

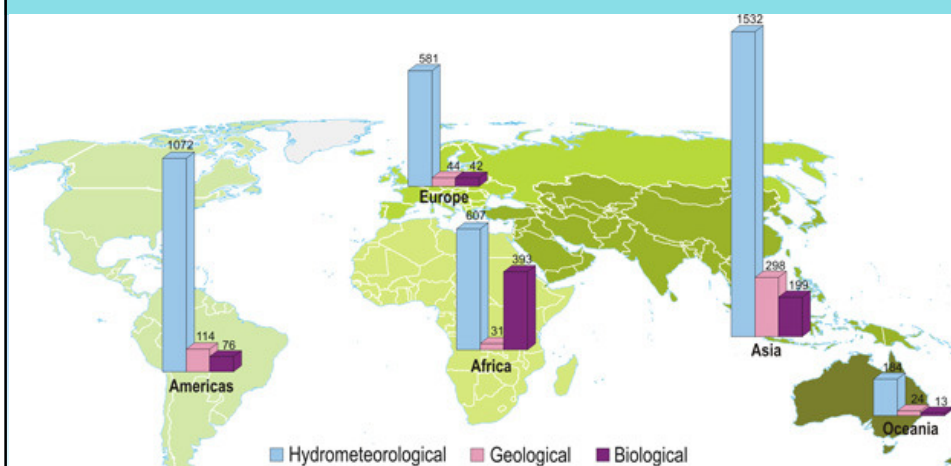


RECENT FLOODS IN SRI LANKA - 2011

Major General Gamini Hettiarachchi (Retd.)
Director General
Disaster Management Centre



Global Occurrence of Natural Disasters



Source : <http://unisd.org/disaster-statistics>





Recent Disasters in Sri Lanka

Key events;

- Floods & Landslides in 2003
- Tsunami 2004
- Floods & Landslides in 2007
- Floods & Landslides in 2008
- Floods & Landslides in 2009
- Floods & Landslides in 2010
- Floods & Landslides in 2011



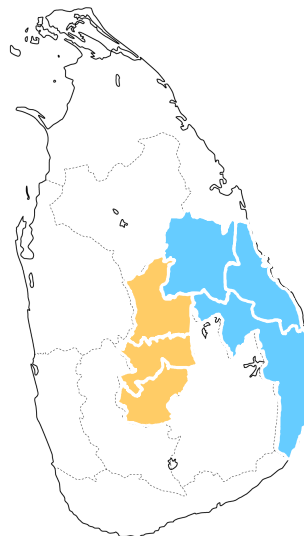
Source : DMC - EOC



Disasters that have occurred in 2011

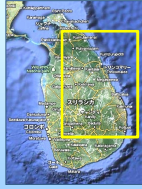
Two disaster events occurred due to heavy rainfall in North East, North Central, Uva and Central Provinces.

- Floods and Landslides
07 – 17 January 2011
- Floods and Landslides :
02 – 11 February 2011

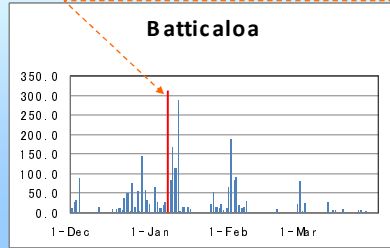


Source : DMC - EOC

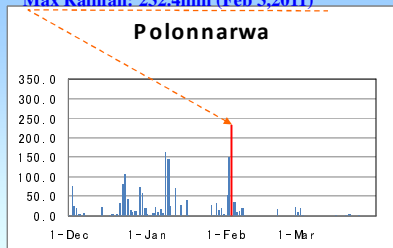
Rainfall Condition



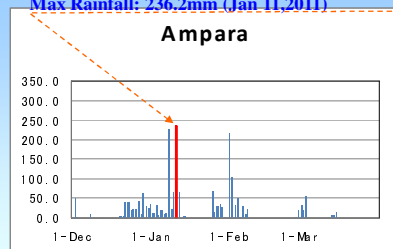
Max Rainfall: 312.2mm (Jan 8,2011)



