

Grant Application Form



ESCAP Trust Fund for Tsunami, Disaster and
Climate Preparedness in Indian Ocean
and Southeast Asian Countries

A. Overview

[For detailed guidance on how to fill out each section of the form, please consult the guidelines posted on the Trust Fund website.]

1	ORGANIZATION SUBMITTING PROPOSAL	Intergovernmental Oceanographic Commission (IOC) of UNESCO
2	FOCAL POINT AT ORGANIZATION AND RELEVANT CONTACT INFORMATION	<p>Bernardo Aliaga Head of Tsunami Unit IOC UNESCO 7 Place Fontenoy 75352 Paris 07 - SP France Email: B.Aliaga@unesco.org</p> <p>Rick Bailey Head of ICG/IOTWMS Secretariat PO Box 1370 Level 3, 1 Ord Street West Perth, WA 6872 Australia Email: r.bailey@unesco.org</p> <p>Ardito M. Kodijat Indian Ocean Tsunami Information Centre (IOTIC) UNESCO Office Jakarta Email: a.kodijat@unesco.org</p>
3	PROJECT TITLE	Strengthening tsunami early warning in the North-West Indian Ocean region through regional cooperation - Phase-2c
4	BENEFICIARY COUNTRIES	India, Iran, Pakistan, Oman and United Arab Emirates (Oman and UAE are not ESCAP countries but will be participating with their own support)
5	TARGET GROUP(S)	National Tsunami Warning Centres and Disaster Management Offices (National and Local) of the NWIO; Communities in tsunami prone areas in the NWIO; Response agencies in the NWIO

6	TIME FRAME	Phase-2c: 12 months
7	TOTAL BUDGET (US\$) AND BREAKDOWN OF FUNDING SOURCES	Phase-2c Total: \$240,000 *Additional in-kind counterpart contributions are detailed under Section M

B. Executive Summary

The magnitude 8.1 earthquake and tsunami of 28 November 1945 in the eastern segment of the Makran subduction zone resulted in reported casualties from different sources of a few hundred to 4,000 people in India and Pakistan, with damage also being reported in Iran and Oman. Indeed, the impacts may have been greater, as reporting was limited at the time. There was no tsunami warning system in place. In differing accounts, the risk of a similar or even larger earthquake and tsunami with even greater impacts may exist today for the North-West Indian Ocean (NWIO) region. Depending on the location of the earthquake, different coastlines and communities of different or more countries may be impacted next time. Since 1945, the populations of coastal communities vulnerable to the threat of tsunamis has also grown immensely.

The project “Strengthening tsunami early warning in the North-West Indian Ocean region through regional cooperation” was originally approved for funding by UNESCAP and commenced for Phase 1 in 2019 and Phase 2a and 2b in 2021. The project was designed to strengthen self-protection capacities at the community level in accordance with the Tsunami Ready framework of the Intergovernmental Oceanographic Commission (IOC) of UNESCO, which is being implemented globally. Once fully implemented, the participating communities will be in a position to address the success indicators of the IOC-UNESCO Tsunami Ready Recognition Programme (TRRP) and be better prepared to face the next tsunami threat.

The overall project, coordinated by IOC-UNESCO, is supporting NWIO countries to improve warning services at the National Tsunami Warning Centre (NTWC) level, as well as the organisation of the national warning chains involving the National/Local Disaster Management Organisations (N/LDMO). Countries supported by the project include India, Iran, and Pakistan. Oman and the United Arab Emirates (UAE) are also participating in the project with their own resources. The overall aim is to better understand the tsunami hazard and risk in the NWIO in order to better inform preparedness, while also ensuring timely warnings get to vulnerable communities who are enabled to perform rapid and effective responses. Due emphasis is also placed on self-protection for near source events when the tsunami may arrive in minutes and before warnings can even be issued. To achieve this the project provides and integrates international and national expert technical advice through national activities and regional training workshops.

The overall project consists of three phases that have been designed using a programmatic approach to promote a long-term, sustained and effective tsunami early warning system in the NWIO:

Phase-1 of the project was funded by UNESCAP finished on 31 October 2021. Although implementation was impacted by the COVID-19 pandemic, Phase-1 still broadly delivered on its objectives:

Phase 1:

- 1) Better understanding of the tsunami risk knowledge to inform and underpin warning and mitigation systems in the NWIO to enable appropriate and effective community responses to the tsunami threat.
- 2) Improvement of warning services at NTWC level and the organization of the national warning chains to assure timely warnings.

Phase-2a and 2b were approved by UNESCAP in 2021 as an important component of the project's programmatic approach and was completed on 19 December 2022. It utilised the capabilities and capacity developed in Phase-1 in national tsunami warning chain development and hazard assessment, through the collaboration engendered between national and local authorities, to finalise outstanding objectives from Phase 1 and identify the requirements for inundation and evacuation mapping in each participating Member State. This has helped underpin future preparedness and effective community responses to the tsunami threat:

Phase-2a:

- 1) Finalisation of some Phase-1 remaining activities in tsunami risk knowledge and strengthening of national tsunami warning chains

Phase-2b:

- 2) Gap analysis and development of guidance on tsunami inundation mapping and evacuation planning in the NWIO region

Phase 2c is the subject of this current proposal. It further builds on the outcomes and capabilities developed in Phase 1 and Phases 2a and 2b to provide training in the ability to develop key tsunami hazard response tools to help pilot communities identified in Phase 1 respond effectively to tsunami warnings provided through enhanced national tsunami warning chains and by natural warning signs developed under Phases 1 and 2a:

Phase-2c:

- 3) Training in development of tsunami inundation maps and evacuation plans to facilitate effective community responses to the threat from near-field and far-field tsunamis.

A further **Phase-3** will be the subject of a future proposal, which is essential in ensuring the outcomes achieved during Phases 1 and 2 contribute towards sustainable and effective national tsunami warning systems in the NWIO region and full Tsunami Ready recognition. In essence, Phase-3 will build upon the

knowledge and momentum of the precursory phases by up-scaling and enhancing national tsunami early warning systems in the countries. It will target all involved stakeholders and pilot coastal communities to exercise and test the capabilities and capacity developed in Phases 1 and 2. It will enable more effective community responses to the tsunami threat information and improved warning processes in the NWIO, in line with the requirements for community certification through the IOC-UNESCO TRRP.

As can be seen from the objectives, the overall project contributes to the 2021-2024 strategic focus of the ESCAP Multi-Donor Trust Fund for Tsunami, Disaster and Climate Preparedness across its four pillars, namely strengthening early warning systems and social and economic resilience through regional cooperation and science, technology and innovation. The project will strengthen the capacity of the countries in the NWIO region and enhance the overall performance of the Indian Ocean Tsunami Warning & Mitigation System (IOTWMS), thus contributing in particular to the 7th Global Target and priorities of the Sendai Framework for Disaster Risk Reductions (2015-2030). It also addresses Sustainable Development Goal 3, Target D, and contributes to the Safe Ocean outcome of the UN Ocean Decade being coordinated by IOC-UNESCO.

