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USAID United State Agency for International Development (USAID)

PROMISE

SRI LANKA

MAINSTREAMING DISASTER RISK REDUCTION IN URBAN LOCAL AUTHORITY SYSTEMS

KALUTARA URBAN COUNCIL
SRI LANKA
2009

Disaster Management Center

National Building Research Organisation

Kalutara Urban Council

PROGRAM FOR HYDRO-METEOROLOGICAL DISASTER MITIGATION IN SECONDARY CITIES IN ASIA (PROMISE)

MAINSTREAMING DISASTER RISK REDUCTION IN

KALUTARA URBAN COUNCIL

Program for Hydro- Metrological Disaster Mitigation in
Secondary Cities in Asia

(PROMISE)

Human Settlement Division
National Building Research Organisation

Asian Disaster Preparedness Center

United State Agency for International Development

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Project was carried out by the Key Project Team comprising the following members of the Human Settlements Division under the direct guidance of Mr. W.B.J. Fernando, Director General, NBRO.

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Finally our gratitude to our Director General, Mr. W.B.J Fernando for his guidance to complete this project successfully.

Preface

Asia is the mostly affected due to natural disasters. In order to prepare communities in Asia, Asian Disaster Preparedness Centre is implementing the Program for Hydro- meteorological Disaster Mitigation for Secondary Cities in Asia with funding assistance from USAID/OFDA. During the last 20 – 30 years, Sri Lanka facing the Hydro - meteorological Disaster risks mostly floods and droughts. In this regard, since November 2008 National Building Research Organization (NBRO) has carried out Hydro- meteorological Disaster Mitigation for Secondary Cities (PROMISE) in Kalutara Urban area which is affected by frequent disaster events such as floods, sea erosion, tsunami and health hazards etc.

Increase of population growth and urbanization in Kalutara city emerging the vulnerability to natural disasters. This situation poses very serious challenges to planners, local officials and disaster managers. In order to overcome these challenges, this project was undertaken at Kalutara Urban Local Authority area in order to reduce the vulnerability to Hydro-meteorological Disaster events through enhanced preparedness and mitigation measures.

According to the national strategy formulated under the phase I of the project number of action projects was identified, which were implement under this project in Kalutara Urban Area. Following are the action projects implemented by the National Building Research Organisation (NBRO) in Kalutara Urban Council Area to achieve the objective of this project;

- Setting up emergency response plan
- Training and Capacity Building Programme for Technical, Health and Sanitation Sector Official in the ULA system
- Preparation of niche of drainage projects for Kalutara UC area
- Resource centre for DRR activities
- School sector disaster management cells for selected schools

From these each action projects implemented in Kalutara Urban Local Authority area, several out puts were achieved which is expected to reduce the vulnerability of the community of the Kalutara Urban Local Authority Area in long term through preparedness and mitigation.

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CHAPTER 01

Follow up activities of Disaster Risk Reduction Project carried out in Urban Local Government sector of Sri Lanka

1.1 Introduction & Background

The world was focusing the global disaster risk reduction to mitigate the world disasters and focussing the disaster risk reduction in their countries to mitigate their country for enhance their safer settlements. However, past reason years, the global tendency was changed into issue of climate changes. Because most of the countries were faced the issue of sea rise, due to rapid increase of temperature. The following table is showing the global hazards occurred in between 1975 to 2008.

Year	Country	Disaster	Fatalities
1983	Ethiopia	Ethiopian drought	300,000
1976	China	Tangshan earthquake	242,000
2004	South Indian Ocean	Indian Ocean tsunami	226,408
1983	Sudan	Sudan drought	150,000
1991	Bangladesh	Cyclone Gorky	138,866
2008	Myanmar	Cyclone Nargis	133,655
1981	Mozambique	Southern Mozambique drought	100,000
2008	China	Sichuan earthquake	87,476
2005	India, Pakistan	Kashmir earthquake	73,338
2003	Europe	European heat wave	56,809
1990	Iran	Manjil-Rudbar earthquake	40,000
1999	Venezuela	Vargas floods	30,000
2003	Iran	Bam earthquake	26,796
1978	Iran	Tabas earthquake	25,000
1988	Soviet Union	Spitak earthquake	25,000
1976	Guatemala	The Guatemala earthquake	23,000
1985	Colombia	Nevado Del Ruiz volcano	21,800
2001	India	Gujarat earthquake	20,005
1999	Turkey	Izmit earthquake	17,127
1998	Honduras	Hurricane Mitch	14,600
1977	India	Andhra Pradesh cyclone	14,204
1985	Bangladesh	Bangladesh cyclone	10,000
1975	China	Haicheng earthquake	10,000

Source: http://www.preventionweb.net/english/hyogo/gar/report/documents/GAR_Chapter1_2009_eng.pdf

The losses of the elements from the disasters were changed due to the economic levels of the countries.

However, the whole world was suffering from the disasters and they used several methodologies for the mitigation those hazards. Hence, transferring the technologies and knowledge are the main important correlation between regions and countries which are insufficient of resources for conduct the prevention programmes. But considering the GDP levels of the country, South Asian and African countries have low GDP values.

