Supporting Report L

Meteorological Consideration for Disaster Management

Supporting Report L Meteorological Consideration for Disaster Management

L.1 Weather type of Heavy rainfall

L.1.1 Data Collection During Days of Heavy Rainfall

(1) Major flood events

JICA Study Team selected major flood events from existing study results and DOM (Department of Meteorology) recommendation, and collected meteorological data such as daily precipitation, daily maximum and minimum temperature, wind direction, and speed and weather charts with the cooperation of DOM.

Table L.1.1 Major Flood Events in Sri Lanka (After 1947)

No	Year	Month	Day	*1	*2	*3	Data	Map
1	1947	August	13-15	○	○		○	
2	1947	October			○		○	
3	1952	May			○			
4	1952	October			○			
5	1955	October			○			
6	1957	December	24-25	○	○		○	
7	1963	October			○			
8	1966	September			○			
9	1966	October			○			
10	1967	October			○			
11	1969	December	29-30	○			○	
12	1971	September			○			
13	1975	May			○	○	○	
14	1978	November	23	○			○	
15	1989	May			○		○	
16	2003	May	16-17	○		○	○	○
17	2004	September	16-18			○	○	○
18	2005	November	19-21			○	○	○
19	2006	June	19-21			○	○	○

**1 : Refer to 'Flood in Sri Lanka', May, 2003, Chandrapala Lalith*
**2 : Refer to 'Country Report', 1999, W. B. J. Fernando*
**3 : Recent events listed by DOM*
Data : Collected data (Precipitation, Temperature, Wind)
Map : Collected weather map

(2) Seasonal periods in Sri Lanka

Generally speaking, Sri Lanka is seasonally affected by two regional scale wind systems. The south-west monsoon period is from May to September and the north-east monsoon period is from December to February. The transition terms between two monsoon periods are called the inter monsoon periods. One inter monsoon period is from March to April, and the other is from October to November.

As shown in Table L.1.1, nineteen (19) cases of flood events were selected. As known in the prior art, almost half of them occurred during the 'South-West monsoon season' (May to September), and half occurred during the 'Second inter-monsoon season' (October to December).

According to a DOM meteorologist, the following are charcterisitcs of monsoon periods, as follows:

1) First half of South-West monsoon season (May to June)

In accordance to the north movement of the ITCZ (Inter Tropical Convergence Zone), the monsoon trough is generated and goes up continuously toward the north side. Along the monsoon trough, a small turbulence is generated, which causes the south-west monsoon and the warm and humid south-west wind brings a heavy rainfall.

2) Second half of South-West monsoon season (July to September)

The ITCZ goes up toward the northern side of the equator, and it is blocked by Himalaya Mountains. Also the monsoon trough is generated and goes up continuously toward the north. Along the monsoon trough, a tropical disturbance is generated, which causes the south-west monsoon and the warm and humid south-west wind brings a heavy rainfall.

3) Inter monsoon season (September to November)

The ITCZ goes down toward the south side. At that moment a tropical depression is generated in the Bay of Bengal and the Arabian Sea, which, sometimes gains strength and become a cyclone that causes heavy rainfall.

4) Beginning of North-East monsoon season (December)

In general, it is the North-East monsoon season in December. It is not unusual, however, that a tropical depression is generated in December at the Bay of Bengal and the Arabian Sea. It can sometimes gain strength and become a cyclone such as that during the Inter monsoon season.

L.1.2 Weather Types of Heavy Rainfall

As above mentioned, the weather in Sri Lanka is characterized by two monsoon periods. Actually, half of the heavy rainfall occurences were experienced in the four months of the south-west monsoon period. A heavy rainfall in Sri Lanka is explained as below.

(1) South-West monsoon period

From May to September, when the ITCZ moves toward the north side of the equator, the southerly wind tends to blow, and this is called the 'South-West monsoon period'. If the temperature of the southern sea surface is high, the southerly wind includes a lot of vapor in the atmosphere. The southerly wind blows from the ocean to Sri Lanka and is blocked by the central mountains of Sri Lanka, then it rains heavily from eastern part to southern part of Sri Lanka. Nineteen (19) cases of flood events is shown in the Table L.1.1, half of which occurred in the period corresponding to this case.

(2) Turbulence in the Bay of Bengal

During the other times of the South-West monsoon period, when turbulence occurs in the Bay of Bengal, the southerly wind tends to blow. The southerly wind brings heavy rainfall in the southern part of Sri Lanka as the South-West monsoon. The 2006 case, as shown inTable L.1.1, corresponds to this. The term 'Turbulence' here does not mean a tropical depression like a cyclone or a low pressure system; it means a small turbulence eddy flow along the monsoon trough.

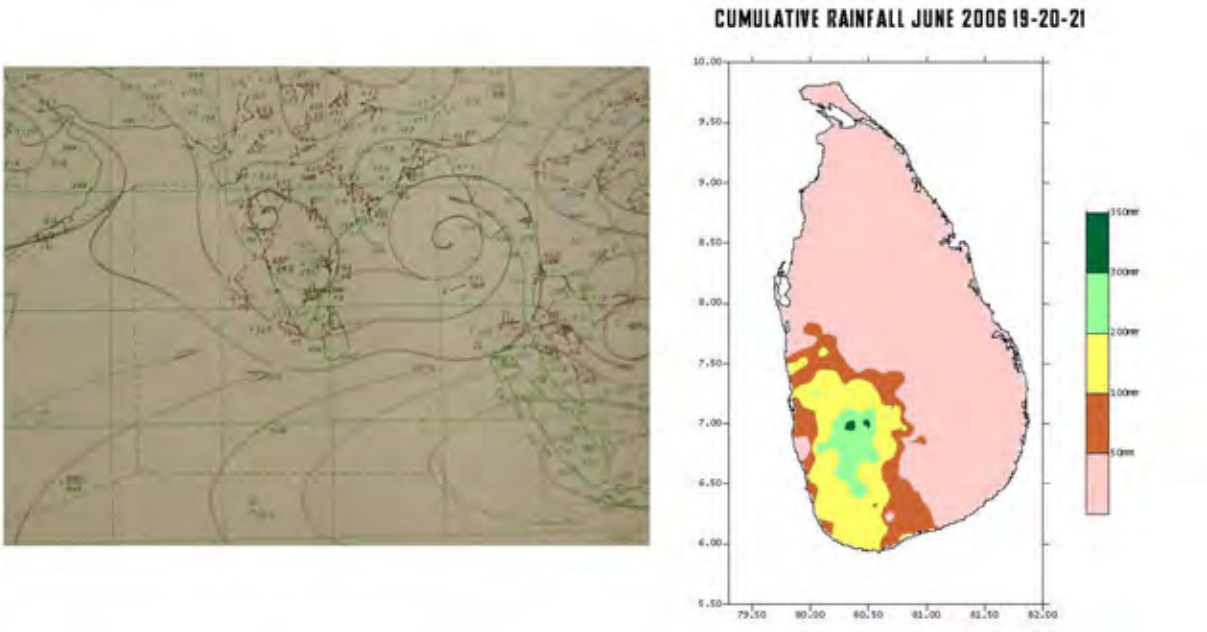

Figure L.1.1 June 2006 Case (Wind stream chart at 850 hPa plane and Cumulative rainfall)

(3) Tropical depression in the center or north side of the Bay of Bengal

This is basically the same case as the case presented in the preceding paragraph where the tropical depression which moves to the north direction of the Bay of Bengal brings a southerly wind to Sri Lanka. The 2003 case indicated in Table L.1.1 corresponds to this case.

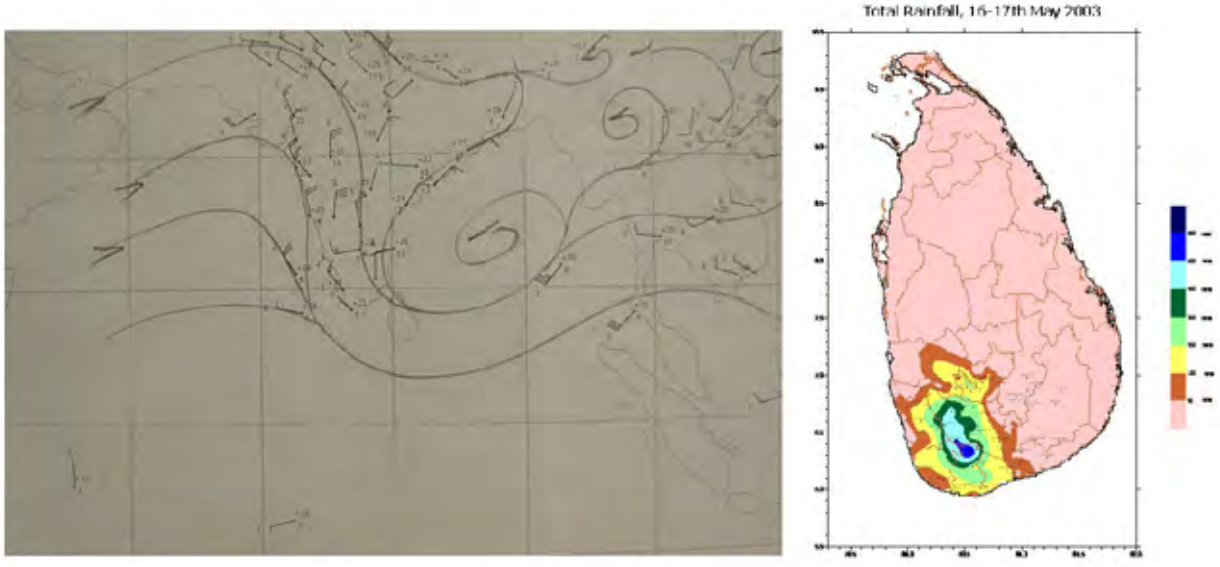

Figure L.1.2 May 2003 Case
(Wind stream chart at 850 hPa plane and Cumulative rainfall)

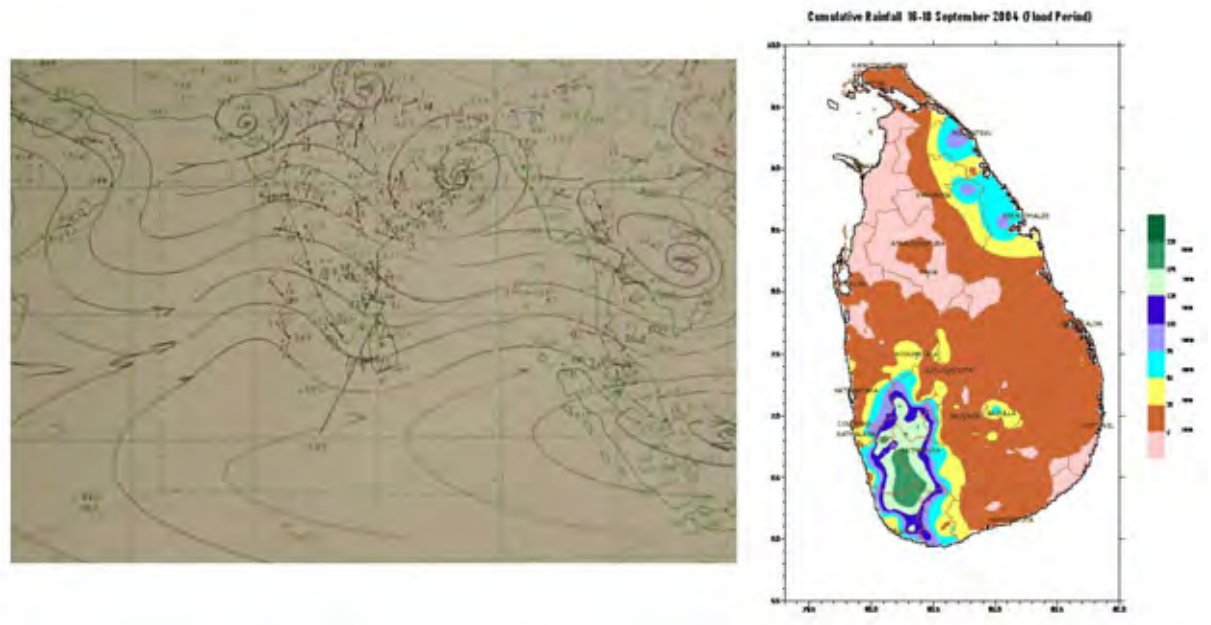

Figure L.1.3 September 2004 Case

(Wind stream chart at 850 hPa plane and Cumulative rainfall)

(4) Tropical depression in the west side of the Bay of Bengal

When a tropical depression moves to the west direction of the Bay of Bengal, it initially brings a southerly wind to Sri Lanka. But as it approaches Sri Lanka, the wind direction changes from the south west to the north east, resulting in heavy rains in the east part of Sri Lanka. The 2005 case shown in Table L.1.1 corresponds to this case.

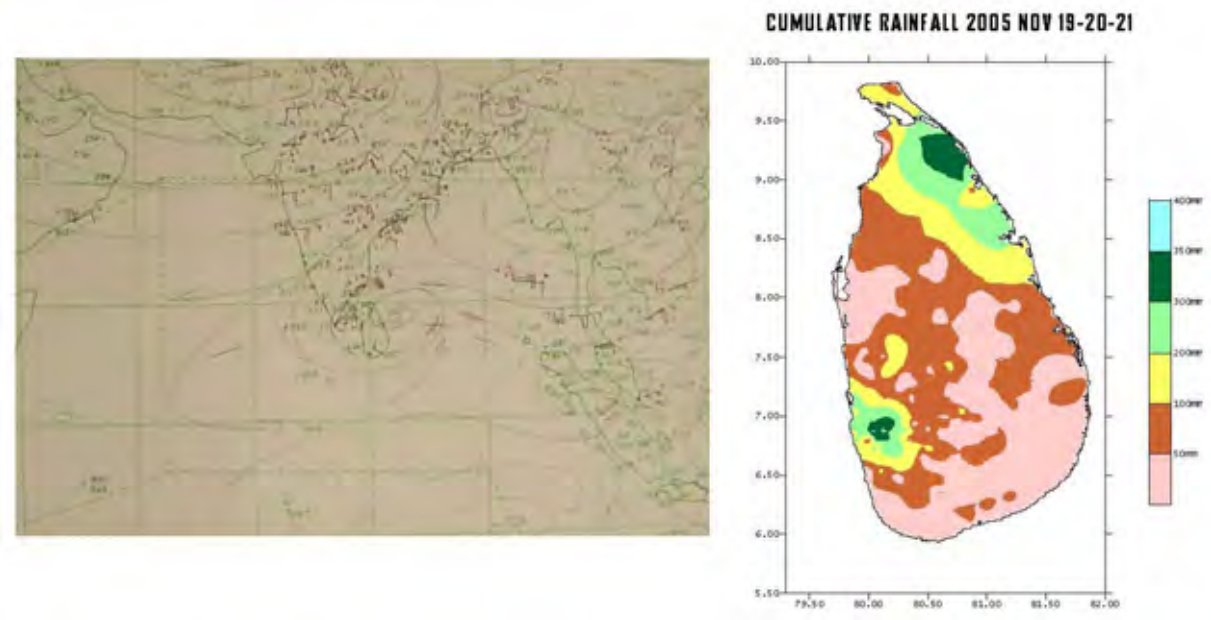

Figure L.1.4 November 2005 Case

(Wind stream chart at 850 hPa plane and Cumulative rainfall)

L.2 Education of Meteorology and Climate

L.2.1 School Education

DOM has dedicated staff in charge of coordinating with the school education system. DOM undertakes various educational activities, as follows:

- Study trip to DOM observation station (Head quarter and local stations)
- Poster campaign for school
- Visiting classes in school

Students from almost 1,000 schools have visited the meteorological observation stations, both in HQ and local stations of DOM.

According to the Ministry of Education guidance, students in schools do not particularly have a subject in meteorology or climate; they however learn meteorological and hydrological matter as a part of the disaster management education and the earth science education. The following are some examples some of the meterology/hydrology education-related activities are conducted in Sri Lanka:

< 6th grade/level>
- Study tour to the Meteorological Office (DOM) and description of the meteorological services
- Study about meteorological measuring instruments, observation and collection of data

< 9th grade/level>
- Description of radar data and collection of radar data
- Description of meteorological satellite data and collection of satellite data

< 7th grade/level>
- Description of stars, group of stars and history of the universe
- Description of meteorological satellite data and collection of satellite data

< 9th grade/level>
- Description of radar data and collection of radar data
- Description of meteorological satellite data and collection of satellite data

L.2.2 Social Education

In general, a social education about meteorology is not carried out.

According to a meteorology expert from DOM, in general, adults don't really understand or cannot interpret satellite imagery or the weather map on the newspaper. Only recently can younger generation understand and interpret satellite imagery and weather chart. But due to past experiences, most of the people know the time of year when heavy rainfall and land slide disaster occurs.

As a social education campaign, DOM produces many TV and radio programs. Last October, a TV program about flood and landslide was broadcasted in the landslide region.

L.3 Capacity Building in the Department of Meteorology (DOM)

L.3.1 Current Condition in DOM

(1) Weather observation

1) Surface weather observation stations

There are 20 surface weather observation stations of DOM in Sri Lanka. Basically, they observe eight (8) times a day (00:00, 03:30, 06:00, 09:00, 12:00, 15:00, 18:00, 21:00, 24:00 UTC). Observed elements are wind, air pressure, temperature (including maximum and minimum), humidity, sunshine, rainfall, evaporation, earth temperature, cloud cover, cloud type, and visibility. Due to the issue of safety, they don't observe at night in some stations. The measuring instruments are conventional type and the automatic observation is not carried out.

Figure L.3.1 Surface Weather Observation Stations

Figure L.3.2 Conventional Observation Field in DOM HQ

2) Upper air observation

The upper air observation (wind, temperature, height, and pressure) is carried out in DOM HQ Colombo by rawinsonde. The upper wind observations are carried out in three (3) stations by pilot baloon, Puttalam, Hambantota and Trincomalee. But at the time of this writing (October 2007), the upper wind observation in Trincomalee and Hambantota was halted.

Figure L.3.3 Upper Air Observation Building and Balloon Release Field in DOM

3) Transmission of observation data

The weather observation data is transmitted by telephone from local stations to the DOM HQ. After 3 hourly observations, the operator in DOM HQ calls the local stations one by one. It almost takes thirty (30) minutes to finish phone calls to all local stations.

Figure L.3.4 Domestic Data Collection by Phone in DOM

(2) Weather forecasting

1) Weather map

Weather maps are prepared four (4) times a day (00:00, 06:00, 12:00, 18:00, 24:00 UTC) in the observation division of DOM as part of its daily routine tasks. The kinds of weather maps preapred are a surface weather map and four (4) kinds of upper level stream line charts at 850, 700, 500 and 200 hPa planes. They are drawn by hand after receiving global weather observation data through GTS (Global Telecommunication System).

Figure L.3.5 Surface Weather Map (left) and Upper Stream Line Chart at 850 hPa plane (right)
At 00 UTC on November 20, 2005

2) Meteorological satellite imagery

There are three (3) or four (4) receiving sets of meteorological satellite in DOM HQ; however, none of them are functional at the moment due to breakdown. Thus, DOM uses meteorological satellite imageries of METEOSAT (Euro) and FY-2 (China) downloaded from the internet.

3) Numerical weather prediction (NWP)

A PC cluster system of the numerical weather prediction was donated by KOICA (Korea International Cooperation Agency in 2006. Numerical Weather Prediction Charts (Resolutionb30 km and 10 km) can be viewed based on MM5 (Mesoscale Model 5) and it has a lot of functions. But as it is operated by KMA (Korean Meteorological Agency) in Seoul, Korea, it is a black box for the officers in DOM. According to their evaluation, the accuracy of prediction is not enough for the tropical area like Sri Lanka.

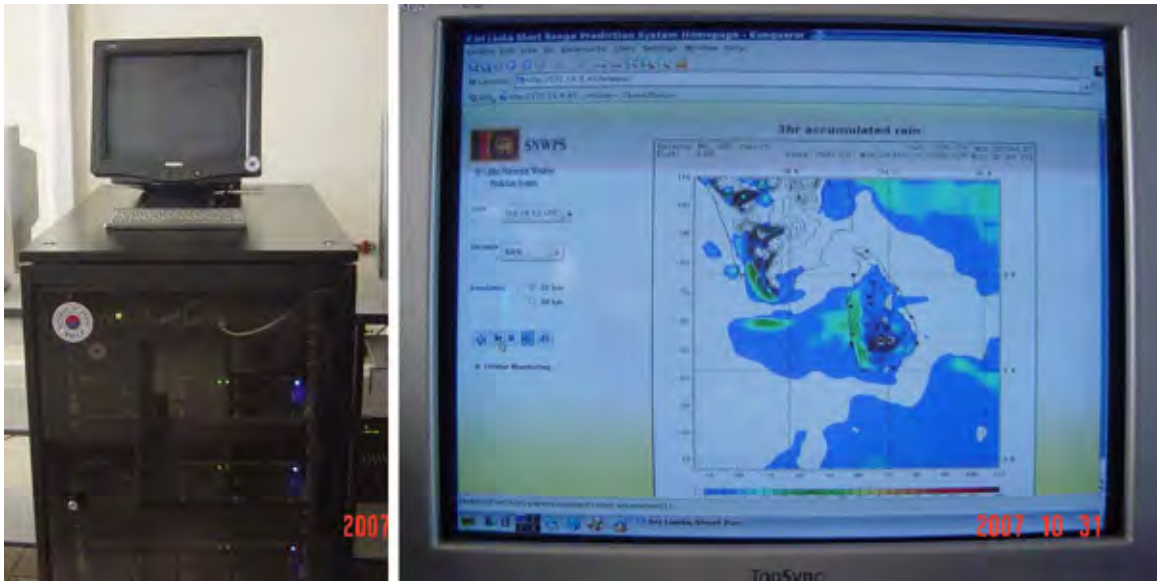

Figure L.3.6 NWP System and Rainfall Prediction

4) Weather forecasting

Weather forecast is issued three (3) times a day and is disseminated through television, radio and newspaper. At the same time, they are available in the web site of DOM.

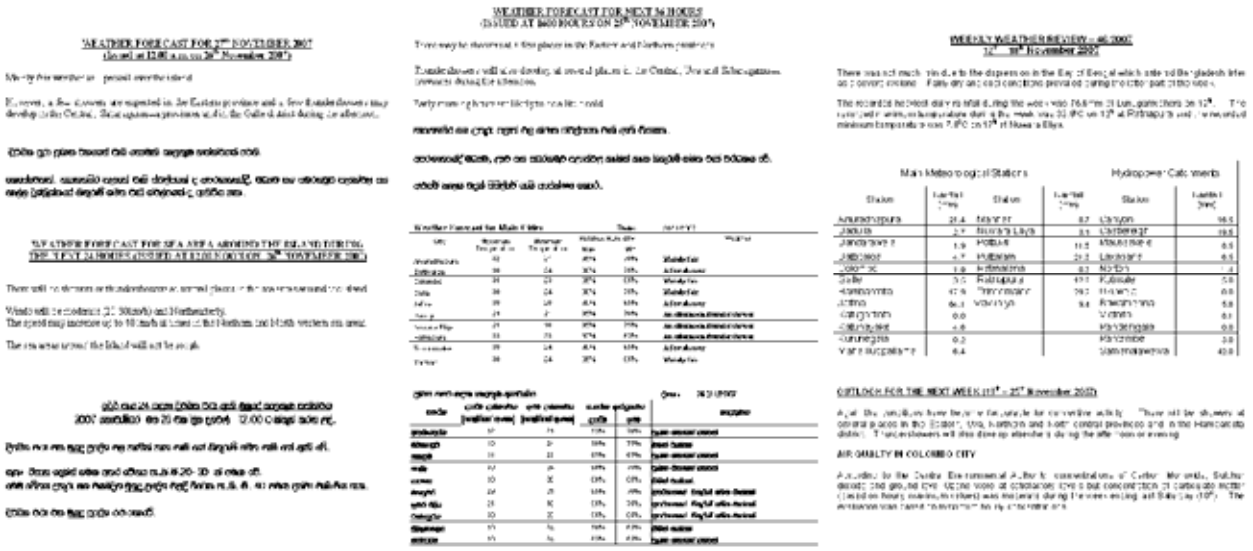

Figure L.3.7 Weather Forecast in the Website of DOM

Figure L.3.8 Weather Forecast in Newspaper

(3) International meteorological data exchange system: Global telecommunication system (GTS)

The Global Telecommunication System (GTS) used in DOM until June 22, 2007 was 50 bps ITU circuit with the Regional Telecommunication Hub (RTH) in New Delhi. Due to its limited bandwidth, selected and limited number of weather data can be received in DOM. But upgrade of old GTS and early warning system was accomplished on June 22, 2007 under USAID project. GTS link was established with New Delhi through 256 kbps Internet leased line. It should be noted that the new GTS has a high speed and high performance.