This proposal now seeks funding for Phase-2c.

C. Needs Assessment

[Which specific policy, institutional, technical, system-wide or other capacity building needs does this project intend to address? What has already been done or is ongoing to address these needs?]

The Indian Ocean Tsunami on 26th December 2004, caused by a magnitude 9.1 earthquake off Indonesia in the eastern Indian Ocean region, resulted in the loss of over 230,000 lives and the displacement of over 1.6 million people around the Indian Ocean. The estimated economic losses were \$14 billion. At the time there was no tsunami warning system for the Indian Ocean and the catastrophe brought global attention to the need for a regional tsunami warning system to serve the Indian Ocean countries. Subsequently, IOC-UNESCO was given the mandate by the United Nations to develop and implement the Indian Ocean Tsunami Warning and Mitigation System (IOTWMS). An Intergovernmental Coordination Group (ICG) for the IOTWMS was established by the IOC Assembly in July 2005 with a mandate to set up an early warning system to efficiently identify and mitigate the hazards posed by tsunamis. The ICG/IOTWMS met for its first meeting in August 2005 in Perth, Australia. The Office of the IOC-UNESCO Secretariat for the ICG/IOTWMS was established in Perth in 2005 with support from the Government of Australia.

An Interim Alert System (IAS) was established in 2005, with support from the USA and Japan. After several years of international collaboration and development,

facilitated and coordinated by IOC-UNESCO, the new IOTWMS began trial operations in 2011 before becoming fully functional in March 2013. The Tsunami Service Providers (TSPs) established by Australia, India and Indonesia assumed full responsibility for the provision of tsunami services for the Indian Ocean region. The TSPs now provide tsunami threat information to the National Tsunami Warning Centres (NTWCs) established in all Indian Ocean Member States. Today the NTWCs provide warnings to millions of people who had no access to such warnings in 2004. IOC-UNESCO also established the Indian Ocean Tsunami Information Centre (IOTIC) in Jakarta to support further capacity development and community awareness, education and preparedness.

An assessment of the status of IOTWMS undertaken during the international conference to commemorate the 10th anniversary of the Indian Ocean Tsunami (Jakarta, October 2014) revealed that the Indian Ocean is much safer against the threat of tsunamis than it was in 2004. However, due to the nature of the hazard, it is important for coastal communities to always be prepared and ready to respond. The conference identified that the focus of IOTWMS for the following 10 years should be on: i) Sustaining the system in place; ii) Enhancing down-stream 'last-mile' preparedness of vulnerable coastal communities; and iii) Greater understanding of the tsunami hazard from the Makran subduction zone. In addition, for locally generated tsunamis that may arrive in minutes and before it is even technically feasible for tsunami warning systems to issue tsunami warnings, communities must also be educated, aware and ready to respond to the natural warning signs for near-field events. Hence there has since been a renewed focus on the down-stream 'last-mile'.

Further, while identifying that the Makran subduction zone hazard is not well understood, the international conference "Reducing Tsunami Risk in the Western Indian Ocean" (Muscat, March 2015) recommended strengthening sub-regional collaboration in NWIO for real-time data exchange and research collaboration to better understand the tsunami threat, particularly to India, Iran, Oman, and Pakistan.

Accordingly, the ICG/IOTWMS, at its 10th Session (Muscat in Oman, March 2015) decided to: (i) Place greater emphasis on community awareness and preparedness to help ensure more appropriate response to tsunami warning information; and (ii) Establish a new Sub-Regional Working Group for the NWIO (RWG-NWIO) composed of members nominated by India, Iran, Oman, Pakistan, Yemen, and other Member States in the Makran region. The RWG-NWIO acts as an advisory and intergovernmental coordination mechanism for this UNESCAP funded project. The ICG/IOTWMS during its 11th Session (Putrajaya in Malaysia, April 2017) requested the IOTWMS Secretariat, IOTIC and the WG-NWIO to prepare a project proposal for submission to the UNESCAP Trust Fund for Tsunami, Disaster and Climate Preparedness to enhance end-to-end tsunami warning and community preparedness in the NWIO, based on the recommendations of the WG-NWIO. The ICG/IOWTMS during its 12th Session (Kish Island in Iran, March 2019) also established the Task Team on Scientific Tsunami Hazard Assessment of

the Makran Subduction Zone to help coordinate and focus scientific efforts on tsunami sources in the NWIO region.

While Member States in the region currently receive regional tsunami threat information from the IOTWMS TSPs, the following needed thorough assessment: i) The timeliness of such information (especially in the context of a local tsunami threat), the efficiency of in-country mechanisms to quickly assimilate the information received from the TSPs and disseminate national warnings to vulnerable communities; and ii) The ability of communities to understand the warnings and/or natural signs and respond appropriately to an impending tsunami threat.

Towards this end, the RWG-NWIO has held six inter-sessional meetings (Muscat, October 2016; Tehran, February 2017; Hyderabad, July 2018; Jakarta, 2019; online, December 2020; online March 2022). The meetings have contributed to the assessment of the current status of end-to-end tsunami warning systems in each of the participating RWG-NWIO Member States (India, Iran, Oman, Pakistan and UAE) and have revealed that most coastal communities are still not prepared to respond effectively to a near-field tsunami threat from the Makran subduction zone. A powerful earthquake in the Makran region could generate destructive tsunamis capable of inundating coastlines within 20 minutes, thus making it imperative for the Member States in the region to be well prepared.

The RWG-NWIO meeting (Tehran, February 2017) was held back-to-back with a UNESCAP analytical workshop that addressed strategies for strengthening tsunami early warning in the NWIO region through regional cooperation and forms the basis for this project. All of the participating RWG-NWIO Member States identified the need to strengthen self-protection capacities at the community level by enhancing national tsunami warning chains, developing evacuation plans to suit a near-field threat, developing hazard and inundation maps, enhancing scientific understanding of dynamics in the Makran subduction zone, and enhancing capacities for tsunami modelling by institutes in the region. A programmatic approach involving cooperation and information sharing amongst the Member States was accordingly proposed to enable: (i) Development of context-specific guidelines/methodologies based on best practice; (ii) National adaptation of the reference materials by Member States; and (iii) Local implementation at the community-level. These are the short-term and medium-term measures identified in this proposal.

In the backdrop of the 2018 Palu and Sunda Strait tsunamis in Indonesia, the ICG/IOTWMS during its 12th Session (Kish Island, March 2019), recognised the challenges involved in tsunami early warning for such tsunamis generated by non-seismic and complex sources and established an ICG/IOTWMS Task Team on Tsunami Preparedness for a Near-Field Tsunami Hazard to help Member States: to (i) Review their tsunami warning chains with a view to minimizing the number of steps, and establish clear authorization of responsibilities amongst stakeholders, especially for near-field tsunami threats; and (ii) Enhance community preparedness for near-field tsunamis, with emphasis on self-evacuation based on natural signs. This task team directly supports the objectives

of this proposal. Immediately prior to the 12th session of the ICG/IOTWMS, a workshop was also held on Expert Consultation on Scientific Tsunami Hazard Assessment of the Makran Subduction Zone.

