The Asia Foundation

FINAL REPORT
(OCTOBER 1, 2009 – AUGUST 31, 2010)

PROGRAM FOR HYDRO-METEOROLOGICAL DISASTER MITIGATION IN SECONDARY CITIES IN SOUTH AND SOUTH EAST ASIA – (PROMISE-SRI LANKA)

ADPC AGREEMENT NUMBER: PROMISE – SRILANKA - UDRM - 1-00

THE ASIA FOUNDATION
Sri Lanka

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1. Introduction

The level of exposure to hydro- meteorological events in secondary cities in Sri Lanka is on the increase. Of the many natural hazards that are prevalent Sri Lanka, floods, landslides, droughts, cyclones and lightning have occurred more frequently during the past few decades, causing severe damage to life and property. Major floods in Sri Lanka are associated with the two monsoons: South – West monsoons during May – Sept, and, North-East monsoons during December - February which typically results in seasonal floods. Further, tropical storms originating in the Bay of Bengal occur seasonally, mainly in the northeastern and eastern part of the country, with a high possibility of being transformed into cyclones. Droughts also affects cities but in different ways. The production of energy in Sri Lanka is mainly connected with hydropower and therefore prolonged droughts are likely to cause power cuts which have an adverse effect on urban areas. Water shortages compel authorities to control the drinking water supply and which also impacts upon urban communities. However, the most common disasters faced by urban communities are flash floods due to the poor maintenance of drainage systems and overflowing of unprotected riverbanks. In the central part of the country, this situation is further aggravated by landslides.

This increased vulnerability to hydro-meteorological events has created awareness among policymakers that disaster management should emphasize risk identification and mitigation rather than the commonly practiced relief-oriented approaches. The subject of disaster management has therefore assumed prime importance, in recent years, particularly as a result of the devastating December 26, 2004 Tsunami that killed tens of thousands of people and destroyed several thousands of dwellings and other buildings.

The Road Map for a Safer Sri Lanka emphasizes the need for proper urban disaster risk management as a cross cutting theme at all levels in the country to reduce the losses due to natural disasters. PROMISE has show-cased the effectiveness of involving Local Government in disaster management at Kalutara, a town of medium size with a population of around 37,000. As a result, there was a demand created for replication of similar activities in other cities prone to hydro-metrological disasters, and Matara was selected as the second PROMISE city by ADPC to undertake activities to demonstrate urban flood mitigation. PROMISE is of the view that Local Governments, in their role in regulating development activities, have the responsibility of reducing the frequency and impact of disasters by imposing disaster risk reduction guidelines in their local development planning and construction regulations.

Figure 1-Matara

Matara is a city located on the Southern coastal line of Sri Lanka approximately 156 Km away from Colombo.

The city of Matara is an economic zone as well a rapidly developing urban commercial centre. One of the country's main rivers, the Nilwala River, originates from Deniyaya and Rakwana hills and flows through the city to meet the Indian Ocean. Matara is full of natural scenic beauty and its sandy and safe beaches are a natural tourist attraction. The sea fishing industry is flourishing and provides a major source of income and supply of fish. The combination of these multi faceted natural resources has made Matara a popular tourist resort.

The city of Matara is the district capital city of the Southern Province and is an economic centre as well a rapidly developing urban commercial centre of the southern Sri Lanka. The Southern Province consists of three districts – Matara, Galle and Hambantota – with Matara situated in between. The total population of the Matara district was around 800,000 in 2007 out of which 76,000 people live in the city. Matara Municipal Council land area spreads over 21.2 sq km with 15 electoral wards, or local units for the purpose of its local administration, the lowest village level administrative unit under the Local Authority Level administrative system. Each of electoral wards in the City Council has a very strong "Pura - Saba" (Citizen Committee) functioning under the patronage of the municipality. The city is catering to the commercial needs of a large catchment area, predominantly dependent on agriculture, fisheries, perennial crops and some industries as livelihoods. The rapidly urbanizing city has its employment generation through commercial sector (77%), industry (16%), agriculture (4%) and others (3%).

Table 1: Demographic and Geographical Details - Matara

Total Population	76,254 in 2007
Male	34,326
Female	36,709
Total land area	21.2 km2
Total No. of wards	15
Number of Households	15,497
Number of families	15,838
Government Buildings	570
Commercial Buildings	4,130
Roads/ Total Length	111.00 km [Bituminous/ Asphalt -95 km , Gravel - 06.4 km Concrete - 10.1 km]

Nilwala Ganga and Associated Disaster Risks

River Nilwala (Nilwala Ganga) is the third longest river in Sri Lanka originating from Deniyaya and Rakwana hills. It runs through Deniyaya town, Morawaka, Akuressa and reaches the city of Matara where it joins the Indian Ocean at Thotamuna. This river irrigates a lot of landscape along the way including tea, rubber and paddy crops as well as cardamom, cinnamon and vegetable plantations.

Figure 2- Nilwala Ganga

The land area in the downstream of the river is flat and more or less evenly spread, and therefore primarily used for paddy and vegetables cultivation purposes.

Major floods in Sri Lanka are associated with the two monsoons: South - West monsoons during May - September and North-East monsoons during December - February. During the monsoon seasons, the Nilwala River carries flood waters from the central up-country hills and freely flows over flat lands often causing severe damage to crops, agricultural lands and finally the urban built up areas of Matara city.

The area north of Matara city and its suburbs often gets flooded during the rainy season due to the over flow of the Nilawala River. The main cause of this flooding is the high annual rainfall in the catchment areas of Deniyaya and Rakwana. Flash floods are also frequent due to the inadequacy of drainage infrastructure and poor maintenance of the city drainage system. A number of structural flood protection schemes such as dykes and earth dams have been undertaken to minimize damages and losses. In 1979, a scheme was initiated by the Ministry of Irrigation with assistance from the Government of France, to mitigate this problem. The first stage of this project has been completed successfully and the areas which were previously flooded are now under paddy cultivation. However, in 2003, floods destroyed 1607 houses and affected 43750 people due to breaching of the flood protection dykes constructed on the river bank.

Table 2 –Recent Disaster Records in Matara

Year/Disaster	Houses Destroyed	Affected People
2003 Flood	1607	43750
2004 Tsunami	2205	22943 (462 died)
2005 Landslide	9	45
2008 Flood	437	1972

Rapid urbanization and the high rate of migration have exacerbated the flood disaster risk almost every year despite the structural mitigation measures that have already been taken. In 2008, floods affected 1972 people in 437 families, inundating the area for several days and damaging the roads of the area. The Great Asian **Tsunami** of 2004 was the worst ever disaster faced by the city in its history. The entire coastal area, a place for famous tourist attraction and fishing industry, was washed away destroying hotels and guest houses and damaging boats and fishing gear. Many people gathered at the morning produce fair were among the victims who drowned in the Tsunami wave. Many of the dead were from areas other than Matara city who came into the city for some reason or were simply passing through the city. A total of 462 of Matara residents lost their lives with 1862 injured, 2205 houses damaged and 22943 people affected.

The eastern part of the city has some elevated areas and minor **landslides** occur during heavy rain fall. Due to the geographical location of the city, which is very close to the southern-most point of the country and open to the Indian Ocean, **cyclone** possibilities cannot be ruled out, although there have been no serious devastations due to severe winds that have been reported in the recent past.

2. Project Overview

2.1 Program Objectives and Goal

Goal

Reduced vulnerability of urban communities through enhanced preparedness and mitigation of hydro-meteorological disasters in urban areas of Sri Lanka.

Program Objectives

- Adoption of specific hydro-meteorological disaster preparedness and mitigation measures to manage hydro-meteorological disaster risk by stakeholders in targeted cities
- Increased stakeholder involvement and further enhancement of strategies, tools and methodologies related to community preparedness and hydro-meteorological disaster mitigation in urban communities
- Strengthened networks and links among relevant risk management institutions/organizations for improving the potential and the capacity of urban local authorities for application and dissemination of lessons learned

2.2 Project Implementing Partner

The Asia Foundation

The Asia Foundation's (TAF) program in Sri Lanka supports local efforts to strengthen democracy, human rights and access to justice; manage and resolve conflict; promote greater citizen participation in policymaking and governance; and, promote private enterprise policy reform. The Foundation supports local initiatives aimed at strengthening the effectiveness and responsiveness of democratic governance. With specific reference to local governance the Foundation has supported capacity building for local authorities on leadership and local development

In the past and at present TAF is assisting the Local Authorities (LA) in the country in development planning. Local Authorities, though explicitly not seen, play a very important role in disaster risk reduction, under their development regulatory role. Nevertheless, in the present LA practices, no emphasis is given to disaster risk reduction, mainly due to lack of awareness and resource limitations. The latest addition to the areas supported by the Foundation under the governance programs is Disaster Risk Reduction (DRR), which was piloted through a project in the Nuwara Eliya District to assist the local administration to enhance their DRR capacities and to support implementation of participatory shelter development program for the families displaced by the landslides. This project entitled 'Creating Opportunities for Economic Revival and Development', (CORD), has a component to develop a framework for policy reforms in the disaster management sector, as a contribution to the policy reform program of the Disaster Management Centre. This policy support initiative will continue in the next phase of CORD, which will be implemented in the Eastern Province, to introduce DRR into the Provincial and Local level administration.

In the concluded phase of the CORD project, TAF was able to highlight the importance of mainstreaming DRR in development planning and the importance of LA involvement in DRR. Consequently, TAF was able to convince the Disaster Management Centre of the importance of LAs in DRR, resulting in bringing forward policy reforms to involve LAs effectively in DRR activities. TAF has also improved its own training curriculum on 'Participatory Planning and Budgeting for Local Authorities in Sri Lanka' by incorporating a section on DRR.

With this introduction of Disaster Management dimension to TAF supported Local Governance programs, it will be beneficial for TAF to stay active in the field of Disaster Management and to build a partnership with a regional technical organization like the ADPC. Though the current project has been a small intervention, it may be considered as a future investment in developing the in-house capacity of TAF in disaster management and augurs well for the Foundation's continued engagement on issues related to disaster management in its Local Governance programming.

2.3 Collaborating institutions

Direct Project Beneficiaries

- Matara Municipal Council (MMC) – project recipient
- Disaster Management Center (DMC)[1] - the national institute in charge of disaster risk management (DRM) - an implementation partner.
- District Disaster Management Coordinating Unit (DMCU) of Matara[2], is the branch of DMC, functioning under the District Secretary.

Resource Providers/ Consultants

- National Building Research Organization[3] (NBRO) - main technical consultant
- Federation of Sri Lankan Local Government Authorities (FSLGA)[4] was commissioned as a consultant for bringing in legal reforms
- Fire Department of Colombo Municipal Council was commissioned for fire and emergency response training
- St. Johns Ambulance of Sri Lanka was commissioned for first aid and emergency response training

2.4 Project Inception

PROMISE commenced its work in October 2009 with an orientation meeting conducted for the purpose of briefing the mayor and Municipal Council (MC) officials about the proposed plan of PROMISE-Matara Municipal Area and to obtain their consensus on the plan. A team comprising a Program Manager and Program Officer of The Asia Foundation, Head Human Settlements of NBRO, and Project Coordinator from ADPC and the PROMISE Field Coordinator participated in the discussions with the Mayor and the Municipal Commissioner. The work plan was presented, fine tuned and agreed upon.

Thereafter, a project inception workshop was held on 13th November 2009 at the Samanmal Hotel, Matara to explain the project plan and to obtain consensus among the stakeholders. The workshop was organized jointly by Matara Municipal Council, The Asia Foundation (TAF), National Building Research Organization (NBRO) and Disaster Management Center (DMC) of Sri Lanka.

