



## CAPACITY DEVELOPMENT STRATEGY 2025

# ZMT Capacity Development Strategy 2025

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Authors: Hildegard Westphal, Werner Ekau, Anna-Katharina Hornidge, Matthias Wolff

Cover: Participants in the winter school on »Ocean Governance for Sustainable Marine Ecosystems«, organised by ZMT and IOI. Photo: Jan Meier

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Leibniz Centre for Tropical Marine Research (ZMT)  
Fahrenheitstraße 6, 28359 Bremen, Germany

Tel. +49 (0)421 238 00-0  
Fax +49 (0)421 238 00-30

[www.leibniz-zmt.de](http://www.leibniz-zmt.de)



# Executive Summary

Following the mission of ZMT to provide a scientific basis for the sustainable management of tropical coastal ecosystems, we are deeply convinced that the internalisation and application of sustainability principles in management are connected intimately with a thorough and holistic Capacity Development (CD) at all societal levels. ZMT is contributing to this by strengthening academia in tropical, mainly developing countries putting special emphasis on the empowerment of women. ZMT has several ongoing and completed capacity development projects. We have shared the lessons we have learned through impact stories in the brochure ["CONCEPTS COLLABORATIONS COMMON GROUNDS: The impact of our work beyond research and academia"](#) (2019).

Sustainable management of their own resources requires a strong effort in tropical coastal countries to build human and infrastructure capacity that in most cases cannot be generated out of traditional structures. CD therefore means to support creating an academic and research environment that in the future is capable to reproduce and maintain itself, stimulate new developments and changes on the national level, and prepare institutions and people to participate actively in an international context.

We are convinced that the best way to achieve the goal of educating responsibly and holistically thinking and acting researchers is the combination of adequate training within scientific projects (*Theoria cum Praxi*), the *leitmotif* of the Leibniz Association and our *leitmotif* since the foundation of ZMT.

ZMT has been active for more than 25 years in training and education of master students in tropical marine ecology research and related disciplines, in guiding doctoral candidates towards careers in the field of ecological science or management, training-on-the-job of technical staff, and advanced training of young postdoc scientists through special courses and fellowships.

During the last 25 years, ZMT has trained some 450 master students (of those more than 330 from 62 countries in its special master program ISATEC<sup>1</sup>) and around 200 doctoral students. More than 800 ZMT alumni have registered in our database, and special effort is being undertaken to enhance the use of this strong network for developing further cooperation and projects. The majority of graduates of our training programs has reached influential positions at universities and research institutions (72%). Others found a job at Non-Governmental Organisations – NGOs (10%), national or international governmental organisations (10%), including United

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<sup>1</sup> Master Program "International Studies of Tropical Aquatic Resources Management" at Bremen University in cooperation with ZMT. From winter term 2020/2021 onwards, the M.Sc. programmes ISATEC and Marine Biology will be fused to form a single M.Sc. programme. ISATEC will be a specific study profile in the revised M.Sc. Marine Biology programme.

Nation agencies, or in the private sector (8%). We consider these alumni as multipliers of the principles of ZMT for sustainable development and cooperation in and with tropical coastal countries.

ZMT aims to continue and further develop this understanding of CD and strives for intensifying its activities at all levels, individual, organisational, and societal. The development of new tools for distributing information (e.g. e-learning formats, policy briefs), involvement of society in research (citizen science, environmental education), and creating ownership in communities (open access, open data) will be used to create a new era of knowledge exchange between science, organisations and society.

## Mission of ZMT

The mission of ZMT is to provide a scientific basis for the protection and sustainable use of tropical coastal ecosystems. In addition to advanced and cutting-edge research, a main means to fulfil this mission is a strong engagement in CD on individual, organisational and societal level. Therefore ZMT's vision statement in the field of CD is:

**Through international cooperation, implementing the adequate CD measures, and following its partnership ethics ("[Bremen Criteria](#)"), ZMT assists its partners in tropical countries in building up their own human and infrastructure capacities to address sustainability issues, saving their resources and developing their livelihoods.**

This contributes amongst others to the implementation of the UN Sustainable Development Goals, specifically Goal 14 'Life Below Water', as well as the Paris Agreement on Climate Protection. It is in line with global engagement and definition of CD as a **"Process by which people, organizations and society systematically stimulate and develop their capacities over time to achieve social and economic goals"**<sup>2</sup> by UN organisations related to the ocean, e.g. the Intergovernmental Oceanographic Commission of UNESCO (IOC-UNESCO) or the United Nations Development Programme – Large Marine Ecosystems (UNDP - LME).