The 2018 Capacity Assessment of Tsunami Preparedness in the Indian Ocean was carried out by the ICG/IOTWMS in 2018 to provide insight on the status of Member States' preparedness for tsunamis, as well as identify specific gaps and prioritise capacity development requirements at both regional and national levels. Several important recommendations arose in the area of risk assessment and reduction that align with the activities of this proposal. Specifically, a need to carry out tsunami hazard and risk assessments, as well as an increase in tsunami hazard preparedness, especially in the areas of evacuation mapping, hazard mapping and inundation mapping, were identified as important capacity development needs. The ICG/IOTWMS during its 12th Session (Kish Island, March 2019), accordingly established the ICG/IOTWMS Task Team on Scientific Hazard Assessment of the Makran Subduction Zone, which also directly supports the objectives of this proposal.

In terms of meeting programmatic needs, the project specifically contributes to the 2021-2024 strategic focus of the ESCAP Multi-Donor Trust Fund for Tsunami, Disaster and Climate Preparedness, by:

- Strengthening people-centred, multi-hazard early warning systems by programmatic approach to strengthening national tsunami warning chains, which link national authorities and local communities, to enable more effective responses by at-risk coastal communities to tsunami and potentially other hazards, such as storm surge and rising sea levels due to climate change.
- Strengthening social and economic resilience in Asia -Pacific by enabling more effective responses to the tsunami threat in the NWIO region for vulnerable and often marginalised coastal communities through evacuation planning, the learnings from which will be shared and potentially utilised by similar communities across the Asia-Pacific for tsunamis and potentially other hazards.
- Enhancing disaster and climate risk management through regional cooperation by establishing effective ongoing regional collaboration processes for the five participating countries of India, Iran, Pakistan, Oman, and UAE.
- Mainstreaming science, technology and innovation by helping implement state-of-the-art processes and procedures used by other countries across the Indian Ocean and around the globe.

The project will strengthen the capacity of the countries in the NWIO region and enhance the overall performance of the ICG/IOTWMS by sharing learnings from this project that will benefit other countries across the Indian Ocean, thus contributing in particular to the 7th global target and priorities of the Sendai Framework for Disaster Risk Reductions (2015-2030) to substantially increase the

availability of and access to multi-hazard early warning systems and disaster risk information and assessments to the people by 2030. The project will also contribute to the Safe Ocean outcome of the UN Decade of Ocean Science for Sustainable Development (2021-2030) being coordinated by IOC-UNESCO, where people will be protected from ocean hazards and 100% of at-risk coastal communities will be Tsunami Ready. It also addresses Sustainable Development Goal 3, Target D, which has an explicit target to strengthen the capacity of all countries, in particular developing countries, for early warning, risk reduction and management of national and global health risks.

D. Problem Analysis

[How was the problem identified? How was the project designed? Which entities (organizations and/or individuals) were consulted? For each organization, briefly explain the process and reasons for consultation.]

The magnitude 8.1 earthquake and tsunami of 28 November 1945 in the eastern segment of the Makran subduction zone resulted in reported casualties from different sources of a few hundred to 4,000 people in India and Pakistan, with damage also being reported in Iran and Oman. The more recent magnitude 7.8 earthquake and tsunami of 24 September 2013 is a reminder of the potential near field tsunami threat to vulnerable coastal communities in the region. A powerful earthquake in the Makran region could generate destructive tsunami waves capable of inundating coastlines within 20 minutes, thus making it imperative for the Member States in the region to be well prepared to respond.

In many tsunami events after the 2004 Indian Ocean Tsunami (e.g., 25 October 2010, 11 April 2012, 2 March 2016, 28 September 2018, 22 December 2018 events) the community responses across the Indian Ocean to natural and official tsunami warnings was quite often chaotic, not only in countries which were close to the tsunami source, but also in countries far away from the source. Some communities conducted self-evacuations or officially ordered evacuations, while many others panicked and did nothing. This demonstrates that the technological component of the warning system should closely engage with socio-cultural aspects of the community.

Further, the ICG/IOTWMS conducted Exercise Indian Ocean Wave 2016 (IOWave16) during September 07-08 of 2016 and Exercise Indian Ocean Wave 2020 (IOWave20) during 06, 13, and 20 October of 2020, with a view to exercise the end-to-end system, as well as build community awareness. India, Iran, Pakistan and Oman conducted community evacuations during IOWAVE18. India involved 350 villages, wherein more than 40,000 people were evacuated to shelters and safe places. In Oman 5000 students from 6 schools participated in evacuations. Pakistan involved approximately 200 people representing schools, residents, fishermen, government officials and a Non-Government Organisation (NGO). Iran involved beachgoers in the exercise, wherein around 30 people were evacuated and moved to safe places. While the IOWave16 exercise itself was very

successful in terms of engaging vulnerable communities in 12 Indian Ocean Member States, an analysis of the results, however, indicated that several of these evacuations were not based on proper evacuation plans that could make them dangerously ineffective during a real event.

Exercise IOWave18, conducted during 04-05 September 2018, attracted greater participation in terms of evacuations (116,000 people) and piloting of Indian Ocean Tsunami Ready in a few communities in India and Oman. But the non-availability of evacuation plans in several member states still remains a challenge. Exercise IOWave20 was held during 06 - 20 October 2020 concurrent with the Covid-19 pandemic. Consequently, the scope and scale of the exercise was reduced, such that Member States mainly just tested communication protocols and conducted virtual table-top exercises. Any community participation was at the sole discretion of the country.

Recognising that most coastal communities in tsunami prone regions are still not prepared to respond appropriately to a near-field tsunami threat, and that the RWG-NWIO Member States are indeed vulnerable to such a near-field threat from the Makran Subduction Zone, an assessment of the current status of end-to-end tsunami warning systems in each of the RWG-NWIO Member States of India, Iran, Oman and Pakistan was undertaken in the inter-sessional meetings of the RWG-NWIO. Representatives of the NTWCs, Disaster Management Offices (DMOs), NGOs, as well as tsunami preparedness practitioners and university researchers participated in these meetings.

