Asian Urban Disaster Mitigation Program

AUDMP Project Report #3

Project Completion Report of the

Sri Lanka Urban Multi-Hazard Disaster Mitigation Project

August 2000

Implemented by

Centre for Housing, Planning and Building

National Building Research Organisation

Urban Development Authority

adpc

Asian Disaster Preparedness Center

Bangkok, Thailand www.adpc.ait.ac.th

The **Sri Lanka Urban Multi-hazard Disaster Mitigation Project** was launched in September 1997 under the Asian Urban Disaster Mitigation Program. The objective of the Sri Lanka national demonstration project is to reduce the vulnerability of the Ratnapura municipality. The project, implemented by the Centre for Housing, Planning and Building in partnership with the National Building Research Organisation and the Urban Development Authority, demonstrated a methodology for identifying hazards and for selecting appropriate strategies to avoid or reduce hazard related losses. The project assisted municipal officials to develop improved tools and skills in development planning and risk management. Activities under the demonstration phase of the project included hazard and vulnerability mapping, risk analysis, strategic planning, policy and procedural changes, training and professional development, and networking.

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Acknowledgements

It is with pleasure that ADPC presents this project completion report of the Sri Lanka Urban Multi-Hazard Disaster Mitigation Project (SLUMDMP). The SLUMDMP is one of the national demonstration projects under the Asian Urban Disaster Mitigation Program (AUDMP) managed by the ADPC. The AUDMP being implemented in Bangladesh, Cambodia, Laos, India, Indonesia, Nepal, Philippines, Sri Lanka, has demonstrated successful methodologies and approaches in mitigating the impact of the disasters in the region. During implementation of the national demonstration projects, there has been continuous building of knowledge and experience emanating from the country projects. The national demonstration projects have produced wealth of knowledge in the form of hazard maps, reports, proceedings, review of policies, documentation of various events and activities, etc.

The purpose of making the report available in the present form is to share the knowledge and experiences with those promoting mitigation in their respective constituencies at community, city and national levels and to help them learn from the experiences of the national demonstration projects.

ADPC congratulates the Centre for Housing, Planning and Building (CHPB) and its partner institutions, including National Building Research Organisation (NBRO) and Urban Development Authority (UDA) for successfully implementing the demonstration project. The project demonstrated methodology for identifying hazards and for selecting appropriate strategies to avoid or reduce hazard related losses. The project also assisted officials to develop improved skills in development planning and risk management.

I also take this opportunity to thank CHPB, NBRO and UDA for successfully implementing the project. The work done by the project is further being replicated in the other parts of Sri Lanka to reduce loss of lives and damage of properties from devastating disasters.

We hope that you will find this paper useful and we look forward to receiving your comments.

Dr. Suvit Yodmani
Executive Director
Asian Disaster Preparedness Center
Bangkok, Thailand

August 2000

Preface

The United Nations Organisation designated the years 1990-2000 as the International Decade for Natural Disaster Reduction (IDNDR). The basic theme within this declaration was the need for creating safer cities in the disaster prone regions of the world. Asia is considered as the most disaster prone region in the world.

In response, a six-year programme, namely, Asian Urban Disaster Mitigation Programme (AUDMP) was designed and is being implemented by the Asian Disaster Preparedness Centre (ADPC) in the Asian region with the assistance from the US Agency for International Development (USAID). There are several countries of the Asian region presently being targeted by this programme. The Sri Lanka Urban Multi-hazard Disaster Mitigation Project (SLUMDMP) is the Sri Lanka project under this AUDMP programme. The SLUMDMP was implemented by the Centre for Housing Planning and Building (CHPB) with two other partner agencies, namely, National Building Research Organisation (NBRO) and Urban Development Authority (UDA), all three organisations falling within the purview of the Ministry of Housing and Urban Development, Sri Lanka.

The Sri Lanka Project was established in October 1997 and the proposal considered the multi-hazard situation, which is experienced in some of the central areas of Sri Lanka. The project activities were completed on 29th February 2000.

This document is the Project Completion Report, which describes the achievements and failures of the project, including strengths, obstacles and lessons learnt. It also includes the project financial status as at the end of the project.

I am grateful to the partner agencies and all other organizations, which extended their co-operation in various activities of the project at different stages.

I wish to express my gratitude to all resource persons, who participated in various training programmes, awareness programmes and workshops. Also I wish to acknowledge those consultants, who were involved in carrying out consultancies and studies related to the project. Without the contribution of these resource persons, the completion of this project as scheduled would not have been a possibility.

Finally, I wish to thank the ADPC and the AUDMP for their support at all times during the project and the USAID for providing financial assistance.

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Project Director
Sri Lanka Urban Multi-Hazard Disaster Mitigation Project

April 2000

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Abbreviations and Acronyms

ADB	-	Asian Development Bank
ADPC	-	Asian Disaster Preparedness Center
AIT	-	Asian Institute of Technology
AUDMP	-	Asian Urban Disaster Mitigation Program
CHPB	-	Centre for Housing Planning and Building
DMSC	-	Disaster Management Steering Committee
EDO	-	Environmental Development Officer
GIS	-	Geographic Information System
GOSL	-	Government of Sri Lanka
IDNDR	-	International Decade for Natural Disaster Reduction
KMC	-	Kandy Municipal Council
LA	-	Local Authority
LGMU	-	Local Government Management Unit
MC	-	Municipal Council
NBRO	-	National Building Research Organisation
NDM	-	Natural Disaster Mitigation
NDMC	-	National Disaster Management Centre
NGO	-	Non-Governmental Organisation
NPTI	-	National Partner Training Institute
NUC	-	Nawalapitiya Urban Council
RDMSC	-	Ratnapura Disaster Management Steering Committee
RHUDO	-	Regional (Housing and) Urban Development Office
RMC	-	Ratnapura Municipal Council
SLIDA	-	Sri Lanka Institute of Development Administration
SLUMDMP	-	Sri Lanka Urban Multi-Hazard Disaster Mitigation Project
UDA	-	Urban Development Authority
UNCHR	-	United Nations Centre for Human Rights
UNCHS	-	United Nations Centre for Human Settlements
UNDP	-	United Nations Development Programme
UPU	-	Urban Programming Unit
USAID	-	United States Agency for International Development
USPAP	-	Urban Sector Policy action Plan

1.0 Introduction

The island of Sri Lanka has a long history of natural hazards. Floods, droughts, landslides, coastal erosion and cyclones have had their impact in its past and recent history. Available statistics with the Social Services Department clearly show the massive cost incurred in relief and rehabilitation of affected people. Yet, little was achieved until the 1990s in terms of integration of natural disaster mitigation in national development efforts, especially in regional and urban development.

Urban development took a new lease of life in the 1990s. Provinces and regions were gaining new governance and development planning responsibilities. In 1993, an Urban Development Sector Project with US$ 36 million assistance from the Asian Development Bank (ADB) was launched, to effect the construction and location of infrastructure of 17 towns including those affected by natural hazards. The Urban Development Authority (UDA) implemented the project.

During the period 1981 – 1994, nearly 50% of all urban settlements had grown with an annual growth rate of 2%[1]. It was likely that such growth would have escalated unplanned land use activities in natural disaster prone areas.

Major areas of seven districts covering nearly 10,000 sq.km. have been identified to be landslide-prone[2]. Increasing population would increase the spread of human habitats into these areas increasing the potential of landslide occurrence through human activities in disaster prone areas.

August 1990 was a turning point in government policy on natural disaster mitigation in Sri Lanka. The Government of Sri Lanka (GoSL) established the Landslide Hazard Mapping Project as a tripartite collaboration, with the assistance from the United Nations Development Program (UNDP) and the United Nations Center for Human Rights (UNHCR). This was to be conducted by the National Building Research Organization (NBRO), which is a research institution under the Ministry of Urban Development, Housing and Construction.

The five-year project had several goals:

- To deliver a complete set of landslide hazard maps at a scale of 1:10,000 for the districts of Badulla and Nuwara Eliya.
- To unfold socio-economic realities of communities resident in landslide prone locations, and inter-relate landslide hazard maps with human settlement growth and efficient management of land.
- To create public awareness about adverse effects of improper land use on the environment.