ZMT in addition addresses strongly the achievement of ecological goals. In its capacity development activities it focuses mainly on academic CD, strengthening and multiplying the abilities of partners to conduct high-level academic research, to build up their own human capital, to improve data accessibility, and to make better

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<sup>2</sup> "Process by which people, organizations and society systematically stimulate and develop their capacities over time to achieve social and economic goals. It is a concept that extends the term of capacity building to encompass all aspects of creating and sustaining capacity growth over time. It involves learning and various types of training, but also continuous efforts to develop institutions, political awareness, financial resources, technology systems and the wider enabling environment" UNISDR (United Nations Office for Disaster Reduction)





Students learn about the work in the chemistry and biology laboratories at ZMT.

use of the available data. This is achieved by educating, training and mentoring young scientists, training of postgraduates and supporting south-south cooperation.

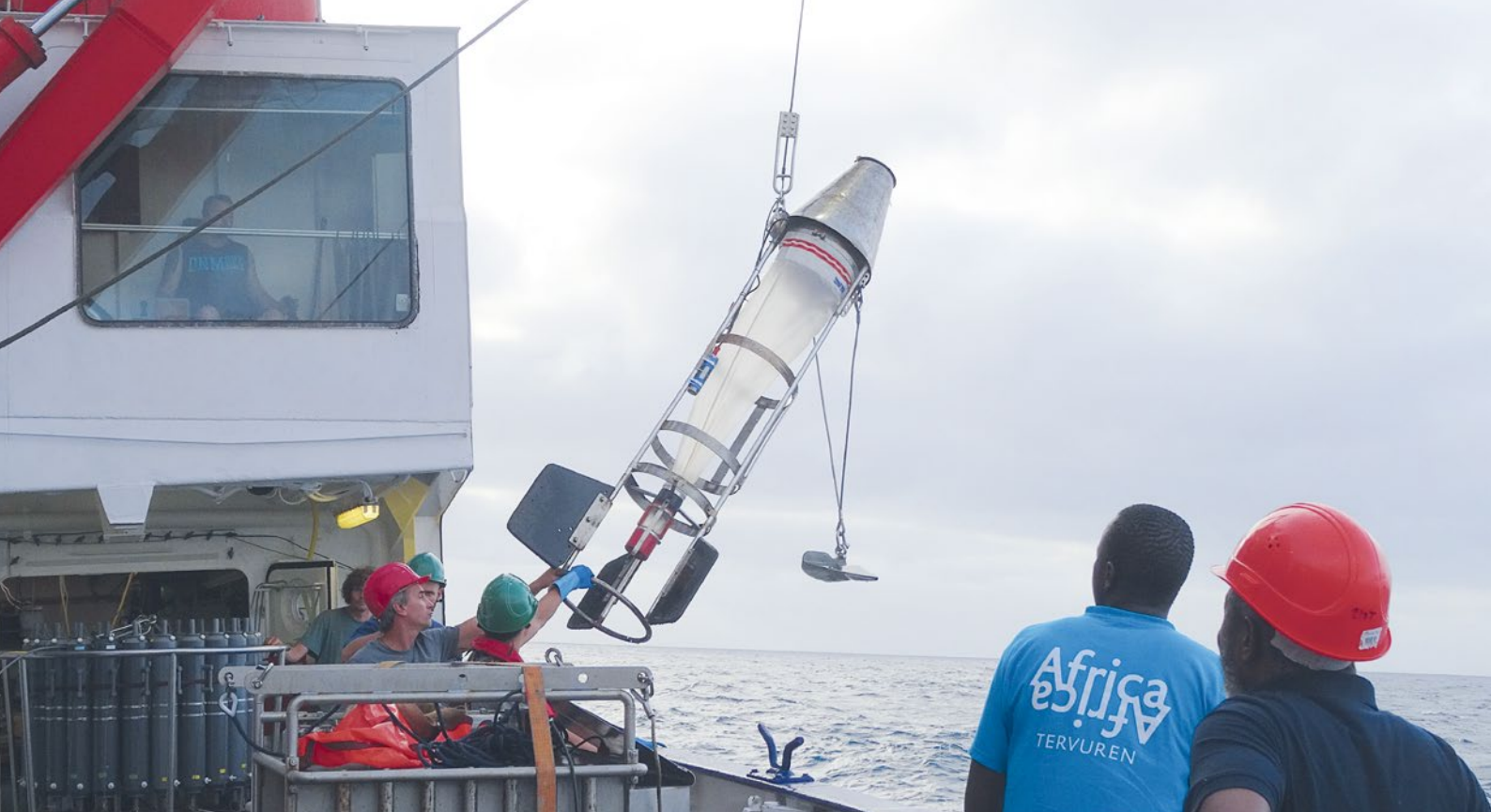
## Achievements and status quo

CD at ZMT covers a range of activities on the individual, the organisational and the societal level.