To cope with near-field tsunamis, the following considerations were discussed during the RWG-NWIO meeting in Tehran in 2017 and further considered in preparing this proposal:

- a) Set-up of early warning systems, policies and procedures must be designed in a way to be executed realistically in the short time frame available. The required procedures and decision-making processes for near-field tsunamis most probably will differ from already established procedures in the downstream part for other hazards with longer warning times.
- b) Tsunami early warning is complementary, and people should never wait for an official warning where the tsunami may arrive in minutes. People must be able to recognize natural warning signs and act on them if they reside close to the tsunami source.
- c) Tsunami warning is essential, especially in cases where the earthquake was not felt strongly but still has the potential to trigger a tsunami (slow earthquakes or epicentre is further away). Early warning systems are required to call off an evacuation process, if data shows that the previously felt earthquake does not have potential to trigger a tsunami, and to issue an "all clear" message once the tsunami threat is over.
- d) The threat of near-field tsunamis requires strengthening of the capacities of the communities at risk towards self-protection. In this regard, it is considered important that communities have a high level of awareness and

sufficient knowledge to react independently and properly during a tsunami threat. National and local authorities must provide all necessary services and references to enable the communities in this regard, especially timely warnings and evacuation plans based on scientific hazard assessments.

The RWG-NWIO meeting (December 2020) further encouraged its Member States to work on their tsunami warning chain with a view to minimising the number of steps (between the NTWC and Public) in the warning chain to meet the short timelines, and with clear authorization of responsibilities amongst the NTWCs, NDMOs, LDMOs and Public. The RWG-NWIO meeting of March 2022 noted the significant progress being made, thanks to this UNESCAP funded NWIO project, in understanding the tsunami hazard in the region and the enhancement of national tsunami warning chains needed to warn at-risk communities.

E. Target Group

[Briefly describe the policies the project aims to influence and/or the institutions whose capacity the project aims to build.]

The focus in this project is on India, Iran, and Pakistan, whilst Oman and the United Arab Emirates (UAE) are also benefiting through participation with their own funding. For Iran, Pakistan, Oman and UAE the main threat from the Makran subduction zone are near-field tsunamis, with minimum travel times of less than 30 minutes. However, they may still be impacted by smaller tsunamis generated by earthquakes in the eastern Indian ocean. Oman and UAE are not ESCAP Member States, but they are members of the RWG-NWIO and considered as self-funded partners for this proposal. India is in a slightly different situation, but still with minimum tsunami travel times from the Makran subduction zone of less than 1 hour. It is worth noting that India also faces a near-field tsunami threat in the eastern Indian Ocean along the Andaman Islands. The project therefore puts a focus on the challenges and requirements of tsunami early warning in the context of near-field tsunamis.

From each participating Member State, it is proposed to continue involvement of representatives of the NTWC, NDMO, Provincial/Local Disaster Management Organisation (LDMO), communities selected for pilot implementation, NGOs, Broadcast Media, and institutions involved in hazard assessment and modelling. During the RWG-NWIO meeting in Tehran in 2017, a focal point for coordination during the project preparation and eventually for project implementation was identified by each Member State.

F. Project Strategy

[What is the overall strategy of the project in addressing the problem referred to in Section B?]

Several interventions have been identified to enhance end-to-end tsunami warning systems in the countries of the NWIO region, especially to strengthen self-protection capacities at the community level.

Rather than attempting to implement these interventions in an isolated manner, the project has adopted a programmatic approach with 3 phases focusing on short, medium and long-term term goals:

Phase-1 and Phases 2a and 2b completed: Short-term – completed

- Better understanding of the risk knowledge based on scientific research.
- Improvement of warning services at NTWC level and the organization of the national warning chains (with an end-to-end perspective and Standard Operating Procedures at each step) to assure timely warnings and rapid response, with due emphasis on self-protection for near source events
- Assessment of Member States capabilities in inundation and evacuation mapping.

Phases-2c: Medium-term – subject of current proposal

- Development of hazard and inundation mapping capabilities by enhancing capacities in tsunami modelling.
- Development of inundation mapping and evacuation planning capabilities in line with the requirement for communities to effectively respond to the threat from near-field and far-field tsunamis.

The long-term goals of Phase-3 are provided in Appendix 1 and are not the focus of this current proposal.

Phase-2c:

Objective 5: Training in development of tsunami inundation maps and evacuation plans to facilitate effective community responses to the threat from near-field tsunamis.

As international travel has become more possible thanks to the development of vaccines and management of the on-going COVID pandemic, the project will facilitate a regional training workshop for inundation modelling and mapping, involving experts from each country and using the Probabilistic Tsunami Hazard Assessment (PTHA) developed in Phases 1 and 2a. A hybrid style workshop will be utilised to extend the outreach and continue to facilitate greater gender diversity in participation. External experts with practical experience in the context of IOTWMS (such as GFZ, INGV, GA, INCOIS) will be involved to provide subject matter expertise and support any limitations due to unavailability or inadequate data, as well as assist on requirements of hazard assessments and inundation mapping for mitigation and preparedness planning. NWIO participants attending in-person will be drawn from the Regional Working Group on Tsunami Inundation Modelling and Mapping (RWG-TIMM) established in Phase 2b. Following this workshop, the national experts (aided by the national consultants) will be required to work on tsunami modelling and inundation mapping in their country for the already agreed Pilot Areas.

The project will continue to support training for selected staff from partner institutions of the NWIO countries to help build a pool of national experts, who will facilitate and assist evacuation processes in the selected coastal pilot areas identified in Phase-1. The project will facilitate a regional training workshop to provide training on the methodology for the planning process, information on technical aspects like the development of evacuation strategies, zoning, map design and evacuation procedures, as well as facilitation on techniques to assure a participatory and consultative approach at the community level. A hybrid style workshop will be utilised to extend the outreach and continue to facilitate greater gender diversity in participation. NWIO participants attending in-person will be drawn from the National Working Groups on Tsunami Evacuation Mapping (NWG-TEPs) established in Phase 2b.

The project will provide backstopping with the help of consultants during the planning processes and implementation in pilot communities to strengthen capacities of the national facilitators, and to assure quality in the processes and outputs. Technical guidance and advice will be provided, for example, by building on and leveraging the distinct downstream experiences from other Indian Ocean countries. The developed evacuation plans and procedures for the identified pilot areas in all five countries within this initiative shall be tested during future tsunami drills. Learning from the planning processes in these pilot areas will be brought into the NWG-TEPs responsible for the development of policies and standards.

In Iran, the pilot communities will be in Chabahar and Jask. In Pakistan, the community will be located within the Province of Sindh. In the remaining Makran countries (India, Oman and UAE), the selection of the communities will be confirmed after national stakeholder consultations.

[To support the activity at the pilot community the project will translate and print two UNESCO-IOC manual and guide 74: UNESCO IOC Tsunami Ready Recognition Programme \(into Farsi language\) and UNESCO-IOC manual and guide 82: Preparing for Community Tsunami Evacuation into Farsi and Urdu language.](#)

G. Results Framework

[What is the longer-term goal (positive impact) that the project aims to contribute to?]

The project aims to enhance national end-to-end tsunami warning systems in the NWIO region, especially to strengthen self-protection capacities at the community level.

