



**Strengthening Tsunami and Earthquake Preparedness in Coastal Areas of
Pakistan**

Quarterly Progress Report January – March 2021

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Project Title: Strengthening Tsunami and Earthquake Preparedness in Coastal Areas of Pakistan

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National and provincial stakeholders/partners Pakistan Meteorological Department (PMD)
National Disaster Management Authority (NDMA)
Provincial Disaster Management Authority, Sindh (PDMA)
Provincial Disaster Management Authority, Balochistan (PDMA)
District Disaster Management Authorities (DDMAs)
District Administrations in the target districts
Pakistan Red Crescent Society (PRCS)
NED University Karachi

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Brief Description of the Project

United Nations Development Programme (UNDP), with financial support from the Government of Japan, is implementing the project titled "Strengthening Tsunami and Earthquake Preparedness in Coastal Areas of Pakistan."

The project aims to enhance the capacities of relevant government entities and communities in enhanced tsunami preparedness, mitigation, and response. Through its activities, the project aims to initiate a policy discourse on the existing capacity and institutional arrangements of agencies involved in disaster risk reduction, preparedness, and response in the coastal areas of Pakistan.

The project will also upgrade the existing tsunami early warning system through strengthening national seismic monitoring capacity in the coastal regions of the country. A comprehensive earthquake and tsunami risk assessment is also being undertaken in the three selected coastal districts of Sindh and Balochistan. Other planned activities include capacity building of government officials and communities in relief, search, and rescue operations; establishing youth response groups; mangrove plantation; developing evacuation routes, raising tsunami shelters, and retrofitting of selected health and education facilities as part of mitigation.

Acronyms

AWP	Annual Work Plan
CBDRM	Community-based Disaster Risk Management
CCA	Climate Change Adaptation
DDMA	District Disaster Management Authority
DEM	Digital Elevation Model
DMA	Disaster Management Authority
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
EWS	Early Warning System
GoJ	Government of Japan
GoP	Government of Pakistan
IEC	Information, Education and Communication
GoB	Government of Balochistan
LoA	Letter of Agreement
NIDM	National Institute of Disaster Management
NDMA	National Disaster Management Authority
NDMP	National Disaster Management Plan
NOC	No Objection Certificate
PDMA	Provincial Disaster Management Authority
PMD	Pakistan Meteorological Department
PPHI	People's Primary Healthcare Initiative
PRCS	Pakistan Red Crescent Society

SAR	Search and Rescue
SDGs	Sustainable Development Goals
TWG	Technical Working Group
VC	Village Community
VDMC	Village Disaster Management Committee
PEOC	Provincial Emergency Operation Cell
DEOC	District Emergency Operation Cell

Introduction

The project “Strengthening Tsunami and Earthquake Preparedness in Coastal Areas of Pakistan” is being implementing in three coastal districts, Malir and West/Keamari Karachi in Sindh and Gwadar in Balochistan. The project components are implemented with the support of NDMA, PDMA Sindh and Balochistan, district administration, Pakistan Metrological Department (PMD), NED University Karachi and Pakistan Red Crescent Society (PRCS). The project seeks to address capacity gaps at institutional as well as at community / local levels.

The coastal areas of Pakistan face risks from potential tsunamis that may be generated by earthquakes in the Arabian Sea. The Makran Subduction Zone, which caused a tsunami in 1945, is located only 100 kilometres from the coast, makes the coastal belt extremely vulnerable to tsunamis. In this context, UNDP is extending support to the Pakistan Meteorological Department (PMD) the up-gradation and expansion of their existing seismological network. The support also includes revision of district specific SOPs, and installation of modern early warning system (EWS) equipment such as tsunami sirens.

Furthermore, the project is providing policy support at the national and sub-national levels through evidence-based research and analysis, aiming at piloting early warning systems to enhance resilience of coastal communities to coastal hazards and expand livelihood opportunities. The project is working with national, provincial and district governments to improve tsunami risk preparedness by enhancing the institutional capacities of the concerned authorities and departments.

Similarly, the project is undertaking community-based disaster risk management (CBDRM) activities in the project districts and building the resilience of communities against tsunamis and other coastal hazards by forming village disaster management committees, enhancing emergency response capacities, strengthening community based EWS and raising awareness.