Max Rainfall: 232.4mm (Feb 3,2011)



Max Rainfall: 236.2mm (Jan 11,2011)



[Source] Department of Meteorology



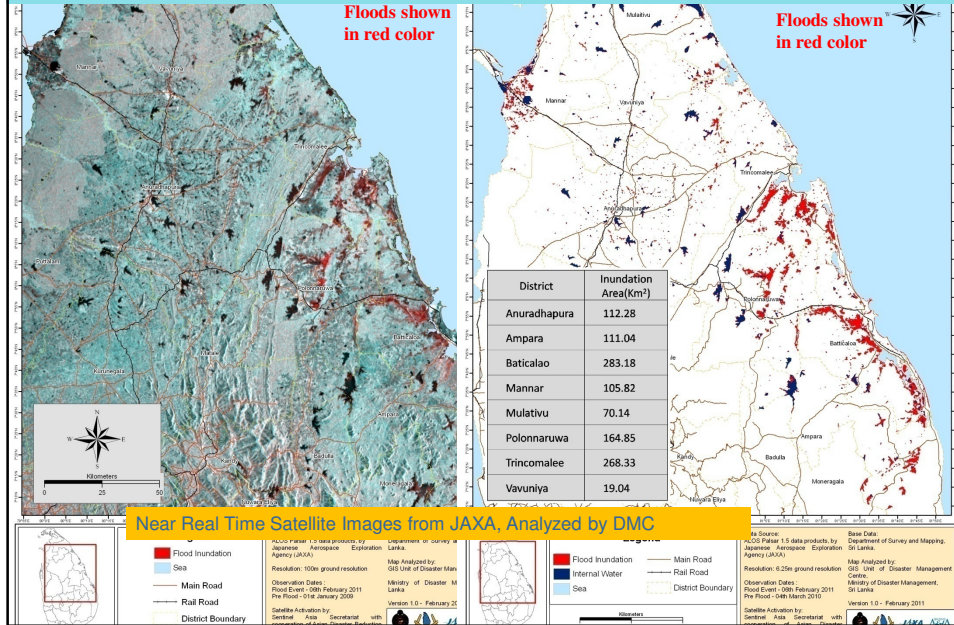
Comparison of rainfall in selected towns during 1st – 20th January and 1st – 6th February 2011 with 30-year average

Town	Total Rainfall 1-20 January (mm)	30 year Average for 1-20 January (mm)	Total Rainfall 1-6 February (mm)	30 year Average for the month of February (mm)
Anuradhapura	199.5	79.2	285.3	55.4
Badulla	443.0	155.2	347.1	103.1
Batticaloa	1195.5	210.3	465.8	128.4
Kurunegala	126.8	56.4	115.0	98.8
Maha Illuppallama	217.6	69.8	230.4	56.8
Pottuvil	496.1	288.4	256.9	163.6
Trincomalee	588.8	115.6	443.1	105.4
Vavuniya	178.6	84.2	286.9	62.5
Mihintale	228.0	95.3	293.1	52.6
Ampara	481.3	239.1	440.2	148.2
Monaragala			174.1	29.0
Polonnaruwa			494.4	82.4

** Source : Department of Meteorology



Flood Inundation Mapping, East and North Central Provinces-2011



Population Affected - 2011

District	January 2011			February 2011		
	Date	Affected		Date	Affected	
		Families	People		Families	People
Trincomalee	15	8479	31910	11	88874	333263
Matale	21	926	3570	11	3348	13141
Anuradhapura	13	2849	11116	6	85000	200000
Polonnaruwa	13	2705	10842	6	6011	21790
Badulla	13	357	1142	9	2589	9660
Vavunia	13	11141	39069	8	9875	25453
Nuwara Eliya	21	111	447	11	694	2480
Kandy	15	541	2643	11	334	1253
Ampara	21	120732	471556	8	81919	312890
Puttalam	15	108	324	6	249	767
Kegalle	13	4	18	6	2	6
Mannar	15	317	1284	7	9990	39948
Monaragala	13	31	118	7	46	198
Batticaloa	13	145131	541688	6	61350	240366
Kurunegala				6	104	399
Mullaitivu	13	498	1500	6	18451	59977
Kilinochchi				7	3733	14895
Rathnapura	15	162	716	8	7	24
GRAND TOTAL		294092	1117943		372576	1276510