Achievements against the Phase-1 and Phase-2a and -2b outcomes place the project in a good position for the implementation of Phase-2c. In particular, a

better understanding of the tsunami hazard of the Makran subduction zone has been achieved through detailed PTHA modelling. The PTHA model is the first of its kind in the region. It provides a much-needed dataset that will be utilised in Phase-2c for modelling scenarios of local tsunami inundation that will inform community evacuation maps. The strengthened national tsunami warning chains developed in Phase-1 will help better deliver more timely warnings to coastal communities at-risk to enact future evacuation plans.

The expected outcomes, performance indicators and outputs are provided below. Annex 1 provides the results framework in tabular form. Annex 2 provides the result framework and the contribution from the project and expected from the participating countries.

[What are the outcomes (changes in policy and institutional capacity) that the project aims to contribute to (what will change as a result of the project)? For each outcome, please include performance indicators specifying how you will know if the outcome has been accomplished.]

Outcomes during Phase-1 (completed)

Objective 1: Better understanding of the risk knowledge based on scientific research.

- Scientific discussions have explored what is known (and remains unknown) about the Makran region, for example, the regional tectonic setting, rupture mechanisms, and maximum credible earthquake magnitude.
- Given the array of uncertainty around the tectonics of the Makran region, the team concluded that a probabilistic tsunami hazard assessment (PTHA) is preferred.
- Earthquake scientists from the Makran countries have consolidated their earthquake catalogues to provide a regional overview of the seismicity of the region as an input to the PTHA.
- Modellers from India have successfully collaborated with their counterparts in Germany and Italy to install and run the PTHA code on INCOIS servers in India.
- The PTHA calculation is underway. A scientific exchange of INCOIS researchers to Germany or Italy at this stage of the pandemic was not possible, but this has been deferred to later in the project when there is also a need for an exchange of scientific experts with regards to inundation modelling (still of course dependant on state of the pandemic and national travel restrictions and organisational protocols).
- The first draft of a unified regional tsunami hazard map for the Makran region is produced.

Objective 2: Improvement of warning services at NTWC level and the organization of the national warning chains to assure timely warnings and rapid response with due emphasis on self-protection for near source events

- A mechanism has been implemented for steering and coordination for the tsunami early warning system at national level in each country.
- The design of an effective tsunami warning chain for a near-field tsunami threat have been consolidated and agreed-upon in all original four countries (UAE joined the project in Phase 2).
- Revised SOPs along the warning chain were presented in the second SOP workshop in October 2021. The SOP development process in Iran and Pakistan continued due to complexities in each country.
- Policies and SOPs for public media for warning dissemination were addressed in two blended workshops in September and October 2021
- Pilot communities have been identified.

Outcomes for Phase-2a and -2b (completed)

Objective 3: Finalisation of Phase-1 remaining activities in tsunami risk knowledge and strengthening of national tsunami warning chain (Phase-2a)

- Latest scientific insights on the tsunami hazard from the MSZ made available as an input for risk assessment activities in the countries
- A unified regional tsunami hazard map was prepared.
- Revised SOPs along the warning chain were prepared.
- Policies and SOPs for Public Media for warning dissemination were drafted.

Objective 4: Gap analysis and development of guidance on tsunami inundation mapping and evacuation planning in the NWIO region (Phase-2b)

- Specifications for a unified approach for tsunami modelling and inundation mapping for the NWIO region were developed.
- A set of national policies, standards and approaches for evacuation planning in the participating countries were recommended.

Expected Outcomes for Phase-2c (subject of this proposal)

Objective 5: Training in development of tsunami inundation maps and evacuation plans to facilitate effective community responses to the threat from near-field tsunamis (Phase-2c)

- Increased capacities and knowledge on tsunami and inundation modelling and mapping in the participating countries
- Improved databases for tsunami forecasting at NTWC level
- Increased coverage of areas with scientifically robust inundation maps for the threat of tsunami, as well as information for risk-sensitive planning
- Tested and approved tsunami evacuation plans in selected pilot areas providing references for further up-scaling

- National mechanism and capability to support the development of evacuation plans at community level in remaining tsunami prone areas in line with the requirements of the UNESCO/IOC Tsunami Ready Programme.
- [Printed UNESCO-IOC manual and guide 74: UNESCO IOC Tsunami Ready Recognition Programme in Farsi language and UNESCO-IOC manual and guide 82: Preparing for Community Tsunami Evacuation in Farsi and Urdu language.](#)

Performance Indicators for Phase-2c (Subject of this proposal)

Objective 5: Training in development of tsunami inundation maps and evacuation plans to facilitate effective community responses to the threat from near-field tsunamis (Phase-2c)

- Detailed reports on training provided on inundation mapping and evacuation planning, including community inundation and evacuation maps.
- Detailed reports on the testing of the developed evacuation plans (one pilot community per country) in a future tsunami drill for each community.

[What are the main outputs (products and services) that will be produced under this project?]

Outputs of Phase-1 (completed)

Objective 1: Better understanding of the risk knowledge based on scientific research.

- 1.1 Gap analysis and strategy for regional cooperation to develop a unified regional tsunami hazard map developed by a NWIO working group on risk knowledge (Concept Note has been produced)
- 1.2 Results from studies on critical issues such as maximum magnitude and source mechanism for tsunami modelling implemented by international scientific partner institutions (PTHA almost completed by international partners, although inclusion of effects of some features, such as complex splayed faulting, still to be implemented and deferred to Phase-2a)

Objective 2: Improvement of warning services at NTWC level and the organization of the national warning chains to assure timely warnings and rapid response with due emphasis on self-protection for near source events.

- 2.1 High-level meeting to discuss and reflect on national strategies for tsunami early warning, warning chains and community preparedness in the context of near-field tsunamis (was successfully implemented on 1 - 2 September 2019 in Muscat / Oman with participation of all partner countries).

- 2.2 Regional workshop to analyse and revise warning chains and discuss the implications for the related SOPs (was implemented on 24 – 28 February 2020 in Karachi, Pakistan)
- 2.3 Regional media workshop to share experiences, mechanisms to involve media in tsunami warning dissemination, and outline requirements for related SOP development (first successfully implemented in September and second to be implemented in late October 2021). Additionally, a Regional Webinar on engagement of the media in the tsunami warning chain was implemented on 17 June 2021 to kick-start the working process on media engagement.
- 2.4 Backstopping to national Working Groups as requested. This has been offered and implemented virtually throughout the project since June 2020, especially to Iran and Pakistan (still ongoing).

Outputs of Phase-2a and-2b (completed)

Objective 3: Finalisation of Phase-1 remaining activities in tsunami risk knowledge and strengthening of national tsunami warning chains (Phase-2a).