Project Performance and Results

Description of overall progress:

During the reporting period, the relevant Provincial Disaster Management Authorities (PDMAs) and other key stakeholders were included in project planning and updated UNDP about the progress in their areas. Five (05) consultative meetings were conducted with 18 (16 men and 2 women) key provincial and district stakeholders in Quetta and Karachi during the first quarter of 2021. Through the meetings, the stakeholders were updated about the installation of early warning siren system, retrofitting of government health facilities, schools, development of school safety guidelines, tsunami risk assessment and tsunami evacuation shelters.

Furthermore, tsunami preparedness and policy planning were improved. The existing SOPs for end-to-end early warning were formulated by NED University through a rigorous consultative process with Pakistan Met department, PDMA Sindh, PDMA Balochistan, Pakistan Navy, Coast Guard, Marine Security Agency, Port Authorities, and the Police to reach a consensus on technical issues, standard protocols and their monitoring. Tsunami preparedness was bolstered through guidelines, which were drafted through a consultative process and shared with the main stakeholders for their feedback. The guidelines were also presented at a Regional meeting to obtain feedback and identify gaps.

Institutional response capacities were also improved through search and rescue trainings for relevant officials. Five search and rescue trainings have been conducted for 88 (65 men and 23 women) government officials during the first quarter of 2021. The participants included representatives from several government departments including Education, Health, Police, Balochistan Levies force, fisheries, districts councils, District Disaster Management Authorities (DDMAs) and community members. The participants were trained in practically carrying out search & rescue, and first aid during and after emergencies/disasters.

The district government of Gwadar was supported in enhancing their coordination and response capacities in February 2021 through support in establishing a District Emergency

Operation Cell (DEOC). The DEOC is furnished with necessary equipment to strengthen the capacity of district administrations/DDMAs to monitor, coordinate and implement activities during emergencies,

Women's resilience to disasters was also improved through livelihood trainings, which would allow them to better recover from the financial impact of disasters. 210 women from the selected communities were trained on enterprise development in the target districts to diversify their livelihood so that collective community resilience is built through improving economic conditions. The trainings were initiated in December 2020 and completed in February 2021. The beneficiary women were identified through VDMCs and have been trained to improve their existing business (sewing and embroidery) and start small businesses.

Progress towards Project Results

Output 1: Enhanced national and sub-national capacities through evidence-based research of correlation of earthquake and tsunami risks, provision of policy and institutional support to relevant stakeholders and installation of tsunami early warning system.

Activity 1.1: Organize 01 national and 02 provincial policy dialogues for developing a policy framework for earthquake and tsunami risk reduction.

During the reporting period, steps were taken to strengthen resilience to tsunamis through policy action. The draft tsunami and earthquake guidelines were finalized in month of February 2021, following extensive coordination and feedback from key stakeholders, including the PDMA, National Institute of Oceanography, Pakistan Navy, Pakistan Maritime Security Agency, Pakistan Meteorological Department, and Pakistan Coast Guard. The validation workshop and launch of the document is planned to be organized in April 2021. (**Annex-1: Draft Tsunami Preparedness Guidelines**)

Activity 1.2: Conduct earthquake and tsunami risk assessment of three-kilometre-wide coastal belt of Karachi, tsunami early warning communication and dissemination SOPs, and earthquake and tsunami guidelines for implanting building bylaws and codes in coastal areas.

The disaster resilience of coastal districts is being improved through tsunami risk assessments being undertaken with the technical support of NED university through inundation modelling. The activity has reached its final stage in the reporting quarter, with the findings of the modelling being analysed and translated to a report form. The draft is being reviewed and will be finalized during the second quarter of 2021. Also, based on the initial findings of the

modelling exercise and risk assessment, the existing SOPs for end-to-end early warning were reviewed by NED university, through a rigorous consultative process with the main stakeholders involved in tsunami risk management, to reach concurrence on the required SOPs. **(Annex-2: Tsunami Early Warning SOPs for Pakistan)**

Tsunami guidelines are in the final stage before dissemination which is planned for April 2021. Infrastructural resilience is also being strengthened by amending building bylaws and codes where required. A draft assessment report on recommendation on building bylaws was developed under the project, through an extensive review of the existing bylaws framework of Pakistan. The draft will be further shared with technical institute, Pakistan Engineering Council (PEC), and other government departments for review and feedback. Once the feedback is received and incorporated, a validation workshop will be organized in the month of May 2021. **(Annex-3: Geo-Database development of build environment).**

Activity 1.4: Piloting tsunami early warning systems in project target districts (Karachi west, Malir and Gwadar) and through revision of district specific SOPs, installation of EWS equipment, including through modern communication tools and technologies.

Disaster preparedness was improved in the project districts through the strengthening of early warning systems. As part of support to the Pakistan Meteorological Department (PMD), provided to the Tsunami Warning Centre (TWC), this includes installation of Real Time Earthquake Monitoring Software (Seis-Comp Pro and Modules), tsunami simulation software, Tsunami Observation and Simulation Terminal (TOAST) and other systems to support dissemination of information through SMS, PC based auto-fax, maintenance of earthquake & tsunami simulation database, internet server, and a Scream server (Display of earthquake waveform). The installation is in progress by the Instrumental Software Technologies, Inc.(ISTA) and is expected to replace the system that was in use since 2008. Trainings in the use of new systems and software are planned to commence in May 2021, once the installation is completed.

In addition, installation of tsunami early warning systems is being carried out in far flung and remote locations of the project districts, through installation of tsunami siren systems. In this regard, the procurement of EW system equipment has already been completed and is in the process of being shipped. During the reporting period, in coordination with Pakistan Meteorological Department (PMD) and the district administration departments, identification of 5 siren sites (2 Malir, 1 West/Keamari and 2 Gwadar) has been completed. Structural work was initiated in February 2021 in the target locations for the installation of the tsunami sirens.



Figure-1: Structural work of foundations of early warning tower

Activity 1.5: Strengthening capacity of relevant provincial and district stakeholders in disaster response and relief (search and rescue operations) 05 trainings.

Tsunami is considered a rapid onset hazard that provides very little reaction time and produces devastating inland impacts if it is generated by a nearby source. Along the coastline of Pakistan, several maritime agencies exist for defence purposes and play an active role in relief operations in case any natural disaster hits the coastal belt. Therefore, UNDP is strengthening the capacity of PDMAs and district administration of coastal areas for carrying out appropriate relief, search, and rescue operations as first responders in their respective jurisdictions.

During the reporting period, institutional capacities were improved so that adequate response can be ensured in the event of a disaster. This will also strengthen the disaster resilience of the wider population as the relevant institutions will be prepared to respond. Officials in Sindh and Balochistan were capacitated through practical exercises. Five search and rescue trainings were provided to 88 (65 men and 23 women) government officials during the month of February and March 2021. The participants were from several government departments including Education, Health, Police, Balochistan Levies force, fisheries, District Councils, DDMAs, and community members. The trainings focused on carrying out relief, search & rescue and first aid in practical. **(Annex-4: Search and Rescue Training Report)**

The training course included five basic modules on search and rescue, understanding the basic concepts used in the emergency/disaster response management, and hands-on exercises on first aid and search and rescue (land and water)



Figure-2: Search and Rescue (SAR) Training for government officials_ February 2021

The trained cadre under this activity will indirectly benefit the whole population of the three districts of Karachi West/Keamari, Malir in Sindh and Gwadar in Balochistan. The combined population of the three target districts is estimated at 6.2 million people (census, 2017 - Gwadar: 263,514, West Karachi: 3,914,757& Malir: 2,008,901), out of which approximately 1.5 million people reside in the coastal belt and considered highly vulnerable coastal hazards, including tsunamis.

In addition, the district administration is also equipped with search and rescue and first aid equipment to enhance their response efficiency. The equipment was handed over to the respective District Disaster Management Authorities (DDMAs). The list of the equipment provided is given in the table below. Visibility of the project and the donor was ensured as Government of Japan and UNDP logos were present on the equipment.



