

Flood and Sediment Management in Philippines in View of Cooperation

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Integrated River Management in DPWH

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Annual Damage

Year	Population Affected		Causalities			House Damaged		Damage Value* (mil. Peso)
	Families	Persons	Dead	Missing	Injured	Totally	Partially	
1984	741,510	4,048,805	1,979	4,426	732	310,646	313,391	416
1987	464,162	2,591,914	1,020	213	1,455	180,550	344,416	8,763
1991	150,894	759,335	5,201	4,278	357	15,458	83,664	74
1995	1,710,619	8,567,666	1,255	669	3,027	294,654	720,502	57,781
1996	260,581	1,254,989	124	49	97	2,690	17,557	10,109
1997	777,997	3,954,175	199	28	66	13,225	53,980	4,842
1998	1,590,905	7,197,953	498	116	873	137,020	406,438	17,823
2000	1,426,965	6,852,826	338	59	370	24,573	195,536	7,217
2001	756,938	3,629,295	431	134	418	14,899	54,422	6,924
2006	724,405	3,625,839	440	219	744	4,486	853	21,106
2007	891,694	4,287,783	871	94	1,457	9460	22,853	4,592
2008	1,997,547	9,935,009	1,704	818	2,091	139,837	569,512	23,513
Total	20,069,999	84,602,604	19,609	13,551	20,272	1,992,414	5,568,456	247,820

Previous Impactful Typhoons

Tropical Disturbance	Date of Occurrence	Casualties			Damages
		Dead	Missing	Injured	Php million
T Ruping		508	246		
TS Uring	1991	5,101	1,256	292	
T Rosing	Oct 31 -	936	316	4,152	
TD Winnie	Nov 28-30, 2004	821	417	400	
T.Myrenyo	Sep. 17, 2006	184	47	536	
T.Remin	Nov. 28-Dec.1, 2006	734	762	2,360	
T.Frank	June 21-, 2008	557	87	826	
T Ondoy	Sep. 26, 2009	420	37	540	11,162
T Pepeng	Nov. 7-9, 2009	489	184	49	16,553

Year	Agency	Japanese Grant Aid Project	Amount (million Yen)	Status
1972	PAGASA	Flood Forecasting and Warning System in	80	Completed
1977	UP	Strengthening of National Hydraulic	60	Completed
1980	PAGASA	Rehabilitation of Flood Forecasting and Warning System in	21	Completed
1981	PAGASA	The Project for Improvement of Flood Forecasting and Warning System in the Pampanga River Basins		Completed
1989	DPWH	Retrieval of Flood Prone Areas in Metro	1,231	Completed
1991	DPWH	Equipment for Hazard Urgent Mitigation	1,455	Completed
1992	DPWH	Retrieval of Flood Prone Areas in Metro (II)	1,254	Completed
2000	PAGASA , DPWH	The Project for Improvement of Flood Control and Warning system in Metro Manila		Completed
1997-2001	DPWH	Flood Mitigation in Ormoc City (I) & (II)	3,255	Completed
2000	DPWH	Rehabilitation of Flood Control Operation and Warning System in Metro	1,048	Completed
2002	DPWH	Construction of Hydraulic	794	Completed
2002-2010	DPWH	The Project for Strengthening of Flood Management Function of DPWH http://www.jica.go.jp/project/philippines/0600933/english/		On-going
2007-2009	PAGASA	The Project for Improvement of Flood Forecasting and Warning System in the Pampanga and Agno River Basins: Phase I		Completed
2009-	DPWH	Camigine Disaster prevention project		On-going
Total		13 Projects	(9,198)	

Year	JICA Development Study Project	Status
1979-1982	Pampanga Delta Development Project	Completed
1982-1983	Re-study of Mayon Volcano Sabo and Flood Control Project	Completed
1983-1986	Panay River Basinwide Flood Control Study	Completed
1985-1987	M/P Study on the Cagayan River Basin Water Resources Development	Completed**
1987-1990	Study on Flood Control and Drainage Project in Metro Manila	Completed
1988-1991	Study of Agno River Basin Flood Control Project	Completed
1989-1991	Study on Ilog-Hilabangan River Basin Flood Control Project	Completed
1992-1995	The Study on Flood Control and Mudflow Control for Sacobia-Bamban/ Abacan River Basin Draining from Mt. Pinatubo	Completed
1996-1997	The Study on Sabo and Flood Control in the Laoag River Basin	Completed
2000	The Study on Comprehensive Disaster Prevention Around Mayon Volcano	Completed
2000	The Study on Existing Drainage Laterals in Metro Manila (LDSP)	Completed
2000	The Feasibility Study on Lower Cagayan River Flood Control Project	Completed
2002-2003	The Study in Sabo and Flood Control for Western River Basins of Mount Pinatubo	Completed
2003	Basic Study on Disaster Prevention & Reconstruction Project for Camiguin Island, Mindanao (LDSP)	Completed
2003	Study on Drainage Improvement in Core Area of Metropolitan Manila	Completed
2006-2008	The Study on the Nationwide Flood Risk Assessment and the Flood Mitigation Plan for the Selected Areas	Completed
2007-2008	The Study on Comprehensive Flood Mitigation for Cavite Lowland Area	Completed
2008-2009	Basic Design Study on the Project for Flood Disaster Mitigation for Camiguin Island	Completed**
2009	Preparatory Study for Sector Loan on Disaster Risk Management in the Phils.	On-going**

