PROPOSAL FOR THE ESTABLISHMENT OF A UNESCO CENTER FOR MARINE BIOTECHNOLOGY, MARICULTURE AND OCEAN SCIENCES IN THE ASIA-PACIFIC REGION (UCMBMOS-APR) AT THE MARINE SCIENCE INSTITUTE OF THE UNIVERSITY OF THE PHILIPPINES DILIMAN AS A CATEGORY 2 CENTRE OF EXCELLENCE UNDER THE AUSPICES OF UNESCO

December 2019

EXPLANATORY NOTE

Introduction

A proposal to establish the UNESCO Center for Marine Biotechnology, Mariculture and Ocean Sciences in the Asia-Pacific Region (UCMBMOS-APR) at The Marine Science Institute of the University of the Philippines Diliman, Quezon City, Philippines is submitted to the Executive Board at its session by the Permanent Delegation of the Philippines to UNESCO.

This initiative is in support of UNESCO's overarching goals to promote education and foster scientific and cultural cooperation among UNESCO member states.

It addresses the United Nations' 17 Global Goals for Sustainable Development or Sustainable Development Goals (SDGs) to be achieved by 2030, particularly: 1: No Poverty, 2: Zero Hunger, 3: Good Health and Well-being, 4: Quality Education, 8: Decent Work and Economic Growth, 9: Industry, Innovation and Infrastructure, 11: Sustainable Cities and Communities, 13: Climate Action and 14: Life Below Water.

It takes cognizance of the United Nations' proclamation of the Decade of the Ocean Sciences for Sustainable Development (2021-30) "to support efforts to reverse the cycle of decline in ocean health and gather ocean stakeholders worldwide behind a common framework that will ensure ocean science can fully support countries in creating improved conditions for sustainable development of the Ocean. The marine realm is the largest component of the Earth's system that stabilizes climate and supports life on Earth and human well-being…"

It supports several major initiatives under the Philippine government's medium-term and long-term development plans, embodied in the documents Philippine Development Plan 2016-222 and *AmBisyon Natin 2040*, respectively, which have goals that are fully aligned with the U.N.'s 17 SDGs.

It recognizes the Philippines as the center of marine biodiversity in the world, and as an archipelagic nation with rich coastal and ocean resources. Through research at the University of the Philippines, the country has also established itself as a strong leader with significant accomplishments in biotechnology, mariculture and ocean sciences. Thus, the Philippines has great potential to lead the Southeast Asian and Asia-Pacific regions in developing marine resources through marine biotechnology to build a vibrant, robust marine economy or "Blue Economy".

However, stark contrasts still exist in Philippine society. While the country has sustained remarkable economic growth in the last 5 years, growth and development are non-inclusive, and poverty, hunger and poor education persist in rural areas especially in marine coastal communities. Fisher folk remain one of the poorest sectors of Philippine society.

Clearly, challenges and opportunities exist to increase productivity, reduce hunger and provide better livelihood in these communities through the application of marine biotechnology and its derivatives.

The urban centers of the Philippines serve as a cultural and education nexus with several top caliber universities led by the national university – the University of the Philippines (U.P.) System - attracting the best and brightest Filipino academics, researchers and students from all over the country. Of late, U.P. has risen steadily, significantly, in the Times Higher Education world university rankings. U.P. leads in performance not only in the natural, physical and engineering sciences, but also in the social sciences, the arts and humanities.

U.P.'s performance reflects the Philippines' great potential to take a leadership role in the Southeast Asian and Asia-Pacific regions, based on the unique advantage of English language proficiency of majority of Filipinos, combined with their in-depth, blended understanding of Eastern and Western cultures.

In this scenario, a UNESCO Center of Excellence Category 2 would thrive and flourish in the U.P. System's leading research and public service institute – The Marine Science Institute in U.P. Diliman (UPMSI) - which has demonstrated capability to effect societal change through its R&D and extension work in marine coastal communities. Established in 1974 as the Marine Sciences Center led by its founding Director National Scientist Edgardo D. Gomez for 26 years, the UPMSI grew to become a full-fledged research and postgraduate degree-granting institute founded on high ethical and scientific standards.

Through the years, UPMSI has been the top contributor to new knowledge generation in the U.P. System, publishing research papers in international journals and filing patent applications for discoveries. It has the greatest number of National Scientists and Academicians of the Philippine National Academy of Science and Technology (NAST) and of internationally awarded scientists, in a single academic unit of U.P. Most notable is National Scientist Lourdes J. Cruz who received the 2010 UNESCO L'Oreal Laureate Prize for Women in Science.