Figure-3: Search and Rescue equipment being handed over to the Deputy commissioner, Gwadar_Feb-2021

List of Search and Rescue (SAR) equipment provided at Gwadar

S #	Short Description	Quantity
1	Claw Hammer	2
2	Tube Tents	20
3	Washroom/Shower Tents	1
4	Telescopic Ladder	3
5	Safety Cones	1
6	Fire Extinguisher	10
7	Scoop Stretcher	4
8	Ladder Flexi	2
9	Barrage Tape	2
10	Fire blanket	15
11	Petrol Chain Saw (Wooden)	3
12	Chipping Hammer (Heavy Duty)	1
13	Rotary Rescue Saw (K-12)	1
14	Electrical Chisel (Heavy Duty)	2
15	Hydraulic Concrete Chain Saw	1
16	Hydraulic Jacks (Heavy Duty)	1
17	Air Cushion	1
18	Portable Multi Gas Detector	1
19	Safety Helmet With Strip And Adjustable Torch Holder	25
20	Whistle	25
21	Hand Torch	25
22	Dust Mask	25

23	Debris Gloves	25
24	Personal First Aid Kit	25
25	Rope Rescue Gloves	25
26	Working Jacket	25
27	Ear Muffs	25
28	Air Horn/Megaphone	5
29	Head Lamp	25

Establishment of District Emergency Operation Cell (DEOC)

District level capacity to monitor, coordinate, and implement disaster response was improved. A District Emergency Operation Cell (DEOC) was established in February 2021, near the office of the Deputy Commissioner (DC) of Gwadar.

Figure-4 Inauguration of DEOC, Gwadar supported by UNDP Tsunami Project-February-2021



The DEOC will be beneficial in enhancing the coordination mechanism during emergencies at the provincial and district levels. The DEOC will ensure that all warning, communication systems and instruments are in working condition, routinely receive relevant risk status and information from the district line departments, receive reports on the status of preparedness activities of the district level departments, and the resources at their disposal to arrange and meet their requirements. The DEOC will assist the commissioner in performing the roles assigned to the District Disaster Management Authorities (DDMA) in the respective district.

List of Equipment installed in DEOC Gwadar

S.No	District	Item Description	Quantity
1	Gwadar	LED TV 55 Inch	6
2		HP Laser Jet printer	1
3		Smart UPS 5KVA	1
4		Video Wall Controller	1
5		Power Generator 5KVA	1
6		Office Table with side rack	1
7		Office Chair	3
8		Revolving Chair	2

9	Desktop table	1
10	Desktop Computer	1
11	File Rack	2
12	Charts reflecting multi hazards etc	3
13	Maps	3
14	White board with stand	1
15	Notice Board	1
16	Water Dispenser	1

Activity 1.7: Develop school safety guidelines and mitigation strategies for coastal areas on earthquake and tsunami hazards.

Based on UNDP’s regional guide for schools to prepare for tsunamis, the school safety guide will be a practical document that guides school administrations on how to prepare for and respond to tsunami and earthquake risks. The guide is being developed by a consultant through consultations with provincial and district education departments and key stakeholders from Sindh and Balochistan. For the development of the document, the regional school safety guidelines will be considered as a benchmark. The guidelines will bolster community-level preparedness and response to coastal hazards.

During the reporting period (January to March 2021), meetings were held with provincial disaster management authorities, provincial and district education departments, the Government of Balochistan, NGOs working on education, and relevant UN agencies (UNICEF & WFP) The objective of these meetings was to seek technical insight in school safety requirements and collect primary and secondary data. As a follow-up, the guidelines are proposed to be integrated within the Provincial Institute of Teacher Education (PITE) curriculum.

Moreover, relevant input was received from relevant stakeholders through a one-day Provincial Stakeholder’s Consultation Workshop for “Development of School Safety Guidelines for Tsunami, Earthquake and Coastal Hazards Preparedness”, held on March 18, 2021 at the PDMA conference hall, Quetta. The attendees were made part of the planning process as they suggested measures for earthquake and tsunami preparedness and ideas on conducting simulation exercises at the school level.

The workshop was attended by 20 (19 men and 01 women) participants from Civil Society Organizations, UN agencies and government departments i.e., Education Directorate, PITE Quetta, curriculum wing of education directorate, District Education Officer, Gwadar, Pakistan Meteorological Department, PRCS Balochistan, PDMA Quetta and Makran division.