Source : DMC - EOC



Deaths and Injured - 2011

District	January 2011		February 2011	
	Deaths	Injured	Deaths	Injured
Matale	0	4	0	7
Polonnaruwa			2	2
Badulla	1	5	2	0
Vavunia	1	0	1	0
Nuwara Eliya	0	6		
Kandy	8	19	1	1
Ampara	11	15	4	3
Monaragala	1	0	0	0
Kalutara			1	2
Batticaloa	22	0	1	0
Rathnapura	0	2		
GRAND TOTAL	44	51	18	24



Source : DMC - EOC



Population Displaced due to Flood - 2011

District	Date	January 2011			February 2011			
		IDP Camp			IDP Camp			
		Nos.	Families	Persons	Date	Nos.	Families	Persons
Trincomalee	13	69	7175	27046	6	176	21220	78510
Matale	13	6	133	560	7	14	425	1755
Anuradhapura	13	20	448	1983	7	128	5038	16480
Polonnaruwa	13	77	2705	10842	6	69	5083	18539
Badulla	13	3	33	129	9	43	944	3596
Vavunia					8	111	10950	41982
Nuwara Eliya	21	1	12	48	9	8	162	559
Kandy	13	10	232	1027	11	27	407	1523
Ampara	13	129	30675	118158	8	23	1026	4029
Puttalam	15	1	68	198	6	5	249	764
Mannar	15	5	308	1245	7	30	4075	14885
Monaragala	12	1	16	61	7	1	40	168
Batticaloa	13	275	42295	165494	6	158	39834	144898
Mullaitivu					6	4	616	2048
Kilinochchi					7	8	238	769
GRAND TOTAL		597	84100	326791		805	90307	330505



Source : DMC - EOC





Housing Sector-2011

District	26 th December 2010 – 14 th January 2011				01 st – 05 th February 2011			
	Houses Damaged				Houses Damaged			
	Fully	Partially	Total	Cost of Damage (Rs. Mn)	Fully	Partially	Total	Cost of Damage (Rs. Mn)
Batticaloa	3118	6441	9559	1911.8	-	-	-	-
Polonnaruwa	723	3186	3909	781.8	22	63	85	17.0
Monaragala	4	100	104	20.8	3	3	6	1.2
Nuwara Eliya	3	108	111	22.2	57	50	107	21.4
Anuradhapura	121	879	1000	200.0	451	2053	2504	500.8
Badulla	27	326	353	70.6	153	1162	1315	263.0
Kegalla	-	7	7	1.4	2	-	-	0.4
Kandy	93	315	408	81.6	96	253	445	69.8
Ampara	1343	4971	6314	1262.8	445	2888	3333	666.6
Vavuniya					920	4471	5391	1078.2
Matale					121	662	983	53.8
Puttalam					8	18	26	5.2
Kurunegala					4	10	14	2.8
Kilinochchi						2709	2709	541.8
Total	5432	16332	21765	4353.00	2492	14342	16818	3363.60



Total Cost of Damage for Housing Sector Rs. Mn 7716.00



Source : Department of National Planning



Agricultural Crops Damages-2011

Flood Damage Paddy Cultivation – January & February 2011		
	Details of the Damage (ha)	Cost of Damage (Rs. Mn)
Maha – January 2011	104,794	10,651.00
Feb 2011	847,613	3849.00
Total	197181	14500.00



