



MaRHE CENTER
Marine Research and High Education Center

MALDIVIAN CORAL REEF RESTORATION WORKSHOP

- 3rd Edition -

30 November – 8 December 2019



Led by Dr. Phanor H. Montoya-Maya and Dr. Simone Montano

INTRODUCTION

WHY THIS WORKSHOP?

Coral reefs are complex and productive ecosystems that encompass the highest biodiversity of any marine ecosystem. To date, we have lost most of the global coral-reef system worldwide due to overfishing, coastal development, sedimentation, marine-based pollution and climate change. This has resulted in the loss of valuable ecosystem services to the livelihoods of millions of people. Although traditional conservation management measures such as the designation of marine protected areas (MPA) do work, this passive strategy works at a slow pace and it alone cannot curb reef degradation by natural disturbances, once the disturbance has ended. Consequently, there is a demand for active reef restoration measures which can complement traditional conservation efforts if we are to ensure the preservation of the ecosystem services that coral reefs provide to humans. This becomes essential in the Republic of Maldives that consists entirely of coral reefs that are significant on a global scale as well, being the 7th largest in terms of area covered, contributing up to 5% of the world's reef area.

The two-step “coral gardening” approach to active reef restoration is a promising alternative for accelerating reef recovery and building reef resilience. The first step entails generating a pool of farmed colonies in underwater nurseries until they reach a threshold transplantation size. The second step is the transplantation of the nursery-grown colonies onto denuded reef areas. As this approach allows for the mariculture of naturally resilient coral genotypes that can be used to rehabilitate degraded reefs, the coral gardening concept is being considered as an adaptive tool against climate change impacts. The **3rd Edition** of the **Maldivian Coral Reef Restoration Workshop** is your opportunity to gain hands-on experience on this active strategy for coral reef conservation.

ABOUT THE MALDIVIAN CORAL REEF RESTORATION WORKSHOP – 3rd Edition -

During the first two editions of Maldivian Coral Reef Restoration Workshop in 2017 and 2018, an intense activity started. Several coral nurseries were built and populated with over 1000 coral fragments. In the 2018 Edition about 750 have been already transplanted, with most of them in an in-situ experimental setting. In the 2019 Edition of this *9-day intensive full-time 80-hour hands-on, in-water practical program* we will focus on the second step of the coral gardening approach: the transplantation of the nursery-grown coral fragments. Specifically, participants will be introduced to cement fixing of coral fragments (nursery-grown corals and micro-fragments) onto hard substrate and assessing the immediate effects of coral transplantation on reef condition. In addition to current best practices for coral reef restoration, the workshop will provide an experience on building and maintaining shallow water fix and floating nurseries, growing different reef organisms for reef restoration, selecting and preparing sites for coral transplantation, and assessing the ecosystem response to coral transplantation.

The workshop will be divided into a series of classroom lessons and field activities. It will be coordinated by Dr Phanor H Montoya-Maya of the NGO Corales de Paz, who has worked for the past four years on large-scale coral reef restoration via coral gardening in the Seychelles (USAID/UNDP-GEF-funded “Reef Rescuers: Restoring Reefs in the Face of Climate Change”) and Colombia (Community-based coral reef restoration in Seaflower MPA, Colombia).

Lessons will be held at the **Marine Research and High Education Center (MarHE Center)** of Milano-Bicocca University in Magoodhoo Island, Faafu Atoll, about three hours by speedboat from Malé airport. All field activities will be carried out on SCUBA diving and snorkelling equipment. This workshop will follow up on ‘Magoodhoo Island Coral Reef Restoration Project’, a collaboration between Corales de Paz and the University of Milano Bicocca.

MALDIVIAN CORAL REEF RESTORATION WORKSHOP – 3rd Edition -

The course will consist of a series of lectures and field activities held by international researchers with experience in tropical marine environments. Classes will be held at MaRHE advanced training center. All field activities in the sea will be carried on by scuba diving.

After completion of this training, you will be able to:

- build coral nurseries;
- populate coral nurseries;
- maintain and monitor underwater coral nurseries;
- out-plant corals onto a degraded reef site;
- improve your knowledge on corals identification;
- assess coral health conditions;
- assess and monitor sites for coral reef restoration;
- understand best practices for carrying out your own coral reef restoration project.

At the end of the **Maldivian Coral Reef Restoration Workshop – 3rd Edition** – the University of Milano-Bicocca will release a digital certificate – Open Badge – to recognize the participant's skills and achievements on coral reef restoration (Coral Restoration Technique) .