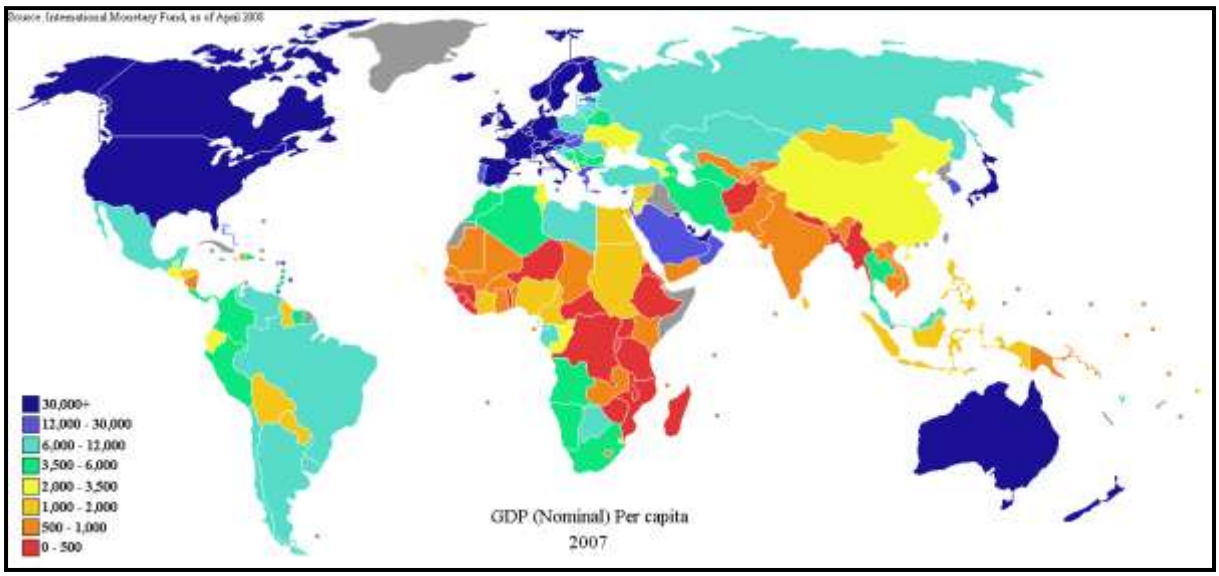


Figure 5: Per Capita GDP in Global Context in Year 2007

Sri Lanka is a small miracle island located in the Indian Ocean closer to down south of the India. Hence, tsunami, flood, drought, and landslide are the main hazard to the country. Deeply precise of the risk history of the country, the major hazards are the droughts and the floods except tsunami which occurred only one time in its history in 26th December 2004.

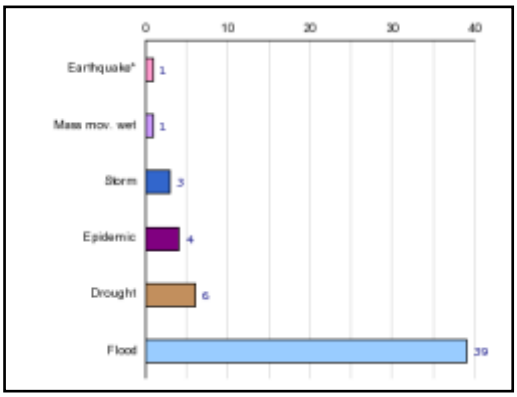


Figure 6: Hazard Records 1980 - 2008

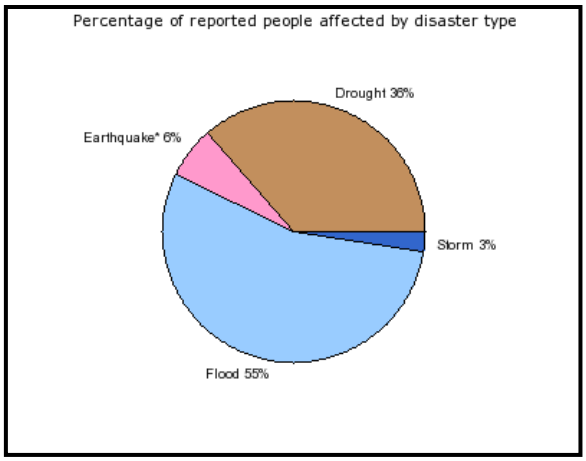


Figure 7: Percentage Shares of Disasters in Sri Lanka

Hence, it is important to mitigation flood and drought hazard in the country. The disaster management is controlled by the Ministry of disaster management and Human Rights. Under the ministry there were three main institutes for the evolving to the mitigation of disasters such as, Disaster Management Center, Metrological Department and National Building Research Organisation.

In 2008, National Building Research Organisation (NBRO), jointly with Ministry of Disaster Management and Human Rights (MDM&HR) and Asian Disaster Preparedness Centre (ADPC) carried out a project to formulate a "National Strategy" on Disaster Risk Reduction (DRR) in Urban Local Government Sector of Sri Lanka. ADPC implemented this project under their international project, Programme for Hydro-Meteorological Disaster Mitigation in Secondary Cities in Asia (PROMISE) which is implemented in six different countries.

- Philippine
- Pakistan
- Vietnam
- Bangladesh
- Indonesia
- Sri Lanka

DRR project was conducted in Sri Lanka successfully and the national strategy was formulated and presented in the national workshop held in July 2008. In this national strategy number of action projects was identified. ADPC recently requested NBRO to prepare a detail

project proposal to implement the short – term action projects identified under the national DRR strategy. These action projects are proposed to implement in the Kalutara which is the main focal point under the PROMISE activities implemented in Sri Lanka. (Annex01:- Description of the Kalutara UC selection among the other Local Authorities)

1.2 Objectives of the Project

The main objectives of the project is implement the indentified short term action projects under the National Strategy on Disaster Risk Reduction (DRR) in Urban Local Government Sector (ULGS) of Sri Lanka carried out under the PROMISE project of ADPC . The Action project were as follows,

1. Setting up emergency response plan
2. Training and Capacity Building Programme for Technical, Health and Sanitation Sector Official in the ULA system
3. Preparation of niche of drainage projects for Kalutara UC area
4. Resource centre for DRR activities
5. School sector disaster management cells for selected schools

1.3 Scope of the project

The scope of the project is aimed at strengthening the capacity of Kalutara UC area through skill enhancement and to equip them with necessary tools, skills for Hydro- meteorological disaster risk management. The main scope can be summarised as follows;

1) Enhancement of the capacity of Kalutara Urban Council through implementation of short term action projects.
2) Enhancement of knowledge and awareness of local government officials on disaster related health and sanitation needs.
3) Creation of awareness on Hydro- meteorological disaster risk reduction aspects through active participation of school children on Disaster management cells
4) Knowledge enhancement of public through facilitation and information sharing.

1.4 Methodology

The action projects were completed as separate parts of the projects. Thus methodology that was used in each action project has been illustrated under the sub project methodology. The methodology of the project has been illustrated as follows;

Figure 8: Methodology of Mainstreaming DRR Project in Kalutara UC

In the initial stage of the project was gathering the data under the action projects and discussed with the stakeholders who were participated to the project. And also development of the Technical Working Groups and discussion among them were conducted on this stage. Basically, in the reconnaissance survey of the project included all initial works which were necessary to adapt to the project. With the basic background of the project, the project team was divided in to five sections to be carried out the action projects.