As a follow-up step of the process, a consultation workshop with the key stakeholders of Sindh will be organized during the second quarter of 2021. The draft national school safety guideline for earthquake and tsunami preparedness in the coastal areas of Pakistan will be finalized and shared with all provincial and district stakeholders in Sindh and Balochistan for review and feedback, once the consultative process is complete. The final validation and launch workshops are planned in the 2nd quarter of 2021.

Output 2: Enhanced preparedness and response capacity of vulnerable coastal communities, keeping gender equity focused approach for reducing threats from coastal hazards.

Activity 2.1: Establish village Disaster Risk Management committees and train 30 youth groups for promoting resilience among communities through sessions, drills, and simulations to help maritime communities better prepare for, respond to, and recover from earthquake and tsunamis.

Women’s livelihoods were improved through skill enhancement and capacity building trainings, which would also improve their resilience to the financial shocks brought about by disasters. The trainings were initiated in Dec 2020 and completed in Feb 2021. The business promotion and entrepreneur management training will help women invest time and capital to establish, expand or improve small businesses to facilitate long-term financial stability for themselves, their families, and their communities.

During the reporting period, 210 women participated in the four day-long training sessions for skill enhancement in the target districts. The trainings were initiated in December 2021 and completed in February 2021. The vulnerable women were identified through the Village Disaster Management Committees (VDMCs) and have been trained to improve their existing skills and trades (sewing and embroidery) and start small businesses. **(Annex-5: Enterprise Development Training Report)**



Figure-6 Training on Enterprise Development for Women Beneficiaries in District Malir, - January 2021

The disaster awareness and resilience of maritime communities was improved through awareness sessions. The activity strengthened and empowered coastal communities to better prepare for disaster response. In this regard, during the reporting period, 30 maritime awareness sessions on earthquakes, tsunami and coastal hazard preparedness were conducted in the 1st quarter of 2021.

Activity 2.2: Production of educational and outreach material and 10 Training of Trainers in earthquake, tsunami & coastal hazard preparedness for educational institutions and community volunteers

Tsunami and earthquake awareness at the community level is being improved through information, education, and communication material. Pakistan red crescent society (PRCS) in collaboration with the Provincial Development Management Authorities (PDMAs) Sindh and Balochistan, Pakistan Meteorological Department (PMD) Tsunami Centre and International Federation of Red Cross (IFRC) has developed information, education and communication material related to coastal hazards with a key focus on earthquake and tsunami preparedness and mitigation. A training manual, booklet, and posters were published in the month of

January 2021. **(Annex-6: Training manual for Training of Trainers on earthquake and tsunami preparedness)**

Institutional risk awareness was also enhanced through a five-day training of trainers, organized from 22-26 February 2021 in Karachi. A total 23 participants (16 men and 7 women) were trained in tsunami risk management. The training participants were from PRCS's provincial and district offices, Pakistan Meteorological Department Karachi, PDMA Sindh and community volunteers. **(Annex-7: Five-days Training of Trainers (TOT) on earthquake, tsunami, and coastal hazard preparedness)**



Figure-7: Five-day training of trainers on earthquake, tsunami and coastal hazard preparedness-February 2021

“Mr. Syed Salman Shah Director General, Provincial Disaster Management Authority Sindh said that UNDP is committed to strengthening effective early warning systems in Sindh and Balochistan. UNDP’ remained actively engaged with the programme’s stakeholders in the province, particularly with coastal communities for making the community resilient to the threat of tsunamis.”



The trainings are expected to have far-reaching positive impacts. This trained cadre will be linked with the district administrations and PDMA for further training opportunities and refresher courses. The trained youth cadre under this activity will reach out to an estimated 20,000 persons residing on the coastal belts of three project districts (every trained youth member will access at least 100 persons in her/his respective community). The trained youth members (both male & female) will impart sessions (formal and informal) to different communities in their respective localities in the 2nd quarter of 2021.

Activity 2.3: Develop 10 preparedness, mitigation, and response plans to help maritime district/ sub district level administration (the lowest governance structure) and communities be more resilient to tsunami hazards.