MSI's marine scientists have contributed to community development through restoration of critical ecosystems such as coral reefs, and the conservation, restocking, culture and propagation of endangered species and high-value marine organisms such as giant clams, sea urchins, sea cucumbers and seaweeds. Marine physical and chemical oceanographers have led expeditions to study uncharted waters in the Philippine or Benham Rise and the *Kalayaan* and Spratly Islands, and they serve as influential consultants of government agencies on climate change. Marine population geneticists are studying the impacts of temperature and other geo-physico-chemical

factors on coral reefs and other benthic and pelagic marine organisms. Marine biotechnologists and biodiversity scientists have led in the discovery of new marine organisms and associated bacteria, and the development of novel bioactive compounds for biomedical applications.

Many graduates of UPMSI's postgraduate degree programs, as well as UPMSI workshop trainees, hold important positions as leaders and administrators in government agencies and NGOs, or now lead as faculty and researchers in other universities in the country. The tremendous public impact of UPMSI's postgraduate education, research and public service programs is highly recognized with national and international awards received by UPMSI.

In 2020, the new MSI Extension Building-MBRIS will be completed. MBRIS (Marine Biodiversity Resources and Information System) will significantly augment the facilities of the current MSI Building, providing space for a museum, exhibits and archival specimen collections, more lecture and conference rooms, research and training laboratories, and offices for our emeritus faculty and international linkages.

Establishing the UCMBMOS-APR in UPMSI is thus timely. It would further enhance UPMSI's global visibility and provide support for its far-reaching programs.

Overall, the future bodes well for the Philippines. It leaped 19 places to 54th out of 129 economies and posted a significant jump in its ranking in the 2019 Global Innovation Index (GII), with improved performance in almost all metrics, including Institutions, Human Capital & Research, Infrastructure, Business Sophistication, Knowledge & Technology Outputs and Creative Outputs. Innovation weaknesses lie in its limited number of global R&D companies, low expenditure on education, low number of scientific and technical articles and low number of new businesses, among others.

While UCMBMOS-APR would benefit from the research-enabling environment that is finally being put in place in the Philippines, UCMBMOS-APR would be proactively contributing to reducing the country's innovation weaknesses and further improving its Global Innovation ranking through the development of a Blue Economy.

Objectives and functions

The UPMSI Center for Marine Biotechnology, Mariculture and Ocean Sciences in the Asia-Pacific Region (UCMBMOS-APR) is being proposed as a UNESCO Category 2 Center of Excellence that will focus on human capacity building in marine biotechnology and other marine sciences in the Philippines and the Southeast Asian and Asia-Pacific region.

The end in view is to build a cadre of highly-trained R&D personnel and a management workforce in the fields of marine biotechnology, fisheries and ocean sciences. This is a critical need to address if the Philippines, is to leapfrog marine R&D and innovation, and create a vibrant, productive and sustainable "Blue Economy" in the region.

Jumpstarting high level marine R&D in the region through the UCMBMOS-APR training program

As a first line of engagement, the center will offer twenty-three (23) certificated, short and medium-term training courses. These will be conducted in English and will cover various interrelated topics. Each course will consist of didactics on basic integrative concepts and principles, and hands-on training in laboratory-based, field-based and shipboard methods.

A short course will be conducted for 4-5 weeks, and a medium-term course, for 8-10 weeks. Each course will be designed with a process- and outcomes-based, eased or enabled interactive mode of teaching-and-learning, with face-to-face and on-line didactics, and a strong hands-on, experimental component, including a problem solving-based mini-project for the medium-term courses.

A course syllabus, outline, modules, suitable research references and other reading materials, multiplatform materials, as well as an evaluation instrument with a teaching-and-learning performance matrix (where the trainer and trainee evaluate each other) will be prepared for each course. A certificate of satisfactory training, of acquired competencies and skills (without a numerical grade), will be given to the trainee at the end of the course.

UPMSI has the complement of faculty and researchers who have the required expertise to conduct these training courses, with contributions from other experts, i.e., local and foreign research collaborators or visiting professors. Each course will be handled by a team of at least two experts to ensure that students are exposed to the combined broader knowledge and expertise of the team.

Aside from producing trained personnel, trainings would foster trans-national, cross-border scientific discourse, research cooperation and collaboration, and also promote camaraderie and socio-cultural understanding among marine workers and advocates in the Southeast Asian and Asia-Pacific region.