[1] DMC is the main state institution mandated with the disaster risk management functions, through an Act of Parliament

[2] DMCU is the local coordination unit of the DMC

[3] NBRO is a state research organization mandated for disaster risk reduction research, and was commissioned by the project as technical consultant

[4] FSLGA is an organization mandated for capacity building of Local Authorities

District Secretary[5], Matara , Divisional Secretary, Municipal Commissioner, Director- Asian Disaster Preparedness Center, Head-Human Settlement Planning Division of NBRO, Director , Training & Public Awareness Division -DMC were among the guests and about 50 participants comprising 15 - Ward[6] officers, 14 - Government Officials Community Service Assistants and 15 – Ward based community representatives have attended for the event, on the invitation by Hon. Mayor of Matara.

Officials from Urban Development Authority (UDA), Coast Conservation Department (CCD), Irrigation Department (ID) were also among the government officials. The workshop was chaired by the Mayor who gave an inspiring speech on his vision for the development of Matara city. The officials from ADPC, The Asia Foundation, DMC and NBRO made presentations on the project outline and proposed activities. During the discussion the activities proposed were fine tuned considering the comments from participants and agreements were reached on continuation of project activities with the participation of the relevant stake holders.

2.5 Project Components

Component 1: Hazard, Vulnerability and Risk Assessment and Development of City Hazard Map

In meeting the objective of the adoption of specific hydro-meteorological disaster preparedness and mitigation measures to manage disaster risk by increased stakeholder involvement through enhanced strategies, tools and methodologies with community participation and through networking of risk management institutions for improving the capacity of Matara Municipal Council (MMC) , a series of risk assessment and participatory planning activities were conducted under the project with the involvement of several new resource institutions introduced to the MMC. They are as follows:

Community Based Risk Assessment Process

Matara City administration is strongly advocating community participatory planning and development through a unique 'Pura Sabha' arrangement, introduced under the citizen charter program. 'Pura Sabhas' have been institutionalized by the city council and is actively involved in local planning and development activities. Each of the municipal ward has a Pura Sabha, working through a back to back arrangement with the city administration, with a dedicated officer appointed to each ward. The Pura Sabha is composed with eight elected members from the ward community and another seven members nominated by the Mayor to maintain inclusiveness. Office bearers including the President and the Secretary are appointed by direct open vote of the community members. In PROMISE activities Pura Sabhas played a major role in bringing the community participation.

Soon after the inception meeting, the risk assessment process commenced during December 2009 to understand the existing situation in relation to hazard, vulnerability and risk. The aim was to develop an action plan to reduce risks through an assessment of disaster risk and develop a city hazard map to bring the site situation into a readable format for decision makers to understand the priority needs and actions. NBRO, which has already conducted similar activities under the previous phase of the project, was commissioned as the technical consultant for this component.

The primary data collection was done through a data collection format developed by the project team. The data sheets were given to the Ward Officers of the MMC, who conducted a ward level survey and filled the data formats with the participation of the communities. The secondary data such as population data, resources and others were collected from relevant institutions.

[5] The District Secretary is the civil administrative head of the District

[6]Matara Municipal area is sub divided into 15 Municipal Wards referred to here as Wards

NBRO together with the technical assistance of DMC conducted three community based disaster mapping workshops by combining representatives of several wards in one group. Pura Sabhas and the ward based Municipal Officers were instrumental in arranging these workshops, which were held in the meeting halls in local temples. The grouping was decided on the basis of the primary hazard levels obtained through primary data collection process. About five community leaders from each ward representing both males and females were invited to participate. In addition, the ward officers of MMC and other relevant stakeholders also participated in the workshop

Three workshops were conducted- the first one, a half day workshop with representatives from 3 wards, and 2nd and 3rd , full day duration combining 6 wards in each as scheduled in the table below:

Table 3: Community Workshops

Workshop No	Ward No	Venue	Date
1	2, 3, 4	Welegoda Sudarshinaramaya temple	19th Dec 2009
2	1, 6, 7, 8, 9, 10	Elawella Pushparamaya temple	16th Jan 2010
3	5, 11, 12, 13, 14, 15	Kotuwegoda Jayasumanaramaya temple	17th Jan 2010

NBRO prepared the Ward Maps to the scale 1: 1000, to facilitate the workshop for demarcating the hazard locations. The workshops were facilitated by resource persons from TAF, NBRO, DMC and ADPC /PROMISE coordinators.

Figure3: Community workshops for the preparation of Hazard Maps

The workshops were structured in a manner to achieve the following outcomes: a) verification of the secondary information relating to hazard history; b) hazard vulnerability assessment and analysis of futuristic risks; c) identification of vulnerable communities; d) capacity assessment of the community and resources in the wards; and, e) an analysis of the land use pattern related to disaster dimension of each ward. As the outcome, ward related above information were subsequently transferred to 1:2000 maps and ward vice description of hazard levels, land uses, capacities and mitigation activities were compiled as a disaster risk management tool for community based risk management, and is given in **Annex VI**.

Through the analysis of primary and secondary data combined with the outcomes of community workshops, the project team developed three main outputs: hazard map, vulnerability map and capacity map. A risk map was developed by overlaying the above three maps. It is important to note that some useful secondary data were drawn from a study done on the Matara city drainage system by Moratuwa University in conducting this task. The risk map indicated the high risk areas where the action projects could be implemented. Based on the risk map, the priority disaster prevention/ mitigation activities were compiled into a draft City Action Plan.

City Consultation Workshop

A workshop was held at the Saman Mal Hotel Matara on 2nd March 2010 to present the City Hazard/Vulnerability/Capacity/Risk Maps (Scale 1:5000) and the draft City Action Plan compiled based on the series of community workshops described above. Matara city officials, headed by the Mayor, community leaders, chairmen of the ward based citizen committees (Pura Sabha) who have participated in the ward level risk assessment workshops attended this workshop in order to review the maps and action plan, and set the priority actions for DRR and mitigation activities for implementation.

His Worship the Mayor of Matara, PROMISE Project Manager (ADPC), DMC District Coordinator for Matara and Program Manager of the Asia Foundation facilitated the sessions. Project Coordinator, ADPC/ DMC, Head- Human Settlements Division of NBRO and his team presented the hazard and risk profile of the Matara city. Community members and the city officials actively participated in reviewing and verifying hazard levels and ranks of their respective wards.

Preparation/Revision of City Action Plan, identification and setting priority activities for mitigation for implementation were carried out during the afternoon session in a facilitated discussion. The concept of bringing government officials and the people together to integrate DRM into development planning is thought to be more effective than the conventional official-led approach as it brings in checks and balances from both sides.

The community representatives participated have appreciated the PROMISE approach of involving them in the decision making process. Their contribution was very effective in refining the hazard and risk profile. They pointed out glaring issues relating to compartmentalization of development plans of different organizations, quoting an example of Road Development Authority developing Matara-Kamburupitiya road closing a drainage connection at the railway crossing, causing flooding of the area. They also pointed out several locations where drainage was blocked by unauthorized constructions and pledged their support to the MC to remove them. They also mentioned the threats from stray dogs and crocodiles, in addition to the identified hazards.

Hazard, Vulnerability, and Capacity Assessment

The final outcome of the above described community based risk assessment process was a comprehensive report on hazard, vulnerability and risk assessment with the Multi-Hazard/ Vulnerability/Capacity/Risk Maps for the city and a separate set of ward level plans, together with a City Action Plan with risk reduction and mitigation activities identified for each ward. This report is expected to be an important planning tool for future development planning of the city.

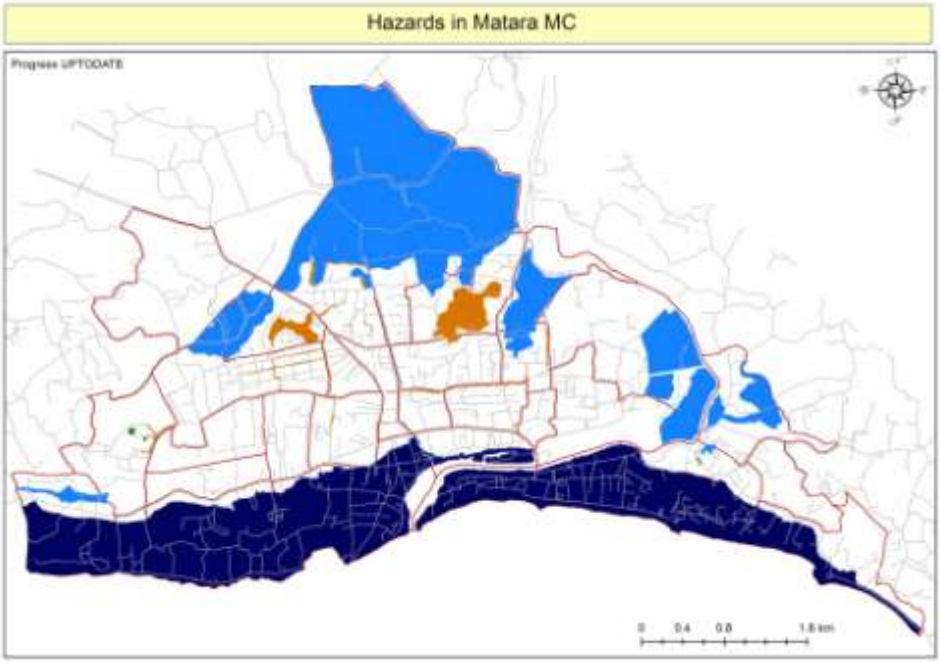

Figure 4-Lands subject to major hazards (Tsunami,floods and landslides)

