

*Please fill in the form in the grey spaces, by following the instructions in italic.*

<b>Requesting country:</b>	Republic of Mauritius
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<b>Request title:</b>	Identification, Characterization and exploitation of Potential Offshore Sand Banks/Deposits
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<b>Contact information:</b>		
<i>{Please fill in the table below with the requested information. The request proponent is the organization that the request originates from, if different from the National Designated Entity (NDE).}</i>		
	<b>National Designated Entity</b>	<b>Request Applicant</b>
Contact person:	Mrs Sin Lan Ng Yun Wing	Mr. Grish Gunraz Gunesh
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Organization:	Ministry of Environment, Sustainable Development, and Disaster and Beach Management	Ministry of Environment, Sustainable Development, and Disaster and Beach Management
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<b>Technology Needs Assessment (TNA):</b>
<i>{Select one of the three boxes below:}</i>
<input checked="" type="checkbox"/> <i>The requesting country has conducted a TNA in 2013 (4 March 2013)</i>
<input type="checkbox"/> <i>The requesting country is currently conducting a TNA</i>
<input type="checkbox"/> <i>The requesting country has never conducted a TNA</i>
<i>Climate technology priority : <b>Dune Restoration and vegetation Restoration</b></i>
<i>Reference :</i>
(i) <i>Technology Action Plan (TAP): <b>Chapter 3 section 3.2</b> : Action Plan for Dune and Vegetation Restoration</i>
(ii) <i>Project Idea Report (PIR): <b>Chapter 3 section 3.2.1</b>: Project Idea for Dune and Vegetation Restoration</i>
(iii) <i>Technology Need Assessment- Barrier Analysis and Enabling Framework: <b>Chapter 3 section 3.2</b>: Barrier analysis and possible enabling measures for Dune and Vegetation Restoration</i>

**CTCN Request Incubator Programme:**

*{Please indicate if this request was developed with support from the Request Incubator Programme:}*

- Yes  
 No

**Geographical focus:**

*{Select below the most relevant geographical level for this request:}*

- Community-based  
 Sub-national  
 National  
 Multi-country

*{If the request is related to the sub-national or multi-country level, please indicate here the areas concerned (provinces, states, countries, regions, etc.)}*

**Theme:**

*{Select below the most relevant theme(s) for this request:}*

- Adaptation to climate change  
 Mitigation to climate change  
 Combination of adaptation and mitigation to climate change

**Sectors:**

Coastal zones and Tourism

**Problem statement (up to one page):**

Rapid economic development in Mauritius over the past years has seen increasing pressures on natural environmental resources. Economic success, particularly in the development of the manufacturing and tourism sectors, has required considerable improvements in national infrastructure. The tourism sector, in particular, relies on the high quality of the coastal environment landscape (the sea and sand) as its primary marketing asset. However, rapid development along the coastal margin is in danger of seriously degrading the very asset which provided the impetus to the development in the first place, and has also encroached on areas that provide important societal benefits and public goods.

Beach erosion (which is a natural process) has been exacerbated as a result of the rapid development in the coastal zone, construction within the dynamic beach zone and previous lagoonal sand extraction activities. Given that the disastrous effects of climate change and associated sea level rise are becoming more evident, beach erosion is likely to worsen in the future. Accordingly, several coastal rehabilitation measures have been undertaken by the Ministry of Environment, Sustainable Development, and Disaster and Beach Management in collaboration with relevant stakeholders to abate beach erosion, adapt and increase resilience to climate change impacts.

In line with recommendations from various reports [(i) study on coastal erosion in Mauritius (2003), (ii) Technology Need Assessment Report for the Republic of Mauritius (2013) (iii) Japanese International Cooperation Agency (JICA) Project on Capacity Building on Coastal Protection and Rehabilitation in the Republic of Mauritius (2015)] and also to preserve the natural beauty and environment of our beaches ( which is a very important asset for tourism), soft measures such as beach recharge (coupled with geobags), beach reprofiling and dune stabilization amongst others are being privileged. These initiatives require sand sediment (for the year 2010-2011 about 10 000 m<sup>3</sup> of sand were utilised). However this precious resource is becoming limited and thus a reliable stock of sand is required.

Lagoonal sand mining has been banned since 2001 and until now we have been able to find sources of sand from two inland sand quarries. However, inland sand mining is closely controlled due to its severe impacts on the environment and flooding associated with it.

In view of the scarcity of sand sediment, offshore sand banks/deposits could be a potential source of sand. Through preliminary survey undertaken by Mauritius Oceanography Institute, it has been observed that over the years there has been an accumulation of sand offshore at reef passes more specifically in the fore reef region. It may be inferred that this accumulation has happened due to cyclonic events, the normal hydrodynamics of the lagoon and heavy swells amongst others. The potential for exploitation of offshore sand has also been recognised in different reports, namely, the JICA report on Capacity Development on Coastal Protection and Rehabilitation in the Republic of Mauritius (2015) and the Sustainable Development Strategy for Mauritius (2013).

However, this potential source of sand remains unused due to lack of locally available technical capacity and specialised equipment for geophysical assessment and extraction. Accordingly, request is being made for technical assistance in order to identify, assess, characterise and to produce recommendations regarding the exploitation of offshore sand banks/deposits

**Past and ongoing efforts (up to half a page):**

The Mauritius Oceanography Institute (MOI) initiated a study on the assessment of sand accumulated at reef passes at Flic en Flac, Le Morne, Trou aux Biches, Albion and Mon Choisy. The preliminary findings indicate that there are about 35 000 m<sup>3</sup> of accumulated sand at the above mentioned reef passes. However, the surveys undertaken up to now by the MOI had been based on use of traditional methods, such as the hammering of a pole to identify the thickness of the sand deposits, amongst others, and same was limited to depths of 15- 20 metres. Accordingly, there is a need for a scientific approach for identification of these offshore sand deposits.

Under the Japanese International Cooperation Agency (JICA) project on 'Capacity development on coastal Protection and Rehabilitation in the Republic of Mauritius', the JICA team also carried out a preliminary survey to identify potential borrow sites for sand nourishment. They were of the opinion that the seabed material at the outside reef of Flic en Flac, Le Morne and Trou aux Biches is appropriate for sand nourishment given its granulometry (0.3-0.5 mm). the JICA team has recommended that there is a need to further investigate these areas in order to determine the volume of sand accumulated and its quality.

**Assistance requested (up to one page):**

The following activities list the needs in technical assistance identified in the Identification, Characterization and Exploitation of Potential Offshore Sand Banks/Deposits. We recognise that CTCN services are limited on time and budget and that the Response Planning Team, together with the NDE and the request proponent, will focus and refine the activities accordingly.

**(a) Identification of the long-term quantity of sand likely to be required for beach replenishment**

- (i) To collate existing data and research to identify critical sites affected by erosion and undertake a sediment budget analysis of these critical sites to understand the amount of sand that can be removed without incurring long term environmental damage.
- (ii) To design or develop a protocol on the procedures to undertake sediment budget analysis especially after extreme weather events.
- (iii) To identify the long term quantities of sand that would be required for beach replenishment/recharge (yearly basis) taking into consideration extreme weather events and sea level rise at the critical sites.

**(b) Identification of potential sites for offshore sand mining**

- (i) To identify offshore sand banks and sand deposits in the reef front, outer reef zones and outer islands, in terms of location (GPS), approximate distance from the shore and depth found.
- (ii) To estimate amount of sand in the sand banks and sand deposits in terms of extent (area), volume and possible thickness. Hydrographic survey to produce digitized bathymetric chart/ map to be favoured.
- (iii) To characterize sediment type (in terms of grain size), the biota and the source of the offshore sand deposits, as far as practicable.
- (iv) To document any particular site and other oceanographic /geological characteristics/ features which would be important aspects to be taken into consideration during the sand extraction.

**(c) Recommendation of sites for sand extraction**

- (i) To categorise the sites identified as potential sources of sand according to:
  - their priority as a source, on environmental and social grounds;
  - the practicality of access to the site, its economic suitability and cost for potential exploitation;
  - Identification of the best method, in terms of cost and environment impacts, for sand extraction at the identified exploitable sand bank.
  - The environmental remediation that is likely to be required

**(d) To undertake an environmental impact assessment for potential exploitable sites**

In order to compare the potential impacts of mining sand with the benefits of beach replenishment, an environmental impact assessment shall be carried out. It should cover as a minimum:

- the impact on sand migration and downstream sinks of removing sand from the locations;
- the biodiversity at sites where sand banks are identified and the impact of sand mining on the biodiversity;
- The wider environmental impact of the activity, including the carbon footprint, shore-works and land-side impacts.