The proposed major and specific areas of training are:

1. Marine ecosystem management and restoration (3)
   1.1. Giant clam culture, handling and restocking
   1.2. Coral culture, stock assessment and restoration
   1.3. One-ecosystem (human community, reef-to-ridge) integrative development

2. Sustainable use of marine bio-resources (8)
   2.1. Marine Protected Area (MPA) and fisheries management and governance
   2.2. Seaweed culture and farm management
   2.3. Sea cucumber and sea urchin culture and farm management
   2.4. Microbial diversity, symbiosis, culture and characterization
   2.5. Bioactive marine-derived compounds: purification and characterization
   2.6. Bioassays for cancer, infections, and neurological conditions
   2.7. Ecological and marine culture propagation assays
   2.8. DNA barcoding/fingerprinting

3. Baseline information and infrastructure for monitoring and protection of marine bio-resources (7)
   3.1. Oil fingerprinting, forensics and cleanup
   3.2. Oil biodegradation, carbon tracking and pollution cleanup
   3.3. Marine ground water survey and movement
   3.4. Coastal erosion assessment
   3.5. Submarine hydrothermal vents detection
   3.6. 3D printing and additive manufacturing for aquaculture and marine fisheries facilities
   3.7. Small-scale community cellular networks and sensors for developing business models for long-term sustainability

4. Public education, information and communication system for protection and sustainable use of marine bio-resources (5)
   4.1. Ecotourism of high biodiversity marine and associated terrestrial ecosystems
   4.2. Marine plastics and other waste pollution, mitigation and management
   4.3. Detection and monitoring of harmful, pathogenic and invasive species
   4.4. Control of biological and chemical pollutants
   4.5. Marine science multiplatform communication and dissemination

The training program will be actively promoted and publicized through the UPMSI website and through other channels and networks in the Philippines and the Southeast Asia and Asia-Pacific region. UCMBMOS-APR will aim to attract and train postgraduate students, teachers and researchers from the best SUCs (State Universities and Colleges) and private HEIs (Higher Education Institutions) in different coastal regions of the Philippines and surrounding regions.

The center will also offer to train political leaders, government agency and NGO managers, administrators and advocacy leaders, who are interested in or are already involved in managing and developing marine bio-resources in marine coastal areas, marine protected coral reef ecosystems and the surrounding oceans. Certificated training would greatly contribute to the career development of the trainees.

UCMBMOS-APR would offer to the region and the world the richest, most biodiverse coastal marine environments of the Philippines, as its unique training ground.

Training as the major and regular first-line activity of UCMBMOS-APR will ensure the financial sustainability of the UCMBFOS-APR as training fees will be charged to cover direct and indirect costs. Standard living accommodations for the trainees will also be packaged and managed by the center.

The schedule of training courses will be announced a year in advance, and a number of courses under each of the 4 training categories will be offered annually. A survey of courses to determine which are in great demand will be conducted periodically. Promotional packages and discounts will be offered to attract groups of trainees to enroll. The course team will devote a lead time of 6 months to plan and design a course, produce course materials, aggressively market the course and recruit trainees.

[If this proposal will merit a full feasibility study, the course syllabi, other course materials and course trainers will be submitted as an integral part of the full-blown UCMBMOS-APR proposal. Approval of courses by the UNESCO will hopefully be used as basis for issuing a UNESCO certification of training.]

Promoting UPMSI's PhD, Masters and Professional Masters programs through the UCMBMOS-APR training program

During the training, trainees would also be exposed to the postgraduate programs of UPMSI. Training courses could then serve as initial attractant to pursuing more in-depth postgraduate studies in marine biotechnology and other marine sciences. Overall, the training program would provide great potential to increase the visibility of UPMSI's faculty, research output and postgraduate programs.

Building and strengthening model STI (Science, Technology and Innovation) marine ecosystems through the UCMBMOS-APR training program

Most importantly, the trainees will be greatly inspired to work together to pursue research on marine bio-resources and the marine environment. Trainees would become part of a network and there would be a greater capacity for them to propose and implement interdisciplinary R&D projects together. An alumni association of training graduates will be created for this purpose.

Furthermore, R&D collaborations will continually be forged among expert scientists in UPMSI, their existing local colleagues and global collaborators from UNESCO Member States, and the newly trained researchers and their supervisors from the coastal regions of the Philippines and the Southeast Asian and Asia-Pacific region. This would be an effective way to grow the number of marine researchers working together in the region addressing the same or similar challenges and exploring each one's unique niches for development using the same or similar strategies.