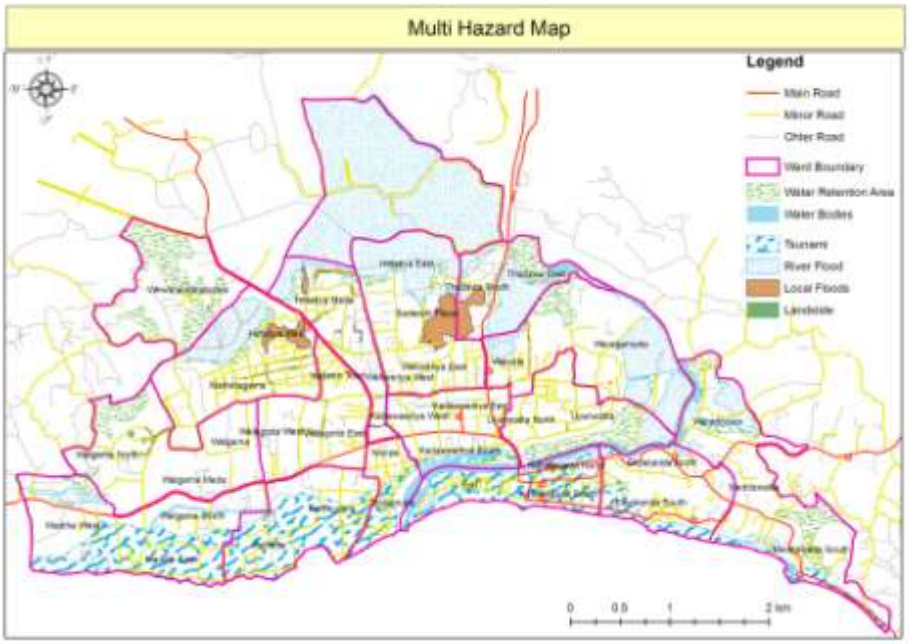

Figure 5-Multy Hazard Map

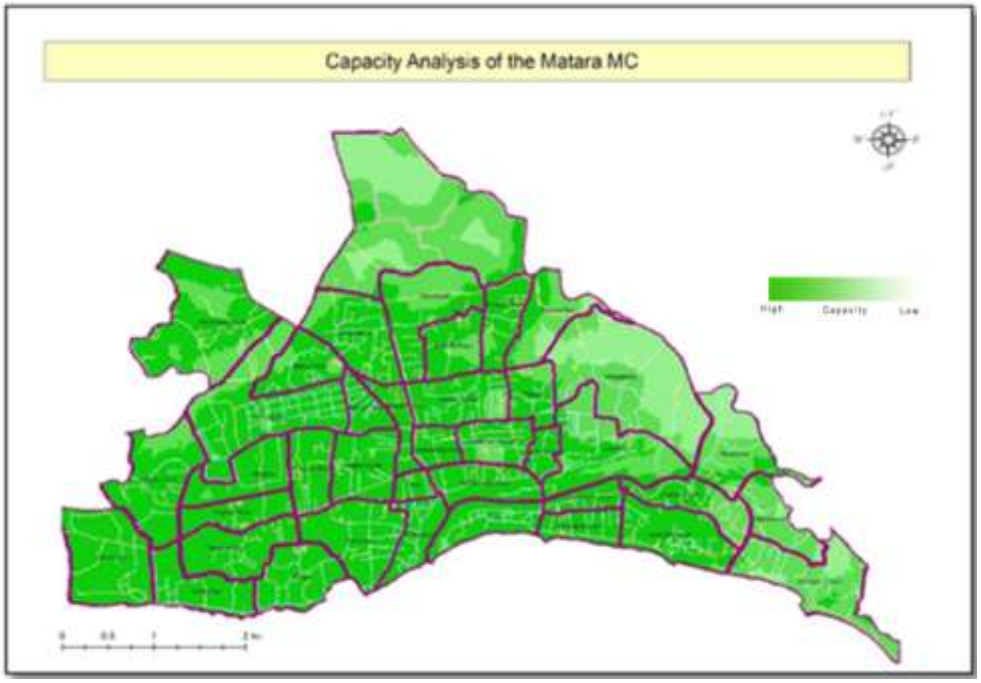

Figure 6- Disaster response capacity map

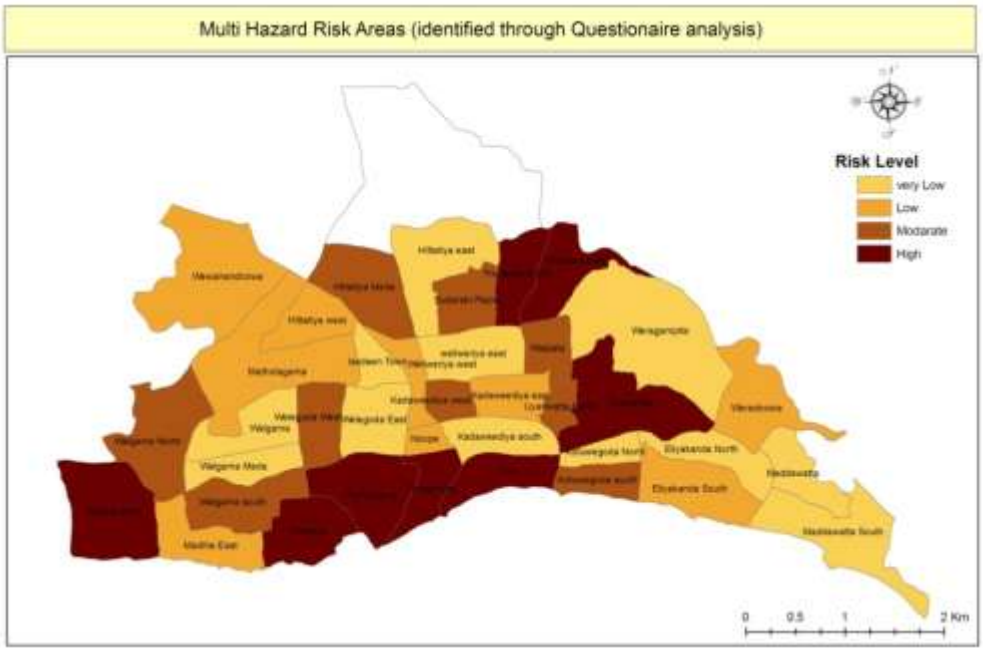

Figure 7- Risk levels

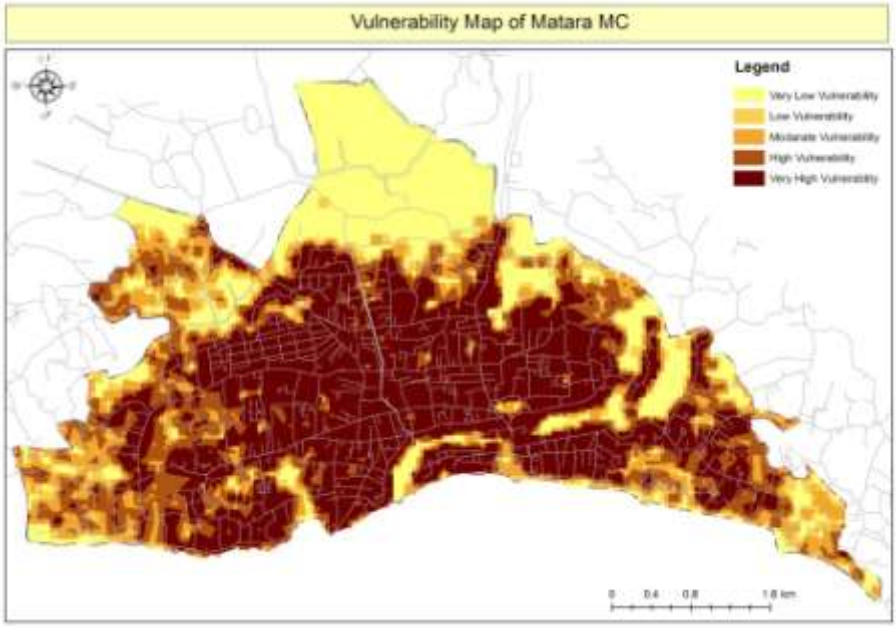

Figure 8-Vulnerability map

Table 4-Summary of Findings:

WARD #	HAZARDS	CAPACITIES	MITIGATION ACTIVITIES
1-Walgama, Walgama meda, Walgama North, Wewahamandoowa	Landslides, Floods and Local Floods. Walgama north area has two landslide locations.	Mahanama Vidyalaya, Sri Vijathilakarama Temple, Anomarama Temple, Werahandoowa wanigasekara Viddiyala were identified as the evacuation places which could accomodate arround 500 persons in each with the basic facilities of electricity, water and sanitation.	Improvement of the drainage networks, prohibit the unwanted land clearance, introduction of the reforestations and introduction the construction techniques in slopes and awareness programmes on consturction of the retaining walls/slope protection methods for the mitigation of landslides.
2-Madiha east, Madiha west & Walgama South	Floods, local floods, coastal erosion, Tsunami	Mahanama Maha Vidyalaya, Anomarama Temple, Weerathungarama Temple and Bodhirukkarama Temple were the identified evacuation places which has basic facilieties of electiricity, water and sanitation. In each of these places could accomadate 500 persons. Chairs, Tents, Generators were available for the support the displaced communities. In addition to them, boats, tractors, lorry and vans are available for the transport the communities.	Prohibiting filling of water bodies and marshy lands, restrict the unauthorised constructions, community awareness programmes for the community including the mock drills for the evacuation and tree-planting in coastal areas where the coastal erosion is taking place.
03-Polhena, Pamburana	Tsunami, rough sea waves during South-West	Sariputta Viddiyalaya was the identified evacuation place in the area which could accomadated 1500 persons. The evacuation	Hazard Resistant Building techniques (Building Codes/ Training Programmes/ Zonning

	monsoons, coastal flooding and erosion	center has the basic facilities of electricity, water and sanitation. Tractors, boats and dozers are available	Regulations/ Imporving Drainage systems), Improving administrative capacity & strengthening the resource base of public institutions and finaly Agricultural & Forestry programmes
4- Welegoda East, Welegoda west, Isadeen Town	Local floods	Sujatha College, Rahula College, Asokarama Temple and Sunandarama Temple were selected as the evacuation places with the basic facilities of electricity, water and sanitation and could accommodate around 500 persons in each	Cleaning and restoration of drains
5- Thotamuna,Noope	Tsunami, river bank erosion	Rahula College was the identified evacuation centre for the ward and could accommodate 1000 persons. Boats and vehicles were available for the transport the threaten people	River bank protection, Cleaning and restoration of drains
6- Hittatiya Meda, Weliweriya west	Floods and local floods	Rahula College, Hittatiya temple were identified as the evacuation centres. Those centres could accommodate 200 persons in each and also they have the basic facilities of water, electricity and sanitation. Cooking pots, tents and vehicles available	Improvement of existing drainage networks, addressing the failures of the Nilwala ganga flood control project, development of construction guidelines for the houses especially in Hittatiya meda area and activate agricultural programmes.
7- Hittatiya West, Mathotagama	Floods and local floods	Hittatiya temple, Mathotagama community hall and Rohana Vidyalaya were identified as the evacuation centres. Hittatiya Rajamaha Viharaya was the most prominent place identified as the evacuation centre. However, all these centres consist of water, electricity and sanitation facilities to accommodate nearly 500 persons.	Addressing the problems of Nilwala ganga flood control project, improving the drainage network, and the introduction of proper housing construction guidelines for the area
8 - Hittatiya East, Sudarshi Pedesa, Weliweriya East	Floods and local floods	Sujatha Vidyalaya, Rahula College, Matara Vidyalaya and Gunarathne Mudaliyanda Temple were identified as the evacuation centres which have facilities of water, electricity and sanitation.	Addressing problems of Nilwala ganga flood control project, Housing Construction Guidelines, Construction the Canal banks and prohibiting land filling in marshy lands and low lying lands.
9- Thudawa North, Thudawa South, Thudawa East	Floods and local floods	Matara Vidyalaya was the identified evacuation centre which can accommodated 1000 persons. It has the facilities of	Addressing the issues of Nilwala Ganga flood control project, developing the housing construction

		water, electricity and sanitation.	guidelines, prohibiting the land fillings were the identified the main mitigation activities in the ward.
10- Walpala, Weragampita	Floods	Olcot Vidyalaya and Uyanwatta primary school were identified as the evacuation centres and those centres have facilities of water, electricity and sanitation. In here, Pilladuwa dam also identified as a place of evacuation during an emergency though it hasn't those facilities for prolonged occupation.	Addressing the issues on Nilwala Ganga flood control project, Cleaning of existing drainage networks and canals, construction of canal banks, prohibiting the land fillings were the identified activities.
11- Uyanwatta, Uyanwatta North, Uyanwatta South	Floods and local floods	Valukaramaya temple, Siri Mangala Pirivena were identified as the evacuation centres and they could accommodate nearly 200 persons in each. Electricity, water and sanitation facilities were available on those centres.	Addressing the issues of Nilwala Ganga flood mitigation project, Awareness programme on Housing Construction Guidelines, Cleaning the existing drainage network and canals, Prohibiting the low lying land filling.
12- Kadaweediya east, Kadaweediya West, Kadaweediya South	Tsunami, floods and local floods	Rahula College, Siri Siduhath Daham school and Meera Jumma Mosque selected as the evacuation places. Rahula College selected as the main evacuation centre which can accommodated 1500 persons. Tents and chairs were available	drain upgrading and reconstruction road side drains along Rahula road in Kadaweediya area and station road.
13-Fort, Kotuwegoda North, Kotuwegoda South	Tsunami, floods and local floods	Rahula college and Tourism Bangalow were identified as the evacuation centres for the area. The new main bus terminal building and market building are the main rescue points. There are many other public and private multi storied buildings in this ward which will provide emergency rescue in a disaster.	Establishment of Disaster Management & Rescue group for the area, constructing the river banks and enforcing the building construction guidelines for mitigation of the hazard risk.
14- Eliyakanda south, Eliyakanda North	Tsunami, Floods and landslides	Gangathilake Temple and Technical Collage were identified as the evacuation centers for the area.	Gabion Wall need for the protection the road users and reduction of vulnerability from Landslide. In addition upgrading of the existing drainage network in Eliyakanda North
15- Maddawatta, Meddawatta South, Weradoova (part)	Tsunami and floods	Isipathana Temple and Jayawardanarama Temple identified as the evacuation centres	Improving drainage in Maddawatta South area- culvert in Eliyakanda junction, cleaning the existing drains