Under the project, UNDP intends to provide technical assistance to the PDMA and district administrations (Karachi West/Keamari, Malir and Gwadar) in developing district and sub district disaster risk management (DRM) Plans for mainstreaming risk reduction in their sectoral planning process.

During the reporting period, local disaster management functionaries were involved in disaster planning. A wider consultative process was initiated in the month February 2021 by engaging district administrations, departmental heads, political leadership, and other stakeholders for risk profiling of the districts, alongside capacity assessments and mitigation measures for reducing vulnerabilities of the communities through recommended actions. For this purpose, four (4) consultation workshops have been organized on developing District and Tehsil disaster risk management plans in Pasni, Gwadar, Jewani and Ormara in District Gwadar in February 2021. Relevant stakeholders were therefore included in disaster preparedness and mitigation planning and provided their inputs on the aspects that should be included in the response plans.

UNDP will further concentrate on Taluka level disaster risk management (DRM) action planning as the extent of vulnerabilities to earthquake and tsunami varies as per distance from coastal areas. Under this action, two district level and 03 Taluka level (sub district) plans will be developed through a consultative process, ensuring participation of the main stakeholders in the target districts in next quarter of 2021.

Activity 2.5: Mangroves plantation on 100 hectares and 19 model structures for earthquake and tsunami mitigation & preparedness and community EW for tsunamis.

Coordination meetings were held with senior officers of the Forest Department, the Government of Balochistan in January 2021, to apprise the department of the proposed mangroves plantation activity and to discuss the best available implementation modality, ensure departmental ownership and support.

In addition, UNDP has initiated a request for proposal (RFP) to engage an organization/firm for the establishment of mangrove plantations & rehabilitation of 100 hectares to strengthen coastal bio-shields. The mangrove plantation is planned to be undertaken in 2nd quarter of 2021.

One of the components of this project is to strengthen resilience to coastal risks by designing and constructing fourteen (14) multipurpose community tsunami shelters and assessing six government health facilities and 13 educational buildings in the project area for their structural stability and sustainability during potential future events like earthquakes, tsunamis, and cyclones. The selected and prioritized vulnerable structures are aimed to be retrofitted to demonstrate sustainability and financial efficacy of structural mitigation measures.

Model structures for earthquake and tsunami mitigation have been identified and the technical feasibility assessment completed. During the reporting period, Bill of Quantity (BoQs), cost estimates and designs for retrofitting government schools and health facilities have been

prepared and reviewed by a technical team, and the process for engagement of a construction firm or company has been initiated. The structural work is planned to be initiated in May 2021.

Challenges

COVID-19 Impact on Implementation: The pandemic and the subsequent lockdowns have hampered project implementation in the field. In this context, most of the project field-based activities faced unprecedented delays, especially those involving community interactions, construction, field surveys, and feasibility assessments of health and education facilities.

Acquisition of NOCs for land allocation for establishment of tsunami evacuation sites and retrofitting of existing public infrastructure is a very cumbersome process and much more time-consuming than anticipated.

District West/Keamari is a newly created district which was notified in September 2020. Since the district is newly carved from Karachi west therefore, it is very difficult to involve government officials from different departments project activities as they are fairly nascent.

Lessons Learnt

Women’s engagement is ensured in all activities of the project. In most of the communities in Gwadar in Balochistan, women and men’s joint village committees are being formed. However, in some communities of Malir and Karachi West in Sindh, separate trainings were organized, owing to cultural sensitivities and social practices in the region.

Ownership and engagement of the Government departments are essential for project sustainability. The project is ensuring regular coordination at national, provincial and district level with government and partners, particularly Provincial disaster management authorities Sindh and Balochistan (PDMAs) and District disaster management authorities (DDMAs), to develop ownership of the project and ensure sustainability. The government counterparts are consulted before any project intervention is carried out, and their concerns and suggestions are taken into consideration to ensure effective implementation.