Ultimately, the goal is to showcase ~three (3) model STI ecosystems in selected marine coastal communities based on a holistic, integrated approach to community development, involving the production of low-, medium- and high-value marine biotechnology products, while managing and protecting the carrying capacity of the marine environment. Model STI sites will be carefully selected based on ongoing, moderately successful, sufficiently funded projects of UPMSI, with clear potential for further growth and development. The establishment of other model STI marine ecosystems in the Southeast Asian and Asia-Pacific region will be strongly encouraged.

To reiterate, marine biotechnology R&D programs in these communities would have as its seedbed and spring board the ongoing funded R&D programs of UPMSI researchers, which would then leverage on UCMBMOS-APR's designation as a UNESCO C2 Center of Excellence, that would attract more funding and other forms of support, to pursue more inclusive, S&T knowledge-based growth and development in these marine communities.

Among the candidate sites for STI marine ecosystems directly contributing to developing a Blue Economy are the following:

1. For “One-Ecosystem” ecotourism: great potential is presented by the municipalities of Abra de Ilog, Occidental Mindoro, and Puerto Galera, Oriental Mindoro, situated in the Verde Island Passage (VIP) south of the main island of Luzon. The VIP is a recognized global center of marine biodiversity. A “One-Ecosystem” complex systems approach for research and management intervention has been introduced in Abra de Ilog, with its significant indigenous human population (the Iraya Mangyan) and its diverse natural landscape consisting of mountain ranges, forests, rivers, coral reefs and other coastal habitats, and the associated agricultural systems. Efforts at marine protection go hand-in-hand with agroforestry and organic agriculture, as well as the promotion of traditional handicrafts such as weaving, making use of native vines.

2. For Integrated Multitrophic Aquaculture (IMTA): seagrass meadow restoration and management, seaweed, sponge, coral, giant clam and fish culture and propagation are ongoing in Bolinao, Pangasinan, in Lingayen Gulf, northwestern Luzon, site of UPMSI’s Bolinao Marine Laboratory. The waters off Bolinao are widely used for commercial aquaculture, which has led to declining water quality and occurrence of unwanted algal blooms. The area is suitable for employing IMTA to improve efficiency, reduce waste and promote bioremediation. Other sites suitable for IMTA of giant clams and corals are Dauis and Anda in Bohol, central Visayas.

3. For mangrove ecosystems R&D: integrated sea cucumber mariculture and mangrove shipworm symbiont-based biotechnology development in Mulanay, Quezon in Tayabas Bay, southern Luzon offer a unique advantage brought about by the support of local government officials, NGOs, and community members to carry out multi-disciplinary and exploratory research to enhance ecosystem services, e.g., improved coastal protection and bio-resources for drug discovery and development, provided by the rich mangrove forest in the area.

4. For biodiversity ecotourism, molluscan megadiversity and ecology studies, mollusk-based drug discovery and development: Panglao, Bohol and Mactan, Cebu in central Visayas are the world’s center of molluscan biodiversity. Currently, UPMSI’s molluscan biodiversity studies involve using simple technologies developed by fisher folk communities to support a thriving commercial shell and tourist industry. The program also involves community outreach and research training of K11-12 teachers and students in a high school in Jagna, Bohol.

5. For Marine Biological Observations Systems (MBOS): in Bolinao and Palawan, the center aims to establish long-term monitoring stations to look at correlations between changes in biological communities and changes in the environment associated with anthropogenic activities and climate change.

In each of these locations, UPMSI already has proposed livelihood enhancement programs, strong linkages with the community, local fisher folk, cooperatives, LGU (local government unit), SUCs (State Universities and Colleges) and high schools and actual or potential industry and NGO partners.

Other candidate STI sites would be the best performing MPAs (Marine Protected Areas)/Coral Reef Ecosystems established by UPMSI and collaborating government agencies and NGOs all over the country. Under UCMBMOS-APR, MSI would seek more collaborations with scientists and partnerships with industries.

[If this proposal will merit a full feasibility study, implementation plans for the development of these STI marine ecosystems will be submitted as an integral part of the full-blown UCMBMOS-APR proposal. Approval of these sites by the UNESCO will hopefully be used as basis for UNESCO recommending or endorsing global industry and NGO partners for each of these sites.]

Strengthening collaborations with marine scientists in UNESCO member states

UCMBMOS-APR will actively seek new expert collaborators from UNESCO Member States, aside from strengthening existing foreign collaborations, to carry out its growing programs.

Forging strong linkages with local academic institutions and with industry

First and foremost, UCMBMOS-APR will seek support from the UPD College of Science (CS) and other CS units such as the Institute of Chemistry, Institute of Biology, Institute of Environmental Science and Meteorology, and the National Institute of Physics.

The UPD CS leadership operates the college based on synergy or free flow and sharing of faculty and research expertise among its units. In particular, UCMBMOS-APR will rely on training from the UPD CS Computational Science Research Center (CSRC) for data archiving and data analytics of the massive data that it will obtain from various projects.

Also, UCMBMOS-APR will use and promote the use of UPD CS' scientific instrument package known as VISSER (Versatile Instrumentation System for Science Education and Research, consisting of 40 instruments and 4 laboratory manuals) as part of its advocacy to train community folk, local managers, students and researchers in quantitative, experimental science in the field and in laboratories.

The center will also strengthen linkages with other U.P. constituent units such as U.P. Visayas and U.P. Cebu which are located in coastal areas in the Visayas and are already involved in some UPMSI programs.

UCMBMOS-APR will seek cooperation with other local institutions such as the Asian Institute of Management (AIM) which is strongly linked with local and foreign entrepreneurs and industries, De La Salle University (DLSU) which engages in marine biotechnology development, and the Ateneo de Manila University (ADMU) whose Bachelors graduates in environmental science are natural feeders into UPMSI's postgraduate program.

UCMBMOS-APR will also tap the expertise of local and foreign-based Filipinos who are members of the Philippine-American Academy of Science and Engineering (PAASE). Foreign-based

PAASE experts based in universities in the United States and elsewhere in the world are already working closely with their counterparts in U.P., NAST, the Department of Science and Technology (DOST) and Department of Trade and Industry (DTI) towards creating STI ecosystems in key regions of the country.

Enabling marine biotechnology-driven community development by linking with mobile communications service in rural areas

To ensure reliable telecommunications in remote rural coastal areas and between these rural areas and urban centers of research, technology and industry, which is critical to creating close partnerships among stakeholders in the STI marine ecosystems, UCMBMOS-APR will make use of a telecommunications system called Village Base Telecommunications Station (VBTS) developed by the UPD College of Engineering with research funding from the Philippine Commission on Higher Education (CHED). U.P. VBTS is now in partnership with the Philippines' largest telecommunications company Globe Telecom.

Multiplying impacts of UCMBMOS-APR through an interactive website, internet TV and open, distance e-learning/training

UCMBMOS-APR has great leverage to publicize its efforts and create a multiplier effect. In particular, the UPMSI website will be transformed to world-class quality, prominently highlighting UCMBMOS-APR and providing interesting and updated information on its training program, researchers and publications, affiliated research programs, and instruments and facilities.

U.P.'s internet television TV-UP will feature a video on UCMBMOS-APR as a UNESCO CC2 Center of Excellence and also selected course materials from UCMBMOS-APR's training programs. As part of an on-line Master's degree program on ASEAN Studies offered by the U.P. Open University (UPOU), a course on ASEAN Science & Technology is being taught by a UPMSI faculty. Topics such as building STI marine ecosystems in relation to attaining the U.N. SDGs and as a model for pursuing UNESCO's goals of education, scientific and cultural cooperation, will be included in this course.

UCMBMOS-APR Expected Outcomes

The expected outcomes over five years would be:

1. significant number of certificated training graduates in every training category from the Philippines and the Southeast Asian and Asia-Pacific region
2. improved public information and dissemination of UCMBMOS-APR programs
3. increased enrollment in the postgraduate courses of UPMSI
4. increased research funding and significant expansion of UPMSI research programs
5. increased number of foreign collaborators and visiting professors in UPMSI from UNESCO member states
6. increased number of research publications with multi-institutional co-authors

7. significant improvement in community livelihood through income-generating marine biotechnology projects in three model coastal communities
8. greater engagement of UCMBMOS-APR with LGUs, SUCs/HEIs, fisher folk and coastal community cooperatives
9. establishment of linkages with local and global industries
10. growth and development of early- to medium-stage STI marine ecosystems in the Philippines and the Southeast Asian and Asia-Pacific region