- 3.1 Exchange of latest scientific results and regional/international studies on the tsunami hazard in the Makran subduction zone (deferred from Phase-1)
- 3.2 Final regional NTWC-DMO (National/Local) and Media workshop to share experiences and provide mechanism to involve media in tsunami warning dissemination and outline requirements for related SOP development
- 3.3 Backstopping to National Working Groups as requested

Objective 4: Gap analysis and development of guidance on tsunami inundation mapping and evacuation planning in the NWIO region (Phase-2b).

- 4.1 Regional working group meetings on tsunami modelling and inundation mapping with the aim to undertake a gap analysis and develop specifications for a unified approach for tsunami modelling in the region, including the provision of inputs from international expertise
- 4.2 Information package on existing approaches, standards, methodologies and best practices for tsunami evacuation planning as well as tailored recommendations for the NWIO countries, including concrete steps for the development of context-specific policies, standards and approaches

Outputs of Phase-2c (Subject of this proposal)

Objective 5: Training in development of tsunami inundation maps and evacuation plans to facilitate effective community responses to the threat from near-field tsunamis (Phase-2c).

- 5.1 Regional training workshop for members of the NWIO Regional Working Group on Tsunami Inundation Modelling and Mapping (RWG-TIMM).
- 5.2 Regional training workshop for selected participants from the National Working Groups on Tsunami Evacuation Planning (NWG-TEPs) of the member countries to build the required capacities to facilitate and provide technical expertise for evacuation planning processes at local level
- 5.3 Implementation and backstopping during the evacuation planning and implementation processes in pilot communities to help strengthen capacities of the national facilitators, and to assure quality in the processes and outputs.

H. Modes of Project Implementation (Phase-2c)

Lessons learnt from Phase-1, Phases 2a and 2b have been taken into consideration concerning the most effective project modality.

As required, adaptive project management will again be deployed to manage the ongoing future challenges of the pandemic and any other situations that may arise (e.g. major Pakistan floods that impacted on Phases 2a and 2b). While uncertainty about the pandemic situation and international travel persists, in many cases it may be possible to organise blended/hybrid meetings, involving both face-to-face and virtual participation.

As international travel may continue to be disrupted by the pandemic and other issues during Phase-2c, local consultants will also be utilised wherever possible within countries to help facilitate coordination, consultation, training, workshops, etc.

I. Contribution to Regional Coordination/Cooperation

[How will the project contribute to regional coordination and/or cooperation towards the functioning of a regional early warning system for coastal hazards in the Indian Ocean and Southeast Asian region?]

This project will provide the right platform for bringing together organisations, institutions and experts working in tsunami hazard assessment, warning systems, awareness and preparedness, and also build upon similar work already implemented in other regions.

Further, strengthening the capacity of the countries in the NWIO region will enhance the overall performance of the IOTWMS and hence this project as per usual will be dovetailed into the formal work plan of ICG/IOTWMS. Outcomes and learnings from this project will be shared with other countries around the Indian Ocean (and globally) to help improve their responses to the tsunami threat.

Once implemented, the communities which will benefit from the proposed project interventions will be in a position to fulfil some of the indicators of the IOC-

UNESCO TRRP (or similar national initiatives), which is being implemented in the IOTWMS based on the recommendations of the IOC-UNESCO Tsunami and Other sea level Warnings Working Group (TOWS-WG) and the recent sessions of the ICG/IOTWMS in 2019 and 2022.

The ICG/IOTWMS-XIII decided to continue Working Group 1 on Tsunami Risk, Community Awareness and Preparedness; Working Group 2 on Tsunami Detection, Warning and Dissemination; Sub-Regional Working Group for the North-West Indian Ocean; and the Task Team on Scientific Tsunami Hazard Assessment of the Makran Subduction Zone. It also established a new Working Group on Tsunami Ready Implementation, which will certainly interact and interface with the project. A Task Team for the upcoming Indian Ocean Wave Exercise will organise an Indian Ocean wide tsunami exercise in 2023 (IOWave23). The upcoming exercise will provide an ideal opportunity to test outcomes from Phases 1 and 2a and some of the early interventions implemented as part of this proposal for Phase 2c. However, IOWave23 will occur before evacuation plans are completed for the pilot communities. Therefore, dedicated drills for each pilot community will be required as part of Phase 2c to test the outcomes

The ICG/IOTWMS-XIII noted the considerable progress made by Phase-1 and Phase-2a and 2b. Further, the ICG appreciated the support from UNESCAP as part of the Trust Fund for Tsunami, Disaster and Climate Preparedness and recommended that UNESCAP be invited to continue as an Observer to the ICG/IOTWMS RWG-NWIO to ensure closer collaboration among stakeholders in the Makran Subduction Zone, as part of its programmatic approach.

J. Gender Considerations

[How will the project address gender-related issues?]

The project implementation will follow UNESCO Priority Gender Equality Action Plan 2014-2021 and the Policy and Practical Guidelines: Making Disaster Risk Reduction Gender-Sensitive, developed by ISDR, UNDP and IUCN. Gender equality will be considered in all aspects of project implementation. Female experts will be included as trainers and facilitators. Equal priority will be given to female participants in selections for training and workshops. In working with coastal communities for tsunami preparedness and the development of evacuation plans, the project will also work with the local communities to help address the issue of gender, noting that women are particularly vulnerable in tsunami events. Similarly, the needs of disadvantaged and groups with disabilities will be addressed as part of the evacuation planning process and engagement with local communities, as per the IOC-UNESCO Tsunami Ready Recognition Programmes (TRRP) guidelines.

K. Partners

[What partners at the regional, national and (as appropriate) local levels will be involved in the implementation of the project, and what will the specific role of each partner be?]

IOC-UNESCO will lead and provide the expertise in the implementation of this project. In addition, the project will also tap into external expertise and technical assistance with the required experience, i.e. GIZ's expertise and experience in Indonesia; Global Tsunami Model (GTM) Network; UNDP project on strengthening tsunami and earthquake preparedness in the coastal areas of Pakistan; OXFAM's expertise and experience in local level activities in Pakistan; NDWC of Thailand on their expertise and experience in warning chain and siren systems; ASEAN Coordinating Centre for Humanitarian Assistance on disaster managements (AHA Centre) on their expertise with preparedness & response; etc.

As the implementation of support process goes hand-in-hand with partner processes in the five countries for Phase-2c, a continuing steering and coordination mechanism at the regional and national level will be established based on the already existing arrangements in the ICG/IOTWMS and its WG-NWIO.