Way forward and key priorities (April-June 2021)

Activity	Planned Activities	Next Quarter 2021
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		April	May	June
1.1	Validation workshop on Tsunami policy guidelines	X		
1.2. b	Tsunami early warning communication and dissemination SoPs	X	X	
1.3	Strengthen 01 end-to-end early warning system (EWS) for coastal areas and improve existing mechanism through review and revision of SOPs, building institutional capacity	X	X	X
1.4	Piloting 06 tsunami early warning systems in target districts, through revision of district specific SOPs, installation of EWS equipment, including through modern communication tools and technologies	X	X	X
1.6	Mainstreaming hazards (earthquakes and tsunamis) specific to coastal areas into national building codes, standards, and bylaws	X	X	X
1.7	Organize workshop to develop school safety guideline Karachi	X		
2.1	Establishment of community resource centre	X	X	X
2.2	Production of educative and outreach material and 10 Training of Trainers in tsunami & coastal hazard preparedness for educational institutions and community volunteers	X	X	X
2.3	Development of preparedness, mitigation, and response plans to help maritime district/ sub district level administration (the lowest governance structure)	X	X	X
2.4	Communities and school safety, preparedness, and evacuation plans with periodic drills	X	X	X
2.5	Mangrove plantation on 100 hectares and 19 model structures for earthquake and tsunami mitigation & preparedness and community EW for tsunamis	X	X	X
2.6	Development of tsunami 14 evacuation sites (designated areas with shelter facilities), prepare and mark evacuation routes	X	X	X

Annexures

Annex-#	Document	Link
1	Draft Tsunami Preparedness Guidelines)	 <p>Tsunami and Earthquake Preparedr</p>
2	Tsunami Early Warning SOPs for Pakistan	<p style="text-align: center;">Tsunami Early Warning SOPs for Pakistan</p> <p>Contents</p> <ol style="list-style-type: none"> 1 Introduction 2 Overview of Early Warning Systems (EWS) <ol style="list-style-type: none"> 2.1 Background on EWS 2.2 Defining EWS <ol style="list-style-type: none"> 2.2.1 Risk Knowledge 2.2.2 Monitoring and Warning Service 2.2.3 Warning Dissemination and Communication 2.2.4 Response Capability 2.3 Global Warning Communication Models <ol style="list-style-type: none"> 2.3.1 End-to-end Warning Dissemination (UNESCO-IOC) 2.3.2 Pre-agreed Dissemination 2.3.3 Automated Dissemination 2.4 Early Warning System (EWS) in Pakistan 3 Challenges and Limitations in Tsunami EWS in Pakistan <ol style="list-style-type: none"> 3.1 Tsunamigenic Sources and Coastline Setting <ol style="list-style-type: none"> 3.1.1 Background 3.1.2 Challenges 3.2 Existing Tsunami EWS Framework and Institutional Roles <ol style="list-style-type: none"> 3.2.1 Institutions and Agencies 3.2.2 Challenges and Hurdles 3.3 Societal Issues <ol style="list-style-type: none"> 3.3.1 Media 3.3.2 Communities 4 Tsunami EW SOP Framework for Pakistan <ol style="list-style-type: none"> 4.1 Roles and Responsibilities 4.2 Tsunami SOP Framework <ol style="list-style-type: none"> 4.2.1 Monitoring SOPs 4.2.2 Decision Making (Scenario based) SOPs 4.2.3 Message Chart 4.2.4 Response Timeline 4.2.5 Community Response 4.3 Tsunami Toolkit 5 Tsunami Hazard and Toolkit <ol style="list-style-type: none"> 5.1 Tsunami Hazard Study <ol style="list-style-type: none"> 5.1.1 Seismic Hazard from Tsunamigenic Sources 5.1.2 Tsunami Hazard 5.2 Tsunami Monitoring and Prediction Tools <ol style="list-style-type: none"> 5.2.1 Tsunami Warning Database 5.2.2 Tsunami Tidal Gauge Criterion
3	Geo-Database development of build environment)	 <p>GeoDataBaseR1.pdf</p>
4	Search and Rescue Training Report	 <p>Final Report of SAR Training.docx</p>

5	Enterprise Development Training Report)	
6	Training manual for ToTs on earthquake and tsunami preparedness	 Modules.zip
7	Five-days Training of Trainers (TOT) on earthquake, tsunami and coastal hazard preparedness)	 Training Report of 05 Days (ToT) on EQ, Tsu
8	Database of Trainings and Workshops	 Database of Training-Workshops.x