CHAPTER 02

Description of the Project Area

2.1 History

Local Health Institute - Kalutara is the first local governing centre in the town which was established in 1978 under the Ordinance of no 09 in 1876. This institute was conducted their services until 15th of December 1922 and thereafter, Kalutara Urban Council was formed on 1st of January 1923.

The Council is presently governing under the law of no 61 of 1935 and 25 presidents governed the council since 1923. In 1st of June 1979, the Kalutara Urban Council Area was declared as Urban Development Area and also the Town and Country Planning Department declared the area as sacred area. Under the Western Province Metropolitan Plan, Kalutara Town was developed as the first level service center at the region.

2.2 Location

Kalutara, main town in Kalutara District, is located in the western coastal belt in Sri Lanka away from 40 km from the Colombo City on Colombo – Wellawaya main Road (A2) with the extent of 7.64 Sq. Km. By considering the location of town, it belongs to Low County Wet Zone. Thus, the geographical features of the town are same as the other low county wet zone cities as Galle city. Kalutara city is located in the Kalu Ganga river basin and with the name of river the city famous "Kalu-thota" in historic civilization. As though, Kalutara town is famous because of the Kalutara temple.

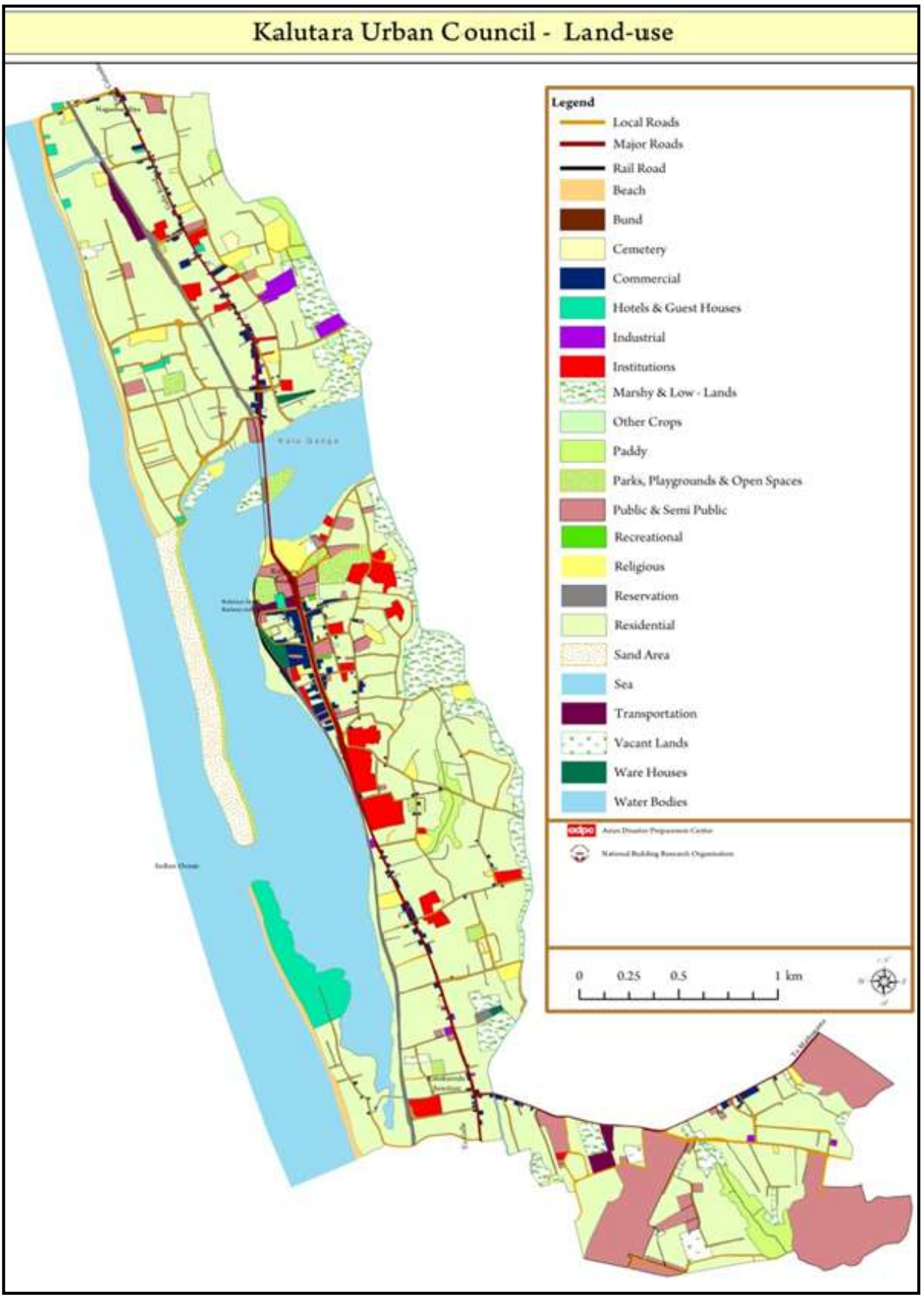
Map 01: Location Map of Kalutara

2.3 Land Use Pattern

In 1st of June 1979, the Kalutara Urban Council was declared as Urban Development Area and also the Town and Country Planning Department declared as sacred areas. Under the Western Province Metropolitan Plan, the Kalutara Town was developed as the first level service centre to the region.

According to the census survey in 2001, Kalutara Town was a multi cultural town and the total population was 37081. And the Population density of the town was 4853 persons per square kilometre. According to the studies, there were around 75000- 100,000 people visiting to the town for their daily requirements.

The duties of the council is increasing due to rapid growth of the population density and the service requirements of civilianize. As though, the Council is maintaining their services and responsibilities to achieve the future goals in sustainable manner.



Map 02: Land Use Pattern of the Kalutara U.C Area

CHAPTER 03

Emergency Response System

3.1 Introduction

Under the project of Disaster Risk Reduction of Kalutara, the action project of emergency response plan play a vital role for the mitigation of disasters in the Kalutara Urban Council. The disaster cycle reveals, the preparedness play a major role in disaster management. In that context, planning of the emergency response system is a key factor for the reduction of damages from the disaster.