Total Cost of Damage for Agriculture Rs. Mn 15070.00

Damage to Other Field Crops, Vegetables & Fruits (ha.) Due to both floods in January & February 2011					
Province	Maize	Chillie	Pulses	Vegetables	Fruits
North	113	169	4,482	633	126
North-East	6,100	377	1,568	1,491	322
North – Central	1,746	2,086	7,600	5,900	415
North Western	32	65	200	13	22
Central	2	58	-	2,962	-
Total Extent Affected (ha)	7993	2755	13850	10999	885
Total Cost of Damage for other field crops Rs. Mn 570.00					



Source : Department of National Planning



Livestock Damages-2011

Damage to Livestock due to Floods during 26th December 2010 – 14th January 2011

Province	District	No of Animals Affected			
		Cattle	Buffalos	Goats	Poultry
Eastern	Ampara	21,000		6,750	125,000
	Batticaloa	65,625	27,125	28,125	153,000
	Trincomalee	9,000	6,250	5,625	11,250
North Central	Anuradhapura	10,000		2,000	
	Polonnaruwa	16,375		2,500	25,000
Northern	Vavunia & Mullativu	2,000		1,500	5,000
Total		124,000	33,375	46,500	319,250
Cost of Damage(Rs. Mn)		1,268	333	235	78



** Source : Department of National Planning

Total Cost of Damage for Livestock Rs. Mn 1922



Damaged Irrigation Schemes-2011

Estimate of Flood Damage Repairs to Irrigation Schemes and Flood mitigation measures, under irrigation Department Assessment by 08th February 2011

District	Details of the damage	Cost of Damage (Rs. Mn)
Ampara	05 Schemes	400
Anuradhapura	36 Schemes	400
Batticaloa	08 Schemes	300
Badulla	10 Schemes	51
Hambantota	09 Schemes	40
Kandy	05 Schemes	17
Kegalle	01 Schemes	1
Matale	07 Schemes	97
Nuwara Eliya	03 Schemes	5
Polonnaruwa	16 Schemes	300
Trincomalee	09 Schemes	250
Monaragala	10 Schemes	55
Kurunegala	05 Schemes	55
Puttalam	06 Schemes	60
Vavuniya	03 Schemes	70
Mannar	03 Schemes	225
Renovation of minor tanks in Island wide flood control & mitigation in the vicinity of major & medium schemes		474
Total Cost of Damage (Irrigation Department)		<u>2800</u>

** Source - Department of National Planning

System	Scheme	Cost of Damage (Rs. Mn)
Mahaweli	System B – Channel System	<u>200</u>
	System L – Channel System	
	System C – Channel System	
	Kala Wewa	
	Dambulla	

Total Cost of Damage for Irrigation Rs. Mn 3000





Damages of Road Sector-2011

Province	National Roads			Provincial Roads		Estimated Total Cost of Improvement (Rs. Mn)
	Damage length (km)	Bridges & Structures	Estimated Cost of improvement * (Rs. Mn)	Damage length (km)	Estimated Cost of improvement (Rs. Mn)	
Central	506	28	9,275	921	190	9465
Eastern	392	31	10,055	408	1,190	11245
North Central	366	2	6,215	296	580	6795
North Western	664	9	7,835	210	359	8194
Northern	588	17		1,140	1,480	1480
Sabaragamuwa	125	10	2,374	46	68	2442
Uva	315	1	8,205	196	2,090	10295
Total	2,955	98	43,959	3,237	5,957	49,916

Note: * - Improvement cost for roads that have been committed for rehabilitation are not include
 ** Source - Department of National Planning