### Individual level:

Highest emphasis is put on the research-based academic **training of young scientists from master student level to young postdocs** from all over the world in an interdisciplinary research environment.

To address specific needs of expertise connected with the problems arising along tropical coasts and the management of their resources, ZMT has pioneered with the development of a tailor-shaped international and interdisciplinary training and education programme to allow for the joint education and training of German and



Doctoral candidates and postdocs are regularly participating in research expeditions on *RV Meteor* and other research vessels.

international students in tropical marine research. These programs address the Master of Science and Master of Arts level (e.g., ISATEC - International Studies in Aquatic Tropical Ecology, implemented jointly with the Bremen University since 1999) and doctoral studies. The aim of individual training is the familiarisation of candidates with research conditions in Germany as well as in tropical countries. This goal is reached by incorporating candidates in running research projects abroad and laboratory work at ZMT.

Experiences gained with the graduate school SUTAS (Sustainable Utilization of Tropical Aquatic Systems), funded by the Leibniz Association, have led to the development of a structured ZMT **Doctoral Programme**, coordinated by a doctoral studies circle comprised of representatives of all status groups of ZMT to guarantee the highest benefit and a long-term strategic planning of the doctoral studies at ZMT. The cooperation with other doctoral programs of universities in the Bremen region is essential to achieve our goals.

ZMT understands its role in CD as a hub for candidates and researchers from tropical countries. ZMT increasingly uses opportunities to host short-term and long-term **fellows funded by [DAAD](#)<sup>3</sup>, [HWK](#)<sup>4</sup>, [POGO](#)<sup>5</sup>, [UN-Nippon Foundation](#), [AvH](#)<sup>6</sup>, and the [NAM S&T Centre](#)<sup>7</sup>**, of which ZMT is a partner.

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<sup>3</sup> German Academic Exchange Service

<sup>4</sup> Hanse Wissenschaftskolleg, a center for advances studies

<sup>5</sup> Partnership for Observation of the Global Ocean

<sup>6</sup> Alexander von Humboldt Foundation

<sup>6</sup> <sup>7</sup> Non Aligned Member States Science and Technology Center, based in India

Another instrument in the CD strategy of ZMT is the training of students in partner countries by the **secondment of experienced ZMT scientists to partner institutes** (e.g lectures, short courses, summer schools, training-on-the-job etc.). This also includes courses in **scientific diving**.

**Cooperation projects** such as European COST Actions, EU Innovative Training Networks (ITNs), and ship-based research cruises, provide ample opportunity for young scientists to gain international experience and intercultural competence.

The ZMT Academy and its Office for Alumni Relations acts as a hub to offer additional and coordinated specific training, support and networking activities for early career researchers at ZMT. This includes courses such as a “Welcome Week” to all new and guest scientists, retreats on topics like science communication and general advice and social networking among research fellows at ZMT.

A strong instrument in its function as a hub is the **further development of ZMT’s Alumni Network**. This currently comprises more than 800 alumni from over 65 countries. This network is strengthened continuously by means of alumni meetings and conferences at ZMT and in the tropics. The events lay their focus on networking between the alumni and ZMT as well as providing information on third party funding opportunities and specific training offers. Alumni Ambassadors represent ZMT in their home countries, offer advice and low-threshold contact of interested students and scientists with ZMT. ZMT is keeping track of its alumni to assess whether the CD



Knowledge exchange is part of ZMT’s strategy on capacity development - as seen here in a meeting with students from Durban, South Africa.



activities need to be adapted or improved, and to strengthen the network in teaching and research institutions in the tropics.

## Organisational level

ZMT is prepared to transfer its scientific, technical and CD expertise into partner countries and organisations.