The report was presented as a part of the document titled '*Mainstreaming Disaster Risk Reduction in Urban Local Authority Systems- Matara Municipal Council, Sri Lanka'*, a document produced by NBRO as an outcome of the project. The above described maps and the City Action Plan is presented in detail in the **Annex I:** Mainstreaming Disaster Risk Reduction in Urban Local Authority Systems- Matara Municipal Council, Sri Lanka'

Analysis of City Land Use in Relevance to DRM and Recommendations

Local land use planning in the Matara city was also examined under the Component 1 of the project. The Urban Development Authority (UDA) had developed a land use plan (LUP) for Matara and was in the process of approval when PROMISE entered Matara. The LUP had been developed by the UDA adopting normal urban development principles, but it lacked the DRM dimension, which is very important for Matara, as a city vulnerable to natural disasters. Concurrently, under the direction of the Mayor, a study had been conducted by the Moratuwa University on the drainage system of the city and several recommendations to eliminate flooding of vulnerable areas of the city had been put forward. NBRO was commissioned under PROMISE to review the UDA land use plan taking DRM into consideration and to integrate the recommendations from the Moratuwa University drainage study. This was done by over laying the existing LUP with the Risk Map that had been developed. The output land use planning report now includes settlement planning guidelines and building construction guidelines for the specific areas with different vulnerabilities and will be an important planning tool for the MMC in future.

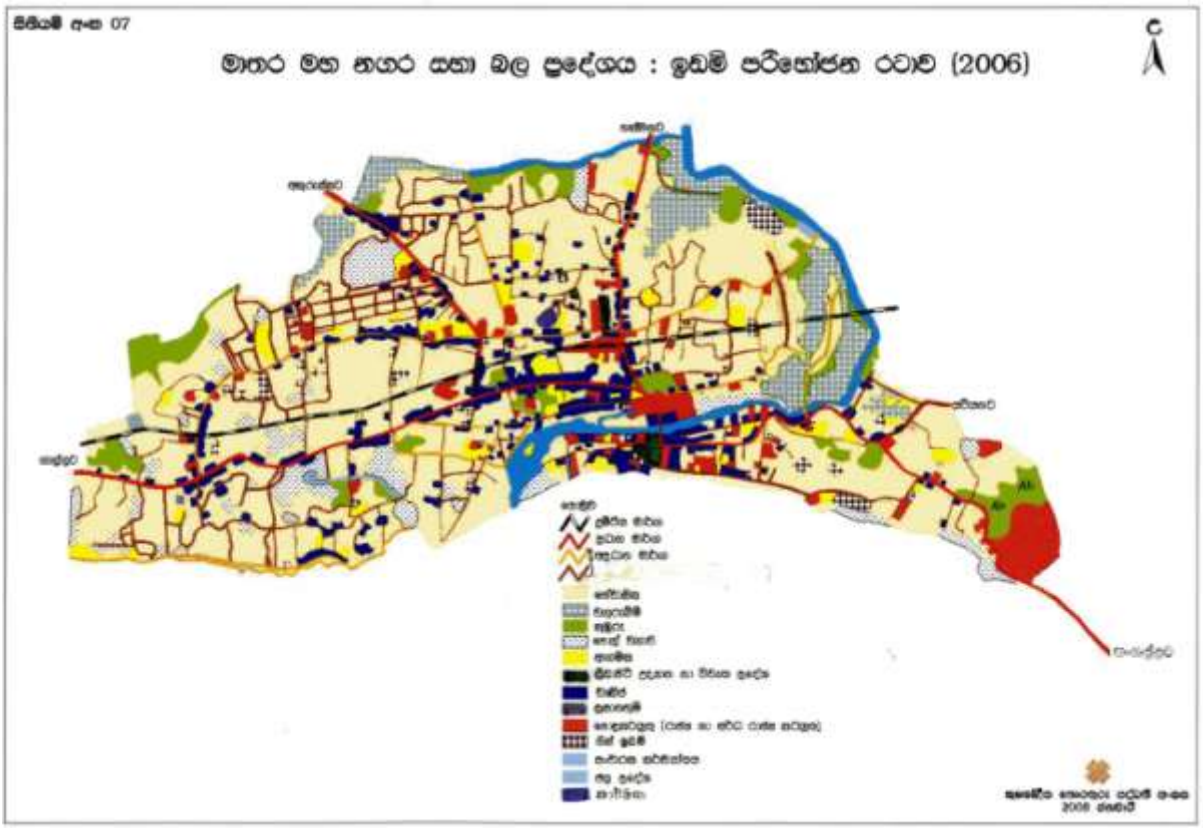

Figure 9: EXISTING Land use

The Matara Town also developed as Concentric Town Centre. Accordingly, the economic activities were developed in the centre of the town centre or the major arterials of the city. The main economic activities were located in along the main road and partly in sub roads which are in Fort, Kotuwegoda,

Kadaweediya and Noope area. The surrounding areas were mostly residential and far from that, the natural boundaries were located.

Therefore, extent of the different existing land uses area are playing the major role of the disaster management planning. Identification of risk on different land use types have gained additional advantage to planning, where it can change in different format or change the land use type. Land use risk areas were selected through the multiplication of multi hazard risk and land use pattern of the area by weighting the exposure level of the land uses. On this, without classification according different hazard types, in-appropriate land use practices were mainly located in Uyanwatta, Weragampita, Kadaweedia West/ East, Mathotagama and Kotuwegoda area. The outcome of this analysis was a set of land use planning guidelines based on estimated risk levels of different land uses which comprised of set of settlement planning guidelines and building construction guidelines focusing on flood and tsunami risk. The analysis also identified Uyanwatta, Weragampita, Mathotagama, Thudawa, Hittatiya area are vulnerable to floods and Madiha, Polheda, Paburana, Pamburana, Fort, Kandegoda and Eliyakanda areas in the coastal belt are vulnerable to Tsunamis and coastal floods.

Areas of applicability of flood guidelines and Tsunami/coastal flood guidelines are shown in the map below;

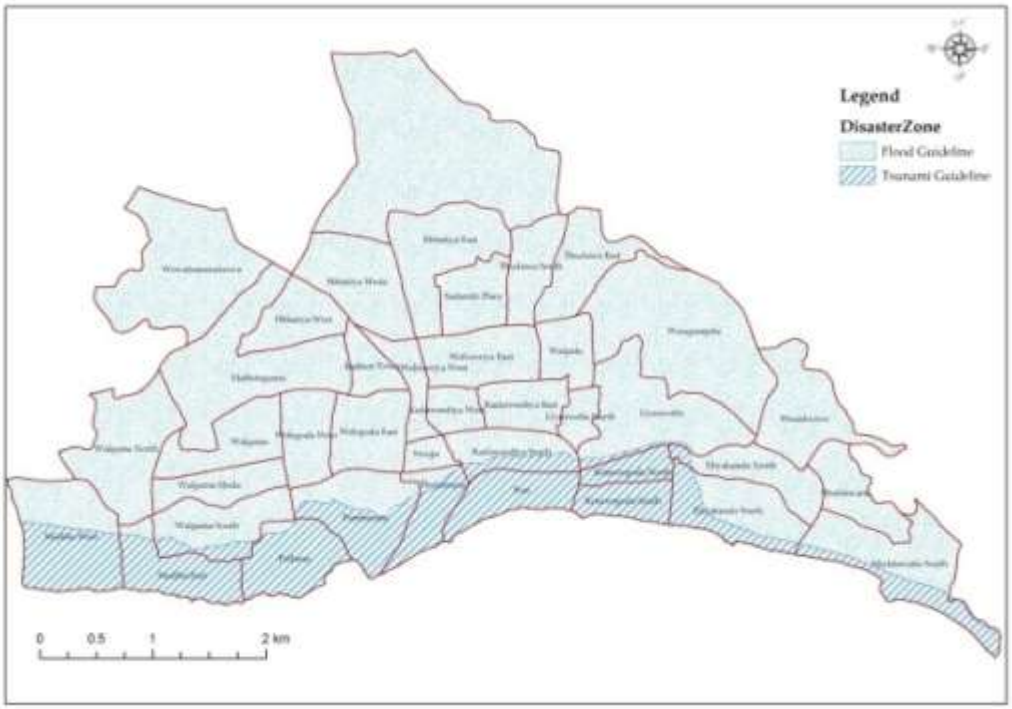

Figure 10: guideline zones

(The detailed land use recommendations including settlement planning and building guidelines are also presented as part of the NBRO document entitled 'Mainstreaming Disaster Risk Reduction in Urban Local Authority Systems- Matara Municipal Council, Sri Lanka', in the **Annex 1**)

Training on Participatory Planning to Consolidate the Land Use Plan Recommendations

In order to consolidate the land use planning recommendations for effective regulation of development activities in the city, a two day workshop was organized on 30th – 31st August, 2010 at the T K Rest House for city officers and elected members. The objective of the workshop was to bring

in land use planning recommendations and DRM concepts developed under the project to the Mid Term (four year) City Development Plan, already being prepared by city officials through a participatory process, under the guidance of The Asia Foundation (TAF), under a different program.

At this two day workshop conducted by TAF in-house resource persons, (using a TAF training module on participatory planning with modifications to incorporate DRM concepts), the City Planning officials and the Municipal Councilors were trained to develop ward level mid- term development plans incorporating DRM concepts and land use recommendations. The participatory planning process involving community representatives is being continued under the guidance of TAF until the end of the year. The envisaged planning process which is ongoing under the supervision of TAF is as follows;

- Set up of MC Planning Cell
- Appoint Process Champion for MC Planning Process
- Set up Ward Level Planning Units
- Appoint Process Champions for Ward level Planning Units (Ward Officers)
- Participatory Consultation Process at ward level under the Guidance of Process Champion to identify the issues and prioritization of issues, proposals and alternative proposals for each prioritized issues, prioritizing projects, estimation of costs and preparation of work plan to implementation of projects. (For the prioritization process details of the Land use plan and Disaster Risk Reduction Concepts are used)
- Prepare the Final Plan for the Ward by the Ward level Planning unit
- Get the consensus of the Pura Sabha
- Amalgamation of the Participatory plans of the Pura Sabha and prepare the Participatory Plan for the entire MC.

The immediate output of the planning process is Medium Term Participatory Development Plans for the Wards and Composite Medium Term Participatory Development Plan for the MC. The long term outcome is sustainable development integrated with disaster risk reduction in the area. At the end of the ongoing process the following outcomes are expected:

1. Fifteen disaster resilient medium term participatory plans for wards completed by the end of the November 2010.
2. An Integrated disaster resilient medium term Participatory Plan for Matara Municipality by the end of the year 2010.
3. Reduction of risk factors in proposals in the medium term plan due to the consideration of risk factors at the planning session
4. People's development proposals move along with the land use plan recommendations.

Following are the direct outputs of the planning workshop done as part of the planning process.

1. Trained set of 45 members of the community and municipal council officers on basics of participatory technology and participatory planning
2. Review of work completed by the Municipal during the last year
3. List of aspirations of people on different departments of the municipality.
4. People's thinking on ways to improve revenue of MC.
5. List of risks identified by the citizens
6. Awareness of Matara Land use Plan
7. Set of requirements of the citizens compiled through participatory methodology

<u>Component 2:</u> Mitigation and Preparedness

It is inevitable that communities are both the immediate victims, first responders and, at the same time, the beneficiaries of correctly identified and implemented mitigation and preparedness activities. Therefore, it is vital that members of the community understand the risks and seek to build some consensus on finding their own preparedness and mitigation measures. In that context, the PROMISE project supported communities in and around the Matara Municipality to better understand their own priorities, ensured that they participated actively in decision-making processes and required their close involvement and engagement in the implementation of selected activities. Accordingly, selection of target communities at ward level and selection of community participatory mitigation activities and implementation were specifically supported under the project. Further, non-structural mitigation actions such as training of community respondents in responding to emergencies were also supported.

Implementation of community participatory mitigation activities

In the City Consultation Workshop, reported above under Component 1, a number of structural mitigation activities were identified and prioritized by community representatives together with city officials. These priority activities will be taken up for implementation in the future four year development plan of the MMC. Under PROMISE, two such priority activities for mitigation of flash floods affecting highly populated areas in Matara were taken up for implementation as two pilot projects of community participatory disaster mitigation projects. These two projects were;

Figure -11

Project 1- Improvement of the canal from Vellawatta to Nawimana Road up to 2nd culvert.
An approximate length of 600 meters of the earthen canal was deepened and widened allowing rain water to flow uninterruptedly and the surrounding area and bank were cleared.

Figure -12

Project 2: Improvement of the Piladuwa Ganga Mawatha 1st cross canal
An approximate length of 100 meters of the canal has been improved by concrete lining of canal bottom and two sides after cleaning and deepening

The selection of projects was based on the number of families who would benefit, the preparedness of local CBOs to participate in the pilots and funding limitations within the project. A Memorandum of Understanding (MOU) specifying the roles and responsibilities between the Municipal Council and each CBO was signed prior to implementation of the two projects which was subsequently approved by the Council of the Municipality.

The Community Development Department of the MMC was instrumental in conducting community meetings to agree on the roles and responsibilities of different parties. Accordingly, the design, technical assistance, and some construction machinery/tools was offered by the Municipal Council. 'Pura Sabhas'-CBOs of the local areas agreed to participate in managing the two projects and in the long term up-keep of the drains. The Works Department of the MMC was capable of preparation of detailed materials lists and cost estimates and assisted the CBOs in providing necessary technical

guidance together with the construction machinery and tools. The Community Development Department of the MMC was responsible for processing the Council approval for the projects and mobilizing the CBOs. The project provided financial support for implementation of construction activities. The two projects were successfully within the budget allocations although there was some unexpected time over-run due to inclement weather. Consequent to the successful implementation of these two projects, the Disaster Management Center (DMC) offered funding for two more projects in the priority list.

Training of Community Respondents in Fire Safety and Emergency Response

Although Matara Municipal Council possesses a sophisticated fire fighting unit its capacity is severely limited by the lack of trained staff. A considerable amount of project time was spent awaiting the Government sanction for the recruitment of fire fighting staff which did not materialize in time for the project to support the MMC to develop a fire emergency response plan and train newly recruited staff. This delay was discussed with the Mayor and an alternative proposal to form a team of community respondents to complement the limited fire fighting staff of the MMC was proposed and agreed upon. Accordingly, a group of 20 community respondents and 10 officers representing operational crews of both Municipal Council and District Disaster Management Coordination Unit (DMCU) were given training on fire safety and emergency response through the Colombo Municipal Council Fire Department at its Colombo Training Centre in a residential program held from 17 – 18, May 2010. The selected community members were from among the most vulnerable communities in the city and were young males with reasonable education and leadership qualities.

Figure - 13

This two day training program included both theory and practice relating to the subject areas: fire - knowledge including chemistry of fire, type of fire and method of heat transmission, extinction of fire, fire fighting agents and fire extinguishers, fire prevention techniques, means of escape, preparing for emergencies, emergency service liaison, first aid-safety procedure, incident management plan (AMEGA), casualty management plan (DRABC), recovery position, CPR (adults), burns, bleeding arresting, faint, epilepsy, fractures, immobilization, bandaging, slings.

The trainees were seen participating very enthusiastically in the training activities in heavy rain showing their commitment. The community respondents were trained in assisting fire fighting operations and will be able to create awareness among vulnerable communities in preventing fire hazards.

Training of Community Respondents on First Aid and Emergency Response

Figure -14

A total of 60 community respondents, both male and female, selected by the MMC from vulnerable locations within Matara City, were trained in first aid and emergency response by the St. John's Ambulance Sri Lanka - a pioneering training agency in the country that also provides emergency medical and health related services.

The selection of the trainees was done among reasonably educated, youthful members within those communities who could give leadership in an emergency situation to conduct responsive action.

The two 4-day training programs were held in the Matara Municipal Council Fire Department. It included theory and practice relating to the subject areas of introduction to first aid, responsibilities of a first aider, incident management, casualty management, CPR, recovery position, wounds and bleeding, dressing and bandages, shock management and their treatments, fractures and dislocations, strains and sprains, poisonings, lifting's and transportations, finals assessment among others.

After successful completion of this training, an internationally recognized certificate was awarded to the participants by the St. John's Ambulance Sri Lanka. It is expected that the trained members will engage in the disaster response initiatives when the community affected by any disaster.

<u>Component 3</u>: Training and Public Awareness

Several trainings and public awareness programs, including those described above, were undertaken with a view to promote risk reduction measures in furtherance of project objectives. Systematic training is essential and enables the community to take proactive action with the making technical assistance all the effective.

School Safety Programme

School children and teachers are a very important segment in society, capable of significant transformation in culture and attitudes towards society. Their awareness influences parents and finally the entire society. On the other hand, children are among the most vulnerable in disasters situations. Among those who lost their lives due to in the 2004 Tsunami, the majority were children and women. Some of the schools of Matara city have already been given Tsunami training by the DMCU. There has been a high level of responsiveness to these trainings and test drills by school authorities as well as parents. Although such trainings were confined to the coastal zone, similar training and safety measures are required for the schools in flood prone areas as well. Therefore, a training program for school children in the flood prone areas was undertaken under the project.

Under this activity, 45 children and some teachers from three major schools at Matara Municipal Area (Janadhipathi Vidyalaya,, St. Servatius' College and St Thomas College) were offered awareness/ training on Hydro-meteorological Disaster Risk Reduction measures on the 4th August 2010 at the St. Servatius' College main hall. The training focused on monitoring of weather for prediction of disasters and response mechanisms at school level. Simulation exercises were included in this program. This training was conducted by the National Building Research Organization (NBRO) and Matara District Disaster Management Coordinating Unit in collaboration with the Municipal Council of Matara.

The training module of the programme had been a one developed jointly by the Disaster Management Centre, Ministry of Education, Institute of National Education and Ministry of Disaster Management and Human Rights. The main objective of this programme was to develop a safer place for the education. A Publication titled "Towards A Disaster Safe National Guidelines for School Disaster Safety" has been used as the training guide. This programme consists of 7 steps:

1 Establishing a disaster management core unit : Principal of the school was the head of this group and some teachers and students were also included this group. The main purpose of this group was to plan further works related to the disaster management plan and evolve a practical method of implementing the programme.
2 Creating an Awareness within the school community : The awareness programme about disasters and mitigation activities was conducted in several ways with the participation of teachers and students by conducting lectures and exhibiting posters. The objective of this awareness activity was to disseminate information among the school community, provide an understanding of the magnitude of hazards with respect to the probability of occurrence and importance of disaster management plan.
3 Understanding the hazards and Disaster Management Capacity : Listing the hazards in the schools and places which may occur and available capacities like first aid kit locations, fire extinguishers.
4 Establishing a Disaster Management Unit and Training : This disaster management unit is consisted with students, teachers, principal, parents, police, PHI, community leaders, politicians and other parties who would have an interest over the school safety.

This group can be divided into several sub groups according to the type of hazard, number of students, available capacities. As an example, the disaster management units can be shown as follows,

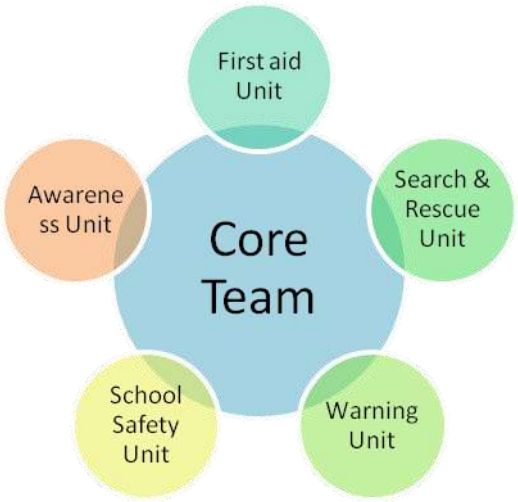

Figure 15 - School Disaster Management Unit

5 Preparing a Disaster Management Plan : School disaster management plans have been developed under this step. Children were first directed to sketch the school map showing the buildings, class rooms, laboratories, name boards, sign boards, play grounds, and other relevant features. Then they were instructed to select the safe evacuation places and evacuation routes. The completed maps should be displayed in the notice boards, class rooms, office and other places where students can readily notice.

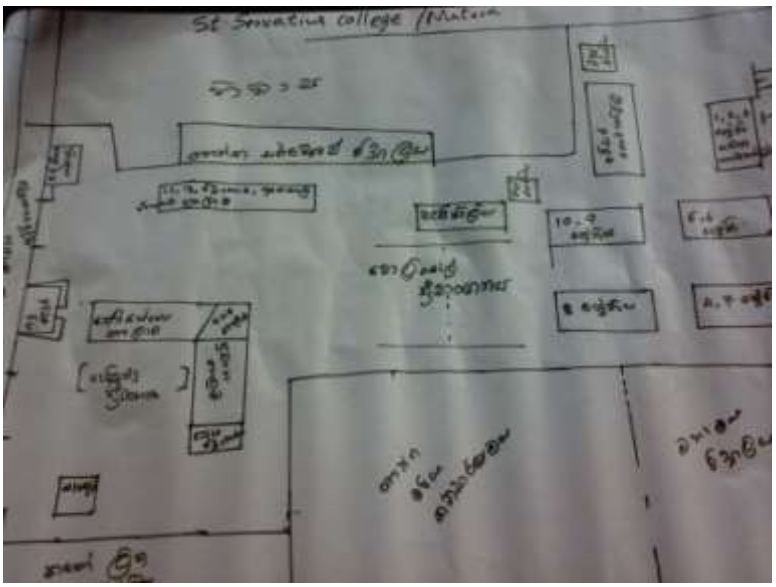

Figure 16 - St. Servatius Collage layout plan

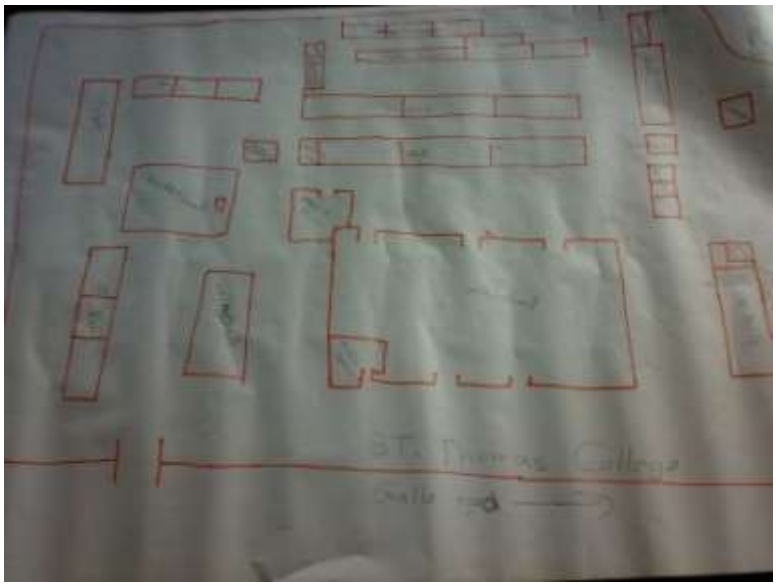

Figure 17 -1 St. Thomas Collage layout plan

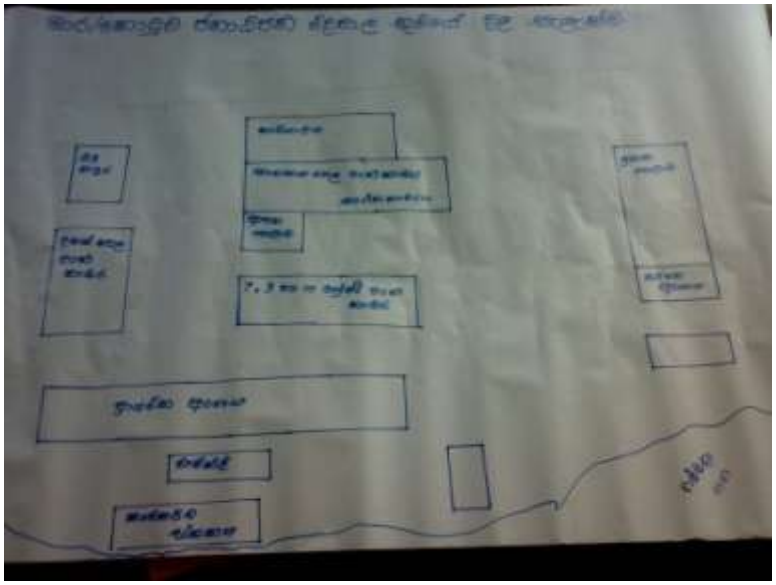

Figure 18 - Janadipathi Vidyalaya, Layout plan

6 Distribute the Disaster Management Plan and Mock drill : The disaster management plan thus prepared should be prominently exhibited as stated above. In addition it is useful to print it as leaflet and given to teachers and students. Finally, a mock drill was conducted to test the practical applicability of the plan.

7 Updating the disaster management plan : It was also highlighted the importance of updating the disaster management plan annually and keeping the new students aware of it.

The report on the school safety program has also been included as a part of the NBRO document entitled '*Mainstreaming Disaster Risk Reduction in Urban Local Authority Systems- Matara Municipal Council, Sri Lanka'* , as an outcome of the project.

Urban Governance and Disaster Risk Reduction Training for the City Officials

A one day training workshop was organized on 15th July 2010 at the SamanMal Hotel Matara for 30 participants from among officials of the local authorities and other planning authorities in Matara focusing on mainstreaming DRR in urban governance. The objectives of the workshop were to:

- Draw the attention of provincial policy makers and local authority officials on the importance of incorporating disaster risk management in local planning;
- Highlight the important role to be played by the Local Authorities in disaster risk reduction as the local planning authority;
- Create awareness on available legal provisions to engage in disaster risk management activities by introducing By-laws;
- Improve the capacity of Local Authorities to perform better in their mandated role in Sustainable Development and Environmental management by improved awareness.

PROMISE has undertaken an assignment on the formulation of municipal by-laws in the DRM sector (under the Component 4) with the Federation of Sri Lanka Local Government Authorities (FSLGA) as the consultant. The assignment included not only the formulation of new by-laws but also a study on existing legal provisions through which the local authorities could engage in DRM activities. This workshop has been organized with the objective of demonstrating the numerous ways that DRM could be integrated into the local government system and thereby advocate for implementing DRM as a part of the mandated role of Local Government under sustainable development and environmental management.

This workshop created awareness among officers of both Central Government institutions and Local Authorities in managing the disaster risks in local areas by working together to integrate DRM at local level, as there was no clear understanding of the available legal provisions the facilitate their performing a DRM role. DRM has been identified as a function of Local Authorities by the National Policy on Local Authorities approved by the Parliament in December 2009.

The resource persons to conduct the workshop were drawn from the consultancy panel of FSLGA who conducted assignment on existing legal provisions and drafting new by- laws. The workshop materials are appended as Annex II: By Law on Disaster Management – Matara Municipal Council and **Annex III:** Paper on Existing Legal Provisions for Disaster Risk Management in Local Authorities.

<u>Component 4:</u> Advocacy for Mainstreaming Risk Management

In order to achieve sustainable development in a city, disaster risk management considerations must be taken into account as an integral part of system of local administration. While Local Authorities in Sri Lanka have a clear legal mandate to function as the "planning authority at local level", and through that role have the capacity to regulate land use planning, environmental pollution control, building approval processes among others, the reality is that attention to DRM, is very minimal.

Figure 19

Applicability of available legal provisions in disaster prevention or mitigation by Local Authorities is in an extremely poor state. In fact, the existing LA ordinances provide avenues for the Local Authorities to formulate by-laws under subsidiary laws to manage disaster situations in the following areas: construction of buildings, drainage, sanitation, stray animals, dangerous industries, fire prevention, domestic and industrial waste. In the recently approved (December 2009) National Policy on Local Authorities in Sri Lanka, DRM responsibility has been clearly vested with the LAs directly and indirectly.
PROMISE commissioned the FSLGA to conduct a study on existing legal provisions and to formulate by-laws to fill the gaps to engage in DRM activities effectively. FSLGA was already engaged in a study to formulate by-laws in other areas of LA interventions under an initiative of the Southern Provincial Council. The FSLGA study revealed that several legal enactments can be positively interpreted to enable prevention and mitigation of disasters, but due to the absence of necessary by-laws and the sheer lack of awareness, most LAs are keeping away from DRM activities thereby exposing the areas under their jurisdiction to disaster risks. The study was done in consultation with the officials of the Local Government Commissioner's office, MMC and the community representatives.

Under the component of 'Advocacy for Mainstreaming Disaster Risk Management', PROMISE project was engaged in mainstreaming DRM into the Sri Lankan LA system by taking Matara Municipal Council as a pilot case. PROMISE conducted several workshops for awareness creation of LA politicians, officials and citizens committees on the important role to be played by LAs in DRM and in drafting relevant by-laws and consolidating them. This experience was shared with other LAs in the Southern Province, Central Province and Eastern Province in three regional seminars conducted in collaboration with FSLGA and the CORD[7].

National level Symposium on DRM

After the Tsunami and its devastating impact in Sri Lanka, there was a dramatic increase in the level of interest among Government and non- governmental organizations on disasters and mitigation strategies. Numerous research, studies and data analyses were initiated to seek remedies including policy level changes, updating regulations, conducting public awareness and other structural and non structural mitigation measures. The National Building Research Organisation (NBRO) conducted a national symposium with the aim of bringing recent key changes related to mainstreaming DRR undertaken by various organizations and to provide an opportunity for an open discussion on the issue. The symposium was organized in collaboration with ADPC through PROMISE jointly with other collaborators.

The National Symposium on Disaster Risk Reduction was held in the Colombo Hilton on the 18th December 2009 to mark the occasion of the Silver Jubilee Celebration of the NBRO under the patronage of Hon. Mahinda Samarasinghe, Minister of Disaster Management & Human Rights. An inaugural session, followed by three technical sessions, was held during the day with a keynote address by Dr. R. K. Bandhari, former CTA in NBRO on "A Disaster Free Sri Lanka – Vision, Strategy and Action Plan". Scientists and other eminent experts presented papers under the following three different themes:

Technical session I – Theme -Strategy for Building Safer Shelter and Human Settlements. The session has chaired by Prof. Emeritus Willie Mendis, University of Moratuwa and session key note address was delivered by him. Mr. Sunil Jayaweera and Ms. Savitha Gunarathne; Scientists of the

[7] Creating Opportunities for Economic Revival and Development (CORD) is a program conducted by The Asia Foundation under a different funding source.

NBRO and Mr. Piyal Ganepola Program Manager , The Asia Foundation presented their technical papers in this session.

Technical session II – Theme Importance of Mainstreaming Disaster Risk Reduction in Local Government Sector Mr. N M S I Arambepola, Director Urban Disaster Risk Management in ADPC chaired this session and session addresses also delivered by him. Mr. H.D.S. Premasiri-Scientist NBRO, Mr. Sudaraman Siripala, Managing director-Geo Informatics International, Mr. Missaka Hettiarachchi- Programme Manager, WWF-EFL-AMROS Partnership, Environmental Foundation limited presented their technical papers during this session.

Technical session III- Theme- Approaches for Landslide Disaster Risk Reduction and Making Communities Resilient. The session was chaired by Prof. Kapila Dahanayake and delivered session keynote address considering Landslide Hazard Zonation as a Tool for Land Use Planning in the Hill Country with Special Reference to a Selected Areas in the Upper Watershed in Sri Lanka. Mr. H.R. Maduranga- Scientist, NBRO presented a paper on Design of the Surface & Sub Surface Drainage Systems at Johnston Estate Resettlement Site – Nuwara Eliya.

3. Achievements and Findings

3.1 Base Data and Hazard Vulnerability Risk and Capacity Survey and Findings

The detailed process of completing the Hazard Vulnerability Risk and Capacity (HVRC) survey and data collection is presented in the attached document titled *'Mainstreaming Disaster Risk Reduction in Urban Local Authority Systems- Matara Municipal Council, Sri Lanka'*. This section of the report provides a summary.

The expected outputs of the project included development of multi hazard map/maps, risk assessment of the city and capacity assessment with a comprehensive report, as a measure to adopt specific hydro-meteorological disaster preparedness and mitigation measures to manage disaster risk by the Matara MC together with the other stakeholders. The mapping methodology that was used for the hazard, vulnerability and risk assessment started with the inception workshop with all the stake holders including community leaders. The main objective of this inception workshop was to introduce the program and obtain the views of stakeholders to fine tune the activities of the project. Thereafter, the project team developed the data collection format for primary and secondary data collection. The community based disaster risk hazard, vulnerability and capacity maps were drawn to a scale of 1: 1000, if possible or to 1:2000 maximum.

Primary data collection was done through a questionnaire according to a data collection format from the community. The secondary data such as population data, resources and others were collected from the relevant institutions. Matara MC is well organized with a ward base data system with its strong ward based community organizations called 'Pura Sabha' and having an officer attached to each ward. The District Disaster Management Coordination Unit (DMCU) had also compiled data relating to disasters and established Disaster Management Committees in the vulnerable Grama Niladhari (GN) Divisions. As a result, the level of awareness of people was fairly high. Through successful primary data collection process conducted with the ward based communities it was revealed that the community members were the best sources of data. Though some members provided exaggerated data in some cases, it was not difficult to verify them by obtaining data from several members and tallying them. Different education levels and gender among community members posed no constraints to the involvement of people in data collection and, in fact, offered an indirect benefit to the project by serving as an awareness creation mechanism in and of itself.

Through the analysis of primary and secondary data, project team developed three main outputs: a hazard map, a vulnerability map and a capacity map to the scale of 1:5000. The risk map was

developed by overlaying these three maps. This risk map indicated the high risk areas, where the action projects could be implemented. A stakeholder workshop- City Consultation Workshop- was held with the participation of community representatives and officials to discuss the draft risk map and to identify the gaps in the map. The workshop finally prioritized the action projects that were required for risk reduction.

Community Based Disaster Mapping workshops were conducted by including representatives of several wards in one group. The grouping was done on the basis of the primary hazard levels, reported by the community in the inception workshop. Approximately, 5 members from each ward were invited to participate as well as MMC officials. Groups representing different wards were facilitated to demarcate the hazard locations vulnerable areas, rescue points and rescue routes on the Ward Maps to the scale 1: 1000(to 2000), prepared by NBRO. To develop the risk map and to maintain the accuracy of the hazard map, ward level maps were extended into GN division levels. The GN level maps were amalgamated to form the basic Multi Hazard Map of the city, which was further refined with relevant secondary data. It was useful to compare the maps developed by the community with Tsunami maps of Coast Conservation Department (CCD) and DMCU.

The data reveals that both local and riverine floods, landslides and tsunami were the main hazards affecting the MMC area. It was also revealed that peoples' lives were threatened by stray dogs with the threat of rabies and crocodiles in the Nilwala River. Several areas of the MMC were reported to be inundated due to the increased water level of the Nilwala River. Riverine floods were minimized due to flood dam previously constructed government flood control program, but many water ways were blocked causing local floods due to a weakness in its design. A flood water pumping station had been constructed at Thudawa North area to pump the logging water to the river, however, this pumping station was currently not operational and people were again suffering due to floods.

Key Findings of the CBM Workshops

1. The tsunami siren was not clearly heard. Matara MC could activate their siren in case of disaster events.
2. Blocking of the Noope Ela and subsequent flooding of Kadawediya South area were caused by waste dumping.
3. The drainage systems in several places such as Kadaweediya south, Weradoowa, Noope, Uyanwatta, Eliyakanda North, Maddawatta, Pamburana, Fort, Polhena and Mathotagama, were blocked due to haphazard development in the catchment area.
4. Walpola, Thudawa, Thudawa East, Sudarshi Place and Hittatiya Meda is threat ended by flooding.
5. Eliyakanda North and Walgama North have landslides susceptible locations.
6. Walgama South, Polhena, Thotamuna, Fort, Kotuwegoda South, Kotuwegoda North and Maddawwtta wards are vulnerable to Tsunami.

Data Sharing and Networking

The project benefitted significantly from unique circumstances in the Matara Municipal area. For example, high disaster awareness levels were prevalent in the community due to numerous post-Tsunami awareness programs that had been held in the area. This enabled the possibility of collecting accurate primary data from the community. This was further supported by the availability of all necessary ward based data with ward officers due to the existence of ward based community organizations with strong relationships with the MMC. DMCU too had its own data base in relation to the disaster history in the Matara District and through the project a link was able to share this data with the other stakeholders. The Divisional Secretariat (DS) of Matara held demographic data and many other important data relevant to capacity assessment. The Coast Conservation Department (CCD) had Tsunami maps in their possession which were useful in verifying risk levels. It was also useful to refer to the website www.desinventar for verifying some

doubtful data. The above mentioned data holding organizations have taken part in stake holder meetings and workshops. As a result their relationship with MMC became much closer, resulting in improved working relationships greater potential for information sharing in future activities.

Vulnerability Assessment of Matara MC Area

The vulnerability map of the area was developed by overlaying the multi hazard map and the secondary data, consisting of information such as age groups, gender, and livelihoods. In addition to the above data, the settlement distribution patterns were also considered in the preparation of the final vulnerability map.

When the data base on the questionnaire were analyzed using GIS as a tool, it was revealed that, Uyanwatta, Thudawa North, Thudawa South and Thudawa East were high risk areas due to flood hazard and local flood hazard. Fort, Thotamuna, Pamburana, Polhena and Madiha West were also in high risk area due to tsunami hazard. The centre part of the Municipal Council area was faced with the risk of local floods which would disturb the normal life of the community. These hazards have a close relationship with the land form of the area. The 'Nilwala Ganga' flowing along the northern boundary of the Matara MC, has caused the formation of a large marsh which creates a kind of flood basin in the North Eastern part of the town.

Like many towns in Sri Lanka, Matara town is a mono centric coastal town. The town has been developed on a main road node and there are special elements like the Matara Bodiya, Matara Fort and Stadiums which tend to result in a concentration of economic activities in the town centre. Many settlements are located closer to the central business district. Therefore, a highly vulnerability situation has been created in the central part of the Matara town. The attached document titled 'Mainstreaming Disaster Risk Reduction in Urban Local Authority Systems- Matara Municipal Council, Sri Lanka' in **Annex I** provides a description of hazard vulnerability and risk assessment in its **Chapter 2**.

Capacity analysis

One of the most prevalent disaster management concepts is the identification of the resources for disaster management or to a focus on becoming disaster resilient. In addition to resource availability, a community, who was trained to use appropriate resources as noted above, is also an asset in systematic disaster management.

For example a Tsunami warning tower which is located in the Paburana area with a siren warning having a reach of around 2 km radius creates a higher capacity. Therefore, around the Paburana area the capacity level is higher than the others in terms of the Tsunami hazard. The road network distribution pattern should also be considered in terms of capacity and vulnerable analysis. If the road network is layered as a grid pattern, the capacity could be taken as high, because a grid road network provides a high connectivity in the area. In MMC area, these data were gathered through a questionnaire by addressing the availability of types of resources in each ward with details of owners of the resources and contact persons. The attached document titled 'Mainstreaming Disaster Risk Reduction in Urban Local Authority Systems- Matara Municipal Council, Sri Lanka' in **Annex I** provides a description of available resources/ capacity in its **Chapter 3**.

Multi Hazard Risk Assessment

The Multi Hazard Risk Assessment was one of the key outputs of this project. This map was prepared by using the common equation on Risk, Vulnerability, Hazard and Capacities.

$$R = \frac{H \times V}{C}$$

A risk map showing the problematic areas can be used in the decision making process by the MMC. The risk map illustrates the risk levels on multi hazards for the MMC and is categorized into 3 groups namely high risk areas, moderate risk areas and low risk areas. The risk was calculated using the relative hazard risk levels for each of the considered hazards. The high risk areas and the moderate risk areas can be considered as suitable for implementation of action projects. The following Hazard Frequency table is presented as a planning tool which gives the summarized information on the hazard events for one year.

Table 1: Frequency of Hazard Occurrence

	Month											
	Jan	**Feb**	**Mar**	**Apr**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Tsunami												17
Flood					13	2			2			
Local Flood				3	8	2	4		3	2	10	4
Landslide											2	

Tsunamis do not occur frequently, but here it is marked as a high vulnerability since the effect of the tsunami in 2004 in Matara was high when compared to other towns. However, the other three hazards have a relationship, to the occurrence and rainfall pattern of the country. During the April to July South-West Monsoon, this area receives high rainfall in high intensity in shorter time periods. Hence, local floods occur due to the blockage of the drainage network and riverine floods occur due to flooding of low lying areas in the eastern part of the town where Nilwala Ganga flood plain is located. Meanwhile, due to high intrusion of water to soil, landslide hazards are likely to occur in the two sloping terrains in the south-eastern and south-western part of the town.

Review on Land Use

Multi disaster risk mapping has highlighted the inappropriateness in land use practices in the area. For example, certain developments permitted under the existing land use plan prepared by the UDA were contributing to intensify flood disaster vulnerability of certain areas. Therefore, the initiative undertaken by the project to review the land use of the city was responsive to the DRM capacity building and was complementary to the HVRC analysis.

Under this study risk levels of different land uses at different locations were derived and mapped. A set of land use planning guidelines and building guidelines were developed and presented to planning officials as a disaster responsive planning tool for MMC. These outputs are detailed in the in the **Chapter 4** of the attached document titled '*Mainstreaming Disaster Risk Reduction in Urban Local Authority Systems- Matara Municipal Council, Sri Lanka'*. in **Annex I**.

Results and Findings

From the Multi Hazard Risk Map and Hazard Frequency Table, the main impact areas of the town can be identified.

- Tsunami Hazard – Fort, Kotuwegoda south areas
- Flood Hazard - Waragampita, Uyanwatta areas
- Local Flood Hazard - Kadaweediya East/West, Uyanwatta North areas
- Flood Hazard - Walpola, Thudawa, Thudawa East, Sudarhi Pedesa areas

- Local flood Hazard – Mathotagama area
- Flood Hazard - Hittatiya meda

Fort and Kotuwegoda South areas faced high vulnerability due to the tsunami threat. This threat was identified as attributed to the fact that Fort is a peninsula surrounded by sea and the Nilwala Ganga. The Multi Hazard map shows that near the bus terminal, the risk level is low due to the high level of capacity in terms of high accessibility, possibility of hearing the tsunami warning siren and existence of disaster resilient buildings etc.

Uyanwatta, Waragampita, Walpola, Thudawa, Thudawa East, Sudarshi Pedesa and Hittatiya areas were indicated as risk areas since the pumping station was not functioning.

Kadaweediya East/ West, Uyanwatta North and Mathotagam were faced the threat of local floods which may arise due to blocking of the existing drainage networks.

3.2 Community Level Interventions

The strong community involvement in the initial survey and HVRC assessment project has been described in the previous section. In summary, the process of primary data collection and development of ward level HVRC mapping was predominantly done with community participation. At all stages of delivery of reports and maps, community representatives were given opportunities to provide their comments. Community representatives have very actively and effectively participated in the inception workshop, city consultation workshops and in all community mapping workshops.

The project provided funding support for implementing two participatory disaster mitigation projects. The selection of projects was also done with the agreement of community representatives from all 15 wards. The selection criteria were based on the number of families affected, level of preparedness and the capacity of the 'Pura Sabha' to undertake the management of the project within the budgetary provisions. The responsibility for conducting these projects was shared between the MMC and the Pura Sabhas and was formalized through an MOU. After being involved in successfully managing these projects, communities praised the support offered by the project, without which they had been undergoing floods several times a year. They also built up confidence in their own organizational capacity and the effectiveness in linking with MMC in solving their issues through these initiatives.

In any disaster, community volunteers are a tremendous help in response mechanisms. The Matara mayor saw the importance of trained communities in enhancing the overall city capacity in DRM. The MMC can benefit from the complementary services of community volunteers who would improve rapidity and efficiency of emergency responses, while helping disaster prevention through community awareness. PROMISE supported the creation of a team of 'Community Respondents' by training community volunteers in basic fire fighting, first aid and emergency response, in accordance with the Mayor's proposal. Twenty young volunteers from the community and some officers from MMC and DMCU were given training on basic fire fighting and emergency response through the Fire Services Department of the Colombo Municipal Council. Training on first aid and emergency response was given to 60 community volunteers through by St. John Ambulance. These volunteers, mainly from vulnerable areas of the city, will complement the MMC's fire services and emergency response sections to rapidly and efficiently operate in those areas. PROMISE involved community leaders in reforming legal provisions to the municipal by-laws, under its Advocacy for Mainstreaming Risk Management component who were very effective in finding the weak areas of LA actions in prevention of disasters.

3.3 Networking and Integration

Local networking in data sharing in DRM sector among MMC, DMCU, CCD and DS Matara has been discussed in the above section. The following describes networking and integration resulting from project initiatives in more detail.

DMC, which is the national organization responsible for DRM, has extended their national interventions to the Local Authority sector from the previous phase of PROMISE and consolidated its position with Matara MC in this extended phase. DMC, on seeing the successes of two participatory mitigation projects done, has extended its financial support to the MMC for another two mitigation projects.

NBRO, a national level technical institution functioning under the Ministry in charge of disaster management, which provided technical expertise to the project, came into the loop of the MMC as a result of the project. NBRO, in its future studies relating to river floods and landslides will work closely with MMC.

FSLGA, which developed the by-laws on DRM for the MMC, will continue institutionalizing those by-laws under its ongoing program of legal reforms with the Southern Provincial Council. FSLGA as an organization mandated for capacity building of Local Authorities was made aware of the importance of DRM in local governance through the project and it will bring many more benefits to the LA sector in the future.

The Fire Department of the Colombo Municipal Council was linked to MMC's Fire Department, which currently operates on a very low profile and the linkage created will result in useful exchange program in the future.

The Matara Branch of the St. Johns Ambulance was introduced to the MMC by the project as a useful training provider in emergency response activities. MMC will be able to capture their help in future emergency responsive activities.

The networking and integration has happened not only through the above described formal relationships but also through many informal personal relationships created during many interactive project activities.

3.4 Information and capacity building products

Several information and capacity building products that were developed under the project with a view to achieving project objectives are listed below:

Under the **Component 1** of the project:

- Multi Hazard Map of Matara city
- Risk/Vulnerability Map of Matara City
- DRM Capacity Map of Matara City
- Individual Multi Hazard/ Risk/ DRM Capacity Maps for 15 wards
- Annual Disaster Frequency Table for Matara
- HVRC assessment report
- Land Use assessment report
- Land Use Planning Guidelines and building Guidelines for Matara
- The book on participatory planning guidelines
- A comprehensive document compiling all the activities conducted by NBRO titled 'Mainstreaming Disaster Risk Reduction in Urban Local Authority Systems- Matara Municipal Council, Sri Lanka'.

Under C**omponent 2** of the project, all training materials produced for the training of community fire respondents through the Fire Department of CMC and on First Aid and Emergency Response by St. Johns Ambulance were given to the participant community members.

Under **Component 3**, a school safety program was conducted through NBRO and the participants were given the training material. A report on this training program is included in the **Chapter 5** of annexed document, *'Mainstreaming Disaster Risk Reduction in Urban Local Authority Systems- Matara Municipal Council, Sri Lanka'* in **Annex I**. FSLGA has developed a paper on DRM provisions within the existing legal framework of LAs based on which the workshop on Urban Governance and Disaster Risk Reduction Training for the City Officials was conducted. This document is provided as **Annex III**.

Component 4, which was on advocacy for mainstreaming risk management, produced the 'By Laws on Disaster Reduction- Matara Municipal Council' which is provided in the **Annex II**. FSLGA, in addition to the above document has produced seminar materials for the three regional seminars conducted. NBRO has published the proceedings of the national symposium on Disaster Risk Reduction, which was conducted with the financial support of the project.

In 2010, August, Matara MC was selected as the best among the Municipal Councils in the country according to the annual performance evaluation carried out by the Ministry of Provincial Councils and Local Government. Disaster management is one of the many indicators; the MCs are evaluated for. The Mayor of the Matara MC stated that as a result of the capacity building efforts under PROMISE, Matara MC managed to strengthen its capacity on DRM and which contributed towards winning the recognition of best MC in the country.

4. Opportunities, Strengths, Obstacles and Constraints

Opportunities and Strengths

A number of special circumstances contributed to the successful implementation of the project. These included the close relationship and institutional arrangements that already existed between the Matara Municipal Council, officials of the MMC and local communities as a result of the leadership and support of a visionary Mayor. The ward-based community organizations, 'Pura Sabhas', and the committed ward officers of the MMC were very supportive of obtaining people's participation. Members of the community themselves were engaged and interested resulting in a very high level of participation in project activities. These circumstances also contributed positively to accurate data collection and documentation of project activities as ward based data had been systematically recorded.

The Matara Municipality had been the recipient of numerous awareness campaigns on disasters conducted by DMCU and other parties involved in Tsunami recovery and therefore people were already aware of the importance of disaster preparedness. Moreover, the unprecedented personal tragedies and experiences of the 2004 Tsunami undoubtedly contributed to the willingness of the communities to participate in disaster responsive activities. It was also observed that literacy levels in the area, even among the underserved communities, was fairly good and they were able to participate constructively in the mapping process.

Local institutions were very supportive to the project and involved themselves proactively in project activities readily sharing data. The familiarity of some project members through their previous engagements in Matara too would have helped in making right contacts.

The implementation partner of ADPC, The Asia Foundation (TAF) is an organization with a long history of working in Sri Lanka, extensive experience in the Local Government Sector and with

strong and well established working relationships with the Matara Municipal Council and national organizations like DMC and NBRO. Therefore, TAF possessed the house capacity, resources and established relationships that could be easily mobilized to build confidence, bring partners on board quickly and support the successful implementation of this project. TAF was able to adapt and customize existing participatory training modules that had been previously developed and tested in other local government programs. Foundation staff consisted of the right combination of technical staff to ensure that resource persons and facilitators were available in-house. Thus, the Foundation was well placed to implement the project and ensure sustainability.

Institutionalizing legal reforms through the project was facilitated by the selection of the FSLGA as they were already engaged in a similar activity with the Southern Provincial Council. This was not only a strength to the project but enabled substantial cost reduction as well.

Obstacles and Constraints

The project did not face many obstacles although inevitably the onset of rains caused a few weeks delay in some of the mitigation projects. However, one constraint that was faced was due to several elections held during the project period which drew the attention of the political leadership, officials and communities away from the project to some extent while the LA leadership was heavily involved in the political campaign. This has resulted in some intermittent delays in some project activities but these were rescheduled and completed without causing an overall delay to project implementation. The project also had to contend with a tense political atmosphere created due to the Mayor's crossing over to a different political party which subsequently got defeated in the Presidential Election. This political back drop did create some uncertainties about the possibility of continuing project implementation but ultimately did not become an issue.

5. Lessons Learned

Though DRM was an area which was not legally recognized within the mandate of the Local Authority system, it was not difficult to find means to introduce DRM concepts to the operational scope of the MC for several reasons;

- By intuition and experience, communities who were facing frequent disasters were aware of the importance of disaster prevention and welcomed the project;
- The Mayor, who had a clear vision for the development of the city, was already aware of the need for building up DRM capacity in his Council and was looking forward for such opportunities;
- A significant amount of preliminary work has been done by the time the project entered the scene, including the completion of a drainage study and the establishment of 'Pura Sabhas", and the project was sensitive enough to identify them and make maximum use of their existence for project implementation;
- The project was able to maneuver its activities to address the capacity needs expected by both the MMC and community organizations. Though the MMC had formed 'Pura Sabhas', when the project commenced these groups were not tasked with sufficient activities to keep them involved in local development. The project offered many activities for the MMC and the Pura Sabhas to work together, bringing the communities close to the MMC.
- The MMC and communities undertook the ownership of the project from the inception. The communities voluntarily and very positively participated in project activities. Community leaders were helpful in organizing venues for awareness programs and the MMC was generous in offering its resources to the project.

Some important lessons learned include the following:

- Local communities in vulnerable areas are looking for opportunities to improve their disaster resilient capacities and the local authority is the best vehicle to take forward such initiatives.

- Political commitment is a key factor in achieving the success of any development activity. The Mayor of Matara provided exemplary leadership in all the project activities conducted with the community. His close coordination with Southern Provincial Council and other DRM stakeholders including FSLGA facilitated efficient delivery of DRM outputs and enabled the consolidation of outcomes within the municipal institutional setup.
- Creating ownership by involving the stakeholders without creating dependency is important to sustainability of outcomes.

In addition to these, a number of other lessons were learned during project implementation.

Select an implementation partner that has a broader, long term interest in issues related to project objectives: The selection of The Asia Foundation as the project implementation partner brought some interesting synergies that must be documented. While the Foundation's past experience in project implementation at a local level and established relationships has been noted above, it is the Foundation's broader governance mandate and objectives that have ensured the deeper institutionalization and future sustainability of project outcomes. For example, the project benefitted from the ability to adapt and customize training modules that had been previously developed by TAF under another program. More importantly, the legal reforms on the introduction of DRM concepts, that were proposed to the Matara MC did not remain solely within the purview of a single municipal body but due to TAF's broader engagement with the Ministry of Local Government through another project, were ultimately disseminated nationwide.

Engage proactively with ongoing initiatives that relate to the project mandate and be willing to adapt and collaborate with other organizations : The project was able to capitalize on on-going activities that were directly related to and relevant to the project objectives. For example, linking up with the DMC, NBRO and DDMCU who all had an established track record of working in the DRM sector at grass roots level enabled the project to easily consolidate DRM concepts at community and institutional levels, to generate a very high level of stakeholder involvement in project activities and laid a strong foundation for future sustainability of project outcomes. Similarly, working with FSLGA, which was already engaged in a legal consultancy in the southern Provincial Council for reforms of municipal by laws, made the process of mainstreaming such reforms easy and cost effective.

Make maximum use of the existing capacities within a community: The project was able to successfully mobilize the traditional knowledge of the community about the environment and make use of the high education levels and awareness that already existed. Women were encouraged to participate actively resulting in a greater understanding of the way communities have coped with disasters. This traditional knowledge base and cultural input was very important to building the city's risk profile in a realistic, grounded manner. Reliance on community knowledge and capacity also created a conducive environment for project implementation as people were confident that their input was considered seriously and valued, therefore participation in project activities was extremely high.

Find innovative ways to overcome obstacles and constraints: Local Authorities are inevitably influenced by the country's political atmosphere and the project was faced with its own share of uncertainties as a Presidential election and a General Parliamentary election occurred during the project implementation period. While the Municipal political authority was heavily involved in political campaigning and this atmosphere penetrated into the communities with the potential to adversely affect the timely delivery of outputs, the Foundation sought to keep its focus and work toward implementing the project plan to the best of its ability rising above the political fray. This proved to be successful as project activities stayed on course with only minor delays. In much the same manner, when the project faced a serious obstacle of delayed government appointments to fill staff vacancies in the Municipal Fire Department, an alternative strategy was proposed, creating a voluntary force of community respondents to assist the MMC in emergency situations. This enabled the project to overcome a serious obstacle and stay on course to achieve project objectives.

6. Exit strategy and sustainability of the project

The project exit was done after consolidation of project outcomes with the main recipient - Matara Municipal Council - and with the ward level community organizations- the main beneficiaries. All the tools developed under the HVRC analysis of the project were carefully explained and handed over to the MMC officials, who were also trained to use them in participatory city planning. The communities were also made aware of the tools that were developed and will work together with the MMC in disaster responsive planning based on the identified preventive and mitigation measures.

All the stake holders, including the UDA, were made aware of the short comings of the land use plan of the city in terms of disaster prevention in the presence of community members. The city planners will be compelled to exercise land use plan recommendations developed under the project in future as they will be closely watched by the communities. The project adopted a strategy of bringing the municipal officials and people together when introducing DRM in development planning with the expectation that it would create a system of checks and balances from both the sides which will help sustain project outcomes.

The effectiveness of participatory development techniques was amply demonstrated in all activities in the project but most particularly in the two pilot disaster mitigation projects which demonstrated the strength of the communities in managing development works within their own localities and serve as an example to other communities. The demonstration effect of these pilot projects was immediately visible as DMC, observing their successful implementation, has offered financial assistance to MMC for two additional projects.

Creation of voluntary community respondent group will sustain the capacity of MMC to respond to future disasters together with communities.

The project was instrumental in establishing a DRM loop – which includes DMC, NBRO, FSLGA, UDA, CCD, ID among others - that will continue to operate even after the completion of the project.

DRM has been strongly infused into the joint planning mechanism of Matara through an open and flexible implementation strategy which can be replicated in future programs in other cities.

The PROMISE intervention in the city of Matara represents the first-ever initiative focused on introducing DRM by-laws into the Sri Lankan local authority system. The institutionalization of these by-laws in the LA system will continue after the project period under a separate effort undertaken by the FSLGA for the Southern Provincial Council. The by-laws introduced under the project will enable Local Authorities around the country to incorporate disaster resource management in their work and give them the authority to function effectively in the DRM sector.

7. Financial Report

The financial report is attached in **Annex V**.

8. Annexes

- **Annex I:** Mainstreaming Disaster Risk Reduction in Urban Local Authority Systems- Matara Municipal Council, Sri Lanka'
- **Annex II**: By Law on Disaster Management – Matara Municipal Council
- **Annex III**: Paper on Existing Legal Provisions for Disaster Risk Management in Local Authorities
- **Annex IV** : Case Study
- **Annex V** : Financial Report
- **Annex VI-**Ward vice description of hazard levels, land uses, capacities and mitication activities