Figure L.3.9 Operation Screen and Product of New GTS

(4) Human resources

Table L.3.1 Meteorologists in DOM

Class	Number	Description
High class Meteorologist	7	- Director General - Director, Deputy Director
Meteorologist in Charge	1	- Supervisor of meteorologists
Duty Meteorologist in Colombo HQ	5	- Meteorologists on the active duty in DOM
New Meteorologist	4	- Meteorologists on training in DOM
Meteorologist in other divisions	4	- Dispatched to Observation division, Computer division, Radar division, and Aviation division
Aviation weather forecaster	5	- Dispatched to meteorological offices in International airports

To put simply, there are only ten (10) meteorologists in DOM HQ and they are in charge of issuing weather forecasts and alerts on a shift work schedule.

(5) Improvement of accuracy of weather forecasting

In order to improve the accuracy of weather forecasting, DOM has to address some of its problems. Based on a DOM report, the problems encountered at present are as follows:

Observing and analyzing skill

- Installation/ replacement of self-reporting stations and reasonable allocation
- Improvement of observing data processing and display system
- Development of observing data analyzing and alert issuing system

Utilization of numerical information through GTS circuit

- Installation of automatic data drawing system for SYNOP (Surface synoptic observations: it is a numerical code (called FM-12 by WMO) used for reporting weather observations made by manned and automated weather stations. SYNOP reports are typically sent every six hours) and NWP (Numerical Weather Prediction)

Utilization of satellite images

- Development of cloud image analyzing system
- Development of synthesizing system for satellite image and NWP

Restart of operation of DOM's own NWP model

- Restructuring MM5 model (Meso-scale Model 5: Numerical Weather Prediction model)
- Restart of operation and analysis of own NWP model

Installation of meteorological radar system

- Installation of a meteorological Doppler radar system around Colombo
- Development of radar Doppler information and rain analyzing system
- Development of synthesizing system for radar analyzing and observing data

Development of short term precipitation prediction system

- Development of short term precipitation prediction system

Development of human resources (Meteorologists)

- Development of human resources (Capacity building)
- Training of meteorologists

L.3.2 Implemented Projects

(1) Numerical Weather Prediction System

In response to the requirement from DOM, KOICA installed the NWP (Numerical Weather Prediction) system in 2005. It is composed of PC-cluster system with NWP software called MM5. It is operated every day and outputs the prediction results twice a day. But since it is operated by KMA from Korea, it is a black box for DOM officers. As mentioned above, their evaluation about the accuracy of prediction is not so good.

(2) Global Telecommunication System

The meteorological information is exchanged every day through the international communication line. It is called GTS (Global Telecommunication System) and it is defined by WMO regulation. In the case of DOM, the GTS is connected to the IMD (Indian Meteorological Department) in New Delhi and DOM gets the world wide meteorological data via GTS. Through US-IOTWS (Indian Ocean Tsunami Warning System) program under WMO-VCP (World Meteorological Organization-Voluntary Cooperation Program), the Government of the United States installed the GTS in 2007. It is composed of a work station server system and telecommunication system with telecommunication software.

Before improvement of the new GTS, the hardware and software was very old and the telecommunication line speed was very slow so that DOM only managed to get the observation data, SYNOP and SHIP. But after improvement of GTS, DOM is now able to get not only observation data but also numerical prediction data by JMA.

L.3.3 Approved Projects for Implementation in the Future

DOM is about to implement the new Meteorological and Disaster Information Network (MDIN).

(1) Automated Weather Station and Center Operating System

The ongoing basic system is composed of Automated Weather Station (AWS), VSAT telecommunication system and Central Operating System (COS). This project planning was done by JICA as the Basic Design Project in 2006 to 2007, and it will be implemented in the next two (2) years.

It is preferred that the new GTS instruments should be connected to the new COS.

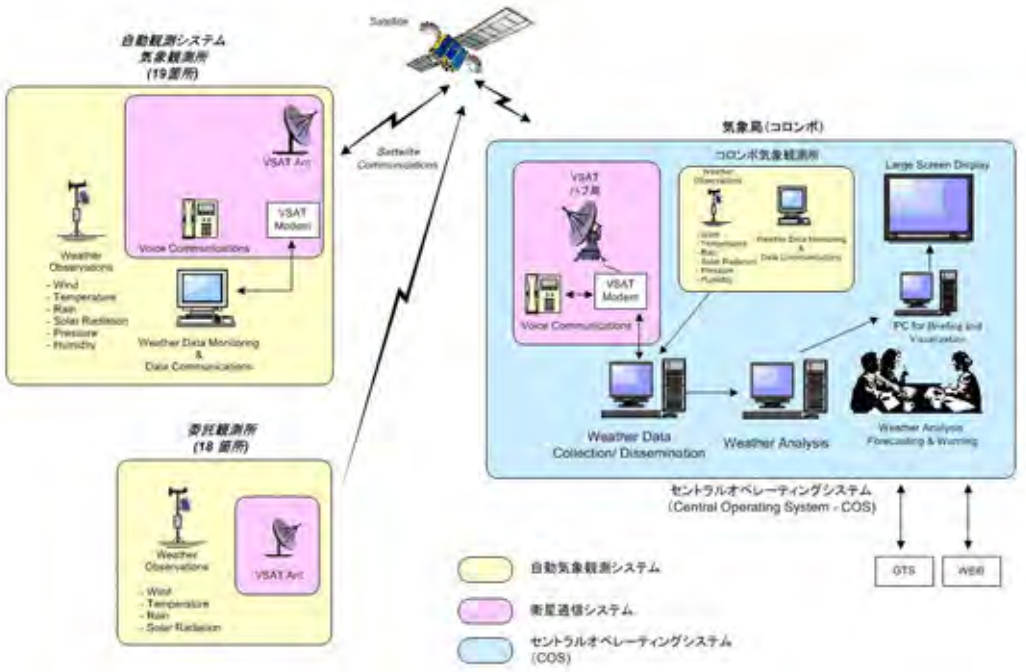

Figure L.3.10 AWS Project in DOM

(2) Doppler Weather Radar System

This project will be undertaken with funding from Sri Lankan government and WMO (World Meteorological Organization) administration. The WMO mission visited Sri Lanka and made the investigation of installation in this September. The system design will be expected to start soon. The output products of this system should be supplied to the COS.

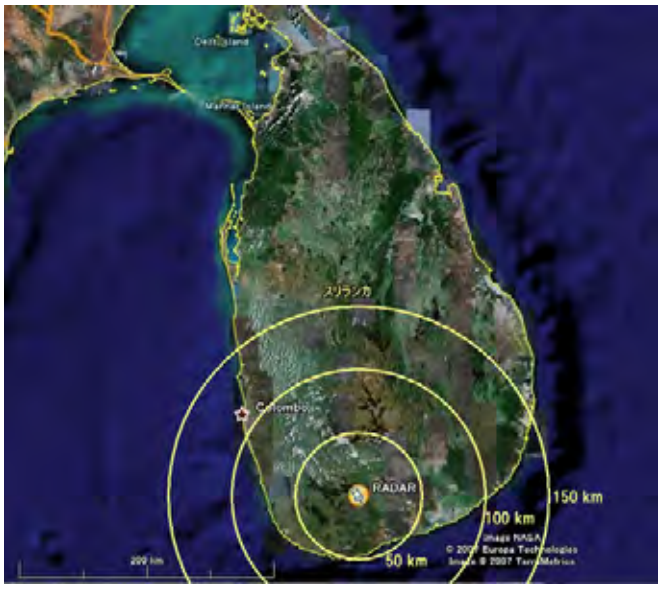

Figure L.3.11 Location of Doppler Radar Site

(3) GPS Upper Air Observation System

This system is now on the design stage, and the output products of this system should be supplied to the COS.

Figure L.3.12 Installation Site of GPS Upper Air Observation System

(4) Lightning Detection System

The system design will soon be started and the output products of this system should be supplied to the COS.

(5) Meteorological Satellite Receiving System

Meteorological Satellite Receiving System will be donated by China Meteorological Agency in 2007. The detailed specification is known, but it can receive FY-2 imagery, METEOSAT digital data, GOMS imagery and NOAA imagery.

(6) Disaster Management Network system

The output products of the COS should be supplied to this system.

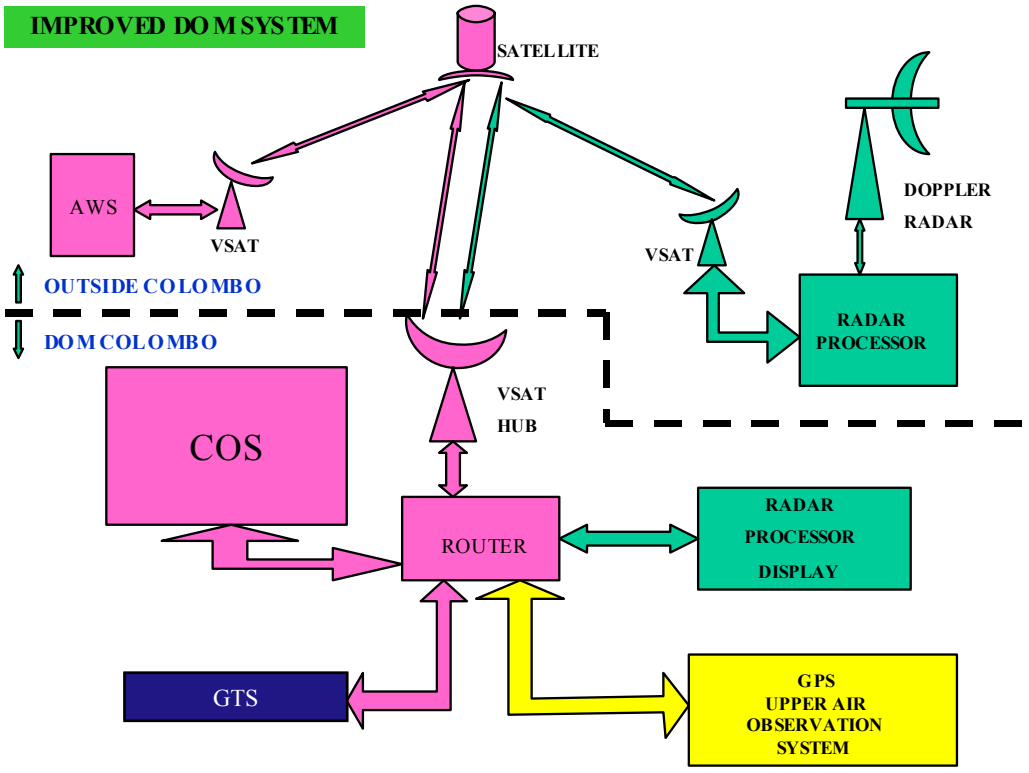

Figure L.3.13 Improved Comprehensive System of DOM

L.3.4 Improvement Projects in the Future

The DOM is now faced with a lot of changes. As already mentioned, a lot of new meteorological observation systems will be installed in the next two years. But installation of new instruments is not enough; capacity building for human resources is as equally important. Through an appropriate organization, for example WMO and other organizations, the development of human resources and the technology transfer should be carried out. Typical issues are presented as follows:

(1) Satellite Imagery Analyzing Technology

Meteorological satellite data shows a lot of beneficial information. In general, satellite images show us a pattern of clouds and movement of clouds. But in order to use satellite data more efficiently, the use of an analyzing application program is needed. Figure L.3.14 shows an example of SATAID (Satellite Animation and Interactive Diagnosis) which is developed by JMA. The left picture shows that a higher temperature area of cloud top is colored in red. It means a red colored area is a lower cloud than the other. The right picture shows a composition of satellite imagery and NWP results. It is one of the most important skills for weather forecast in Japan.

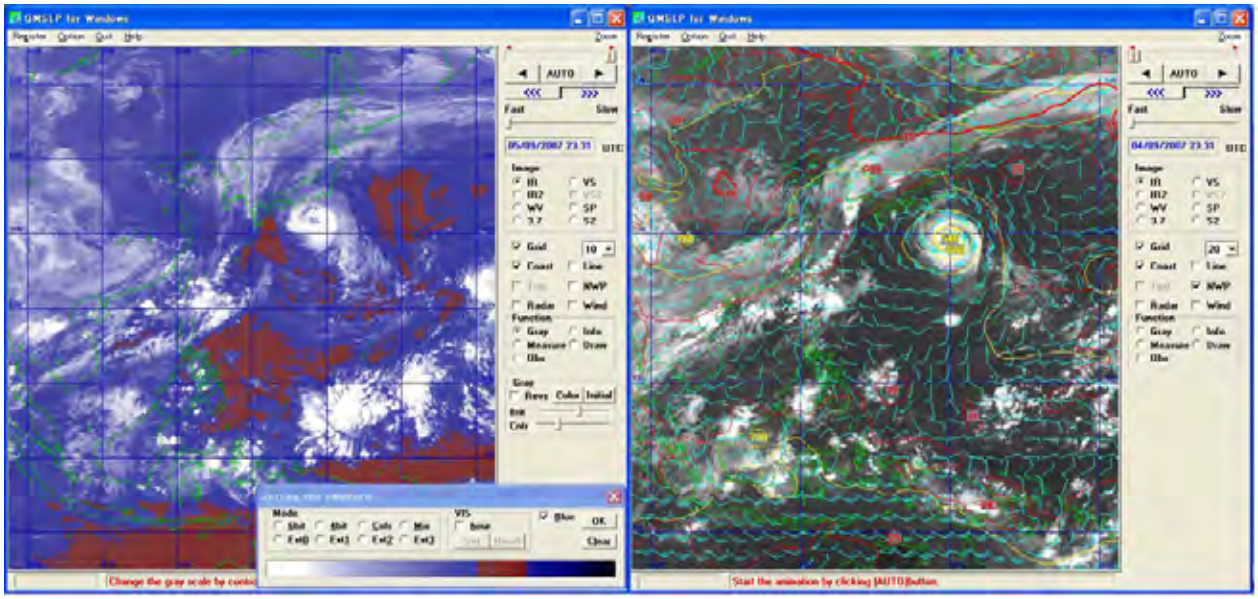

Figure L.3.14 Satellite Imagery Analyzation

(2) (Numerical Weather Prediction System and Analyzing Technology

The results of NWP (Numerical Weather Prediction) bring us a lot of useful information too. In order to use NWP data more efficiently, translation of the result to weather forecasting word (e.g., Precipitation, Temperature, Wind, etc.) is needed. This is called 'Guidance' in Japan, and JMA makes a variety of guidance.

Table L.3.2 Variety of Guidance in JMA

Probability of precipitation	Temperature
Precipitation	Wind direction and speed
Maximum precipitation	Maximum wind speed
Probability of heavy rainfall	Weather
Probability of snowfall	Rate of sunshine
Ratio of rain and snow	Minimum humidity
Probability of lightning	

(3) Radar Image Analyzing System and Radar-Observation Precipitation Analyzing Technology

There are increasing limitating factors to the installation of observing stations such as lease of land, installation cost, maintenance cost, and so on.

One of the most effective methods to observe planar/two-dimensional rainfall condition is through a meteorological (rainfall) radar. Conventional radar is enough to observe rainfall condition, but Doppler radar is better in observing movement of rainfall area. In general, a detectable range/ coverage of meteorological radar is from 150 to 250 km in radius.

As already mentioned, especially in the tropical area, a scale of meteorological phenomena is very small and a variation is very rapid, so meteorological radar is extremely useful and effective to monitor meteorological phenomena and to reduce meteorological disaster.

It is very important to remember that meteorological radar can observe only relative intensity of rainfall. In order to observe/analyze quantity value of rainfall, it is necessary to develop skills in analyzing/converting method using the observed rainfall data in land stations at the same time. This method, called 'Analyzed Rainfall Information', has been developed and in practical use in Japan by JMA.

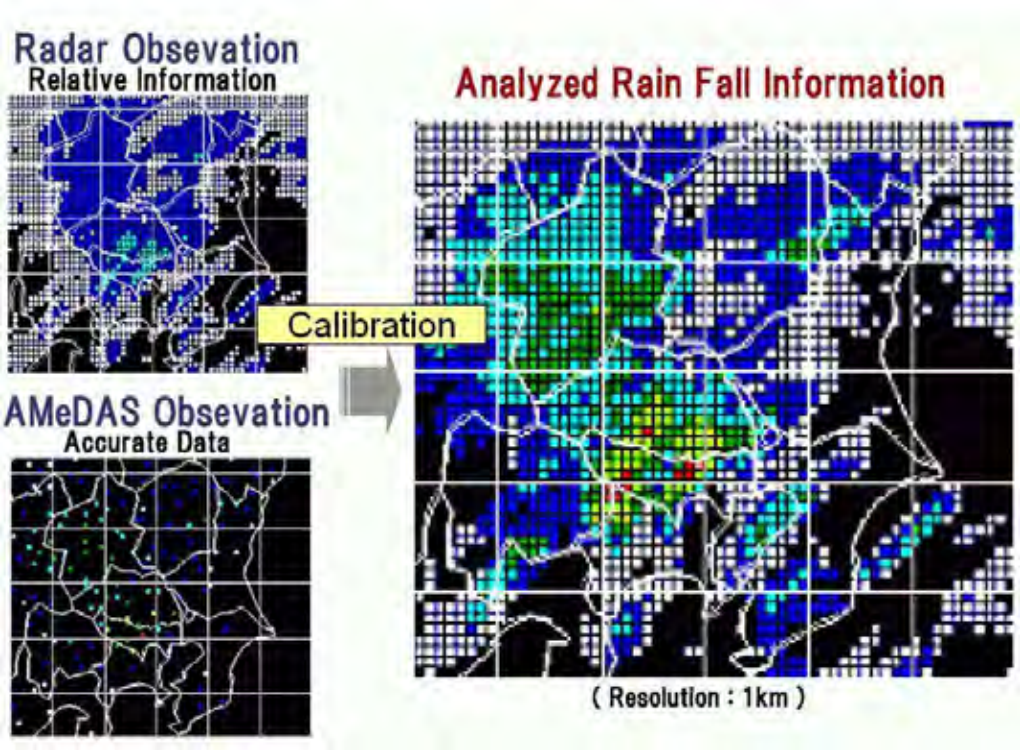

Figure L.3.15 Composition of Radar Data and Observing Data

(4) Short term Rainfall Prediction Technology

In addition, if the meteorological radar is Doppler radar, the movement (direction and velocity) of rainfall area can be observed. From analyzing variation of rainfall intensity and movement of rainfall area, it will be possible to predict rainfall intensity and area in the near future. This method has also been developed and in practical use by JMA as 'Short term rainfall prediction' in Japan.

Thus, when the meteorological radar is installed in the near future, transfer of knowledge and technique shall be required.

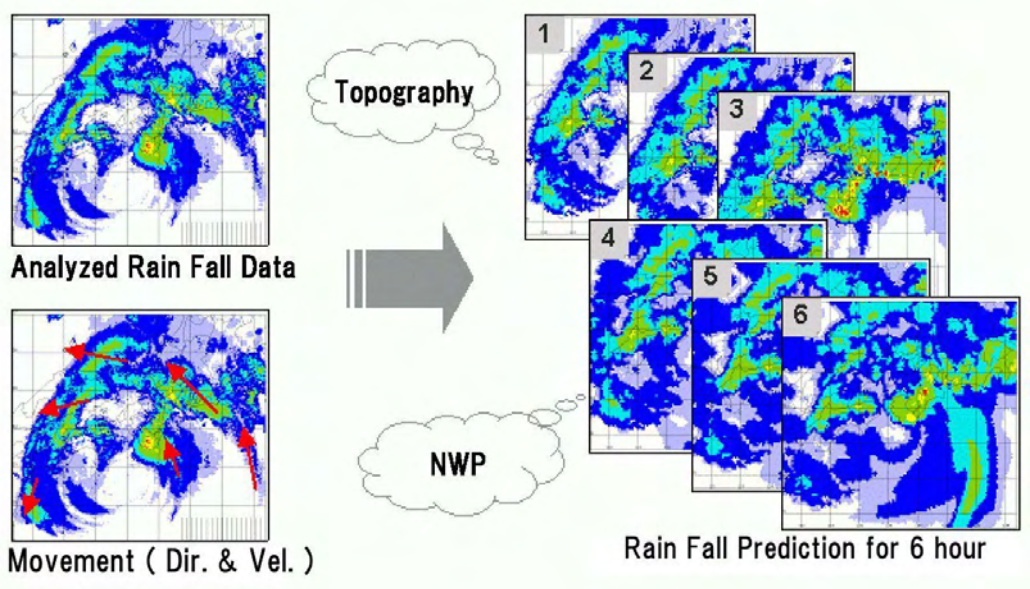

Figure L.3.16 Short term Rainfall Prediction

(5) Technical Development of Weather Warning/ Advisory

In order to mitigate the damages caused by disaster, timely issuance of not only a weather forecast but also a weather warning and advisory is required. Thus, when the AWS (Automated Weather Station) system and the meteorological Doppler radar system is installed in the future, a background on how to issue accurate weather forecast should also be provided. By that time, it will be necessary to prepare weather warning and advisory to local area.

(6) Long-term Improvement Plan of Comprehensive Meteorological Services

In order to mitigate damages of natural disaster, it is very important to develop an early warning system and to establish an effective network between and among organizations concerned. In Sri Lanka, most natural disasters are caused by weather phenomena; thus, it is very significant to support DOM and its initiatives.

As already mentioned, the improvement of observing instruments and the development of human resources are very important. But very important as well is the basic need to have a long term improvement plan of comprehensive meteorological services as a national organization. Further, to develop a concrete long term improvement plan, dispatch of technical experts or conduct of feasibility studies is required.

Supporting Report M

Community-based Disaster Management

Supporting Report M Community-based Disaster Management

M.1 General

Enhancing capacities of communities for disaster risk management is one of the very important aspects for reducing negative impact of disasters. The activities of Component-3 aiming at strengthening their capacities has been conducted according to the workflow below (Figure M.1.1) in close cooperation with the Disaster Management Centre (DMC), as well as technical counterpart organizations such as Department of Irrigation (DOI) and National Building Research Organization (NBRO).