For more details, please visit: www.openbadges.org and <https://bestr.it/badge/show/400?ln=it>

WORKSHOP DAILY PROGRAM

Day 1

Arrival to Malé International Airport, Maldives

Transfer by speedboat to MaRHE Center, Magoodhoo Island

Arrival in Magoodhoo Island and accommodation

Dinner

Briefing on next day's activities

Day 2

Classroom Session 1: *Review of reefecology*

Open Water Session 1: Diving skills check-up

Classroom Session 2: *Nursery selection, construction and deployment*

Land Session 1: *Nursery construction*

Open Water Session 2: Nursery site assessment and fragment collection

Recap & Briefing on next day's activities

Day 3

Classroom Session 3: *Monitoring nursery-grown colonies*

Open Water Session 3: Nursery deployment and stocking

Open Water Session 4: Nursery maintenance & fragment monitoring

Classroom Session 4: *Review of coral reef monitoring techniques*

Recap & Briefing on next day's activities

- Day 4**
- Open Water Session 5: Restoration/Transplantation site assessment
 - Open Water Session 6: Transplantation site's baseline monitoring
 - Classroom Session 5: *Data capture and analysis for baselinemonitoring*
 - Recap & Briefing on next day's activities
- Day 5**
- Classroom Session 6: *Techniques for out-planting corals*
 - Land Session 2: *Transplantation of nursery-grown corals*
 - Open Water Session 7: Transplantation by cementing colonies 1
 - Open Water Session 8: Transplantation by cementing colonies 2
 - Recap & Briefing on next day's activities
- Day 6**
- Open Water Session 9: Collection of colonies for micro-fragmentation
 - Land Session 3: *Introduction to micro-fragmentation*
 - Open Water Session 10: Reef rehabilitation by micro-fragmentation
 - Land Session 4: *Preparing for monitoring transplanted colonies*
 - Recap & Briefing on next day's activities
- Day 7**
- Open Water Session 11: Rescue cementing
 - Open Water Session 12: Transplantation site ecological monitoring
 - Classroom Session 7: *Data capture and analyses*
 - Recap & Briefing on next day's activities

Day 8 Open Water Session 13: Monitoring transplanted site

Open Water Session 14: Recovery dive

Classroom Session 8: *Data capture and analyses*

Classroom Session 9: *Group presentation of monitoring results*

Final Recap

Day 9 Departure from Magoodhoo to Malé airport

IMPORTANT: The program may be subject to minor changes, due to weather and sea conditions or other problems

DIVING REQUIREMENTS

- Each participant must have a diving license with a minimum of 20 logged dive or a minimum of 15 logged dives with at least 5 dives performed in the last 6 months before the Workshop.
- All divers must have a valid Diving Insurance (DAN or similar) in order to perform diving activities.
- Every diver has to fill in upon his/her arrival at MaRHE Center a medical declaration (**see example: Appendix 1**). In case of positive answer to any questions, an additional medical certificate will be required to attest the suitability to diving activities.

USEFUL INFORMATIONS

DOCUMENTS

To enter Maldives a **valid passport is required** (validity at least six months after the exit from the country) **with at least 2 empty pages**

CLOTHING AND EQUIPMENT

The air temperature is around 28-29°C. The weather is always pleasant, even during the rainy months (Fig 1). Please note that most of the day will be occupied by field activities, seminars and exercises, it is therefore advisable to wear comfortable and sport clothes.

It is recommended to avoid too skimpy clothing, as Magoodhoo island is not a tourist destination and local costumes are those of an Islamic country.