In partner countries and institutes abroad, **ZMT staff engages in teaching and training**. Moreover, ZMT contributes to the **development of curricula** at universities and research institutes in ZMT's partner countries<sup>8</sup>, to the training of young scientists on the job, e.g., in seagoing expeditions and the use of modern laboratory instruments, thereby enhancing the institutional capacities and strengthening the cooperation with the partner institutes. This includes activities based in the ZMT Academy supporting our alumni in their institutions by special training opportunities, such as alumni conferences at partner institutes of our alumni or cooperation in capacity development on data management and data science. The implementation of scientific diving standards and training in partner countries are one of the pillars of the **Scientific Diving Centre at ZMT**. General practices in scientific diving and safety measures are of utmost importance to ZMT and our partners. Our approach consists of different layers that cater to the needs of our partner institutions and range from basic health and safety training, train the trainer courses to helping implement scientific diving standards.

While the support for infrastructural development at partner institutions is not the focus of ZMT's CD strategy, the institute occasionally contributes here via larger integrated and multilateral research projects with international sponsors.

Regarding contributing its CD expertise to other organisations ZMT acts on national and international level:

On the **national level**, ZMT cooperates in research and CD with the University of Bremen, Jacobs University, University of Kiel, University of Hamburg, University of Oldenburg, University of Bonn, Max Planck Institute for Marine Microbiology (MPI), Alfred Wegener Institut (AWI), Thünen Institute for Sea Fisheries in Bremerhaven, Hochschule Bremerhaven, and others. ZMT is also a member of the [University Bremen Research Alliance](#) (UBRA) which includes eleven non-university research institutes and the University of Bremen.

Moreover, ZMT is a member of the [German Alliance for Marine Research](#) (DAM),

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<sup>8</sup> E.g. the International Master Program Indo-Pacific Coral Reef Biodiversity and Conservation (IPCRBC) at the University of Manado (Indonesia) which has now the first cohort of graduates.





ZMT held a conference on “Ocean Governance” at the Überseemuseum in Bremen.

which aims to strengthen the sustainable use of the coasts, seas and oceans through research, data management and digitalisation, infrastructure and transfer. To this end, the DAM is working together with its member institutions to develop solution-oriented knowledge and to communicate potential courses of action to politics, business and civil society. ZMT is also one of the member of the [German Marine Research Consortium](#) (KDM), which brings together the marine science expertise of its member institutions and collectively presents it to policy makers and research funding organisations as well as to the general public.

On an international level ZMT is a member of the [Partnership for Observation of the Global Ocean](#) (POGO) network and the [International Ocean Institute](#) (IOI) which engages both in capacity development activities.

Through these collaborations and networks, the hub function of ZMT in national and international networks for CD in tropical marine research is further developed and expanded.

## **Societal level**

The transfer of research results into societal fora and groups is seen as a prominent task of ZMT being an institution working at the forefront of transdisciplinary

social-ecological research. The provision of expert scientific advice to the various stakeholders in the tropical coastal regions is in the core of ZMT's advice activities.

A particular duty of ZMT is to give advice to the Free Hanseatic City of Bremen and the Federal Government of Germany as well as its representatives on the level of the EU on issues of marine research, especially its development as well as on matters of scientific cooperation with countries in the tropics. ZMT engages in advising the BMBF in agenda setting for coastal and marine research via the DAM and also KDM and directly, offers regular discussions with scientists to the members of the Bremen Parliament, and invites political representatives to visits to ZMT and its projects in the tropics.

ZMT is unique in its multi- and interdisciplinary expertise in the tropical belt. This expertise it shares with and is requested to provide to governmental bodies such as the Federal Ministry for Education and Research (BMBF), the Federal Ministry for Economic Affairs and Energy (BMWi), the Federal Ministry for Economic Cooperation and Development (BMZ), the Federal Foreign Office (AA), the German Intergovernmental Oceanographic Commission (IOC), the Federal Agency for Nature Conservation (BfN) and institutions (e.g. EU, G7). ZMT is also approached by a range of countries to coordinate research activities because of its neutral position and the mutual interest in sustainable research and development (e.g. Red Sea Programme coordinated by ZMT).

The creation of the **Office for Knowledge Exchange (OKE)** of ZMT mirrors this development. The OKE supports the issuing of Policy Briefs prepared jointly by ZMT and partner institutions, the organisation of discussion fora with politicians, the involvement of the ZMT alumni network to identify topical policy-relevant fields for research and CD, and consultancies for the private sector. OKE organises and supports cooperative projects for awareness and skill raising with development organisations, such as the *Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)*.

## Future Development

With the advancement of the institute over the last years and as a consequence of the admission to the Leibniz Association, ZMT is now well prepared to further develop inter- and transdisciplinary research in its projects, and transfer results into a holistically directed training of our students and young scientists.

