in ISATEC. Many of them continued as Ph.D. students in Bremen or elsewhere. Earlier or later, most returned to their home country for positions in research, administration or industry or they became professors at local universities. Recently, an interdisciplinary graduate school SUTAS (Sustainable Use of Tropical Aquatic Systems) was established jointly with tropical partners. Zanzibar is presently the focal region of the first group of German and local PhD students under SUTAS. Training in research projects have been taking place over the past twenty years. Medium to long-term research programmes have been developed by ZMT in Brazil, Red Sea region, SE-Asia, China and in the Benguela LME. Those projects combine multidisciplinary research with training of local and German graduates and junior scientists. A number of rules, known as the Bremen criteria, have been adopted. The partnership projects shall provide:

- a significant contribution to a scientifically important theme,
- bi- and multilateral planning and execution, fully recognizing the scientific and societal wishes, competencies and other potentials of the host country. The incorporation of expertise available at various institutes from both sides respectively as well as full participation and recognition of young scientists is wanted,
- a major contribution to strengthening the scientific capacity in the host country and its region, and to fostering long-lasting scientific relations,
- projects of long duration (1–2 decades) with regular mid-term evaluations and firm long-term financial commitment with contribution from the host country,
- links to regional and global programmes-so both partners can also in part fulfil their international obligations via such partnership projects,
- full integration into the scientific structures of the host country and its universities,
- exchange of knowledge with non-scientific stakeholders throughout and beyond research projects and in collaboration with local partners,
- unrestricted exchange of data and storage of data in international data banks,
- joint publications, preferably in international journals, and joint participation in international conferences and workshops, including many young scientists.

## 2. Capacity building in LMEs at global scale

Over the years, much human capacity and technical infrastructure within the LME projects was created through national efforts. Further support came from outside through UN funding and bilateral assistance, Meanwhile several splendidly equipped institutes for marine science and fisheries have been established in Third World countries and staffed with local scientists. Much could be achieved by making full use of the regionally existing scientific capacity by sharing it between LMEs. Preventing brain drain is another important issue. In many places there seems to be adequately trained scientific personnel in sufficient numbers, but it is often difficult to retain promising young scientists who are frustrated by poor income and lack of adequate support in their scientific career. Nevertheless new capacity is needed. In the following case presentations three questions were addressed:

1. What kinds of capacity have to be created for the different LME projects and for the LME movement in general?
2. What are the institutional conditions to make good use of human capacity in LME projects?

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