Existing or future legal status

The U.P. Marine Science Institute (UPMSI) is a National Center of Excellence in the Marine Sciences, established and recognized through Philippine Presidential Order Proclamation No.51 in 1994, and it has remained the Center of Excellence for the Marine Sciences under the Philippine Commission on Higher Education (CHED) since 1998. The institute was recognized as a Regional Center of Excellence in Coral Reef Research and Marine Protected Areas by Partnerships in Environmental Management of the Seas of East Asia (PEMSEA) in 2013. MSI is one of eleven (11) institutes in the College of Science of the University of the Philippines Diliman. In 2006, Philippine Executive Order 583 established the National Science Complex in U.P. Diliman and allocated funding of PhP1.7Billion over three years to build new infrastructure and facilities for institutes in the U.P. Diliman College of Science.

UPMSI would seek approval from the U.P. Board of Regents, the highest governing body of the U.P. System, to officially host the UCMBMOS-APR.

A critical aspect that will be examined by UNESCO is whether UCMBMOS-APR will serve the Asia-Pacific Region and not just the Philippines. To achieve this goal, key UNESCO Member States in the region will be encouraged to become part of UCMBMOS-APR, in which case they would partake in the finances of the center and participate in its governance based on the directives that are put together by the center. The proper legal and financial structure that would allow this arrangement will be worked out with U.P. System and the Philippine government. UCMBMOS-APR will establish a legal personality that will allow it to draw legal contracts and enter into MOAs, MOUs or partnerships independently under the auspices of U.P.

Management, governance and advisory teams

UCMBFOS-APR's projects will be implemented and managed by a UC Executive Team (UCET). Governance and oversight will be the responsibility of a UC Board of Governors (UCBG). Guidance and directions will be provided by a UC Advisory Committee (UCAC).

At the onset, UCET will consist of ~9 faculty members of MSI led by an Executive Director (ED) and a Deputy Executive Director (DED). These faculty members have signified interest in active involvement in UCMBMOS-APR through their ongoing projects. One member will serve as the finance officer. To distribute the workload and responsibilities equitably among the members, as well as to ensure smooth transition and continuity, the two leaders will serve for one year, after

which the DED assumes the ED position, and a new DED is selected. UCET members will serve a term of 3 years and can be reappointed by the UCBG for another three years.

UCET will have the following functions:

1. plan and implement the training program and STI marine ecosystems program
2. raise funds and manage finances for the training program, research and outreach, website, meetings and other activities
3. publicize and promote the center's activities
4. coordinate involvement of scientists from UNESCO Member States with the center's training program and research projects
5. identify priority community-based marine biotechnology projects
6. coordinate linkages with other Philippine academic institutions and with industries
7. implement metrics to monitor performance
8. reevaluate the vision, mission and implementation plan of the center periodically
9. prepare an annual accomplishment report to be evaluated by UCBG and UCAC.

To be efficient and economical, management will be streamlined and will rely on regular, frequent face-to-face and on-line meetings of the UCET and on on-line archiving of records and reports.

The UCBG will lead in democratic and consultative governance of UCMBMOS-APR. UCBG will consist of 7 core members consisting of representatives from the UNESCO, Philippine Department of Science and Technology, Department of Foreign Affairs, National Economic Development Authority, U.P. System and the UPMSI Director and UCMBMOS-APR Executive Director.

UNESCO Member States in the region who wish to become members of UCMBMOS-APR will indicate their wish formally in a letter and once they become members, they will partake in the financing of the center based on the directives that the center will put together. As indicated above, a proper legal and financial structure will be established to allow membership in UCMBMOS-APR and representation in the UCBG.

The UCBG core members will have the following functions:

1. provide guidance, goals and directions to UCET on the center's various projects and activities
2. monitor and evaluate the various projects and activities of the center
3. approve the proposed annual budget of UCET
4. monitor the expenditures of UCET
5. monitor the management by UCET
6. evaluate the annual report of UCET
7. approve the reappointment of UCET members
8. establish terms of engagement on projects and financial responsibility for UNESCO Member States interested to join the center, including annual membership fees
9. evaluate and decide on the applications for membership by UNESCO Member States

UCBG members representing UNESCO Member States will have the following functions:

1. ensure financial contributions to the center
2. ensure implementation of funded projects as part of the center
3. ensure collaborations with Philippine-based projects
4. contribute to the discourse with UCBG core members on all matters pertaining to the center

UCAC will consist of 5 members: two Philippine scientists and three foreign scientists selected by UNESCO from among the nominees of the UCET. Among these scientists, one would have to be in the field of the social sciences, i.e., economics, business or management sciences.