This approach is aimed to generate scientific minds that overcome sectoral



thinking, and are able to transfer inter- and transdisciplinary cooperation into research and development projects on international and transnational level. ZMT has been a driver in this field since its beginning and has set another milestone with the implementation of the Office for Knowledge Exchange and the ZMT Academy. Both bundle CD activities across sectors, departments and discipline. A consequent further development of this approach is our aim.

By hosting the head International Project Office of Future Earth Coasts, ZMT actively contributes to an international community of coastal sustainability researchers and practitioners. Through this community, opportunities for networking, learning and capacity development will be offered by various means, e.g. mentorships, working groups or demonstration projects

The “Digital ZMT (DigiZ)” initiative which is an extension of the institute with a new section dedicated to data science and based on the principles of open access, open data, open research design, and citizen science. ZMT links the DigiZ activities as a new thematic focus of our capacity building activities by involving our partners and alumni and developing together training material.

ZMT social scientists interviewing local fishers and shell collectors on Zanzibar.







ZMT organised an international summer school on the „Ecology of Eastern Boundary Upwelling Systems (EBUS)“ in Saint-Louis, Senegal. Many early career researchers took part in the week-long event in Saint-Louis, Senegal.

The implementation of the CD Strategy of ZMT is understood as a dynamic process continuously discussed and reflected against the needs arising from scientific, societal and political developments in Germany and tropical partner countries.

### **Individual level**

ZMT will continue its activities in academic training at master and doctoral studies level and postdoctoral fellows as the heart of its CD programme. We will take advantage of the technical developments to distribute teaching content via internet (e-learning and blended learning formats) and to reorganize data acquisition, storage, and access (citizen science, DigiZ). The NAM S&T fellowship program, DAAD programs, POGO-program and AvH and HWK fellows will be included even more efficiently and strategically to bring cooperation partners to ZMT and strengthen our network in order to allow for long-term CD in joint projects. They will also be encouraged to publish their views in the working paper series of ZMT.

Technical and soft skills will receive more attention in training and education programs, as these are often the highest hitches for scientists from developing countries to work and publish with colleagues from industrialised countries on equal footing. Scientific diving, data management, scientific writing and conference presentations are some of skills to be taught. With the start of the



DigiZ programme competence development in the field of data cooperation will be strengthened. New working groups in data management and data science will strengthen the focus on capacity development in the field of research data.

On the local level in Bremen, ZMT engages more and more in accepting trainees in technical and administrative fields to increase an open and intercultural mind also in young German citizens.

The envisioned recruiting of new scientific workgroup leader positions within the next few years will provide the opportunity to shape the existing activities and programs and further tune the structure and content of courses. The new group of Fish Ecology and Evolution, for example, can strengthen the cooperation with the Biodiversity Centre in Oldenburg and corresponding training and research capacities.

## Organisational level

ZMT will continue its active role in shaping university curricula in partner institutions and support teaching activities in this context. At the same time, we are exploring new methods for teaching that reach out in areas not easily serviced with teaching via traditional approaches. This includes the development of e-learning formats together with partner institutions (from MOOCs to blended learning concepts).

ZMT also proposes CD formats to donors. With this we try to implement unconventional tailor-shaped CD formats such as tandem supervision programs urgently needed to support academic personnel, for example at African universities. Joint field stations are also part of this strategy. With this we aim at reducing blockades in the academic systems in our partner countries.