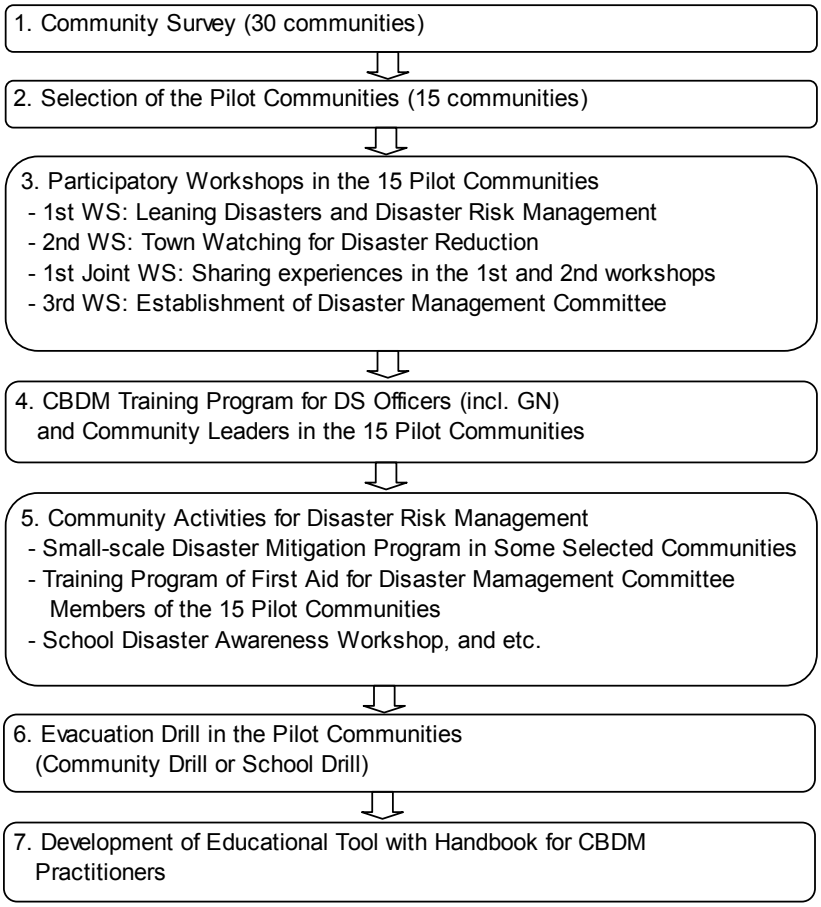

Figure M.1.1 Flow of the Activities of Component 3

M.2 Selection of the Pilot Communities

M.2.1 Preliminary Community Survey

The activities for Component 3 started with a preliminary survey on the communities. The survey was designed for understanding the conditions of the communities in disasters and disaster risk management and getting necessary information and data for the selection of the 15 pilot communities to conduct community-based disaster reduction activities in the Study. A total of 30 communities in the Study area were selected from the scale of potential risks to disasters perspective based on the result of baseline study by the Study team members as well as the recommendation from DMC, DOI, and NBRO. Table M.2.1 shows the selected target communities of the survey.

Table M.2.1 Target Communities of the Survey

Type of Disasters	Target Areas	#	Target Communities	G.N.	Division	Population (G.N.)*
Flood	Kelani River basin	1	Kittanpahua	Kittanpahua	Kolonnawa	4,705
		2	Biyagama	Biyagama	Biyagama	1,923
		3	Hanwella	Hanwella	Hanwella	1,748
		4	Ranala	Ranala	Kaduwela	N.A.
	Kalu River basin	5	Angammana	Angammana	Ratnapura	N.A.
		6	Mudduwa	Mudduwa	Ratnapura	3,700
		7	Kahangama	Kahangama	Ratnapura	1,958
		8	Dimiyawa	Raddalla	Elapatha	1,053
		9	Ukuwatta	Ukuwatta	Dodangoda	613
		10	Yatawara	Yatawara	Millaniya	598
	Gin River basin	11	Baddegama	Baddegama	Baddegama	2,978
		12	Agaliya	Agaliya	Weliwitiya	3,139
	Nilwala River basin	13	Akuressa	Ihala Aturaliya	Aturaliya	N.A.
		14	Kadduwa	Kadduwa	Malimbada	1,136
Sediment Disasters	Ratnapura District	15	Hapurugala	Niralagama	Pelmadulla	224
		16	Kiribathgala	Wanniyawatta	Nivithigala	619
		17	Helauda	Mahawala	Ratnapura	1,272
		18	Balibathgoda	Haldola	Elapatha	380
	Kalutara District	19	Niggaha	Niggaha	Bulathsinhala	970
		20	Kosgulana	Kukeleganga	Palinda Nuwara	925
		21	Nagalakanda	Kananvila-south	Horana	1,859
		22	Govinna	Govinna	Bulathsinhala	1,075
Tsunami	Matara District	23	Polhena	Polhena	Matara	3,150
		24	Thotamuna	Thotamuna	Matara	N.A.
		25	Gandara South	Gandara	Dondra	N.A.
		26	Kottegoda	Suduwella	Dickwella	1,567
	Ampara District	27	Sinna Ullai	Sinna Ullai	Pothuvil	1,761
		28	(40th Post Area)	Sinnamuttuaru	Alayadiwembu	1,191
		29	(3rd Section)	Vinayagapuram	Thirukkovil	1,600
		30	Akbar	Periyanilavani	Kalmunai	1,217

(* Population data is based on the result of the Survey.)

M.2.2 Method and Contents of the Survey

In each of 30 selected target communities, a questionnaire survey was conducted among a randomly selected sample of 20 households. A total of 600 households completed the survey in the target areas. In addition to the household survey, a questionnaire survey was conducted by interviewers for the Grama Niladari (G.N.) to get baseline data and information on the target communities.

The main contents of the survey were as follows: 1) Structure and management system of the communities; 2) Situation of the recent main disasters and community's disaster response; 3) Existing mechanism of disaster risk management in the communities; 4) Current status of public awareness on disasters and disaster management; and 5) Current situation of school education for disaster risk reduction. The questionnaire survey forms for the households of the communities and local government officials are presented in Data Book 4.

M.2.3 Result of the Survey

The collected data was tabulated by each community and analyzed by each target area for selection of 15 pilot communities. Detailed results of the survey are presented in Data Book 4.

M.2.4 Selection of Pilot Communities

Based on the information and data collected and analyzed in the Survey, 15 pilot communities for conducting disaster reduction activities were selected according to the criteria shown in Table M.2.2 and in consultation with DMC, DOI, and NBRO. Table M.2.3 shows the list of selected 15 communities.

Table M.2.2 Criteria for the Selection of Pilot Communities

Criteria	Details
(a) Disaster Risks	High disaster risk areas
(b) Leaderships	Leadership capacity Relationships with other organizations/ administrative organizations
(c) Disaster and Risk Management Awareness	Public awareness on disaster risk management Public attitude to ward disaster reduction activities
(d) Mutual Cooperation Spirit	Organizational capacity, social solidarity Awareness of vulnerable people
(e) Social Impact	High expectation of demonstration effect Good reputation as strong communities Various surveys have already been conducted; however, actual project has not been conducted yet.

Table M.2.3 Selected 15 Pilot Communities for Community Activities

Type of Disasters	Target Areas	Target Communities	G.N.	Division	District
Flood	Kelani River basin	Kittampahuwa	Kittampahuwa	Kolonnawa	Colombo
		Malwana Town	Malwana Town	Biyagama	Gampaha
	Kalu River basin	Angammana	Angammana	Ratnapura	Ratnapura
		Mudduwa	Mudduwa	Ratnapura	Ratnapura
		Ukwatta	Ukwatta	Dodangoda	Kalutara
	Gin River basin	Baddegama	Baddegama	Baddegama	Galle
	Nilwala River basin	Kadduwa	Kadduwa	Malimbada	Matara
Sediment Disasters	Ratnapura District	Kiribathgala	Wanniyawatta	Nivithigala	Ratnapura
		Helauda	Mahawala	Ratnapura	Ratnapura
	Kalutara District	Niggaha	Niggaha	Bulathsinhala	Kalutara
		Nagalakanda	Kananvila-south	Horana	Kalutara
Tsunami	Matara District	Gandara South	Gandara	Devinuwara	Matara
		Kottegoda	Suduwella	Dickwella	Matara
	Ampara District	Sinna Ullai	Sinna Ullai	Pothuvil	Ampara
		3rd Section	Vinayagapuram	Thirukkovil	Ampara

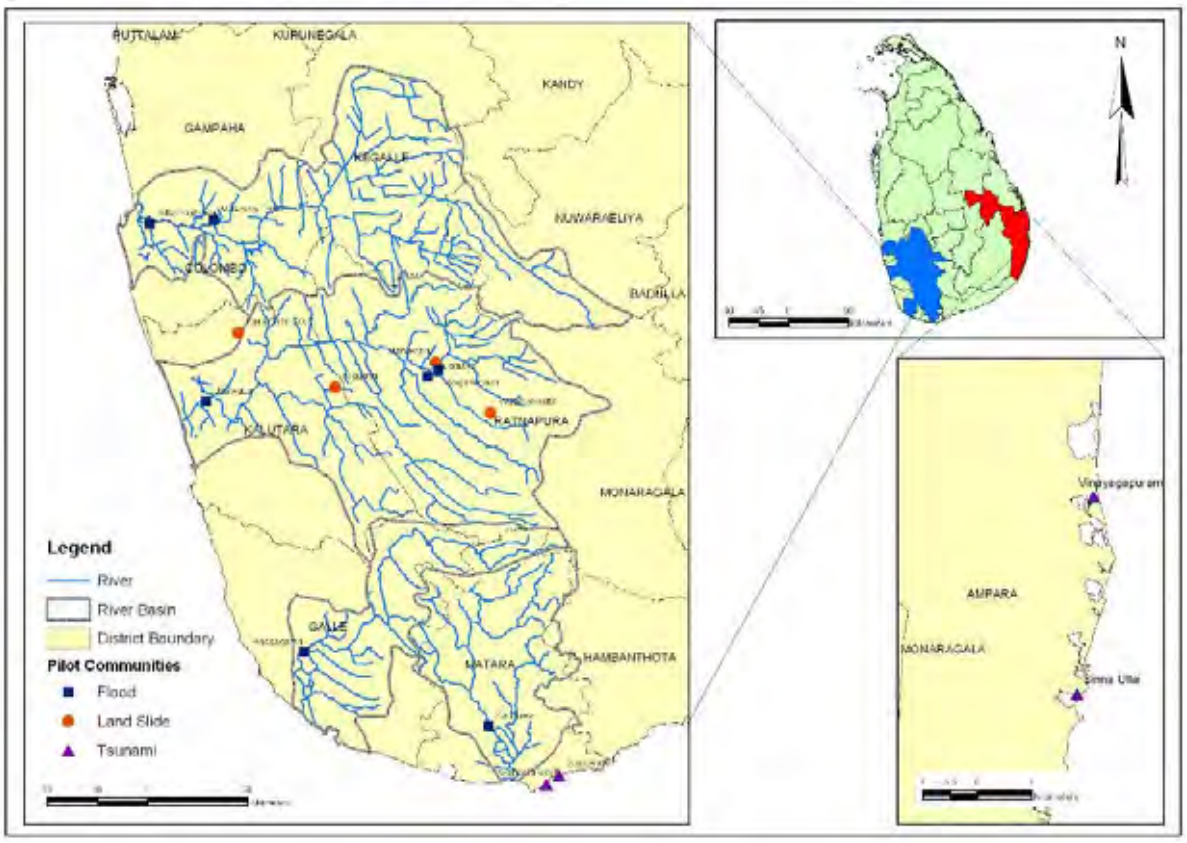

Figure M.2.1 Location of the Selected Pilot Communities

M.3 Community Participatory Workshops

M.3.1 General

(1) Overall Plan of the Community Participatory Workshops

To contribute to enhance capacities of the disaster risk management in each of the pilot communities, the following overall activity plans were originally prepared (Table M.3.1). In the course of implementation of the activities, the planned activities were reviewed and modified in consideration of situation of each community. As a result, the first joint workshop was conducted after the series of second workshop. Similarly activities after the third workshop were made extensive modification based on priority areas and needs of each community as well as progress of the activities through the workshops as shown in Table M.3.1.

Table M.3.1 Original Overall Plan of Community Participatory Workshops

	Study Phase Year/Month	Purpose	Activities
First Workshop	Phase 1 February 2007	To understand current situation of community disaster risk management system and disaster response	Learning of disasters and disaster risk management DIG (Disaster Imagination Game) Discussion on disaster risks in community
Second Workshop	Phase 2 May 2007	To establish community evacuation plan	"Town Watching for Disaster Risk Reduction" Program Discussion on evacuation in case of emergency
Third Workshop	Phase 2 October 2007	To formulate community disaster risk management plan	Community-based Hazard Mapping Discussion on action plan for enhanced disaster risk management in community
First Joint Workshop	Phase 2 November 2007	To share the experiences and efforts in pilot communities	Introduction of the activities and action plan for disaster risk reduction Discussion
Fourth Workshop	Phase 3 February 2008	To conduct a disaster management drill for enhancing community's disaster risk awareness for review of the disaster risk management system	Discussion on promotion of disaster risk reduction activities Discussion on collaboration with administrative organizations and schools in case of emergency
Fifth Workshop	Phase 4 May 2008	To strengthen collaboration between community and school To enhance students capability for disaster risk management To review community disaster risk management plan	Discussion on education for disaster risk reduction "Exploration for Disaster Prevention for School Children" Program Discussion on the review of disaster risk management plan
Second Joint Workshop	Phase 4 November 2008	To share the experiences and efforts in the pilot communities	Introduction of the activities and action plans for disaster risk reduction Discussion

(2) Objectives of the Community Workshops

Main objectives of the community workshops were as follows: 1) to analyze hazards and vulnerability to disasters of communities, 2) to foster common understanding of risks among all the stakeholders of the communities including local residents and government officials, 3) to identify problems in the communities and measures to be taken for improving disaster risk management, 4) to formulate community disaster risk management plan, and 5) to promote a "culture of disaster prevention" in the communities.

(3) Participants of the Community Workshops

Basically G.N. and 40 residents were invited from each of the 15 communities to participate in each of the workshops. In addition, taking into consideration the importance of the collaboration and involvement of all stakeholders to formulate communities' disaster management plans, the invitation was extended to officers of Divisional Secretary (DS) Office such as Technical officer, Land-use Planning officer, Environmental officer, Social Services officer, Samurdhi Development officer, and Youth Services Officer. District Disaster Management Coordinators (DM Coordinators) and Assistant Coordinators of DMC in the respective districts were requested to participate in the

workshops in view of capacity development for conducting same kind of activities by themselves in future. The workshops attracted a large attendance from community members and most of the workshops were participated in by more than 60 residents.

(4) Lecturers of Workshops

Lectures in the workshops were provided by the following lecturers in consideration of active involvement of counterpart organizations in the Study:

Table M.3.2 Lecturers in the Workshops.

Theme	Type of Disasters	Lecturer
Mechanism of Disasters:	Flood	Officials of DOI
	Sediment Disasters	Mr. R.M.S. Bandara, Head of Landslide Studies and Service Division (LSSD), NBRO, Mr. Dharmasena, LSSD, NBRO
	Tsunami	Dr. Nimal Wijayaratna, Ruhuna University Mr. Ryo Matsumaru, JICA Study Team
Disaster Management System in Sri Lanka	(Flood)	Ms. Lalani Imbulana, Director of Preparedness/Planning, DMC
	(Sediment Disasters)	Mr. K.N. Bandara, Assistant Director of Training/Public Awareness, DMC
	(Tsunami)	Dr. Buddhi Weerasinghe, Director of Training/Public Awareness, DMC
Disaster Management System in Japan (JICA Study Team)	Flood	Mr. Yoshihiro Motoki, Mr. Ryo Matsumaru and Mr. Yoshihiko Uchikura
	Sediment Disasters	Mr. Satoru Tsukamoto
	Tsunami	Mr. Ryo Matsumaru and Ms. Miki Kodama
CBDM		Ms. Miki Kodama

M.3.2 Series of First Community Workshop (February 2007)

(1) Objectives of the First Community Workshop

The first workshop specifically aimed at understanding risks of disasters in the respective communities and current situation of community disaster risk management system and response by exposing the participants to a wide range of information on disasters and risk management.

(2) Format of the First Community Workshop

The basic format of the workshops is described in Table M.3.3. In the morning, lectures were provided and in the afternoon, group work was organized as follows:

1) Lectures on Disasters and Disaster Risk Management

Visual and oral explanation on potential disaster risks and their management in each community was provided in order for the participants to know risks in the community and to understand what disaster reduction is. In addition, Japanese experts introduced the experiences of disasters in Japan and Japanese disaster management system which contribute to reducing human losses.

2) Group Work: DIG (Disaster Imagination Game)

Community maps were developed through the group work. Participants were requested to draw a base map of each community in groups which are consisting of 8-10 members. The base map should include information on infrastructures such as roads, rivers, canals, houses, and buildings of the

community. They were then asked to discuss what will be expected to occur in the event of a disaster and add information on possible disaster situation such as estimated/past inundated areas, dangerous spots to pass by and important facilities for disaster risk management on the map.

Table M.3.3 Basic Format of the 1st Workshop

09:00 – 09:20	Opening Ceremony - Oil Lamp Lighting - Remarks by Divisional Secretariat or a representative of DS Office - Remarks by DM Coordinator, DMC or a representative of District Disaster Management Coordinating Unit (DDMCU)
09:20 – 09:40	Introduction of the Workshops to be provided JICA Study
09:40 – 10:00	Visual Introduction of Disasters (Flood, Sediment Disasters, or Tsunami)
10:00 – 10:30	Disaster (Flood, Sediment Disasters, or Tsunami) in Sri Lanka and in the surrounding areas of the community [To introduce characteristics of main potential disaster in the area]
10:30 – 11:10	Disaster Management in Sri Lanka (Focusing on Flood, Sediment Disasters, or Tsunami) [To introduce current disaster management and future plan in Sri Lanka]
11:10 – 11:40	Disaster Management in Japan (Flood, Sediment Disasters, or Tsunami) [To provide some other ideas to enhance disaster management system in the areas]
11:40 – 12:00	Video of Community-based Hazard Mapping - Early Warning System, Hazard Mapping, etc.
13:00 – 15:00	Group Work: DIG (Disaster Imagination Game)
15:15 – 16:30	Presentation & Discussion
16:30 – 16:45	Explanation about next workshop

(3) Summary of Findings from the First Community Workshop

Lectures which were provided in the workshops were rather long in time and content were found to be too technical at times. However, most of the participants seemed to be interested and paid attention on the explanations provided, especially when visual materials such as pictures and videos are being used.

DIG program had active participation. Each group in each of workshops developed community maps enthusiastically with some disaster related information which they have already recognized. Through the workshops, the participants could make vigorous exchange of their opinion on disaster risk management.

Specific findings summarized by each of disaster type are presented below.

1) Workshops in Flood Vulnerable Pilot Communities

The lectures provided in the pilot communities frequently suffering from flood were very informative focusing on the flood situation in the area in cooperation with DMC, DOI and JICA Study Team. In addition, some of the participants pointed out based on their learning through the workshop program that effective delivery of early warning information should be urgently considered.

Figure M.3.1 Workshops in Flood Vulnerable Communities

2) Workshops in Sediment Disaster Vulnerable Pilot Communities

In the pilot communities prone to sediment disasters, informative and practical lectures were provided with very positive contribution from NBRO. Discussion through the workshops made clear that one of the main problems in minimizing damage by sediment disasters in the communities was the lack of enough funding. Some of the participants shared that they were provided land by Government under its relocation program, but they do not have enough money to build houses on the land, thus forcing them to still live in high risk areas. Similarly, in some communities, needs for improvement of drainage system or bridge for safe evacuation was identified.

Figure M.3.2 Workshops in Sediment Disasters Vulnerable Communities

3) Workshops in Tsunami Vulnerable Pilot Communities

The program was enthusiastically participated in since this type of the workshop has never been conducted in the communities in Ampara district. On the contrary, the participants in the communities in Matara district were less interested in the program since similar activities were conducted by other aid agencies before. In addition, it was recognized that additional information on risk management tropical cyclone is required to the communities in Ampara district as guide on saving their lives from strong winds.

Figure M.3.3 Workshops in Tsunami Vulnerable Communities

(4) Review of the First Community Workshop Activities

The first workshops in the 15 pilot communities were basically well coordinated to achieve the set objectives. Although coordination and preparation time was very limited due to delay of the selection of the communities, all the workshops were conducted on schedule with the cooperation of all the related organizations and communities.

The following points were recognized as needing to be improved:

- Further close coordination with District Disaster Management Coordinators who have leading roles to promote disaster risk management activities at local level including organizing this kind of workshop.
- More involvement from G.N. level disaster management committees which were/will be established by DMC in order to avoid duplication works and effective implementation of the action plans to be discussed in the workshops.
- More participation from the officers of D.S. offices who have responsibility to take necessary actions for solving problems in communities and improving people's life.
- More active involvement from community leaders in each community for promoting participation of the persons who are in the position to help realize the actions to be planned.
- Enhancing better understanding among officials of DOI about importance of their involvement in community-based activities for considering effective disaster risk management.

M.3.3 Series of Second Community Workshop (May-June 2007)

(1) Objectives of the Second Community Workshop

The second community participatory workshop in each of the 15 pilot communities was conducted to establish community evacuation plans in the respective communities. To achieve the objectives, a community-based hazard mapping program that included town watching for disaster reduction was conducted. Community-based hazard mapping is a program to help residents to reconfirm the safe evacuation routes and sites in their communities and to find the best way to create a community's disaster risk management plan based on knowledge of local residents. At the same time, it contributes to raising awareness of disaster and disaster reduction in communities.

(2) Format of the Second Community Workshop

The basic design of the workshop is shown in Table M.3.4.

1) Town Watching (Field Survey)

Initially, the participants conducted a field survey on their own villages by groups utilizing the community's base maps which were drawn during the First Workshop. They checked the aspects that could be advantageous or disadvantageous to the community if a disaster happened in the areas, with the guidance and advices of the government officials of DMC, DOI, and/or NBRO, and JICA Study Team members. Interview with the residents were also conducted so as to obtain specific local information.

2) Mapping and Discussion

Based on the results of the field survey, and after discussion on the advantages and disadvantages in terms of reduction of damages in cases of disasters, information and observations collected were traced onto the base maps, taking into consideration safe evacuation of the community people. The developed map by each community will then be consolidated into one large master map by the representatives of the participants for future distribution in the communities.

The discussion also focused on the negatives issues observed; and this became the basis for developing a matrix of problems, solutions and responsibilities. For each identified issues and problems, a solution was also agreed upon. In addition, the formulated solution included the "who" and "how" components, and all participants, both the community people and the concerned government agencies, tried to determine what can be their respective roles, either alone or together.

Table M.3.4 Basic Format of the Second Community Workshop

Time	Activities
08:30 – 09:00	Opening/ Introduction of Today's Program
09:00 – 10:30	Town Watching (Field Survey) / Slope Watching
10:45 – 12:15	Mapping & Discussion
13:15 – 14:45	Presentation & Discussion
14:45 – 15:00	Explanation about the next workshop

(3) Summary of Findings from the Second Community Workshop

1) Town Watching in Flood Vulnerable Pilot Communities

Figure M.3.4 Town Watching in Flood Vulnerable Communities

Town watching activities in the seven flood-vulnerable pilot communities mainly focused on observation of the condition of river banks, canals, drainages, and water gates. In many communities, poor condition of smooth water flow were observed or reported by the residents due to blockages or small capacities of canals and drainages. In addition, bank erosion by illegal sand mining or improper maintenance was also observed in many places.

The participants also checked evacuation routes and identified various problems such as narrow roads, unsteady pathways in case of rain, and no street lights.

Similarly, issues of worsening condition of the flood by recently constructed structures such as foundation of highway or gate of bund were raised up during the field survey.

2) Town Watching in Sediment Disaster Vulnerable Pilot Communities

Figure M.3.5 Town Watching in Sediment Disaster Vulnerable Communities

Town watching activities in the four sediment disaster-vulnerable pilot communities mainly focused on observation of slope condition of their living areas. NBRO officers provided an on-site explanation to the participants on the risks of the slopes. They also provided information on the pre-disaster signs and encouraged the participants to conduct periodic observations of the condition of the slopes and surrounding areas. For their part, the residents shared to the NBRO officers their experiences based on past disasters.