Total Cost of Damage for Road Sector Rs. Mn 49916



Water & Sanitation-2011

District	Damage to Drinking Water Supply – January 2011			Damage to Drinking Water Supply – February 2011			Total Cost of Damage
	Number of wells affected	Pipe borne water system damaged	Cost of Damage (Rs. Mn)	Number of wells affected	Pipe borne water system damaged	Cost of Damage (Rs. Mn)	
Batticaloa	102,591	One pump house	335	64,000		318	653
Ampara	116,944	500m transmission line and a pump house	400	15,000		147	547
Trincomalee	65,562		213			6	219
Polonnaruwa		Bore hole wells and pipe broke down	1	30,000		119	121
Anuradhapura		Bore hole wells	1				
Matale						15	15
Kandy						100	100
Nuwaraeliya						15	15
Kurunegala						1.5	1.5
Mannar				1,000		19	19
Vavuniya				1,000		19	19
Total	285,097		950	111,000		760	1710

Source : Department of National Planning



Total Cost of Damage for Drinking Water Supplies Rs. Mn 1710

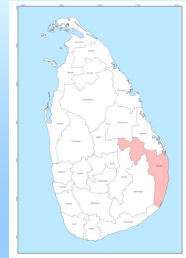




Ampara District



Population Displaced
- 122187



Batticaloa District



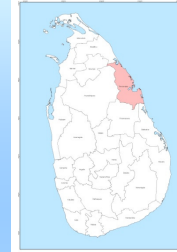
Population Displaced
- 310392





Trincomalee District

Population Displaced - 105556



Trincomalee District



Roads damaged by floods, Trincomalee District





Polonnaruwa District

Population Displaced - 29381






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Water level of Parackrama Samudraya




මුද්‍රිත ඉංග්‍රීසි භාෂාව, ඉංග්‍රීසි භාෂාව
Polonnaruwa – Batticaloa main road has submerged

Anuradhapura District

Population Displaced - 18463










Vavuniya District



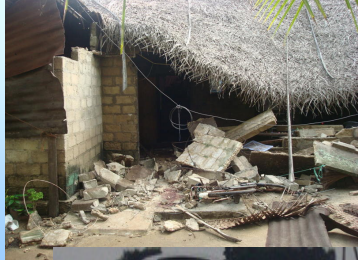

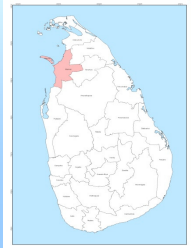
Population Displaced - 41982





Mannar District

Population Displaced - 16130





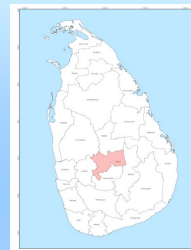
Matale District



**Houses Damaged
(Fully) due to
landslide - 121**



Kandy District land slides - 2011



**Houses Damaged
(Fully) due to
landslide - 189**





Cause for Recent Flood

- High intensity rainfall
- Unauthorized land filling and illegal construction in reservations and low lying areas
- Due to problems in Drains
 - Drains available only for few areas
 - Lack of maintenance
 - Narrow drains
 - Unauthorized constructions on drains etc.,
- Due to problems in canals
 - Narrowing canals
 - Inadequate outlets
 - Lack of Reservations
 - Lack of maintenance
- Decrease of retention capacity in Wetlands
 - Due to Siltation
 - Unauthorized filling
- Increase of Run-off due to built up areas
- Urbanization



Progress of urbanization heighten the risk of flood on low grounds

▪ After Development

Since surface has been covered by concrete or asphalt, and forests and paddy fields have disappeared, water flow to downstream has increased: the risk of flood damage in low grounds will increase.

▪ Before Development

Most of rainwater is infiltrated into the ground or reserved in paddy fields: the flow into the downstream is controlled.





Activities Carried out by the DMC during flood situation - 2011

- Coordinated emergency response and relief activities.
- Sent District Disaster Management teams with vehicle to Ampara, Batticaloa, Polonnaruwa, Anuradhapura, Trinco and Vavunia Districts Secretariat to assist and coordinate response activities.
- Coordinated with Police, Army, Navy, Air Force to carryout emergency rescue operations.
- Coordination and distribution of food and relief items.
- Monitoring IDP Centres
- Provided boats with OBMs, Water purification plants and Chainsaws, etc.,
- Preparing daily Situation Reports and monitoring incidents of districts and obtaining incident reports.



Emergency Responders

- Local Authorities
- Volunteer groups
- Police / Civil defense
- Red Cross / NGO
- Military (Army / Navy/ Air force)





Tri Forces & Police Contribution for Recent Floods - 2011

- Conducted search & rescue operations
- Assisting in establishing IDP camps and monitoring them.
- Providing rescue teams with Boats.
- Providing Rations to people in IDP centers and isolated villages.
- Distribution of Food and relief items.
- Providing Medical support & First Aid.



Tri Forces & Police contribution for Recent Floods - 2011

- Assisting in road/ culvert repairs
- Deployment of Helicopters for distribution of relief items/Dry Rations and rescue people
- Providing communications and transport
- Providing information on flood levels in the areas





Allocations Provided for Relief 01-01-2011 to 15-03-2011

Districts	Allocations(Rs. Mn)
Ampara	112.5
Anuradhapura	95.6
Badulla	10.3
Batticaloa	140
Colombo	0.042
Hambantota	10.7
Jaffna	0.698
Kandy	18.8
Kegalle	1.064
Mannar	26.1
Matale	10.5
Matara	1
Killinochchi	5
Monaragala	3.22
Mullativu	6.42
Nuwaraeliya	4.5
Polonnaruwa	26.5
Trincomalee	127
Vavuniya	33

Total Allocations
Rs (Mn.) = 632.94

Prepared by : National Disaster Relief Services Centre(NDRSC)



Relief Coordination - 2011





Support flood assessments and flood damage information system for the districts affected by 2011 floods. This includes;

- Develop high resolution maps to reflect the flood damage in Eastern and North Central Provinces
- Train District Level Officials of the respective sector agencies to carry out disaster damage and loss assessment



Questioning the Grama Niladri on the flood Damage - Anuradhapura



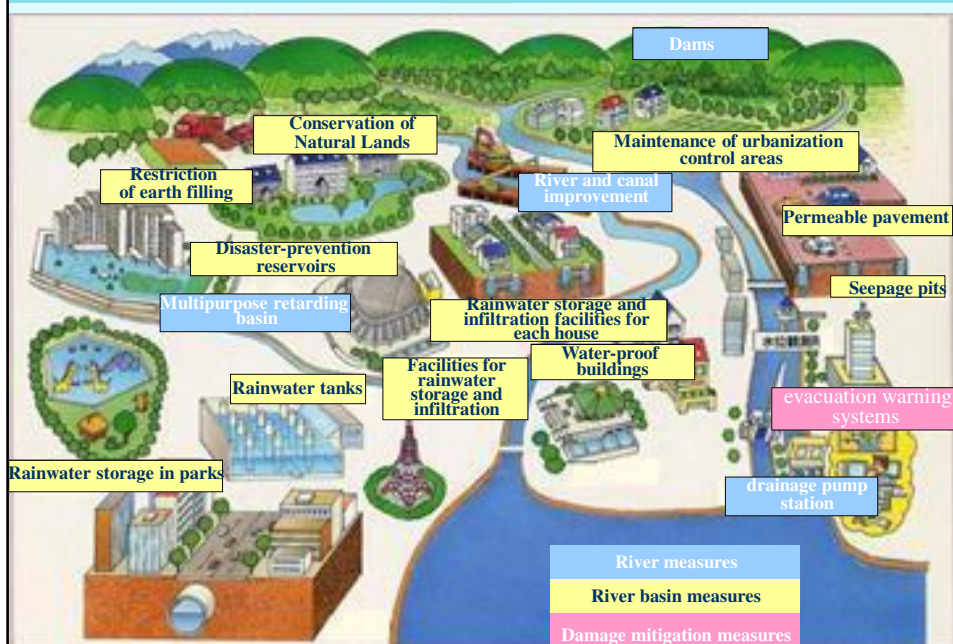
Road Damage



House Damage



Integrated Flood Management in a River Basin





Thank You

