capacities. Beside emergency opeartions, preparedness and early recovery actvities are also assigned for each functional cluster to reduce the earthquake vulnerability to a certain manageable level. The proposed operational functional clusters with lead and support agencies under National Earthqauke Contingency Plans are: Emergency Operations Cluster 1 Overall Command and Coordination (lead-DMB), Emergency Operations Cluster 2 Search, Rescue and Evacuation (lead-FSCD), Health Cluster (DGHS), Relief Services (Food, Nutrition and other Relief) Cluster (lead-DRR), Shelter (Including Camp Management) Cluster (lead-DMB), Water Supply, Sanitation and Hygiene Cluster (lead-Local Government Bodies: City Corporations/pourashava), Restoration of Urban Services Cluster (lead-Local Government Bodies: City Corporations/pourashava, Transport (Road, Rail, Air, Sea) Cluster (lead-BRTA, BIWTA, Bridge Authority, Security and Welfare Cluster (lead-Police). The role of Armed Force Division is actively associated with almost all the clusters.

With regard to each functional cluster, spatial planning requirements in terms of locating facilities at appropriate locations, need assessment based on spatial coverage, identifying alternative locations and routes for emergency supplies, identifying emergency evacuation routes and places for temporary shelters and medical facilities, pre-positioning of facilities, etc., have been identified and mapped under GIS environment that would enable the key emergency responders to act in a coordinated as well as cohesive way. For instance, the total number of displaced population needing temporary shelter has been estimated at around 870,000 within Dhaka city during Madhupur earthquake. It is estimated that 50 percent of the displaced people will need immediate shelter after the earthquake and the remaining 50 percent will manage shelter at their relatives' and other places.

The population evacuated in immediate shelter requires about 3,800 cubic meters of emergency water at a rate of 15 litres per capita per day. The population taken outside require about 9,200 cubic meters of water per day. So, the total emergency water needed in the emergency shelters is about 13,000 cubic metres per day. Pre-positioning of this amount of water at the planned spaces before the earthquake is the most appropriate way to provide immediate emergency response of water. To manage toilets in the immediate shelters, space is the main challenge related to sanitation. There should be one toilet for every 20 people in the emergency shelter, coming to about 13,000 toilets needed in the open spaces within Dhaka City and an additional 30,000 toilets need to plan for the people of Dhaka who need immediate shelter outside Dhaka city.

The total number of skilled/trained workers required for repairing the potable water and waste water system within Dhaka City Corporation area after an earthquake is about 1,800 people per day to repair the system within seven days, 900 in 14 days and 420 in 30 days. The total estimated cost required for repairs is about 27 million USD.

The contingency plans have been developed in around 30 interactive meetings with the agencies. Moreover, two workshops have been conducted in national level to validate the plans. The plan is a measure of the quality of the process. A good planning process will produce a adequate plan. Even though the earthquake that occurs may be very different from the one planned for, the plan will still be useful. A good contingency plan ensures better preparedness for any emergency that may occur, even one that is very different from the scenario in the plan. Legal provisions and organisational set up, functional response roles and responsibilities assigned for the agency, operating procedures guideline and readiness checklists are also outlined in this plan.

Microzoning led risk assessment and corresponding development of contingency plan is a new approach in Bangladesh through CDMP initiatives. There is still room to improve the earthquake hazard assessment. Once the hazard scenarios change, vulnerability and risk will also bring updated results. In order to understand and operate the plan, training on incident command system and restoration of lifelines within shortest possible time have been provided to the professionals of the responding organisations. To cope with emergency situations, organisations need to exercise the plan through simulation drills.

Recent initiatives for capacity building for Search and Rescue operations and Earthquake research activities

Strengthening with Search and Rescue equipment: Disaster Management Bureau procured heavy equipments worth around BDT 70 crore to enhance current facilities of search and rescue operations of Armed Force Division (AFD), Fire Service and Civil Defence (FSCD) and City Corporations. Moreover, FSCD professionals have received advanced training on Medical First Responder (MFR), Collapsed Structure Search and Rescue (CSSR) and advanced training on civil defence through the initiatives of CDMP and other organisations at home and abroad.