**(e) Produce a good practice guide for the activities of sand mining and beach replenishment.**

A good practice guide shall be produced for the management of sand mining and beach replenishment. It should be designed to be used by the operational staff engaged in the mining and replenishment activity. As a minimum the guide should cover:

- List of authorised sites and the maximum annual sand volume that may be mined;
- The best method for extraction of sand shall also be identified and justified, in terms of cost and environmental impacts;
- Steps to be taken to protect the mining environment;
- Steps to be taken to protect the marine environment, including the management of the waste of ships and the prevention of the introduction of alien species from imported dredging equipment;
- Steps to be taken to protect the lagoon during beach replenishment, including the protection of coral and marine life;
- Guidelines for monitoring and evaluation of the sand sources and the replenished beaches; and
- Guidelines for the provision of shore-side and marine-based support including fuel handling (if not expected to be facilitated through existing ports).

**(f) Provide support to identify investment/funding opportunities for the exploitation of the sand banks or potential sources**

- Funding opportunities to be considered from multilateral, bilateral, domestic public and or private sector investment.

**Expected benefits (up to half a page):**

- (i) Availability of a reliable stock of sand to be used judiciously in future beach rehabilitation works ( beach recharge, dune restoration, amongst others) whereby severe beach erosion have occurred due to the adverse impacts of climate change.
- (ii) Capacity building of local counterparts on assessment of sea floor/stratum, use of specialized equipment, identification and mitigation of environment impacts associated with offshore sand mining.
- (iii) Restoration and enhancement of the natural beauty of the beaches
- (iv) Sustained income from tourism and associated activities.

**Post-technical assistance plans (up to half a page):**

*{Please describe here how the results of the CTCN technical assistance will be concretely used by the applicant and national stakeholders, to pursue their efforts of resolving the problems stated above after the completion of the CTCN intervention (list specific follow-up actions that will be undertaken).}*

- (i) Implementation of the recommendations for Dune and vegetation restoration as identified in the Technology Need Assessment Reports ( 2013)
- (ii) Implementation of recommendations for exploitation of offshore sand deposits
- (iii) Identification of storage sites for extracted sand
- (iv) Monitoring ( hydrodynamics and ecology) of exploited sites
- (v) Training for local officers
- (vi) Establishment of a pool of experts that can provide advice at the regional and international levels.

**Key stakeholders:**

*{Please list in the table below the main stakeholders who will be involved in the implementation of the requested CTCN technical assistance, and what their role will be in supporting the assistance (for example, government agencies and ministries, academic institutions and universities, private sector, community organizations, civil society, etc.). Please indicate what organization(s) will be the main/lead counterpart(s) of CTCN experts at national level, in addition to the NDE.}*

Stakeholder	Role to support the implementation of the assistance
Mauritius Oceanography Institute(MOI) ( lead counter parts)	Provision of existing facilities, logistics and man power. Study on coastal processes
Ministry of Housing and Lands ( Hydrographic unit)	Provision of existing facilities, man power and hydrographic charts ( if required)
Ministry of Ocean Economy, Marine Resources, Fisheries, Shipping and Outer Islands ( Fisheries Division)	Assessment of marine ecology and advice on the mitigation measures.
Beach Authority ( under the Ministry of Environment, Sustainable Development, and Disaster and each Management)	Facilitating access to utilities on beach
Mauritius Police Force ( National Coast Guard)	For boat facilities and divers amongst others

**Alignment with national priorities (up to half a page):**

*{Please demonstrate here that the technical assistance requested is consistent with documented national priorities (examples of relevant national priorities include: national development plans, poverty reduction plans, technology needs assessments (TNAs), LEDS, NAMAs, TAPs, NAPs, sectorial strategies and plans, etc.). For each document mentioned, please indicate where the priorities specifically relevant to this request can be found (chapter, page number, etc.).}*

- (i) **Budgetary measure for the year 2014** : beach re-profiling was proposed as a budgetary measure and the aim was to refill sand in order to restore and preserve the natural beauty of the public beaches around the Island (website of Ministry of Finance and Economic Development : [www.mof.govmu.org/budgetspeech.pdf](http://www.mof.govmu.org/budgetspeech.pdf), page 43 Section on ‘Promoting an Environmentally Friendly lifestyle and Cleaner Mauritius’ , para. 371 and 372)
- (ii) **Technology Need Assessment (TNA) Report II (2013) [Barrier Analysis and Enabling Framework- Adaptation (Water, Agriculture and Coastal Zone)], TNA Report III (2013)[Technology Action Plan – Adaptation (Water, Agriculture and Coastal Zone)] and TNA Report IV (2013)[Project Idea Report- Adaptation (Water, Agriculture and Coastal Zone)]**: In these reports ‘Dune and vegetation restoration’ has been identified as a climate Technology priority in the Coastal Zone. However one of the barriers for implementation of this technology has been due to inadequate sand sediment and also same is very costly. Accordingly, exploitation of offshore sand deposits could be an avenue for sand sources. References:

- *TNA Report II( Barrier Analysis and Enabling Framework): Chapter 3 section 3.2: Barrier analysis and possible enabling measures for Dune and Vegetation Restoration;*
- *TNA Report III [Technology Action Plan (TAP)]: Chapter 3 section 3.2 : Action Plan for Dune and Vegetation Restoration*
- *TNA Report IV [Project Idea Report (PIR)]: Chapter 3 section 3.2.1: Project Idea for Dune and Vegetation Restoration*

(iii) **Intended Nationally Determined Contribution for the Republic of Mauritius (INDC):** This report identified ‘Dune and vegetation restoration’ as one of the priority adaptation actions for the coastal zone sector. However, as pointed out earlier this require sand sediment.

(iv) **Sustainable Development Strategy for Mauritius (2013):** the report has identified offshore sand dredging as an activity that will help Mauritius to realise its Sustainable Development vision. Accordingly, the Government of Mauritius require the support of technical specialists to carry out this activity

**Development of the request (up to half a page):**

*{Please explain here how the request was developed at the national level and the process used by the NDE to approve the request before submitting it (who initiated the process, who were the stakeholders involved and what were their roles, and describe any consultations or other meetings that took place to develop and select this request, etc.)}*

As mentioned earlier, beach re-profiling was identified as a budgetary measure and exploitation of offshore sand mining was also identified in the Mauritius Sustainable Strategy for Mauritius [accordingly a Terms of Reference (ToR) was prepared]. Accordingly, several meetings were held with the relevant stakeholders, namely the Mauritius Oceanography Institute, the Ministry of Housing and Lands, the Ministry of Fisheries to review the ToR and pool in resources and technical capacity for implementation of the activity. However, due to lack of technical capacity and necessary equipment, little progress has been made. It was also suggested that a consultant be recruited for same, but same has not been feasible because of limited funds.

Further to a presentation by a representative from Climate Technology Centre Network (CTCN) in August 2015 on the roles and functions of the CTCN, this Ministry has seized the opportunity to submit the request for technical assistance.

**Expected timeframe:**

12 months

**Background documents:**

- Study in Coastal Erosion in Mauritius, 2003
- Integrated Coastal Zone Management (ICZM) Framework for the Republic of Mauritius, 2010
- Mauritius Strategy for Sustainable Development, 2013

- TNA Reports II, III and IV ( Water, Agriculture and Coastal Zone), 2013
- The Project for Capacity Development on Coastal Protection and Rehabilitation in the Republic of Mauritius , 2015

**Monitoring and impact of the assistance:**

*{Read carefully and tick the boxes below.}*

By signing this request, I affirm that processes are in place in the country to monitor and evaluate the assistance provided by the CTCN. I understand that these processes will be explicitly identified in the Response Plan in collaboration with the CTC, and that they will be used in the country to monitor the implementation of the CTCN assistance.

I understand that, after the completion of the requested assistance, I shall support CTCN efforts to measure the success and effects of the support provided, including its short, medium and long-term impacts in the country.

**Signature:**

NDE name: Mrs. Sin Lan Ng Yun Wing

Date: 28 Jan 2016

Signature: 

**THE COMPLETED FORM SHALL BE SENT TO THE [CTCN@UNEP.ORG](mailto:CTCN@UNEP.ORG)**

*Need help? The CTCN team is available to answer questions and guide you through the process of submitting a request. The CTCN team welcomes suggestions to improve this form.*

*>>> Contact the CTCN team at [ctcn@unep.org](mailto:ctcn@unep.org)*