The RWG-NWIO is represented by the NTWCs and DMOs of all the **five** countries (India, Iran, Pakistan, Oman and UAE) who have been involved in all the project preparation phases and will continue to be the major partners in project implementation. The project will work also with the **key** stakeholders in national disaster risk reduction, mainly the National Tsunami Warning Centres (NTWCs), the National and Local Disaster Management Offices (N/LDMOs), and for Phase 2c representatives of the pilot communities. The Broadcast Media will be involved in terms of education on the outcomes of the evacuation planning process in the pilot communities. **The key stakeholders in each participating country are identified below:**

India: Indian National Centre for Ocean Information Services (INCOIS), National Disaster Management Authority (NDMA), Local DMOs (LDMOs) and representatives of the pilot communities. In addition, stakeholders that may also be involved in the specific activities are:

- National Centre for Seismology (NCS)
- Institute of Seismological Research (ISR)
- Odisha State Disaster Management Authority (OSDMA)
- Gujarat State Disaster Management Authority (GSDMA)
- Maharashtra State Disaster Management Authority (MSDMA)
- Disaster Management, Andaman & Nicobar Administration

Iran: National and local institutions that will be involved in this project as a whole are the Iranian National Institute for Oceanography and Atmospheric Science

(INIOAS), the National Disaster Management Organization (NDMO), International Institute of Earthquake Engineering and Seismology (IIEES), Local DMOs and representatives of the pilot communities in Chabahar and Jask. In addition, stakeholders that may also be involved in the specific activities are:

- University of Tehran Institute of Geophysics
- Geological Survey & Mineral Explorations of Iran
- Iran National Cartographic Center
- I.R. of IRAN Meteorological Organization
- University of Hormozgan
- UNESCO Tehran

Pakistan: Pakistan Meteorological Department (PMD) and the National Disaster Management Agency (NDMA) of Pakistan, the Provincial Disaster Management authority (PDMA) and representatives of the pilot communities. In addition, stakeholders that may also be involved in specific activities are:

- NED University of Engineering and Technology
- UNESCO Islamabad

Oman: Directorate General of Meteorology (DG-MET), the National Committee for Civil Defence (NCCD), Local DMOs and representatives of pilot communities. In addition, stakeholders that may also be involved in specific activities are:

- Public Authority for Civil Defence and Ambulance (PACDA)
- Sultan Qaboos University

UAE: National Centre of Meteorology. In addition, stakeholders that will also be involved in the specific activities are:

- National Emergency Crisis and Disasters Management Authority

Further, the ICG/IOTWMS has a network of Tsunami National Contacts (TNCs) identified through formal channels who can facilitate in-country policy level support.

L. Capacity

[What is the internal capacity of the organization submitting this proposal to undertake activities and achieve the expected deliverables?]

The IOC-UNESCO ICG/IOTWMS Secretariat in Perth, Western Australia and the IOC-UNESCO Indian Ocean Tsunami Information Centre (IOTIC) housed in UNESCO Jakarta Office will be in charge of the overall project coordination and implementation. Both have diverse practical experiences in the fields of project management, intergovernmental coordination, tsunami warning and mitigation system development and implementation, tsunami exercises, development of SOPs at national and local levels, training on timeline driven SOPs, media involvement and awareness. Both are involved in the implementation of the IOC-UNESCO TRRP across the Indian Ocean.

Further, the project will also draw upon the experience and tools which have been developed by various initiatives and projects in the context of the IOTWMS and other ocean basins especially focussing on near-field tsunami threat. The longstanding experiences in Indonesia in applying a structured approach to develop tsunami preparedness, development warning chains and evacuation planning which have been well-tested and validated, as well as Tsunami KIT developed through the GITEWS/PROTECTS project are all considered relevant for the project. The approach of Thailand to establish a warning chain which links the NTWC directly with the communities at risk might be another interesting reference for the NWIO countries and an opportunity for Thailand to share their experience and lessons learned. Experiences in the development and implementation of the Australian Tsunami Warning System (ATWS) will be drawn upon. Further, experiences and tools developed and documented by various international initiatives, like the Regional Integrated Multi-Hazard Early Warning System for Africa and Asia (RIMES), the AHA Centre, the International Tsunami Information Center (ITIC) and the North-Eastern Atlantic, Mediterranean and connected seas Tsunami Information Centre (NEAMTIC) will be considered.

Over the last 18 years since it was established in 2005, the ICG/IOTWMS Secretariat has successfully helped to coordinate the development of the Indian Ocean Tsunami Warning & Mitigation System in collaboration with the three TSPs, 24 NTWCs and several international partners. The Secretariat also has established a proven track record in implementing numerous regional projects and capacity development initiatives for development of integrated TSP/NTWC/DMO Standard Operating Procedures (SOPs) for tsunami warning and emergency response in the Indian Ocean. The ICG/IOTWMS Secretariat has supported the roll-out of Community Model Interface for Tsunami (ComMIT) training workshops to help all countries across the Indian Ocean develop capabilities in inundation modelling. The ICG/IOTWMS Secretariat has also been coordinating regular tsunami threat information communication tests between TSPs and NTWCs, as well as the Indian Ocean Tsunami Exercises (IOWave) held every two years.

The IOC-UNESCO Indian Ocean Tsunami Information Centre (IOTIC) housed in UNESCO Office Jakarta was initiated in 2012 with a mandate to developing education, awareness, and preparedness materials for Indian Ocean Member

States. IOTIC has implemented several regional activities and projects with funding support from different organizations such as Canadian International Development Agency (CIDA), International Strategy for Disaster Reduction (ISDR), UNESCAP, Indonesian Funds in Trust (IFIT), Malaysian Funds in Trust (MFIT), Japan Funds in Trust (JFIT), Global Fund for Disaster Risk Reduction of World Bank, DFAT-Australia, and UNESCO Regular Programme. IOTIC has been actively participating in policy development and formulation in Indonesia, both at national as well as sub-national level (i.e., Padang and Aceh) by supporting the development of tsunami evacuation maps, plans and procedures.

The ICG/IOTWMS Secretariat and IOTIC jointly implemented several UNESCAP-funded projects resulting in the publication of manuals and guidelines, e.g. "Tsunami Risk Assessment and Mitigation for the Indian Ocean: Knowing your tsunami risk and what to do about it", 2015; Training Modules, e.g. "Training Modules on Tsunami Exercise" and "Training Modules on Policy Support for Tsunami Risk Reduction", 2015; and several national guidebooks, e.g. "National Guidebook for Tsunami Exercise for Timor Leste and Myanmar", "National Tsunami Risk Reduction Programme and Policy for Myanmar", 2015. IOC-UNESCO has also published the booklet "Remembering the 1945 Makran Tsunami: Interviews with Survivors beside the Arabian Sea" (2015) based on an UNESCAP-funded initiative. Also, IOTIC and the ICG/IOTWMS Secretariat implemented training workshops for SOPs in tsunami warning and emergency response in Pakistan, Vietnam, and Myanmar, as well as supported capacity building on tsunami preparedness in Mozambique, Tanzania, Seychelles and Mauritius.

M. Knowledge Management and Results Dissemination

[How will results and experiences from the project be documented and disseminated?]

Knowledge management will be an integral part of the project. The experience gained from project phase-1 will be transferred to phase-2 in support of up-scaling. As in the case with other IOC-UNESCO projects, outputs from this project will be documented in the form of publications such as manuals, guidelines, training modules and other material. Online versions will be made available through websites of IOC-UNESCO (www.ioc-tsunami.org) and IOTIC (www.iotsunami.info). Information will also be linked to other relevant websites within IOC-UNESCO and the Tsunami Information Centres.