The mitigation measures consist of two different types on structural mitigation and Non structural mitigation. The structural mitigation implies some structural development in the hazard prone areas such as retaining walls, drainage network, disaster resilient buildings and so on. The non structural mitigation implies the non structural development in the area including the awareness programmers, display boards, guidelines and so on. The structural mitigation consists of high technical phenomena to avoid vulnerabilities in the area by giving the solution. However, the non structural mitigation phenomena is considering the knowledge building of the community and this education is being expected to transfer generation to generation.

For the development of emergency response system it is necessary to conduct proper planning procedure. This planning procedure should address the problems of the area when before it will happen. Thus, it needs to identify the hazard prone areas, rescue places for disasters and the safer routes to avoid the risks.

3.2 Objectives

The main objective of the action project was to prepare of the multi – hazard map including hazards, sheltering location and evacuation routes. For the achievement of above objective it was followed a procedure to guidance.

3.3 Scope and Limitations

The scope of the project was considered only the Kalutara Urban Council area. The Hazards which occurred in the past were included to the map for the preparation of multi – hazard map. The major limitations of the study was the threaten areas in past also affected in future due to same hazard level. Therefore, the hazard map indicated the previous hazard areas. Other than that, the hazards which were occurred in same intensity were not considered. Although, the hazards which were occurred outside the boundary, was not considered. However, the procedure of the finding suitable places for the rescue, it considered the best places among the all locations. Therefore, the threats which can be occurred beyond the boundary can be ignored. Not only that, the finding the secure routes to reach the safer place were considered by analysing the inside routes.

3.4 Methodology of the Multi – Disaster Map Preparation

Disasters in the area have been divided in to two main categories as Natural Disasters and Man - Made Disasters. The natural disaster implies the natural phenomena which support to damage properties of the areas and the social disruptions. The Man - made disasters indicate the man made activities that were affected to the society such as chemical exposures, bomb explosions, and so on.

For the hazard map preparation the whole gamut of the disasters has not been considered. Following are the disasters affect the Kalutara UC area. Hence, following hazards have been considered in hazard map preparation.

- Floods
- Tsunami
- Sea erosion
- Urban fire
- Road Accidents

3.5 Floods

Flood can be defined as a body of water that rises to overflow into land settlements, which are not normally underwater. And it can be categorized as Riverine floods; natural or seasonal flooding due to overflow of rivers, flash Floods; due to rapid accumulation of runoff

waters from rain storms especially in hilly areas, coastal floods; due to high tidal waves in coastal areas due to cyclonic or other high winds, local floods; due to lack of adequate drainage or retention area. On those floods Riverina flood and local floods are the major types that can be occurred with the tabulation of the historic data.

The reverrine floods occur in the south-west monsoon period which results of the high rainfall intensity to upper catchment areas. Even though, because of the velocity of the water transportation the flood disaster is occurring after two days when the heavy raining in upper catchment areas. Therefore, the disaster managers have advantage to prepare for the disaster of floods. As well as, the civilians of the flood prone areas have their indigenous knowledge about weather and floods. Therefore, disaster managers can easy to manage those communities.

And also, in 27th of September 2009 Landslide Studies and Service Division of National Building Research Organisation was conducted the research studies of "Flood forecasting system proposed for disseminating flood warning among selected communities along the Kalu Ganga with the use of a developed mathematical model".

3.5.1 Methodology to Delineate Flood Prone Area

The Delineation of the flood boundary of the Kalutara UC area, the above research was played a vital role. The model, mention above, was the base for the reverine flood boundary. However, with the scale of the above model was not rightly suite with the areas. Thus, field check was important section for the delineation boundary. And also, in the Urban Development Plan, which was been completed by the Urban Development Authority in 2005, was identified the several flood locations.

Map 03: Flood Prone Areas

The draft boundary was declared by overlaying the all secondary layers of the flood boundary areas.

Field checking was conducted after the delineation of flood boundary to enhance the accuracy. This ground level survey based on the community meeting which was held at Kalutara Urban Council in collaboration with Chairman of the Kalutara urban council and the technical officers of the area. This re-correction was completed through GPS.
The updated and the final flood boundary illustrated bellow.

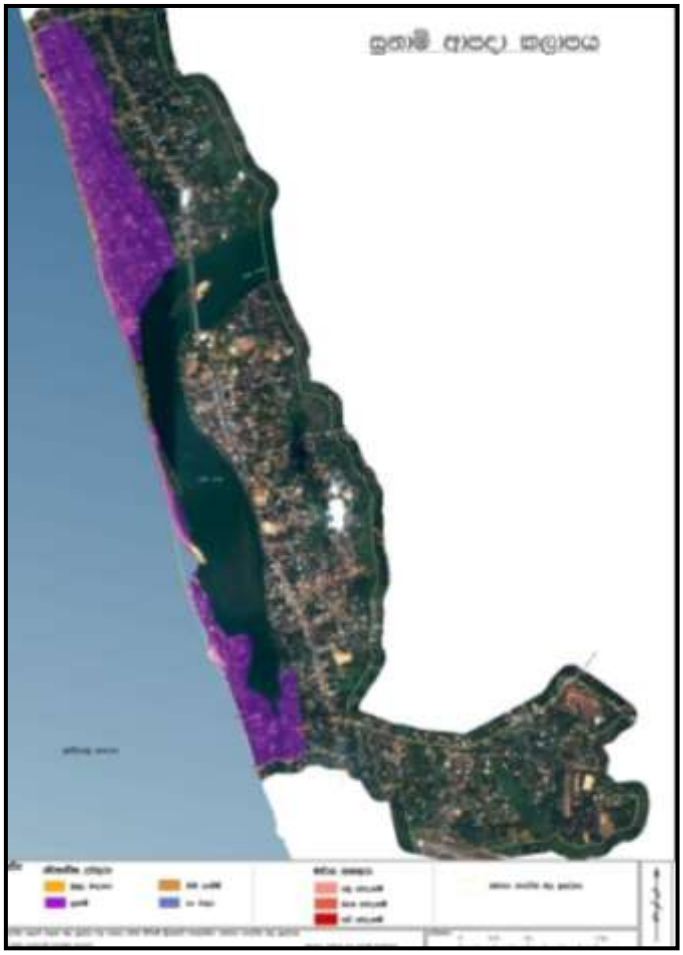
Map 04: Updated Flood Boundaries

3.6 Tsunami

After the colonial period, the Sri Lankan cities were developed closer to the ocean and change their economic pattern agriculture to trade economy. Therefore, the cities were moved from central low land areas to coastal zone. So, people faced another major incidence of tsunami and other marine threats as coastal erosion.

On 26th of the December 2004, Sri Lanka experienced the Tsunami disaster hazard which was accelerated due to 9.0 magnitude of earthquake occurred in the Indonesian island of Sumatra and killed 31,147 peoples. This hazard caused most of the coastal cities and destroyed the large amount of properties.

Kalutara district was affected the tsunami disaster with the superb explanation of Bernoulli concept. Because, it was located the opposite side of the tsunami occurred position. Even though, there were 213 deaths, 48 missing and 421 injured.



Map 05: Tsunami Affected Areas

Tsunami hazard is occurring with the result of the high fluctuation of the sea tidal in the ocean. But this high fluctuation is result of additional activity such as horizontal earth plate movement, explosion in the sea, meteors and so on. But the earth plate movement is the high possibility incidence which occurred in the past experiences of horizontal movement of earth plate closer to Sumatra Island. The past tsunami earth quake was highest magnitude of earth quake in the plate.

Thus, for the map preparation of indicating the vulnerable areas for the tsunami was marked the 2004 tsunami hazard areas.

3.7 Sea Erosion

Sea erosion is the one of major hazard occurring in the coastal cities which results to degradation of valuable urban lands for the advanced development in the coastal belt such as economic zone includes the hotels. Even though, this result to deduction of the linear urban parks which includes the beach activities.

The methodology of the delineation of the erodible areas was based on the technique of overlay. By overlaying the 2005 satellite image and the 2008 satellite image the erodible areas as well as sand dumping areas could be found.

Map 06: Sea Eroded areas

"Calido" Beach- well known sand dune where the located in the bay of Kalu Ganga, was highly erodible area as well as highly sand dumping area. Because, the high capacity of water transmission from the up country the large amount of sand were transmission. Those sand

were dumping on this sand dune. Hence, during the rainy season the KUC was cut the sand dune to expansion of the river bay. Other than that, around the north boundary area of the KUC was also eroding.

3.8 Urban Fire

With the Urbanisation the city was facing the risk of fire where the activities established by using the exponential materials such as fuel, paint industries so on. However the local government should be facilitated for the minimisation of the fire risk by establishment of the fire brigade unit in the authority.

In Kalutara there was not high fire hazard but also, some fire hazard occurred in the past years. But most of the areas free from the fire hazard. But for the preparation of the disaster is more suitable for the prevention of the damage to the community. Hence, the new fire brigade unit was newly established in the KUC in 2009.

Map 07: Urban Fire

3.9 Road Accidents

Road is the nerves of the urban areas which is connecting to the hinterlands to facilitate the activities transfer from there to urban culture. But this is not only the purpose of the road. With the different dimension of the road usage, its adjoin the different activities to facilitate. The “A” class road is the major trunk road system in the country which is connecting different regions. “B” class roads are connecting rural areas and the urban areas where the known as the harvesting foods transferring to the city centre for the purpose of marketing. However, “C” & bellow class level roads are mainly inter connectors with the roads. Hence, the major transmission hub is the A class roads.

The road accidents are the unexpected hazards which occur on the road because of inappropriate delicious of road users who unable to follow the road signals and limits. Nevertheless, in appropriate construction methods, land use patterns and not following the construction guide lines beside the roads also helped to increase the road accident as positive factor. Most people pointed out the road users are the only factor for the accidents. But for the deep consequence of the accidents this factor not suitable. Because, if this is true, by analysing of the road accidents could not be founded any correlation.

For the preparation of the Kalutara Multi Hazard Map, road accidents were also considerd. And the analysis was conducted by gathering past 2 year road accidents in the KUC area. Putting those factors in the spatial distribution of the KUC, there were high accidents risk zones and moderate risk zones.

Map 08: Accident Prone Areas

The high risk accident areas have some reasons for the increase of accidents. The high accident zone around the Nagashandiya was a junction where the Horana road connect. Near to the junction, the road is drastically narrow down without showing the sign board. Hence, the road users have faced some unexpected situation. Not only that, in the junction there was not any roundabout for the turning. Hence, the most of the accidents occur due to this factor.

The one of high accident zone located in the junction called “Pilima handiya” where is the wide bend. As well as, closer to the bend the privet academic class were located. Hence, these things can be related to the increase the road accidents.

In the KUC area the road network is located as a mesh shape. Hence, the de-routing for any road segment not faced any difficulties without the bridge of Kaluganga.

3.10 Multi Hazard Map

By overlaying the above discussed layers, the final multi hazard map was completed.

The final map was in main Sinhala, Tamil and English languages. And the map was published in the outdoor banner format in three locations; Nagashandiya, near Kalutara Bodiya and Katukurnda junction. The final map also was consisted the evacuation routes and the evacuation places where the higher elevated places in the Kalutara Urban Council area as well as high land areas for the temporary location.

Map 09: Multi Disaster Map

CHAPTER 04

Training and Capacity Building Programme for Technical, Health and Sanitation Sector Official in the Urban Local Authority System

4.1 Introduction

Health sector play a vital role during disaster incidence and face the challenges. It effects not only the hazard time but also the post hazard time the issues are becoming. Thus, the proper mitigation activities should be considered for the health and sanitation sector to minimize the issues due to hazard crisis. The significance of the health sector in mitigation the hazard risk considers several tasks such as,

- Rescue people & animals from the disaster
- Provide Medicine
- Mental & social treatments
- Control spreading diseases
- Maintain health & sanitary facilities in refugee camps and so on.

But these tasks are auctioned in different time frame in the disaster mitigation situation. With the disaster cycle these tasks are in different location.

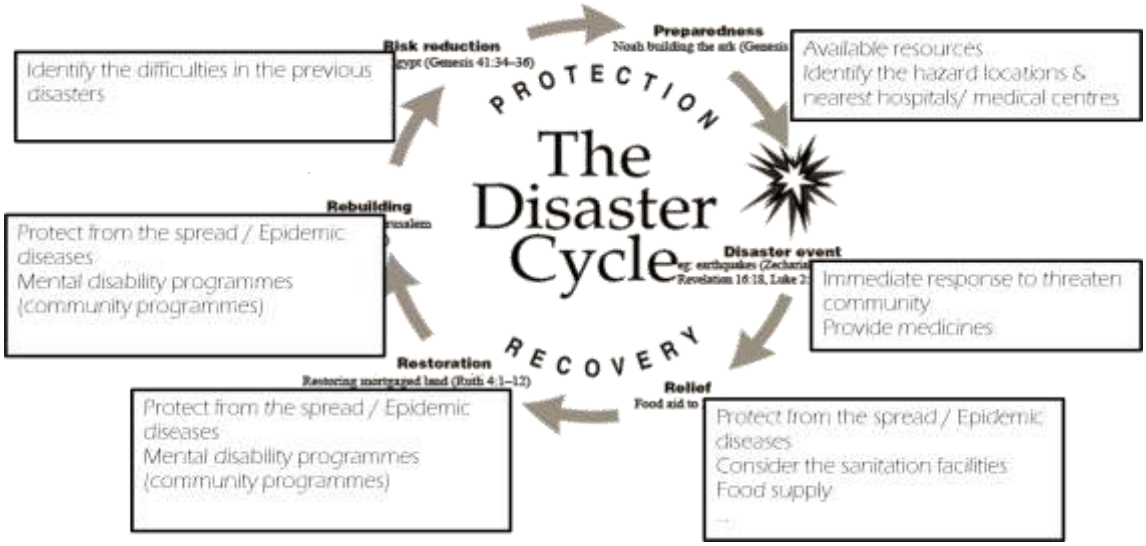


Figure 05: Disaster Management Cycle

Therefore, the mitigation of disaster risk it should be clearly addressed the different programmes in different times. However, to conduct the health sector programmes, it should be consisted of several objectives as,

- To maintain or restore the health status of the population following a major incident
- To define the communication network and procedures for alerting health service providers in the event of a disaster
- To define the responsibilities for control and coordination of the collective response by the health sector to a major incident or disaster
- To outline the appropriate casualty evacuation chain and the relative functions of agencies and institutions operating along it
- To provide an overview and coordination of emergency response plans operated by hospital and health services and other strategic health providers in the region

Thus, for the preparation is very essential for the mitigation of the hazards. However, the followings were expected to on that preparation.

- List out the available resources and its connections to the area
  - Hospitals
  - Dispensaries
  - Routes (away from floods,..)
- Identify the immediate needs when disaster occur
- Identify the social issues in disaster
- Identify the long term projects to recover the threaten people
- Identify the possibilities to improve the capacity of the health sector
- Improve the communication systems

On the series of the training programs were expected to identify the current issues in the health and sanitation sector for mitigation of hazards in the area and find out the solutions for accumulate the best solutions for the issues.

The details of the programmes and the issues which were identified in the awareness programmes were discussed in following sections.

4.2 Programme 01

According to the project proposal the capacity building through training programme is conducting for Kalutara Urban Council officers including technical officers, Health & Sanitation sector officers of Disaster Risk Reduction Method (DDR). The first workshop which is done under the capacity building programme was held at 22 June 2009, Villa Ocean View Hotel, Wadduwa.

In the workshop, the chairperson people were Mr. W.B.J. Fernando, Director General of the National Building Research Organisation and Mr. Kishan Sugathapala, head of Human Settlement Division, National Building Research Organisation. Mr. Kishan Sugathapala started the programme by explaining the project background, the aims of the workshop and the background of health sector responsibilities when the disasters occur. From his invitation, Mr. W.B.J. Fernando was starting the first lecture about develop the social development by reducing the risk of disaster. He explained the background of hazards, hazard history, mitigation, hazard reductions by gathering examples in various countries. After Dr. A. Balasuriya, Public Health Inspector, was carrying out the next session of the workshop as group discussion sessions. In this group discussion he explained the current situation of health sector responsibilities in disaster mitigation. Major Sanjeewa Samaranayake, who is the District Coordinating Officer of the Disaster Management Centre in Kaluara District, carried out the next session which explained the strategies for the health sector in the disaster management plan.

When finishing out the lecture series, the next session, which discussed the limitations and affordable activities that can be taken to overcome the situations, was begun by Mr. R.M.S. Bandara, Head, Landslide Studies and Service Division, National Building Research Organsiation. This session was the final session of the workshop and it gathers the all lecture

series, which was conducted before, to the action. This session was also conducted with the group discussions and group activities.

The outputs of the group discussions are follows,

Group 01:

Reporting of Unauthorized construction

- Building application – Plans – Inspection (Mandatory involvement by MOH)
- Check out the random houses in the local authority area and submit the report to Local authority through MOH
- Investigations the complaints from the community by MOH
- Funding and budget allocation – legal procurements
- Advocacy for provincial/ local government

Group 02

Solid Waste and Waste Water/ Human Excrement

- Formulation of steering committee to take decisions and to manage on solid waste
- (Waste water and human excrement are in different levels) health authority should be represent at all levels
- Applicable suitable monitoring system (with Reduction, Reuse, Recycle and Reject)

Group 03

Applicability of Building plans for the reduction of Disaster Risk Reduction

- Designated of zonings for different uses – residential, commercial, industrial…
- For the development of building plan it should be considered not only health & sanitation of house but also the health & sanitations issues due from house to environment
- For any erection and re-erection of building the health certificate is must
- Development of guidelines for the building which can be anticipated issues to environment (tributes, drains, wet areas…)
- Development of disaster resilient building guidelines

The major problems that they had discussed can be categorized in to main sections as,

- Approving the block out plan
- Approving the building plan
- Drainage systems
- Waste disposal

4.3 Programme 02

The second health sector Training and Capacity Building Programme for Technical, Health and Sanitation Sector Official in the Urban Local Authority System was also held at 14th July 2009 in the Villa Ocean View hotel.

For this workshop the lecture series were developed based on the outcomes of the first programme. Thus the lecture series were conducted as follows.

The head persons of the programme were Mr. W.B.J. Fernando, Director General of the National Building Research Organisation, Dr. Vijitha Perera, Deputy Director, Training, National Health Institute, Kalutara and Mr. Kishan Sugathapala, head of Human Settlement Division, National Building Research Organisation. Mr. W.B.J. Fernando began the first lecture about develop the social development by reducing the risk of disaster. The second lecture was conducted by Dr. A. Balasuriya, Public Health Inspector. After that there were two short lecture series conducted which were Housing and Town improvement Ordinance related to health sector and the current activities in the Disaster Management Centre.

By the end of the lecture series the group discussion was begun with the discussion of programme 01 out puts. Thus, the main schemes of the group discussion were Building Application process, unauthorized constructions, and the drainage system.

By considering facts that discussed in the group discussion, the following main sections were elaborated to the next programme.

- Disaster resilience construction
- Zoning & hazard zoning
- Waste Management (Economics, Lands, …)
- Research methodologies for the health sector mitigation

- Legal unauthorized construction, Monitoring and comprehensive

Hence, for the continuous of the programme series should be addressed the above facts.

Thus, the final workshop for the health sector the following lecture out lines was decided.

01. Strategies for Mainstreaming Disaster Risk Reduction into the Local Government
    a. Global Disasters and Intensity changes
    b. Governanace Structure of Disaster management
    c. Local Authority responsible for disaster Mitigation
    d. Problems on Disaster Mitigation
    e. Guidelines for Nationa, Regional and Local Disaster Planning

02. Disaster Resilient Settlement Planning Guidelines
    a. Use of zoning for DRR
    b. Significance of disaster resilient techniques in human settlement planning
    c. Techniques for using zoning for different hazards
    d. Zoning Guidelines especially for Landslides, Floods, Tsunami

03. Construction Guidelines for Disaster Resilient Construction and Retrofit of Disaster Prone Buildings
    a. What is disaster resilience construction
    b. Methodologies for improvement of buildings to Disaster resilience building
    c. Guidelines for Disaster resilience constructions
    d. Advantage and disadvantages of disaster resilience construction

04. Techniques, Procedures for incorporating the disaster risk reduction and monitoring, compliance checking of construction in Urban Local Authority
    a. Building Application procedure
    b. Common failures **Ex:-** Ventilation, Sanitation, sewerage
    c. Problems due to unauthorized construction
    d. Legal procedure to identify the unauthorized construction
    e. Monitor and evacuate unauthorized construction
    f. Creation of by-laws in DRR

4.4 Programme 03

The final workshop of the health and sanitation sector improvement workshop was conducted at Vila Ocean hotel in 25th of August 2009. As above discussed key outlines of the lectures were conducted by the skill persons who was engaged in those fields. The sequenced of the lectures were conducted for proper understanding of the audiences who were PHI and sisters. The audiences for the programme 03 were selected from the National Health Institute, Kalutara.

The Key lecture, "**Strategies for Mainstreaming Disaster Risk Reduction into the Local Government**", was conducted by Mr. W.B.J. Fernando who was the Director General of the National Building Research Organization, with the explanation above mentioned key outlines as well as explained his experiences where worked in the Northern provinces of the country in 1960's in related to health sector. The second lecture "**Disaster Resilient Settlement Planning Guidelines**" was been conducted by the Dr. Udeni Nawagamuwa, who was the senior lecture of Department of Civil Engineering, University of Moratuwa. In this lecture, explains the different construction methods and structures in different soil layers.

And the next lecture, Techniques, Procedures for incorporating the disaster risk reduction and monitoring, compliance checking of construction in Urban Local Authority, was conducted by Mr. Hemantha Jayasundara who is the president of Institute of Town Planners in Sri Lanka for next two years. And he worked in Urban Development Authority and several planning related Organisations. As well as, he worked as a planner in different projects in country as Bere Lake project and Malabe IT Park. On his presentation he explained Disasters at local level, Causes for the disasters and Strategies for the disaster reduction. And he mentioned the legal background for construct the well ventilated houses.

The final lecture," Disaster Resilient Settlement Planning Guidelines", was conducted by Mr. Kishan Sugathapala who is the head of Human Settlement Division in National Building Research Organisation. In this lecture he was explained importance of zoning guidelines for the mitigation of disasters, zoning examples and use of different techniques in different zones.

The open group discussion was conducted at the end of the workshop and there were several key outputs that the audiences were expected to carry out.

01. Need to discuss the more details on Local governing systems with relate to health sector responsibility because after the training program, the health inspectors will work with the local government sector. Thus they need more details on local government governance.

02. Need more details on construction of Foundations. In the PHI training programme these sections were considered and the additional theories should be included to those programmes.

03. Need lecture series on Disaster risk reduction: The Housing and Town Improvement Ordinance were thought under the PHI training programme. Thus, the disaster management section should be included to those lecture series with proper introductory of disaster management techniques.

With the key recommendations on the workshop the audiences were agreed to the final solution for adaptation the subject of disaster management under the Housing and Town Improvement Ordinance as follows.

Disaster Management: 30 hour lecture series

H&TI Ordinance: 10 Hour Lecture Series

Zonation Planning and Disaster Reliance Techniques: 10 Hour Lecture Series

(Annexure 02:- Curriculum for Health Sector)

CHAPTER 05

Preparation of Niche of Drainage Projects for Kalutara UC Area

5.1 Introduction

Proper drainage system is important for any urban area in order to mitigate the adverse impacts of flood. As an urban area in Kalutara locates at the Kalu Ganga river basin continuous function of drainage system and proper maintenance reduce adverse impacts of flood in Kalutara urban area. For this purpose, considering the importance of stake holder participation in problem identification in drainage system of the area it was proposed to conduct stakeholder meetings to identify the existing problems in the drainage system.

The first meeting for the local stakeholders and government officials was held on 06/02/2009 in order to identify the existing problems in the drainage system of the Kalutara UC area. At this meeting the participants express their views and feed backs through questionnaires (Annexure 03:- Questionnaire). At the end of this meeting it was decided to conduct cluster meetings includes participants from community of the area, Granma Niladaries, local authority officials and officers from NBRO in order to list down the problems and prioritize the problems regarding the drainage system in Kalutara UC area. To achieve this target there were 6 clusters meeting hold for 16 G.N divisions. At the first cluster meeting, communities were divided into groups and prepare the proposals for the drainage improvements of the area. Ex:- Extend the length of the drain same time solutions also received from the community.

5.2 Problems in Existing Drainage Network

The second stakeholder meeting was held on10/02/2009With the participation of Mr. N.M.S.I. Arambepola, Director, Programme Manager (PROMISE), Urban Disaster Risk Management. At this meeting available drainage system at the area and the problems at each drainage system with the solutions were listed by the G.N.

Following are the problems identified at the drainage system

- Due to the lack of maintenance of the drainage system it is used as garbage dumping place as result of this during rainy season flood situation in the area.
- Un authorized land filling in water retention areas
- No proper plan for drainage system

From the listed whole drainage system in Kalutara UC area it was categorized in terms of scale known as small, medium and large with the support of technical officers participated at the meeting in order to improve the drainage system of the area using structural measures. (Annexure 04:- List of Drainage System)

Meanwhile, other work shop was conducted include the whole community and total number of G.N divisions in the local authority area with the participation of Mrs. Padma Karunarathne, programme manager (PROMISE) of the ADPC. At this workshop prioritization was done according to the severity of the problem after prioritize the estimate cost prepared by the technical officers of the UC. Further, estimations were prepared for the structural measures. (Annexure 05:- Prioritize Project & Cost Estimation)

5.3 Present Situation of the Drainage

As earlier discussion, for the mitigation of the flood hazard it is important to control the drainage network in the area. As although, there were several locations which were affected from the flood hazard were selected for the initial stage.

The selected location was the main drainage connector from the hill area where the side of Dharmavijaya temple located to marsh areas. Thus, the location was in the low line land areas. Hence, it is important to discharge the excess water without any disturbance.
But when the field visits to the drainage area, it has a drainage network but it was suddenly stopped. With the reason of that, the local flood occurred in low rainfall. The top soil condition was always wet.

Figure 06: Existing Drainage

5.4 Construction the Drainage Network

The length of the drainage which was repaired was 50ft. As the project objective the drainage should be constructed by the community. Hence, with community participation of "Srama dana" the community was clearing and constructed the drain. And the Kalutara Urban Council was supplied the construction materials for the community and the technical assistance.

Figure 07: Construction of New Drainage

NBRO also, was evaluated the construction process.

During the rainy days which after the construction period, could be observed the reduction of the disturbance to the water. With discussion of the people on these areas, they were pointed out that, it was important decision to construct the drain.

CHAPTER 06

School Sector Disaster Management Cells for Selected Schools

6.1 Introduction

The community contains the several stratus of communities. Therefore, they are reacting for the disaster in different ways. From those, the elder group, children, pregnant woman group and the disable peoples faced high vulnerability from the disasters. This result due to either they haven't higher movability or lack of understanding of the situation. Hence, the capacity building programme for the society is playing major role for the response, mitigation, development, preparedness for the disaster.

But the question is "From whom do we started?" the training programme and the capacity building programme for the achievement of proper awareness to whole community. The aim of the awareness programme should be transfer the disaster management knowledge and develop the knowledge on younger generations and the uneducated peoples. Hence, major groups that first should be aware are secondary school going populations and the officers who are working on the disaster management sector.

School students participation is appreciated in disaster management because of they are the future leaders of this country also the advance knowledge of existing school going population in Sri Lanka have the talents to face challenges of the adverse impacts of natural disasters from the knowledge they gain from information and communication technology which is a compulsory subject module in Sri Lankan education system.

6.2 Description

In this background, for the implementation of Disaster Risk Reduction in Kalutara UC area 8 schools have been selected from the list of schools functioning under the Kalutara zonal education division based on the stakeholder meeting and considering the severity of damage face by schools due to natural disasters during past.

Following are the schools selected considering the severity of damage face due to natural disasters.

1. Kalutara Balika M.M.V
2. Kalutara Muslim M.M.V
3. Tissa M.M.V
4. Gnanodaya M.V
5. Kalutara Muslim Balika M.V
6. Welapura M.V
7. Sugatha Primary Vidyalaya
8. Kalutara M.V

Out of the above 8 schools 5schools have been selected to implement the project based on contribution and active participation at this project. Following are the schools selected to implement the project.

1. Kalutara Balika M.M.V
2. Kalutara Muslim M.M.V
3. Gnanodaya M.V
4. Kalutara Muslim Balika M.V
5. Sugatha Primary Vidyalaya

At these selected schools awareness programmes were conducted in each school for the school students and teachers on disaster identification, disaster prevention methods, and disaster preparedness methods. After the completion of awareness programmes disaster management cells were formulated, which includes 1 to 3 teachers about 2 students and parents. The purpose of the disaster management cells was to implement continuous awareness programmes among the schools. In order to strengthen the process one day training programme was conducted for 5 students and teachers from each disaster management cells. Further, Rs. 10,000/- was allocated for these five schools for School Development Societies to purchase first aid box and notice boards. More than this, altogether 5 rain gages were provided to these 5 schools in order to measure rain fall as an early warning measure for flood. For this purpose, officers from meteorological department trained the students to learn the rain fall measurement process.

CHAPTER 07

Resource Centre for DRR activities in Urban Local Authorities

7.1 Introduction

Urban Local Authorities are the main governing sector in the country. The planning is a multi disciplinary subject area that includes the all aspects which related to physical, economic, social and environment aspects. However, with the taking place of haphazard planning the whole areas is going to effect on the problems of hazards.

For the mitigation of the hazard risks, it should need to be proper investigations and controlling unit in urban local authority. Hence, for this, under the DRR action project established the resource center for fulfillment of the disaster mitigation in the urban local authority area. By the establishment of the resource center in the local authority area is expected to facilitate the planning requirements on disaster mitigation and support to development the urban risk reduction.

7.2 Location of the Resource Center

Figure 08: Resource Center

The site location of the Resource Center is one of the major components in the local authority area. Thus it should be located closer to the governing centers in the LA. The Kalutara UC was selected the building space in closer to the Kalutara Public library building. And Kalutara UC was developed the interior facilitate of the Resource Center. And NBRO is going to purchase the equipments which are important to Resource Center.

The following equipments are to be going to be purchased.

- Computer
- Computer table and chair
- Reading table and chairs
- Office table and chair
- Filling cupboard
- Notice board
- Screen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கலுத்தறை நகரசபையின் அனர்த்த வரைபடம்
Multi Disaster Map of Kalutara Urban Council
Map Key
Hazards
River Floods
Local Flood
Sea Erosion
Tsunami Effected Area
Urban Fire
Road Accident Areas
Moderate Risk
High Risk
Emergency Information
Evacuation Routes
Temporary Evacuation Places
Emergency Helicopter Landing
Emergency Telephone Numbers
Funding Agencies
Asian Disaster Preparedness Center
United State Agency for International Development (USAID)
Implementing Agencies
National Building Research Organisation
Kalutara Urban Council
Disaster Management Center