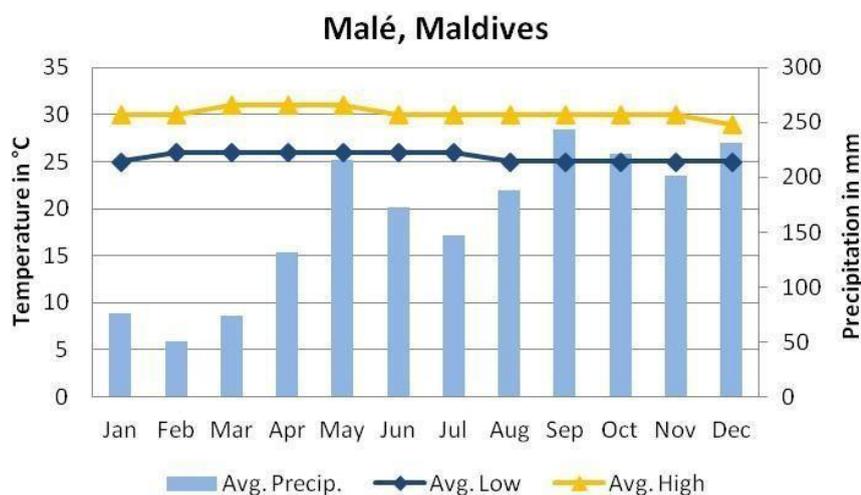


Fig 1. Monthly air temperature (°C) recorded in Maldives and monthly averages of sunny and rainy hours recorded in Maldives

For field activities into the sea it is necessary to have - in addition to a bathing suit and a towel - **the following equipment:**

- mask;
- snorkel;
- fins (booties);
- wetsuit;
- diving computer;

It is possible to rent diving equipment on site, depending on size and availability.

ACCOMMODATION AND MEALS

The accommodation has been organized at the guesthouse of the Centre, in multiple rooms with bathroom, full board (breakfast, lunch and dinner). Sheets and towels are provided. Food is prepared according to local customs and consists, for the most part, of fish, chicken, rice and vegetables prepared in different ways.

HEALTH

No vaccinations are required for travelers coming to Maldives from Europe. However, each participant should take care of this aspect in order to enter the country.

SAFETY

Any field activity presents risks and dangers, and there are some basic rules to be observed in order to minimize these risks.

In the water it is necessary to respect the buddy system: working groups will be settled, and, within the group, working couples will be established.

EXCHANGE

The Maldivian currency is the Maldivian Rufiyaa (MVR). Euro and dollars are accepted in any bank and exchange office.

1 Euro = about 18 Rufiyaa ; 1 US \$ = about 15 rufyiaa;

COST AND REGISTRATION

The cost of the MALDIVIAN CORAL REEFS RESTORATION WORKSHOP is

- **1400 Euro** for students (regularly registered at any university course)
- **1500 Euro** for non-students

The above amount **includes**:

- speedboat transfer from/to Malé airport;
- transfers for all the activities envisaged under the program;
- full board treatment and accommodation in multiple rooms (single rooms are not available);
- lessons and activities as provided for in the workshop program.

The above amount **does NOT include**:

- flight to/from Malé;
- passport renewal expenses;
- entry visa (if required) to the Maldives;
- anything else not specified above

REGISTRATION:

To proceed with the registration, you have two options:

Option 1) you are required to complete the questionnaire at the following link:

<https://forms.gle/TNTYxPero9iMDxTS9>

After completing the questionnaire, we ask you to send an email to the address marhe@unimib.it specifying in the subject: "**Name Surname – Registration Coral restoration Workshop 3rd Edition**".

Option 2) you are required to fill in the attached registration form and send it by e-mail to:

marhe@unimib.it and simone.montano@unimib.it

In both cases, we kindly ask you to send us your CV and a good quality color scan of your passport.

IMPORTANT: Please wait for our confirmation before proceeding with the payment of the fee and the purchase of the flight.

The workshop will be activated once a minimum number of participants has been reached, therefore we will give you the green light to purchase your flights once we reach this threshold. Your mistakes (incorrect flight dates or other) cannot be reimbursed. A maximum number of participants is also provided (16). **The registration deadline is 1st October 2019.**

FLIGHT TICKET:

You will be responsible for purchasing the flight. The choice of the airline is at your discretion, provided you are at the airport for the day and time established (detailed instructions will follow once registered).

For organizational reasons, we will ask you to send us a copy of your air ticket by **15 October 2019** especially for those requiring an entry visa, that we will take care of.

Bank Account details:

IBAN: IT87 K056 9601 6280 0000 0200 X71

Headed to:

UNIVERSITA' DI MILANO-BICOCCA

BANCA POPOLARE DI SONDRIO

AGENZIA DI MILANO AG. n. 29 – BICOCCA, Piazza della Trivulziana, 6

20126 - MILANO

SWIFT CODE: POSOIT22XXX

Purpose of payment:

“Coral Restoration Workshop – 3rd Edition” + [NAME and SURNAME].