The participants also checked evacuation routes and found out that some community members will have difficulty evacuating safely after some period of heavy rain due to easily inundated areas between their houses and evacuation sites.

3) Town Watching in Tsunami Vulnerable Pilot Communities

Figure M.3.6 Town Watching in Tsunami Vulnerable Communities

In the four Tsunami-vulnerable pilot communities, town watching activities mainly focused on observation of evacuation routes and sites and early warning facilities. They checked the areas inundated by the Tsunami on 26 December 2004 and confirmed the safe evacuation routes. They also observed that available facilities for information and warning dissemination such as loud speakers or bells of temples cannot reach some houses due to distance.

4) Hazard Mapping

Based on observations made from the town watching activities, the participants in each of the 15 workshops drafted an evacuation plan on their respective community maps including the necessary information such as evacuation places, flooded areas based on past records of flood or Tsunami, evacuation route and direction, as well as the current problems and issues to be addressed for safe evacuation.

In sediment disaster-vulnerable communities, the areas where relocation was recommended or relocation has already been conducted were marked to indicate the most dangerous areas.

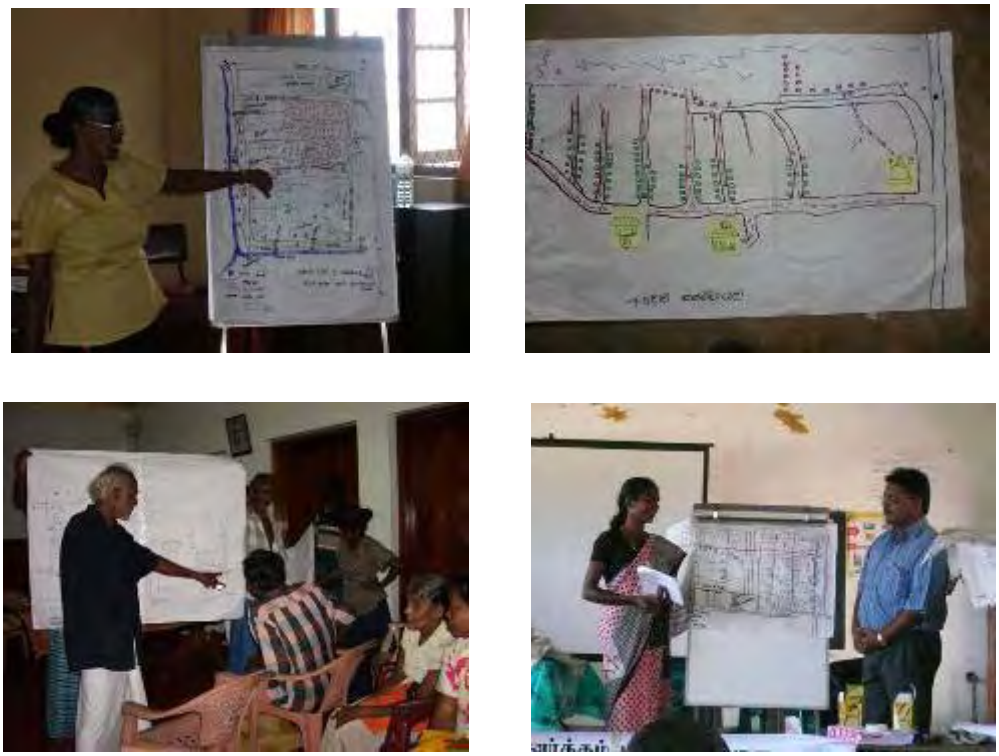

Figure M.3.7 Presentation of Developed Hazard Maps

5) Group Discussion

During and after mapping, the participants discussed main problems and possible solutions for safe evacuation and disaster reduction. Outlines of the discussed points are summarized below in each of disaster types.

(A) Flood Vulnerable Pilot Communities

Issues and problems pointed out in many of the flood vulnerable pilot communities are summarized in Table M.3.5. One of the main issues was inappropriate water flow due to poor condition of canals or drainages in the areas. For the people living in the areas where they suffer flood disaster every year, improvement for better water flow management seemed to be the most serious concern. Most of the recommended possible solutions identified by the participants were submitted as request to the governments. However, the facilitators and the JICA Study Team encouraged the participants to also formulate solutions which the community can do by themselves.

Table M.3.5 Main Problems and Possible Solutions in Flood-prone Communities

Main Problems	Possible Solutions
• No standard and effective information transfer system in case of emergency	• Utilization of the bells of temples or an efficient information transfer community network should be considered
• Roads for evacuation are narrow, ill maintained, risky for falling down, or not appropriate for prompt evacuation	• Establishment of community's early warning systems utilizing available facilities/methods
• Water blockage in drainages which are not properly maintained or are too narrow for water flow in case of heavy rain.	• Request Municipality/Division office for technical (expertise, machinery) and financial support • Residents provide physical contribution (such as manpower) • Public awareness on important role of drainages
• Erosion of river banks	• Request Municipality/Division office for maintenance works • Request governments to prohibit illegal sand mining • Residents do constant watch of illegal activities
• Unnecessary accumulation of sand in waterways due to gem mining works	• Request governments to prohibit illegal sand disposal to waterways
• Nonfunctional old dam	• Request maintenance works from the governments (already done several times)
• Break down of water pump due to aging	• Request DOI for replacement of old pumping machines
• Insufficient water level observation	• Request DOI for establishment of public gauges
• Insufficient numbers of rescue boats	• Request Division office to provide public rescue boats • Residents consider good maintenance system in communities • DMC provides training for paddling and maintenance
• Lack of adequate evacuation sites	• Request division office for appropriate measures considering population growth
• Insufficient facilities in designated (possible) evacuation sites (drinking water, toilets, electricity/ generators)	• Request governments for improvement of facilities
• Improper disposal and clearance of waste and debris after disasters	• Request for waste management program
• Flood water stagnation after the disasters (has bad effect for foundation and walls of houses)	• Request government for a better recovery work system
• Improper waste management	• Public awareness for the residents • Request for waste management program
• Low height of electricity transformer	• Request for adjustment of the location
• New highway construction and environmental effect	• Request for meetings to explain on the progress of construction
• Theft and looting during disasters	• Request Police support

(B) Sediment Disaster Vulnerable Pilot Communities

As shown in Table M.3.6, in sediment disaster vulnerable pilot communities, one of the most critical issues identified is still that some people are still living in the high risk areas. In addition, dangerous spots due to easy flooding in case of heavy rain prevent safe evacuation of the people in some areas. Early warning system appropriate to the communities should be established for both these groups as soon as possible.

In consideration of the above conditions, a small rain gauge was provided and installed in each of the four pilot communities as one of the supporting equipments for early warning. Representatives of the community members started rainfall observation and recording just after the workshops.

Figure M.3.8 Explanation on the Rain Gauge and Observation of Rain Fall

Table M.3.6 Main Problems and Possible Solutions in Sediment Disaster-prone Communities

Main Problems	Possible Solutions
• There are houses which should be relocated as soon as possible	• Request for governments' prompt action in terms of policy on relocation of high-risk communities, including financial support to possible persons to be relocated
• Roads for evacuation are easily inundated and not appropriate for safe evacuation	• Request governments to consider improvement of dangerous spots
• Considerable numbers of houses are cracked and households have to bear annual repairing cost on maintenance.	• Request governments for financial support
• Improper human behavior such as deforestation and cultivation of the slopes	• Public Awareness
• Early prediction of landslide should be required	• Effective utilization of the rain gauges installed by JICA Study

(C) Tsunami Vulnerable Pilot Communities

People in the Tsunami-vulnerable pilot communities learned from past disaster experiences the importance of the early warning information and prompt evacuation. Thus, the discussion mainly focused on proper information dissemination in their communities as shown in Table M.3.7. The main issues pointed out were the lack of equipments and transportation facilities necessary for prompt information transfer. Information dissemination to people living in the coastal area and in the seaside was also seriously considered.

It was also shared during the discussions that some of the community members have in fact already participated in disaster risk management programs provided by other organizations such as UN agencies, International NGOs and DMC after the calamities of Tsunami in December 2004. Thus, it was also pointed out that this JICA Study program should make proper coordination with those agencies to prevent duplication of activities and to avoid confusion among the community members.

Table M.3.7 Main Problems and Possible Solutions Identified in Tsunami-prone Communities

Main Problems	Possible Solutions
• No effective early warning system	• Request for the installation of some small loud speakers
• Limited capacities of evacuation sites	• Seeking for more possible evacuation sites
• Inadequate facilities in evacuation sites (drinking water, toilet facilities, power generator)	• Request to division office for improvement of facilities of evacuation sites
• Unavailability of transport methods for vulnerable people	• Need more cooperation among community members
• Slow progress of recovery work of the Tsunami damage in 2004.	• Request to the governments for better coordination on this matter
• Security problem prevent effective coordination for disaster risk management (Ampara)	N.A.

(4) Review of the Second Community Workshop Activities

Through the activities in the Second Community Workshops in the 15 pilot communities, the following points were identified to be considered in future CBDM activities.

1) Importance of proper risk recognition and risk communication among stakeholders

The workshops served as a reconfirmation, or for some, realization, of their current situation in terms of risks and disaster risk management. Despite the community people's tendency to think that they know their respective communities very well, they realize the importance of periodic town watching which can provide proper information as well as better coordination and management to reduce impact of disasters in their own areas. In addition, such exercise can result in immediate results since actual conditions can be pointed out to accompanying government officials for necessary actions to be undertaken. Thus, more focus on the importance of proper risk recognition and risk communication among stakeholders will be considered in the future activities.

2) Enhancement of group action

In most of the communities, the members tended to heavily depend on the governmental support to solve the problems identified during the town watching and workshop discussions. While the facilitators and JICA Study Team members encouraged them to consider community actions to solve or minimize the problems, it was however quite difficult to change their attitude and mind-set on this and still regard it as government responsibility. Thus, in the conduct of further activities of the JICA Study program, creation of voluntary committees within the communities which will be in-charge of disaster reduction will be promoted to aim at creating disaster-resilient communities. Promotion of group action as a whole community for common purpose should be much more emphasized.

3) Active involvement of G.N.

Through the workshop activities, it was recognized that active involvement of G.N. is very important for effective implementation of the program. It was observed that a more dynamic and practical exchange of ideas and opinions resulted in community workshops where there was active participation by the G.N. This also ensured the participation of community members who play relatively important

roles. In this context, activities to enhance G.N.'s awareness should be considered for proactive CBDM activities.

4) DMC's strategy for CBDM activities

DMC has placed strong emphasis in the promotion of community-based disaster risk management. On 30-31 July 2007, DMC organized the "Regional Workshop on Community-based Disaster Risk Management (CBDRM)" inviting several regional experts on CBDRM in cooperation with UNDP and other NGOs. The workshop was aimed at initiating an appropriate CBDRM plan modality to initiate large scale disaster-development initiatives at the community level, and was particularly focused on reaching a consensus on the appropriate CBDRM approach/modality to initiate large scale CBDRM activity in Sri Lanka. As a result of the workshop, an organizing committee which was composed of workshop participants from Sri Lanka was created to develop a guideline for CBDM in Sri Lanka. It is therefore necessary to establish an effective coordination mechanism with this committee to be updated on the progress of this initiative and to avoid duplication of activities particularly in the development of manual for CBDM which is also an undertaking of this JICA Study.

M.3.4 First Joint Workshop

(1) Objectives of the First Joint Workshop

Based on the findings from the Second Workshop, a Joint Workshop was conducted on 19 October 2007 which was participated in by community representatives and G.N.s in the 15 pilot communities as well as the relevant government officials after the Second Workshop. The objectives of the Joint Workshop were as follows:

- To share information among stakeholders in each pilot community and also among the disaster vulnerable communities in Sri Lanka;
- To discuss a practical and appropriate action plan for disaster risk management in each community and
- To start preparation for the mock drill to be held in each community.

In addition, through the activities of the Joint Workshop, it was also expected that the workshop will increase the level of awareness among the leaders on the important roles they will play in effectively coordinating the Third Workshop and the mock drill.

(2) Participants of the First Joint Workshop

The following persons were invited to the Workshop.

- One or two representative(s) from each of the 15 target communities
- One G.N. in charge for each of the 15 target communities
- DM Coordinators and an Assistant Coordinators from Colombo, Gampaha, Ratnapura, Kalutara, Galle, Matara and Ampara
- Division officers in charge for social services, social assistance, or planning
- Government officials of DMC, DOI, and NBRO

(3) Program of the First Joint Workshop

The program of the workshop is as shown in Table M.3.8

Table M.3.8 Program of the First Joint Workshop

Time	Contents
09:45 – 09:55	Oil Lamp Ceremony & Welcome Remarks
09:55 – 10:15	Opening - Remarks by Dr. Buddhi Weerasinghe, Director, DMC - Remarks by Ms. Yasuko Nishino, Deputy Director, JICA Sri Lanka Office - Remarks by Mr. Ryo Matsumaru, JICA Study Team
10:15 – 10:25	Introduction of Community Workshops in the Study by Ms. Miki Kodama, JICA Study Team
10:25 – 10:30	Brief Explanation of the Purpose of the Joint Workshop
10:30 – 12:30	Presentation by community members what they have learned and discussed in the past two workshops 10:30 – 11:30 Group presentation 11:30 – 12:00 Plenary presentation (5 representatives, 10 min each)
12:30– 12:45	Support Activities for Community Disaster Risk Management of the District Disaster Management Centers focusing on the G.N. Level Disaster Preparedness and Response Plan by Ms. Lalani Imbulana, Director, DMC
12:45 – 13:00	Brief explanation of the current status of establishment & activities of the G.N.. Level Disaster Management Committees by Kittanpahua G.N.
14:00 – 14:30	Introduction of Good Practices of Community Activities for Disaster Risk Management in Japan by Ms. Miki Kodama, JICA Study Team
14:30 – 15:00	Group discussion for promoting community activities for disaster risk management • how to activate community's disaster management committee (issues/problems & proposed countermeasures) • how to increase level of involvement and awareness of community members on disaster management activities • how to ensure sustainable implementation of disaster reduction activities (issues/problems & proposed countermeasures)
15:00 – 15:30	Presentation by group representatives (5 min x 4 groups)
15:30 – 15:45	Presentation on Importance of Early Warning & Evacuation Drill and Explanation of the Planned Flow of Warning Information in case of flood, landslide and Tsunami in Sri Lanka by Mr. Ryo Matsumaru, JICA Study Team
15:45 – 16:15	Group works among the related members (District DM Coordinator – G.N. – community representative(s)) on the evacuation plan in each of the target communities Advisors: DMC, DOI, NBRO, JICA Study Team Creation of draft evacuation plan for each community (1) Information flow (2) Evacuation route and site Formulation of an action plan for promotion of activities of committee and awareness program for community members
16:15 – 17:45	Presentations (5 min x 15 communities)
17:45 – 17:50	Closing - Schedule of the 3rd community workshop & disaster management drill

(4) Summary of Findings from the First Joint Workshop

1) Group Presentation on their Past Activities under the Study Program

The workshop activities started with the group presentations on past activities conducted in the Study program in each of the pilot communities. The participants were divided into four groups according

to the types of major disasters in their areas as shown in Table M.3.9, and a representative from each of the 15 pilot communities made a summary presentation of their past activities in the Study program.

Table M.3.9 Grouping for Presentation and Discussion

Group A	Flood Vulnerable Communities	Ukuwatta (Kalutara), Baddegama (Galle), Biyagama (Gampaha), Angammana (Ratnapura)
Group B	Flood Vulnerable Communities	Kadduwa (Matara), Kittanpahua (Colombo), Mudduwa (Ratnapura)
Group C	Sediment Disaster Vulnerable Communities	Niggaha (Kalutara), Nagalakanda (Kalutara), Helauda (Ratnapura), Kiribathgala (Ratnapura)
Group D	Tsunami Vulnerable Communities	Sinhala: Gandara (Matara), Kottegoda (Matara)
		Tamil: Ullala-Pothuvil (Ampara), Vinayagapuram-Thrikkovil (Ampara)


Figure M.3.9 Group presentations

Active discussions on common issues and ideas for addressing the problems ensued after the presentations by each representative. After the group discussions, a summary was presented in the plenary session by each group representative. Dr. Buddhi Weerasinghe, Director of DMC, presented on the DMC's initiatives and plans to deal with some of the problems presented by the participants.

2) Lectures & Discussion on Enhancing Community Level Activities for Disaster Reduction

Ms. Lalani Imbulana, Director of DMC, presented an introduction on and outline of support activities by DMC towards the enhancement of community disaster risk management. In particular, she highlighted and discussed in detail the initiative to establish the G.N. Level Disaster Preparedness and Response Plans in each disaster-vulnerable community. A sample of activities recently conducted by DDMCU was presented with some pictures.

Following the presentation, Mr. Rohitha Senewirathne, G.N. of Kittanpahua, briefly explained the progress of community activities for disaster risk management with some information about the disaster situation in the community.

This was followed by a presentation by Ms. Miki Kodama of JICA Study Team which provided the participants a glimpse of the various best practices of community activities for disaster risk management in Japan. As one of the advanced disaster risk management countries, the Japanese government has promoted mutual assistance among community members for disaster reduction with the support of local government. Thus, there are accumulations of experiences of community activities to enhance their capacity for disaster risk management. From this presentation, the

participants recognized the importance of community collaboration for effective disaster risk management. Among the best practices presented, the awareness activities combined with sports festival in schools attracted the attention of the participants.

Figure M.3.10 Lectures in the First Joint Workshop

Based on these new information provided from the presentations, a group discussion for promoting community activities for disaster risk management was conducted within the perspectives of: (a) how to activate community's disaster management committees, (b) how to increase level of involvement and awareness of community members on disaster management activities in the village and (c) how to ensure sustainable implementation of disaster reduction activities. The following are some of the suggestions on (b) and (c):

- Art competitions on disaster management
- School children awareness programs.
- Disaster-related activities incorporated into New Year sports festivals.
- Practical trainings and drills
- Choosing the best G.N. division that has the highest level of awareness on disasters.
- Making brochures and posters about Disasters
- Organizing training programs.

3) Lectures and Discussion on Early Warning System and Evacuation Drill

An introduction was provided by Mr. Ryo Matsumaru of JICA Study team on the importance of early warning and periodic evacuation drills to reduce damages caused by disasters. He also explained the planned flow of warning information in Sri Lanka in case of flood, landslide, and Tsunami, with some examples of government level information dissemination exercise conducted in October 2007.

Following the presentation, group discussion among the members of each community took place. Each of the 15 communities formed a group consisted of a G.N.(s), Community representatives, Divisional officers and DM Coordinators of the respective communities. The main focus of the discussion was the disaster information flow from the DMC, DS, G.N. to the community. The community is used to the bottom-up approach in informing the government about disaster situation in their respective area. However, the JICA Study Team also emphasized the importance of the top-bottom information flow for the provision of accurate early warning and dissemination to all members

of the community. In conjunction with the information flow, the communities prepared their respective draft evacuation plans, taking into consideration the information flow and the evacuation route and sites based on the real local conditions and situations as documented in the recent town watching.


Figure M.3.11 Lectures and Discussion on Early Warning & Evacuation

(5) Review of the First Joint Workshop Activities

The expected result of the Joint workshop was successfully achieved by enhancing level of awareness of most of the G.N.s and community representatives. Thus, active involvement in the Study program from the next workshop will be assured and it is anticipated that they will be key in the effective implementation of the program activities.

However, due to time constraints of the program, there was less focus provided on encouraging the active participation of DM Coordinators in the workshop activities. Thus, the follow-up activities will be required for their further understanding of and involvement in the Study program.

M.3.5 Series of Third Community Workshop (October-November 2007)

(1) Objectives of the Third Community Workshops

During the First Workshop, the community members were provided presentations and information on disasters and disaster risk management while the second workshop allowed them to analyze their own risks and discuss on how to improve risk situation in their communities. Based on these activities, it was recognized that establishment a system to cope with their risks by themselves is important.

In this context, the objectives of the series of Third Community Workshop were defined as follows.

- To formulate community disaster risk management plan
- To prepare and plan community evacuation drill

In particular, in accordance with the DMC's current initiatives to enhance community activities, the forming of G.N.-level disaster management committee was identified as an important part of community's disaster risk management plan.

(2) Format of the Third Community Workshop

The basic format of the Third Community Workshop is shown in Table M.3.10.

Table M.3.10 Basic Format of the Third Community Workshop

Time	Contents
09:00 – 09:10	Opening
09:10 – 09:20	Introduction of Today's Program
09:20 – 09:40	Introduction of the Community Disaster Management Committee and their activities – Japanese Experiences- by JICA Study Team
09:40 – 09:50	Explanation about Establishment of G. N. Level Disaster Management Committee & Sub-Committee
09:50 – 10:30	Grouping/Appointment and Group Discussion Forming/Activation/Promotion of the G.N. Level Disaster Management Sub-Committees Action plan for realization of the objectives of committee
10:40 – 11:10	Presentation - Brief presentation from the groups (5 min x 6 groups)
11:10 – 11:40	Explanation about Early Warning & Evacuation Drill
11:40 – 12:10	Discussion on Current Disaster Information System in Community & Future Improvement
13:00 – 15:00	Group Works/Discussion on Early Warning & Evacuation - Information Flow (how to and who get information, how to and who disseminate information, what is required) - Planning of the disaster management drill - Finalization of Community's hazard map (evacuation site & route) in one map - Support of Evacuation (vulnerable people, counting) - Action plan for preparation

(3) Summary of Findings from the Third Community Workshop

The summary of the Third Community Workshop are as follows:

1) Establishment of G.N. level disaster management committee

The workshops started with the introduction of the current initiatives to establish G.N. Level disaster management committee (Figure M.3.12). For better appreciation and understanding of the planned committee, Japan's best practices on community activities for disaster risk management were also introduced. During this workshop, the creation or activation of the following sub-committees was particularly emphasized.

In the communities where such committee has not been established yet, through the initiatives of G.N.s and DS officers, some of the participants were newly appointed as the sub-committee members. Participation of the other members in the communities other than the workshop participants were also considered for appropriate appointment of the committee members. Thus, the sub-committees in some communities were temporarily established during the workshop but pending approval of its other members. Also, in some communities, it was decided that establishment of the sub-committees be deferred for the next workshop due to the absence of some community members who are believed to have important roles in the communities.

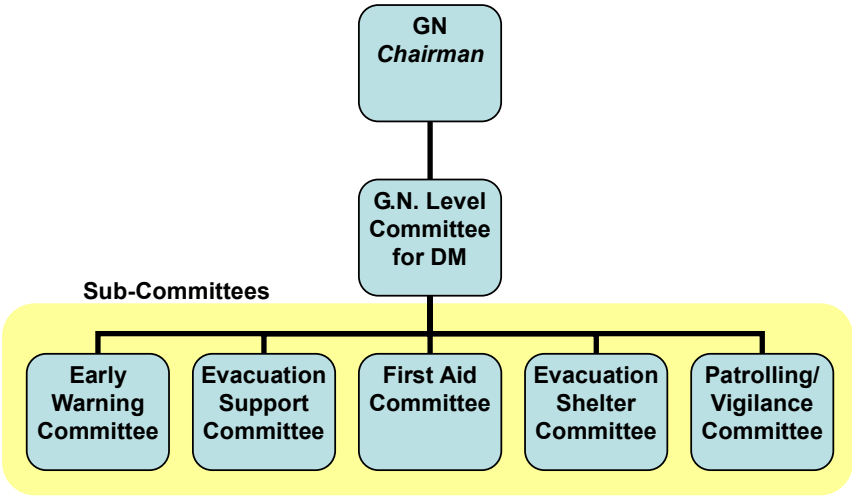

Figure M.3.12 Composition of G.N. Level Disaster Management Committee

Figure M.3.13 Selection and Appointment of Sub-Committee Members

For communities where the committee has already been created, reconsideration of the members and/or additional appointment from the workshop participants were considered by G.N.s and DS officers. In some communities where committees were already established, the appointed members were less aware then of their roles in the committees. Thus, the information and discussion during the workshop has helped increase their understanding. The condition of the formation of sub-committees in each of the 15 pilot communities is shown in the Table M.3.11.