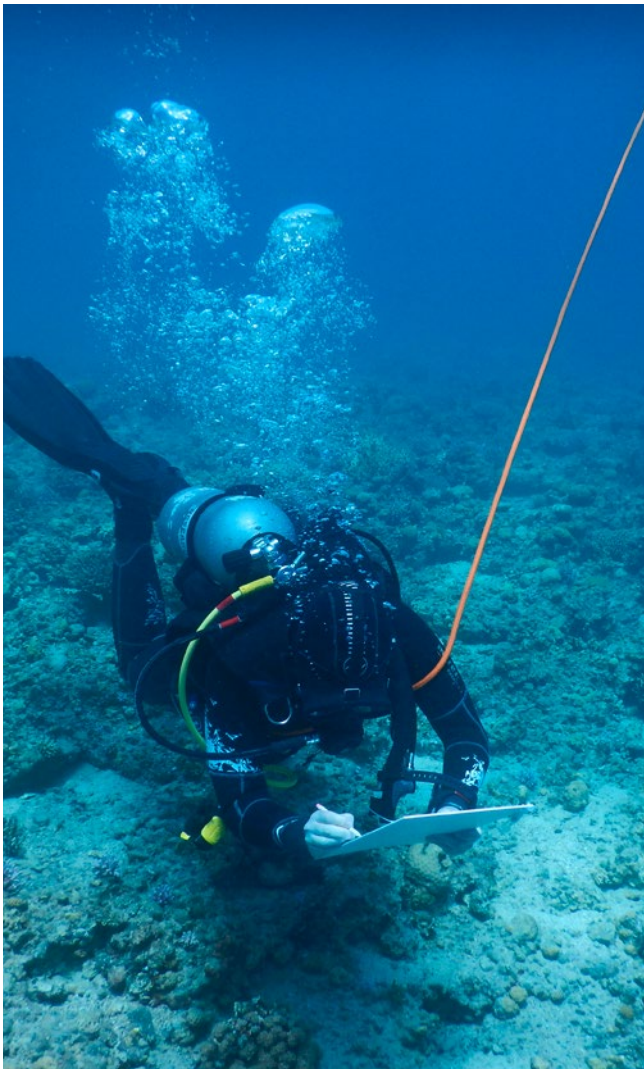
ZMT will continue and strengthen its engagement in international CD programs such as those of IOC and IOI.



ZMT scientists are using coral cores as archives to document climate change.

## Societal level

We strongly believe in the importance of science diplomacy. Science diplomacy is necessarily based on respect and serious interest in the needs of the stakeholders in the partner countries. We are convinced that embedding our research in the societal context of the partner country from the first steps of planning is imperative for useful and sustainable science in our field. Dialogue on eye-level is the very basis of this approach, and this includes CD activities where required. On the international level, we are increasingly active in informing the non-scientific stakeholders via policy briefs and multi-stakeholder workshops. On national level, our future activities will include the continuation of public information activities as well as visits of school pupils to our premises.



Scientific diver taking notes as part of a dive expedition in Eilat, Israel.

## Expected outcomes

In the next years, we will further develop our CD activities according to our CD strategy, concentrating on our core goals. Derived from this, we expect the following outcomes:

### Individual level

We expect to see the completion of 20 MSc and MA degrees per year embedded in ZMT research. Completed doctoral degrees will amount to 15 per year, these numbers include 50% of students from tropical countries.

Training on the job in field and laboratory work will involve 15 persons per year, while short courses and summer/winter schools, including alumni workshops, on special topics will see participation of more than 25 per year. Here again this will include 50% participants from tropical partner countries. We expect to host five NAM S&T fellows from tropical countries and five other fellows per year.

## Organisational level

In the field of cooperation and support in the development and implementation of university curricula in marine science at partner universities, the outcome depends on the requests from the partners.

The ZMT Scientific Diving Centre will further implement scientific diving standards and training in Germany and tropical partner countries alike.

Our engagement in the development of CD strategies of international organisations is expected to lead to a footprint in the following international organisations: G7, International Indian Ocean Expedition (IIOE), Intergovernmental Oceanographic Commission (IOC), International Ocean Institute (IOI).

## Societal level

ZMT working groups with the support of the Office for Knowledge Exchange will undertake about six workshops for stakeholder engagement per year in the next years. It will issue about five Policy Briefs per year.

After having gained experience in advising EU bodies (EU Commission, Parliament) and engagement in activities such as the EU Ocean Conference in Malta 2017, we will continue to explore this field actively. Also we will continue to participate in agenda setting processes of the Federal Ministries in Germany where possible (e.g. Mare:N of BMBF).

We will continue to provide consulting to various societal actors and specifically engage with policy actors through various avenues. This includes hosting the annual science-policy forum "Leibniz in der Bremischen Bürgerschaft"

ZMT in the future will continue to respond to the requests of relevant panels, administrative bodies, development organisations, and fora from Germany and our partner countries and actively further the exchange with these institutions in order to strengthen the relationships, provide information, identify the needs, and explore collaboration possibilities.

Bremen, November 2020



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**ZMT**   
**LEIBNIZ CENTRE**  
for Tropical Marine Research

Leibniz Centre for Tropical  
Marine Research  
Fahrenheitstraße 6  
28359 Bremen / Germany

Telephone: +49 (421) 23800-0  
Fax: +49 (421) 23800-30  
Email: [contact@leibniz-zmt.de](mailto:contact@leibniz-zmt.de)  
[www.leibniz-zmt.de](http://www.leibniz-zmt.de)

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