L/A Date	Agency	JICA(OECF,JBIC) Loan Project	L/A Amount (million Yen)	Status
03/23/1973	PAGASA	Flood Forecasting and Warning System in Pampanga River Basin	3,028	Completed
08/01/1974	DPWH	Flood Control Dredging Project in the Pampanga, Bicol & CoTabato River Basins	3,187	Completed
09/09/1975	DPWH	Pasig River Flood Control Project	5,112	Completed
01/04/1978	PAGASA	The Flood Forecasting Systems Project	1,774	Completed
11/09/1978	DPWH	River Dredging Project (II)	2,429	Completed
05/31/1982	DPWH	Lower Agusan Development Project (ES)	330	Completed
05/31/1982	PAGASA	Flood Forecasting and Warning System for Dam Operation Project	3,600	Completed
09/09/1983	DPWH	Nationwide Flood Control Dredging Project (Telemetry)	1,140	Completed
05/07/1984	DPWH	Metro Manila Drainage System Rehabilitation Project	3,012	Completed
05/30/1986	DPWH	Pampanga Delta Development Project (ES)	705	Completed
05/30/1986	PAGASA	Flood Forecasting and Warning System for Dam Operation Project (II)	3,988	Completed
01/27/1988	DPWH	Metro Manila Flood Control Project (II)	10,818	Completed
01/27/1988	DPWH	Small Water Impounding Management Project	3,193	Completed
01/27/1988	DPWH	Lower Agusan Development Project, Stage I, Phase I	3,372	Completed
02/09/1990	DPWH	Pampanga Delta Development Project, Flood Control Component (I)	8,637	Completed
02/09/1990	DPWH	North Laguna Lakeshore Urgent Flood Control & Drainage Project (ES)	454	Completed
08/30/1995	DPWH	Agno and Allied Rivers Urgent Rehabilitation Project	8,312	Completed
03/29/1996	DPWH	Mt. Pinatubo Hazard Urgent Mitigation Project	6,911	Completed
03/18/1997	DPWH	The Metro Manila Flood Control Project West of Mangahan Floodway	9,411	Completed
03/18/1997	DPWH	Lower Agusan Development Project (Flood Control Component - Phase II)	7,979	Completed
09/10/1998	DPWH	Agno River Flood Control Project (II-A)	6,734	Completed
12/28/1999	DPWH	Pasig-Marikina River Channel Improvement Project (ES)		Completed
12/28/1999	DPWH	Mt. Pinatubo Hazard Urgent Mitigation Project (II)	9,013	Completed
04/07/2000	DPWH	KAMANAVA Flood Control and Drainage System Improvement Project	8,929	On-Going
05/30/2001	DPWH	Laoag River Basin Flood Control and Sabo Project	6,309	On-Going
05/30/2001	DPWH	Agno River Flood Control Project (Phase II-B)	2,789	On-Going
03/28/2002	DPWH	Iloilo Flood Control Project (Stage I)	6,790	On-Going
02/27/2007	DPWH	Pasig-Marikina Phase II (Pasig River Improvement)	8,529	On-Going*
Total		28 Projects	137,504	