For more information please contact – Simone Montano (simone.montano@unimib.it) or
MaRHE Center (marhe@unimib.it)

REMEMBER:

PLEASE PROCEED WITH THE PURCHASE OF YOUR FLIGHTS ONCE DATES ARE CONFIRMED

THIS IS A WORKSHOP THAT REQUIRES SCUBA DIVING CERTIFICATE FOR ENROLLMENT.

For students enrolled in the International Master's course in Marine Sciences (University of Milano-Bicocca) there will be the recognition of training credits: the full set of activities carried out during the workshop can reach a total of **4 CFU** (practical training).

Students enrolled in other degree courses and / or other universities are requested to inquire at their institution.

REGISTRATION FORM

MALDIVIAN CORAL REEFS RESTORATION WORKSHOP

UNIVERSITY OF MILANO-BICOCCA & CORALS DE PAZ

FULL NAME (as reported on the passport)

PLACE AND DATE OF BIRTH

ATTENDING THE _____ YEAR IN _____ (degree course attending)

REGISTRATION NUMBER _____

e-Mail: _____

Tel.: _____

ALLERGY OR FOOD INTOLERANCE No Yes (if so please specify)

ALLERGY DRUG No Yes (if yes please specify)

CHRONIC DISEASE No Yes (if yes please specify)

DO YOU HAVE A SCUBA DIVING CERTIFICATE? No Yes

WHAT IS YOUR HIGHEST SCUBA DIVING CERTIFICATION LEVEL?

HOW MANY LOGGED DIVES DO YOU HAVE? _____

WHEN DID YOU DIVE THE LAST TIME? _____

(You are required to submit copy of your SCUBA diving certificate with this registration form.)

PARTICIPANT'S SIGNATURE

Appendix 1

MEDICAL STATEMENT

The purpose of this Medical Questionnaire is to find out if you should be examined by your doctor before participating in recreational diving. A positive response to a question does not necessarily disqualify you from diving. A positive response means that there is a preexisting condition that may affect your safety while diving and you must seek the advice of your physician prior to engaging in dive activities. Please answer the following questions on your past or present medical history with a **YES** or **NO**. If you are not sure, answer **YES**. If any of these items apply to you, we must request that you consult with a physician prior to participating in scuba diving. Your instructor will supply you with an RSTC Medical Statement and Guidelines for Recreational Scuba Diver's Physical Examination to take to your physician.

____ Could you be pregnant, or are you attempting to become pregnant?

____ Are you presently taking prescription medications? (with the exception of birth control or anti-malarial)

____ Are you over 45 years of age and can answer YES to one or more of the following?

- Currently smoke a pipe, cigars or cigarettes
- Have a high cholesterol level
- Have a family history of heart attack or stroke
- Are currently receiving medical care
- High blood pressure
- Diabetes mellitus, even if controlled by diet alone

Have you ever had or do you currently have...

____ Asthma, or wheezing with breathing, or wheezing with exercise?

____ Frequent or severe attacks of hayfever or allergy?

____ Frequent colds, sinusitis or bronchitis?

____ Any form of lung disease?

____ Pneumothorax (collapsed lung)?

____ Other chest disease or chest surgery?

____ Behavioral health, mental or psychological problems (Panic attack, fear of closed or open spaces)?

____ Epilepsy, seizures, convulsions or take medications to prevent them?

____ Recurring complicated migraine headaches or take medication to prevent them?

____ Blackouts or fainting (full/partial loss of consciousness)?

____ Frequent or severe suffering from motion sickness ?

____ Dysentery requiring medical intervention?

____ Any dive accidents or decompression sickness?

____ Inability to perform moderate exercise?

____ Head injury with loss of consciousness in the past 5 years?

____ Recurrent back problems?

____ Back or spinal surgery?

____ Diabetes?

____ Back, arm or leg problems following surgery, injury or fracture?

____ High blood pressure or take medicine to control blood pressure?

____ Heart disease and/or attack?

____ Angina, heart surgery or blood vessel surgery?

____ Sinus surgery?

____ Ear disease or surgery, hearing loss or problems with balance?

____ Recurrent ear problems?

____ Bleeding or other blood disorders?

____ Hernia?

____ Ulcers or ulcer surgery ?

____ A colostomy or ileostomy?

____ Recreational drug use or treatment for, or alcoholism in the past 5 years?

The information I have provided about my medical history is accurate to the best of my knowledge. I agree to accept responsibility for omissions regarding my failure to disclose any existing or past health condition.

Date:

Signature: