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EVALUATION OF THE COASTAL EVACUATION, COASTAL DISASTER RESILIENCE AND UNDERSTANDING THE DISASTER MANAGEMENT FRAMEWORK OF MALDIVES

Sri Lanka – Maldives joint Scientific Mission of CABARET

28th to 30th July 2019

In Maamigili and Male, Maldives

Short Term Scientific Missions (STSM)

The Team

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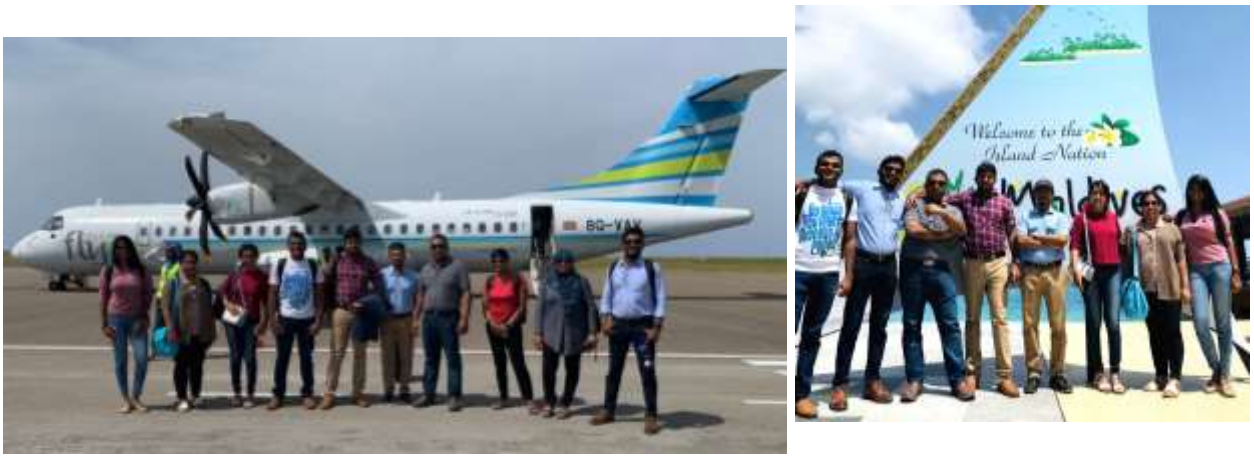

Figure 01 : CABARE Team in Maldives

Overview

Objectives of the visit

- Understanding the disaster management framework of Maldives
- Identifying the gaps and barriers in the disaster management mechanism

Visit Flow

28th July	•Arrival to Maamigili, Maldives •Maamigili Council Meeting •Maamigili community Survey
29th July	•Arrival to Male, Maldives •Symposium at Male National University
30th July	•Visit to Meteorology Department •Visit to Maldives National Disaster Management Authority •Arrival to Sri Lanka

SUMMARY OF THE DATA GATHERED

Institutional Data

1) Meteorological Department

Figure 02 : CABARET Team at Meteorology Department with Department Staff

Main job and service of the Meteorological department is to monitor and issue early warning.

- Main stakeholders - Police
  MNDF (forces)
  TVM (public media – TV)
  VOM (public media – Radio)
  Airport
  EOC
  NDMC
- Monitoring ocean currents, ocean temperature
- Since 1975 - data available (more than 60 years old)
- Technology usage - Mobile app (Monson)
  Radar system
  Planning to integrate all the monitoring systems to one main system

- Technical workforce gather within 10 minutes time duration to proceed with emergency situations
- Awareness sessions - schools in different islands
- Island wide drills – all the stakeholders were participated
- Every year conducting community testing
- Community Viber group – within 7 months 14826 participants

- One way communication
- Most efficient communication modes- social media, mobile app, SMS
- More than 90% use smart phones
- 3 main telecommunication companies - all the islands are covered by both
- Corporates for SMS services
- Alarm system > 5 of magnitude earthquakes
- Following SOP > 7 of magnitude
- Do not have sirens in the islands
- Mobile app – real time data update, notifications, two languages
- They have a separate land phone communication system which is to be used during an emergency, each land phone dedicated to each organization in emergency response such as, Air Port, EOC, NDMC, TVM, VOM, PTWC, MNDF and Police.
- They maintain a backup power system using generators

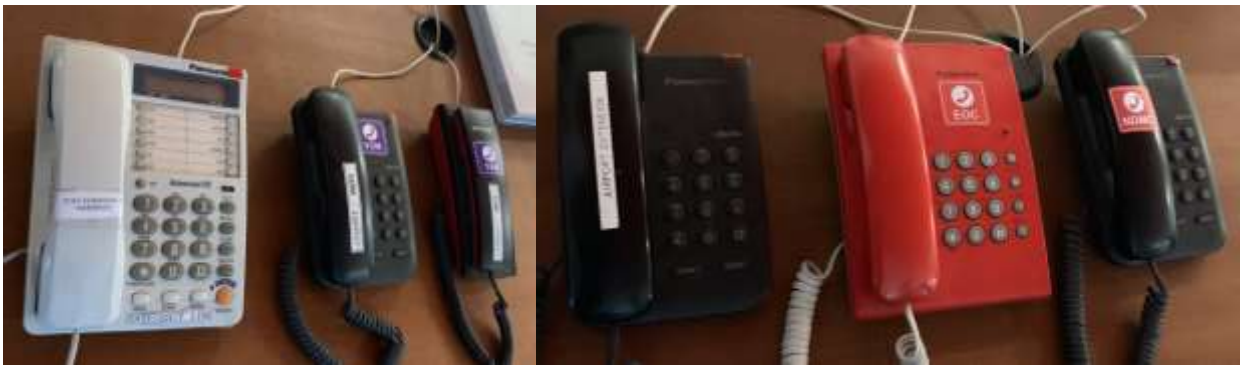

Figure 03: Dedicated Land Phone Communication system Maintained

Figure 04: Power back up systems and the monitoring system maintained

2) National Disaster Management Authority

Figure 05 : CABARET Team conducting meeting with the NDMA

Initial situational studies were started around 1980s. After the Tidal Wave Incident, Suggestions from the workforce to the government of the Maldives were suggested to implement or set up specific institution for Disaster Management. After that, in the president's office a body within them have come up with a set of frameworks and guidelines with an institution to work on as Disaster Management Center. Before 2004, Maldives was a very peaceful country. They haven't faced many natural hazards or and government was not bothered about the disasters until the 2004 Tsunami.

During the initial Period (2004 -2008) after Tsunami, reconstruction and relief operation processes were carried out while DMC and other institutes related to disaster management were established by President of Maldives. These organizations were given the lead to manage the relief and recovery operations during a disaster which also includes integration between different organizations, reconstruction and rehabilitation. After 2005, they stated to work with international partners on resilience of building and the communities to carry out events such as risk assessments and come up with hazard profiles. Around 2007, Maldives had the first disaster risk profile done for 10 key islands with the support of UNDP which is the only recourse done up to today. Those risk assessments were used for planning and the understanding of what sort of disasters that the Maldives will have a risk of going through. DMC or currently named as NDMA has started to work with organizations such as UNDP, ADPC and Mercy International and have started a program called Community Based Disaster Risk Management (CBDRM) Program. Currently, in 52 islands, they have conducted the initial CBDRM activities. NDMA has reviewed their old process and have come up with the CBDRM version 2.0 with better performance. Now the CBDRM 2.0 has been integrated with the program of island disaster management plan as a tool. Also NDMA has established local disaster management committees and community emergency response teams and have looked into how early warning mechanisms and communication systems can be established and practiced in the islands while simulation exercises are also performed in the islands. CBDRM 2.0 has been started to develop in 2017 and have worked in 4 islands using

this newly developed tool during 2018 and 2019. But 50 other islands have been covered through the old version of CBDRM. Due to the rapid changes and developments happening in Maldives, especially in the islands, the CBDRM tool must be revised in a way suitable for the current context and the future trends in the country.

Maldives currently have the Disaster management Act of Maldives since 2015 which have set the entire direction for the government towards disaster management which specify the responsibilities of the government or state and the citizens of Maldives. The existing governance framework is led by the NDMA and the president of Maldives along with the National Steering Committee which is a technical agency. For many reasons the establishment of NDMA was hold by the presidents of Maldives until 2018 December. But with the change of government and the severe flooding occurred in Male, the current president of Maldives has taken steps to establish the NDMA by transforming the DMC into the NDMA. There are lot of stakeholders involved with NDMA and some of them are, National Emergency Responses Forces (NERF), MNDA, Police, public health organizations, Maldivian recurrent. Early Warning mechanism is also guided by the Disaster Management Act of Maldives and it says that NDMA should have a national emergency operation plan in place which also needs to be revised every 5 years' time or periodically basis on disaster conditions that the country is facing. In early 2018, with the support of the World Bank and a Sri Lankan consultant team, the National Emergency Response Plan (NERP) of Maldives was completed and currently NDMA is working with other ministries to identify the major changes that should happen in the system and incorporate them into the National Emergency Response Plan (NERP). NERP document has 2 volumes. Volume 1 is about Legislative Arrangements and institutional arrangements for emergency response in the country and coordination within the country (Chapter 1 on DRR, Chapter 2 on early warning mechanism where different hazards will have specific organizations/ministries responsible for issuing early warnings). Volume 2 is about the analysis of functions before, during and after a hazard.

Different ministries have to come up with their own early warning mechanisms and ways to issue early warning alerts within their ministries while communicating and coordinating with NDMA. These ministries have to issue early warning alerts, not status alerts. NDMA is the body responsible to issue sautés alerts (level of emergency that the region or the island is at). There are 3 main emergency declaration methods/ procedures in Maldives which is Included in the NERP. First one is the Constitution where the President of Maldives has the right to declare the notice. Second one is the Disaster management Act of Maldives where the President of the National Disaster Management Council (president of the country) declare the notice. Thirdly the Public Health Act where the Director General of Public health with the consultation of the Minister of health declare the notice. There are 4 levels of emergency alerts in NERP as below,

1. White: Ministry of Operation Center and Disaster management authority get together and decide in releasing the alert
2. Yellow: Ministry of Operation Center and Disaster management authority get together and decide in releasing the alert
3. Orange: President and the disaster management Committee are involved in releasing the alert
4. Red: President and the disaster management Committee are involved in releasing the alert

National Disaster Management Plan (NDMP) has not been published yet due to many reasons such as waiting for Sendai Framework and after publishing of Sendai framework waited for National Guidance document from the Sendai Framework. Currently, working with National Development Plan. Therefore, NDMP will be included in the National Development Plan as no need of several documents. But it's a must to have a NDMP in the country according to the law and it has to be reviewed every five years' time and has to be integrated with the National Development Plan (NDP). Usually, MET issues forecasted warning alerts or early warning alerts. NDMA issues situational (advisory) alerts after proper analysis from the data they receive from different stakeholders. NDMA of Maldives have observed the alerting mechanisms of India, Sri Lanka and other South Asian countries to improve their mechanisms. Any technical agency who has the relevant technologies and knowledge can issue their own warning alerts and those have to be coordinated and centralized to the NDMA. Currently Maldivian NDMA is working towards a centralized system/process. NDMA will look into the alerts issued and the ground reality of the situation, and say where the state is right then, in level basis (with color codes).Generally what NDMA does is analyses the different alerts and issue a common alert to local councils but not issuing early warning alerts. Also they issue advisory alerts, where other agencies or organizations can't issue. Local councils will pass the alert message to different island councils. During the 2015 Tsunami threat that they had, the whole network was broken down within 30 minutes. So currently they are working on a satellite network system as a backup system (plan B) during a hazard which is connected to Indian SAAC satellite system and it is technically assisted by UNDP.

Maldivian government and private institutes face a challenge due to lack of sufficient resources such as, technology for real time data monitoring and management, have to work with secondary information rather than direct information as no resources to come up with own direct information. Coordination between local councils and the general public is really weak, especially in contacting the island council presidents. Local council including the president of the council handle groundwork due to the lack of proper and timely coordination and the difficulty in receiving and sending the information between island councils. There are 4 regional commands given by MNDF under the arm forces act which is also responsible to respond in an emergency crises on their own. They also have their own mechanisms and coordination with the NDMA. There are 7 regional divisions of the police across the country which also actively involved in emergency situations. Maldivian police is better in communication and coordination as police has more stations and man power than MNDF. But MNDF has more resources compare with the Maldivian police. NDMA is also responsible for moving people during an emergency. For 54 islands, which they have completed the disaster management plan, they have a database which mansions all the details about the resources available in each island such as number of trained people available with their details, available resources (such as water drainage pumps and firefighting equipment) and people whom to coordinate. For islands where the planning is not done yet, it's difficult to communicate and coordinate during a disaster. With the response and advises getting from NDMA, island councils can work on their own plans, but they have to inform and coordinate everything to the NDMA. Each council has their own SOP and mechanisms which have coordinated with NDMA. Maldivian councils have 2 acts that they can work on as Local Government Act or Local Decentralization Act which is not specifically about disasters but about all community affairs and the Disaster Management Act that has a sub clause about disaster management in local communities which gives the local councils the authority to establish disaster management committees in islands which

gives the leadership to response. NDMA also helps to formulate these disaster management committees while increasing the capacities of island communities. Through decentralization act, the power to execute their plans have been restricted for the 3 city councils that the Maldives have but not for the local councils. The authority in decision making of city councils have been taken off by the state. This makes the state authority to handle all city level minor incidents and hazards as well due to lack of top to bottom flow. Therefore city councils should be given the responsibility to handle city level hazards while NDMA work as a top level authority who coordinate everything. Also when the NDMA gives away the responsibility to local councils, they don't act without providing the resources. But NDMA don't have sufficient resources to provide them with.

Currently, NDMA has taken many national and city level initiatives in DRR activities. One of them are, school programs based on Tsunami which provide the knowledge about natural hazards that the Maldives is more vulnerable into and the proper training drills are provided to school children. Community based programs can be identified as another initiative of NDMA which provides the awareness and trainings with a certificate for the delegation. With these initiatives the NDMA also faces many challenges as well. The trained people won't retain due to the knowledge and certification received, as they move to different islands and resources for jobs. Therefore difficult to maintain the trained team during an emergency. Therefore, a new mechanism should be introduced and implemented to sustain the trained teams. Resources such as drainage pumps, firefighting equipment should be provided to Island council levels to work their own without waiting for forces. (This has been started to provide during projects conducted in the islands). Incorporating cluster system to divide the NGOs depending on disaster type. NDMA is also working on new innovations such as incorporating GIS into the CBDRM to expand the system as currently they are using drones to draw map and seeking collaborative support from university to get support to expand GIS and real time data management. Also Maldivian NDMA is current working on identification of required research areas to be developed and doing research on this areas such as flooding and its pattern, effects due to sea level rise and climate change, etc. NDMA also looks for long term sustainable partnerships with universities and academia as research partners and industry partners to mitigate the disasters and build up disaster resilient constructions.

Figure 06: CABARET Team at National Disaster Management Authority with its Staff

Symposium at the Maldives National University, Male

Sri Lankan CABARET team also attended to the Engineering Symposium 2019 of the Maldives National University which was held in Male on 29th July 2019. Prof. P.B.R Dissanayake and Dr. C.S. Bandara conducted two key note speeches as well as participated for a panel discussion on Green Innovation and Entrepreneurship, Sustainable building practices and about the green rating tools with the importance of integrating the Disaster Risk Reduction (DRR) and Disaster Resilient in Green rating tools. During their speeches and the panel discussion the practises and the gaps in both construction industry as well as disaster management aspects were discussed while proposing the new initiatives to the Maldivian audience who were present there.

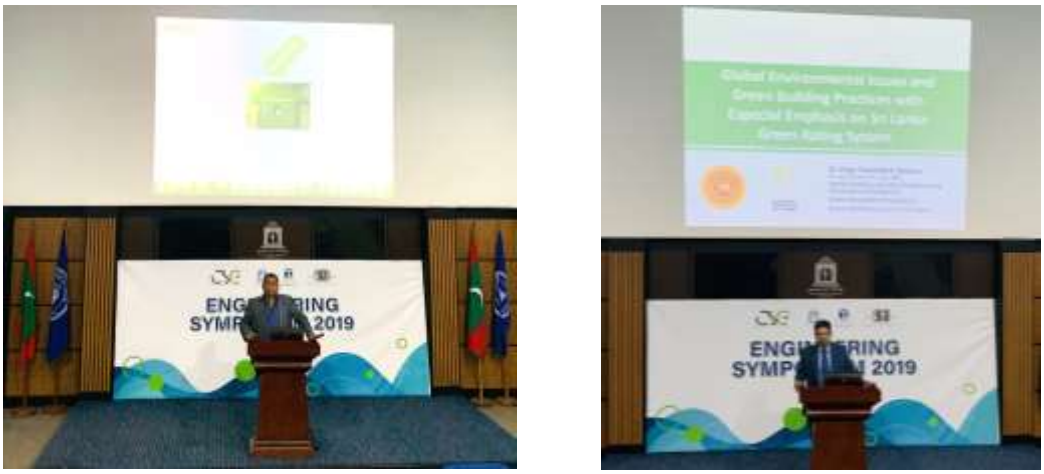

Figure 07 : Prof. Dissanayake and Dr. Bandara delivering their key note speeches

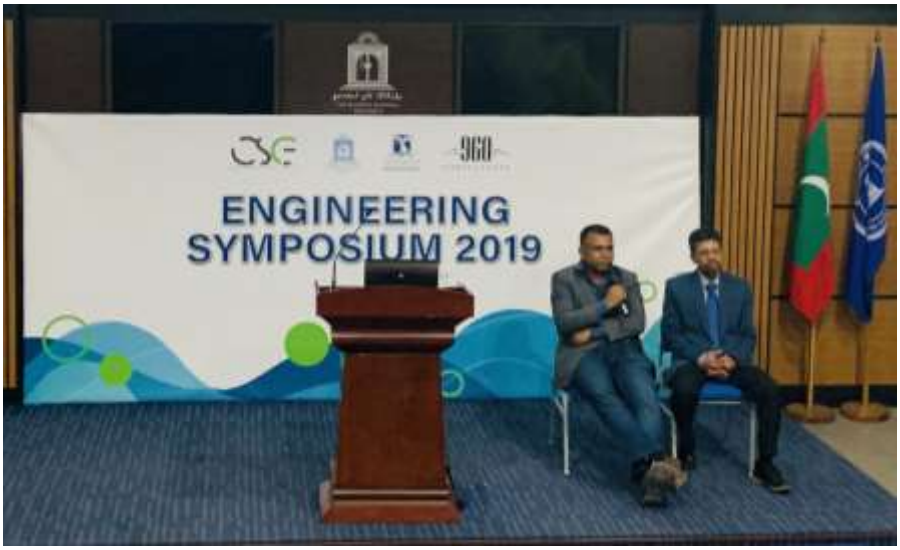

Figure 08 : Panel Discussion

Community Visit Data

1) Village Council - Maamigili

- Community Viber group (most widely used) – to make the community alert on natural hazards

All the council officials are also connected through it

- Do not have sirens or Tsunami Warning towers in the island
- One way communication system for emergency Early Warning system
- Not conducted Tsunami drills in the island
- Relocated community - from Madifushi island which was totally destroyed from Tsunami
- Earthquake monitoring – National Disaster Management Center
- Following Standard Operation Procedures – to follow before, during and after natural hazards
- Main technical agencies (Earthquakes) – IOTWC – ocean forecasting
  INCOIS
  Bureau of Meteorology – Australia
  Indian Meteorological Department - IMD

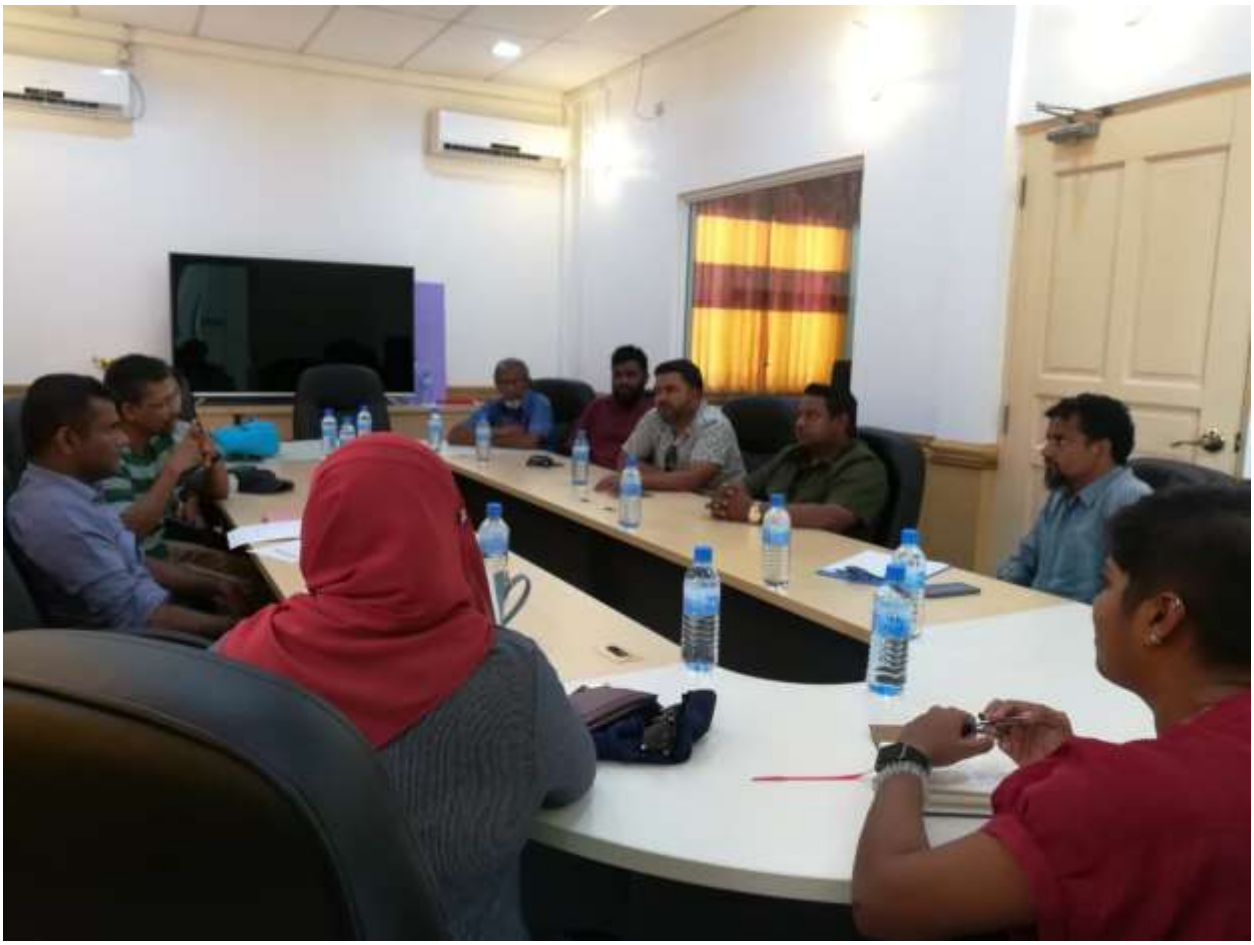

Figure 9: CABARET Team conducting meeting with the Council

2) Village Survey Data

The community surveyed are relocated from Madifushi Island after the 2004 Tsunami. Tourism sector, Mosque work and government service are the main occupancies. Madifushi had a high impact from the Tsunami event. The island was not habituated after the event and recently a resort was started to construct.

The Maamigili Island has a sea wall to protect the island. These constructions are a result of the airport development. The island is safe from Tsunami as of today and acts prone to most coastal hazards.

By the time of the Tsunami Madifushi had no early warning system dedicated to island with respect to Tsunami. The TV/ Radio was the only method available at the time. Now at the Maamigili Island the council gets information as well as individuals has direct access to data and updates for disasters.

Figure 10: Maamigili Community Survey

The income methods at that time were destroyed and completely abounded at Madifushi. With the rehabilitation new income methods were implemented. It was majorly a transfer of work from Madifushi to Maamigili. The community stated that the level of work is better at Maamigili now, when compared to the Madifushi state back in 2004. The relocated people has lands for themselves. As mentioned at the council the land ownership is awarded by the state by considering number of criteria and eligibility.

Figure 11: Maamigili Community Survey (2)

Figure 12: Maamigili Community Survey (3)

It was the state contributed to the development of lands and houses. Yet there were business men who acted in responsible manner in after the Tsunami disaster for the betterment of the community. They have provided the community with ways of evacuation (boats), shelter for the time being and also offered number of job opportunities.

The community has no specific plan to treat people with special needs.