Knowledge sharing will be promoted through presentations at the meetings of the IOTWMS Working Groups, ICG/IOTWMS sessions and IOTWMS presentation to the TOWS-WG and the IOC Assembly. Opportunities to share results of the project will also be made possible through ESCAP engagements, such as the 4th Asia-Pacific Disaster Resilience Network Regional Learning Platform.

N. Sustainability

[How will sustainability beyond project end be facilitated? Please explain how the results of the project would be sustained beyond the end of the project.]

One of the main goals of this project is to develop the capabilities and capacities of the five participating nations of the NWIO to be able to implement and sustain effective national tsunami warning chains, tsunami modelling and inundation mapping, and evacuation planning. The support process as part of this project will focus on providing strategic inputs, capacity development and implementation of Tsunami Ready in the Indian Ocean. Implementation to all at risk communities will be responsibility of the participating Member States and requires their allocation of adequate human resources and budget. Conditions for sustainability of outcomes and further up-scaling of the supported measures will be identified, and adequate mechanisms will be agreed with the partner countries to assure sustainability and future roll-out. Towards this goal, substantial consultations have already been undertaken during the proposal preparation phase with the key project partners from India, Iran, Pakistan, Oman and UAE to ensure the objectives of the project are aligned with their urgent requirements.

Sustainability shall be reached by strengthening partner processes, building capacities in the countries, as well as developing tools and processes.

O. Counterpart Contributions

[What are the expected counterpart contributions (in-kind and cash) from your organization towards this project?]

For Phase-2c (Objective 5), IOC-UNESCO will contribute an approximate of 90 person days (equivalent to USD 43,315) of IOTIC and IOTWMS Secretariat staff time in addition to activity and operational costs (equivalent to USD 7,500).

In-country project partners shall make in-kind contributions through participation of their personnel in the project activities, in-country activities and provision of logistics for hosting workshops.

The Directorate General of Meteorology, Government of Oman and the National Center of Meteorology, UAE will co-fund their participation in this project.

P. Monitoring, Evaluation and Audit

[Explain the proposed monitoring, evaluation and audit arrangements. Please see guidelines for further details.]

A steering and coordination mechanism at the regional and national level will be established based on the already existing arrangements in the ICG/IOTWMS and its RWG-NWIO. Project monitoring mechanisms shall include:

- Monthly meetings of the project team for reporting of progress updates, including delivery of outputs, problems met, and solutions needed, and activity planning and coordination.
- Quarterly reporting from project partners on progress of in-country activities, including efforts in sustaining project activities.
- Semi-annual meetings of project team and partners to review project progress against the project framework, including follow-up actions, and receive feedback, including good practices, lessons learned, and steps taken to ensure sustainability of project outcomes.

The project team will prepare progress reports to IOC-UNESCO and ICG/IOTWMS. Further, IOC-UNESCO will provide regular six-monthly reports to UNESCAP, as well as a closing report at the end of Phase-2c of the project. Each report will contain a narrative section and a statement of financial expenditure.

The project will rely on UNESCO internal monitoring and audit mechanisms. With the support of the Administrative Officers in UNESCO Offices in Jakarta and Paris, all activities will be monitored and checked to comply with UNESCO administrative regulations and procedures.

IOC-UNESCO will arrange an independent evaluation of Phases 2a, 2b, and 2c after the end date of Phase-2c of the project. The evaluation will be conducted according to the guidelines from the Internal Oversight Service of UNESCO.

Q. Annexes

[Please provide a table of contents outlining the number and title of each Annex Sample Table of Contents.]

Annex Number	Annex Name
1	Phase -2c Logical Framework Outcome and Outputs
2	Phase -2c Logical Framework Outputs and Contributions
3	Phase -2c Activity Work Breakdown Structure and Budget
4	Phase -2c Calendar of Activities

R. Budget and Payment Schedule.

[Excel form in separate file, "Budget and Payment Schedule Template".]

An initial payment of USD 174,411.36 will be provided by ESCAP upon signature of the Agreement by both to start activities as in indicated in the attached Project Budget and Payment Schedule (Annex-3) and Calendar of Activities (Annex-4).

Subsequent payments will be provided upon approval by ESCAP of a written request for payment from the IOC-UNESCO, together with the relevant progress reports containing both substantive and financial sections on Month 6 and Month 10 (as further detailed in section Q below) and will take into account the progress of the project and projected liquidity needs, as contained in the Budget Payment Schedule and Expense Report.

S. Reporting Requirements

Instalments Phase-2c	
First instalment (USD 174,412)	Payable upon signature of the LoA
Second instalment (USD 56,322)	Payable upon receipt of a satisfactory progress report and financial report for the first six-month period
Third instalment (USD 9,266)	Payable upon receipt and satisfactory Phase-2c progress report and financial report for the next 4 months (Month 10)
Final instalment (USD 0.00)	To acquit the third instalment as an advance upon completion of all LOA activities and receipt and satisfactory Phase-2c final technical and financial report (Month 12). Any amount in excess of final reported expenses must be returned to ESCAP within 2 weeks after submission of the final financial report.
End-of-year reporting	For compliance with IPSAS based on delivery principle in ESCAP book of accounts, UNESCO is required to provide interim financial report accompanied by the list of equipment purchased

	with quantity and value as of 31 Dec 2023 no later than 15 th January of the following year.
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ESCAP retains the right to deduct any overpayment on previous instalments not substantiated by the progress reports from following instalment until delivery is demonstrated through submission of expense report

Financial report should include the details of any equipment purchased including the quantity and value of such equipment.

Appendix 1: Phase 3

The current revisions to the overall project do not affect Phase-3, which is anticipated to be largely carried out as outlined in the 2019 original/initial proposal. The long-term goals of Phase-3 include:

- Enhancing national tsunami early warning systems in the countries by getting all stakeholder involved and the public in general
- Up-scaling of the tested and validated approaches to support self-protection at the local level developed in Phase-1.
- Tsunami risk assessment and development of mitigation strategies looking at a multi-hazard risk management approach and considering risk transfer / financing solution where appropriate.
- Strengthening of self-protection arrangements at local level: establishment of local 24/7 mechanism and warning dissemination technologies, promotion of the development of sub-district and institutional evacuation plans in line with the district or city plans, development of strategies to strengthen tsunami awareness and knowledge at the community level, including public and private sectors.
- Strengthening tsunami emergency response plans, as well as response capabilities.
- Continue to strengthen the understanding of the dynamics in the Makran subduction zone to enhance tsunami modelling and accuracy of tsunami warnings in the NWIO region, based on research by the science community.

Notably, a foreseeable addition will be to further align community activities with the IOC-UNESCO TRRP, which was adopted for global implementation in 2022.