UCAC will have the following functions:

1. provide advice and guidance to UCBG on directions and opportunities of national, regional and global significance
2. evaluate the accomplishments of the center annually
3. submit an evaluation-of-accomplishment and recommendations report to UNESCO annually
4. submit a cumulative report on the center's accomplishments and its recommendations midway (end of the third year), and at the end of the center's lifespan (end of the sixth year) to UNESCO

Structural organization involving collaborators from other UNESCO Member States

Method of financing and origin of its various resources and legal authority to accept such resources as subventions, gifts, legacies or payments for services rendered

Legal authority to accept resources

Donations will be coursed through the U.P. Foundation, Inc. of the U.P. System; also through the Marine Environmental Resources Foundation (MERF), Inc. of UPMSI. Both foundations have duly signed agreements with the university that authorize them to raise funds for U.P.'s institutes, programs and projects and serve as conduits to receive donations from the international and local community. As the center acquires an independent legal and financial status operating under the auspices of U.P., it can accept donations and research grants directly, much like U.P. Foundation and MERF.

Funding of project proposal feasibility study

International donors will be tapped to fund the feasibility study through international organizations such as the International Union of Biochemistry and Molecular Biology (IUBMB).

This would augment funding that would be requested from the U.P. Diliman Administration, U.P. System Administration and Philippine government agencies such as the National Economic

Development Authority (NEDA), Department of Science and Technology (DOST), Department of Trade and Finance (DTI) and the Department of Agriculture Bureau of Fisheries and Aquatic Resources (DA-BFAR). DTI recently launched the implementation of the Innovation Act with an allocated Innovation Fund to create STI and trade ecosystems.

Funding of training program

The training program will be self-liquidating and self-sustaining. Training fees will be collected to cover direct and indirect costs.

Funding to support the travel and compensation of foreign experts as course reviewers and trainers will be augmented through the U.P.'s Visiting Professor, Scientist-in-Residence, World Expert Lecture series (WELS) programs administered by the U.P. System Office of International Linkages (OIL). Funding of the DOST for training programs will also be explored.

Additional funding will be generated through a "UPMSI UCMBMOS-APR partnerships promotion program" to attract donor NGOs and private industry sectors that are already engaged in marine biodiversity conservation programs, marine resource development, capture fisheries, e.g., seaweeds industry, tuna, milkfish and sardine industries, etc. In particular, successful U.P. alumni committed to inclusive growth and development through the sustainable development of marine resources will be tapped for donations through the U.P. Alumni Association, Inc.

Funding from UNESCO training programs and funding from ASEAN and Asia-Pacific network organizations that promote academic cooperation and trade and industry linkages will also be vigorously pursued.

Expenses for the training program would be for the following: course planning, development and review; production of course materials; rental for use and maintenance of equipment; consumables and laboratory supplies; compensation for faculty, associate trainers and consultants, travel, and food and accommodations during field or shipboard training.

Funding of STI marine ecosystems projects

The candidate STI marine ecosystem projects described above already have seed funding from various sources, from U.P., DOST, and other Philippine government agencies, international government agencies such as the U.S. National Institutes of Health, and international NGOs such as Ecotone Resilience, Inc. in Paris. More funding will be raised through UNESCO and its partners.

Funding of management services, executive and advisory meetings, public dissemination, promotion and fundraising activities

The UCMBMOS-APR training program and ongoing funded projects on marine biotechnology of UPMSI will contribute part of their indirect fees or administrative cost to run UCET on a daily basis, to host meetings of UCET, UCBG and UCAC, to spruce up the UPMSI website and

highlight UCMBMOS-APR projects, and train the UPMSI website manager in new creative skills and technical competencies.

Expenses would be for center logo design and branding, website planning, design and management, preparation of abridged training materials, hard copies and online; promotional materials, hard copies and online; promotional activities, physical and online events; targeted fundraising events; honoraria of management and promotions staff. The cost of printing hard copies of course materials will be covered by the course training fees.

Three international conferences on the theme of building STI marine ecosystems in the region will be hosted by UCMBMOS-APR, at inception, midway, and after 5 years of existence of the center. This is to generate interest, share experiences, disseminate accomplishments, and discuss the solutions to challenges and growth and expansion opportunities of the center. Seed funds will come from the U.P. System's Office of International Linkages (OIL) program on Hosting of International Conferences (HICs).