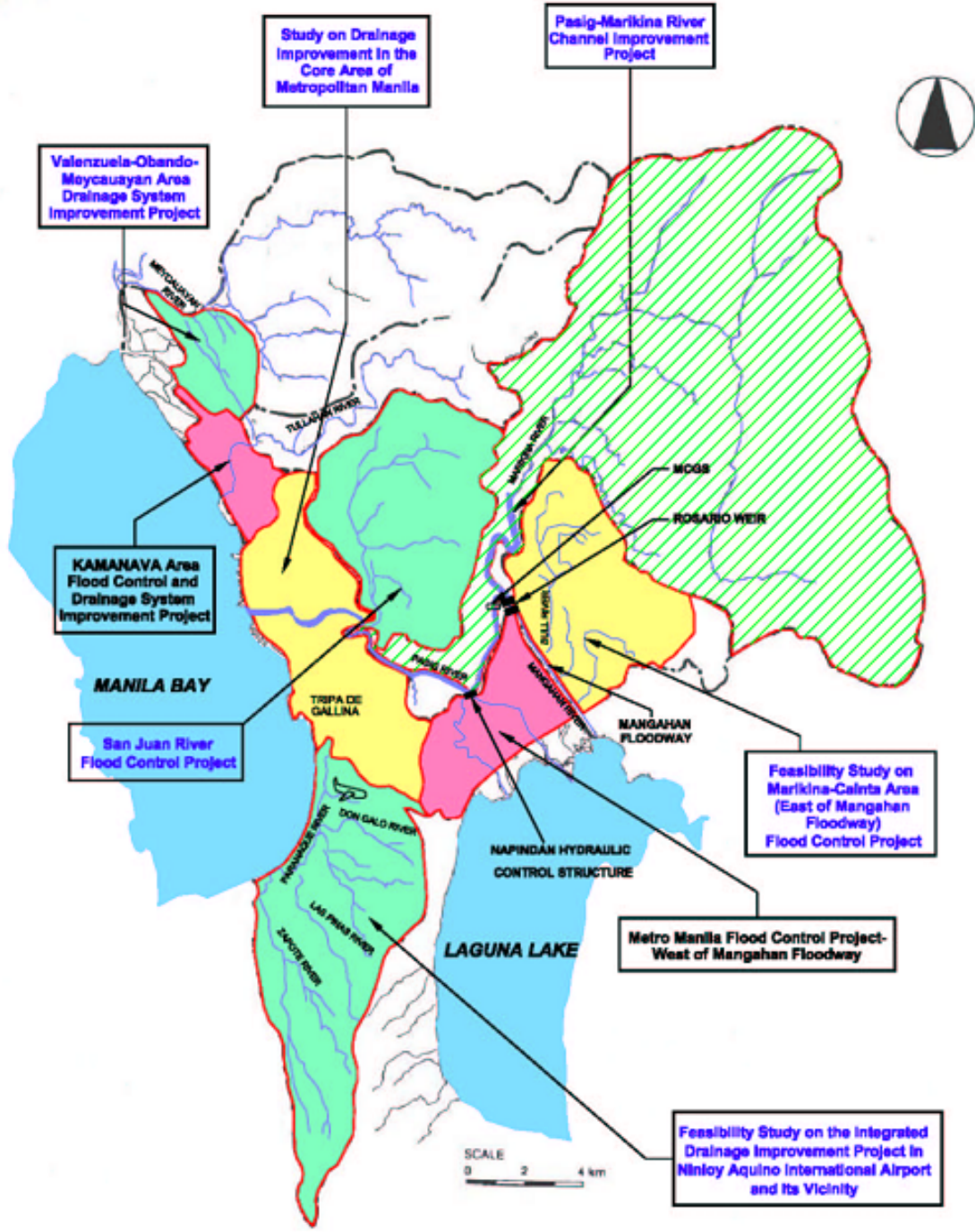
Name of River or Area	Return Period	Design Discharge m ³ /sec	Catchment area Km ²	Specific Discharge: q (m ³ /sec)/ Km ²
Laoag	1/25	11,200	1,332.1	8.41
Agno	1/10	6,410	5,910	1.08
Pampanga delta flood way	1/20	3,800 – 4,300		
KAMANAVA	1/30: river 1/10: drainage	450	18.5	
Pasig-Marikina	1/30	2,900	500 (Sto.Nino)	5.8
Mangahan Flood way	1/30	2,400		
Iloilo	1/20: rivers (1/50) 1/5: drainage	1,000 (1,400)	412	2.4 (3.4)
Agusan	1/25	8,010	10,621	0.754
Ormoc	1/50	610	25.2	24.21

History of Flood Control in Metro Manila

1. 1942 – The first Study was undertaken after the flood in November 1942
2. 1947 – 1952 The Study resumed after the Battle of Manila. The Study covered North Manila Watershed (2,176 has) and South Manila Watershed (2,908 has)
3. 1975 The study for Paranaque Spillway and Pasig River Cut-off, Development of Laguna Lake were done by World Bank
4. 1974- 1978 OECF, Construction of first 7 pumping Stations (Pandacan, Aviles, Quiapo, Valencia, Tripa de Gallina, Sta. Clara & Paco) 2 Independent Floodgates and 4 Drainage Mains.
 - OECF Loan – Const. of Mangahan Floodway.
 - ADB Loan – Napindan Hydraulic Control Structures
 - Const. of additional 5 Pumping Stations (Libertad, Makati, Binondo, Balete & Escolta), 3 Independent Floodgates and 3 Drainage Mains.

History of Flood Control in Metro Manila

5. 1984 – World Bank – Metro Manila Integrated Urban Drainage and Flood Control Master Plan
6. 1988-1990 – JICA – Study on Flood Control and Drainage Project in Metro Manila Priority Areas for Implementation:
 - a) Malabon- Navotas – Valenzuela- Caloocan (KAMANAVA)
 - b) Pasig-Marikina River System Impvt. Project
 - c) Taguig-Pateros-Pasig-Cainta-Taytay Area (West of Mangahan Floodway)
7. Aug. 16, 2002 – the operation and maintenance of all Flood Control Facilities and Drainage Structures were turned over to MMDA which they readily accepted.



AREA COVERED BY THE PROJECTS IN METRO MANILA

What for future ?

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