The workshop participants who were not appointed to the committees were also divided into groups under the sub-committees' subject and joined the discussion as supporting members.

Table M.3.11 Status of Formation of the Sub-Committees in each Pilot Community

Disaster Types	District	Communities	Status of Creation of Committee
Flood	Colombo	Kittampahuwa	Will be created on 13 January 2008
	Gampaha	Biyagama	Not yet (Need Further Coordination)
	Ratnapura	Angammana	Reorganized in the WS by utilizing the appointed members by DMC and Red Cross activities
	Ratnapura	Mudduwa	Temporary reappointed in the WS (need for confirmation of G.N. as an official procedure)
	Kalutara	Ukwatta	Created in the WS
	Galle	Baddegama	Created in 3 G.N.s in the WS (Joint Committee was formed for the evacuation exercise)
	Matara	Kadduwa	Already created by DMC and activated in the WS
Sediment Disasters	Ratnapura	Helauda	Reorganized and activated in the WS
	Ratnapura	Kiribathgala	Created in the WS
	Kalutara	Niggaha	Created in the WS
	Kalutara	Nagalakanda	Not yet (Need Further Coordination)
Tsunami	Matara	Kottegoda	Not yet (Need Further Coordination)
	Matara	Gandara	Created in 3 G.N.s in the WS (Need further coordination with DMC)
	Ampara	Sinna Ullai (Pothuvil)	Already created by DMC
	Ampara	Vinayagapuram (Thrikkovil)	Already created by DMC

2) Consideration of early warning system in the community and evacuation plan

After the presentation introducing the importance of early warning and evacuation drill, a plenary discussion was conducted on current disaster information delivery system in the communities to clarify on (i) who and how to get information and (ii) who and how to disseminate information to all of community members. Based on the current planned early warning dissemination system by DMC, community members considered appropriate information flow and methods for the communities to disseminate early waning information such as that shown in Figure M.3.14.

In the Tsunami-vulnerable pilot communities, the actual conditions were reviewed based on recent experiences when the Tsunami warning was issued on 12 September 2007 by the government. Since the experience was still very fresh in the participants' memory, they were able to participate actively in the discussion. It was however not easy for them to understand the concept on DMC system to provide early warning message through government structure since it was not how they receive information in real situations.

Similarly, in the flood-vulnerable pilot communities, people in the communities have had long experience of deciding for themselves on the timing of their evacuation, thus they are not very convinced on the necessity to receive early warning information from the government. However, for larger-scale floods that may occur in the future, it is anticipated that the present information dissemination system within the community will not be effective. Thus, DOI officers and JICA Study team introduced and installed a simple observation system of water level and rain amount to make the community people understand the importance of receiving early warning information from the

government. Due to the relatively lack of information from DOI, the detailed information about their observation and warning helped the community people understand the flood warning system.

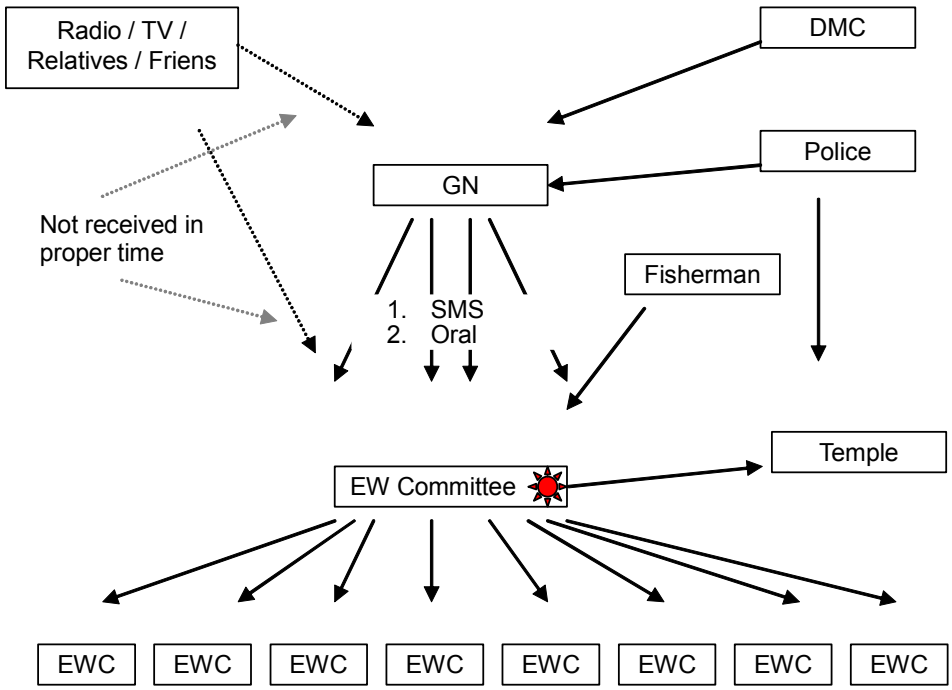

Figure M.3.14 Basic Information Flow at Community Level

Figure M.3.15 Observation Systems Introduced by DOI

In the sediment disaster vulnerable communities, installation of manual rain gauge equipments and active involvement of NBRO officers in their observation made people understand the need of establish an effective information flow mechanism. Particularly in some communities, since they have problems for safe evacuation due to blockage of evacuation route by flooded water, prompt information dissemination is therefore necessary. This realization encouraged them to actively participate in the discussions on how to efficiently and effectively deliver the information to all of the community members as well as how to utilize available, traditional equipment.

Figure M.3.16 Installed Rain Gauge Equipment and Rainfall Records by Residents

3) Preparation for Evacuation Drill

Discussion on the preparation for evacuation drills to be held as next step of activities were conducted in the communities where the G.N. level disaster management sub-committees were successfully established or activated. After presentation on the importance to conduct evacuation drills to ensure adequateness of the communities' evacuation routes and sites, the participants discussed about the effective and realistic coordination required to conduct the drill with the guidance of the facilitators and JICA Study Team members. The roles of the committee members to be played in the drills were discussed and clarified.

Figure M.3.17 Discussion in Workshops

In some of the communities, on the other hand, it was recognized that further coordination will be required for the activities utilized disaster management committees. Thus, discussion on the evacuation drill was postponed until the next workshop.

4) Review of the Third Community Workshop Activities

Discussions during the Third Community Workshop in each of the 15 pilot communities showed varying degrees of condition of preparedness to and people's interests on disaster risk management, current disaster situation and level of participation of the members who play important roles in the respective communities. Considering this situation, the design of and activities in the Fourth Community Workshop scheduled in February 2008 should be developed accordingly, depending on

progress of each community. Further discussions on the creation of committees will be required in some communities, more discussion on their evacuation plan will be needed in some communities, and evacuation drills will be conducted as a next step of the progress of their activities in some communities.

In consideration of the above condition where the different activities are required in each community, the schedule of the Fourth Community Workshop will be reconsidered.

(4) Consultation Meeting on Last Mile of Early Warning Information Dissemination

The results of the discussions during the Joint Workshop showed that there should be coordination established with the District Disaster Management Coordinators for effective implementation of the community activities. In addition, it is important for the CBDM program to update the Coordinators on the ongoing efforts of the JICA Study to establish an early warning system for Sri Lanka. In this context, a consultation meeting on last mile early warning information dissemination with District Disaster Management Coordinators was conducted on 9 November 2007.

The discussion, which centered on the case of early warning issued on 12 September 2007, revealed that the last mile early warning in DMC is still in the process of development. The discussions that ensued also gave the impression that the Coordinators still lack proper understanding and appreciation of the importance of their responsibility in delivering proper and timely information to the community members. Their activities on 12 September 2007 mainly focused on providing guidance for safe evacuation and traffic control for solving traffic congestion.

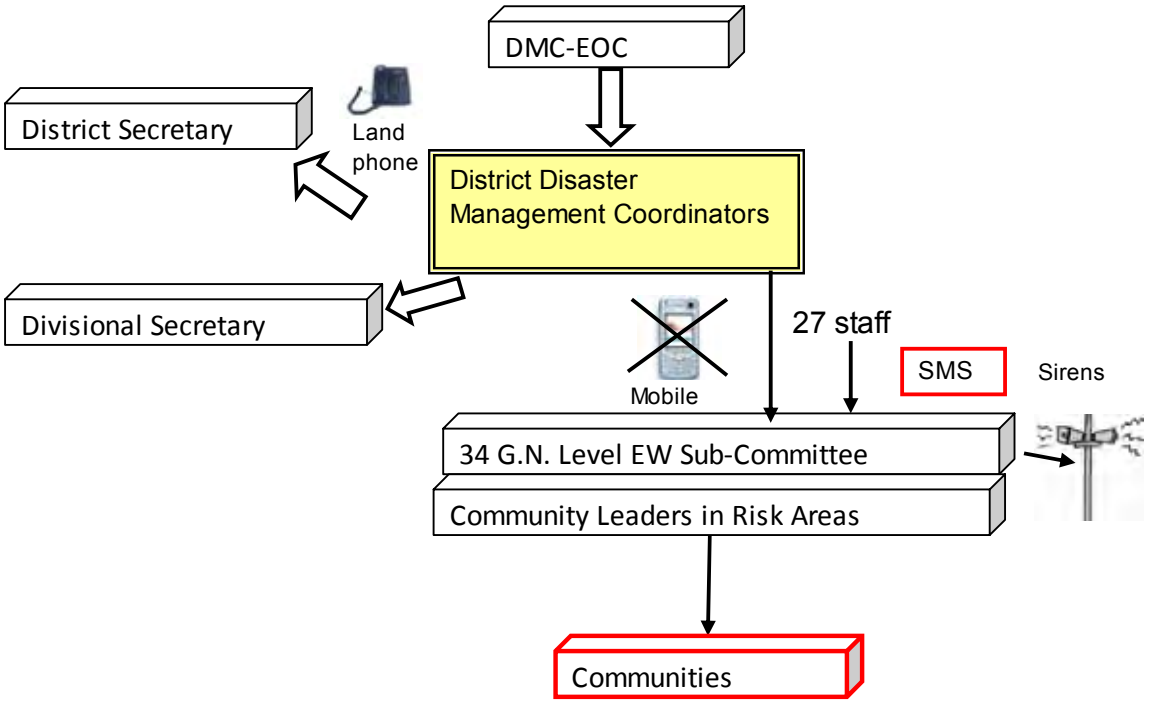

Figure M.3.18 Review of the Early Warning Information Flow on 12 Sept. 2007 in Colombo District

Although the meeting did not result to any concrete solution to improve the current situation, it provided a good opportunity for the Coordinators to realize that more substantial information system

is required. Furthermore, their understanding of the CBDM activities of the JICA Study was improved.

M.3.6 Significant Effect of Installed Rain Gauge in one of the Pilot Communities

As briefly introduced in the Section M.3.5, rain gauge equipments were installed in the sediment disaster vulnerable pilot communities and observation & recording of data with the use of these equipments are ongoing.

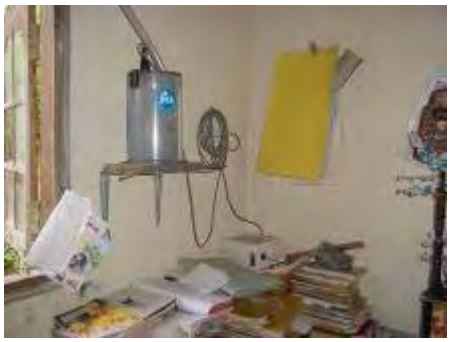

Figure M.3.19 Rain Gauge installed in Nagalakanda

In the midnight of 22 November 2007, some parts of Nagalakanda village, one of the pilot communities, was affected by a landslide triggered by heavy downfall of rain. This occurred just after the Third Community Workshop of this JICA Study was conducted on 11 November 2007.

The community representative who observes the rainfall reported to NBRO that the recorded amount for a half day period exceeded 150mm. Thus, based on the formulated strategies, people in the village were able to evacuate to a pre-decided gathering point before the event occurred. In addition, the police and other government officials including officer working at the area on landslide from NBRO have visited the site and have taken necessary measures.

M.3.7 Reconsideration and Modification of the Plan of CBDM Activities in the Study

(1) Interim Review of CBDM Activities in Each Pilot Community

In November 2007 when a year has passed since the CBDM activities have started in each pilot community, an interim evaluation of CBDM activities in the Study was done.

Through review of the result of the activities, distinguished differences of the progress on the planned activities among the 15 pilot communities were revealed. The condition differs from each community, however, basically, in the communities with strong community ties and/or strong leadership, the activities had been smoothly conducted. In addition, the leadership or G.N.'s active involvement had assured people's active participation.

It was recognized that reconsideration of the plan of the activities in each of the communities based on further review at this stage is needed for effective implementation of the Study program.

Considering the above mentioned situation, evacuation drills which were scheduled in February 2008 were conducted only in selected 4 pilot communities as one of the activities in the Comprehensive Disaster Management Exercise.

Table M.3.12 Brief Summary of Condition of the Participation and Progress of Activities in the Pilot Communities and Consideration for the Next Step

Disaster Types	District	Communities	Remarkable Aspects in Survey Result	No. of Participants				Committee Formation	Remarkable Aspects Noticed through WS	Proposed activities in the next step
				1st	2nd	3rd	trend			
Flood	Colombo	Kittanpahua	Relatively good communication infrastructure	60	50	50	→	▲Will be formed in School Committee	• G.N. is becoming active • Urban community with wide variety of interests	• Further awareness of G.N.
	Gampaha	Biyagama	Lower Income	60	50	54	→	☒Need further coordination	• Disaster situation is not so severe in this area	• Reconsideration of the area for the activities
	Ratnapura	Angammana	Existence of DM Committee	60	48	50	→	◎Activated in the WS	• G.N.'s active involvement • People's high awareness	• Small-scale project
		Mudduwa	Relatively good communication infrastructure	72	58	70	↗	○Re-formed in the WS	• G.N. and D.S. involves well	• Evacuation drill
	Kalutara	Ukwatta	Recognized Leadership	50	55	49	→	○Formed in the WS	• Small coherent community with solidarity for improvement of living condition	• Evacuation drill
	Galle	Baddegama	Relatively good communication infrastructure	71	55	49	→	○Formed in the WS (3G.N.)	• D.S. and G.N.'s active involvement	• Evacuation drill
	Matara	Kadduwa	No good mutual support	60	56	64	↗	☒Need further coordination	• Strong interest on management of water gate	• Consultative meeting
Sediment Disasters	Ratnapura	Helauda	Recognized Leadership	63	45	47	→	◎Activated in the WS	• Another mitigation activities are providing • High expectation to the activities	• Small-scale project
		Kiribathgala	Strong Community Tie	88	51	53	→	○Formed in the WS	• Coherent community with leadership • People's strong interest on DM activities	• Evacuation drill • Small-scale project
	Kalutara	Niggaha	Stagnated community	98	51	56	→	○Formed in the WS	• G.N.'s active involvement • Big construction work is required for improvement of current risk situation	• Evacuation drill • School children program
		Nagalakanda	Strong mutual support	60	51	48	→	▲Need further coordination due to participation	• Relocation of people in high risk area • Disaster occurred after the 3rd Workshop made them	• Evacuation drill • School children program

Disaster Types	District	Communities	Remarkable Aspects in Survey Result	No. of Participants				Committee Formation	Remarkable Aspects Noticed through WS	Proposed activities in the next step
				1st	2nd	3rd	trend			
Tsunami	Matara	Gandara	Strong mutual support	45	43	43	→	○Formed in the WS (3G.N.)	• Less participation of men • DMC conducted evacuation drill in this area	• Drill in cooperation with Schools
		Kottegoda	Existing DM Committee	45	54	47	→	▲Need further coordination	• Relocation of people make less interest to activities	• Drill in cooperation with Schools
	Ampara	Ullai (Pothuvil)	Relatively business area	73	38	46	→	○Already exist	• Lack of interest to the activities	• Drill in cooperation with Schools
		Vinayagapuram (Thrikkovil)	Lower Income, traditional village	63	55	41	↘	○Formed in the WS	• High expectation from the activities	• Drill in cooperation with Schools

(2) Evaluation of the Past CBDM Activities in Each Pilot Community

Based on the result of interim review of the activities in the Study, further evaluation of the past CBDM activities in each pilot community was conducted in February 2008. Table M.3.12 shows a brief summarization of the condition of the participation and progress of the activities in the workshop of JICA Study. Main points identified through the evaluation are as follows.

1) Condition of the participation in each pilot community

The participation in each pilot community basically has not made big change through the workshop period. The number of participants in the First Workshop was relatively high in all of the communities owing to the program contents that visual materials including video of disaster situation were shown and attracted the community members who were not invited to the workshops including young children. Considering the situation, from the comparison of the participation in the second and third workshops, it is considered that the trend of the participation keeps same level in most of the communities.

However, in Kadduwa which there have a big controversial issue on the management of water gate, the Third Workshop for discussing on formation of disaster management committee was attended by more people than the Second Workshop. People in the village thought that the workshop was the opportunity to discuss on the water gate management. Their interest on the disaster management is assumed to be on the issue.

In Sinna Ullai of Ampara district, the big part of community consists of Muslims, and their interests seemed to be basically on business matter. Even though number of the participants had no big change, however, their involvement in the workshop activities was inactive. The participants frequently suggested providing this kind of awareness activities for the school students.

2) Relation between the Progress of the Planned Activities and Condition of Involvement of Community Leaders

It is considered from review of the past activities that the condition of current progress of the planned activities in each community has close relevance to the leaders' interest to the disaster risk management and their active involvement and participation in the activities. In the communities where leaders were actively involved in the activities, the community members also participated in the program in a proactive manner. Therefore, the planned discussion was conducted very fruitfully and constructively with the good result of formation or activation of disaster management committees.

In Helauda, community leader attended all the workshops and played important roles to coordinate the activities. With their high awareness on disaster risk based on the experience of debris flow disaster in 2002, the leader and community members has seriously concerned about current situation and made efforts for improvement of risk management, such as installment of warning board for conservation of trees on the slopes. Under this condition, the leader brought very good condition to promote community activities for disaster reduction.

Figure M.3.20 Community-made Board for Forest Preservation in Helauda

3) Official Endorsement of the Program

Even though community people often say that government arrangement is not good or their consideration for the communities is not enough, it is observed that people understand that the government involvement of the program is one of important factors for sustaining the efforts for improving their situation. Community people listened to the explanation by the government officers very carefully in the workshops and explained enthusiastically their current conditions in the discussion and town-watching program to them. In the communities where there was active involvement of local government officers from D.S. offices and DDMCU, people's attitude for participation seemed to be very active.

In Angammana, municipal government previously provided some support for garbage management and first aid training for the community. Therefore, their expectation to the local government was relatively high. The participation of this community is dominated by women, however, they well organized disaster management committee which was an officially requested form for village-level disaster risk management.

4) Solidarity of Community

As it can be easily thought the community solidarity is also important factor for driving promotion of CBDM activities. In the communities where people have cohesive relation, their discussion evolves in a very cooperative manner and comes to the conclusion benefit to all the community members.

Kiribathgala is located in a mountainous area, and quite far from main road in Ratnapura district. In this situation, they created a community with strong solidarity and cooperation spirit. In the activities of the Study, they made very fruitful discussion for considering emergency information delivery using their indigenous knowledge and practices.

(3) Summary of Important Factors for Promotion of CBDM activities

In summary, the following points are to be seriously considered for the promotion of the progress of the community activities for disaster risk management.

- Active involvement of community leaders and/or G.N.s
- Official endorsement of the community activities and involvement of local authorities
- Community's solidarity
- Severity of disaster situation or experience of severe disaster in the past

In addition, it was realized the following factor should be considered for effective ways for conducting community activities;

- Consideration of the approach from children to overcome persistence tendency of the adult stemmed from the past practices in case of disaster

(4) Proposed Activities for the Next Step

Based on the above mentioned findings, the following activities are proposed for the next phase in the Study.

1) Activities for improving local government officers' involvement

Local government active involvement is one of the key factors for promoting CBDM activities. The following activities will be conducted for enhancing awareness of local government officers as well as providing a good opportunity for risk communication among stakeholders at local level.

(A) 2-day Training Program for Local Government Officers in Divisional Secretariat Offices (DS) and Community Leaders of the 15 Pilot Communities

(B) Development of a user manual for community-based disaster management activities and Workshop for effective utilization of developed manual

2) Activities for further progress of community activities

In the communities where the progress of community activities has been very smooth and successful, people have strong intention for conducting disaster risk mitigation activities. To support their motivation for improving current condition, small-scale disaster mitigation program will be conducted in some selected communities. The activities will be conducted participatory method and expect further progress of their own initiatives for disaster risk management.

(A) Small-scale Disaster Mitigation Program for the Selected Pilot Communities (for flood prone communities)

(B) Small-scale Disaster Mitigation Programs for the Selected Pilot Communities (sediment disaster)

3) Activities for promoting CBDM through enhancement of school community' awareness

In the communities where people's interest in disaster risk management activities was not high, progress of community activities has been very slow. Approach from school children will be considered as another option for enhancing community capacity and awareness. The following activities are proposed based on the needs of the related organizations in the Study.

(A) One-day School Children Awareness Workshop in Kalutara District
(B) School Evacuation Drill in Cooperation with Communities

4) Originally planned activities with some modification in the implementation method for the communities which made good progress in the past programs

Evacuation drill was originally planned to be conducted separately in each community. Based on the result of the evacuation drills conducted combined with the Information Transfer Exercise at government level in February 2008, it was reviewed that the drill combined with government exercise

generates a synergistic effect both government side and community side for understanding of the purpose of the drill. Therefore, the drills are planned to be conducted simultaneously on the occasion of Comprehensive Disaster Management Exercise scheduled in October 2008. In addition, one of the communities which conducted the drill in February is selected for implementation of second drill. Based on the evaluation of the first drill, their current information transfer system will be improved before the 2nd drill.

(A) Evacuation Drill combined with the Comprehensive Disaster Management Exercise in Some Selected Pilot Communities

5) Activities for activating the formed G.N. level disaster management committee

The challenge for maintaining and keeping motivation of the formed disaster management committee should be seriously considered. Periodical training opportunities will provide incentive for their continuous activities. Some selected members of the first aid committee, one of the sub-committees of G.N. level DM committee, in each of the pilot communities will be invited for developing their specific capacity related to the task in the committee.

(A) One day First Aid Training for G.N. Level DM Committee at each District

6) Special program for the community with controversial issue to proceed to the next step

Kadduwa, one of the flood prone pilot communities has serious controversial issues on water gate between upper upstream residents and downstream residents. Under this condition, the progress of community activities has tended to be stagnated. Opportunity to discuss the effective maintenance of the water gate will be provided for proceeding to the next step of the community activities.

(A) Consultation Meeting on Flood Band Gate

M.4 Community Activities for Disaster Risk Management

M.4.1 General

Three workshops in each of the 15 pilot communities and some additional activities have been conducted in the Study program aiming at strengthening local capacities for disaster risk management since October 2006. Through the evaluation of the activities, the following community activities were decided to be conducted in consideration of the condition of the progress of activities.

- Evacuation Drill combined with the Comprehensive Disaster Management Exercise
- 2-day Training Program for Government Officers in DS Offices and Community Leaders of the 15 Pilot Communities
- Small-scale Disaster Mitigation Program for the Selected Flood Vulnerable Pilot Communities
- Small-scale Disaster Mitigation Programs for the Selected Sediment Disasters Vulnerable Pilot Communities
- Consultation Meeting on Flood Bund Gate
- One-day School Children Awareness Workshop in Kalutara District

- School Evacuation Drill in Cooperation with Communities
- One day First Aid Training for G.N. Level DM Committee Members at each District

M.4.2 Evacuation Drill in the Comprehensive Disaster Management Exercise

(1) Objectives of the Evacuation Drill

Evacuation drills in some selected pilot communities were conducted as one of the important activities of the Comprehensive Disaster Management Exercise held on 26 February 2008 and 16 October 2008. The objectives of the evacuation drill in the communities were;

- To make sure prompt and proper actions in case of disasters,
- To review the community's disaster management plan, especially the flow of prompt information dissemination to all the community members,
- To foster collaboration among community members, and
- To improve disaster management capacities in communities.

(2) Selection of the Communities for Conducting Evacuation Drills

The drills combined with the government information transfer exercise were conducted in the four communities on 26 February 2008 and seven communities on 16 October 2008 as shown in Table M.4.1.

The communities to conduct the drills on 26 February 2008 were basically selected from the pilot communities by the following criteria; a) progress of the community activities in the Study has been relatively smooth, b) G.N. level disaster management committees have already formed, and c) the sites are located in target divisions of the Comprehensive Disaster Management Exercise in the Kelani or Kalu river basin. Malwana in Gampaha district is not among the original pilot communities in the Study. It was selected as one of the sites for the drill based on strong request by the Gampaha district disaster management coordinator of DMC. Malwana is a village where most of the residents are Muslims and people has strong community spirit.

The communities to conduct the drills on 16 October 2008 were basically selected from the pilot communities by the following criteria; a) the sites are located in target divisions of the Comprehensive Disaster Management Exercise in the Kalu river basin, and b) evacuation drill was not conducted in February 2008. However, Helauda was included for getting information of the condition for the second trial of the drill. Baddegama in Galle located at Gin river basin was also included in consideration of the progress of the community activities.

Table M.4.1 Pilot Communities Selected for the Evacuation Drill

	District	Division	G.N.	Disaster Type	No. of Participants
Evacuation Drill on 26 February 2008	Colombo	Kolonnawa	Kittampahuwa	Flood	150
	Gampaha	Biyagama	Malwana	Flood	30
	Ratnapura	Ratnapura	Angammana	Flood	75
			Helauda	Sediment Disasters	160
Evacuation Drill on 16 October 2008	Ratnapura	Ratnapura	Mudduwa	Flood	22
			Mahawela (Helauda)	Sediment Disasters	113
		Nivithigala	Wanniyawatta (Kiribathgala)	Sediment Disasters	62
	Kalutara	Dodangoda	Ukwatta	Flood	103
		Horana	Kananvila South	Sediment Disasters	68
		Bulathsinhala	Niggaha	Sediment Disasters	112
	Galle	Baddegama	Baddegama Town	Flood	33

Numbers of the participants to evacuate to the designated evacuation places in the target communities in the drill were decided by the decision of each of the G.N.-level Disaster Management committees in consultation with the JICA Study team members. In some communities, at least one person in the houses located in the risk areas was decided to attend the drill. In other communities, they decided only committee members joined the drill and evacuated to the site as a first trial. The final participants' numbers were shown in Table M.4.1.

(3) Design of the Evacuation Drill

The basic design of the evacuation drill is shown in Table M.4.2.

Table M.4.2 Basic Design of Community Evacuation Drill

Time	Activities
<By previous day>	
	Pre-Meeting for confirmation of flow of information dissemination and roles by G.N. level disaster management committee members
	Pre-announcement to all the community members about conducting the drill
<On the day>	
Around 11:00	G.N. receives "Evacuation Instruction"
Approx. 11:00 – 11:10	G.N. informs to G.N. Level Disaster Management Committee (Early Warning Sub Committee) about the information
Approx. 11:10 – 11:20	Wide dissemination of the information (Designated way: Temple bells, Mosque speaker, Knock the door of the houses, Oral communication, etc.)
Approx. 11:10 – 11:40	Evacuation to the designated evacuation site - Head counting / Record of evacuation time
Around 12:00	Evaluation of evacuation activities
(12:00 -)	(First Aid Training)

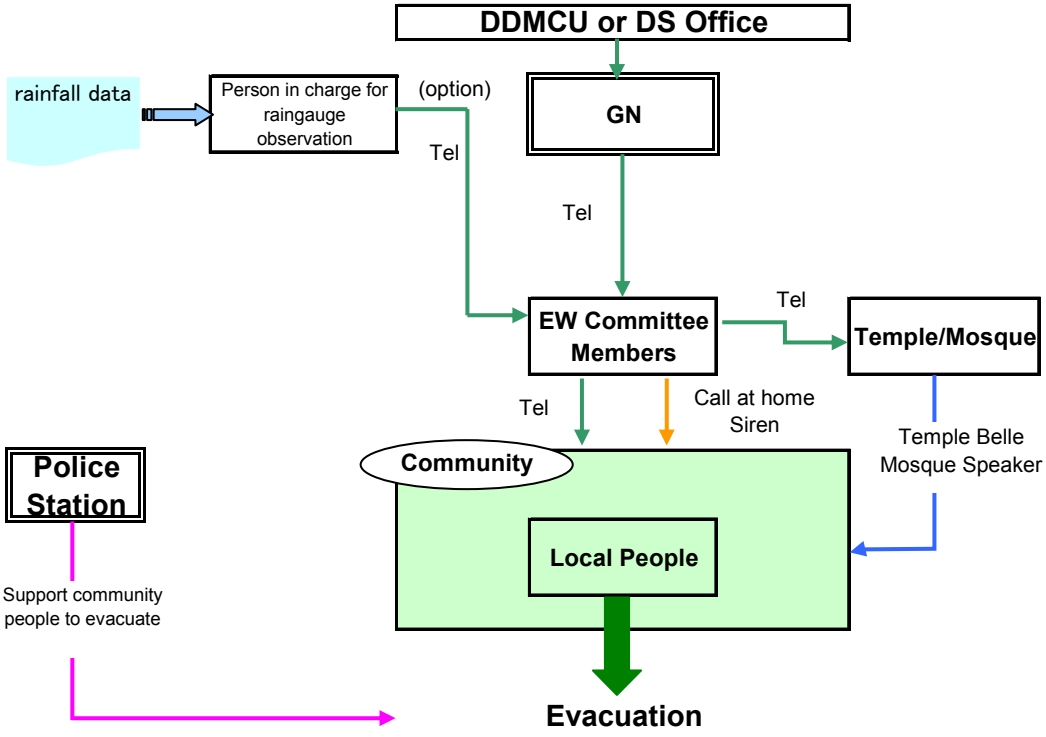

Figure M.4.1 Basic Information Flow for Early Warning Information Dissemination

(4) Summary of Findings from the Evacuation Drill

1) Review of Preparation by G.N. and G.N. Level Disaster Management Committee

(A) Pre-Meeting

Figure M.4.2 Pre-Meeting in Malwana Town, Biyagama (left)/ in Kiribathgala (right)

Pre-meetings were held in all of the target communities attended by the committee members, community leaders, G.N.s, officers of DS, representatives of DDMCU, and JICA Study team on at least one day prior to the drill. Procedure of the drill and the designated flow of the information dissemination were confirmed.

In Kittanpahua and Angammana, it was found that due to consideration of the security situation at the period, the designated evacuation places, i.e., schools, could not be used for the event gathering many

people at this time. Instead of the schools, temples were decided to be used as the place of evacuation only for drill purpose.

(B) Pre announcement to community members about conducting drill

In all the targeted communities, pre-announcement was properly done by G.N.s or committee members by previous day of the drill. Owing to this arrangement, there was no confusion and panic caused by the drill implementation.

(C) Preparation of the lists of the contact for dissemination of early warning information

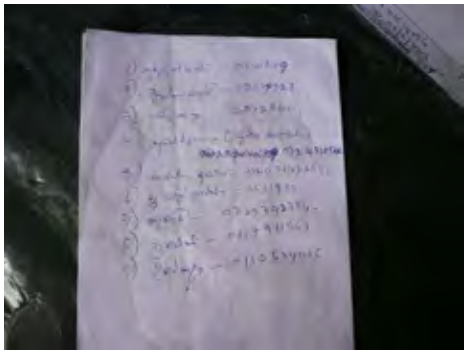

Figure M.4.3 List of Contact in Kittampahuwa

In most of the targeted communities, the lists of the contact for dissemination of early warning information were not well prepared. They were not in the written format or temporarily prepared for this drill by hand writing. It should be recommended that a list is prepared in a certain format and kept by G.N.s and all the early warning committee members with the figure of information flow.

(D) Preparation of the community hazard maps

In order to make easy understanding of the disaster and risk situation and safe evacuation place of the community among all the stakeholders, using a hazard map is very effective.

Some G.N.s in the target communities for the drill on 26 February were keeping the draft community hazard maps developed through the past workshops in the JICA Study in their offices and utilized them for evacuation planning of the drill. While, boards of community hazard maps which were developed through the community activities in each pilot community were located at the target communities before the day of the drill on 16 October.

Figure M.4.4 Preparation of Community Hazard Maps in G.N. Offices: Helauda (left)/ Baddegama (right)

2) Review of the Actions Taken in the Evacuation Drill

(A) Early Warning Information Dissemination to Committee Members

Basically, the information dissemination after G.N. received the early warning message from DS offices was smoothly conducted without any big problems. One of the reasons of this situation was brought by utilization of telephones and mobile phones. The usage of telephone for communication was agreed in consideration of assumption no serious congestion of telephone lines would be occurred at the stage of early warning information dissemination since the target disasters in this drill was flood and the sediment disaster.

In Malwana where the community activities in the JICA Study were not conducted before, the flow of information among committee members was decided on the occasion of pre-meeting. The 12 committee members have always worked together for improvement of community condition, and could make smooth communication for proper information dissemination.

While, in the drill on 16 October, there were some delay of information transfer from DMC to DDMCU or DDMCU to DS offices due to the communication problem of FAX machines and others. Therefore, the information was not delivered at originally scheduled time to the G.N. offices. The delay made some confusion of the coordination of the process of drill at community level.

(B) Wide Dissemination of Early Warning Information to Community Members

Temple bells, mosque speakers, or sirens were basically used for wide dissemination of early warning information to community members. The prompt action was taken by the committee members or G.N. to inform to temples, mosque, or the person who is in charge of blow of siren after receiving the evacuation instruction. Therefore, within a few minutes, information was delivered to the community members through ringing bells, speaker, or sirens in those communities. The sirens used in some of the target communities were distributed under the Study program. The distribution of the sirens was decided based on the review of the first evacuation drill on 26 February. Through the drill, the community members recognized that the sound of belles in the temple was quite small, and reached only limited members in the villages.

In some communities, taking consideration of causing panic to the other residents who did not attend the drill, they did not use the medium for mass communication such as temple bell in the drill and informed to neighbors by visiting each house. It took relatively long time than using temple bell, Mosque speaker, or sirens to disseminate information to all the members. More proper pre-arrangement for prompt information transfer based on consideration of information flow was required if the information is transferred only by the methods.

(C) Evacuation Action Taken by Community Members

Figure M.4.5 Evacuation of the Community Members to the Evacuation Site

In all of the target communities, people intended to join the drill smoothly and promptly evacuated to the designated sites for evacuation. Most of the people understood the action to be taken after hearing the information. However, in some communities in the first drill on 26 February, people gathered to the evacuation sites before starting the information dissemination by misunderstanding of the purpose of evacuation drill. In the second drill on 16 October, this experience was introduced to the people and to take evacuation action after hearing the evacuation information by the designated ways was reconfirmed in the pre-meetings as well as pre-announcement to community members.

3) Arrangement of Head Counting and Confirmation of the Evacuees

In the targeted communities except Kittampahuwa and Mudduwa, the record sheets of the evacuees for using head counting of safely evacuated people were prepared in advance. And, the person(s) who record the names and time were previously decided.

In some communities, more than three persons were allocated for recording the names and time reached to the evacuation site, and they could avoid heavy congestion near the recording places although the attendants' number exceeded 100. They also recorded the ages of the evacuees and calculated the number of people who may need special assistance in the evacuation places based on the range of the ages.

Figure M.4.6 Recording of the Name and Time of Evacuation

Table M.4.3 Time Required for Completion of Evacuation

	G.N.	Disaster Type	No. of Participants	Time required for evacuation
Evacuation Drill on 26 February 2008	Kittampahuwa	Flood	150	N.A.
	Malwana	Flood	30	20 minutes
	Angammana	Flood	75	40 minutes
	Helauda	Sediment Disasters	160	25 minutes
Evacuation Drill on 16 October 2008	Mudduwa	Flood	22	78 minutes
	Mahawela (Helauda)	Sediment Disasters	113	43 minutes
	Wanniyawatta (Kiribathgala)	Sediment Disasters	62	37 minutes
	Ukwatta	Flood	103	36 minutes
	Kananvila South	Sediment Disasters	68	36 minutes
	Niggaha	Sediment Disasters	112	51 minutes
	Baddegama Town	Flood	33	55 minutes

4) Other remarkable arrangements for the drill in the communities

In Helauda, the disaster management committee is well organized, and discussion for the activation of the committee in the third workshop in the Study was also very fruitful. Based on the discussion in the workshop and pre-meeting for the drill, they spontaneously conducted demonstration activities of some sub-committees. The first aid committee members prepared medical treatment spot in the evacuation place and made demonstration of first-aid treatment for light injured. In addition, evacuation committee members demonstrated for carrying the injured by hand-made stretcher.

Similarly, in Ukuwatta, the shelter management committee members prepared signs to indicate necessary facilities in the evacuation site such as places for drinking water, toilet, and garbage damp.

Figure M.4.7 Demonstration Activities/ Indication Sign in Evacuation Site by Sub-committee Members

(5) Evaluation of the Drill

1) Evaluation Meeting just after the Drill

(A) Drill on 26 February 2008

After all the intended evacuee reached to the designated evacuation site, an evaluation meeting for debriefing of the participants were conducted in each of the target communities.


Figure M.4.8 Evaluation Meeting in Helauda (left) and Angammana (right)

In the drill, owing to the circumstances that schools cannot be used for mass gathering events due to current security consideration, the communities in Helauda and Angammana chose the temples as temporary evacuation site for the drill. In real situation of disasters, the schools are the evacuation sites designated in terms of safety of the people. Thus, in the drill of this time, real situation for evacuation was not verified in Helauda and Angammana, especially in terms of check for evacuation route.

(B) Debriefing after the Drill on 16 October 2008

After all the intended evacuees reached to the designated evacuation site, a debriefing meeting was conducted in each of the target communities.

In the drill, owing to an approximately one-hour delay of information transfer due to communication problem at district or division level, some of the target communities started the evacuation before receiving the evacuation instruction. This decision was made in consideration of avoiding confusion among the intended evacuees who were waiting at home for the start of drill. However, even in those cases, the participants verified the process of the information transfer at the community level.


Figure M.4.9 Debriefing in Nagalakanda (left)/ in Mudduwa (right)

In spite of the above mentioned unfortunate conditions for the people in some communities in both of the drills, the following results were achieved through the drills;

- People could learn how to receive official information on disaster risks and disseminate it to all the community members by participating in the Comprehensive Disaster Management Exercise,
- People could identify the problems of current information dissemination systems in each of the communities and consider possible solution for improving the situation,

- People could understand what kinds of arrangements are required in the evacuation site,
- People reviewed the roles of sub-committees of G.N. level DM committee, and
- G.N.s understood their important roles to deliver information for safe evacuation to community members.

2) Evaluation Meeting of Comprehensive Disaster Management Exercise

On 17 October 2008, one day after the evacuation drill on 16 October, an evaluation meeting of Comprehensive Disaster Management Exercise was conducted in Colombo. From each of the target communities, G.N. and a representative were invited to participate in the meeting. The participants could learn whole pictures in the exercise and recognized many organizations and people took necessary actions simultaneously based on the designated flow. Basically actions in all of the communities were highly evaluated as taking proper actions in the discussion made among all the participants in each district. Kiribathgala (Wanniyawatta G.N.), Ukuwatta, and Baddegama Town received award for best performance in each of target districts.

M.4.3 Training Program for Government Officers in DS Offices and Community Leaders of the 15 Pilot Communities

(1) Objectives of the Training Program for DS Officers and Community Leaders

The main objective of the training is to raise awareness of local government officers on the importance of community activities for disaster risk management. It is one of the important aspects for sustainable community disaster risk management activities. In addition, the training is aiming at making close relationship for effective risk communication for the respective communities.

Expected outcomes of the program are: completed community-based hazard maps with relevant necessary information for prompt and proper evacuation of the 15 pilot communities, and enhanced risk communication circumstances among the stakeholders in each of the pilot community. Also, the G.N. level disaster management plans of the pilot communities are expected to review through the training program.

(2) Program of the Training for DS Officers and Community Leaders

Table M.4.4 shows the program of the training for DS officers and community leaders. The brief outline of each session is as follows.

1) Session 1: Current disaster risk management in Sri Lanka

In Session 1, the participants learned (a) brief outline of disaster risk management system in Sri Lanka, (b) recent progress of disaster risk management system focusing on community view point, and (c) recent progress of disaster risk management for flood & sediment disasters, and weather observation including topics on cyclone & Tsunami early warning. The lectures were provided by officers of DMC, DOM, DOI, and NBRO.

2) Session 2: Risk Communication among Stakeholders: Disaster Management Game "Crossroad"

Session 2 provided opportunity for the participants to know various view points for the actions to be taken in case of emergency or for disaster risk management. The activities were including group discussion and plenary discussion. Through the game, all the participants were expected to express their own decision and opinions to the given questions on the actions in case of emergency. The participants recognized there are a lot of dilemma situations for disaster risk management and differences in actions related to positions of individuals.

3) Session 3: Completion of Community-based Hazard Map

Through several community activities done in 2007, draft community hazard map had been created. In the Session 3, the maps were finalized and completed for printing on the community board to be installed in each of pilot communities.

4) Session 4: Importance of Early Warning

Although effective early warning systems are still in the process of being introduced in most of the areas in Sri Lanka, it is urgently required to consider better ways for disseminating early warning information to community members. In the session 4, the participants were requested to think about the early warning system for their own communities under the current condition and also propose improvement plans for future, through the lessons learned by the recent experiences of disasters.

5) Session 5: Development of action plan for their own communities

The participants are requested to develop action plans for their own communities for improving disaster risk management based on the learning through the 2-day training program. An action plans including schedule and obstacles to implementation for each of the 15 pilot communities were considered in the session.

Table M.4.4 Program of the Training for DS Officers and Community Leaders

<Day 1> Tuesday, 15 July 2008	
09:00 – 09:30	Opening Session - Remarks by Mrs. Lalani Imbulana, Director of Preparedness & Planning, DMC - Remarks by Mr. Ryo Matsumaru, JICA Study Team
09:30 – 10:00	Introduction of the Training Program - Brief explanation of JICA Study (progress and plan for FY2008) by Ms. Miki Kodama, JICA Study Team - Objectives of the today's program by Mr. Palitha Bandara, Assistant Director. Training, DMC
10:15 – 10:45	Session 1-1: Recent Progress of Disaster Risk Management System in Sri Lanka focusing on community's disaster management by Mrs. Lalani Imbulana, DMC
10:45 – 12:15 (10:45 – 11:15) (11:15 – 11:45) (11:45 – 12:15)	Session 1-2: Recent Progress of Disaster Risk Management [Presentations and Q&A] - Weather related disaster & Tsunami early warning by Mr. S.R. Jayasekara DOM - Flood disaster management by Mr. Ajith Gunasekara, DOI - Sediment disaster management by Mr. R.M.S. Bandara, NBRO
13:30 – 15:00	Session 2-1: Group Discussion "How you act in case of emergency" using DM Game "Crossroad"
15:15 – 15:45	Session 2-2: Video Presentation & Discussion - Facing Disasters Making Decision: The gender dimensions of disaster management
15:45 – 16:45	Session 2-3: Plenary Session for the Result of Group Discussion Facilitator: by Mr. Buddika Happuarachchi, Practical Action

<Day 2> Wednesday, 16 July 2008	
09:15 – 10:45	Session 3: Finishing work for community hazard map for disaster risk management with early warning information
11:00 – 12:30	Session 4: Importance of Early Warning System (Group Session) [Tsunami & Landslide Group] - Picture Story: Tsunami (15 min) & Video: Landslide (25 min.) - Discussion on Early Warning at the time of Tsunami warning in September 2007 & heavy rain situation in April & May 2008 Coordinated by Mr. Ryo Matsumaru, JICA Study Team [Flood Group] - Discussion on Recent Flood Disaster & Early Warning Coordinated by Mr. Yoshihiko Uchikura, JICA Study Team and Mrs. Lalani Imbulana, DMC
13:30 – 14:30	Session 3 (Cont.): Finishing work for community hazard map
14:30 – 16:00	Session 5: Group discussion for development of action plan to improve current situation of disaster risk management for each pilot community Committee Formation/ Early Warning System/ Safe Evacuation Place
16:00 – 16:30	Closing Session - Summary of the training program by Mr. Buddika Hapuarachchi, Practical Action - Introduction of future programs by Ms. Miki Kodama, JICA Study Team - Closing remarks by JICA Study Team by Mr. Ryo Matsumaru, JICA Study Team - Closing remarks by DMC by Mrs. Lalani Imbulana, Dir. Preparedness & Planning, DMC

(3) Summary of Findings from the Training for DS officers and Community Leaders

The participants were composed of the persons who attended the community programs in the Study and the persons who have never attended them. Especially for the latter part of persons, the information provided in the session 1 was quite new and could broaden their understanding on disaster risk management. The lectures delivered by major technical organizations for disaster risk management in Sri Lanka were very informative and useful for the participants to consider improvement of their undertaking for disaster risk management.

Figure M.4.10 Lectures by DOM (left) / by NBRO (right)

Based on the evaluation of the program by the participants which was conducted at the end of the training, the talk of DOM officer was received high recognition. His explanation was done with some jokes and easy-understandable concrete examples. Capacities development of officers of technical organizations for disaster risk management to make good lectures appropriate to the level of the participants is also important for enhancing awareness of the people in Sri Lanka.

The discussion used disaster management game "Crossroad" was enthusiastically made by all of the participants. The questions in the game, which was developed in Japan based on the experiences of the Hanshin-Awaji Earthquake, were modified based on the Sri Lankan experiences. The participants made heated debate referring to their own experiences in case of disasters when opposite ideas were brought up. The game provided the participants with opportunities to think that there is no single right answer for the decision because of the different circumstances with uncertain factors and share opinions of others from different point of view.

Figure M.4.11 Active Discussion in the "Crossroad" Game

Discussion on early warning was made based on their recent experience of the disasters. Since the memory of the disasters is still fresh especially in case of flood which affected wide areas of nation

from April to May 2008, the participants made concrete and intense discussion on the issues and challenges for better arrangement of early warning system.


Figure M.4.12 Discussion on Early Warning (left)/ Completion Work of Draft Hazard Map

(4) Review of the Training Activities

The originally intended objectives were achieved through the training activities. The stakeholders for each of the 15 pilot communities could make close communication and share their own ideas and opinion through the program. The created good circumstances would make the future CBDM activities more smoothly and effectively in each of the pilot communities.

The draft community-based hazard maps were unfortunately finalized in some of the communities due to the unforeseen reasons such as absence of G.N. and loss of the final draft maps. The works for completing maps had been done continuously in those communities by the coordination of the participants after the training.

M.4.4 Small-scale Disaster Mitigation Program

(1) General

In the communities where the progress of community activities has been very smooth and successful, people showed strong intention for conducting disaster risk mitigation activities. To support their motivation for improving current condition, small-scale disaster mitigation programs were conducted in some selected flood and sediment disaster vulnerable communities as pilot cases. The activities were conducted participatory method.

(2) Program for the Selected Flood Vulnerable Pilot Communities

1) Objectives of the Program

Through three community workshops conducted in 2007 and the evacuation drills conducted combined with information transfer exercise in the government organizations, the people in the pilot communities vulnerable to flood in Colombo and Gampaha identified the need for making continuous efforts to mitigate negative impact of disasters. The work to install river water level gauges and establish continuous observation system of river water by community members was proposed for providing more prompt early warning information to the residents in risk areas. The mitigation program is conducted in residents' leading & participatory manner aiming at enhancing people's awareness through the work.

2) Format of the Program

The program was conducted by the following set of activities.

(A) A small consultative meeting with leading members of the communities

The purpose of the meeting was a) to decide the place to install the gauge, b) to make explanation about observation of water level, and c) to ask them to discuss continuous observation system by community members.

(A) Installation of the gauge with community members

(B) A half day training program for reading gauges and continuous observation activities

(C) Observation by community members

3) Summary of Findings from the Program Activities

The consultative meetings were conducted by participation of the residents much more than the intended numbers. They listened carefully the explanation for the purpose of continuous observation and decided to install the gauges and conduct regular monitoring by the community. Similarly, based on inundation experience in April and May 2008, the places for installing the gauges were decided by the initiatives of the target community members.

Figure M.4.13 Consultative Meeting (left)/ Training for Reading Gauges (right)

The community members were also actively involved for the installation work. When the gauge was installed, the community members in Malwana requested to lay more stable foundation in consideration of rapid current at the place of installment as well as modification of letters of numbers to see more clearly.

The training program conducted after installation of the gauges was very useful and pragmatic for starting observation. An engineer of DOI made detailed explanation for reading calibration and made small training for the main person in charge of observation.

4) Review of the Program Activities

Due to serious conditions they faced in the recent flood in April and May 2008, the participants' interest and expectation for the activities were very high. The residents should make continuous efforts for long time until they can have a significant criteria based on the observed data. Further cooperation for sustainable monitoring activities among the residents is required.

(3) Program for the Selected Sediment Disasters Vulnerable Pilot Communities

1) General

Through three community workshops conducted in 2007, the participants in the pilot communities vulnerable to sediment disasters in Rathnapura learned their risks and how to mitigate damage caused by disasters. They developed plans to improve current situation and proposed some mitigation measures for preparing future disasters. DMC and JICA study team reviewed the proposals and small-scale damage mitigation program for sediment disasters was conducted in Helauda (Mahawala G.N.) and Kiribathgala (Wanniyawatta G.N.) in Rathnapura district with technical and financial support by DMC, NBRO and the JICA Study Team.

2) Rehabilitation and Maintenance of Drainage Canal in Helauda (Mahawala G.N.)

(A) Outline of the Program

Community in Helauda proposed to restore a drainage canal to improve the drainage condition in the area, which is effective to reduce the landslide risk. NBRO, DS, Municipal Council and DDMCU gave a technical support for rehabilitation of the drainage canal. The mitigation program was conducted by residents' active involvement. They identified masons and other non skilled labors from the area and at first cleaned up the drainage by sweeping out stones and sludge to maintain the drainage canal for appropriate condition. Then, they prepared all the necessary materials such as concrete, iron bar, cement and did construction work with getting technical advices by DS office and Municipal Council.


Figure M.4.14 Cleaning of the Drainage Canal (left) / The Improved Drainage Canal

(B) Review of the Program Activities

The drainage canal was rehabilitated within one month after they have started construction works. The labours for the works were voluntarily provided from the community members by using their free time. After successful completion of the improvement works, water leakage of the earth at the bottom side of the drainage area has been drastically reduced. One of the reasons of the success of the program was the leaders' strong will and good coordination to lead the community members to make active involvement in the program.

3) Improvement of Safe Evacuation Routes in Kiribathgala (Wanniyawatta G.N.)

(A) Outline of the Program

Community in Kiribathgala proposed to construct a bridge and a crossing for securing evacuation routes from the risk areas of sediment disaster in the community based on hazard mapping program in the Study. After careful examination and consultation with NBRO, JICA Study Team decided to support the construction of the crossing and improvement of access pathway for the evacuation routes based on the technical consideration of safe land condition. DMC and UNDP decided to support construction work of the proposed bridge.

At the beginning of the program, a consultation meeting was conducted among the community members with officers of NBRO, DDMCU, and DS office. Then, the construction work was done by voluntary labour of the community members with the technical support of NBRO and DS office.

Figure M.4.15 Consultation Meeting (right)/ Construction Work by Community Labours

(B) Review of the Program Activities

The crossing was completed within one month since they have started the construction work. One of the reasons of the prompt and successful completion of work was the community's solidarity and good coordination of leader and young leader to lead the community members to make active involvement in the program.

Figure M.4.16 The crossing before improvement (left)/ the constructed crossing (right)

Construction of bridge and pathway will be constructed and completed by the community by end of December 2008. This improvement of evacuation route ensures the safe evacuation for the residents who are living in the risk area in case of heavy rain and disaster situation.

M.4.5 Consultative Meeting on Flood Bund Gate

(1) Outlines of the Consultative Meetings on Flood Bund Gate

The people in the Kadduwa, one of the pilot communities vulnerable to flood disasters in Matara learned their risks and needs of mitigate the damage caused by flood through the community workshops. However, in the due course, workshop organizing team of DMC and the JICA Study team realized that there is a big controversial issue on flood bund (BR16) among the residents of upstream and downstream. Therefore, the organizing team decided to hold consultative meetings inviting representatives of residents in both upstream and downstream, and a DOI officer who explained the current flood protection system and future improvement plan of DOI and Sri Lankan Government.

The consultative meetings were held in steps as shown in the Table M.4.5. The third meeting was coordinated by District Secretary with more wider participation of stakeholders.

Table M.4.5 Steps of the Consultative Meetings

No./Date	Participants
1st Meeting (September 1)	Representatives of residents in the area of downstream
2nd Meeting (September 11)	Representatives of residents in the area of upstream
3rd Meeting (September 26)	Both residents of upstream and downstream and more wider participation

Figure M.4.17 2nd Meeting among Upstream Residents (left)/
3rd Meeting for Both Residents (right)

(2) Review of the Consultative Meetings

The community has a conflictive issue on opening of flood band gate between the upper part community members and lower part of them. Therefore, better understanding of the function of the gate and effective management of gate opening/closing was required. At first, the meetings targeted to each of the representatives of residents in upstream and downstream were separately conducted. The participants learned the background information of the flood bunds located in the Nilwara river basin from DOI engineers and discussed solution of current adverse condition with keen interest. Then, a meeting inviting both sides of residents was conducted by coordination of District Secretary. In the meeting, enthusiastic discussion was made showing the views and opinions of both sides of

residents. Then, the talks proceeded to explore an overall plan for resolution considering of more fundamental causes of flood. In the meeting, the people could not reach final conclusion, however, they have decided to continue the discussion for seeking good solution. The series of meetings were very good opportunity for the people in the communities situated in flood risk areas to discuss comprehensive solution for flood disasters in the catchment areas of the Nilwala River.

M.4.6 One-day School Children Awareness Workshop in Kalutara District

(1) Objectives of the School Children Awareness Workshop

Through the workshops conducted in 2007 in the Study, the people in the pilot communities in sediment vulnerable areas in Kalutara District identified needs of enhanced children's awareness on disaster risk management as one of the priority areas. The workshop program was conducted on 8 July 2008 aiming at;

- Enhancing understanding of school children on the disaster risks around them and provide opportunity for them to learn how to prepare for disasters
- Disseminating the knowledge on disaster preparedness learned from the program to parents and adults through the participants
- Encouraging advance level students to take this subject as a project

The workshop targeted the students of schools located in the landslide vulnerable areas in Palinda Nuwara, Kalutara District. Around 200 students from 16 schools and teachers & parents participated.

(2) Program of the School Children Awareness Workshop

The workshop was jointly organized by DMC, NBRO, and JICA Study Team in cooperation with DOM, DOI, DS office of Palinda Nuwara, and Zonal Department of Education. The program of the workshop is presented in Table M.4.6. Brief outlines of the program were as follows.

In the morning, after the welcome speech and opening remarks, lectures on the disaster and disaster risk management from technical organizations were provided. The participated students learned basic knowledge of disaster risk management from DMC, weather observation and weather-related disaster from DOM, and flood risks around them from DOI. Also, Mr. Manikupura (NBRO) provided lecture on sediment disasters in Sri Lanka and how to save their lives from impact of the sediment disaster. The lectures were rather long in total, however, the participants concentrated on their talks, and made a lot of questions on the topics in the Q&A session.

During the lunch time, some video program of awareness on sediment disasters were shown to the participants aiming at providing visual images of power of sediment disasters.

Table M.4.6 Program of School Children Awareness Workshop

Time	Program
08:30 – 09:00	Opening - Welcome Speech by Mr. Sirisoma Lokuwithana, Divisional Secretary - Remarks by Mrs. Lalani Imbulana, DMC - Remarks by Mrs. Pathmini Wijesinghe, Zonal Department of Education - Remarks by Mr. Ryo Matsumaru, JICA Study Team
09:00 – 09:15	Introduction of the Workshop by Mr. R.M.S. Bandara, NBRO - Objectives of today's program
09:15 – 11:35	"Let's learn disasters and disaster risk management in Sri Lanka" from disaster management experts
(09:15 – 09:50)	- Disaster Risk Management System in Sri Lanka by Mrs. Lalani Imbulana, DMC
(09:50 – 10:25)	- Weather related disaster & Tsunami early warning by Mr. Jayasekara, DOM
(10:25 – 11:00)	- Flood disaster management by Mr. W.N. Silva, Irrigation Engineer, Kalutara, DOI
(11:00 – 11:35)	- Sediment disaster management by Mr. Mr. Manikupura, NBRO
11:35 – 12:00	Explanation of Field Trip & Homework by NBRO
13:00 – 16:00	Field Trip to landslide prone areas, instructed by NBRO - Group Study (40 persons x 5 groups) escorted by a NBRO officer in one group

Figure M.4.18 Participated School Children in the Workshop

In the afternoon, a field trip to Baduraliya, a landslide prone area in Matugama was conducted. The area they visited is called Polkirimulla, where NBRO has identified as a high risk area of sediment disasters and the settlers had already been evacuated. The students were divided into 5 groups and visited the area with the instructors of NBRO staff members. The instructors had guided all the participants and gave them further information on causes of landslides, characteristics of land slide prone area and measures that could be taken to prevent in front of the affected area. For most of the students it was first time to see the real disaster affected area. They directly felt the threat of natural disaster and risks of landslide.


Figure M.4.19 Lectures on Disasters (left)/ Field Visit to Landslide Prone Area (right)

(3) Review of the School Children Awareness Workshop Activities

The workshop was successfully completed with getting students' great interest on the topics. It is expected that the participated students share their knowledge with their friends in the school as well as parents and adult in their communities. Through the workshop activities, the following points were identified as recommendation for future efforts for disaster reduction.

- Improving the awareness among the school children is considered as one of the most effective way of preventing disaster risks in the country. It is important to use all possible avenues to reach school children and build their knowledge and awareness on disaster risk and risk reduction.
- Children news papers and books could be considered as one of the effective measures to reach school children. It is important to promote contents on disaster risk reduction in children educational medium. Sri Lanka government has already been working with National Institute of Education to incorporate contents of disaster risk management into school curricula. The efforts should be further promoted.
- Students engaged in project activities as a part of their formal education could be promoted to work on different disasters. Regional officers of the relevant agencies could be linked to provide guidance to the students.

M.4.7 School Evacuation Drill in Cooperation with Communities

(1) Objectives of the School Evacuation Drill

The three workshops conducted in the Tsunami vulnerable pilot communities in 2007 underlined the needs of consideration for taking approach from the school children to promote disaster reduction in the communities. In Sinna Ullai, Pothvil in Ampara district, people's interest in disaster risk management activities was not high, and progress of community activities had been very slow. In the pilot communities in Matara district, people had joined several similar disaster management activities conducted by other agencies after the Tsunami disasters in 2004, and involvement in the Study program of the people was rather limited. Taking due consideration of above condition, approach from school children was considered as another option for enhancing community capacity and awareness.

The school evacuation drill was jointly organized by DMC and JICA Study Team in cooperation with Department of Education as a school children awareness program in October 2008. The main

objective of the drill is to make better understanding of importance of prompt evacuation in case of Tsunami and necessary pre-arrangement for school children's safety for the purpose. Through the drill, the parents are expected to understand the schools provide necessary arrangement for their children and not to make panic by worrying about their children in case of disasters.

(2) Basic Format of the School Evacuation Drill in Cooperation with Communities

The basic format of the program was as shown in Table M.4.7. However, through the consultation with Matara DDMCU and the target school in Gandara South, one of the pilot communities in Matara, the program provided in this area was decided to be an awareness workshop in the school inviting parents as shown in Table M.4.8. It was because the school is located in the safe area from Tsunami and evacuation place for the communities is not the school.

Table M.4.7 Basic Format of Program of the School Evacuation Drill

<Before the Drill Day>	
Pre-Meeting by Teachers & Representatives of Communities	
<On the Drill Day>	
08:00 – 08:30	Advance Guidance to School Children of Target Classes by Teachers - Registration of Attendance - Explanation of Evacuation Drill *Teachers of non-targeted classes should also explain about drill to avoid the panic of school children
09:00 – 10:00	Evacuation Drill *Refreshment after completion of head counting
10:30 – 12:00	Evaluation & Awareness Program
(10:30 – 10:40)	- Principal's Review of the Drill
(10:40 – 11:00)	- Evaluators' Recap and Review of the Drill
(11:00 – 11:20)	- Lecture: What is Tsunami & Importance of Prompt Evacuation by DM Coordinator
(11:20 – 11:30)	- Q&A
(11:30 – 12:00)	- Practical exercise for understanding of effective disaster risk management

Table M.4.8 Program in Gandara South, Matara District

Time	Program
11:30 – 11:45	Opening Address
	by Mrs. M.M. Peramesal, Acting Principal Capt. Saman Balasooriya, Matara District DM Coordinator
11:45 – 12:00	Keynote Message by Mr. Ryo Matsumaru, JICA Study Team
12:00 – 12:40	Lecture on Tsunami and Q&A "What is Tsunami & Importance of Prompt Evacuation" by Capt. Saman Balasooriya, DM Coordinator Matara
12:40 – 13:00	Picture Show "Inamurano-hi Story" "Let's discuss what we should do to reduce Tsunami damage"
13:00 – 13:30	Practical Exercise for understanding of effective disaster risk management

(3) Outline of the Activities in the Program

The program of the evacuation drill was basically conducted based on the draft "National Guidelines for School Disaster Safety" developed by Ministry of Education and National Institute of Education

with the support of German Technical Cooperation (GTZ). DMC is going to promote the school awareness activities according to the Guideline.

In addition, representatives of the parents were invited to observe the drill and join the awareness program after the drill.

1) Pre-Meeting

The activities of the program were started by preparatory meetings conducted prior to implementation of the drill in each of the target schools. In the meetings, the following discussion was made.

- Form a school disaster management committee composed of several sub-committees with specific tasks such as first aid, site security check, and evacuation support.
- Acquire the information of conditions of school by the Committee members. (information should be updated once a year): i) total number of students, teachers, and administrative staff, ii) total number of students in each classroom, iii) identify students and/or teachers with special attention (disabled, old, etc.), iv) acquire the most recent school layout/ map and floor plan (with information of corridors, staircases, and exits)
- Determine safe places for evacuation (or temporary evacuation) based on the school layout and floor plan, and evaluate how many persons can be accommodated in each safe place.
- Develop a school evacuation plan including early warning dissemination system, and evacuation routes from each classroom considering the traffics

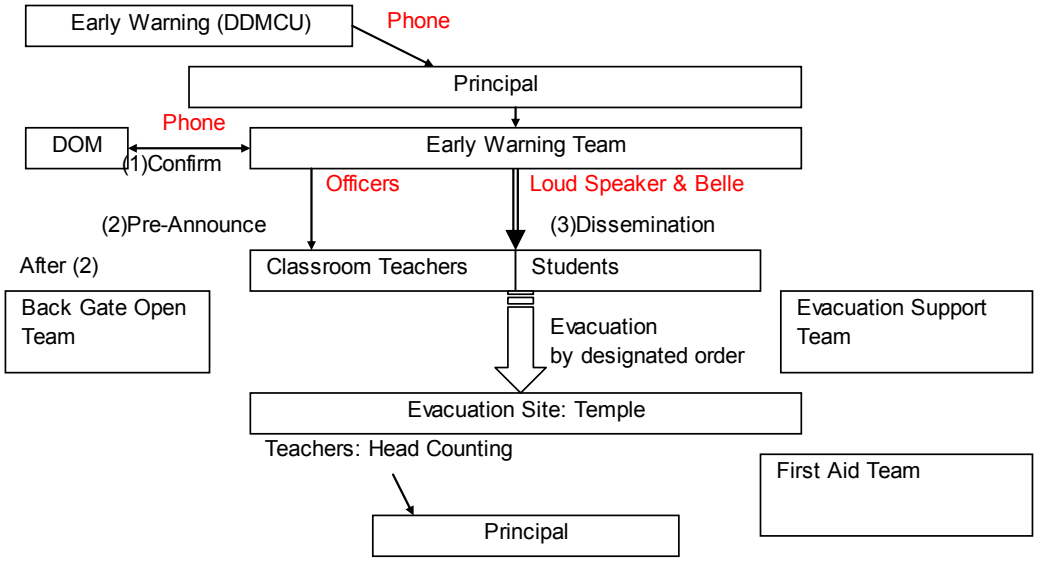

Figure M.4.20 Designated Flow of Activities and Role Allocation Talalla Maha Vidyalaya, Matara

The result of discussion was summarized as shown in Figure M.4.20.

While, in Gandara Primary School located in the Tsunami safe area, the teachers discussed how to inform the children's safety to the parents. To avoid confusion made by the parents rushing into the school in case Tsunami early warning is issued, they made a plan to deliver summarized information

of school children to the G.N. level disaster management committee as shown in Figure M.4.21. The plan was introduced to the parents in the awareness program.

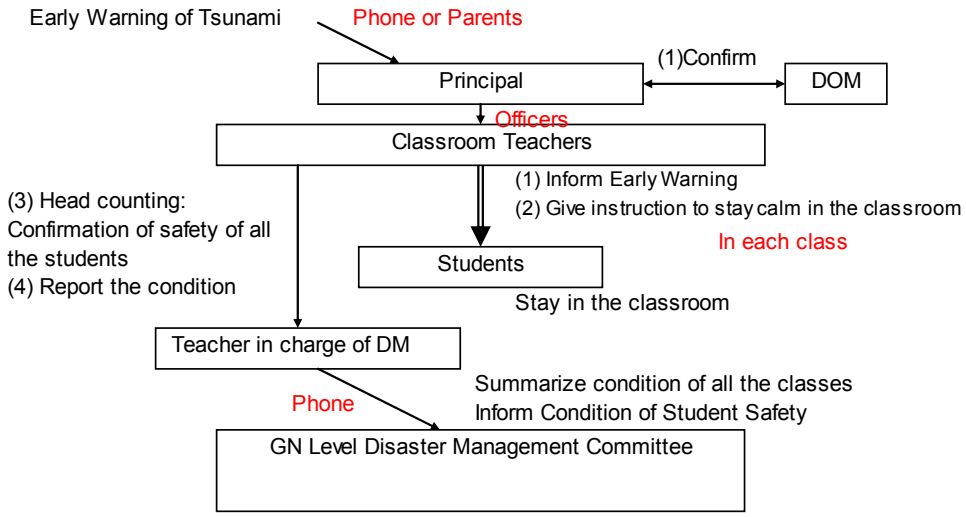

Figure M.4.21 Designated Actions in case of Issuance of Tsunami Early Waning

Figure M.4.22 Preparation Meeting among Teachers in Kottegoda (left)/
in Vinayagapuram (right)

2) Evacuation Drill

At first, the classroom teachers gave advance guidance to the students including a significance of evacuation drill, route and place for evacuation, and the following instruction for safe evacuation; i) to escape in an orderly manner, and ii) to keep the 4 basic principles for evacuation <P. R. S. R.> (P: Don't push, R: Don't run, S: Don't speak, R: Don't return).

Then, the actions of the drill were taken based on the designated flow. The basic flow of the actions was as shown in Table M.4.9. The basic assumption of the disaster condition was as follows:

- A big earthquake occurred in the Indian Ocean
- "Tsunami Warning" is announced by DOM at 8:55, and arrival of Tsunami to the coastal area of Sri Lanka is predicted at around 9:55, 1 hour after the announcement
- Media and other related agencies deliver early warning message to the people through designated information flow.

Table M.4.9 Basic Flow of the Actions in Evacuation Drill

Time (estimated)	Action
am 08:00 – 08:30	Advance guidance to school children - Explanation of the drill, Registration of attendance
am 08:15	Occurrence of Earthquake in the Indian Ocean (assumption)
am 08:55	DOM announces Tsunami early warning message by several medium (assumption)
am 09:00	School receives/notices early warning message for Tsunami (*in the drill, DDMCU gives information by phone)
am 09:02	[Early Warning Team] Confirm the information with Department of Meteorology Inform to school teachers of each classroom by administrative staff
am 09:05	[Early Warning Team] 1) Ringing bell for emergency alert and announce 2) Announce "Evacuation drill, Evacuation drill. Tsunami warning is issued. All students, evacuate under the supervision of teacher" 3) Open the back gate
am 09:06	[Classroom Teachers] Instruct "Everyone, Tsunami warning has been issued. We are evacuating to the temple (the designated evacuation place) immediately. Keep < P. R. S. B. > in mind." Teachers assemble the students to the school ground and lead the way to evacuation site with the attendance book of the class. [Students & Teacher] Start evacuation
after reaching to the evacuation site	[Classroom Teachers] Head count of the students and school staff members -> report to Evacuation Support Team the result of counting [Evacuation Support Team] Verification of people-count -> report to principal
around 09:50	[Principal] Make announcement of safe evacuation of all the students and teachers -> Distribution of refreshment. Everybody move to school.
move to school hall	Principal's review and evaluators' recap & review

Figure M.4.23 Evacuation Action in Kottegoda (left)/ in Sinna Ullai (center)/ in Vinayagapuram (right)

3) Evaluation of the Actions and Awareness Program

After all the students and teachers were safely evacuated to the designated evacuation place and head counting was completed, an evaluation session and awareness program was carried out. In the awareness program, active participation of the observed parents was also requested. Practical exercise

to understand the difficulty of prompt and accurate information delivery as well as the lectures on Tsunami was provided.

Figure M.4.24 Awareness Program in Kottegoda (left)/ in Sinna Ullai (center)/ in Vinayagapuram (right)

Similarly, in Gandara Primary School, where they did not conduct evacuation drill, the participants learned Tsunami mechanism and risk reduction by lectures and importance to pay much attention to deliver accurate information by practical exercise. In addition, the explanation for the safety arrangement during Tsunami warning in the school was introduced. The participants, especially the parents understood that the school location is safe from Tsunami, and they do not need to worry about their children when they are in the school.

Figure M.4.25 Pre-meeting among Teachers (left)/ Awareness Program with Parents' Participation

(4) Review of the Activities in School Evacuation Drill

Basically, evacuation drill in each of the schools in the target areas was conducted in a coordinated manner without any big trouble. Students could make smooth evacuation in a designated way with the guidance of teachers. Observed parents could have a confidence of safety arrangement of the school and understand that they do not need to worry about their children in case of disasters.

In most of the schools, the drills were passively organized by the teachers with the support of DDMCU and the JICA Study team. Some of the teachers seemed to underestimate the importance of evacuation drill. It is required to provide the teachers with the opportunity to learn disaster risk management so as to implement evacuation drill only by themselves in the near future.

M.4.8 One day First Aid Training for G.N. Level DM Committee Members at each District

(1) Objectives of the First Aid Training

The JICA Study team recognized that the members of G.N. level disaster management committees need enhancing their technical knowledge. At the same time, it is necessary to provide learning opportunity for keenly aware of their responsibility as disaster management committee members. To make G.N. level disaster management committee more active and provide proper technical information of first aid to the committee members, the First Aid training program was conducted at each target district.

(2) Outline of the Training

The training was conducted in each of the following groups inviting around 5-10 members from each G.N. level disaster management committee members:

District	Pilot Communities	Date
Colombo & Gampaha	Kittampahuwa, Malwana Town	24 Aug 2008
Ratnapura	Anganmana, Helauda, Kiribathgala, Mudduwa	20 Aug 2008
Kalutara	Niggaha, Nagalakanda, Ukuwatta	21 Aug 2008
Matara & Galle	Kadduwa, Gandara, Kottegoda, Baddegama	31 Aug 2008
Ampara	Sinna Ullai, Vinayagapuram	15 Nov 2008

In the training, experts of Red Cross or St. John Ambulance gave a lecture including demonstration and practical exercises. The community members actively learned basics for treating the injured and participated in the exercise to use the First Aid kits and tools

Figure M.4.26 First Aid Training in Each District

(3) Review of the Training Activities

Through the participation in the training, the participated committee members became more actively to consider the disaster risk management in their own communities.

M.4.9 Development of Community-based Hazard Maps

As described in the explanation in the previous sections, community-based hazard maps were completed step-by-step through several activities in the Study program. The steps in each pilot community are as follows:

1) Community members drew base maps of the community in groups through DIG (Disaster Imagination Game) in the first workshop
2) Community members developed draft hazard maps using the base maps through town watching (field survey) and discussion in the second workshop
3) Representatives of the participated community members were requested to combine the maps developed in groups in the second workshop into one map.
4) The combined draft hazard map was verified and added some missing information by the G.N., community leader, and officer of DS office participated in the training program in July 2008.
5) *The G.N. absent from the training was requested individually to verify and add missing information on the draft hazard map
6) The validated hazard map was digitalized and printed on the board. And then it was installed in the pilot community

Figure M.4.27 Steps to Complete Community Hazard Map in Niggaha

Figure M.4.28 Completed Community Hazard Map of Niggaha

M.5 Disaster Reduction Education in Sri Lanka

M.5.1 Disaster Reduction Education in School

(1) School Education System in Sri Lanka

In Sri Lanka, admission to the Primary Level is at the age of 5, and the general education (G1-13) is threefold, as follows:

1. Primary Level (Grade 1-5)
2. Secondary Level (Grade 6-11)
3. Collegiate Level (Grade 12-13)

The Secondary Level of Education is sub-divided as follows:

1. Junior Secondary (Grade 6-9): Completion of Basic Stage Education
2. Senior Secondary (Grade 10-11)

At the end of the Secondary Level, the students would take the public examination called the General Certificate of Education (Ordinary Level). Enrollment rate to Grade 1 is 98% and Primary Level Completion is 96%. Completion of Junior Secondary (Grade 9: Basic Stage Education) is 83%. These very high figures may be attributed to the welfare system of education wherein students get free school fees, free text books from Grade 1 to Grade 11, free school uniforms, and subsidized transport. The high rate of completion of basic education leads to High Literacy (92.5%) of the whole population in Sri Lanka.

(2) Disaster Reduction Education in Schools

As the rate of completion of basic stage education is relatively high in Sri Lanka, disaster reduction education in school should certainly be effective.

However, before the Tsunami disaster in 2004, disaster reduction education in schools was not well considered. As mentioned in the Road Map, the promotion of disaster reduction education in schools is recently considered as one of the important elements for public awareness based on the experience in the Tsunami disaster.

(3) Disaster Risk Reduction Topics in the Current School Curricula

Some progress has been achieved in integrating disaster risk reduction into school curricula, as indicated by inclusion in some student textbooks.

1) Secondary Level (Grade 6-11)

(A) In the “Geography” for Grade 8, the following topics related to disaster risk management are as follows:

(B) Mechanism of Disaster (Earthquake, Seashore Erosion, Cyclone, Tsunami, Drought, Flood, Landslide)

(C) Damage by Tsunami in 2004, Cyclone in 1978

To be Safe from Natural Disaster;

- Awareness of media warning
- Have knowledge about disaster
- Cooperate with neighbors
- Follow the instructions by Government

Figure M.5.1 Textbook on Geography (Grade 8)

Also in the "Physical Education", basic first aid is included. For instance, topics such as "what to do when they are drowning in the river, injured in a fire and bitten by a snake" are introduced. Students are taught how to treat a wound, check breathing and circulation.

However, it is most unfortunate that "Geography" and "Physical Education" are only elective subjects, thus not all students are required to study them.

Figure M.5.2 Textbook on Physical Education (Grade 8)

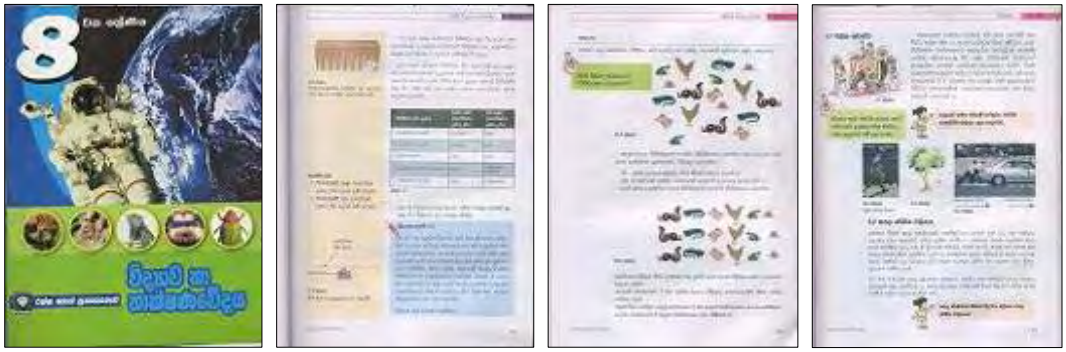

Figure M.5.3 Textbook on Science (Grade 8)

In the Junior Secondary Level, the students study 6 compulsory subjects (Religion, Mother Tongue, English, Mathematics, Science, Social Studies) and 4 optional subjects. In one of its compulsory

subjects, “Science”, disaster reduction is not included as it covers the area of basics of Chemistry, Biology and Physics. Major topics in “Science” are Electricity, Liquid, Living creature, Animal Classification, Pressure, Planet, etc.

2) Primary Level (Grade 1-5)

In the Primary Level Grade 1 to 5, the curriculum is common nationwide. All the students study the following 6 subjects:

(1) Buddhism

(2) Mother Tongue (Sinhalese/Tamil)

(3) English

(4) Mathematics

(5) Environmental Studies

(6) Creative Activities

Only 4 subjects (Buddhism, Mother Tongue, English, and Mathematics) have textbooks and there are no textbooks for Environmental Studies and Creative Activities. And disaster reduction is not included in any of these 4 textbooks.

(4) Institutional Arrangement for Integrating Disaster Reduction into School Curriculum

Incorporating topics on disaster reduction and management in school curriculum has been initiated and is already in the process of implementation by the Ministry of Education, National Institute of Education (NIE) and National Science Foundation with the support of GTZ as shown in Table M.5.1. In the meantime, the activity is being taken on a secondary level.

According to the Ministry of Education, it is necessary to revise the curriculum once every 8 years, taking into consideration the fact that the school curriculum should be subjected to modernization based on quality and applicability to present times.

Table M.5.1 Present Integration Activities

Grades	Subjects to incorporate DM aspects
Grade 6 to 9	Life Competencies and Civic Education
Grade 9 to 13	Geography
Grade 11	Civics and Governance
Grade 10 & 11	Science

GTZ has also been assisting the implementation of teachers’ training. Training teachers of Geography for Grade 6 and 10 are planned in 2007, while training for Grade 7 and 11 teachers is scheduled in 2008. In addition, teachers’ guidance and tool kit for supplementary materials for new curricula will be developed in time with GTZ support.

(5) Supplementary Materials for School Library

DMC has conducted a training program for teachers and has developed some supplementary educational materials for various types of disasters for easy understanding of school children. The materials are for Cyclone, Flood & Thunder, Landslide, Seashore Erosion, and Drought for the Primary Level. The total number of the booklets for printing is 10,000 copies and it is planed to be distributed to the school library. This project is supported by the Canadian International Development Agency (CIDA) and Practical Action.

The materials were designed with a lot of drawings and illustrations, to make sure that younger students can easily understand as well as be interested on the content about the disasters as shown in Figure M.5.4. Also, the most important and simple "Dos and Don'ts at the Time of the Disaster" is introduced. For instance, in the book of "Cyclone", importance of early warning by media and timely evacuation is emphasized.

Figure M.5.4 Covers of the Materials (Cyclone, Flood & Thunder, Landslide, Seashore Erosion, Drought)

Figure M.5.5 Some Contents of the Booklet for Flood & Thunder 1

Figure M.5.6 Some Contents of the Booklet for Flood & Thunder 2

In the book of "Flood & Thunder", in addition to the importance of timely evacuation, the danger of the flood water is introduced as shown in Figure M.5.5. Also introduced are the simple tips to avoid damages from thunder, which has been claiming 50 lives every year as shown in Figure M.5.6.

Figure M.5.7 Some Contents of the Booklet for Cyclone

Considering that it will take some time to include disaster reduction into primary level curriculum, these supplementary materials could be immediately used. While DMC has already printed 10,000 books, it is still trying to find support for additional printing. DMC is also planning to make a movie based on these supplementary materials.

(6) Materials on Landslide

National Building Research Organization (NBRO) plays a critical role for landslide disaster reduction. In August 2000, NBRO published a pamphlet series on "Landslide in Focus" (Figure M.5.8) for government officials and students, in English, Sinhalese, and Tamil, with assistance from UNDP. The total number of the pamphlets printed was 10,000 and the stock has gone down to 2,000. NBRO distributed it to the library of 500 schools, which are located in the hill areas.

The pamphlet demonstrates the mechanism of the landslide using the simple phenomenon, and introduces past landslides in Sri Lanka.

Figure M.5.8 Materials on Landslide by NBRO

(7) Current Status of Disaster Education

As discussed, various activities have been implemented for disaster reduction education through the support of donors, especially after the 2004 Tsunami disaster.

Regarding the formal education, the Ministry of Education, NIE and GTZ have together made a great first step towards integrating disaster reduction into the formal school curriculum such as in "Geography" for Secondary Level, even it is not a compulsory subject. It is therefore suggested that disaster reduction be integrated into the compulsory subjects such as "Science".

Also, even though DMC has made contributed remarkably by distributing supplementary materials in the school library for Primary Level, it is suggested that disaster reduction be taught in the classrooms of the Primary Level.

Furthermore, even though first aid is introduced in the "Physical Education" subject, the community workshop participants expressed the need for training on first aid, especially in the rural communities where there are no hospitals and permanent nurses.

M.5.2 Public Awareness

(1) Current Initiative for Promoting Public Awareness by DMC

Public Awareness is one of the important pillars of the DMC activities. In the 4th Draft of National Disaster Management Plan, training program for enhancing public awareness should be provided for the following target audiences.

(a) DMC staff and affiliated members
(b) Technical personnel and professionals of different categories
(c) G.N.s
(d) Community at G.N. division level
(e) School teachers

Figure M.5.9 Some Community Activities Conducted by DM Coordinators

In particular, the Plan has defined that special trainers' training for community awareness should be provided to the DM Coordinators who will be associated with community program, and for Assistant Coordinators. As of today, the DM Coordinators and Assistant Coordinators have received several training programs on how to work with communities, community level hazard mapping, identifying evacuation routes, evacuation & emergency planning, community level evacuation drill, etc. After the training, they have started their activities in some disaster vulnerable communities including establishment of G.N. level disaster management committee & Sub committees, collection of profile data of community and risk situation, and development of community disaster risk management plan as shown in Figure M.5.9. The completion of these activities is one of their main tasks and the progress of the activities was reported to DMC every month.

As for the sustainable activities in communities, the involvement of division officers and G.N.s is essential. However, at present, the training program provided so far is limited to just a one-day program. In the future, more opportunities for them to learn about community level disaster risk management should be provided.

(2) Other Remarkable Activities for Public Awareness

Besides the DMC's activities, several disaster awareness programs were provided by various key players. NBRO has especially been providing many programs on landslide risk management for various stakeholders in collaboration with other organizations. NBRO has developed and distributed various kinds of booklets, brochures, posters for public awareness, etc. Similar initiative by DOI should be considered for people's better understanding of flood risk management.

In addition, DMC considers effective utilization of NGOs for community level awareness program. For this purpose, DMC had tried to reach a consensus on the appropriate CBDM approach/modality to initiate large scale CBDM activity among the relevant organizations. This initiative of promoting NGOs' active involvement in CBDM activities is very important to ensure effective implementation of activities and to avoid confusion and misunderstanding in the communities. Based on the discussion among the players, "Community Based Disaster Management – Modalities and Guideline" was developed in May 2008 and shared for standardized community activities.

(3) Material for Public Awareness Currently Used in DMC

Figure M.5.10 Brochures of Five Kinds of Disasters

To support the public awareness activities, various pamphlets and posters for disaster education for general public have been produced by DMC and NBRO, with assistance from various donors. DMC, in cooperation with NBRO and support from UNDP and Swedish International Development Cooperation Agency, has developed brochures on the 5 kinds of disasters: Cyclone, Thunder, Landslide, Tsunami and Flood as shown in Figure M.5.10. DMC also produced posters as presented in Figure M.5.11 with support from the GTZ and these are largely used for workshops and seminars for general public and government officials.

Figure M.5.11 Posters on Disasters

At present, however, the quantity of these materials is continuously decreasing thus needing further support for reprinting.

(4) Consideration for Further Enhanced Public Awareness Activities

DMC has used a series of leaflets (Figure M.5.10) for public awareness on possible disasters in Sri Lanka and the risk management for them. They include much useful information, however, the design of the leaflets is a bit complicated and difficult to be read by poorly-educated people. Further, currently there are no standardized educational tools to be utilized in the CBDM activities. Development of public awareness materials in more user-friendly format with utilized illustrations can attend to the needs of DMC and the public.

M.6 Development of Educational Tool for CBDM Activities

M.6.1 Development of Educational Tool

(1) Background

CBDRM activities have been conducted in the disaster vulnerable communities in Sri Lanka mostly as project-based activities by various organizations. However, after establishment of DMC, there has been momentum for improving such ad-hoc implementation of activities and providing more systematic and horizontal distribution oriented CBDRM activities. As mentioned in the section 1.5.2, DMC developed "Community Based Disaster Management – Modalities and Guideline" with professional contribution from the National Advisory Committee for CBDRM, including members from Practical Action, Sri Lanka Red Cross, UNDP Sri Lanka, and others. The document is providing necessary information for common approach to conduct CBDRM activities in the country.

Educational materials easily utilized by the practitioners of the CBDRM activities have not been well developed as reviewed in the section M.5.2. Each time, most of the practitioners have to prepare their own materials or use tools introduced in some books and manuals. To ensure common activities in the country, it is required to develop easily-understandable educational material for CBDRM in consideration of use under local condition.

(2) Development of "Fliptation" for CBDRM

Considering above mentioned condition, an educational tool for the CBDRM named "Fliptation" was developed under the Study program. The developed educational tool for the CBDRM was named as "Fliptation". "Fliptation" is a combination word of flip chart and presentation. Like making presentation using PowerPoint materials, the lectures use the "Fliptation" in the CBDRM activities. As mentioned above, main objective of development of the "Fliptation" is to make practitioners' efforts for conducting CBDRM activities easier and provide standardized and easy-understandable educational materials for CBDRM activities. It is also aiming to ensure dissemination of appropriate knowledge about disaster mechanism and CBDM processes to the community people.

The "Fliptation" is a set of flip charts printed on A1 size durable materials which can be easily carried to the local community and presented to the group of people without having to worrying about availability of electricity in the venue. And it consists of front pages which have short description with illustrations and pictures for showing to the people, and back pages which have scripts for explanation for using by lecturers. In addition, a handbook which includes more detailed explanation of "Fliptation" and can be utilized for preparation of lecture. The handbook also provides some reference data, documents and presentations to deeply understand the subject in DVD as attachment.

(3) Contents of "Fliptation"

The "Fliptation" for CBDRM is composed of 2 kinds of editions and the main contents are as shown in Table M.6.1. The contents were developed based on the experiences and lessons learned through the Study activities in consultation with DMC, DOI, and NBRO. Draft contents were also reviewed in the CBDRM Seminar conducted on 5 December 2008 to reflect practitioners' opinions and ideas. The developed "Fliptation" for CBDRM and handbook is presented in Data Book 5.

Table M.6.1 Main Contents of “Fliptation”

Theme	Main Contents	Page
CBDRM Activities	- Outline of CBDRM Activities - Importance of Knowing Risks in the Community - Community-based Hazard Mapping Activities - Formation of Disaster Management Committee - Disaster Management Drill - Disaster Risk Management Plan	Total 20 pages
Mechanism of Disasters and Disaster Reduction - Volume 1: Flood - Volume 2: Sediment Disasters - Volume 3: Tsunami	- Mechanism of Disasters - Major Historical Disasters in Sri Lanka - Structural Measures to Mitigate Disaster Damages - Non-structural Measures to Mitigate Adverse Impact of Disasters	10 pages for each volume

Figure M.6.1 Developed “Fliptation” for CBDRM (CBDRM/Flood/Sediment Disasters/Tsunami)

The developed “Fliptation” for CBDRM and its handbook is expected to be periodically revised and modified by DMC based on the experiences in their practices of future CBDRM activities.

M.6.2 Seminar for Effective Utilization of the Developed Educational Tool

(1) Objectives of the CBDRM Seminar

CBDRM Seminar for providing more enhanced community activities – sharing experience and know-how of the JICA Study was jointly organized by DMC and the JICA Study Team on 5 December 2008. The main objective of the seminar is to promote more enhanced CBDRM Activities in the disaster vulnerable areas in Sri Lanka.

The seminar was conducted targeting DM Coordinators & Assistant Coordinators and government officers in DS to familiarize basic knowledge of CBDRM and the “Fliptation” to promote CBDRM activities in their own responsible areas by reviewing and considering effective utilization of the “Fliptation”. Total around 70 persons were attended the Seminar including the target participants and some NGO members.

(2) Program of the CBDRM Seminar

The program of the Seminar is as shown in Table M.6.2.

Table M.6.2 Program of CBDRM Seminar

Time	Program
08:30 – 09:00	Opening Ceremony Oil lamp lighting Remarks by Major General Gamini Hettiarachchi, Director General, DMC Remarks by Mr. Ryo Matsumaru, Deputy Team Leader, JICA Study Team
09:00 – 09:30	Introduction of the Seminar - Brief explanation about CBDRM Activities in the JICA Study by Ms. Miki Kodama, JICA Study Team - Introductory presentation of CBDRM by Mr. I.A.K. Ranaweera, (DM Coordinator in Matale), Trainees of CBDRM in Japan
09:45 – 12:00	Session 1: Guide to community-based disaster risk management (CBDRM) activities - Basic outline of "Fliptation for CBDRM" by Ms. Chiho Ochiai, JICA Study Team - Model lectures utilized the "Fliptation" CBDRM by Mrs. Lalani Imbulana, DMC Sediment Disaster by Ms. Kumari Weerasinghe, NBRO - Group Work: Trial lecture utilized "Fliptation" for CBDRM & review
13:00 – 14:00	Session 1 (cont.) Presentation of Group Work
14:00 – 15:30	Session 2: Community-based Hazard Mapping (table-top exercise by group)
15:45 – 17:00	Session 3: Group Discussion "How do you act in case of emergency" using DM Game "Cross Road"
17:00 – 17:30	Closing Session Remarks by Mrs. Lalani Imbulana, DMC Remarks by Ms. Miki Inaoka, a representative of JICA Sri Lanka office

The outlines of the activities in the Seminar are as follows.

1) Session 1: Guide to community-based disaster risk management (CBDRM) activities

The developed "Fliptation" was introduced and reviewed. The participants discussed the contents of "Fliptation" as well as how to effectively use it through model lecture and trial lecture in group work. The group work was conducted in the groups divided based on the most significant disaster in their respective responsible areas.

2) Session 2: Community-based Hazard Mapping (table-top exercise)"

Community-based Hazard Mapping is one of the most important and effective tools for CBDM activities. The participants are in the positions to lead the accurate mapping activities by community. In the session, they deeply learn important tips for hazard mapping and basic technique for mapping by table-top exercise.

3) Session 3: Group Discussion "How you act in case of emergency" using Disaster Management Game "Crossroad"

The disaster management game "Crossroad" was used in the training program conducted in the Study and recognized an effective tool to lead active discussion in the CBDRM activities in Sri Lanka. The session 3 activity was conducted aiming at introducing the tool to the participants for their use in their practices.

(3) Summary of Findings from the CBDRM Seminar

In the introduction session, the participants were exposed to many examples of CBDRM activities conducted under the Study program. The participants could have concrete images of the activities through the presentation used many pictures. Poster presentation to introduce the activities in each of the pilot communities was also helpful for their understanding. In addition, the trainee of the CBDRM training in Japan introduced his finding for good practices in Japan to provide the participants to expand their ideas for CBDRM activities.

Figure M.6.2 Introduction Session (left)/ Poster Presentation of the JICA Study Activities (right)

In the Session 1, the participants were enthusiastically involved in the discussion on the "Fliptation". Many opinions and ideas to improve the "Fliptation" were brought up in the group work. The participants recognized more clearly the concept and process of CBDRM though the model lecture and the discussion. They also learned importance of providing appropriate and proper information on disasters and disaster risk management to the community members and the effective method to deliver such information.

Figure M.6.3 Model lectures using the "Fliptation" of CBDRM (left)/ Sediment Disaster (right)

Figure M.6.4 Group work for discussion on “Fliptation”

In Session 2, the participants had a bit hard time to develop a hazard map in the tabletop exercise. They were requested to draw a map by using house maps, the aerial photos of the areas and technically prepared hazard maps without field survey. At the end of the session, however, each group could manage to make hazard maps of the given communities with the provided data. In the community-based hazard map activities, utilization of local knowledge and field survey are important, however, as a basis for the activities, they need to have more deep understanding of the technical data for mapping.

Figure M.6.5 Table-top Exercise of Hazard Mapping

Disaster management game “Crossroad” in the Session 3 led all of the participants to enthusiastic discussion. Based on the knowledge and past experiences, the participants made intense debate when the opposing opinions were expressed. Through the session, the participants learned various view points for the actions to be taken in case of emergency or for disaster risk management. Similarly they understood the effectiveness to use such a tool for making active discussion and getting all the participants’ opinion.

Figure M.6.6 Active Discussion in the “Crossroad” Game

(4) Review of the CBDRM Seminar

All the activities in the Seminar were smoothly conducted with active participation of the participants. Especially, in the session 1 which discussed the “Fliptation”, the participants expressed constructive opinions and ideas for improvement much more than expected. The “Fliptation” for CBDRM will be finalized by incorporating some significant suggestions after reviewing all of them.

Due to the approaching cyclone on the seminar day, unfortunately some of the expected participants could not attend the workshop owing to stand-by for taking necessary action in case of occurrence of disasters. However, from most of the districts, at least a person participated in the seminar. Sharing the knowledge leaned by the participants in the seminar, it is expected that the CBDRM activities in the country will be more enhanced.