[1] Wanasinghe, Y.A.D.S. (1997) Settlements in Arjuna's Atlas of Sri Lanka, p54.
[2] Parker, J.; Jayasinghe, H.; and Asford, S. (1996) Sri Lanka Landslide Mitigation Project, Preliminary Report for the Asian Urban Disaster Mitigation Program (AUDMP), USAID.

By the end of the project period, 35 Geographic Information System (GIS) maps covering 1112 sq.km. in the Badulla and Nuwara Eliya districts were completed which can form the basis for systematic land use planning and appropriate land use management in these high-risk areas. A database has been established on landslide hazards. In 1995, the NBRO completed a ***" Manual on Landslide Hazard Zonation"*** and "***Guidelines for Site selection, Development Planning & Construction in the Hilly Regions of Sri Lanka"***. Thirteen training programs were completed by 1995, which have contributed to awareness raising among the local authorities that can use these end products of the project. At the last tripartite meeting, GoSL entered into a commitment to map all landslide prone districts within Sri Lanka.

In May 1994, Sri Lanka hosted a workshop to mark the International Decade for Natural Disaster Reduction (IDNDR) under UNDP sponsorship. This was followed by a consultative workshop for exchange of national experiences in disaster management in December 1994 sponsored by UNCHS which implements UNDP sponsored projects within the region. A result of these workshops was the establishment in July 1996, of a National Disaster Management Center (NDMC), in the Ministry of Health, Highways & Social Services. In January 1998, the UNDP provided financial assistance (US$ 250,000.00) for the strengthening of disaster management capacity in Sri Lanka. The Government of Sri Lanka has taken further action towards disaster mitigation in urban settlements. With UN support, the Government has initiated drafting of a Bill by NDMC for the Enactment of Sri Lanka Disaster Counter Measures Act of 1980, which is now pending approval.

These outputs should have played a helpful role in urban development at other high-risk areas. However, without integration of mitigation approaches for natural hazards in policy planning, these outputs were not fully utilized.

Concurrent with these activities, the UDA played a major role in formulating the ADB supported Urban Sector Policy Action Plan (USPAP) which offers opportunities to integrate hazard management into urban development. It achieved full development by 1996. The ADB entrusted the Urban Programme Unit (UPU), (established in 1985 under the then Ministry of Local Government, Housing and Construction), with the enhancement of the management and financial capabilities of urban local authorities for disaster mitigation. The Local Government Management Unit (LGMU), functioning under the Ministry of Provincial Councils and Local Government, became the successor to the UPU.

Parallel to these developments, the Land Use Policy Planning Division of the Ministry of Agriculture and Lands has compiled a ***Land Use Planning Guide Book for Land Use Planning*** at national, provincial, divisional village and plot levels. Draft National Land Use Policy Paper prepared by the Land Use Planning Division of the Ministry of Agriculture and Lands is pending legislature.

As a further development to these initiatives, a draft proposal[2] for a demonstration project for landslide mitigation at Ratnapura Municipal Council in the Sabaragamuwa Province of Sri Lanka was prepared in December 1996 by a team of consultants as the Sri Lanka Project of the Asian Urban Disaster Mitigation Programme (AUDMP), managed by the Asian Disaster Preparedness Center (ADPC) within the Asian Institute of Technology (AIT) and funded by USAID.

The lead institutions initially identified for the project were the LGMU, the UDA and the NBRO. The Sri Lanka Institute of Development Administration (SLIDA) was identified to assist in the training and human resource development component of the project.

The gestation period that followed surfaced issues of motivation and commitment, which though not officially documented, led to the re-thinking about the key players for project implementation. The project involved several Ministries and organizations. This would invariably have created the overlapping and diffusion of the authority for project execution between several institutions. This appeared undesirable. Therefore, the Center for Housing, Planning and Building (CHPB) under the Ministry of Urban Development, Housing and Construction (M/UD,H&C) was identified for project management. CHPB has a proven track record of project implementation as well as training and human resource development. The NBRO was selected as the recipient of the grant in order to overcome procedural constraints. All the three agencies, CHPB, NBRO and UDA are agencies under the same ministry, which would be a convenient arrangement for implementation.

On 18 September 1997, a grant agreement was signed between the ADPC/AIT and Ministry of Urban Development, Housing and Construction, providing financial assistance to implement the project, **"Creating Safer Communities: Sri Lanka Multi-Hazard Disaster Mitigation Project"**.[3] The project was to be implemented in partnership between NBRO, UDA and CHPB under a tripartite Memorandum of Understanding between the three institutions, managed by the ADPC under the broader Asian Programme.

The Life of Project (LOP) commenced on 1st October 1997 and the scheduled completion date was 28th February 2000.

In December 1997, approval of the Cabinet of Ministers of the Government of Sri Lanka for the intended project was officially informed to the participating institutions by the Secretary to the Ministry of Urban Development, Housing and Construction by his letter No. 08-01-13-001, dated 3 December 1997. When the work was in progress on the request of the project management, the first extension was granted up to 31st July 1999 on a no-cost-increase basis. This was necessitated as some of the activities were not possible to commence due to various reasons. The second extension was granted up to 31st December 1999 on the same basis due to similar reasons and in December 1999 the third extension was granted up to 29th February 2000, on which date the project activities were completed.

2.0 Overview of the Project

2.1 Project Goal

Reducing natural disaster vulnerability of urban population, infrastructure, lifeline facilities and shelter in Sri Lanka.

[3] Grant Agreement No. AUDMP – Sri Lanka - DP-1-97 under USAID Cooperative Agreement No. 940-1008-A-00-5531-00.

2.2 Project Objective

To establish sustainable public and private sector mechanisms for disaster mitigation in Sri Lanka.

2.3 Detailed Objectives

i. To demonstrate a methodology for identifying hazards causing disasters to life and economic assets, assessing the vulnerability, and determining potential losses and damages from a particular hazardous event.

ii. To demonstrate a method to select appropriate mitigation strategies to avoid or reduce hazard related losses.

iii. To provide local authorities with improved tools and skills for risk management and development planning.

2.4 Project Partner Agencies

Centre for Housing Planning and Building (CHPB)

Training and research centre, which is a permanent division of M/UD,H&C. Established in 1979 utilizing a grant from the government of the Netherlands. Current mission is delivering training, research and information services, in support of national, provincial and local level public and private sector agencies and individuals involved in the planning and management of activities in broad areas of housing, human settlements development, urban infrastructure and urban development.

National Building Research Organization (NBRO)

Research organization under M/UD,H&C established in 1984. Began its landslide studies in 1990 with support from UNDP and UNCHS. Has developed methodology for production of landslide hazard zonation maps using GIS to serve as stools for planning of settlement and infrastructure development in the hill country. Has drafted a manual, viz,. "Site selection, Development Planning and Construction in the Hilly Regions of Sri Lanka" NBRO also has a landslide database and a detailed methodology for assessing landslide risk.

Urban Development Authority (UDA)

The main planning agency of Sri Lanka under the M/UD,H&C. Has successfully implemented many large urban development projects, including Sabaragamuwa Regional Structure Plan, which produced a map of landslide-prone areas and a divisional land use plan to cope with current and expected natural hazard and urban environment problems. Has produced environmental map workbooks for Bandarawela and Hambantota with support through projects funded by the USAID.

Asian Disaster Preparedness Center (ADPC)

A regional resource center, established in 1986 and located in Bangkok, Thailand. ADPC works with governments and communities of the Asia and the Pacific Region to strengthen their capacities in disaster preparedness, mitigation and response through training, technical assistance, information and research.

2.5 Methodology

The methodology adopted in the project is to carry out

- Demonstration activities in a selected municipality prone to multiple hazards,
- Training for the demonstration municipality officials and national level officials, and
- Information, Networking and Policy Development Activities.

Documentation processes are to be carried out and a lessons learnt workshop is to be held at the end of the project. Replication of demonstration activities will also to be carried out in two selected cities during the project period.

2.6 Elements of the Project

2.6.1 Demonstration Project

Ratnapura Municipal Council area was selected as the project site. Ratnapura is vulnerable to a number of hazards such as landslides, frequent flooding, soil erosion and land subsidence due to gem mining.