Funding of membership of UNESCO Member States

As indicated above, for UCMBMOS-APR to make a major impact in the Southeast Asian and Asia-Pacific region, UNESCO Member States in the region will be encouraged to join the center and participate in its projects and activities. Membership will be an additional source of finances for the center, i.e., through annual membership fees, indirect fees or administrative costs from research project grants.

Ensuring UCMBMOS-APR's financial sustainability

In summary, UCMBMOS-APR's financial sustainability will be ensured through donations obtained through active promotions, through research project grants, training fees, and annual membership fees, grants and donations from UNESCO Member States who become members of UCMBMOS-APR. These will provide adequate finances to cover research, training, management, including hiring of management and promotions staff, etc.

Type and nature of cooperation sought with UNESCO

To support the various programs and activities of UCMBMOS-APR, the following forms of cooperation and support from UNESCO are sought:

1. UNESCO will recommend expert reviewers and trainers of training courses from other UNESCO Member States.
2. UNESCO will issue certificates of training to trainees.
3. UNESCO will recommend expert scientists to collaborators in STI marine ecosystems projects.
4. UNESCO will help provide or search for funding to support the visits of experts from UNESCO Member States for the training and research programs.

5. UNESCO will help identify regional and global industries committed to attaining the U.N. SDGs, particularly SGD 14: Life Below Water and other supporting SDGs, who could locate in the STI marine ecosystems being developed by UCMBMOS-APR.
6. UNESCO will help provide funding for the hosting of international conferences.
7. UNESCO will publicize UCMBMOS-APR in its websites.
8. UNESCO will champion the vision, mission and plans of the UCMBMOS-APR with affiliate international networks and organizations especially in the ASEAN.
9. UNESCO will appoint a UNESCO official to lead the UCMBMOS-APR Board of Governors (UCBG).
10. UNESCO will select two Filipino scientists and three foreign scientists from among the nominees submitted by UCET to become members of UCAC.

Respective responsibilities of the UNESCO Member States concerned and of the organization

The proposed UCMBMOS-APR aims to serve not only the Philippines but the whole Asia-Pacific Region. UNESCO Member States who will be invited to participate in UCMBMOS-APR are the ASEAN and Asia-Pacific Member States, also the United States, Canada, Germany, France, Denmark, other EU and Scandinavian countries, and other UNESCO Member States from all continents of the world.

UPMSI faculty already have existing research collaborators from many of these countries. The collaborators' involvement with UCMBMOS-APR will be formalized through an exchange of letters between UCMBMOS-APR and their respective universities. Their participation in the center's programs will be acknowledged and publicized in the UPMSI UCMBMOS-APR website and by them in their CVs.

Furthermore, UCMBMOS-APR will seek support and guidance from the International Union of Biochemistry and Molecular Biology (IUBMB) to carry out its programs. UPMSI scientists will actively pursue academic and research linkages with more expert scientists from all over the world through the IUBMB.

To reiterate, UNESCO would formally recognize the participation of the UNESCO Member States through their scientists, as UNESCO CC2 Scientists/Science Consultants, and hopefully these scientists would be provided travel support and per diems for their visits to the Philippines through the UNESCO central office in Paris and/or UNESCO offices in the Member States. This would augment the limited funding available from U.P. and Philippine government funding agencies for the visits of foreign experts.

Undertaking by the UNESCO Member State to take the necessary measures for the establishment of the center

The Philippines as the UNESCO Member State serving as the principal proponent will undertake the following measures for the establishment of UCMBMOS-APR:

1. Upon approval by the UNESCO of UCMBMOS-APR CC2, UPMSI faculty proponents of UCMBMOS-APR will immediately organize UCMBMOS-APR led by the UCET, UCBG and UCAC.
2. With endorsements from several levels of U.P. administration, Philippine government leaders and science collaborators from other UNESCO Member States, UCMBMOS-APR will embark on a massive promotions and fundraising campaign targeted to various sectors of the local, regional and international community.
3. The center will prepare, package and promote training courses, solicit expert reviewers of training courses, and formally invite expert scientists from UNESCO Member States to participate in the center's programs.
4. The center will package and promote ongoing and candidate STI marine ecosystems projects.
5. Within 6 months from inception, the center will organize and host an international conference to promote its programs and discuss progressive ideas with the international community.
6. The center will implement its training and STI marine ecosystems programs soon thereafter.

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