Project Activities

- Multi-Hazard Mapping, including development of a method for expediting the mapping process in replicating the demonstration activities.
- Systematic identification of hazards.
- Inventory of elements at risk (Residential zones, public utilities, life-line facilities, economic activities)
- Risk Assessment: Assessment of vulnerability and identification of priority areas for detailed analysis.
- Impact Assessment.
- Mitigation Strategies: Formulation of a range of options for appropriate utilization in areas at risk and protective actions for existing development.
- Selection and implementation of mitigation strategies and actions in line with municipal action plan;
- Development of guidelines for land use with a view to mitigating disasters to be used by Planners and Technical Personnel in the Municipality.
- Development of Emergency Preparedness Guidelines for use in Emergency Situations by the Municipal and other government officials.

- Public Awareness for the General Public, Businessmen, School Children etc.

2.6.2 Training and Professional Development

These activities include,

- Training for planners and technical officers at local level.
- Regular courses for technical personnel and administrators involved in disaster mitigation.
- Training for UDA planners.

2.6.3 Information, Networking and Policy Development

- Development of a National Database of Disaster Management and Mitigation Resources.
- Workshops for planners on integration of hazard maps in the planning process.
- Policy improvement

2.6.4 Replication Projects

At the outset of the project, a conscious undertaking was to replicate selected demonstration project activities at two other selected cities prone to similar disasters. As replication cities Kalutara and Nawalapitiya Urban Council areas were identified. As a later development in June 1998, Kandy Municipal area was selected to replace Kalutara . This was based on the recommendation of the Hon. Minister of Urban Development, Housing and Construction and the UDA Chairman, that Kandy was at higher risk from natural hazards than Kalutara.

3.0 Ratnapura Demonstration Project and Replicating Activities

Demonstration Project activities commenced with meetings among the project partners and then with the building up of rapport and good will with the Mayor and other officials of the RMC. Subsequent to this the Ratnapura Disaster Management Steering Committee (RDMSC) was established under the Chairmanship of the Mayor, who had very good relations with most of the government agencies, the community and the NGOs in the area.

The presentation of the process in the demonstration project comprises the following key areas:

- Mapping of natural hazards, resources, services and infrastructure facilities in order to compile the Map Workbook including Natural hazard zonation maps.

- Risk analysis, identification of elements at risk and development of risk mitigation approaches to the area in order to integrate them with planning for development.

- Prioritisation of the risk mitigation strategies and preparation of the Disaster Mitigation action Plan

- Implementation of selected mitigation actions

3.1 Mapping

3.1.1 The Process

The process of mapping in Ratnapura resulted in the following outcomes:

By NBRO:

- Preparation of derived landscape hazard zonation maps based on attributes, viz., Landslides and Colluvium, Geology, Hydrology, Landform, Landuse Management and Slope Categories.
- Preparation of integrated Landslide hazard zonation map
- A methodology was established for Landslide Zonation in this process

By UDA: Preparation of

- Maps of existing wards, population density and present landuse
- Maps of wetlands, major irrigation schemes, industries and archeological sites
- Flood hazard zonation maps
- Maps of road network, accidents, social services, power supply network, telephone network, water supply network and location of gem mines
- Proposed zoning plan for Ratnapura

By Project Partners:

- Compilation of Map Workbook
- Presentation of Map Workbook to the RDMSC

3.1.2 Strengths and Opportunities

i. The ADB supported Urban Sector Policy Action Plan (USPAP), which offered opportunities to integrate hazard management into urban development in its Phase 1, produced 1:5000 scale maps for Ratnapura. This reduced the time scale for mapping activity for Ratnapura under the present project.

ii. The ADB project also put in place a storm water drainage system for Ratnapura, shifted the central bus stand to a higher elevation and constructed pedestrian crossing across the river which provided an opportunity for better community reception of the present project. These were visible implementation of proposals given in the USPAP.

iii. The fact that the UDA is the main planning agency of Sri Lanka and working very closely with the Local Authorities was a strength in carrying out the project activities in this phase successfully.

iv. The pre-project experience of the NBRO in the Landslide Hazard Mapping Project (1990-1995) was a strength. The availability of computer hardware and software at NBRO, to be available for the digitization of maps, pending procurement of new equipment for SLUMPDP, created an opportunity to reduce gestation at commencement. It therefore appears that skills, capacity and availability of necessary equipment already encapsulated within the NBRO for the demands of the project was an opportunity that has favoured the visible expediency of the mapping phase. Had this situation not prevailed, it is most unlikely that the achievements recorded would have been realized.

v. The established capacity of the CHPB to network amongst government organizations was also a strength in generating the momentum for take-off from zero point. The rapport and good will generated with the Ratnapura Mayor, its officials and relevant government organizations within the Ratnapura Municipality seem to have helped largely in overcoming constraints experienced.

vi. Participation of the NBRO was conducive as it has already been assigned with the land slide hazard mapping of Ratnapura and Kegalle districts.

3.1.3 Obstacles and Constraints

i. A history of a series of unrealized project proposals for Ratnapura flood mitigation resulted in low credibility of new project proposals with the community.

ii. There appears to have been a difficulty in attracting co-operation of the Survey Department to provide maps and boundary markings of the municipality area. For instance, there was a difficulty in establishing flood prone areas physically on location due to non-availability of survey benchmarks within the city. The project also encountered a delay in the delivery of new town sheets for the Ratnapura MC by the Survey Department.

iii. Lack of base map data in the scale needed.

iv. Non availability of 1:10,000 scale maps as well as accurate records related to floods, landslides and related natural hazards for the area has been a constraint. Simulation studies were made necessary to work out flood data using available rainfall data.

v. Monsoon weather during the mapping phase compelled delays on fieldwork.

3.1.4 Lessons Learnt

i. Scheduling of fieldwork should consider weather suitability for such work during identified time periods.

3.2 Risk Analysis and Disaster Mitigation

3.2.1 The Process

This phase of the project clearly demonstrated that risk analysis and mitigation approaches could be successful only through a participatory approach with the stake holders such as the general public, municipality officials, government institutions and other agencies interested or related with disaster impact and who are involved in development activities, provision of services and information activities in the geographical area under consideration.

The activities that took place are listed below in the chronological order:

- The exercise of **risk analysis** commenced with a workshop in October 1997, with the participation of the project partners, members of the RDMSC, officials of the RMC and other relevant national and provincial agencies providing services. The agencies represented were,

  At National level
  - National Disaster Management Centre
  - Social Services Department
  - Central Environmental Authority
  - Project Partner Agencies

  At Provincial level
  - Provincial Director of Health
  - Provincial Irrigation Department
  - Provincial office of Meteorology Department
  - Provincial Road Development Authority
  - Provincial office of the National Water Supply and Drainage Board
  - Provincial office of Ceylon Electricity Board
  - Provincial office of Sri Lanka Telecom
  - Director, Engineering Services, Sabaragamuwa Province

  At District Level
  - District Secretary, Ratnapura
  - District Manager, National Housing Development Authority
  - Director, Education, Ratnapura

  At Municipal Council Area level
  - Deputy Inspector General of Police, Ratnapura
  - Municipal Council
    - His Worship the Mayor

    - Municipal Commissioner
    - Municipal Engineer
    - Public Health Inspector
  - Deputy Director, UDA, Ratnapura
  - Gem and Jewelry Authority, Ratnapura

Analysis of responses based on a questionnaire circulated at the workshop revealed a perception of natural disasters in the following hierarchy:

- Floods
- Landslides
- River Bank failures
- Soil erosion
- Subsidence due to gem mining activities

- In the first quarter of 1998, three workshops were conducted with assistance from a UNDP/TOKTEN Expert. These were **Probabilistic Analysis in Geo-technical Engineering**, **Analysis of Landslide Risk** and **Soil Erosion**. The objectives of these workshops were to train the involved professionals in Risk Analysis. Participants represented the NBRO, CHPB, Road Development Authority (RDA), UDA and the Water Resource Board.

- These workshops were followed by another workshop on **Risk Based Mitigation Planning**, in June 1998, conducted by Ms. Linda Noson, an ADPC Consultant. Nearly 50 participants took part in this workshop. Amongst them were Engineers, Planners, Geologists, Scientists from project partner agencies and the demonstration project as well as the replicating cities. At this workshop, Resource Persons for future risk analysis endeavours were identified.

- By the end of the third quarter of 1998, **Guidelines on Risk Based Mitigatory Approaches for Planning** based on the June 1998 workshop by the ADPC Consultant was completed and published. This was made available to all UDA Planners.

- In January 1999, a second workshop was conducted on considerations of the **Natural Hazard Aspects in the Planning Process** with the same ADPC consultant. This workshop was mainly conducted for planners of the UDA and other project staff.

- The materials used by the consultant at the January 1999 workshop were compiled as a Planning Workbook and published as "Integrating Natural Hazards into the Planning Process – Risk Control Planning Workbook". Copies of this book were made available to UDA planners.

- An analysis of risks and identification of elements at risk at the RMC area were carried out at a workshop with the participation of selected planners and other professionals. Mitigation options were proposed and listed, which were subsequently reviewed by involved professionals and organisations in the district. This led to the preparation of the Action Plan for Ratnapura MC.

- Finalization of mitigation strategies in the Action Plan was completed by the first quarter of 1999. The Draft Action Plan was ready by March 1999. It was then reviewed by the ADPC. This was followed by discussions with stakeholder agencies and several meetings of the partner agencies before finalisation for printing.

- The strategies selected were prioritised on the basis of time scale and funding availability under the project in the following manner:

    1. To be implemented under the project
    2. Long term strategies requiring funding from government and in some cases even requiring feasibility studies

3.2.2 IMPLEMENTATION OF SELECTED MITIGATION STRATEGIES

By way of implementation of selected strategies the following activities were carried out:

- **Training for craftsmen -** Two workshops were conducted during February 1999 for craftsmen involved in construction activities

- **Training of Social Animators for Rescue Operations -** This was achieved by subcontracting the training component to the International Commission of the Red Cross (ICRC). This was achieved in February 1999. The volunteer groups were selected in July/August 1999 and training scheduled for August 1999.

- **A flood simulation study** had to be undertaken due to the non-availability of accurate flood data. During the first quarter of 1999, the site visits and methodology were finalized. The simulation model was completed by the third quarter of 1999 and boundaries are yet to be established on the ground.

- In the latter part of 1999, the development of **Guidelines for Construction in Disaster Prone Areas** was finalised and the printing was completed in January 2000. These guidelines cover six hazards, viz., floods, landslides, cyclones, mining and blasting, lightening and droughts.

- In September 1999, a workshop was held to familiarize UDA Planners on **Integration of Hazard Zonation Maps in Development Planning**

- Revision of development approval procedure for Ratnapura was carried out as an exercise in the workshop for UDA planners. This would be presented to the RMC officials for review and then passed in the Council. The finalized version would then be printed for use. Thereafter, training of municipal council staff would be carried out under the Replication Phase.

- By the beginning of the second quarter of 1998, an **Emergency Management and Response Plan (EMRP)** for natural disasters in

Ratnapura was formulated by the project staff, which identified objectives, persons/organizations responsible, emergency measures required, and an operation plan for implementation during emergencies. The project officers and Ms. Shirley Mattingly, ADPC Consultant presented this plan in July 1998 to the RDMSC and RMC members. Techniques adopted for mitigation in the EMRP were,

- Avoidance
- Loss reduction
- Prevention
- Preparedness

This document has since been published in three volumes. For implementing the EMRP in the RMC, institutional arrangement has to be established by passing an enactment in the RMC and Sabaragamuwa PC followed by training and awareness. Providing assistance to the RMC in this respect is an item proposed in the Proposal for Replication Phase.

- Under mitigation strategies for public awareness the following specific activities were carried out:
  a) Printing of poster
  b) Art, poster and essay competition for school children in demonstration and replicating cities
  c) News Letters (in local language) 7 issues
  d) Video film (Tele drama)
  e) 3-day school awareness programme (150 children and teachers) in October 1999 at Habitat Lanka - 99 Celebration on the theme of 'Cities and Environment' held at Embilipitiya, Sabaragamuwa Province

- The following public awareness programmes were carried out:

  a) For Ratnapura district branch of ICRC (as trainer training for SAR parties)
  b) Govt. Officials of Kegalle and Ratnapura - 29.06.1999
  c) For first aid volunteers of ICRC Ratnapura branch
  d) Provision of resource inputs for the Workshop on Community Based Preparedness, organised by the Ratnapura SLRC

- In the Action Plan, Training too was emphasised as an essential requirement for effective disaster mitigation. These will be described under the section on training.

3.2.3 Strengths &Opportunities

i. The high level of co-operation from the Mayor and officials of the Ratnapura Municipality was a strength for the implementation of the project, especially during this phase.

ii. The project undertaken by the UDA to create a playground within the Ratnapura New Town resulted in slope failures. This was a clear demonstration of errors in development planning. The

incident provided an opportunity for better reception of natural hazard integration into development activities.

iii. 1999 brought the biggest flood in seven years. The relief measures that went into place created an environment conducive to convince the public as well as municipal staff of the need for natural disaster mitigation planning.

iv. The appointment of a Presidential Committee during the fourth quarter of 1997, directly under the Hon. Minister of Environment and Forestry, to look into landslides and associated problems in the aftermath of massive landslides in the Badulla district, in 1997, has created a national interest in natural disasters and the need for disaster mitigation. The report has been submitted to the Hon. Minister during the first quarter of 1998.

v. The Insurance Corporation of Sri Lanka agreed to launch a new policy to cover the impact of natural disasters. In February 1998, token insurance policies were awarded to selected beneficiaries from Ratnapura, Nawalapitiya, Kalutara and Haldummulla. The presentation was made by the Hon. Minister of Housing and Urban Development which contributed to national awareness of the problem.

vi. The National Action Plan on Climatic Change (NAPCC) has recognized the importance of incorporating natural disaster mitigation measures in urban development planning. The project has participated in this activity.

vii. The inputs for natural disaster mitigation at Ratnapura have received attention of political propaganda, during the last Provincial Council Elections and would thus continue to enjoy political patronage both at Municipality and Provincial Level

viii. NBRO has been involved in conducting awareness programmes, especially in landslide hazard mitigation, which was a great strength in implementing this phase of the project.

3.2.4 Obstacles and Constraints

i. Provincial Council elections and the involvement of municipal council members and staff in election matters took priority over the project activities, delaying project outcomes. Matters beyond the control of the project such as the postal strike within the project period from March to May 1998 added further delays.

ii. Due to the delay in identifying Kandy replicating city, the officials did not get the opportunity of participating in the Risk Analysis and Mitigation Workshops held in Colombo during this phase of the project.

3.2.5 Lessons Learnt

i. Pre-publicity of project objectives and their importance as well as their endorsement by the Cabinet of Ministers would have facilitated better attendance and commitment of participants at workshops.

ii. Community participation as well as political patronage is essential for successful implementation of formulated strategies.

iii. Early identification of local and foreign resource persons would reduce delays in organizing workshops.

iv. Adequate budgetary provision should be made available for future endeavours based on the current experiences.

3.3 Replicating Activities

According to the project proposal as replicating activities during the project, only mapping activities were to be carried out in the two selected replicating cities. For this purpose Nawalapitiya Urban Council (NUC) and Kandy Municipal Council (KMC) were selected. While NUC was identified almost at the beginning of project activities, there was a delay in identifying KMC as this replaced the earlier selected Kalutara UC.

In consequence the mapping process was carried out in the replicating cities, which resulted in the outcomes similar to those of the demonstration project. The Map Workbooks are available for both cities.

Prior to the mapping process, in both the cities of Nawalapitiya and Kandy, workshops were conducted for identification of hazards prevailing in the respective local authority areas. NUC had the advantage over the KMC due to its selection as a replication city earlier, providing the opportunity to its officials to get involved in the various workshops conducted at central level at CHPB. In addition, various training and awareness programmes have been conducted at Nawalapitiya area.

For NUC, apart from the Map Workbook, the disaster mitigation Action Plan was also formulated. However there was no provision for implementing any strategies apart from training and public awareness programmes. For implementing the identified mitigation strategies NUC will have to identify funding sources and request for funds after incorporating these strategies in the Annual Programmes.

The following public awareness programmes were conducted in the NUC area.

a) For school children and teachers - Nawalapitiya
b) For NGOs on landslides, lightening, climate change, erosion etc. - Nawalapitiya
c) For disaster management officials of national level and central province organisations at Nawalapitiya - 05.11.1999

As less activities were carried out at KMC, it is expected to get the officials more involved in the future training programmes centrally, and also conduct public awareness programmes in the KMC area during the replicating phase.

3.3.1 Strengths and Opportunities

i. The early identification of Nawalapitiya UC as one of the replicating cities enabled the participation of NUC officials in most of the risk analysis and mitigation workshops held in Colombo.

3.3.2 Obstacles and Constraints

i. There was a delay in identifying Kandy MC as a replicating city, resulting in the officials not getting the opportunity of participating in the risk Analysis and Mitigation Workshops held in Colombo during this phase of the project.

ii. Due to the same reason any public awareness programmes could not be conducted in the KMC area

3.3.3 Lessons Learnt

i. Early identification of replicating cities would have resulted in greater involvement of the replicating city officials in the training programmes and increased awareness programmes in the replicating city areas

4.0 Training and Professional Development

4.1 The Process

Training and professional development may be categorised broadly as overseas training and local training.

4.1.1 Overseas Training

The overseas training was in courses organized and sponsored by the ADPC, viz., Urban Disaster Mitigation (UDM), Technological Risk Mitigation in Cities (TRMC) and Community Based Approaches in Disaster Mitigation (CBDM). It allowed the opportunity to train the Mayor and the Municipal Engineer of the Ratnapura Municipal Council (where the demonstration project was implemented); the Chairman and Environmental Development Assistant of the Nawalapitiya Urban Council (where a replication project is being implemented) and eight members of partner institutes of the project (UDA, NBRO & CHPB). Director (Training) of the CMC, who is a visiting faculty member of SLUMDMP also received training in the UDM-2 course.

4.1.2 Local Training

The local training was implemented under the following broad categories:

1. Training at municipal (local) level
2. National level training
3. Training for UDA planners

- The achievements under the training component of the SLUMDMP can be listed as follows:

  a. Short training by Dr. Buddhima Indraratna, Associate Professor, University of Wollongon on,
     - Concepts on Risk Assessment Based on Probabilistic Methods
     - Risk Assessment
     - Basic Concepts of Soil Erosion

  b. Public lecture on Building Informational Resources for Collaborative Development efforts by NGOs - Mr. Eswaran Selvarajah, UNDP Consultant

  c. Introductory Seminar on Natural Disaster Mitigation Training

  d. 1st National Course on Natural Disaster Mitigation (NDM-1) - 6 days. Adapted training curriculum and training materials are available for use in the proposed regular training courses of the CHPB and SLIDA.

  e. Training for Technical Officers of Local Authorities in collaboration with the Local Govt. Management Unit of the Ministry of Local Govt. and Provincial Councils - 9 programmes

  f. 2 Training Workshops for UDA Planners on Integration of Hazard Maps

  g. Training Workshop for UDA Planners on Planning Guidelines

  h. 4 Schoolteacher Training Programmes in Competence Development for GCE (A) Level Projects and Assignments (3 days each). Training materials are available for future use.

  i. 2 Training Workshops for politicians, administrators and Technical Officers of Ratnapura and Kegalle districts in Sabaragamuwa Province on Guidelines for Construction in disaster Prone Areas

  j. 2 Training programmes for SAR Parties - Ratnapura

  k. 2 Training Programmes for Craftsmen on Counter Disaster Measures - Ratnapura

  l. NBRO School Books (with UNDP funding)

  m. Adult Training Technology for CHPB faculty of trainers.

- The following public awareness programmes were conducted on the request of various parties in addition to the public awareness

programmes carried out in the demonstration project and the replicating city of Nawalapitiya:

a. For school children and teachers, Yatiyantota school, Sabaragamuwa Province 17.07.1998
b. At Mathugama, Kalutara district on causes of natural disaster occurrence 26.11.1998
c. For Environmental Officers of Kegalle district - 31.05.1999
d. Govt. Officials of Kegalle and Ratnapura - 29.06.1999
e. Half-day session for Eheliyagoda Youth Camp
f. For Journalists in collaboration with ITDG - 09.11.1999
g. 1-day programme for University of Peradeniya, Dept. of Geology- final year students and new graduates
h. 1-day programme for residents of Wellassa, Moneragala (remote area)
i. For govt. officials of Yatiyantota, Kegalle district on Rain Induced Natural Disasters - October 1999

- One significant achievement was the institutionalisation of National level Natural Disaster Mitigation (NDM) training in the two National Partner Training Institutes (NPTIs), viz., Centre for Housing Planning and Building (CHPB) and Sri Lanka Institute for Development administration (SLIDA

- Open University of Sri Lanka has agreed to include subject matter related to natural disasters in their syllabus for Geotechnical Engineering offered for the Bachelor of Technology.

- Department of Technical Education and Training has agreed to incorporate the subject of natural disaster mitigation in the National Certificate of Technology (Civil) Course. Discussions have been held.

- Training at school level has been initiated with the National Institute of Education and the Ministry of Education. This training is focused on the newly introduced assignments and projects for the advanced level students according to the recent educational reforms. Project-based learning is an important concept in the current educational reforms being implemented in the country. This programme was designed to train the teachers in natural disaster prone areas to undertake these assignments and projects based on natural disaster mitigation aspect.

- The CHPB has designed a Certificate Course in Environmental Management. The draft curriculum development was completed in March 1999. The focus was to be mainly on natural disaster mitigation, but it also provides a multi-disciplinary training needed for a broader outlook at the issue of Environmental Management. The course could not be conducted, partly due to the shortage of staff. Also this was purposely postponed with the intention of conducting at a later stage.

4.2 Strengths and Opportunities

i. The opportunity to train persons like the Mayor of the Ratnapura Municipal Council is an opportunity and a strength for project activities. After the overseas training, the Mayor, Ratnapura has moved up his career path to become the Environment Minister of the Sabaragamuva Provincial Council. The presence of persons with training at high positions of the political hierarchy would be an asset.

ii. The willingness of ADPC to extend overseas training opportunities will strengthen the capacity building of professionals locally.

iii. The willingness on the part of national institutes to widen training opportunities in natural disaster areas is an added strength for sustainability of the project initiated disaster mitigation activities.

iv. The experience of the CHPB in training design, curriculum and material development and conducting training for technical professionals at different levels and in a variety of disciplines provided a great strength for carrying out the truing component of the project

v. The established high calibre visiting faculty of the CHPB provided easy access to professional training specialists for engagement in the SLUMDMP training activities

vi. NBRO has been involved in providing awareness programmes, especially in landslide hazard mitigation, which was a great strength.

vii. The UNDP Project (of NDMC and NBRO) which commenced in January 1998 to strengthen disaster mitigation capacity in Sri Lanka, provided components for awareness creation. These included the production of landslide posters, videos etc. which got absorbed into the present project, creating an opportunity for enhanced public awareness.

viii. The organisational capability of the CHPB helped the successful implementation of training events at CHPB and other events at CHPB and outstation

ix. The training programme by CHPB specially designed for technical officers of local authorities on the request of the formerly Local Government Management Unit (LGMU) and presently Sri Lanka Institute for Local Governance (SLILG), provided a very good base for training of Technical Officers at local level and can be considered as a very good opportunity.

x. The structure of the UDA having planners at district and local levels providing planning expertise to the Local Authorities with the focal point in the Head Office, made the task of gathering all planners for training somewhat less difficult.

4.3 Obstacles and Constraints

i. Full and committed participation of selected participants at workshops seems to have been a problem. Their perception of priority for natural disaster mitigation was low. Commitment to attend workshops could have been improved if awareness raising has preceded the workshops.

ii. Limited human resources available imposed constraints on output levels, where such resources are needed for workshop planning and related activities. This is especially important where national and international events are concerned. Special secretariats should be made available for such

iii. Inadequate co-ordination to avoid delays in other project activities running concurrently. This was mainly due to inadequate staff in the project.

4.4 Lessons Learnt

i. Workshops conducted for UDA planners, municipal council officials, NGOs, Environmental Development Organizations (EDOs), Schoolteachers and school children are extremely effective in upgrading knowledge and for awareness raising. However, to effect spiraling-off of such spillovers, there is a necessity for well-designed material (such as print and audio-visual material) for dissemination at these workshops, especially in the case of non-governmental participants.

ii. Networking with institutes of higher learning could result in expansion of training opportunities.

iii. Training should be continued beyond the project period to consolidate achievements until such a time when training could become a self supporting endeavor.

iv. Full and committed participation of selected participants at workshops seems to have been a problem. Their perception of priority for natural disaster mitigation was low. Commitment to attend workshops could have been improved if awareness raising has preceded the workshops

v. Educational material should be continuously updated to enhance training efforts and the NPTIs may have to continue the preparation of print, audio, and video material targeted for selected audiences. The provision of financial resources for such activity may be a constraint.

5.0 Information, Networking and Policy Development

5.1 The process

It had become clear in the preceding sections, that no project can be viable without appropriate support from the community and the stakeholders. Therefore, a key component of the project was Information Dissemination and

Networking. The process can be presented under 3 main areas, viz., Information dissemination, Networking and Policy Development.

5.1.1 Information Dissemination

- Development of the computer database for Disaster Mitigation Resources and part collection of information.

- Collection of miscellaneous books, reports and journals related to natural disasters.

- Mitigation of Disasters - In Scintilla language

- Regional Workshop on Rain Induced Earth Failures - unplanned activity

- Following the workshop for journalists, networking with active journalists resulting in field trip to disaster prone areas in Ratnapura and, paper articles and radio broadcasts.

- In January 1998, the Project Manager, SLUMDMP, made a technical presentation at the Sri Lanka Institute of Engineers on landslides, which was followed up with a publication in the January issue of the Sri Lanka Engineering News. It created an interest amongst the engineering professional with good feed back.

- Further opportunity was made available for dissemination of project news at the Golden Jubilee Exhibition to commemorate 50th year of Independence held at the BMICH. The CHPB stall had a separate display on natural disasters. The exhibition had an enormous number of visitors and provided an opportune moment for the project to reach the public with its news.
- June 1998 saw the launch of an international art and poster exhibition in Colombo – "Seeing Disasters Differently". It was organized by an NGO, 'Duryog Nivaran' and allowed an opportunity for school children from natural disaster prone areas to participate.

- The SLUMDMP launched the inaugural issue of a bi-monthly newsletter "Disaster News" in June 1998. It is published in the Sinhala medium, which has wide community circulation in disaster prone areas. Bilingual publication would have been ideal but it is hampered due to scarcity of resources for bilingual work. 8 issues of the Newsletter have been published to date.

- In February 1999, an Essay and Art Competition for school children of Ratnapura, Nawalapitiya and Kandy provided an opportunity to disseminate information at school level in the demonstration project and replication project sites.

- These have been followed up by the production of a tele-drama, carrying a message of how to avoid losses due to natural disasters coupled with a foyer poster campaign.

5.1.2 Networking

- To achieve this, at the very commencement of the project, information on the evaluation of landslide disasters in Sri Lanka was compiled at the Web Site of ADPC. This was in October 1997.

- The project suffered a handicap right at the beginning, due to lack of reliable records of necessary data, which could be used readily for project work. In the fourth quarter of 1997, the project established links with the Irrigation Department and the Meteorological Department to get access to flood and rainfall data respectively in order to carry out simulation studies.

- The next step established communications of the project center with the National Disaster Mitigation Center (NDMC) which resulted in a long-term link throughout the project period.

- International links were strengthened through a visit by the Senior Project Manager, AUDMP – ADPC and the Finance Manager, AIT in December 1997.

- In March 1998, a visit by Director, RHUDO, New Delhi and its Project Management Specialist led to a sharing of experiences between the two countries).

- During the same month further strengthening of international links was established with the visit of the USAID Evaluation Mission, which had extensive discussions with partner agencies, the Disaster Management Steering Committee at Ratnapura, NDMC and the Additional Secretary (Technical), Ministry of Urban Development, Housing and Construction.

- Another public lecture by a UNDP consultant in August 1998, on "Building Informational Resources for Collaborative Development by NGOs" provided an excellent opportunity to link with NGOs operating in Sri Lanka.

- In November 1998, the project partners, the UDA, NBRO and the CHPB were made ex-officio members of a sub committee on Human Settlements for the National Action Plan on Climatic Change (NAPCC) providing further opportunities at networking.

5.1.3 Policy Development

- Project Manager presented a paper on Policy status in Sri Lanka at a Regional Workshop in India on Disaster Reduction Policy Issues and Strategies - TCDC workshop

- Studies to Review Policies Related to Natural Disaster Mitigation - Environment, Human Settlements and Landuse

- Assistant Project Manager, SLUMDMP, participated as a Resource Person on 'Available Policy Framework in Disaster Management' organized by Duryog Nivaran Network held from 4 –7 February in India.

- On 26th July 1999, a **Policy Workshop** was held, with the participation of agencies under several ministries, viz., Ministry of Housing and Urban Development, the Ministry of Land and Agriculture, the Ministry of Environment and Forestry, Ministry of Social Services and Ministry of Provincial Councils and Local Government. In this workshop top administrators of relevant institutes, academics and experts in relevant fields of study deliberated on policy and infrastructure issues of disaster mitigation. Reports of two consultancies carried out towards this goal were presented. Resolutions formulated were submitted to the cabinet through the Hon. Minister for further action.

- A workshop was organised as a collaboration of the Ministry of Housing and Urban Development, Ministry of Science and Technology, Ministry of Environment and Forestry, Department of Social Services, and National Disaster Management Center (NDMC), with international organizations on the *'Role of Research and Development Institutions in Natural Disaster Management'.* This was held on 10th and 11th September 1998. This was a milestone in official recognition of the need for national institutional inputs to address the problem of natural disasters. This should create a conducive policy environment to further project objectives. Resolutions arrived at the workshop have been forwarded to the Cabinet of Ministers. It has also contributed to enhanced networking of the project center (SLUMDMP) with local institutions.

5.2 Strengths and Opportunities

i. The availability of a large number of NGOs and EDOs in the country interested in environmental issues and development seems to offer an opportunity to reach a wider sector of society through them.

ii. Willingness to participate shown by municipal officials offers an opportunity for dissemination activities.

iii. The image and credibility of the partner organizations of the project is a strength in the delivery of messages, which are perceived as credible.

iv. The launch of an international exhibition in June 1998 in Colombo – "Seeing Disasters Differently", organized by an NGO, 'Duryog Nivaran' was a great opportunity for school children from natural disaster prone areas to participate.

5.3 Obstacles and Constraints

i. It would have been desirable for the project to have had a small unit for public relations and public communication with well designed leaflets, audio-visual aids (audio and video cassettes) and telecommunication facilities. The small number of people within the project who appear to have already been over burdened by other components of the project appear to have been responsible for organizing networking and information dissemination as well.

ii. It is regrettable to note the poor cooperation extended to the project by the NDMC.

iii. The bi-monthly newsletter of the project "Disaster News" is published in the Sinhala medium only, whereas it would have been ideal to have a bilingual publication having in the Tamil medium as well. However this was hampered due to scarcity of resources for bilingual work.

5.4 Lessons Learnt

i. The information exercise should have been considered as a social marketing endeavour for attitudinal change through dissemination of information. It should have been designed after a need analysis and a compatible communication strategy evolved prior to the commencement of the project. However, it appears that allocation of funds would not have allowed such an approach. The current knowledge gained through experience by the project, clearly indicate that much remains to be done in the area of public awareness which would in turn help facilitate networking.

ii. Although much has been achieved, the task of information dissemination would have been more widespread and effective if a public relations unit was in place within the project.

iii. Awareness raising prior to commencement of the project would have facilitated implementation.

iv. The design of information leaflets, posters and mass media components take time and must be planned well ahead of the desirable point in time.

v. Reaching professionals on a technical platform is comparatively easier than effectively reaching the average citizen for which expertise in the communication field must be sought.

vi. Establishment of an appropriate mechanism to address the issues of disaster management is very desirable.

6.0 Project Management

6.1 Administrative Arrangement

ADPC identified the CHPB to manage the project with technical inputs for the mapping activities from the NBRO and UDA. The activities were to be carried out based on a tripartite MOU signed by the three institutions. Apart from managing the project the CHPB was identified as one of the national partner training institutes in addition to the Sri Lanka Institute of Development Administration (SLIDA) as earlier identified.

In April 1997 Director CHPB, who would serve as the Project Director of SLUMDMP, attended the Working Group Meeting of the AUDMP at the ADPC and presented the proposal prepared by the consultants indicating methodology for implementation, which was approved.

The project office was established in the CHPB Building at 33, Sunil Mawatha, Pelawatta, Battaramulla. While Director, CHPB would serve as the Project Director, the Assistant Director, CHPB would serve as the Assistant Project Director. Head, Landslide Division of NBRO was selected as the Project Director considering his experience in landslide hazard mapping and hazard mitigation exposure including public awareness activities.

As the CHPB is a division of the M/UD,H&C, it had procedural constraints in handling finances. The ADPC was informed of the two possible alternatives in managing the finances, first being through the Ministry and the second being through the partner agency, NBRO. Before signing the Grant Agreement the ADPC/AIT auditors visited Sri Lanka and after studying the financial procedures of the Ministry and NBRO decided on the NBRO as the recipient of the grant. Thus the Director (Finance), NBRO would be the Project Accountant.

The key personnel of the project including details of National Partner Training institutes and technical inputs from the ADPC are given in **Annex I.**

6.2 Performance Monitoring and Evaluation

For the purpose of monitoring and evaluating the performance of the project, measurable objective indicators were established at the beginning of the project. Further, several would be results were identified and the corresponding indicators were established. These were initially presented in the form of an Objective Tree, which is shown in **Annex II**. These were also presented in a reporting format to be used for reporting quarterly project performance. The performance in this format as at the end of the project is in **Annex III.**

6.3 Monthly and Quarterly Reporting

As a requirement of the AUDMP/ADPC, monthly and quarterly reports were submitted to the ADPC:

i. Monthly Progress Report of activities

ii. Quarterly Progress Report in the following format:
   1. Project objectives
   2. Accomplishments for reporting period
   3. Planned vs. actual
   4. Problems encountered
   5. New opportunities
   6. Lessons learnt
   7. Activities planned
   8. Project financial status up to the end of the given quarter
   9. Performance report in the format in **Annex III**.

iii. Disbursement / Liquidation Report (quarterly)
iv. Statement of Cash Needs (quarterly)
v. Counterpart Contribution (quarterly)

6.4 Process Documentation

As a requirement of the AUDMP, a Documentation of Processes was to be carried out. The consultant selected for the purpose submitted the report in November 1999. The report detailed the processes of the components of the project as given below:

i. Demonstration Project, which included Mapping, Risk Analysis and Disaster Mitigation
ii. Information Dissemination, Networking and Policy Improvement
iii. Training

Each section of the report provided the following:

- Chronology of the Process
- Strengths and Opportunities before and during the implementation
- Obstacles and Constraints faced during implementation
- Lessons Learnt

6.5 Lessons Learnt Workshop

The Lessons Learnt Workshop was held on 16th January 2000 with the participation of all agencies and personnel involved in the project activities. The sessions of the workshop were organised in such a manner so as to cover the following sessions, each of which included the Processes; Strengths and Opportunities; Obstacles and Constraints; and Lessons Learnt:

- Multi-Hazard Mapping, Risk Analysis and Disaster Mitigation - A Review
- Experience on Integration of Disaster Mitigation Considerations in Landuse Planning in the Demonstration Project and Replicating Cities
- Public Awareness on Disaster Mitigation – Project Experience
- Disaster Mitigation Training in Sri Lanka
- Catalyzing Community Participation – The Need, the Way and the Sustenance
- Media Integration in Dissemination of Disaster Mitigation Information – The Reality
- The Experience in Managing the Project

This Project Completion Report is presented partly based on the report on Process Documentation and the Proceedings of the Lessons Learnt Workshop.

6.6 Strengths and Opportunities

i. The positive attitude of the ADPC in encouraging the SLUMPDP through its monitoring and networking, although not a visible or quantifiable entity, should be recorded as a catalyst for the new project.

ii. The pre-project experience of the NBRO in the Landslide Hazard Mapping Project (1990-1995) was a strength for managing this project

iii. The established capacity of the CHPB to network amongst government organizations was also a strength in generating the momentum for take-off from zero point

.

iv. UDA having successfully implemented many large urban development projects and having worked closely with the Municipal Councils played an important role in the implementation of the project.

v. The fact that all the three partner agencies were under the same ministry was a positive factor in getting the co-operation of the ministry and with each other.

vi. The high level of co-operation from the Mayor and officials of the Ratnapura Municipality and the Nawalapitiya UC was a strength for the implementation of the project.

6.7 Obstacles and Constraints

i. Procedural impediment, in terms of banking arrangements for the project, procurement of required equipment, and recruitment of staff (Project Secretary), through normal government procedure, had a slowing down effect at the commencement of the project.

ii. Limited human resources available somewhat imposed constraints on output levels. Such resources are needed not only in managing the project but for workshop planning and related activities as well. This is especially important where national and international events are concerned. Special secretariats could be made available for such co-ordination to avoid delays in other project activities running concurrently.

6.8 Lessons Learnt

i. It is desirable that at the time of formulation of a project of this nature, the Cabinet Memorandum, which provides statutory empowerment, addresses the issue of co-ordination between relevant organizations in order to evoke mandatory co-operation between them. Such an arrangement would have facilitated the acquisition of data and maps that were necessary to expedite the project. It would also have provided more flexibility at UDA to commission staff to the project component of mapping by relieving them of their normal chores and duties.

ii. Official publicity for project approval in mass media as well as Ministerial communications to related organization would play a facilitator role towards expediency and better co-operation. It will also create better awareness amongst stakeholders.

7.0 Concluding Remarks

- The following selected activities left over from the project are recommended to be taken up during the proposed replicating phase.

  i. NDM-2 (in collaboration with ITDG)
  ii. Disaster day at Ratnapura (including exhibition of art and posters of the competition held at demonstration and replicating city councils)
  iii. Finalisation of database on disaster mitigation resources – Finalise with data collection, which has been delayed due to unavoidable circumstances
  iv. NDM course by SLIDA
  v. Printing of Guidelines on Planning in Natural Disaster Prone Areas

- Although the Disaster Mitigation Action Plan was prepared for the NUC, there was no provision for implementing any strategies apart from training and public awareness programmes. For implementing the identified mitigation strategies NUC will have to identify funding sources and request for funds after incorporating these strategies in the Annual Programmes in addition to the treasury allocation of Rs. 100,000 for the year 2000.

- The high level of co-operation from the Mayor and officials of the Ratnapura Municipality and the Chairman and officials of the Nawalapitiya UC throughout project is commendable.

- As less activities were carried out at KMC, it is necessary to get the officials more involved in the future national training programmes, and also conduct public awareness programmes in the KMC area during the replicating phase. Also the possibility of formulating the Disaster Mitigation Action Plan should be looked into.

- The overseas training in the courses organized and sponsored by the ADPC was very valuable and it allowed the opportunity to train several key personnel involved in the project. Continuation of ADPC training opportunities will strengthen the capacity building of professionals locally.

- Training should be continued beyond the project period to consolidate achievements, until such time as training would become a self supporting endeavor. In this regard the willingness on the part of national institutes to widen training opportunities in natural disaster areas is an added strength for sustainability of the project initiated disaster mitigation activities.

* * *

Annexes

Annex I - 1

Key Personnel of Partner Agencies of SLUMDMP

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Present Project Manager
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Assistant Director
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Project Accountant
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Director (Finance)
National Building Research Organisation

Contact Persons of Partner Agencies
(NBRO)
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Deputy Director, Head, Landslide Mapping Division

Presently:
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Senior scientist

(UDA)
Mrs. Hester Basnayake Tel. & Fax: 94-1-865912
Director (Landscaping and Environment)
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Annex I - 2

National Partner Training Institutes (NPTIs)

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Additional Director
Sri Lanka Institute of Development Administration
28/10, Malalasekera Mawatha
Colombo 07

Technical Inputs – ADPC Consultants

Risk Based Mitigation Planning (Preparation of workbook)	-	Ms. Linda Noson ADPC consultant
Review of Emergency Response Plan and Natural Disaster Mitigation Training	-	Ms. Shirley Mattingly ADPC consultant

* * *

Annex II

Sri Lanka Urban Multi-Hazard Disaster Mitigation Project (SLUMDMP)

Strategic Objective Tree

Project Goal:
Reduced natural disaster vulnerability of urban populations, infrastructure, lifeline facilities and shelter in Sri Lanka

Project Objective: Establishment of sustainable public and private sector mechanisms for disaster mitigation in targeted urban areas of Sri Lanka

Objective Indicators:

1) No. of Action Plans developed with resources identified by national collaborating institutions to carry out mitigation measures thro' Ratnapura demonstration project and identified replicating towns at Nawalapitiya and Kandy MC area.

2) No. of mitigation skills and procedures promoted in the Ratnapura demonstration project and in two replicating cities

3) Amount of investment from non-AUDMP funding sources attracted by project activities.

4) % of households potentially benefited from the project (% of the total population of the Ratnapura MC area)

Result #1:
Improved capacity of municipal officials to manage risk, apply mitigation skills and techniques

Indicators:

1.1 No. of existing building regulations revised to include the disaster impact

1.2 No. of new or improved assessment methods used for hazard assessment by public and private sector organisations

1.3 No. of new guidelines/ standards used for development activities by public and private sector organisations

1.4 No. of emergency management plans used to reflect improved information on hazard and vulnerability

1.5 No. of disaster management plans prepared for disaster mitigation.

Result # 2:
Improved access to hazard mitigation information and skills (techniques, methodologies and experience) throughout the country.

Indicators:

2.1 % of Municipality staff attached to demonstration project area and replicating cities with AUDMP initiated disaster mitigation training who are actively involved and using these skills in fields impacting disaster management or urban sector development

2.2 Number of public and private sector professionals trained through AUDMP initiated natural disaster mitigation training courses

2.3 No. of institutions where SLUMDMP initiated skill training and professional development courses are institutionalised

2.4 No. of public and private organisations participating in the national and international linkages established in the project

2.5 No. of people participating in the national and international linkages established in the project

Result # 3:
Improved policy environment for disaster mitigation

Indicators:

3.1 Review of existing National Policies (Land Use Policy Action Plan, Environment Policy Action Plan, Urban Sector Development Action Plan) and relationship for national policy changes submitted

Annex III-1

SRI LANKA URBAN MULTI-HAZARD DISASTER MITIGATION PROJECT

Performance Monitoring & Evaluation Indicators – End of the Project Performance Report

Performance Indicators	Baseline	Life of Project Target	Achieve-ment to-date	Overall Assessment
Project Goal: Reduced natural disaster vulnerability of urban populations, infrastructure, lifeline facilities and shelter in Sri Lanka				
Project Objective: Establishment of sustainable public and private sector mechanisms for disaster mitigation in targeted urban areas of Sri Lanka				
Objective Indicator #1: No. of Action Plans developed with resources identified by national collaborating institutions to carry out mitigation measures thro' Ratnapura demonstration project and identified replicating towns at Nawalapitiya and Kandy MC area.	0.1	3	2	For Ratnapura demonstration city and Nawalapitiya replicating city action plans has been completed. As there was a delay in identifying Kandy MC as a replicating city the Action Plan could not be completed in time.
Objective Indicator #2: No. of mitigation skills and procedures promoted in the Ratnapura demonstration project and in two replicating cities	0	3	3	Procedure for integration of hazard maps has been promoted and training provided to UDA planners involved in all 3 cities.
Objective Indicator #3 Amount of investment from non-AUDMP funding sources attracted by project activities.	0	10% of project cost (1.4 mln)	3,777,000	From UNDP to NBRO for mapping Rs. 346,000; for printing school books US$ 36,000; R&D Workshop Rs. 500,000; From ITDG for printing Construction guidelines Rs. 100,000; Rain-induced Earth Failures Rs. 75,000; Income from NDM-1 Rs. 200,000.
Objective Indicator #4 % of households potentially benefited from the project (% of the total population of the Ratnapura MC area)	0	50%	50%	Although no accurate estimate is available from a survey, it can be assumed that well over 50% households may have been benefited

Annex III-2

Performance Indicators	Baseline	Life of Project Target	Achievement to-date	Overall Assessment
Result #1: Improved capacity of municipal officials to manage risk, apply mitigation skills and techniques				
Indicator 1.1 No. of existing building regulations revised to include the disaster impact	0.2	1	-	Revision of Ratnapura MC Building Regulations are completed and now being finalised.
Indicator # 1.2 No of Procedures developed for Risk Based Mitigation Planning Approach	0	1	1	Risk Based Mitigation Planning Approach printed in Sept. 1998
Indicator 1.3 No. of Risk Control Planning Workbooks developed for Integration of Natural Hazards in to the planning process	0	1	1	Risk Control Planning Workbook by Ms. Linda Noson in January 1999
Indicator 1.4 No. of Emergency Management and Response Plans (EMRP) written to reflect improved information on hazard and vulnerability	0	1	1	Ratnapura Emergency Management and Response Plan (EMRP)
Indicator 1.5 No. of new guidelines/standards developed, which are used for development activities by public and private sector organisations	0	1	1	-Construction guidelines completed and printed. -Planning guidelines being finalised

Annex III-3

Performance Indicators	Baseline	Life of Project Target	Achievement to-date	Overall Assessment
Result #2: Improved access to hazard mitigation information and skills (techniques, methodologies and experience) throughout the country.				
Indicator 2.1 % of Municipality staff attached to demonstration project area and replicating cities trained with AUDMP initiated disaster mitigation training and who are actively involved and using these skills in fields impacting disaster management or urban sector development	0	75%	65%	Kandy MC staff could not be trained due to delay in identifying same as replicating city
Indicator 2.2 Number of public and private sector professionals trained through AUDMP initiated natural disaster mitigation training courses	0	30	47	19 Professionals from NBRO, CHPB, NDMC, UDA, RMC, Nawalapitiya UC, CMC trained in UDM, TRMC, CBDM & DMC, and 28 personnel trained in NDM-1.
Indicator 2.3 No. of institutions where SLUMDMP initiated skill training and professional development courses are institutionalised	0	4	4	CHPB, SLIDA, OUSL & LGMU. In addition in the MSc course in Geology in University of Moratuwa a special 1-day seminar is being conducted for each batch on Natural Disaster aspect.
Indicator 2.4 No. of public and private organisations participating in the national and international linkages established in the project	0	25	49	Organisations participating in Policy W/S, Training Appreciation Seminar, NDM-1 and other programmes
Indicator 2.5 No. of people participating in the national and international linkages established in the project	0	100	119	Persons participating in - same as above -

Annex III-4

Performance Indicators	Baseline	Life of Project Target	Achievement to-date	Overall Assessment
Result #3: Improved policy environment for disaster mitigation				
Indicator 3.1 Review of existing National Policies (Land Use Policy Action Plan, Environment Policy Action Plan, Urban Sector Development Action Plan) and relationship for national policy changes submitted	-	1	3	Consultants have reviewed these policies, submitted reports and presented them at the Policy Review workshop in July 1999.

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The **Asian Urban Disaster Mitigation Program (AUDMP)**, launched in 1995, is the largest regional program of ADPC. The program, with core funding from the Office of Foreign Disaster Assistance of the United States Agency for International Development, will ultimately work in ten or more countries of the region. The program was designed to make cities safer from disasters. The goal of the AUDMP is to reduce the disaster vulnerability of urban populations, infrastructure, critical facilities and shelter in targeted cities in Asia, and to promote replication and adaptation of successful mitigation measures throughout the region. Towards this end, the program develops and supports national demonstration projects, information dissemination and networking activities, and policy seminars and professional training in the target countries of Bangladesh, Cambodia, India, Indonesia, Lao PDR, Nepal, Philippines, Sri Lanka, Thailand and Vietnam.

The **Asian Disaster Preparedness Center (ADPC)** is a regional resource center dedicated to disaster reduction for safer communities and sustainable development in Asia and the Pacific. Established in 1986 in Bangkok, Thailand, ADPC is recognized as an important focal point for promoting disaster awareness and developing capabilities to foster institutionalized disaster management and mitigation policies.

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